THE IMPACT OF URBANIZATION ON THE AGRICULTURAL LAND USE: A CASE STUDY OF ALLAHABAD FRINGE AREA.

ABSTRACT

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ABSTRACT

1 CONCEPTUAL BACKGROUND AND THE STATEMENT OF THE PROBLEM

The brisk pace of urbanization has given rise to the process of suburbanization because of limited land resources and infrastructural facilities within the city and it indicates extension of urban functions, urban values and urban land uses in fringe settlements of central cities.

The peripheral areas around cities showing remarkable changes in physical and morphological as well as in cultural landscape changes giving emergence to a transition belt with mixed land uses of rural and urban features are identified as the fringe. Fringe areas exhibit a set of features resembling in nature and structure with that of urban and rural areas they are contiguous with. The fringe areas neither exhibit a complete set of urban characteristics nor any of rural but incorporate rural as well as urban features in its landscape. The fringe is a mix of land use caused by the extension of the city and demands which it makes on its marginal areas and at the same time it reveals distraction in the nature of communities which occupy it, brought about by the migration of mobile, middle class families oriented to the city and dominated by life styles.

Fringe is the transition zone between urban and rural areas which begins at the point where agricultural land uses appear near the city and extends up to the point where villages have distinct urban land uses or some persons, at least, from the village community commute to the city daily for work or other purposes. These peculiarity give to the emergence of different sets of characteristics of rural-urban fringe such as changes in land use pattern, changes in occupational structure, changes in demography, changes in social attributes, presence of factories at the village or
town site, presence of brick kiln, timber yard, warehouse, airports, bus and truck repair centre, and location of Transport Nagar etc.

1.1 Statement of the Problem

The problem of the development of the fringe of rapidly growing million plus cities of India has assumed new dimension and calls for careful analysis, evaluation, adequate appreciation and rational planning. The entire phenomena of the transformation of rural-urban landscape of the fringe of big cities need critical evaluation in the light of structural changes in the urban based economy and society. The process of urbanization and growth of cities beyond its corporate limit have changed not only the land use patterns but the entire societal structure of the fringe area is radically metamorphosed because of its strong linkages with urban economy. The process of transformation is gradual and directly related to accessibility and distance from the city. Thus at the relevance of study of rural-urban fringe of Allahabad city is obvious in the Light of growing population, especially urban population due to rural influx and outward growth of the city at over limited land resource, basic infrastructural facilities and other services to provide the good quality of life and clean environment.

1.2 Conceptual Background

The rural-urban fringe is defined as the land surrounding the town which is not considered as a part of it but whose use is influenced directly by the town. It is extension of urban values, urban functions and urban land uses into the country side land. A zone of frontier or discontinuity between city and country side in which rural and urban land uses are intermixed and absence of clear break-rural and urban conditions-is feature of the modern city. This zone of frontier is known as rural-urban fringe.

T.H. Smith (1937) used the ‘urban fringe’ for the first time for the built-up area of city in the study of population of Louisiana.
Salter (1940) defined urban fringe as “a mixture of land-uses, rural and urban” Wehrwein (1942) described the fringe in USA as an ‘institutional desert’ because of controlled locations of unpleasant and noxious establishments such as slaughter houses, junkyards and whole sale of oil storage and of utilities such as sewage plants and cemeteries. Mayers considers the urban fringe as the zone between the country and the city while to Andrews the rural-urban fringe is “that are adjoining the inner fringe outward from the economic city in which there is an inter mingling of characteristically agricultural and characteristically urban land uses” According to Dickinson the urban fringe is an area “on the outer borders of the city, between the area of urban and rural land use, and intermediate zone which shares the characteristics of each”.

R.B. Andrews (1942) established difference between urban fringe and rural urban fringe. He pointed out that urban fringe is completely built-up area and active extensive area while rural-urban fringe emerges after circumference of urban fringe. Rural-urban fringe expanded at the outer boundary of economic city.

H.H. Balk (1945) used rurbanisation for the development of the fringe. W.I. Firey (1946) recognized that the accessibility of the area at the outskirt of the city induces the phenomena of fringe areas.

Blizzasd and Anderson (1952) have attempted a more specific definition and according to them “rural urban fringe is that area of mixed urban and rural land uses between the points where full city services cease to be available and the point where agricultural land uses predominate”.

Kurtz and Eicher (1950) used the word ‘rural-urban fringe’ and declared it transition zone with mixed land use with rural and urban characteristics. Russwurm (1960) has called the discontinuous land between city and village, as the fringe.

Whitehand (1967) has described the fringe heterogeneous
region. He proposed three belts of urban fringe—

1. Inner Fringe Belt
2. Middle Fringe Belt
3. Outer Fringe Belt.

K.V. Sundaram (1968) established difference between satellite towns and urban fringe. He has kept the fringe area as the third part of city and according to him its boundary is determined on the basis of agricultural land and unused urban and rural land. Carter (1972) has asserted the process of dispersion to be responsible for emergence of fringe area in which extension of urban land leads to the development of urban fringe.

R.L. Singh has expressed the urban fringe to be urban erosion. Om Prakash said it to be peri-urban area and accepted it such a circumferential belt compared to an island with its boundary beach which gradually vanishes into seas.

K.N. Gopi (1978) says, the trend of fringe development has been characterised by different secondary causes or impulses. The main cause or impulse however, has been the same, viz. rapid growth of the core city. R. Ramachandran (1989) says, the rural urban fringe is an area of mixed rural and urban populations and land uses. Manju Panday (2005) assumed the urban fringe as the probable area of development in present and future.

Historically the trend of development has been characterized by different causes or impulses. The main impulse has been the rapid growth of the city. In Western countries mainly transportation has induced the expansion of cities to the outlying rural areas. The insatiable thrust of city for space and easily available means of transportation private or public resulted in development of residential areas and economic activities along high ways in the fringe areas. Absence of land use restrictions and cheapness of land set a trend to shift city based industries to the fringe areas. In
addition recreational needs of city have also focused the fringe.

Although the impulses and forces generating the physical outgrowth of the city in the west may not be applicable with equal intensity to the cities in India, yet one can not detract from the generally valid logic of the process. This is evident from the similarity in the trend and pattern of development of fringe of Allahabad city and other cities of the West. The location of industries, sewage plant, warehouses, air strip etc. in Allahabad, to a large extent, confirms the observations made by Dickinison with regard to western cities. Indian geographers have also studied fringe and observed the same pattern of fringe development.

The importance of fringe areas has increased many folds and it has received attention of urban planners. An attempt has been made in this study to analyse the impact of the stresses and strains of a million plus city on its rural-urban fringe in depth. It also examines the response and reaction of rural community in transition which is being slowly, though firmly, attracted into the orbit of a rapidly growing sophisticated urban community. The essence of this study lies into the attempt to enquire into the nature and extent of the impact of an expanding city on the social and economic structure of fringe community and the resulting pattern of change in land use and cropping system in the fringe areas.

1.3 Aims and Objectives

The main objectives of this study is to analyses into the trend of changing land use pattern and to enquire into the nature and extent of impact of an expanding city on social and economic structure of the fringe community, and the resulting pattern of interaction between the city and the fringe areas.

The major objectives of present study for Allahabad Fringe Area are as follows:

(i) To observe the trend of physical growth of city and its
impact on agricultural land.

(ii) To review the existing land use pattern in fringe areas and preparation of data base.

(iii) To study the socio-economic transformation in fringe area.

(iv) To prepare a land use plan for systematic development of fringe area.

(v) To analyses the impact of interaction with the city on socio-economic structure of the community.

(vi) To study the dynamics of occupational structure of fringe area.

1.4 Research Methodology

The research methodology adopted for this study is an admixture of empirical survey research, historical method, field observation and use of geographical, economic and statistical research tools. A set of parameters were selected for delimitation of fringe areas around Allahabad city. These are as follows:

(i) Changes in land use pattern,
(ii) Conversion of agricultural land to non-agricultural purposes,
(iii) Presence of factories,
(iv) Presence of secondary activities of economy,
(v) Occupational structure,
(vi) Level of urbanization and literacy,
(vii) Development of residential areas,
(viii) Presence of urban infrastructure,
(ix) Accessibility.

Different zones have been developed from all these attributes around Allahabad city and the zones having four or more than four
attributes are recognised as fringe areas. Census data, statistical data published by statistical magazine of district and information canvassed by physical verification of the study area have been used to develop different zones.

Occupation structure of the countryside areas around the city beyond its corporate limit for the years 1981, 1991, and 2002 has been basically used to demarcate the fringe landscape with dominant urban activities. Occupational structure includes mainly four categories-

(i) cultivators
(ii) Agricultural labourers
(iii) Workers in household industries
(iv) Other workers.

1.5 Data Base

The study is mainly based on the statistical data meant for the year 2006-07, but some data related to various period of time for analyzing pattern of changes according to need has been utilized for the Census years right from 1961 to 2000-01. The present study is based on two types of data obtained through various sources of primary as well as secondary statistical data.

The primary sources of data for the present study have been generated by the conduct of field survey through question and three types of schedules were prepared to elicit relevant information.

(i) Schedules of villages,
(ii) Schedules of households,
(iii) Schedules of other listing.

The data for schedules of villages were gathered from village level functionaries, Gram Pradhans, ex-Gram Pradhans, Lekhpals and also from well informed citizens.
The data for schedules of households were collected from certain farmers of each segment of fringe area. Representation of all categories and communities was taken care.

The data for schedule of other listing were canvassed to gather information related to demography, land ownership, literacy, land use pattern, occupational structure, livestock, use of technology etc.

The secondary data related to present study have been canvassed from the records of the government offices which include both published data and unpublished data generated by various line departments.

1.6 Hypotheses

Hypotheses have been formulated to carry on the research work, which have been tested during research.

(i) Fringe areas are outcome of juxtaposition of urban and rural landscape.

(ii) The intensity of urban activities decreases in the fringe with increasing distance from the city.

(iii) There is direct relationship between land put to non-agricultural uses and urban activities in the fringe.

(iv) There is inverse relationship between agricultural land and development of urban settlements in the fringe.

(v) The land use pattern changes very rapidly into the fringe as compared to countryside.

1.7 Review of Literature

The study of rural urban fringe acquired momentum due to rapid growth of urban population. The process of urbanization and its impulses generated strong pull power to attract human resource towards cities to avail them better opportunities into the diversified base of economy. This made the urban tendencies to shift towards the country-side.
The process of origin and evolution of fringe areas necessarily gets theoretical base in ‘Ecological Theory of Sub-Urbanization’ of Vinsworrow.

Volumes of literature surfaced to study the process of suburbanization and evolution of transition zone between the city and the countryside in western countries during the period from mid 1940 to the beginning of 1960s. These periods were basically concerned with the defining features and delimitation of rural urban-fringe.

The views of the fringe, however, for the first time was put forward by von Thesen in 1928. Although he did not used the term ‘fringe’ but he presented that a city is surrounded by annular rings of land use.

A number of sociologists like Dougloous, Park, Mackenzee and Bugess etc. presented their views of fringe belt. Mackaye in 1928, for the first time in ‘The New Explorations’ expressed that cities are invading on their outer areas and exploiting agricultural lands by building up banglow, godown, factories, bill boards, filling stations and restaurants etc. He termed it ‘metropolitan invasion’. During the period of 1940s Christaller, Homer Hoyet, Mackenzee and Colby carried out significant study about surrounding areas of city.

Some other western scholars who put serious insight to enquire rural urban relationship and development of the fringe are T.H. Smith, Salter, C.D. Harris, H.H. Balk, W.I. Fiery, Mc Kain, Burnight, R.A. Kurtz, Prior, Blizzard, J.B. Eicher and R.G. Golledge etc.

In India, the study of rural-urban fringe gained momentum during last 1960s and early 1970s.

Ujagir Singh, in 1966, studied ‘Urban Fringes in KAVAL Towns’. He based his study on different socio-economic factors i.e. population density, occupational structure, changes in built-up area, pattern of transportation, localization of different industries and

1.8 Chapter Scheme

Present research work has been organized into seven chapters detailed account of which has been explained as follows.

The First chapter, ‘Theoretical and Conceptual Framework of Rural Urban Fringe’, deals with the problem of rural-urban fringe. The evolution of rural-urban fringe as a process of suburbanization has been discussed and the characteristics and parameters of fringe presented by western as well as Indian scholars have been analyzed to evolve generalized parameters those are relevant in Indian prospective. Theories and concepts put forward by different geographers and sociologists have been scrutinized to derive the attributes suitable for delimitation of fringe area of Allahabad city. The problem of delimitation has also been discussed. Review of literature has been presented.

The second chapter deals with ‘Physical and Historical Background’ of Allahabad. Physical background is related with site, situation, physiography, geology, climate, drainage system, soil, flora and fauna of Allahabad while in historical background evolution of townscape of Allahabad from ancient to modern period has been presented.

The third chapter, ‘Analysis of Changes in Land Use : Allahabad Fringe Area’ discusses with the categories of land-use as recognized by revenue department and pattern of changes in land use categories into fringe area have been analyzed.
The fourth chapter deals with ‘Evaluation of Spatial and Temporal Changes in Cropping Pattern’, wherein cereal crops of paddy, wheat and maize; oil seeds; commercial crops like sugarcane and vegetable etc. have been discussed. The impact of use of technology, irrigation, high yielding varieties of seeds, fertilizers, pesticides and weedicides in farming have been established. The domestication of livestock as mixed farming has also been evaluated.

‘Transformation of Allahabad Fringe in the Light of Marketing’ has been presented in the fifth chapter. This chapter aims at the discussion about the role of periodic and regular markets around Allahabad city in expansion of fringe areas and about the pull power of these markets.

The sixth chapter, ‘Evaluation of Socio-Economic Landscape’ deals with social and economic structure of study area. In social profile, demography, literacy, settlement and status of scheduled castes and scheduled tribes have been discussed while in economic profile; landholdings, occupational structure and industries have been presented.

Lastly, the seventh chapter, ‘Fringe Area Land Use Plan and Suggestions’, includes the land use problem and three-tier land use plan for the development of Allahabad Fringe Area. Several suggestions for proper growth of the fringe and rational use of agricultural and non-agricultural land have been presented.

### 2 Physical and Historical Background

The second chapter consists of physical and historical background of Allahabad district and the study area.

The district of Allahabad lies between latitudes of 24° 47’N to 25° 47’N and longitudes of 81° 30’E to 82° 21’E. The area of Allahabad
district is 5482sq. km. and its population is 4936110 according to Census, 2001. The northern boundary of Allahabad district is formed by district of Pratapgarh and Jaunpur while on the east lies the district of Varanasi, on the south-east lies Mirzapur district, on the south, the state of Madhya Pradesh and on the west that of Pratapgarh.

On the basis of administrative structure, Allahabad district has been divided to into 08 tahsil, 20 development blocks, 218 judicial panchayats and 1425 village panchayats. There are 2802 habitable villages and 262 non-habitable villages. It has been divided into 2 parliamentary constituencies and 11 assembly constituencies. There are 13 townships, one Principal Corporation, one cantonment area, eight Nagar Panchayats and two census towns. Allahabad district has reputation of being an educational centre with two Universities and 53 degree colleges, 3 Industrial Training Institutes, 617 intermediate colleges, 1585 higher secondary schools and 2932 primary schools.

Allahabad fringe Area is located between 25°16'N to 25°35’N latitudes and 81°40’E to 82°E longitudes. It is located in the heart of Gangetic plains around the Sangam of the Ganga and the Yamuna which surround the city from three sides creating a natural barrier in physical expansion of the city. Total area of Allahabad fringe is 30329.81 hectares.

It is located around Allahabad city as a prominent cultural, education, administrative and religious center. Allahabad Fringe Area basically lies in five block of Allahabad district named Kaurihar, Soraon, Bahadurpur, Chaka and Jasara including Sadar areas which are contiguous with Allahabad city.

Total population of Allahabad Fringe Area is 394942 including 213713 males and 181229 female. According to Census 2001, literacy is 60.05 percent and sex ratio is 848. So far as occupational
structure of Allahabad Fringe Area is related cultivators, agricultural
labourers, workers in household industry and other workers are
21.17 percent, 11.76 percent, 8.52 percent and 57.75 percent
consecutively. Average size of landholding in the fringe is 0.62
hectare.

Geologically the district presents a greater complexity. The
whole Trans-Ganga tract, the greater portion of Doab is composed of
gangetic alluvium. The alluvial detritus of Vindyas is found in the
southern part of the Doab. The Trans-Yamuna tract, the Vindhyan
detritus merges in the gangetic sand and silt.

The district may be divided into the three distinct physical
parts, the **Trans-Ganga plain, Trans-Yamuna tract and the Doab**
which are formed by the Ganga and its tributary, the Yamuna. The
Yamuna joins the Ganga at Allahabad, the confluence being known
as **Sangam**.

The rivers of the district belong to the main system of Ganga
and comprise several sub-systems of which the most important are
the Yamuna and the Tons.

The climate of Allahabad district is characterized by a long and
hot summer, a fairly pleasant monsoon and cold seasons. The winter
usually extends from mid-November to February and is followed by
the summer which continues till about the middle of June.

The south- west monsoon then ushers in the rainy season
which lasts till the end of September. October and the first half of
November constitute the post monsoon season.

The district has 8 rain gauge stations. The rainfall of Allahabad
district generally decreases from the south-east to the north-west.
About 88 percent of the annual rainfall is received during the
monsoon season. July and August are the months of maximum
rainfall.

There is one meteorological observatory in the district. From
about the middle of November, the temperatures begin to fall rapidly and in January (the coldest month) the mean daily maximum temperature at 23.7°C. Temperatures rise rapidly after February. May usually is the hottest month of the year with the mean daily maximum temperature at 41.8°C and the mean daily minimum at 26.8°C.

The climate is marked by the high relative humidity i.e. 70 to 80 percent during monsoon and there is progressive decrease in humidity. During the monsoon season the skies are heavily clouded but during the rest of the year they are clear except for short spells due to western disturbances.

Winds are generally light throughout the year with some increase in force in the summer and during the south-west monsoon season.

The reserved forest area under the state forest department in the district is 19839 hectares of which nearly 98 percent lie in Trans Yamuna region in two sub-divisions Meja (14832 Hect.) and Bara (4806 Hect.). Phulpur and Karchhana have no forest cover. The chief varieties of trees found in these forests are Dhak, Kakor, Aonla, Kahwa, Jharberi, Kanju, Mahua, Semal, Salai, Khair, Harra, Chiraunji, Bahera and Babul.

The wild life of the district has depleted considerably owing to the destruction of forest and reckless shooting in the past. The number and species of wild animals are much greater in trans-Yamuna tract and along the banks of the Ganga than elsewhere in the district. The tiger visits the district form Mirzapur or Madhya Pradesh. The main animals found in the district are bear, chinkara, sambar, hyaena, Indian blank buck, boar, nilgai or blue bull, fox, hare and Sahi or Indian porcupine.

Minerals wealth of the district has great significance in terms
of socio-economic prosperity and economic base. The mineral products that are commonly found in the district are glass sand, building stone, kankar, brick earth and reh.

### Analysis of Changes in Land Use: Allahabad Fringe Area

The discussion on the land use pattern is divided into two parts. One deals with the land related to agriculture and the other part deals with all categories of land use other than agriculture. Following categories of land use have been recognized in the present study.

1. Forest,
2. Barren and Uncultivable Land,
3. Land Put to Non-Agricultural Uses,
4. Culturable Waste Land,
5. Permanent Pasture and Other Grazing Land,
6. Land Under Miscellaneous Trees and Groves,
7. Current Fallow Land,
8. Other Fallow Land,

The main fringe area has very scanty forest which is almost negligible or 0.01 percent due to deforestation for other economic activities. In the fringe areas percentage of forest could be increased from 1.0 to 2.0 percent if some parts of their fallow land and cultivable waste land could be used for social or energy forestry. A green strip of trees (10m. wide) could be developed on both sides of road.

**Land put to non-agricultural uses** has increased continuously during the past four decades in Allahabad Fringe Area.
due to conversion of land to develop transport network, expansion of built up area and institutions etc. It was 20.51 percent in 1980-81 which in increased to 29.81 percent in 2006-07.

**The barren and uncultivable land** in the study area have decreased form 6.68 percent in 1985-86 to 2.57 percent in 2000-01 but it increased to 4.59 percent in 2006-07 due to excessive exploitation of land with modern technology and increasing salinity and land pollution.

**Culturable waste land** is significantly high with varying percentage in different segments of the fringe. It increased from 3.37 percent in 1980-81 to 6.71 percent in 1996-97 and started decreasing afterward to become 4.01 percent in 2006-07. These culturable waste land are either disputed land or piece of land deposited by a thick layer of soil not suitable for agriculture and non-irrigated land.

**Permanent pasture and other grazing land** in the study area are almost negligible with a share of 0.01 percent presently. Land under **miscellaneous trees and groves** have decreased from 2.01 percent in 1980-81 to 0.81 percent in 2006-07 because of encroachment of urban activities and built-up area.

**Current fallow** land is comparatively high. It remained almost 10 percent from 1980-81 to 1990-91 which increased to 11.90 percent in 1996-97 and become 13.01 percent in 2006-07 to plotting of land which remained uncultivated.

**Other fallow** land has also increased from 7.25 percent in 1980-81 to 9.11 percent in 2006-07. This category of land shows non enterprise. There should not be a category of fallow land and agricultural waste land. If the cultivation is not possible, then it could be inverted into area for social forestry or can be developed as pasture and other grazing land.

The **net sown area** into fringe has decreased continuously
from 52.85 percent in 1980-81 to 38.59 percent in 2006-07 due to transfer of agricultural land to non-agricultural purposes.

4 Evaluation of Spatial and Temporal Changes in Cropping Pattern

Cropping patterns are representative of different attributes of socio-economic landscape. The distinction in cropping pattern lies in the facts of differences in physical, economic, social and institutional factors in different regions.

Paddy Cultivation

Paddy and wheat are the main cereal crop of the study region. Paddy is the mono-season crop in the fringe as it is grown once a year which is autumn rice harvested in October. Paddy cultivation has decreased from 38.02 percent in 1980-81 to 30.79 percent in 2006-07 due to shifting interest of farmers to other commercial crops and uncertainty of monsoon as it requires regular irrigation. Paddy cultivation under irrigation increased from 16.48 in 1980-81 to 95.72 percent in 2006-07.

Wheat Cultivation

Wheat is significant crop of Ravi cropping season. It is cultivated in winter seasons when there are no rains or traces of rains. Therefore, it totally depends on irrigation. Total cultivation of wheat has increased from 44.41 percent in 1980-81 to 48.72 percent in 2006-07 due to improvement in irrigation facilities and new areas brought under wheat cultivation. Wheat cultivation under irrigation increased from 88.40 percent in 1980-81 to 92.69 percent in 2006-07. Paddy and wheat cultivation have been largely affected by green revolution.

Barley Cultivation

Barley is the third important coarse grain crop of the fringe. It is grown in the same season as of wheat. Total barley cultivations
have decreased from 9.23 percent in 1980-81 to 1.03 percent in 2006-07 due to shifting of area to the wheat cultivation and other commercial crops. Barley cultivation under irrigation has decreased from 21.82 percent 1980-81 to 2.00 percent in 2006-07. It is grown ceremonially and for diet of livestock.

**Cultivation of Pulses**

Pulses are used as supplementary of diet in India. Vegetarians have only source of proteins in the form of pulses. Pulses are leguminous plants which enhance the soil fertility. Total pulses cultivation in fringe area has decreased from 20.56 percent in 1980-81 to 9.53 percent in 2006-07 due to low productivity and high susceptibility to the pests and animals. Pulse cultivation is almost rain-fed and area under irrigation is only 15.59 percent.

**Cultivation of Oil Seeds**

Cultivation of oil-seeds is very low in fringe areas because of under developed state of oil-processing industries and low oil content in the seeds. Total oil seeds cultivation was 0.42 percent in 1980-81 which increased to 0.62 percent in 2006-07. Irrigated area in oil seed cultivation was 6.64 percent in 1980-81 which increased to 26.32 percent in 2006-07.

**Sugarcane Cultivation**

Sugarcane is the cash crop cultivated in the fringe. Its cultivation has decreased from 0.30 percent in 1980-81 to 0.09 percent in 2006-07 because of long gestation period and small holdings. Sugarcane cultivation is totally under irrigation.

**Potato Cultivation**

Potato is an important vegetable in Indian diet. Potato cultivation increased from 5.06 percent in 1980-81 to 8.00 percent in 1996-97 but decreased to 5.24 in 2006-07 due to supply of potato from rural areas at lower price and shift of farmers to cultivate other vegetables. Potato cultivation in the fringe is totally irrigated.
Irrigation Facilities

The production of crops need more water in addition to rain water. Modern techniques of production, use of fertilizers and pesticides fail to give result in absence of irrigation facilities. The main sources of irrigation in the fringe are tube wells especially private tube wells. Irrigation by private tube wells is as high as 96.54 percent while government tube wells account only 3.68 percent. Other sources of irrigation are insignificant.

Use of fertilizers

Fertilizer is the key input for increasing agricultural production. In the fringe use of fertilizer has been increasing but their balanced and proportionate application has not been reported. Use of nitrogen increased from 1590 MT in 1980-81 to 5931MT in 2006-07 while phosphate increased from 320 MT in 980-81 to 2279 MT in 2006-07. Use of potash is comparatively low. It increased from 110 MT in 1980-81 to 243 MT in 2006-07 while total fertilizer used increased from 2020 MT to 8453 MT during the same period.

Use of Technology and Livestock

The extent of mechanization has increased in the fringe. The number of tractors, plough machines, sprayers and threshing machines etc. have increased while wood plough have decreased during the last 20 years.

Livestock render extremely useful service in transport and agriculture. In the fringe, livestock are domesticated with commercial purposes. Dairy farming and poultry farming are main features. Total numbers of livestock have decreased except cows, pigs and poultry.

Transformation of Allahabad Fringe in the Light of Marketing

The advancement in the landscape of area is materialized by effective specialization from a self contained subsistence economy.
The essence of urban character is service for a tributary area. A town owes its growth to such specialized resource oriented functions. All these aspects of urbanism are related to the transformation of the rural urban fringe with mixed landscape of urban and rural elements. The real spirit of these activities lies in the service centres developed in the contiguous area of the city and procedure for their investigation needs extensive study.

Christaller has demonstrated that there is strict ordering whereby each settlement serves its own hinterland and an area of population equivalent to the hinterlands of two other settlements in addition; hence it has been called ‘the rule of three’ using the constant ‘K’ to express this. K=3 denotes marketing principle; K=4, the transport principle and K=7, the administrative principle.

The principle of general interaction was, for the first time, applied by Reilly as ‘The Law of Retail Gravitation’ to analyse the interaction among major cities.

Origin of marketing centres comes to fore due to sequential development of economy as a system. The periodic markets evolve in order to meet the requirements of local society in less developed countries or developing countries as most of the population is engaged in agricultural activities of primary sector and more or less they depend on periodic markets to fetch their daily needs. The process of marketing had been developed very early in Allahabad around the city. Naini and Phaphamau are old marketing centers.

Other important marketing centers are Katahula Gauspur, Akbarpur, Marham Uparhar, Mahrudih, Lakanipur and Bhagipur. These marketing centers established direct relationship with Allahabad city and lead to the extension of city with special characteristics called the fringe.

\[ \textbf{6 Evaluation of Socio-Economic Landscape} \]

The process of developments brings about changes in social
and economic landscape realities of any region i.e. in demographic profile, settlement profile and trend of urbanization, occupational structure and distribution of landholdings.

**Demographic Profile**

The population of the fringe has increased about four times during the last four decades. It was 98,525 in 1971 which increased to 394,942 in 2001. The growth rate of population has been more than 50 percent during the last three decades due influx of rural as well as urban population in fringe. The maximum percentage of the population of fringe lies in age group 15-59 years.

**Total population of scheduled castes** was 53,128 including 28,547 males and 24,581 females while the total population of scheduled tribes was 202 including 115 males and 87 females according to Census 2001 in the fringe. SCs constitute about 13 percent of the population in the fringe

**Sex Ratio**

Sex-ratio in the fringe increased from 839 in 1981 to 848 in 2001 with fluctuating trends. It is less than the average of district which is 879. Sex-ratio in scheduled castes has decreased from 895 in 1971 to 861 in 2001. The sex-ratio in scheduled tribes was 757 in 2001.

**Literacy**

The literacy was 68.05 percent in 2001 in the fringe while the literacy in Allahabad district was 62.11 percent including 56 percent rural and 79.14 percent urban literacy.

**Occupational structure**

In the occupational structure of the fringe, percentage of cultivators has decreased from 35.89 percent in 1981 to 21.97 percent in 2001. Agricultural labourers have also decreased from 22.73 percent in 1981 to 11.76 percent in 2001. Workers in
household industry increased from 6.04 percent in 1980-81 to 8.52 percent in 2000-01. In the category of other workers, it was 35.34 percent in 1980-81 which increased to 57.75 percent in 2001. Thus, the percentage of agricultural labourers has decreased but that of workers in household industry and other workers have increased during the past two decades in the fringe.

**Distribution of Landholdings**

Pattern of distributions of landholding affects the agricultural returns. Average size of landholdings in fringe areas was 0.71 hectare in 1995-96. The percentage of landholdings below 1 hectare was 79.63 percent of total number of landholding which accounted for 32.50 percent of area in 1995-96. Landholdings between 1 to 2 hectares were 11.84 percent with area of 17.08 percent while that of 2 to 4 hectare registered number to be 6.87 percent and 21.78 percent area during 1995-96. Landholdings above 10.0 hectare were 0.31 percent but it accounted for 6.81 percent area.

Thus maximum percentage of landholdings belong to small and marginal farmers but area was less i.e. about 90 percent of landholding constitute only 50 percent of area. This is due to transfer of small landholdings to medium and big farmers and purchasing of the land by influential people of the city like doctors, advocates and administrative officers.

**Built-up Area**

The residential areas in the fringe have increased at rate of 35 percent per decade which is an obvious shoot off increase in population which will have serious implication for land use planning in coming decades. Many of the institutes, colleges and hospital are also being developed in the fringe.

Presently the most of the industries around the city are located or proposed in the fringe of Naini, Bamrauli, Phaphamau and Jhusi.
Fringe Area Land Use Plan and Suggestions

The problem of changing land use pattern has been closely studied to put forward a land use plan for Allahabad Fringe Area on the basis of its land capability and feasibility to change present land use pattern in the focus of agricultural land being usurped by industrial establishments, urban sprawls, expansion of human settlement, economic activities and infrastructural facilities. The land use plan also focuses on waste land which can be utilized for non-agricultural purposes. The fringe area also needs the green belt for better harmony in man-environment relationship.

The growth of Allahabad Fringe Area is not uniform in all the directions around the city. Therefore, it needs planning at different levels. The focus on preparation and analysis of land use plan for the development has been two folds:

(a) Land use plan related to agricultural land,

(b) Land use plan related to land put to non-agricultural uses.

Land use plan related to agricultural land involves rationalizations of landholdings, net sown area, cropping pattern, cropping intensity, productivity, irrigation facilities, use of fertilizers and pesticides, extent of mechanization and livestock etc. Many of the factors inhibiting the growth of agriculture in the fringe have been lack of resources, capital deficiency, right marketing techniques to sell products, problems of water logging, the problem of salinity and pollution of underground water etc.

As an effective planning, the first step is to protect the best land for agriculture. The land that is most suitable for crops should be protected for agriculture. Fringe Area Land Management Committee and local authorities should be entrusted with responsibility to ensure that these policies be implemented effectively. There is need of restructuring of production process in such a way to serve the interest of small and marginal farmers. For this purpose societies and self help
groups should be formed. A corporate farming society should be formed for better storage, transportation and marketing syndicates. There is also need of crop diversification i.e. cultivation of vegetables, cash crops, plants like Jatropha, Popular and eucalyptus etc. Dairy farming, bee farming and sericulture should be promoted.

Land use planning other than agricultural land mainly focuses on the categories of land as recognized by revenue department.

(i) Forest,
(ii) Land put to non-agricultural uses,
(iii) Barren and uncultivable land,
(iv) Culturable waste land,
(v) Permanent pastures and other grazing land,
(vi) Land under miscellaneous trees and groves.

The focus of planning for these categories has been many folds:

(a) Agricultural land should not be transferred for other uses.
(b) There should be increase in forest area, miscellaneous trees and groves and area under pasture and grazing land.
(c) Use of culturable waste land and fallow land for above purposes.
(d) Industries, buildings and other institutions should be developed on barren and uncultivable land.
(e) There should be regulation of land use along the road side.
(f) The conversion of land should be checked by effective law and there should be heavy fine for such practices.

Thus, all these aspects of planning need to be addressed properly in the fringe for the systematic development of the study area.