

Natural and Anthropogenic Environmental Effect on Livestock Husbandry: A Case Study of Shahjahanpur District, India

Mushir Ali[#], Syed Murshid Husain^{*}

[#] Department of Geography and Environmental Studies,

Mekelle University, Ethiopia, NE Africa

¹mushirjbd@gmail.com

^{*}Department of Geography G.F. (PG) College

Shahjahanpur, Uttar Pradesh, India[#]

Abstract- Present research paper attempts an effect of environmental factors on growth and distribution of livestock in semi-subsistence economy where livestock are integrated with rural households. The study was conducted in Jalalabad sub-division, a micro geographical region where 480 households were sampled from 12 selected villages to get detail information regarding environmental effects on livestock husbandry. Doi's crop combination was used to recognize livestock rearing region. To analyse data, simple percentage method was used to derive specific conclusion. Findings show that total growth of total livestock was negative (-1.34%) varies species to species at among studied blocks. Growth and distribution of livestock was affect by leading geographical factors; mechanization of agriculture, changing of land use pattern, frequent change in weather, intensity of flood and economic returns. Therefore, positive growth for goat (0.71%), while negative growth for cow (-1.81%) and buffalo (-0.75%) are major findings of the study

Key words: Livestock, growth, land use pattern, mechanization and flood.

I. INTRODUCTION

Livestock husbandry is an integral entity of agro-economies in the world. Globally, it has been estimated that 675 million rural poor people depend upon livestock for their subsistence [1]. Livestock play role in socio-economic development of rural households where 70% of the rural poor lived who are livestock owners. This sector has significant positive impact on equity in terms of income, employment, and poverty reduction in rural areas through production of milk, meat and assisting agricultural operations in many ways in Indian economy [2]. Distribution of livestock is more egalitarian as compared to land that provides about 6% to GDP, and 25% to the Agricultural GDP [3]. It is also considered as one of the potential sector for export earnings [4]. Livestock often are considered separately from the crops, theoretically, but these two components are well integrated having a strong symbiosis [5]. Livestock farming in association with crops is viewed as a good form for sustainable agriculture [6]. It is thought as profitable system of production for farmers of low size of land holdings [7]. The importance of livestock goes beyond its food production-function. Livestock sector provides draught power and organic

manure for agriculture, and hides, skins, bones and so on to the industrial sector [8]. Moreover, livestock are considered as supplementary income for production of crops to absorb shocks, due to crop failure [9], they generate a continuous stream of income and employment to reduce seasonality in livelihood patterns, particularly to rural poor, marginal and small farmers [10, 11]. Women economic empowerment is also projected through their involvement in household livestock rearing, especially of small species like goats [12]. These livestock are described as women's economic resource in India [14, 15]

Though, livestock husbandry is likely to emerge as an engine of agricultural growth in the coming decades, over the last two decades, the growth of livestock has declined globally, especially in developing countries like India. Mainly responsible factors related to environment those have impact on the rearing ecology of livestock [16]. The environmental impacts vary according to distribution of types of soil, relief, climate, seasonal over flow of rivers, and social-economics of the herders. A vulnerable damage is extensive, whereas, invariably changes in cultivation method, shrinking pasture fallow and grasslands, and the over flow of rivers in their catchment areas [17].

II. OBJECTIVES

Keeping into consideration of natural and anthropogenic environmental effects on livestock husbandry, the study was conducted in Jalalabad *tehsil* of Shahjahanpur district with following objectives.

- To assess spatial distribution and growth of livestock and
- To analyse human and natural factors those affect rearing of livestock

Data and methods

The present study is based on both primary and secondary sources of data. Secondary data were derived from Indian Livestock Census, 1988 and 2003. Primary data were obtained through field surveys of selected villages using schedule in 2007-08 from sampled households. On the basis of stratified random sampling 12 villages were selected. There was strata

developed consisting with interior and adjacent villages of *tehsil*/block headquarters, distance from asphalt road and bank of the rivers. Using systematic random sampling 480 respondents, 40 from each village, were sampled and interviewed for detail information regarding natural and anthropogenic factors those affect livestock husbandry. The collected data were processed in tabular form whereas Doi's crop combination (Σd^2) to recognize livestock regions, simple mean and percentage methods were used to analyze and to derive specific conclusions. Maps were prepared with the help of GIS technique, and representation of the data was made through choropleth map and bar diagrams.

Study area

A micro geographical region, Jalalabad *tehsil* (sub-division) was selected as study area. It is situated at southern part of Shahjahanpur district which lies on the tract between foothills of the *Himalayas* and the river Ganga in *Rohilkhand* division of Uttar Pradesh, India. Latitudinal and longitudinal extension of the *tehsil* is 27° 35'-27° 55'N and 79° 37'-79°46' E.

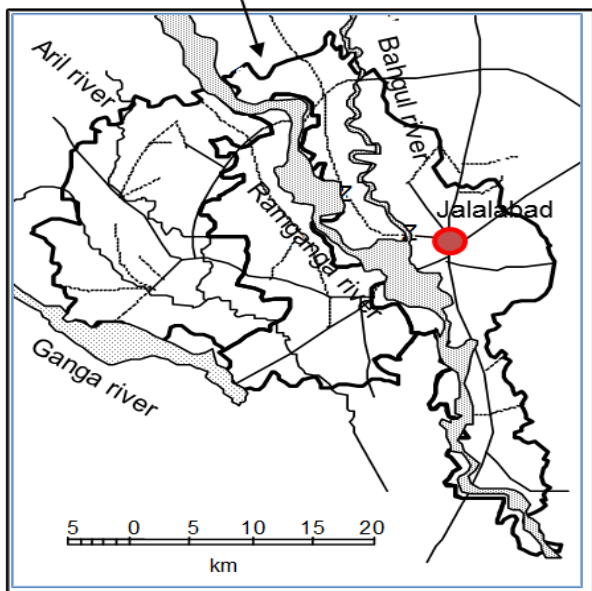
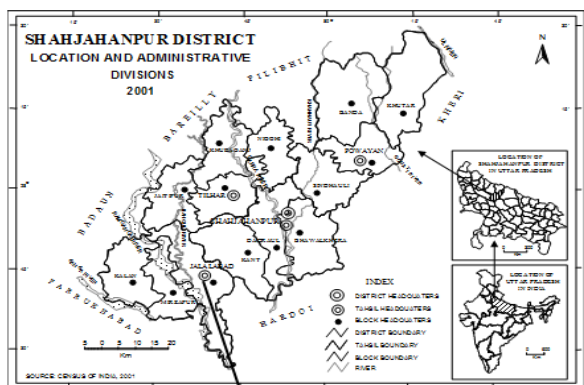


Fig.1 Location of Tehsil Jalalabad, Shahjahanpur

The study is comprised with natural divisions known as the *Ramganga khadar* and the *Bankati jungle* where the river Ganga, the Ramganga and the Bahgul flow with their

tributaries perennially, having a trend of frequent change their courses and winds particularly in rainy season. They brought flood that develops several meanders and ox bow lakes. The *tehsil* has an area of 997 sq. km containing with three blocks, two urban centres, and 370 villages those were inhabited with 0.4 million people. There were 217,693 total heads of livestock consisting of 89,790 buffalo, 64,428 cattle, and 53,746 [11].

III. RESULTS AND DISCUSSIONS

To recognize the study as an ideal livestock combination region among different livestock, Doi's Crop Combination method (Σd^2) was used. Here, Σd^2 is the sum of squared deviation of actual percentage of livestock, i.e., cow, buffalo, goats, pigs, and others. Thus, study area was identified as a region of cow, buffalo, and goats and the study is mainly focused these three species of livestock.

Table 1: Distribution of livestock in Jalalabad Tehsil, 1988

Block	Cow	Buffalo	Goats	Others	Total
Kalan	28654 (31.54)	35098 (38.63)	14172 (15.60)	12922 (14.23)	90846 (100)
Mirzapur	31218 (34.32)	33868 (37.22)	17910 (19.68)	7992 (8.78)	90988 (100)
Jalalabad	28484 (31.46)	32140 (35.50)	16492 (18.22)	13418 (14.82)	90534 (100)
Tehsil (average)	88356 (32.44)	101106 (37.12)	48574 (17.83)	34332 (12.61)	272368 (100)

Source: Indian Livestock Census, 1988

*Figures in parentheses show % to the total

Distribution of livestock

Livestock have multifaceted contributions to growth and development of the agricultural sector in the study region [1]. They provide nutrient-rich food products, income and employment for a big segment of farmers and agricultural labours, draught power and manure inputs to the crops and act as a cushion against crop failure. Despite a contribution of livestock in mutual relationship with agriculture whereas crop residues are used to feed livestock, and livestock are used for multi-operations in agriculture, livestock follow decline trends in recent years (Table 1 & 2).

Table 2: Distribution of livestock in Jalalabad Tehsil, 2003

Block	Cow	Buffalo	Goats	Others	Total
Kalan	21526 (30.88)	29391 (42.16)	15432 (22.14)	3357 (4.82)	69706 (100)
Mirzapur	22940 (29.66)	31251 (40.42)	20029 (25.90)	3111 (4.02)	77331 (100)
Jalalabad	19962 (28.25)	29148 (41.26)	18285 (25.88)	3261 (4.61)	70656 (100)
Tehsil (average)	64428 (29.59)	89790 (41.25)	53746 (24.69)	9729 (4.47)	217693 (100)

Source: Indian Livestock Census, 2003

*Figures in parentheses show % to the total

The increasing tendency was recorded 37.12% to 41.25% for buffalo, and 17.83% to 24.69% for goats during 1988-2003. The population of cow was declined from 32.44% to 29.59% in the *tehsil*. However, the spatial variations were recorded among three blocks.

Growth of livestock

It depicted from analysis of the data that livestock heads decreased at rate of -1.34% per annum which was not homogenous regarding all animals in all blocks. It was negative in case of cow and buffalo (-1.81%) and (-0.75%) respectively. The positive was recorded positively 0.71% annually (Fig.2) because they were mainly reared by landless and agricultural labourers to supplement their income. That is why goats are known as cow of the poor.

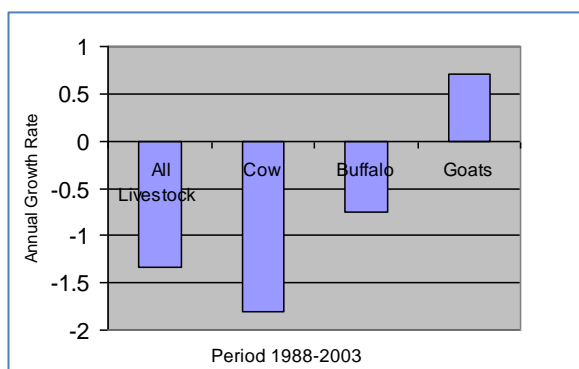


Fig. 2. Growth of livestock in Jalalabad Tehsil, 1998-2003

Table 3 highlights that the highest negative growth was among cow (-1.99%) It was above average in Jalalabad block followed by Mirzapur block (-1.77%) and Kalan block (-1.66%) respectively. The decreasing rate was on the highest in Jalalabad consisted with two urban centres, and comparatively higher mechanization in cultivation, and economic consciousness among the people in the block. Moreover, this block faces high flow in the rivers during rainy season.

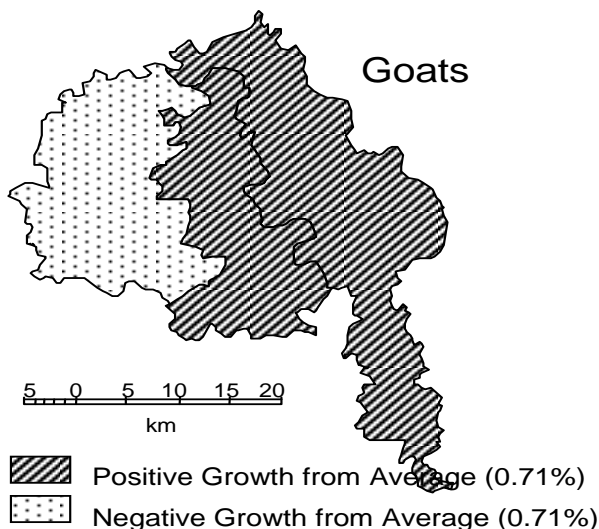
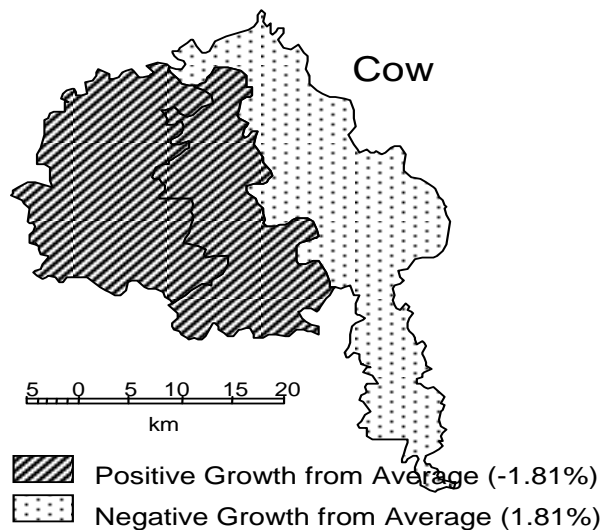
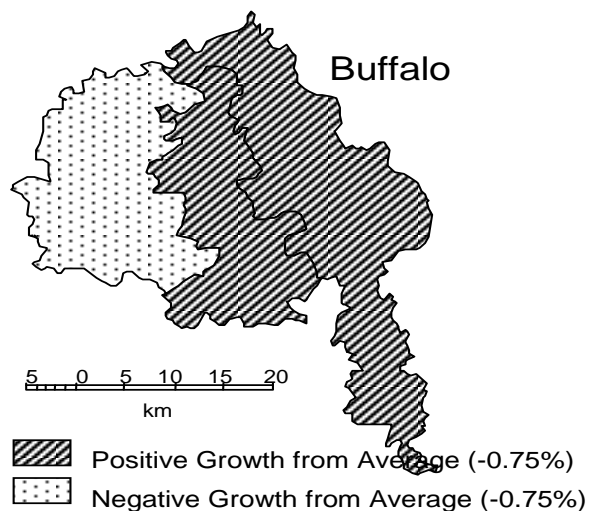
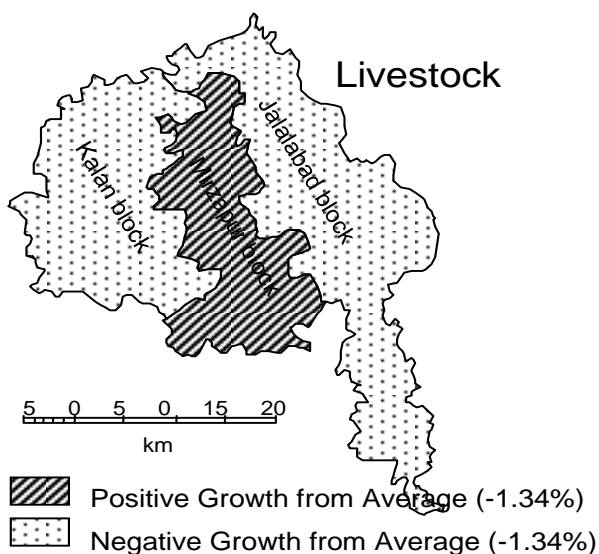


Fig 3. Annual growth of livestock in Jalalabad Tehsil, 1988-2003

Factors influencing rearing of the livestock

The responsible causes for uneven growth and distribution of livestock in the study were recorded during the field survey (Table 3 & 4). There were cow decreased sharply at rate of -1.81% annually followed by buffalo -0.75% per year respectively. It was mainly due to shifting of land use, mechanization in agriculture, low economic return, as well as problem in rearing in all-weather seasons. The major cause in decreasing number of livestock was change in land use shifting of fallow pasture land and forested area to agriculture, construction of roads, settlements and industrial purposes. Consequently, grasslands and grazing grounds for cow have become disappear. Moreover, cultivated land also shifted from traditional crops to markets oriented crops [18]. As a result, problem of grazing ground and fodder shortage have appeared for livestock, especially for cow and buffalo. Thus, the mechanization of agriculture has share 20.83% for reducing cow heads and 48.96% for buffalo respectively.

Table 3: Responsible factors for negative growth of cow and buffalo

Responsible causes/ factors	Causes (%) decreasing of cow	Causes (%) decreasing of buffalo
Shifting land use	25.00	41.67
Mechanization in agriculture	20.83	48.96
Low economic return	19.79	0
Rearing problem in all-weather seasons	16.67	5.20
Flood intensity	17.79	4.17
All	100	100

Source: Field survey, 2007-08, N=480

The livestock rearing also follows economic Darwinism; survival to the fit for economic return [20]. It was recorded during field surveys that cow were not fit for rearing at present scenario in villages. They have been restricted for slaughter purpose due to socio-religious obligation, thereby cow become uneconomical after lactation period. Moreover, oxen have been out dated due to mechanization in agriculture Therefore; they are not as economically beneficial as other livestock. Thus, lower economic return plays at least 20% role in reducing number of cow in the study region. Contrary to it, buffalo were unaffected with this economic whirl (Table 3). They are fit in the time of globalization of economies because they are used for multi-purpose such as milk, meat, and agricultural operations.

Problem in rearing of livestock in all-weather seasons contributed 16.67% for cow and 5.20% for buffalo. It was due to lack of place for rearing in small size houses. As study region is socio-economically backward, and population growth was high (2.83%) that force defragmentation of family, as size of houses and land [11]. Besides, traditionally livestock are ranched at home with family members. Flood is a spatial feature of the study area that contributes 16.67% and 4.17% shares in reducing number of cow and buffalo. There are two

main rivers namely the Ganga, the Ramganga and their tributaries those flow in the *tehsil* hazardous flooded every year in rainy season since last decade due to anthropogenic causes (construction activities), and changing behaviour of precipitation [19]. Consequently, the traditionally livestock rearing belt at adjoining areas of the rivers are submerged with flood water which affects rearing pattern of livestock leads enhance rearing, small animals, i.e., goats.

Table 4: Responsible factors for growth of goats

Responsible causes/ factors	Causes (%) increasing of goats
Grazing and feeding	33.33
Small place for rearing	22.92
Good economic return	27.08
Adjustable in all-weather seasons	16.67
All	100

Source: Field survey, 2007-08, N=480

Goats were favorite livestock among small farmers and rural poor dwellers and enhanced rearing since 1988 with annual growth rate 0.71 per year. There were grazing and feeding major causes rearing livestock; it was noted during field surveys that there were due to changes in cultivated areas, use tractors in agriculture, and shrinking of grasslands and pasture of lands, big species of livestock, i.e., cow, buffalo were not prefer. While, for grazing and rearing of goats small spaces are required. Moreover, the study area is dominated by agricultural labourers, marginal and small landholders who reared goats' particular by the poor and women. They are known as women's resource and poor's cow because, they are reared to get easy and quick cash to sustain nutritional security of the family members. Goat transaction also provides a good economic return due to their excessively high demand for both meat and rearing purposes. That is why the share of economic return is 27.08% in increasing number of goats (Table 4).

VI. CONCLUSIONS

Livestock make versatile contributions to growth and development of the agricultural sector in study region. The overall growth of livestock was -1.34% per year but in case of cow it was more negative than average of livestock, however, goats were recorded with positive growth. The analysis of data reveals that livestock heads are decreasing due to changing of land use pattern, mechanization of agricultural, frequent change in weather, intensity of flood and economic return. Overall, in spite of decreasing the total number of livestock, their contribution for livelihood of poor and land less farmers was positive. Livestock rearers are going to be conscious for their economic sustainability so they prefer to rear goats, instead of cow. However, to achieve the goal for development in rural areas, it is necessary to formulate policies and take actions to control decreasing population of livestock, and ensure their positive growth. Thereby, the poor and the people of weaker sections of rural areas are able to get maximum benefits, income, and livelihood to survive their lives.

REFERENCES

1. FAO (1999). World Agriculture: Towards 2015/2030 - An FAO perspective. www.fao.org/docrep/005/y4252e/y4252e07a.htm
2. Khan, N. and Ali, M. (2008). Geographical Analysis of Livestock Trade through Rural Markets in Shahjahanpur District, Uttar Pradesh, *The Geographer*, vol. 56 (2): 58-66.
3. Ali, J. (2007). *Livestock Sector Development and Implications for Rural Poverty Alleviation in India*, Agriculture Management Centre, IIM, Lucknow, India.
4. Ali, M. and Neka, M. (2012). Livestock Husbandry and Economic-Sustainability of Small Farmers in Peri-Urban Areas: A Case Study from West Gojjam Region, Ethiopia, *Ethiopian Journal of Environmental Studies and Management*, vol.5 (2): 207-17.
5. Bujarbaruah, K.M. and Rohilla, P.P. (2001). Role of Livestock in Farming System of NEH Region, *Indian Farming*, vol. 51 (9): 39-40.
6. Fakoya, E. O. (2007). Utilization of Crop-livestock Production Systems for Sustainable Agriculture in Oyo State, Nigeria, *Journal of Social Science*, vol. 15 (1): 31-33.
7. De Leeuw, P.N. (1971). The Prospects of Livestock Production in the Northern Guinea zone Savannas, *Samaru Agrie News*, vol. 13: 124-133.
8. Khan, N., Iqbal, A. and Ali, M. (2010). Livestock Revolution and Its Impacts on Sustainability of Marginal and Small Farmers in India: A Case Study, *Asian Profile*, vol.38 (6):579-89.
9. Jost, C. (2004). Men, Women, Children, and Livestock: A Livelihood Analysis of Region Kuchi Focused on Gender and Animal Health Kabul, *GRM International*, 37. www.tufts.edu/vet/vetcommon.
10. Ali, M. (2009). *Geography of Agricultural Marketing at Grass Roots Level*, Pacific Publication, New Delhi.
11. Birthal, P. S. and Ali, J. (2005). Potential of Livestock Sector in Rural Transformation, In: *Rural Transformation in India: In: Rohini and Sharma A N (eds) The Role of Non-farm Sector* Institute for Human Development, Manohar, New Delhi.
12. Okaiyeto, P. (1977). *The Social and Economic Importance of Cattle in Nigeria*. Zoria, Faculty of Veterinary Medicine, Ahmedu Bello University.
13. Kumar, A. (2003). Women in Livestock Sector Development in Uttranchal, *Indian Farmers Digest*, vol. 36 (11-12): 44-45.
14. Maity, S.B. and Das, M.M (2000). Goat Farming-A Profitable Enterprise at Bundelkhand Region, *Indian Farming*, vol. 50 (8): 28-29.
15. Attari, B.L. and Shrivastava, S.K. (2004). Empowering of Women Farmers of India, *Agriculture Today*, vol. 7 (11): 54-56.
16. Randhawa, M.S. (1962). Agriculture and Animal Husbandry India, *Advisory Planning Commission, ICAR*, New Delhi.
17. Ali, M. (2014). Environmental Impact Assessment of Diversification of Horticultural Crops in Ethiopia: A Case Study, *American Journal of Experimental Research*, vol. 4 (1): 90-100.
18. Ali, M. (2009). Market Value Changes Farming of Crops: A Study of Shahjahanpur District, *H.R. Journal of Management*, vol. 2 (2): 19-26.
19. Net/India(2008).<http://www.andhranews.net/India/2008/September/28-Flood-situation-remains-66514.asp>
20. Ali, M. (2012). Livestock Trade in Semi-Subsistence Type of Rural Economy: A Case Study from India, *International Journal of Management, IT and Engineering*, vol. 9: 353-68