Conclusion and Suggestions

The purpose of this study is to examine the dynamics of livestock development in the study area Aligarh district, the socio-economic profile of sampled households, locational and seasonal effects on livestock development and to examine the economic viability through livestock husbandry in Aligarh district. The study also aims to suggest the measures for improvement in livestock and its related activities in the study area in particular and the country in general. To understand the role of animal husbandry in economic viability of small and marginal farmers, four livestock species i.e. buffalo, cattle, sheep and goat have been selected.

An overview of present research presents dynamic and dramatic changes in livestock sector of the study area. It is found through the study that the growth of livestock as a whole improved with a tune of 7.13 % during two points of time i.e. 1993 and 2003. This change also shows regional variation from one block to another block. Out of 12 blocks, 6 blocks namely Tappal, Chandaus, Lodha, Gonda, Iglas and Bijauli showed negative growth with a marginal variation while the other 6 blocks (Khair, Jawan, Dhanipur, Atrauli, Gangiri, Akrabad) showed positive growth with large percentage variation. The variation in livestock development in various blocks is accredited to the variation in urban population, muslim population, distance from the urban centers, level of development of agriculture, variations in income level, medical facilities, awareness regarding livestock husbandry, availability of grazing and pasture land, milk collection centers, livestock markets, education level of the people, landholdings by the farmers, women’s participation and change in the composition of livestock in respective blocks.

Livestock-area index recorded a marginal positive change during discussed period which indicates the increasing pressure of livestock over available land features. Livestock population also witnessed a positive change which shows that the growth of livestock is directly proportional to the change in population. It is due to the increasing demand for animal derived products
especially among urban and middle class income population. The livestock area index and livestock population index at block and district level analysis shows variations. This variation is because of the different socio-economic and demographic conditions in each and every block of the district.

Individual species also showed dynamism in their distribution and growth at block and district level. The district Aligarh exhibited positive growth of buffalo with an excellent rate of 30 % during 1993-2003. Their growth at block level is positive in almost all blocks except Tappal, Lodha and Dhanipur but the rate varies from one block to another one. It varied between -19.79 % in Tappal block 177.78 % in Khair block. Buffalo-area and buffalo population indexes revealed that buffalo rearing improved well but with an extra burden on limited land. Livestock number and human population in the area have shown conformity with the growth of each other.

Contrary to this the number of cattle has continuously declined during 1993-2003 and it exhibited a negative growth of -25.42 %. All twelve blocks showed negative growth with the variation of -12.35 % in Jawan to -61.09 % in Iglas which are the lowest and the highest negative growth during the discussed period. Number of cattle per unit area and number of cattle per thousand human populations also reflected negative trend of growth with the exception of Khair block due to much use of male cattle in agricultural practices. This shows the backwardness of the area.

The negative growth of cattle is attributed to the modernization and mechanization of agricultural operation during the last few decades that has taken place. It reduced the demand of male cattle as they were well used for ploughing the land and transporting the agricultural products from farmhouse to the markets. Prohibition of slaughtering of cattle especially cows due to religious reason has also discouraged the rearing of the cattle in the study area. It was also realized during field survey that cattle became a burden when they are out of milk or agriculture operation by any reason.
Despite the increasing importance of goat as it is low capital intensive and is consumed by all ethnic groups, the number of goat as well as density of goat/unit area and density of goat per thousand populations both at district and block level is decreasing. This is mainly because of the squeezing of common grass land/pasture land. The growing income level is also one of the major causes of farmers' motivation towards buffalo husbandry in place of goat husbandry. Secondly the increasing female education also discouraged the women's attention to goat rearing. Besides, the increasing participation of females in horticultural production and dairy farming are also responsible for negative growth of goat rearing in study area.

Similarly, sheep husbandry also exhibited a set back showing negative growth with a tune of -48.26 % in Aligarh district during 1993-2003. All the blocks showed negative growth with the exception of Gonda block. Number of head of sheep per unit area declined by -0.02 head/hectare during this period. All the blocks except Tappal showed negative growth. Similarly, sheep per thousand population also exhibited negative growth in each block with no exception. The decline in number of sheep and their indexes is mainly due to the traditional form of sheep rearing and their transaction. Besides, low socio-economic strata of the sheep rearers are also one of the major factors causing negative trend for livestock.

Livestock husbandry is a complementary activity of agriculture which influences the socio-economic structure of households. More than half of the rural people of study area are involved in this sector. Educational level of the farmers, women participation, caste-wise involvement in livestock husbandry, fodder availability, grazing land/pasture land availability, income level of the farmers, landholding capacity of the farmers played an important role in the livestock husbandry development in the study area. Gender-wise analysis of livestock rearers or workforce involved in livestock husbandry shows the domination of female. 7 blocks namely Lodha, Dhanipur, Gonda, Iglas, Atrauli,
Bijauli, Gangiri shared more than 60% female out of the total workforce in livestock husbandry.

Such high level of female participation is contributed to the indoor activities like feeding, washing of animals, milking etc. Landless, marginal, small and medium farmers showed rather higher proportion of female participation ranging from 53.54% to 73.22%. There is an inverse relation between female participation and size of landholdings. The big farmers have very low participation rate of female in the livestock husbandry due to their high social position in the society. Female participation in agriculture is considered as below standard work. While in a poor backward family, female does all indoor works required for sustainable livestock husbandry.

Time utilized by female members to serve the livestock is more than the men workers except the females of medium and big farmer's households because the male members are engaged in other works to earn extra money while their female utilize their extra time to serve the livestock. Most of the women (more than 90%) who are engaged in livestock husbandry are unpaid i.e. they are not paid by any source/farmers. But among different farmers, big farmers have the largest share of paid women as they hire female labour to graze their animals in the field. Their own female members are not involved in this economic activity to a considerable level.

Social stratification played a significant role in livestock husbandry. OBC (Other Backward Caste) showed domination in livestock husbandry in study area due to their age old traditional experience of animal rearing as well as full time involvement of the family members throughout the year. Secondly the small size of land holdings of OBC compelled them for adoption of mixed farming system for sustainable use of their limited land and abundant labours. After OBC, High caste is the next participants in livestock husbandry. However, Scheduled castes, the most backward and the deprived caste showed the least share of their participation in livestock husbandry. Their least participation is attributed to the concept of untouchability and social taboos due
to which people of other caste do not prefer to take dairy products from them. They are only involved in feeding and cleaning the livestock. Their poverty also discouraged them from livestock husbandry especially of rearing of big ruminant like cattle and buffalo which are capital intensive.

However participation of livestock workers varies with the level of educational status in the district. Only 55.51% of livestock workers are literate as evident from the study. Among literate livestock workers 56.38% persons have primary education, 36.83% have secondary education and 6.79% have more than secondary education. The proportion of livestock worker with educational status also varies from one block to another block. This variation in level of education of livestock workers attributed to the size of landholding, occupational structure, Ignorance from education, size of family members, social status etc.

Occupational structure establishes the linkages of different economic activities of the farmers in the region. Study area exhibited five types of farmers on the basis of their landholding who practiced livestock husbandry. The occupational structure of various categories for livestock farmers revealed that crop farming is the main occupation of all kinds of farmers with various sizes of landholdings except landless population in the study area. Livestock husbandry is followed by them as secondary or subsidiary work. Consequently they follow cropping-livestock husbandry integrated farming system which is rather more economically viable and environmentally sustainable system. Livestock husbandry is followed as a source of extra income for their livelihood. While the landless group of population work mainly as agriculture labour hired by medium and big farmers. They involved themselves in cropping system as a tenant or crop sharer as their subsidiary occupations, while the livestock husbandry is the second preference of their subsidiary occupation.

Locational and seasonal aspects played very important role for determination of the economic viability of livestock husbandry. Aligarh district
has three seasons for milk production i.e. mean period, lean period and flush period. All the three periods are greatly influenced by seasonal variation. The highest milk production is in flush period (November to February) followed by mean period (March - April and September-October) and lean period (May to August). The high milk production in flush period accredited to the easy availability of green fodder in large quantity. Other factor is that animal can convert feeds into milk at a rather faster rate in other season.

Seasonal effect on meat production revealed that November to March is the peak month for buffalo meat production while the least productive season is July for buffalo beef production. The high quantum of meat production in former period is due to cold weather in which demand for meat is enhanced considerably. Beside, during survey period the Muslim festival Baqraeed (Eid-Ul-Zuha) also occurred during this season in which thousands of buffaloes are sacrificed and meat is produced. Dry hot weather conditions in the latter case have rather reduced the meat consumption, consequently fall in meat production. However, the mutton production is not much affected by the seasonal change.

Moreover, livestock husbandry and livestock derived products like milk, meat are also affected by locational factors. With the increase of distance from dairy centers and livestock markets from livestock rearing center, farmers reduced their number of livestock. Thus the size of livestock and the distance to the dairy centers or livestock market stands in inverse relation. Due to increasing urban consumption of buffalo beef at local as well as at national level and location of dairy centers at village level promoted the buffalo production in all blocks of the study area. Development of marketing and export facilities for beef and location of meat producing industries have positively affected buffalo rearing in study area. Contrary to this the rearing and production of cattle and goat have not been much affected by locational factors. They are rather more influenced by socio-cultural factors.
The block-wise estimation of milk production through field survey showed spatial variation from one block to another block. Such variation is attributed to the type and composition of milch animals, availability of grazing land, fodder, veterinary hospitals and salinity of the ground water. It was also affected by proportion of urban population and number of dairy processing centers and nature of institution (dairy centers) and their managements. Similarly meat production also showed block-wise variations. Meat production is the highest in Lodha block due to the 3 registered slaughter houses. More than 20000 buffaloes are slaughtered daily in Aligarh. 3/4th of the product is exported to various neighboring countries. Remaining other blocks that showed rather less production are due to the low proportion of urban population and lack of meat producing units as well as municipal controlled slaughter house on an account of various socio-cultural hindrances.

Livestock husbandry is a capital intensive activity. The cost of rearing varies with the nature and kinds of livestock. The assessment of the cost incurred for different species of livestock is revealed that the return for livestock rearing is directly proportional to the size of holding of the rearers upto medium size of landholdings. Highest profit for medium size of holder is attributed to the availability of all kinds of livestock feeds from crops and free labours from household members. Contrary to this for big farmers the input cost is rather high due to use of hired labour for all kinds of operations performed for livestock husbandry, though feed, fodder, concentrates etc are fully available from the cropping system.

Livestock husbandry employed a lion share of workforce available in the study area. The proportion of livestock workforce to total workforce is directly related with size of holdings up to medium farmers ranging between 16.02 to 28.40% while the big holders absorbed only 8% of their total workforce in livestock sector. Work-wise analysis revealed that the rearing work employed largest proportion (78.08%) of livestock workers followed by marketing and collection. In rearing activity big farmers have the domination
followed by small farmers while in marketing sectors, marginal farmers are dominant over all other farmers. Landless farmers lead in collecting and processing activity.

There are two forms of livestock husbandry activity in study area i.e. exclusive livestock husbandry and livestock cropping integrated system. Second system is well integrated system for the best management of livestock and crops-derived products utilization through recycling process. Study revealed that this system proved to be more economically viable than the exclusive livestock system in which all feed and fodder are purchased and obtained from outside on payment.