

Delimitation of Urban Fringe Area of Jodhpur City

Abstract

This research paper makes an attempt to clarify the conceptual framework of the urban fringe and to delimit the fringe area of Jodhpur a growing class I city of north-west India. Occupational structure and demographical determinants have been taken two determinants for delimiting the urban fringe of Jodhpur city.

Keywords: Conceptual Framework, Urban Fringe, Occupational Structure, Demographical Determinants.

Introduction

The most cities of India are dynamic human artefacts and have a rich fringe area which is transitional belt between urban and rural area. Jodhpur is a beautiful ocious city in the western Rajasthan. It is also known as blue city or Sun City. Jodhpur is the second largest district of Rajasthan founded by Rao Jodhaji in 1459 A.D. Jodhpur city is located between latitude 26°15' N to 26°20' N and longitude 73°0' E to 73°4' E. The standard urban area of Jodhpur Municipal Corporation town is 209.31 km² comprising 78.60 Sq. Km area of urban component and 130.71 km sq. area of rural component. Jodhpur Development Authority region extends into 253.94 Square Kilometre. The Jodhpur Urban/Metropolitan area includes Jodhpur, Kuri Bhagtasani, Mandore Industrial Area, Nandri, Pal Village and Sangariya. The Fringe area of the city comprises sequences of sandstone and shales belonging to Jodhpur Group of Marwar Super Group resting uncomfortably These area have no specific boundaries because its boundaries are timely changeable and not constant. But these are defined its character. A study of the available literature reveals that most of the studies appeared during the period from the mid-1940s to the beginning of 1970s, in which attention was focused mainly to the physical delimitation, identification and the defining features of the rural-urban fringe. the word urban fringe has been firstly used by socialist T.M Smith (1937) to describe built-up area just outside the corporate limits of the city. It is very clear that the fringe area can better be identified in terms of land use than in any other way.

Reviews of Literature

In continuous to the research articles quoted above, there are some more articles that define delimitation of urban fringe U.Singh (1966) and K.K Dube (1976) have delimited the urban fringe of KAVAL town by superim-potisation of a series of maps covering several geographical factors .i.e. built up area and house type and types and pattern of streets , occupational structure , site for large institutional and industrial establishments, presence of line and bricks and limits of essential services etc. thus they find that the outer limits of the primary fringe generally coincide with the municipal limits while the outer limits of secondary fringes more or less coincides with the regulated area of these cities. Alam, S.M. 1972 researched on the impact of the delimitation of Hyderabad city on the bases of newspaper, higher education, bus services and impact of rail transportation, availability of vegetables, milk and fruits. Jothimani (1997), took three major metropolitan cities of Ahmedabad, Vadodara and Surat in Gujarat to delineate major urban land use classes using topographical maps and IRS-LISS II satellite data. He delimited the sprawling suburbs and identified the zones of growth as well as the emerging suburban land uses such as developing industrial/residential cluster and dynamism in rural fringe agricultural areas. These help in identification of typical land use zones and their territorial extent.

Determinants of Delimitation of Urban Fringe

The city is the largest urban centre in terms of the areal coverage and population size and is experiencing the highest growth rates among other urban centres in the western part of State. As a result of rapid growth of population, the Jodhpur city spills over the surrounding area and causes



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frequent changes in the urban limits of the fringe. The urban fringe belt of Jodhpur city fluctuates and continues shifting outward from the city on account of diffusion of urban activities in the surrounding villages. For delimitation of urban fringe of Jodhpur city, two sets of determinants have been selected which are spatial and partly occupational and demographic determinants

Spatial Determinants

Area of Further Extension of the Town

There is little possibility of the physical extension of the city in the adjoining west and north - west parts of Jodhpur city because of highly dissected hills and as a result there of the extension of build-up area along Jodhpur to Jaisalmer road which runs in this direction is negligible.

After Study of Fringe Area of Jodhpur city That the development rate of all parts of city area is not equal and The Urban facilities is more concentrate in middle part of city. But when we go to outer side of city, It has been decreasing and It is also changing level of Urban facilities. In the study area urban development is growing on main Road and Railway Line like Finger type. There is a stablishing residential building and some Industrial unit's beacause of increasing Jodhpur Muncipal Corporation's boundry, extention of urban facilities, broadly use of Motorwehical for trade and commercial work and other development activities. Main development of urban fringe has been seen in the direction of South, South-West, North and North-East. Ralawas, Basani Karwar and Daijar settlements are on National Highway 65 in North and Jaliwal Kurti, Khokharia, and Nandri are on Jodhpur-Jaipur Railway marge and in South-West Chaupasani and Barli Ner and in South Direction, Basani Silawatan, Bornada Industrial Area, Narnadi and Pal Gaon on National Highway 112, Adarsh Nagar, Sangaria Mogra khurd and mogra kala are on National Highway 65, Salawas and some other settlements are on Jodhpur-Barmer-Pali Railway marge *et.c*

For the same area this ratio decreases with fragmentation but in our case urban area is increasing from year to year. From year 1880 to 1927 urban areas where developed in patches, which resulted in more perimeter in comparison to increase in area and hence lowering in the value of ratio is observed. Similar situation was observed during 1880 to 1927. City experienced growth in North-East and south and South-West directions. Industrial areas were developed during this period. Many residential colonies came on Chopasni road which runs in North-North-East of the city. Areal spread did not increase much between 1990 to 1997 but the density of construction in already acquires areas increased. During 1997 to 2005 Jodhpur experienced further development in South and South-East direction. Sprawl development in Jodhpur was initially in the form of low density continuous sprawl in year 2011.

The study to map out the status of land use of Jodhpur city between 1971, 2001 and 2013 that has taken place in this status particularly in horizontally and vertically also, so as to predict possible changes that might take place in this regard

in the next 18 years. During analysis of land use change detection in Jodhpur city, it was observed that the parts of Jodhpur city have experienced more quantitative and qualitative change regarding land use.

The existence of a military Cantonment lying in the east of Jodhpur city acts as a strong cultural barrier for the physical expansion of the town in this direction. Similarly, the plain land without any physical obstacle flowing in the south, south-east, east and north-east of the city restrains the expansion of the city. Due to these factors, the development of the city along national highway 112 and 65, running in South-east and east direction is little marked. On the other hand, with favorable geographical and economic factors the city is growing very fast towards south, south-east, east and north-east and most of the future development of Jodhpur city is expected to take place in these directions. Some of industries are developing fast in a ribbon type manner on two highways and railway, running in these directions due to availability of better infrastructure for industrial growth in the from the linkage and accessibility, suitability of land, etc. Industrial development is comparatively faster on national highway 112 where some industrial hub. The existing land use pattern map reveal a mixed use of land with brick-kilns dotted along roads in plenty in the west, north-west and the north outside the city limit. Most of the villages on NH 112 and 65 are well connected with minor roads and are easily approachable.

Under the impact of these factors the area having strong interaction with the city is slightly linear with respect to the existing location of the city. The boundary of the urban fringe coincides with these developments. Hence, the southern fringe is extended up to 15 kilometers from the city centre, while it is hardly up to 7 kilometers in the western and northern part.

The two sets of indices/determinants for delimiting the urban fringe of the Jodhpur city are as follows:

Occupational Structure

1. Ratio of non-agricultural workers

Demographic Determinants

2. Density of population
3. Sex ratio
4. Literacy rate

Occupational Structure

Ratio of Non-Agricultural Workers

In fact, a high percentage of non-agricultural workers in the working force of the rural areas are an approximate measure of urban influence. This particular group is composed of the persons engaged in household and manufacturing industry, In case of Jodhpur's fringe the mean percentage of rural workers engaged in non agricultural occupation to the total workers comes near 52.40%. For further grading of the intensity of this factor Standard Deviation (SD) methods seems to be helpful. Considering this mean + 1SD is being taken as the lower mark for fixing the outer limit of the urban fringe. Further, in the urban fringe, village having mean + 1 SD to 3 SD's values are termed as secondary fringe while village having

more value than this have been classified as primary fringe, as they show a higher degree of urban character.

For the grading of intensity of this determinant the standard deviation method has been adopted. Considering this, the mean percentage of non-agriculture workers has been taken as lower limit for delimiting the rural- urban fringe of Jodhpur city. Villages, showing value in between average 52.40% and average +1 S.D. (52.40%+28.32%) fall within the rural fringe of the city. With regard to delimitation of urban fringe, the villages having average +1S.D. to +3S.D. (80.72 %-84.96%) values have considered in primary or urban fringe, as they show high degree of urban character

When plotted on the map, the distribution of non-agricultural activities shows an extension towards the south, south-west, south-east, north and east. This extension is more along the roads and railway lines which provide the facility to commuters to enter the city daily for various purposes. The western part, with least accessibility shows a weaker influence.

Table 1: Range of Values for Demarcating Ratio of Non- Agriculture Workers

S.No.	Categories	Range of values
1.	Primary/Inner Fringe	Mean +1 S.D to Mean +3 S.D (80.72% - 84.96%)
2.	Secondary/Outer Fringe	Mean to Mean +1 S.D (52.40% - 80.72%)

Source: Calculated by Scholar on the base of Census 2011

The above mentioned indicators reveal that Jodhpur city enjoys a wide range of interaction not only with its surrounding area but also highly with the whole region. A city acts as a functional centre, providing the employment not only to the residents of the city but also to those who reside in its vicinity. As a city grows the demand for service increases, with the result the people reside in the surrounding area of city found increasing employment industry, manufacturing industry, construction trade and commerce, transport, storage, communication and other services. The average rural and urban average has stood at This zone has Ralawas, Basani Karwar, Daijar, Desooriya Vishno, Jaliwal Kurti, Khokharia, Nandri, Uchiyada, Alakhara, Jhalamand, Adarsh Nagar, Sangaria, Mogra, Salwas, Basani Silawatan, Bornada Industrial Area, Narnadi, Pal Gaon, Chaupasani ,Barli Ner, Fidusar and some other small settlements etc. are some of the important milk producing centers. Small farmers and live stock breeders daily brought milk to the city early in the morning.

Demographic determinants Population Growth

The fringe area of Jodhpur city has also experienced a high growth rate of population from 1981 to 2001. The average rural and urban limits of population growth from 1981 and 2001 are recorded at 55.82 percent and 74.38 percent respectively. The villages with the growth rate equal or more than urban average have considered delineating the inner

boundary fringe out of the total settlements, 49.03 percent of villages fall in this range. Similarly the villages with the growth rate less than rural average are considered to demarcate the outer fringe boundary and account 26.94 percent of settlements as outer fringe. While as the villages with the average in between the rural and urban limits are considered to demarcate the rural urban fringe boundary accounting 24.03 percent of settlements.

Population Density

Due to the high population density within the city, this leads to counter urbanization to the adjacent area of the city and results in the increase in the density of population. It is the strong demographic indicator for demarcation of rural urban fringe. In other words we can say that the density of population decreases with the increase in distance from the city.

The population density, therefore, in the surrounding villages of the city gets increased. The mean rural density of the region is 499 persons per sq. km. (Census of India 2011). This average density has been taken as the lower mark for fixing the outer limit of the urban fringe. Further, villages under study are showing heterogeneity so far as their population density is concerned due to which the standard deviation is as high as 733.84

The villages with average + 1 S.D are taken as peripheral area of rural-urban fringe. Further, villages having mean + 1 S.D to + 3 S.D are taken as inner or urban fringe, as they show high degree of urban character.

Table 2: Range of Values for Demarcating Population Density Zone

S.No.	Categories	Range of values (persons per sq.kms)
1.	Primary/Inner Fringe	Mean +1 S.D to Mean +3 S.D (1233-2202)
2.	Secondary/Outer Fringe	Mean to Mean +1 S.D (499-1233)

Source: Calculated by Scholar on the base of Census 2011

Literacy

Literacy is a powerful indicator of development and it reflects the level of modernization of people. It is an important indicator to analyze the urban influence on fringe area. Naturally the villages in the vicinity of a city are having more literacy rate than their counterparts. The highly educated society of the city affecting and transforming the traditional and old living style of the villages. The surrounding area is gradually changing in literacy pattern of all age groups. The total rural literacy average for fringe area is 56.86%. The average literacy has been taken as the lower mark for fixing the outer limit of urban fringe. For further grading of the intensity of this factor standard Deviation (S.D) methods seems to be helpful. Considering this villages with average + 1 S.D (56.86+9.69) i.e. 66.55% of literacy are taken as peripheral areas of rural – urban fringe. Further, the villages having mean + 1 S.D (56.86+9.69) to mean +3 S.D (56.86+29.07) are taken as inner or urban fringe, as they show a high degree of urban character.

Remarking An Analisation

Further, the villages having mean + 1 S.D (56.86+9.69) to +3 S.D (56.86+29.07) are taken as inner or urban fringe, as they show a high degree of urban character.

Table: 3 Range of Values for Demarcating Literacy Zone

S.No.	Categories	Range of values
1.	Primary/Inner Fringe	Mean +1 S.D to Mean +3 S.D (66.55% - 85.93%)
2.	Secondary/Outer Fringe	Mean to Mean +1 S.D (56.86% - 66.55%)

Source: Calculated by Scholar on the base of Census 2011

Sex Composition

The sex ratio (female / 1000 males), another effective demographic variable, A urban zonal level of the sex ratio indicates continuous increase as one goes far from the city. Keeping this view in mind, villages having value of mean (860) to mean -1 S.D (860-171) are taken as outer or secondary fringe. Further the villages with mean -1S.D to mean -3 S.D (860-513) females per thousand of males reveal primary or urban fringe character.

Table 4: Range of Values for Demarcating Sex Ratio Zone

S.No.	Categories	Range of values (females per thousand of males)
1.	Primary/Inner Fringe	Mean -1 S.D to Mean -3 S.D (689-347)
2.	Secondary/Outer Fringe	Mean to Mean -1 S.D (860-689)

Source: Calculated by Scholar on the base of Census 2011

Fringe Extent and Form of Urban Fringe of Jodhpur city

All those villages which have fulfilled at least any three of the above indices and which are contiguous to the city have been included in the urban fringe of Jodhpur city. Towards the inner side (or city), it merges into the city and towards the outer side it grades into the peripheral rural areas. In fringe area the villages, which have attained at least any three of

the indicators and lie adjoining to the city, have been considered to determine the urban fringe of Jodhpur city. Thus, the extension of urban fringe begins from the Municipal corporation boundary and reaches up to the rural tangential areas.

On the basis of this process the urban fringe zone of Jodhpur city may be classified into two groups which are inner and outer fringe (map no. 1)

Inner or Primary Fringe

The primary fringe exists just beyond the municipal boundary of the city and is highly urbanized. This zone is more urban and less rural in character and the major occupation of this zone is the production of goods which are in demand for the city such as vegetables, fruits, dairy products and eggs etc. This zone is undergoing a transformation process in terms of their physical, occupational and demographic structure at a much more rapid rate than the villages beyond this zone. This zone is also characterized by unplanned growth of the built up area associated with lack of sewage and other urban amenities which ultimately give rise to various problems at the margin of city. Its extension is between 7.5 to 15 Kilometres around the main urban boundary. There is rapidly development of urban facilities and activities. It is continuously spreading built up area which have difference in width and mainly extended on Road and Railways. There is found all facilities (*like* Electricity, Telephone, Water Supply pipe line.) which are found in Urban settlement. There are some settlement which comes in this belt *like*, Daijar, Barliner, Desooriya Vishno, Khokharia, Jhalamand, Pal Gaon,. Uchiyada, Alakhara, Sangaria, Nandri, and jajiwal kurti.

Outer Fringe

The secondary or outer fringe starts beyond the outer boundary of the primary fringe. The built up area in this outer zone is discontinuous, percentage of agricultural land is relatively high, marketing facilities are partially available. There is no physically clear cut boundary between these two zones, but both are interrelated and interconnected. There is slow development of Urban facilities and activities compare to Inner Fringe. It is mainly rural characteristic fringe. There are some settlement which comes in this belt *like*, Ralawas, Basani Karwar, Mogra kurd, Mogra kalan, Salawas, Basani Silawatan, gura vishnoi, and Narnadi, (map no.2)

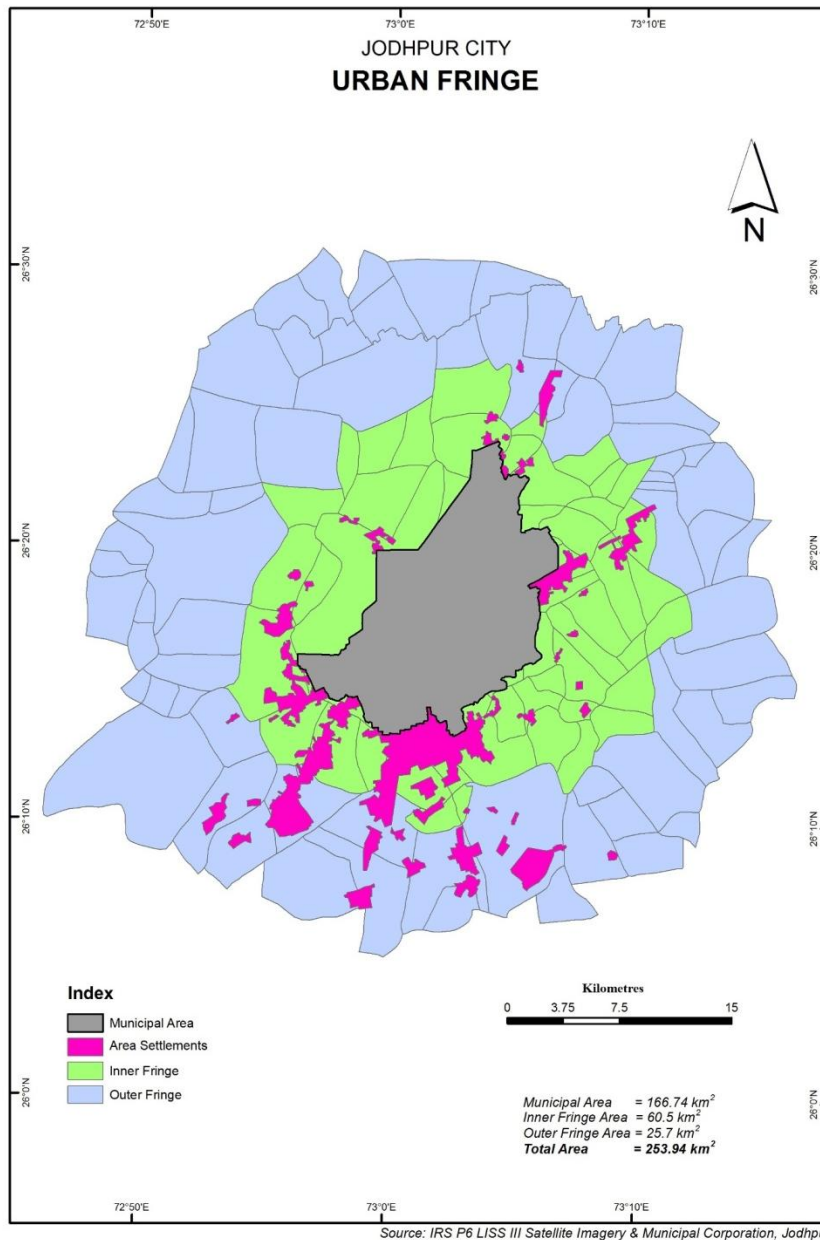
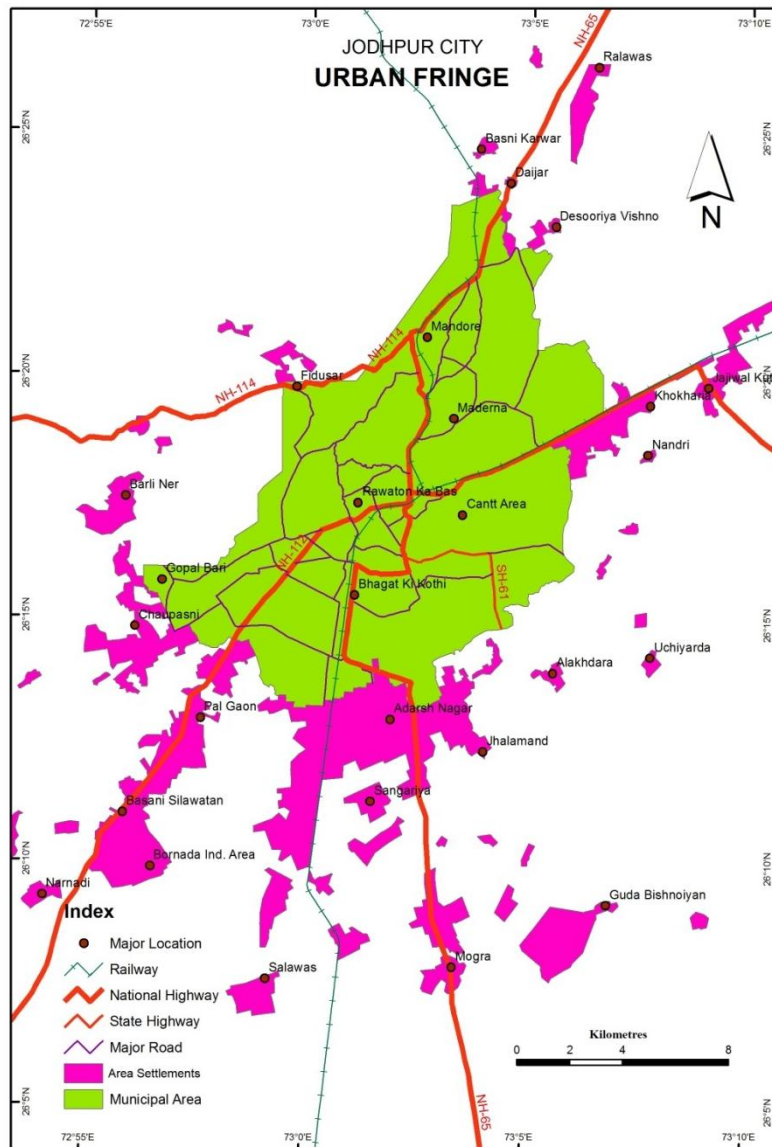


Table 4: Urban Area and Population under Urban Fringe of Jodhpur City

Type of fringe	No. of Villages	Area in Sq. kilometre	Population 2011
Primary/Inner fringe	11	60.5	90955
Secondary/Outer fringe	8	25.7	25864
Total	19	85.5	116819

Source: District Census Handbook, Jodhpur 2011



On the basis of spatial, occupational and demographic determinants the urban fringe of Jodhpur city has 19 settlements (map no. 2), with an area of 86.20Sq. Kilometer The Primary Fringe includes 11settlements with 60.5 Sq. kilometer area; Secondary Fringe includes 8 settlements with 25.7 Sq. kilometer area. The fringe area is not extended in concentric zones around the city but a star shaped and it extends between 15 kilometer to 22.5 kilometers from the city centre (map 3.2), It will be unscientific and laborious too to consider a basic unit for urban fringe delimitation and different land use, demographic, occupational and socio-economic parameters of the said zones are evaluated.

All these above discussed indicators have resulted in the expansion of the city mainly towards the south and south east direction especially along bypass of national highway and Railway line. In the north –east side of the city the fringe extends to village Daijar, Desooriya Vishno, Khokharia, Jhalamand, Adarsh Nagar, lying between 7.50 to 15 kilometre distance from the city centre. While in the

south and south-East it is noticeable up to village Adarsh Nagar, Pal Gaon, Chaupasani Uchiyarda, Alakhdera, and Sangaria and in South West barliner and chaupasani. The western side fringe area is bounded by hilly area. Toward the eastern side the fringe area is extended up to the village Jajiwali kurti.

The extension of the fringe is generally more along the transport network particularly along the axial routes, while in intersectional spaces, the fringe tends to shrink.

Acknowledgement

I am extremely grateful to my supervisor and guide, **Dr. B.L. Gupta** for initiation into this research paper , valuable guidance, suggestions and regular inspirations throughout the period of research

References

1. *Aslam, S.M. (1965) "Hyderabad – Secunderabad" (Twin cities): A Study Geography, Allied Publishers Pvt. Ltd. Mumbai*
2. *Blizzard and Andreson, (1952), "Problems in Rural Urban Fringe Research", Pennsylvania*

- State College, Agl. Expt. St. Progres s Report, No. 89, p.11.
3. Hind,J., and Smith,(1969)"The Impact of Urban Growth on Agriculture Land: A Pilot survey", Referred in A. Coleman, "The Planning Challenge of the Ottawa Area", Geogl. Paper No. 42, Deptt. of Energy Ottawa, pp. 11 -12.
 4. Jothimani, P.(1997). "Operational Urban sprawl Monitoring Using satellite Remote sensing: Experts from the studies of Ahmedabad , Vadodara and Surat ,india
 5. Lal,H.,(1973),Urban Fringe: An Analysis of Concept, Uttar Bharat Bhogol Patrika, Gorakhpur, Vol. IX, No. 2, pp. 71.
 6. Myres, R.B., and Beagle, J.A.,(1947), "Delimitation and Analysis of the Rural Urban Fringe", 3 Applied Anthropology, Vol. 6, pp.14-22.
 7. Rodehaver, M.W.,(1947),"Fringe Settlement as a Two Directional Movement Vote on Demographic Analyses of Rural- Urban Fringe", Rural Sociology, pp.91-101.
 8. Russwurm, L.H., (1969), "The Rural-Urban Fringe with Comparative Reference to London", Referred in Alice Colman"s, "The Planning Challenges of Ottawa Area," Geog. Paper No. 42, Dept. of Energy, Ottawa, p. 11.
 9. Singh.U (1996), Urban fringe in KAVAL towns in R.L singh (ED.) Applied Geography ,NGSI,
 10. U.S. Bureau of Census, (1950), Seventeenth Census of the U.S.A, Population, Vol. 2. p.24.
 11. Wehrwein, G. S.,(1942),"The Rural Urban Fringe", Eco.Geog. Vol. 18, pp. 217-18.
 12. Masser, I., Managing our Urban Future: The Role of Remote Sensing And GIS, 2003.
 13. Master Plan, Jodhpur, 1976-96 (Draft).
 14. Master Plan, Jodhpur, 2001-23
 15. Master Plan, Jodhpur, 2031(Draft)