Introduction
INTRODUCTION

Urban centers exhibit wide spatial variation in the developing and developed world. In the forthcoming decades, rapid urbanization will be one of the greatest challenges in the developing world to ensure human welfare and a viable global environment. Due to inability of rural areas to provide better economic prospects, people are on move from rural to urban areas. As result new urban center are continue to come-up and older ones are increasing their territories. According to a current estimate, cities occupy 4 percent of the world’s terrestrial surface, which is a home for almost half of the global population (United Nation 2009). This phenomenon is most common in countries of Asia and it has been estimated that the fastest rate of urban growth over the next 25 years will be in medium and small cities. The recent report of UNO shows that human settlements 54 percent of the total human population is living in urban area. The expected population by 2050 is 9.60 billion (UNO, 2015), most of which will be in developing world. Further, by 2050 the percentage of urban population is estimated to be 6.4 billion i.e. 66.67 percent of global population.

The growth rate of urbanization in the developed world is lesser than developing countries, so that up to 2025, the annual rate of change in the urban population is expected to be 2.27 percent in developing countries, and 0.49 percent in developed areas. The rate of urbanization is low but the urban population in developed regions is more. The average growth rate between 1975 and 2007 was 0.8 cent which is expected to decline to 0.3 per cent between 2025 and 2050. The growth of urban population in the developed world will be mainly due to international migration from developing countries. On average 2.3 million people migrate to the developed countries each year. International migration, therefore, accounts for about one-third of urban growth in developed countries.

The out world movement of city population and in- migrated rural people, to develop suburban, industrial residential and commercial areas results in a massive socio-economic change of cities. This phenomenon common in all developing countries which is more common in Asia where development of peri-urban areas can be seen as the process of suburbanization. This has created teething problems resulting in unplanned development. The urban poverty and within cities, rising unemployment,
poor governance and the absence of coherent urban planning policies have led to widespread urbanization. The other problems are poor agricultural performance, financially weak municipalities incapable of providing basic services, slum development and informal settlements. Asia accounts for about 60 per cent of the world population. The urbanization is at its highest level in this region. The urban population increased from 237 million (17 per cent) in 1950 to 1.65 billion (41 per cent) in 2007. By 2050, it is expected that more than two-thirds of the population will be urban. Furthermore, the increasing trend of urbanization resulted in pressure on supply of food especially from cropping and livestock sectors of agricultural economy in the present era of agricultural intensive spread with value added crops and livestock, livestock husbandry appears to be the most blessing agricultural enterprise in peri-urban areas of most of cities.

The most important farming systems employing is the livestock husbandry. It directly supports the livelihoods of 600 million poor smallholder farmers in the developing worlds (Thornton et al., 2006). The most important risk reduction component for the poor and vulnerable communities all over the globe is livestock. The livestock products contribute 17 percent kilocalorie consumption and 33 percent to protein consumption globally, though there are large differences in the consumption pattern between poor and rich countries (Rosegrant et al., 2009). The share of livestock sector in the developing countries is quickly increasing in the agricultural GDP. The livestock sector is one of the fastest growing agricultural sub sector driven by the rapidly increasing demand for livestock products, this demand being driven by population growth, urbanization and increasing incomes in developing countries (Delgado, 2005). The level of demand for nutritious food derived from livestock products largely milk, eggs and meat is increasing globally especially in urban centers.

Urbanization affects improvement in infrastructure, supply chains including marketing opportunities and cold chains at both nation and global levels. The urban population has varied forms of diet rich in fats, and animal protein characterized by higher consumption of meat, milk, poultry and other dairy products. The livestock products provide high value protein. Wide range of essential micronutrient particularly Iron and Zinc and vitamins such as vitamin A. This nutritional value and
taste makes the livestock products as a desired food for majority of the people in the world especially in developing countries (WHO, 2003).

Meat and milk are the most important food products derived from livestock. The total meat production in the developing countries almost tripled during 1980 to 2002 from 45 to 134 million tons, much of this growth concentrated in counties of East Asia experiencing rapid economic growth during the last decades (World Bank, 2009). The per capita global consumption of meat during 1964-66 was 24.2 Kg/year which increased to 36.6 Kg/year during 1966-97 and is estimated to be 45.3 Kg/year during 2030. Similarly, the per capita global consumption of milk during 1964-66 was 73.90 Kg/year which increased to 78.1 Kg/year during 1996-97 and is estimated to be 89.5 Kg/year during 2030. The growth rate in per capita global consumption of milk and meat is higher in the developing countries. The per capita meat consumption during 1964-66 was 10.2 Kg/year which is estimated to 36.7 Kg/year by 2030, whereas the milk consumption during 1964-66 was 28.0 Kg/year which is estimated to be 65.8 Kg/year in 2030.

The present increasing tendency of livestock production in the world revels that the mixed crop-livestock systems will continue to be critical for ensuring food security because about two third of global population is practicing this system. Therefore, some of highly potential areas of mixed systems in Asia and Africa are already facing resource pressure. Still, there are options of increasing intensification and efficiency (Herrero, et al, 2010). The development of livestock sector resulted in many issues pertaining to competition over natural resource especially social change, grasslands, diversification of agriculture, livelihood opportunities, improvement of health, development of trade, changes in problems of environmental pollution and dietary intake. The increasing livestock numbers in future will add to larger demand of water especially in production of livestock feed (Peden, et al., 2007). The share of population living in water stressed regions is 38 percent. This share is estimated to become 64 percent by 2025. The livestock sector will also be affected by the climate change. The increasing climate variability is a risk to the livestock production. At the same time, livestock food chains are a major contributor to the greenhouse gas emissions (Steinfeld, et al., 2006, Khan, N. et al, 2011). The changes in livestock
sector at global level has far reaching effects upon the future prospects of health, livelihoods and food security of rural population especially in the peri-urban areas.

India has experienced rapid and unplanned urban growth since last decades. During 2001 the share of urban population in 1027 million populations was 27.81 percent with absolute number. It rose to 31.16 percent in 2011 (Census, 2011 a). The urban population is expected to become 40 percent of total population by 2040. This is in sharp contrast to only 60 million (15 percent) who lived in urban areas in 1947, when the country became independent. During the last sixty years after independence, the population has grown by two a half time while the urban population has grown up to five times. This rapid urbanization has led to wide gap between the demand and supply of crucial services and infrastructure. Additional, problems of increasing urban poverty, risks to productivity, high health costs, environmental stress, and lack of access to basic services, such as water supply, sanitation, and housing have emerged in most of the major urban centers.

Urban expansion in term of area and population has been an important feature and eating a large segment of valuable productive arable lands in the fringe areas. The farmers sell their lands to the private urban development authorities for the residential, academic and institutional purposes at very high prices, thus, there is an increase in the landless people who lose their land and livelihood. Thus, the landless people turn towards the urban centers for livelihood and shelter. The rapid migration to cities results in large chunk of rural population settled in urban periphery area or in nearby town/city for employment, education, and better quality of life. This unplanned migration and settlement and settlement in the newly developed areas of the city is further adding the problems of the growing urban centers. Horizontal as well as vertical growth has taken place. Several industries at different scale, educational institutions, health care centers, religions institutions as well as recreational center are also added over the period of time. Thus, demand of various kinds of food is an inevitable phenomenon with the increasing urban population in the recent decades.

The independent India witnesses a revolution in agriculture especially in food grain production after one decade of independence. Late 1960 are considered as the
beginning of Green Revolution, due to which some parts of the country achieved self-sufficiency in food production in only two decades. But this success was achieved at the cost of decline in environment sustainability, ecological suitability, genetic diversity, and the various kinds of potential of diversification of farming systems. Consequently, the development of Indian farmers and farming remained imbalanced. During the last decade of 20th century, Indian agriculture stood at a crossroad and frustration among farmers was inevitable. The food grains production became uneconomical due to increasing gap between input cost and output price per unit weight of its production due to increasing cost of inputs because of removal of subsidies by the respective governments. In successive year, under the influence of new world economic order, and inefficient agricultural marketing system resulted in low price per unit weight of output traditional food crops. Reduction in the size of operational holder as year after year due to division of holdings among the heirs has also contributed in reduction of productivity and consequently badly affected the economic viability of some traditional crops like food grains. This critical agricultural policies and object orientation of farmers toward diversification of crops and farming systems in the country in recent decades. The agricultural policies in the current decade urged the farmers to move from subsistence traditional cropping system to value added market oriented agriculture and from monoculture to diversified one. In this perspective, the farmers adopted various kinds of farming systems along with cultivation of some major food crops.

The increasing cost in the agricultural inputs coupled with the increasing transport cost, labour unavailability, competitive marketing and other constraints have led to reduction in the benefits in crop production. Further, the continuous fragmentation of the landholdings has resulted in smaller landholdings which are uneconomical and give very less returns. Thus, reduction of landholdings up to marginal level has resulted in production of traditional food crops as uneconomical. So the agricultural resources area minimized. The present scenario has frustrated the farmers and they are forced farmers to produce more remunerative crops. This has resulted in the changing cropping pattern. However, more than 75 percent of the landholders having marginal and small landholdings rely upon the livestock for supplementary income. In many arid and semi-arid regions in the country, livestock is the major source of livelihood.
However, in spite of its economic importance, the performance of the livestock sector has been extremely poor, due to lack of basic amenities, availability of critical inputs and services and poor linkage with the market.

Livestock is one of the important segments of Indian agriculture. It has been practiced as auxiliary activity in the process of production of different food and non-food grains crops since antiquity. Livestock in India have great usages. Earlier, power driven machines were very few. The bullocks and other animals are used draught animals. Presently, they have been replaced by power driven machines. Still, they are used for drawing ploughs and carts and lifting water from wells for irrigation purposes in some areas. Their dung makes excellent manure. Dried dung is commonly used as household fuel. Moreover, in semi-arid and arid tracts of northwest India and the interior Indian plateau, sheep are reared for wool as well as for mutton and goats for mutton and milk. Various kinds of livestock species like cattle, buffalo, goat, sheep, pigs, hen, etc. were reared as domestic and subsistence animals. Traditional techniques and practices have been applied in the process of their rearing. Commercial form of livestock husbandry rarely existed before the independence except in the case of milk and meat production at a small scale. Cattle and buffalo have been reared and used mainly to work as drought animals. Their dung is valuable and is still used for manures as well as domestic fuels in villages of rural India. Despite very primitive and traditional form of livestock husbandry system in pre independence India had large share of cattle, buffalo, pig, chicken and goats in the world.

Livestock farming, however, has been appearing as one of the most important value added farming systems adopted in the country. It is an important source of food security as it provides meat and milk and other dairy products, which enrich the nutrition intake. Increasing urbanization and burgeoning middle class population as well as improvement in level of income and socio-economic transformation have expanded the demand of meat and milk products in developing countries. It is expected to double in 10 years and approach the per capita consumption level of the developed countries by 2020. This kind of dramatic change in demand and production of livestock and their products is described as “animal revolution” by IFPRI analysts (Delgado et al., 2000). The livestock revolution has offered the opportunities to
producers to expand this sector through enhancing production, both in qualitative and quantitative terms. Scaling up of the production is being encouraged in developing countries like India. It is due to the high demand of livestock products from tropical monsoon countries in Asian as well as European markets. These products especially produced in India have good competitive price in international markets due to low production cost as compared to developed world after reducing the subsidies on agricultural production and export in recent year.

Urban fringe or peri-urban areas are the important concentric zones at various radial distances from the city for the flow of perishable food resource like vegetables, milk and meat, their increasing demand has encouraged the peri-urban agriculture with the production of horticultural products and livestock husbandry. Mode and scale of production have been also changing up. This particular form of peri-urban agriculture has the potential to provide cheap, fresh and nutritious food. It also saves the expenditure incurred for packaging, storage and transportation and has potential to generate more employment and incomes.

Livestock husbandry in urban fringe area is rather highly promising and remunerative than the cultivation of cereal crops. It needs less area and has more potential of risk coverage during drought or any other kind of crop failure. Intensification and commercialization of this sector has taken place in recent years. Livestock holders are usually landless, and small farmers and they follow mixed farming. Various forms of employment is generated and it became boon for poor in the peri-urban areas. The development of this sector will improve food intake, health and social security. They also provide raw materials for many processing industries like cheese, paneer, curd and sweets etc. Further, more foreign exchanges would be added to the balance of payment of the nation through the export of livestock products.

However, the livestock revolution also presents threat to resource poor livestock keepers in less developed countries like India. It is changing from multipurpose to single production, from ruminant to non-ruminant, from marginal geographical area to humid and sub humid zone and from rural to urban area. Structurally, they are also shifting from resource driven to demand driven production of livestock products. Scaling up of production from traditional small scale to large scale industrial nature
and shifting of horizontal integration to vertical one are testimonial to important changes in urban livestock sector. Increasing competition with big firms, revenue constraints, disease threat, new trade standards and environmental issues are important factors putting pressure on this sector. The emergence of commercial livestock production as opposed to traditional small farmers seems to be a threat to poor livestock rearers. It is demonstrated into four inter-related process including structural integration, specialization, close spatial link between production and consumption points. In India, the commercial livestock production has raised some important issues like role of livestock production and export to national economy, protection of environment due to increasing intensive farming techniques, protection of human and animal health and maintenance of social equity. Livestock-environmental pollution is an important issue which causes havoc every year. It is viewed that pollution is locally generated by concentration of small farms. The intensification and commercialization of livestock has negative impact on social equity. The small producers suffer a set back and they have lost out in the competition and fail to recover from price fluctuation or disease outbreak that destroys their capital and stock.

More over the urban fringe area is more dynamic and region of transitional change in farming system and various socio-economic attributes in developing countries like India. The medium and small towns are under the process of fast change with reference to their fringe area.

Dairy farming appears the most important agricultural system in response to change demand for dairy products in the town and city. Thus the assessment of impact of urban centers on the agricultural land use and farming system would be on academic effort.

**Study Area**

Aligarh district is one of the important districts located in the western part of Uttar Pradesh at a distance of 130 kilometers from Delhi. The district lies between latitudes 27° 34' N to 28° 11' N and between longitudes 77° 29' E to 78° 38' E in the central part of Ganga-Yamuna doab. It is bounded by the district of Bulandshahr in the north, Hathras in the south, Etah in the east and Mathura in the west and south west, Aligarh is separated from Badaun district by the extreme north eastern boundary of river
Ganga whereas the extreme north-western boundary, formed by the river Yamuna, separates Aligarh from Gurgaon district of Haryana state.

The total area of the district was 3700 sq.kms with a population of 3,673,889 persons in 2011. The maximum extent of the district from east to west is 116 kms and the maximum extent from north to south is about 62 kms. The shape of Aligarh district is now dominated by an east west protrusion after the carving out of a large part of Aligarh district in 1998 to form the newly created district of Hathras. The district has been divided into 5 tehsils subdivision namely, Atrauli, Gabhana, Khair, Koil and Iglas. These tehsils are further subdivided into 12 development blocks namely, Atrauli, Gangiri, Bijauli, Jawan, Chandaus, Khair, Tappal, Dhanipur, Lodha, Akrabad, Iglas and Gonda, which include 1180 villages.

Moreover, Aligarh city is an important administrative, commercial, industrial and educational centers experiencing continuous increase in the population. Horizontal and vertical expansion both has taken place tremendously during last two decades. Aligarh is an academic hub and attracts thousands of population. Muslim population shares approximately 50 per cent of total city residents. Approximately, twenty thousand students reside in the different hostels of the Aligarh Muslim University. There is a very high demand for livestock products i.e. milk and meat. Buffalo meat is greatly demanded in the city itself due to larger numbers of Muslim population. Recently, many industries involved in packaging, processing and export of meat have emerged in the periphery of Aligarh city. This has demand for slaughter of at least 5700 buffalo per day (Amar Ujala 4\textsuperscript{th} Sept., 2013). Besides, a large number of milk processing units are located in the peri-urban area as well as in the city which procure more amount of milk excluding the milk demanded for direct consumption.

The present scenario of urbanization and commercialization of livestock production has an impact upon farming system, vegetable cultivation and floriculture in the peri-urban areas of the city Therefore, a detailed study pertaining to intensification and commercialization of livestock and its impact upon the farming system in the peri urban areas of Aligarh city is necessary to understand its far reaching effects upon the socio-economic conditions of the livestock rearers, environmental aspects and sustainable urban and peri-urban planning in modern era of globalization of trade.
LOCATION OF STUDY AREA

Figure 1

Peri-Urban Area of Aligarh City

Figure 2
Objective of Study

Under the consideration of above mentioned significance of urbanization and its effects in various trends of change in its peri-urban areas, the researcher aim to understand the following objective.

- To estimate the demand of dairy product in Aligarh city.
- To understand Spatio-temporal dynamics of dairy farming in the peri-urban area.
- To assess the level of generation of employment & livelihood by Dairy farming.
- To assess the impact of urbanization on development of Dairy farming.

Hypotheses

The following hypothesis have been tested in the present study.

- Urbanization process reflected positive effect on development of Dairy farming.
- Dairy farming is positively related to generation of livelihood to people in peri-urban area.
- Dairy farming is key to alleviation of poverty & sustainable development of peri-urban area of Aligarh city.

Research Methodology and Data Collection

The study is mainly based on the primary and secondary data collected from various sources. Individual observation of the researcher during the field survey was also considered. The secondary data were obtained from the reports of various government and non-government agencies and scientific articles, book, thesis and dissertation. The primary data were obtained with the help of a questionnaire through field survey conducted in selected villages in the peri-urban areas of Aligarh city.
This study shows that Peri–urban areas are the transition zones, or interaction zone, where urban and rural activities are juxtaposed, and landscape features are subject to rapid modifications, induced by human activities. The peri-urban area is demarcated on the basis of latest Master Plan of Aligarh development authorities. The maximum distance demarcated for the present study is approximately 20 Km from the center of Aligarh city. Four buffer zones were made at an interval of 5 km. there by, 3 villages from each buffer zones were selected excluding innermost zone consisting Aligarh city, for the detailed field survey on the basis of population size and accessibility. The sampled villages were having the population below 5000. Thus, in total 9 villages, from the peri-urban area of the city were selected for detailed field survey.

A well framed questionnaire was used to collect data regarding population size, number of household, cropping pattern, family size, caste, land use pattern, educational status and livestock husbandry. Furthermore, they were enquired about the inputs and outputs in livestock husbandry, economic benefits obtained, trend and pattern of various livestock species, presence of vegetable cultivation and floriculture, trend of vegetable cultivation and floriculture other social and environmental aspects pertaining to livestock husbandry and the effect of intensification and commercialization of livestock upon the socio-economic condition of the rural people, and the farming system.

A total of 9 villages were selected for field survey in the peri-urban area of Aligarh city. From these villages a total of 270 households were selected for questionnaire based data collection. The secondary data related to geographical setting of the study area including climatic condition, soil characteristics, rainfall, and vegetation, land use pattern, demographic characteristics and socio-economic characteristics of the district was obtained from different publication of government department and organizations.

The collected data were processed tabulated and presented well through construction of statistical diagrams and maps. Simple statistical techniques like comparative tables simple regression and SPSS software are used for analysis of the data. The present’s thesis is planned in to 5 chapters including introduction and conclusion.
Table 1
List of Sampled Villages and Household for Field Survey

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Sampled Villages</th>
<th>Total households</th>
<th>Total Sampled household</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mehrawal</td>
<td>1500</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>Bonner</td>
<td>450</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>Havatpur Fagoi</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td><strong>Total Zone I</strong></td>
<td><strong>2020</strong></td>
<td><strong>90</strong></td>
</tr>
<tr>
<td>4</td>
<td>Amrauli</td>
<td>1200</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>Madrak</td>
<td>550</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>Karsua</td>
<td>800</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td><strong>Total Zone II</strong></td>
<td><strong>2550</strong></td>
<td><strong>90</strong></td>
</tr>
<tr>
<td>7</td>
<td>Ahmadpura</td>
<td>300</td>
<td>30</td>
</tr>
<tr>
<td>8</td>
<td>Jaitholi</td>
<td>250</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>Alampur (Kath)</td>
<td>250</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td><strong>Total Zone III</strong></td>
<td><strong>800</strong></td>
<td><strong>90</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Sampled Villages</strong></td>
<td><strong>5370</strong></td>
<td><strong>270</strong></td>
</tr>
</tbody>
</table>
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