Livestock Development in Meghalaya: Biodiversity, Threat and Conservation

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Abstract

Meghalaya is very rich in animal fauna having a substantial number of livestock that includes cattle, buffalo, sheep, goat, pig and poultry. Along with crop production, farmers depend on livestock for their livelihood. The tribal populations of the state are non-vegetarian. Meat from pig, cattle, goat, sheep and poultry birds is mostly being consumed and there is no taboo for consumption of meat. In spite of having huge livestock and fish biodiversity, the region is not self sufficient in terms of livestock production. Meghalaya is highly deficient in all the livestock products like milk, meat, egg, etc. This may be attributed to the low productivity of the livestock and also due to the fact that the farmers have not taken up large-scale livestock farming as entrepreneur. There is a huge gap between demand and production of livestock particularly cattle, pig and poultry in the region. It is being imported worth thousand millions of rupees from neighboring states like Assam, Bihar, West Bengal and Andhra Pradesh to meet out the demand of meat and meat products. It is, therefore the need of the hour to understand the strength of faunal biodiversity of the region, the factors which are harmful for the biodiversity and measures to be taken to conserve it.

1. Introduction

The hill state of Meghalaya, located in the North-Eastern region of the country, has a geographical area of 22,429 km², which is only 0.7 % of the country's geographical area. The state has a forest cover of 15,584 km². Total population of the state is 23, 18, 822 persons (2001 census). The density of the population is 103 km⁻². 85.9% of the total population is schedule tribe and 80.42% of the population lives in rural areas. Majority of the farmers in these regions follow mixed crop-livestock farming systems wherein livestock rearing is integrated with food crop production. The growth of livestock sector has been found slower in the North-Eastern Region (NER) of India than the national level. However, a significant proportion of landless laborers, small and marginal farmers have access to livestock resources and acceleration in the growth of livestock offers significant opportunities for household income augmentation and employment generation. Most of the farmers in the state are small and marginal and mainly follow the mono-cropping system and *Jhum* cultivation, which is the traditional agriculture in hilly areas. Due to soil erosion during monsoon, low fertility of the soil and indiscriminate mining diminishes the area of cultivation. Therefore, crop production alone cannot provide round the year farm income that is why animal husbandry has become an important farm activity for sustaining

their life. The consumption of meat is relatively higher in this region, and that of milk and milk products is lower. Coupled with the traditional meat-eating habit, increasing per capita income, urbanization and changes in life-style, the region is deficit in production of livestock products. However, responding to the rapidly increasing demand for livestock products in a sustainable manner is a big challenge. The widening gap between the demand and supply of livestock products can be bridged by introducing changes in production structure or opening up the international trade, either of which can correct the imbalances in the long run.

2. Livestock Biodiversity in Meghalaya

As per the 17th livestock census, the state of Meghalaya had 0.41% of cattle, 0.02% of buffaloes, 0.03% of sheep, 0.26% of goats and 3.10% of pig population of the country. The poultry population is 0.58% of the country's total poultry population. The crossbred cattle population has increased much by 35.3% and indigenous cattle have just increased by 0.8 % during the period between 16th and 17th census. There is an overall increase of 1.6% in total cattle population during the inter-censual period. Buffalo, sheep, goats and pigs have shown an increase of 5.9%, 16.8% and 19.4%, respectively. Total livestock in the state has increased from 1.422 million to

1.551 million between these two censuses showing an increase of 9.1% (Table 1 and 2).

Major reasons for the farmers not rearing the crossbred dairy cattle is non availability of green fodder round the year, high cost of concentrate feed, high input cost in terms of housing and management and less adaptability to the local conditions. Due to their small body size and heat tolerance, native cattle are well adopted to the local conditions.

2.2. Buffalo

Buffaloes are found in almost all states of NER. Total buffalo population in this region is 840 thousands. Population of buffaloes in Meghalya is very less, i.e. 18 thousands. Buffaloes found in this region are considered to be of swamp type. Average milk yield has been recorded to be around 500 kg lactation^{-1} compared to around 850-1060 kg lactation^{-1} in reverine buffaloes of India, but the quantity of milk in swamp buffaloes of NER are found to be very good. These swamp buffaloes are mainly used to plow the agriculture field and for transportation purpose.

2.3. Goat

Total goat population in NER is 4366 thousands. Out of which 327 thousands are found in Meghalaya. The goats found in this region are of three genetic groups, viz. Assam hill goat, Sikkim local and Black Bengal goat besides the non-descript goats. Assam hill goats are mainly found in the hills of Assam, Meghalaya, and part of Nagaland. The Assam hill goats are of very small in size weighing around 12 kg at 12 months of age. They are very poor milker and are mainly reared for meat purpose. However, due to poor productive performance, goat husbandry has not been popular among the farmers.

2.4. Pig

Pig population in NER has been recorded to be 2427 thousands and is distributed almost equally in all the states. Pig population of Meghalaya is 419 thousands which are non-descript local pigs, crossbred and exotic breeds. Local pigs found in different states of the NER (7 states) are having different genotypic and phenotypic characteristics. The productive and reproductive performance in all pig varieties of this region is very poor. However, ICAR Research Complex for NEH region has developed the upgraded pig variety by crossing selected indigenous local pigs of Meghalaya with exotic Hampshire boars which is found to be highly profitable in terms of growth rate, body weight, litter size at birth and well adopted to local conditions. These upgraded pig variety is highly popular among the farmers.

2.5. Sheep

Sheep are mainly found in Assam, Arunachal Pradesh and Meghalaya. In Assam and Meghalaya, they are found throughout the state but not in organized farms and are mainly being reared for meat purpose. Total sheep population in Meghalaya is reported to be 18 thousands.

Table 1: Population of different livestock species in Meghalaya

Livestock Population (000)	1997	2003	% Increase/ decrease
Crossbred cattle	17	23	35.29
Indigenous cattle	738	744	0.81
Total cattle	755	767	1.59
Buffaloes	17	18	5.88
Total bovines	772	785	1.68
Sheep	17	18	5.88
Goats	280	327	16.79
Pigs	351	419	19.37
Others	2	2	.0.00
Total livestock	1422	1551	9.07

Source: Livestock Census, 2003

Table 2: District-wise livestock population in Meghalaya

Name of district/ livestock species	Cattle	Buffaloes	Sheep	Goats	Horses and ponies	Pigs	Total livestock
East Khasi hill	54434	226	5776	53041	216	105786	219479
Ri-Bhoi	57471	3604	166	13407	96	37688	112432
West Khasi hill	105119	2884	5132	54781	1050	62638	231604
Jaintia hill	133255	2048	732	24642	415	54169	215261
East Garo hill	156186	977	41	38587	21	57833	253695
West Garo hill	220562	8223	6228	120311	18	81140	436482
South Garo hill	39988	41	128	22563	17	19676	82413
Meghalaya	767015	18003	18203	327332	1833	418930	1551366

Source: Statistical Handbook, Meghalaya, 2007

2.6. Duck and poultry

Total poultry population in the region is 36,462 thousands which include exotic breeds, broiler and local breeds. Some local varieties of poultry, viz. *Miri*, *Davo Thigir*, *Brahma*, etc. having specific characteristics are also found in Meghalaya. *Miri* is an egg type breed and are efficient mother. *Brahma* and *Davo Thigir* are good for meat production. Some of these varieties are having good fighting characteristics. Some duck varieties, viz. *Pati* and *Nageswari* found in Meghalaya are of non-descript and dual purpose type. Ducks are being reared both for egg and meat. Egg production in these varieties is very low ranging from 50 to 80 numbers. Indiscriminate crossing with high yielding breeds is leading to dilution of purity in the indigenous duck.

2.7. Fish

With the availability of enormous aquatic resources, the NER of the country is regarded as one of the hotspots of fresh water fish biodiversity in the world. A total of 274 fish species have so for been identified from this region. This includes food fish, ornamental fish, cultivable fish and sports fish. The region possesses some of the rare and uncommon ornamental fish having a tremendous potential for exporting. Some of the potential ornamental fish are *Brachydanio merio*, *Danio dangila*, *Esomus danricus*, *Batia dario*, etc. However, due to the destruction of habitat and fishing methods, many of the indigenous fish fauna are under serious threats. Therefore, concrete efforts are needed from all to protect the gifted and highly valued fish resources of the region.

3. Status of Livestock and its Products

According to the livestock statistics of Meghalaya, there was a considerable increase in the population of cattle, goat, pig and poultry between 1988 and 2003 but the population of buffalo, sheep, and horse were decreased (Figure 1 and 2). Production of livestock products like milk, meat and eggs were also increased from 1993 to 2005 (Table 3). Since the production has not increased at the same pace as the demand; there exists a huge gap between the production and requirement in animal products. The per capita availability of milk in Meghalaya is 75 g as against all India availability of 211 g haed^{-1} day^{-1}.

Similarly, availability of egg is 38 numbers head^{-1} year^{-1} as against NRC recommendation of 180. There is deficiency in meat production also. However, the requirement is met by importing live animals from outside the region where a substantial amount of money from the state goes out. Though the total production of milk, meat and egg has increased in recent past the deficiency still remains. This may be attributed to the fact that the human population has also

Table 3: Comparative analysis of milk, meat and egg production in Meghalaya from 1993-94 to 2004-05

Year	Milk production ('000 t)	Meat production ('000 t)	Egg production (million)
1993-94	52. 9	23. 5	73. 0
1994-95	54. 0	24. 7	75. 0
1995-96	55. 4	26. 5	77. 0
1996-97	57. 4	27. 7	79. 2
1997-98	59. 1	28. 8	81. 4
1998-99	60. 7	29. 6	82. 6
1999-2000	61. 6	31. 6	84. 7
2000-01	64. 0	33. 0	87. 0
2001-02	65. 8	34. 0	90. 2
2002-03	67. 7	35. 5	91. 6
2003-04	68. 23	35. 64	93. 54
2004-05	71. 65	37. 84	94. 90

Source: Statistical Handbook, Meghalaya, 2007

increased simultaneously side by side. Therefore, greater efforts are necessary to bridge the gap between production and requirement.

Milk production has increased in Meghalaya from 52.9 thousand t in 1993 to 71.65 thousands t in 2003 (Table 3). But the increase was at a slower rate than that at national level (4.27%). Similarly, meat production has increased very slowly from 23.5 thousands t in 1993 to 37.84 thousands t in 2003. The slow growth of milk and meat production in Meghalaya can be explained by the compositional change in the livestock population over the years. Percentage of crossbred cattle population is very low as compared to all India average. Average milk productivity of crossbred cattle in India is 6.5 l day^{-1} but in NER, it is 4.7 l day^{-1} which is still lower in Meghalaya. The average productivity of local cattle and buffalo is less then half of the national average. Similarly, the growth performance of indigenous pig and beef cattle, which accounts the major share of meat production in the state, is very poor. These indigenous pigs and beef cattle are small and low carcass yielder, while the crossbred pigs and cattle grow faster and produce high carcass. In fact the indigenous pig population in Meghalaya has been doubled from 1992 to 2003. The preference of tribal people for indigenous pig meat over crossbred and the premium price paid for it by urban consumers, induce the pig producers to continue to rear the indigenous pigs in Meghalaya. Growth in egg production has also been much slower in Meghalaya than at all-India level (5.7%). This is due to the fact that the local or indigenous birds are low egg producer, unscientific methods of rearing practiced

by the poultry farmers and high cost of feed in Meghalaya.

4. Developmental Programs

Several developmental programs were initiated and implemented during various five-year plans since 1992-93 to improve the production of different livestock products in the state of Meghalaya. In spite of all the efforts, the targeted achievements could not be attained due to certain constraints. Considering the state of development of animal husbandry and veterinary sector in Meghalaya, emphasis was laid during tenth plan to continue on growth of infrastructure and to create conditions to increase the production of meat, milk and egg and also to generate self-employment to the people through livestock farming. The following programs were undertaken by the State Animal Husbandry and Veterinary Department (SAHAV) for livestock development in Meghalaya.

4.1. Cattle development program

Cross breeding of the local non-descript indigenous cattle with exotic breed was started through artificial insemination using frozen semen to increase the milk production in the state. Action has also being initiated for production of quality males as it would be an essential component of breeding policy. It was opined by the SAHAV Govt. of Meghalaya that a milch herd of around 1 lakh cows and buffaloes with effective genetic improvement for milk production would be sufficient to meet the demand of milk in the state.

4.2. Meat production

It was estimated that during eighth plan 40% cattle, 11.2% pigs and 18. 36% goats were imported to meet the requirements of meat. Therefore, emphasis was laid on to increase more crossbred cattle, pig and goats by crossing them with exotic breed to improve the meat production in Meghalaya.

4.3. Feeds and fodder

Since the productivity of livestock is dependent on the availability of feeds and fodder it was planned to make available the required feed ingredients throughout the year besides to exploit non-conventional animal feed resources to meet out the required nutrients for the livestock. During the tenth five-year plan, various developmental programs like cattle development, piggery development, sheep, goat and rabbit development, feeds and fodder development besides veterinary services and animal health were undertaken to increase the milk, meat and egg production and to provide better health care for livestock covering more areas. In addition to the above, following new schemes have also been proposed.

- Assistance to private entrepreneurs for rearing beef cattle to meet the demand of meat
- Development of infrastructure for piggery farming by the department for the group or society of educated

unemployed youth to meet the demand for pork
- Setting up of three new pig farm
- Organizing training programs and rendering necessary assistance to women to take up poultry farming
- To set up diagnostic laboratory in each district of Meghalaya for quick diagnosis of disease
- Upgrading veterinary aid center into veterinary dispensary to provide better veterinary health care
- Establishment of three additional vocational training centers in addition to the two vocational training centers to train the farmers and unemployed youth on modern animal husbandry practices for self-employment and more production of meat, milk and egg
- To provide facilities to the farmers for processing and marketing of livestock products

Through the implementation of above schemes the SAHAV is expected to improve the present production status of livestock products besides improving upon the livestock health care facilities. From the detail programs and proposed schemes it appears that the department is moving in the right tract to keep balance on the production and requirements of livestock products in the state. However, to reach the desired goals some more actions needs to be taken for overall improvement of the present scenario.

- The hilly terrain of Meghalaya is more suitable for horticultural crops and animal husbandry. Extensive areas are lying as fallow land in the state. These areas can be best utilized for animal husbandry and horticultural crops. Schemes may be prepared to use these barren fallow lands and develop into high quality pasture land for goats and beef cattle. Goats and discarded male cattle population can be reared in this type of land with minimum expenditure. These animals do not require much concentrate feed and can be reared in high quality pasture land supplemented with vitamins and mineral mixture.

- Most of the farmers of the state are not aware of scientific breeding, feeding and management of the livestock for which the required production level is not attained by the livestock. The extension workers have to play the most vital role in this respect. Therefore, extension functionaries need to be strengthened to make aware the farmers on the latest technologies developed and also on scientific breeding, feeding and management of livestock.

- The farmers of Meghalaya are mostly small and marginal farmers and keep one or two animals and few birds in their backyard. These farmers should be encouraged for semi-commercial type of farming by providing them some subsidy for establishing small breeding units. Villagers/ farmers should be encouraged to form Self Help Group

(SHG) and the department should extend all possible help in establishing commercial/semi-commercial livestock farming for more production.

- Immediate action needs to be taken to find out locally available ingredients, which can be utilized as feed supplement for the livestock. Besides, the fallow lands need to be developed for cultivation of fodder for livestock.

- Local farmers should be encouraged to take up cattle farming for milk production even in small scale also to fill the gap of milk production deficiency in the state to some extent. Establishment of livestock seed farm at least one in each district on cattle, pig and goat for regular supply of superior germplasm. These farms may buy back the finishing product from the farmers and arrange to slaughter the animals/sale the products to the consumers.

- Establishment of organized slaughter house, at least one in each district, on public-private partnership mode to augment the meat production. Besides producing clean meat for the consumer it will also help the farmers to sell their livestock thereby creating marketing facilities for the farmers. The slaughter house will also help in producing value added products.

- Establishment of collecting centers for the produce of dairy cattle farmer along with cold storage facilities will help the farmers to sale their dairy products since there is no proper market in the villages for the dairy products in Meghalaya. It is also not economic for the farmers to go to the town/city to sell their products. Facilities need to be created to establish dairy unit at least one in each district headquarter for collection, pasteurization and storage of milk and milk products. These dairy units besides marketing will also help in producing value added dairy products for the consumers.

- One village in each district of the state can be adopted by the department and make it as a model village for livestock production. Looking into these villages progressive farmers from other villages are also likely to take up livestock farming in a bigger way thereby making Meghalaya self sufficient in livestock products. In addition, the state will be able to export its livestock products and help in earning revenue for the state.

- Coordinated programs with livestock research organizations may be taken up by the State Animal Husbandry and Veterinary Department for the latest technologies developed in this sector and to implement these technologies in the field through their extension workers for better production. It may be concluded that there is a tremendous scope to develop Meghalaya into a state whose economy can largely depend upon livestock products.

5. Threats to Animal Biodiversity

5.1. Deforestation and degradation

Primary vegetation in extensive areas of NER has been disturbed and modified and in some places destroyed by seismic activities, frequent landslides, and resultant soil erosion. While these natural causes have contributed only marginally to the change in vegetation type, human-induced activities have led to irreversible transformation in the landscape and resulted in great loss of biodiversity throughout the region. Shifting cultivation, *jhuming*, or slash-and burn agriculture is the major land use in NER of India extending over 1.73 m ha area (FSI, 1999). Different agencies have made various calculations of the total area under shifting cultivation in the region. This traditional practice has largely been blamed for deforestation in the region. Use of poison and dynamite has been responsible for depletion of fish stocks in the water bodies. NER of India has 64% of its total geographical area under forest cover and it is often said that it continues to be a forest surplus region. However, the forest cover is rapidly disappearing. There has been a decrease of about 1,800 km^2 in the forest cover between 1991 and 1999. More worrisome is the fact that the quality of the forest is also deteriorating, with the dense forests (canopy closure of 40% or more) becoming degraded into open forest or scrub.

5.2. Agriculture

The economy throughout the region is agrarian in nature. The inaccessible terrain and other factors have made industrialization in this region difficult, and agriculture has therefore been the main livelihood among the hill and plain tribes. In addition to settled agriculture (mainly paddy cultivation), shifting cultivation is carried out by many tribal groups. *Jhuming* is one of the most ancient systems of farming, believed to have originated in the Neolithic period around 7,000 BC, and it is intricately linked with the ethos and the socio-cultural values of the tribal communities (Borthakur, 2002). *Jhuming* has often been blamed for having adverse effects on ecology and conservation, including destruction of soil fertility, soil erosion in the upper catchments resulting in sedimentation of water bodies, destruction of wildlife and natural habitat, and flooding. Along with *jhuming*, there are also other practices such as bun cultivation for potatoes, particularly followed on the hill slopes of Meghalaya, which have the potential to cause both soil and water erosion. Similar instances can be found of settled agriculture being responsible for causing loss of biodiversity.

5.3. Forest fires

Forest fires are common and frequent, especially at the end

of the winter season, affecting about 20% of the total forest area. Villagers set fire to the forest floor, which is littered with inflammable dry leaves and twigs. Regeneration (natural as well as artificial) is affected and wildlife and their habitat are impacted negatively (Semwal, 2003). The hill forests may be burnt when *jhum* fires go out of control and spread to the surrounding areas. This is causing immense harm in the catchment areas of major rivers. Fire poses a serious threat to biodiversity as only hardy species are able to survive; microflora and microfauna are often destroyed.

5.4. Replacement of indigenous species with exotics

Due to the increase in demand for certain products, such as food grain, vegetables, milk, and meat, some high-yielding varieties of plants and animals have been introduced leading to reduced propagation of indigenous varieties. In some cases, the indigenous varieties have been altogether ignored. New varieties of poultry, fish, livestock, and fruit have been introduced for mass propagation and higher production. Crossbreeding between local varieties of animals and exotics has been undertaken. Though production has increased, the crossbreds are susceptible to disease, sometimes causing large losses of livestock and birds. The unsustainable harvesting of fish, crabs, and prawns, often by means of poison, bombs, or electric generators, can cause irreparable damage to aquatic systems. Hunting, trapping, and snaring of wild animals and birds are also common in the state.

5.5. Uncoordinated infrastructure development

Some of the developmental pressures are new to the fragile region and are taking place at a pace that does not permit a thorough environmental assessment of possible ecological impacts. Activities such as construction of road, which is an essential component of developmental infrastructure, sometimes cause destruction of biodiversity. Mining has been a cause of concern in Meghalaya. Coal extraction uses a primitive mining method commonly called rat-hole mining. Dumping of coal has been the cause of air, water, and soil pollution. Water in coal mining areas has been found to be highly acidic, with low dissolved oxygen (Patiram and Kumar, 2005).

6. Conservation of Animal Biodiversity

Meghalaya has rich and diverse livestock genetic resources as evident from the availability of all species of livestock and large number of breeds/strains. Meghalaya has some of the best breed of dairy, draught and dual purpose cattle. These breeds of livestock and poultry are essentially the products of long-term natural selection and are better adopted to withstand tropical diseases and perform under low and medium input. Many of these breeds may have useful genes for fast growth, prolificacy, and adaptability. Such utility genes and breeds shall be identified, conserved and utilized. Many of the indigenous breeds

because of poor economic viability are showing decline in numbers and even facing extinction. The livestock owner may neglect such relatively less productive breeds and, therefore, the state shall take up the responsibility of conserving them and appropriate action is being taken accordingly.

7. Conclusion

It is the need of the hour to conserve our indigenous fauna and to prevent them from extinction. The livestock serve the humans through their multi-dimensional role in agriculture. The original characteristics of these animals need to be preserved. The new livestock policy must be formulated which should be ecologically sound and socially acceptable. More emphasis should be given on production of native breeds and conservation of animal biodiversity, strengthening the role of farm animals in sustainable agriculture, taking urgent steps to improve the fodder situation by planting the crops and trees necessary for the livestock, preventing the import of environmentally unsound methods of intensive farming of animals, which degrade and pollute the environment, stopping the export of oil cakes and livestock feed and preservation of natural aquatic resources like reservoirs, lakes, and ponds to preserve the ichthiofauna. Some action has already been taken for conservation of livestock through the establishment of National Research Center (NRC) on pig, yak and mithun in NER by Indian Council of Agricultural Research (ICAR), New Delhi. Some more such centers need to be established for conservation of other species also.

8. Acknowledgements

9. References

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