

# Current scenario of livestock development and potential interventions for livelihood improvement: **The cases of Arunachal Pradesh and Mizoram**

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SIR RATAN TATA TRUST &  
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# Current scenario of livestock development and potential interventions for livelihood improvement:

The cases of Arunachal Pradesh and Mizoram

Background Paper

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## Executive summary

Arunachal Pradesh, located in the northeastern part of India is a predominantly tribal state. A traditional system of livestock farming is followed. The main objective of rearing cows is to produce male offsprings for draught purpose and manure. The animals are not stall fed. In this low-input system, the output is apparently poor. In certain remote areas where milk is not a part of the diet of the people, farmers do not milk the cows. Small ruminants such as goats are reared in an open grazing system, with least attention paid to their feeding, housing, disease control, vaccination and management. These animals serve as insurance for the family in times of need and also as feast for guests. Pig farming is also popular. Poultry is reared under traditional semi-intensive scavenging backyard poultry system and on intensive small-scale farms. Livestock farmers are also faced with problems in marketing.

It is necessary to create awareness among the farmers in Arunachal Pradesh about the potential of improved methods of livestock rearing to improve their livelihoods. The other stakeholders such as meat traders also need to be made aware of improved methods of slaughter and the value of food safety and hygiene in marketing of meat. The existing informal marketing system needs to be restructured for ensuring higher profit margin for the producers. Facilitating supply of superior quality inputs along with training of farmers to make efficient use of these inputs is also essential. Appropriate and economically viable technological interventions are necessary for upgrading the nutritional quality of available feed and fodder.

Mizoram is the least populated state in the northeast. Nearly 50% of the population lives in urban areas. Over 94% of the population is Scheduled Tribes. Livestock comprises large and small ruminants, pigs and poultry which are quite evenly distributed across the state. Cattle are mostly owned by medium-scale farmers, while poultry and pigs are important sources of livelihood for the landless, near landless, marginal and small farmers. A small proportion of semi-medium and large farmers also own poultry and pigs. The livestock sector contributes 30% of the value of output from agriculture and its allied activities.

One of the major constraints in livestock production is the lack of orientation and awareness among the farmers about the potential of livestock as a revenue generation activity. Farmers either maintain their animals on unbalanced home-grown feed and common property resources or are compelled to buy expensive feed resulting in low economic returns. Lack of credit facilities in the northeastern region in general and Mizoram in particular is a serious constraint for promoting development activities. The market system is unregulated and dominated by private traders and middlemen.

As the dietary preferences of consumers in the state are towards animal products, there is good scope to increase the production of food from animal origin thereby generating income and employment opportunities for the farmers. Consumer awareness campaigns about the benefits of milk consumption can increase the demand for dairy products and ensure higher economic returns for the dairy farmers.

Apart from tribals who are predominant in the state, households from other social groups should also be covered in the livestock development programs. Future investment efforts in Mizoram need to first improve access to the market and subsequently ensure availability of production inputs for increase in income.



# 1 Introduction

## 1.1 Background of the study

Livestock is an integral component of the farming system in India. The livestock sector is socially and economically very significant due to its multi-functional outputs and socio-cultural security. This sector is adding value to the tune of India Rupees (INR)<sup>1</sup> 1310 billion (4.2%) to the national Gross Domestic Product (GDP) as per statistical data of 2007–2008 at 1999–2000 prices, by contributing over 25.6% to the agricultural GDP and providing employment to more than 20 million people.

However, public investment in animal husbandry and dairying (AH&D) has not been commensurate with the contribution of this sector to the national economy. Since the Fifth Five Year Plan, the outlay for AH&D has been less than 10% of the total allocation for agriculture. In 2008–2009, the aggregate state capital expenditure on livestock was only 5.5% of the public investment in agriculture and its allied activities and only 0.19% of the capital expenditure for developmental activities.

The growth in this sector has been limited to certain regions. For example, the states of Gujarat, Punjab and Haryana have emerged as dynamic dairy regions, while poultry has shown faster development in southern India, particularly Andhra Pradesh. The focus has been less on small ruminants and pigs particularly in the eastern and northeastern parts of the country.

The eastern and northeastern states of Bihar, Jharkhand, Orissa, West Bengal, Assam, Arunachal Pradesh, Mizoram, Meghalaya, Tripura, Manipur and Nagaland are predominantly rainfed regions that have been bypassed by the agricultural revolution that the country (especially northern India) experienced till the late 1980s. These states trail behind the national averages in agricultural productivity, availability of infrastructure, per capita income etc. Apart from the poor growth in crop production, these states have also recorded slow development of the livestock sector.

Based on the potential of the livestock sector to generate income and employment, the Navajbai Ratan Tata Trust (NRTT) has taken up the challenging task of livestock development in the underprivileged states of Jharkhand, Arunachal Pradesh, Mizoram, Nagaland and Uttarakhand, with special focus on tribal and other marginalized groups to improve their livelihoods. The International Livestock Research Institute (ILRI), the technical partner in this project, will be developing a long-term proposal focusing on Enhancing Livelihoods through Livestock Knowledge Systems (ELKS) in these states.

The background papers provide empirical inputs for formulating a suitable livestock investment strategy for the states of Arunachal Pradesh and Mizoram based on the existing situation in these states.

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1. India Rupees (INR). On 26 July 2010, USD 1 = INR 46.8151.

## 1.2 Objectives and approach

The specific objectives of the study are to:

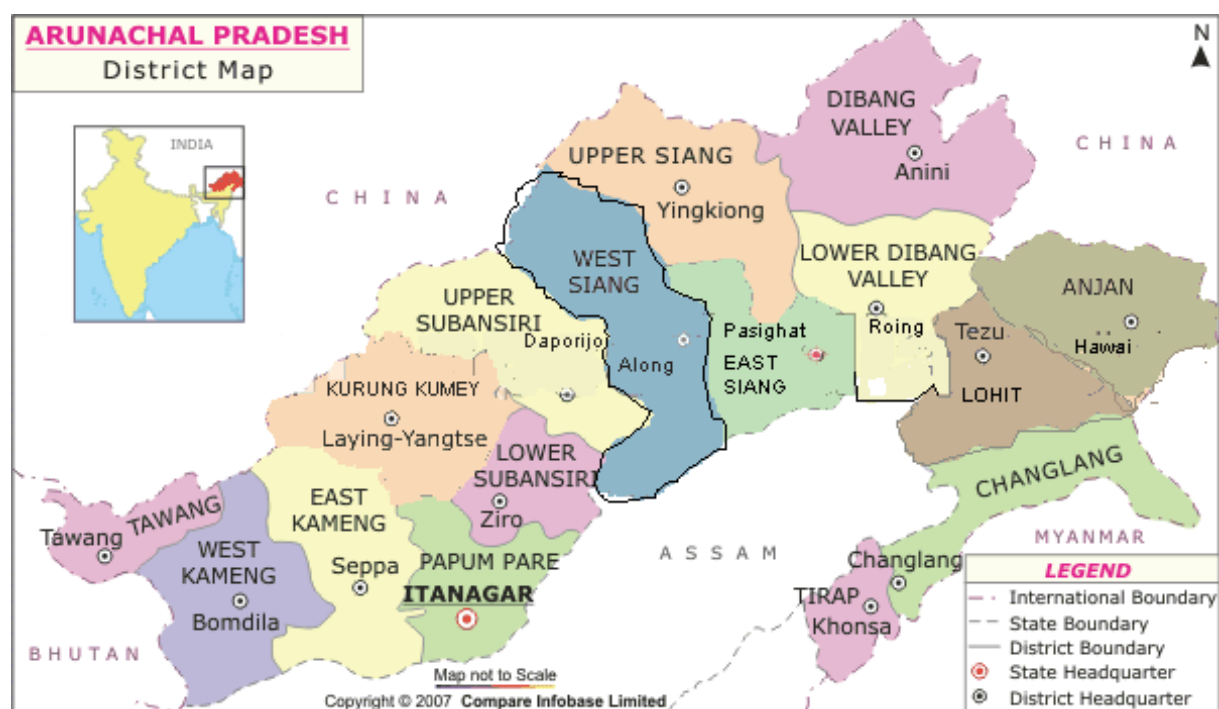
- assess the livestock development situation in the states
- identify the target (poor) livestock communities
- delineate the constraints in livestock development and outline the threats faced by the poor livestock holders
- assess the opportunities for growth
- review the success and failures of past interventions in the area
- suggest technical, institutional and policy interventions to improve the livelihoods

This study conducted in Arunachal Pradesh and Mizoram is based on secondary information collected from various published and unpublished sources, apart from data analysed from a field survey.

## 2 Arunachal Pradesh—State profile, livestock and opportunities for livelihood improvement

### 2.1 Geographical profile

Arunachal Pradesh (Figure 1), situated in the northeastern part of India, became the 24<sup>th</sup> state of the Indian Union in February 1987. With a geographical area of 83,743 km<sup>2</sup>, it is the largest state in the region. The state shares a long international border with Bhutan to the west (160 km), China to the north and northeast (1080 km) and Myanmar to the east (440 km). Most parts of the state are covered by mountain ranges; the snow-capped Greater Himalayas in the north and Shivalik foothills and lower ranges of Patkai hills in the central and southern parts. The undulating hilly terrain is interspersed with rivers and valleys. Many large and small tributaries of the Brahmaputra river flow through the hilly slopes. Abrasion and attrition by the mighty rivers, have led to the formation of wide valleys in the northern regions and marshy land in some parts of the state.



**Figure 1.** Map of Arunachal Pradesh.

The climate varies with elevation. Areas at a very high elevation in the Upper Himalayas and close to the Tibetan border, enjoy an alpine or Tundra climate. Below the Upper Himalayas are the Middle Himalayas, where a temperate climate is experienced. Areas at the sub-Himalayan and sea-level elevation generally experience humid, subtropical climate with hot summers and mild winters. The state receives more than 300 cm rainfall on an average, varying from 450 cm in the foothills to 80 cm in the upper reaches.

Over 80% of the geographical area is under forests. The mountainous slopes and hills are covered by alpine, temperate, and subtropical forests of dwarf rhododendron, oak, pine, maple, fir, and juniper; sal (*Shorea*) and teak are the major economically valuable species. This forest

wealth is the most important source of revenue. Leasing of forest land owned by the tribals, by the forest department is a unique system. A variety of medicinal plants is also available in the forests which are utilized by the natives for treatment of various ailments.

## 2.2 Demographic profile

The human population is 1.10 million (2001 census), spread over 17 towns and 3863 villages. Despite 26% growth in population during 1991–2001, the density of population is only 13 persons/km<sup>2</sup>. Some districts such as Anjan, Dibang Valley and Kurung Kumey and Upper Siang are even more sparsely populated, with the density of population ranging from 1–5 persons/km<sup>2</sup>. Out of the 16 districts in the state, about 54% of the population is concentrated in Changlang, Lohit, Papum-Pare, W. Siang and Tirap districts. In terms of density of population, Papum-Pare, Tirap and Lower Subansiri are the leading districts.

The level of urbanization is very low as about 80% of the population lives in rural areas. In the capital district of Papum-Pare, urbanization is the highest, with 51% of the population living in urban areas. The other districts where the urban population is relatively higher than the state average are Upper Subansiri, East Kameng and East Siang.

A predominantly tribal state, the Scheduled Tribes (STs) comprise 64% of the population. There are about 20 major tribes and a number of sub-tribes living in the state. Most of these communities share a common ethnic culture. The important tribes are: Adi, Aka, Apatani, Nyishi, Galo, Khamptis, Khowas, Mishmi, Memba, Wancho, Nocte, Tanga, Sherdukpen, Singpho, Tagin, Khampa, Monpa, Hill Miri, Miji, Sulung, Lisus, Mayor and Nah. Over 80% of the ST population is located in the tribal districts of Kurung Kumey, E. Kamang, L. Subansiri, U. Subansiri, W. Siang, and Tirap. Papum-Pare, W. Siang and Tirap districts account for about 33% of the tribal population.

The sex-ratio (893:1000, female:male) and literacy (54.7%) levels are lower than the corresponding national averages and the differential ratio between female and male literacy levels is significantly wide. The occupational distribution of the workforce indicates that the ratio of workers to non-workers is quite high. The agricultural workforce is predominantly engaged as cultivators (58.44%) and only about 4% are working as agricultural labourers. Non-farm employment opportunities in the household industry are limited. Nearly 33% of the workforce is employed as other workers which comprise of government servants, those engaged in trade, commerce, banking, construction, hotel, wage labourers etc.

## 2.3 Economic profile

The real Gross State Domestic Product (GSDP) has increased at a moderate compound annual rate of 6.7% during 2000–2008. The real per capita income (at 1999–2000 prices) was INR 20,431, about 10% lower than the national average. The average monthly per capita consumption expenditure (MPCE) for rural and urban areas during 2004–2005 was estimated at INR 772 and INR 881 respectively. The incidence of poverty (17.6%) is estimated to be lower

than that of the national level. About 0.194 million rural and 0.09 million urban people are unable to meet the daily per capita expenses of INR 13.

In spite of dependence of the people on agriculture and its allied activities, the contribution of the primary sector to the State GDP was only about 33% during 2001–2002, which declined to 25% in 2007–2008. Under the existing land-use pattern, only 2.4% of the geographical area is cultivated and that too under single cropping. The cropping intensity is only 107%. Only about 22% of the net sown area (NSA) is under irrigation and canals are the main source of irrigation.

The low contribution of the agricultural sector to the economy is due to poor crop productivity. The average yields of the major crops are 1.91 t/ha for paddy, 1.34 t/ha for maize, 0.87 t/ha for millets, 1.49 t/ha for wheat, 1.01 t/ha for pulses and 7.59 t/ha for potato. The prevalent method of cultivation is *Jhuming*, i.e. slash and burning method of cultivation. Less than 50% of the NSA is under permanent cultivation. Traditionally, a few tribes such as the Apatanis, Singhos and Khamtis practise settled cultivation. However, the method of permanent cultivation is outdated without judicious use of improved agricultural inputs. Manure/fertilizers, improved or HYV seeds and plant protection methods are used only in about 9, 25 and 13% of the cropped area respectively.

## 2.4 Profile of the poor

As reported earlier, the incidence of poverty is lower than the average all-India figure. Contrary to the national scenario, the ST households in the state show a much lower incidence of poverty than other social groups (Table 1).

**Table 1.** Poverty and household consumption expenditure in social groups: 2004–2005

Social group	Poverty head count ratio (percent)	
	Rural	Urban
ST	14.1	4.8
SC	27.2	8.6
OBC	18.8	8.6
Others	25.4	4.2
All	22.3	3.3
	Percentage of population having MPCE below the average MPCE	
ST	61.7	63.7
SC	3.0	84.1
OBC	75.7	10.7
Others	68.4	60.3
All	63.2	59.5
	Average MPCE (INR)	
ST	784	858
SC	1104	740
OBC	591	1069
Others	736	889
All	772	881

Source: (1) Planning Commission (2) NSSO Consumption Expenditure Survey.

Despite relatively low HCR in rural areas, the MPCE of a majority of the rural population, among them ST, OBC and Other social groups, is below the average MPCE of the state, which indicates wide disparities in expenditure. In urban areas, the disparities in income are wider as the incidence of urban poverty is less than 5% among ST and Other social groups, while over 60% of their population has MPCE which is below average.

Across the occupational categories in rural areas, the MPCE is lowest among the non-agricultural labour households followed by agricultural labour households. For over 26% of the non-agricultural labourer households, the MPCE is below the poverty line of INR 388 (Table 2). In urban areas also, the casual and other labour households are the most disadvantaged.

**Table 2.** Percentage distribution of households by MPCE class and household type

MPCE class (INR)	Rural					
	Self employed in non-agriculture	Agricultural labour	Other labour	Self-employed in agriculture	Others	All
0–365	3.8	12.7	25.5	7.7	10.1	3.8
365–510	15.5	4.9	27.7	21.4	14.1	15.5
510–1155	51.9	73.4	44.9	61.9	57.4	51.9
1155 and more	28.8	9.0	1.9	9.0	18.6	28.8
	Urban					
	Self employed	Regular wage/salaried earnings	Casual labour	Other labour		All
0–485	7.4	10.3	37.6	32.2	–	12.1
485–1100	66.1	63.6	55.6	56.9	–	63.8
1100–2540	25.8	25.1	6.8	9.3	–	23.3
2540 and more	0.8	1.0	0.0	1.6	–	0.9

Source: NSSO, Consumption Expenditure Survey (2004–2005).

Across social groups in rural areas, the condition of ST labourer and self employed households is better than their counterparts in Non-ST social groups (Table 3). However, in urban areas, among the higher castes (social group 'Others'), it is the self-employed OBC and regular wage/salaried class who are relatively better off in terms of higher average MPCE as compared to the other household types and social groups.

**Table 3.** Average MPCE (INR) by household type and social group

Household type	Rural					
	ST	SC	OBC	Others	All	
Self-employed in non-agriculture	1053	1236	778	929	1010	
Agricultural labour	813	–	377	616	703	
Other labour	614	–	–	518	547	
Self-employed in agriculture	755	–	633	578	726	
Other	763	1091	–	1010	861	
	Urban					
	Self-employed	874	694	1130	887	909
	Regular wage/salaried	893	773	571	961	911
	Casual labour	554	709	513	597	589
	Other households	751	–	–	720	739

Source: NSSO, Consumption Expenditure Survey (2004–2005).

Among the rural households that are self-employed in agriculture, contrary to the expected direct relationship between the size of landholding and MPCE, no such pattern is observed (Table 4). Among the ST households, the consumption expenditure does not vary much across landholding categories thereby indicating that land resource does not ensure substantial income. The distribution of landholding across farm-size categories shows that unlike the all-India pattern, the bulk of holdings are 2–10 ha, i.e. under semi-medium and medium farm-size categories. This indicates that although the size of holding among the cultivator households is not very small, the natural terrain of the state and traditional methods of farming have kept the incomes from farming low which is reflected in low MPCE of the bigger farmers whose lands measure more than 2 ha.

**Table 4.** Average MPCE (INR) by size of landholding of rural household self-employed in agriculture and distribution of operational holdings

Land-size of ownership holding (ha)	Category	ST	SC	OBC	Others	All	Operational holdings (%)
<0.01	Marginal	644	–	–	1253	706	14.04
0.01–0.40	Marginal	775	–	–	715	769	14.04
0.41–1.00	Marginal	806	–	633	469	755	14.04
1.01–2.00	Small	708	–	–	533	665	18.78
2.01–4.00	Semi-medium	745	–	–	588	722	34.05
4.01+ 10.00	Medium	778	–	–	861	784	27.80
10.00	Large						5.33

Source: Agricultural Census (2001).

The status of development of the districts reflected in the estimates of real per capita income (2007–2008) and Human Development Index (HDI) indicates that Lower Subansiri, Chaglang and E. Kameng are relatively more backward as is evident from low per capita income and HDI (Table 5). Although the per capita income is lower than the state average in Papum-Pare, W. Siang and E. Siang districts, their performance is better in other development indicators, which may be due to higher urbanization. Upper Subansiri and Tirap have relatively higher per capita income. However, they rank low in terms of HDI because of poor literacy and health status.

## 2.5 Livestock scenario

As per the estimates of the 17<sup>th</sup> Livestock Census (2003), the state had 4.78 million large ruminants, 2.51 million small ruminants, 3.3 million pigs and 17.43 million poultry birds (Table 6). The state accounts for 2% of the pig population, 69% Mithuns (*Bos frontails*) and 14% Yaks (*Bos grunniens*) in India. The presence of two different species of large ruminants makes the livestock wealth of the state distinct from other parts of the country. Mithun, the domesticated free-range bovine species is an important component of the livestock production system in the northeastern region. This animal has religious significance and is closely related to the socio-cultural dimension. Traditionally considered as a symbol of wealth, apart from being reared for meat and highly preferred by the tribals, the animal is also a good source of superior quality milk and hide.

**Table 5.** *Status of development of districts*

Districts	Per capita income (2007–2008) (INR)	HDI* (2001)	District ranking as per HDI
Lower Subansiri	17,760	0.425	11
Changlang	18,602	0.452	9
East Kameng	19,090	0.362	13
East Siang	19,478	0.66	1
Papum Pare	20,393	0.573	3
West Siang	20,527	0.558	5
State	20,679	0.515	
Upper Siang	20,976	0.524	7
Tawang	21,050	0.555	6
Lohit	21,053	0.518	8
Upper Subansiri	21,305	0.438	10
Tirap	21,730	0.397	12
Dibang Valley	23,360	0.659	2
West Kameng	26,222	0.573	3

\* Based on eight indicators of education, health and income.

**Table 6.** *Livestock population: 2003*

Livestock species	Arunachal Pradesh (No. in '000)	All-India (No. in '000)
Crossbred cattle	13	24,686
Indigenous cattle	445	160,495
Buffaloes	11	97,922
Yaks	9	65
Mithuns	192	278
Sheep	20	61,469
Goats	231	124,358
Pigs	330	13,519
Poultry	1743	489,012

Source: Livestock census, Govt. of AP.

Yaks are multipurpose animals that are reared mostly by the Buddhists in the high hills of Arunachal Pradesh, Sikkim, Ladakh and Himachal Pradesh. Yaks are pack animals capable of carrying heavy loads of 50–60 kg on very rough high altitude terrain and survive on inadequate local feed resources. In addition, they are also a source of milk, wool and occasionally meat.

The livestock sector contributes 21% of the value of output from agriculture and its allied activities. The average real value of output from this sector has increased from INR 1252.6 million (at 1999–2000 prices) in 2002–2003 to INR 1401 million in 2005–2006. The meat group accounted for 35% of the value of livestock output, followed by milk (32%) and eggs (14%). During 2002–2003 and 2005–2006, the real value of meat and egg output increased (from INR 326 million to INR 490 million and INR 134 million to INR 198 million respectively) while that of milk declined from INR 561 million to INR 442 million.



**Composition of livestock:** The composition of livestock population brings out several notable features which have implications for the kind of programs to be initiated.

- Indigenous cattle, pigs, goats and mithun are the major species.
- The poultry population is also sizeable.
- Due to small cultivated area, the proportion of draught cattle is only 20% in the indigenous cattle stock.
- About 5% of the adult bovine stock is unproductive and comprises of adult males not used for breeding or farming activity; non-calved and non-breedable adult females.

The adoption rate of improved breeds of cattle, sheep, pigs and poultry is only 3.4%, 0.1%, 2.4% and 11.6% respectively as compared to 19.2%, 9.3%, 16.1% and 47.9% at the national level. This indicates the potential to increase the productivity of livestock by undertaking breed improvement programs.

- **Spatial pattern:** The major characteristics of species-wise pattern of livestock distribution that emerge from the district level analysis (Table 7) are as follows:
- The state had about 4000 crossbred (CB) milch cows largely concentrated in Lohit and Papum-Pare and which accounted for 56% of the CB milch animal population in the state.
- Indigenous milch cattle are the main source of milk production. The major indigenous milch cattle pockets are Lohit, Changlang, W. Siang, E Siang and Lower Subansiri districts.
- In addition to CB and indigenous cows, Lohit district also has milch buffaloes indicating that this district has relatively higher potential for dairy development.
- The density of goat population is over 500/100 km<sup>2</sup> of the geographical area in Lower Subansiri, E. Kameng, Papum-pare and Tirap districts (Table 7), indicating that these districts have potential for goat development.
- Sheep population is mainly concentrated in Tawang and W. Kameng districts.
- Pig population is spread over all the districts. Based on their density and share of district in the total pig stock in the state, the major districts for development of piggery are Lohit, W. Siang, Tirap, Papum-Pare, L. Subansiri and Kurung Kumey. The first four districts have nearly 100% concentration of crossbred pigs.
- The density and number of mithuns are the highest in L. Subansiri district which together with Kurung Kumey, E. Kameng, East, West and Upper Siang are home to over 75% of the mithun population.
- Yaks are confined to the districts of Tawang and W. Kameng.
- The density of poultry birds is more than 2000/100 km<sup>2</sup> of the geographical area in Changlang, L. Subansiri, Papum-Pare, Tirap, U. Siang and W. Siang but in terms of the number of birds, the stock is smaller in L. Subansiri and Tirap.

**Table 7.** *Density of livestock population*

Districts	No./1000 km <sup>2</sup> of geographical area								
	CB milch cattle	Local milch cattle	Milch buffaloes	Goats	Sheep	Yaks	Mithuns	Pigs	Poultry
Changlang	7	205	7	413	19	0	0	385	2676
East Kamang	10	171	0	536	0	0	495	756	1991
East Siang	8	277	4	298	0	0	430	623	1175
Kurung Kumey	0	50	0	235	0	0	315	437	933
Lohit (incl. Anjan)	9	194	14	333	0	0	64	329	1656
Lower Dibang Valley	1	143	54	237	0	0	54	472	1632
Lower Subansiri	10	616	9	1372	0	0	2879	2738	6130
Papum Pare	55	161	1	571	1	0	368	448	2937
Tawang	4	207	0	202	583	365	0	131	442
Tirap	8	141	3	635	0	0	109	901	3713
Upper Dibang Valley	0	0	0	4	0	0	19	17	139
Upper Siang	1	61	0	108	1	0	320	342	2112
Upper Subansiri	1	51	0	261	0	0	246	365	1105
West Kameng	1	65	0	184	78	17	70	89	725
West Siang	3	214	0	195	0	0	243	482	2044
Total of Arunachal Pradesh	6	132	5	276	23	11	229	403	1541

Source: NSSO Land and livestock holding survey (2003).

**Distribution across landholding:** The main features of the distribution of livestock across landholding categories based on the NSSO land and livestock holding survey (Table 8) are:

- Cattle are owned by about 38% of the rural households mostly by farmers, who have access to land resources.
- The stocking rate of male cattle is higher than milch cows. The number of milch cows/1000 households is very small indicating that a very small herd is maintained by most of the rural households. The number of female cattle is higher on semi-medium and medium-sized holdings.
- Buffaloes are reared by a small proportion of medium farm-size categories only.
- Large heads other than cattle and buffalo that comprises mainly of mithuns are owned by farmers of all farm-size categories (except the landless and near landless households) and their number increases with the size of the land holding.
- Small ruminant and poultry dominate the composition of livestock on holdings of landless and near landless farmers, while on the other farm-size category of farmers, poultry and pigs are predominant.
- About 75% of the rural households own poultry and its stocking rate is over 20,000/1000 households on small and medium farms. Nearly 93% small farmers reported ownership of poultry birds.
- The stocking rate of pigs is high on marginal and small farms indicating the economic importance of this species for economically weaker sections.

**Table 8.** *Ownership and no. of livestock based on land-size category*

Land-size category	% of households reporting ownership of					
	Cattle	Buffalo	Other large heads	Small ruminants	Poultry	Pigs and rabbits
Landless and near landless	20.3	0.0	0.0	17.0	53.8	4.1
Marginal	50.9	0.4	41.7	39.2	84.8	72.8
Small	49.2	0.2	46.5	36.3	92.5	76.6
Semi-medium	33.7	0.0	48.1	33.9	81.1	55.8
Medium	50.9	16.6	42.4	38.7	84.1	66.2
Large	0.0	0	0.0	0.0	0.0	0.0
All-sizes	38.2	0.6	35.5	28.8	74.4	56.6

Land-size category	No./1000 households						
	Adult male cattle	CB milch cows	Indigenous milch cows	Other large heads	Small ruminants	Pigs	Poultry
Landless and near landless	226	0	16	0	432	120	7589
Marginal	1082	10	209	1289	1108	1965	14,824
Small	1594	16	296	1567	1040	2203	21,377
Semi-medium	1230	11	207	2212	885	1619	15,961
Medium	1398	12	539	3719	1452	1897	22,987

Source: NSSO Land and livestock holding survey (2003).

## 2.6 Livestock farming practices

The available information on livestock farming practices followed by the livestock keepers is limited. By and large, both the tribal and non-tribal people follow outdated and traditional methods of livestock farming. The nature of livestock production system of various species has been synthesised below.

### 2.6.1 Cattle production

Cattle are usually reared in a traditional free-range system. In the low-hills and mid-hill zones where land is under permanent cultivation, the indigenous nondescript cattle are allowed to graze on the fields after the crops are harvested. During the agricultural season, the animals are tied or tethered with a rope and restricted to road side, river banks etc. However, in the high-hill zone where only jhum cultivation or terrace farming is practiced throughout the year, the cattle graze freely in the forest areas and around human settlements. In the evening, the animals are brought back to their sheds and tied in the seyam, i.e. kucchha cattle shed made of locally available material or in the luder viz. an area below the high-rise houses of cattle owners. The animals are not stall fed with concentrate feed, although some farmers provide vegetable and kitchen waste along with salt in the evening. In this low-input system, the output is apparently poor. The main objective of rearing cows is to produce male offsprings for draught purpose and manure. In certain remote areas where milk is not a part of the diet of the people, farmers do not milk the cows.

In some areas like Papum-Pare where crossbred cattle are reared, the cows are managed under an intensive stall fed system. However, the package of practices adopted by the farmers is traditional and not based on improved management. A majority of the farmers prefer not to feed commercial concentrate feed and instead prepare cattle feed with wheat bran, boiled broken rice and mustard oil cake. These ingredients and a handful of salt are mixed in a bucket to make a semi-solid composition with water and fed to the cattle thrice a day. Along with this mixture, paddy straw and grasses collected from unprotected forest area, fallow lands etc. are also fed as dry fodder and green fodder respectively. Calves and heifers are least cared for by the farmers and are fed with very poor quality feeds with low nutritive value. The animals are not provided with adequate drinking water. There is no provision for water supply for cattle even in the intensive stall fed system. The conditions of the cattle shed are very unhygienic exposing the livestock to various diseases. The vaccination of animals is sporadic and limited to FMD vaccine. The breeding of cows through AI is limited and largely restricted to farmers living in and around the towns. Natural service from a nondescript bull is the prevalent breeding practice.

### 2.6.2 Small ruminant production

The goats are reared in the open grazing system, with least attention paid to their feeding, housing, disease control, vaccination and management. These animals serve as insurance for the family in times of need and also as feast for guests.

### 2.6.3 Pig production

Tribals are skilled in piggery farming. Traditionally, pigs are let loose and allowed to scavenge on roots and tubers available on open fields, kitchen waste, garbage and hotel waste etc. in urban and peri-urban areas. These animals are housed below the platform of the houses. The resource rich pig farmers in urban and peri-urban areas follow an intensive system of pig rearing where pigs are housed in a pig sty (locally known as *ghumre*). The housing structure is made of concrete floor and CIG roofing sheet. In rural areas, the sty is constructed with locally available material in the backyard or near water bodies. In the intensively managed system, pig ration comprises of wheat bran, boiled rice and *colocasia* which is fed to the pigs twice or thrice a day. Preventive health care practices are hardly practised by the farmers.

### 2.6.4 Poultry production

As in the case of livestock, poultry is also reared under two systems; one, the traditional semi-intensive scavenging backyard poultry and two, on intensive small-scale farms in some urban areas. In rural areas, the birds are housed in a traditionally designed poultry shed (called *Pyr or Pere*) attached to the residential area. Inside the shed, bamboo or cane cages of varying sizes are kept to provide shelter to birds of various age groups. The poultry sheds are made up of bamboo walls, wooden base and roof of toko and wild banana leaves. The layer nests are made separately and hung around the wall of the poultry shed. The laying cage or box is prepared by placing a bamboo mat inside the base of the bamboo cage covered with dry fern leaves spread

as bedding as a nest for the layer birds. Early in the morning, the birds are provided with broken rice or maize crush in the cage and then let loose to scavenge in nearby localities throughout the day.

In the smallholder intensively managed farms in urban areas, the feeding and housing of the birds is better. However, as the overall management and feeding practices are not scientific, optimum production potential is not achieved.

## 2.7 Production performance of livestock

The production performance of all the species may not be substantially below the average national yield levels (Table 9), but they are below the yield levels of the best performing states. Thus, there is an urgent need to improve livestock farming practices to ensure that livestock serves as a reliable source of income and employment.

**Table 9.** Yield of livestock and poultry: 2005–2006

Product	Species	Unit	Arunachal	India
Milk	Crossbred cow	Kg/day	6.00	6.44
	Local cow		1.15	1.97
	Buffalo		–	5.58
	Goat		–	0.35
Eggs	Desi fowl	No./annum	112	200
	Improved fowl		297	258
Meat	Sheep	Kg/animal	12	12.59
	Goat		12	9.63
	Pig		60	32.23

Source: Livestock Census, Govt. of AP.

## 2.8 Constraints/gaps in livestock production

Negligible adoption of improved livestock farming practices is the major constraint in livestock production. By and large, farmers lack awareness about the potential of livestock in generating revenue. The livestock holders in urban and peri-urban areas have some interest in taking up livestock activity as a source of income, but they are faced with constraints related to availability of inputs and disposal of outputs.

In the absence of adequate knowledge about improved livestock farming practices, the farmers follow traditional breeding, feeding and management practices. The lack of inputs and production system with low output is based on grazing and scavenging. Even in the semi-intensive and intensive production system, poor quality feed with low value is used. There is shortage of quality feed and fodder in the state. The prices of prepared cattle feed is about INR 12/kg and that of poultry feed is about INR 16–18.50/kg in Papum-Pare district.

Although the state has sufficient infrastructure for livestock development (Table 10), preventive health cover and breed improvement are inadequate. As per the report of the State Animal

Husbandry department, no AI was performed during 2007–2008. The number of vaccinations was about 0.325 million covering less than 10% of the livestock and poultry population.

**Table 10.** *Infrastructural facilities for animal husbandry (in numbers)*

District	Vet-erinary hospital	Vet-erinary dis-pensary	Vet-erinary aid centres	Cattle up-grading centres	District diagnostic laboratory	Sheep and wool ext. centres	Cattle breeding farms	Poultry breeding farms	Pig breeding farms
Tawang	–	5	11	8	1	4	–	1	1
W. Kameng	–	7	17	15	1	3	1	1	–
E. Kameng	–	7	7	12	1	–	1	1	–
Papumpare	1	5	13	6	–	–	1	1	1
L. Subansiri	–	4	7	5	1	–	1	1	–
U. Subansiri	–	6	10	8	1	–	1	1	–
W. Siang	–	12	19	19	1	–	–	1	1
E. Siang	–	8	8	–	1	–	1	1	1
U. Siang	–	5	9	3	–	–	1	–	–
D. Valley	–	1	4	1	–	–	1	–	–
Lohit	–	9	14	16	1	–	–	2	1
Changlang	–	8	11	8	1	–	1	1	–
Tirap	–	5	12	11	1	–	1	1	–
Kurung Kumey	–	5	6	1	–	–	–	–	–
L. Dibang Valley	–	6	7	7	1	–	1	1	1
Anjaw	–	–	–	–	–	–	–	–	–
Total for AP	1	93	155	120	11	7	11	13	6

Apart from various constraints in inputs, the livestock farmers are also faced with problems in marketing. The markets are underdeveloped and unplanned without any control on the quality of the products sold. In case of milk marketing, the prevalent channels are direct selling by producer to the consumer, sale of raw milk through milk vendors and cooperative societies. These channels lack assessment of quality and hygiene. The state also has a government-owned milk processing plant in Papum-Pare district but the milk collection is from a small area.

The marketing of pork and other meat is informal with little concern for hygiene. These markets have inadequate infrastructure and sell pork in the open air. Broiler meat is subject to volatile price fluctuations. The local producers are unable to meet the high demand for chicken and a large number of live broiler birds from the neighbouring states are finding their way into the markets of Arunachal Pradesh. Lack of technical advice, inputs and marketing system restrict farmers from up-scaling and commercializing small scale ventures.

## 2.9 Opportunities for growth

The geographical location and poor connectivity with the rest of the country may make it difficult for livestock farmers to tap the rapidly rising demand of food from animal origin. Nevertheless, the prevalent local dietary pattern offers tremendous scope for enhancing the income and employment. The monthly per capita consumption of eggs and all kinds of meat (mutton, beef/buffalo meat, pork, chicken) in rural and urban areas, is much higher than all over the country (Tables 11 and 12). About 97% of the rural households and 94% of the urban households are consumers of animal products. Sharply increasing average MPCE on eggs and meat with increase in expenditure class indicates that rising income along with economic development will increase the demand for animal food products thereby ensuring market-driven opportunities for growth.

**Table 11.** Average MPCE (INR) on animal food-products: rural

MPCE classes	Arunachal		India	
	Milk and milk products	Eggs, meat and fish	Milk and milk products	Eggs, meat and fish
0–235	0.00	31.76	4.4	5.0
235–270	1.29	13.79	9.3	6.5
270–320	1.84	2.18	13.7	9.1
320–365	4.62	31.09	20.3	10.6
365–410	4.11	44.21	27.9	12.5
410–455	9.54	47.17	33.8	14.8
455–510	7.17	49.23	44.3	16.9
510–580	5.41	63.50	53.1	20.0
580–690	14.22	75.74	63.9	24.8
690–890	18.74	92.85	84.3	27.9
890–1155	39.37	110.56	113.6	33.4
1155 and more	47.10	145.04	137.9	54.2
All classes	19.30	81.44	47.31	18.60
% of households reporting consumption	39.7	96.9	74.9	58.5

Source: NSSO, Consumption expenditure survey 61<sup>st</sup> round (2004–2005).

Based on the prevalent food habits, the demand for milk and milk products is relatively lower in rural areas. However, in urban areas about 75% of the households report consumption of dairy products and the average MPCE is over INR 100 in expenditure class of INR 1880 and more. The trend towards urbanization will create substantial demand for dairy products particularly in the districts of Papum-Pare, W. Kameng and Lohit.

**Table 12.** Average MPCE (INR) on animal food-products: urban

MPCE classes	Arunachal Pradesh		India	
	Milk and milk products	Eggs, meat and fish	Milk and milk products	Eggs, meat and fish
0–335	0.0	10.0	14.3	9.1
335–395	21.6	24.3	25.6	12.4
395–485	11.5	38.5	32.6	17.2
485–580	23.9	57.7	44.3	19.3
580–675	19.2	70.1	55.1	23.3
675–790	40.5	82.8	66.2	24.0
790–930	43.6	77.4	79.4	25.9
930–1100	50.9	94.9	93.3	29.9
1100–1380	64.8	115.4	110.6	37.4
1380–1880	92.8	144.3	138.1	40.7
1880–2540	117.1	154.4	174.7	50.0
2540 and more	132.4	275.5	213.5	62.9
All classes	43.2	84.9	83.3	28.5
% of households reporting consumption	76.0	94.0	88.2	57.7

Source: NSSO, Consumption expenditure survey 61<sup>st</sup> round (2004–2005).

## 2.10 Conclusions

The above information reveals that investments (in terms of finance and time) in livestock development should focus on districts where the per capita income and HDI is low viz. Lower Subansiri, Changlang and E. Kameng and those which are more urbanized viz. Papum-Pare, E. Siang and W. Siang districts. The specific livestock species that should be targeted in each of these districts are as follows:

- L. Subansiri : Cattle and pigs
- Changlang: Poultry
- E. Kameng: Goat
- Papum-Pare: Crossbred cattle and pigs
- E. Siang: Dairy
- W. Siang: Pigs

Development of livestock enterprises can be instrumental in ensuring economic upliftment of the poor rural and urban masses. The policies and programmes should not be focused on a specific ethnic or social group such as ST since empirical evidence reveals that inter-social group disparities in MPCE and poverty are not to the disadvantage of the tribals. Hence, development efforts should include all the poor households irrespective of their social group and focus on improving the socio-economic conditions of households that are self-employed in agriculture.

In view of the constraints in livestock production, it is important that the interventions are prioritized. The first step should be to create awareness among the farmers about the potential



of improved livestock rearing to improve their livelihoods. Farmers need to be motivated to change their attitude towards improved management practices. The other stakeholders such as meat traders also need to be made aware of less hygienic methods of slaughter and value of food safety and hygiene in marketing of meat. The second step should be development of the market. The existing informal marketing system needs to be channelized or remodelled for ensuring higher profit margin for the producers. Facilitating supply of superior quality inputs along with training of the farmers to make efficient use of these inputs is the third step in transforming the livestock sector. Availability of quality breeding material or parent stock, veterinary pharmaceuticals, qualified and well-trained veterinary personnel, credit linkage with financial institutions, particularly for micro-credit requirement of the farmers; management of common property resources (CPR) for feed and fodder requirements; technological interventions for upgrading the nutritional quality of available feed and fodder; and assessing the potential of non-conventional locally available agricultural and forest products to be used as nutritive feed, are some of the areas which require attention for livestock development in the state.

### 3 Mizoram—Livestock and opportunities for livelihood improvement

#### 3.1 Geographical profile

Mizoram, situated in the far east from 25°6'N to 27°4'N latitude and 93°20'E to 95°15'E longitude, became a Union Territory in 1972 and was later granted statehood in February 1987. With a total geographical area of 21,081 km<sup>2</sup>, the state shares long international borders (722 km) with Bangladesh to its west and Myanmar to its east. Its neighbouring states are Tripura to its west and Manipur and Assam to its north. Among the northeastern states, Mizoram has the most difficult terrain; the topography being by and large mountainous with precipitous slopes forming deep gorges and culminating into several streams and rivers. The hill ranges usually traverse in the north–south direction with a tendency to be higher in the north and tapering towards the south. Fifteen major rivers flow across the state, of which seven flow northwards and confluence with the Barak river of Assam valley. The rugged topography poses a problem in communication within the state and with the neighbouring states.



Figure 2. Map of Mizoram.

It has a mild climate; it is generally cool in summer and not very cold in winter. The entire area is under the direct influence of southwest monsoon; it rains heavily from May to October and the average rainfall is 254 cm/annum. Normally, there is no rainfall in winter. As the state receives heavy rains for a period of about 5–6 months, the working season during the year is restricted. It is rich in flora, tropical trees and plants. A large part of the geographical area is under forests.

## 3.2 Demographic profile

It is the least populated state in the northeast. The total population is 0.889 million (2001 census) and the density of population is 42 persons/km<sup>2</sup>. In view of the increase in population by about 29% during 1991–2001, it is anticipated that the population growth will also be high in the current decade which will further increase the vulnerability of the communities due to increasing pressure on resources.

There are 8 districts. The capital district of Aizawl is the most populated, inhabited by about 37% of the total population in the state. The concentration of population is about 12–15% in Champhai and Lunglei districts and 6–8% in the remaining districts.

Nearly 50% of the population lives in urban areas. The rate of urbanization is very high in Aizawl (76%) followed by its neighbouring district Kolasib (55%) in the north and Serchhip (48%) in the south. In these districts, the population density is also higher than the state average. Aizawl is the most densely populated district. The southern-most district of Lawngtlai has a low population density and is completely rural.

Over 94% of the population is Scheduled Tribes (STs). About 45% of the non-tribal population (approximately 45,000) lives in Aizawl while Kolasib district has 10% non-tribal population.

The sex-ratio (female:male) ranges from 901 in Lawngtlai to 953 in Champhai, with a state average of 938. The literacy rates in this state are the highest among the northeastern states and second highest in the country after Kerala with 91% male and 87% female literacy. The high literacy levels are nearly the same in all the districts except Lawngtlai where it is somewhat lower at 64%. Despite the high literacy status, skill development among the labour force is very poor. Based on estimates, only 10% of the total work force is skilled. Among the literate, nearly 60% are unskilled.

The dependency ratio is less than one as 53% of the population is engaged as work force. Across districts, except in the two southern districts of Lawngtlai and Saiha, the work force participation rate is lower. This may be due to limited employment opportunities. Despite nearly 50% population residing in urban areas, agriculture is the main occupation of a majority of the work force. The agricultural workforce is predominantly engaged as cultivators and only about 6% are working as agricultural labourers. The non-farm employment opportunities in the household industry are extremely limited. More than 33% of the workforce is employed as 'Other workers' that comprise government servants, those engaged in trade, commerce, banking, construction, hotel, wage labourers etc. but availability of non-farm employment opportunities are largely concentrated in Aizawl; in the rest of the districts, 70–80% of the workforce is engaged in the agricultural sector (Table 13).

**Table 13.** Occupational distribution of workforce

Districts	Ratio of workers to non-workers	Percentage of workforce working as				
		Cultivators	Agri. labourers	Total agri. workers	Household industry workers	Other workers
Aizawl	1.00	30.96	4.14	35.10	1.86	63.04
Champhai	1.69	69.12	9.79	78.91	1.16	19.94
Kolasib	1.17	57.47	8.94	66.40	1.14	32.46
Lawngtlai	0.86	70.05	6.92	76.97	2.42	20.61
Lunglei	1.10	63.81	3.87	67.69	0.83	31.48
Mamit	1.27	76.15	6.34	82.49	0.90	16.62
Saiha	0.79	67.50	5.20	72.69	0.92	26.39
Serchhip	1.52	72.87	4.37	77.24	2.75	20.02
Total of Mizoram	1.11	54.87	5.73	60.60	1.52	37.88

### 3.3 Economic profile

There has been a slow increase (compound annual growth rate 5%) in the real GSDP during 1999–2009. The increase has mainly been due to growth of the service sector while the agricultural sector, which is the predominant employer of the workforce has grown only at 1.6% per annum. The share of agriculture and its allied activities in the state GDP has declined from 20.4% in 2001–2002 to 15.9% in 2008–2009. The slow growth of the agricultural sector and its declining contribution to the economy is attributed to erosion of water, acidity of the soil etc. which have degraded vast stretches of the land. The soils are generally immature and low in fertility. Only about 4% of the geographical area is cultivated and as per the land-use statistics of 2007–2008, just 1000 ha is sown more than once per year. The agriculture is by and large rainfed with less than 15% of the cropped area under irrigation.

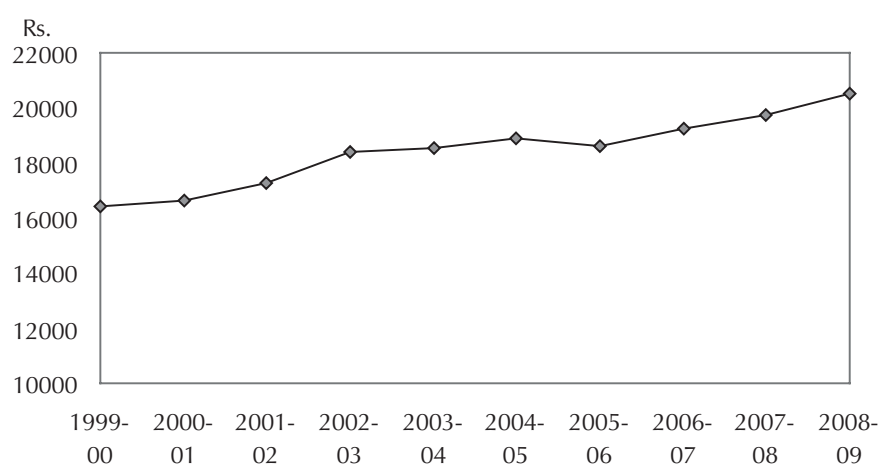
As in other parts of the northeastern region, *jhum* or shifting cultivation is widely practiced. 67% of the cropped area is under *jhum* cultivation, resulting in pressure on the forest cover spread over 76% of the geographical area. It is estimated that annually 80,000 ha is destroyed by slashing and burning of trees for *jhum* land.

Paddy is the major crop occupying over 50% of the cropped area. Two types of paddy seeds are mainly sown in the same field—early paddy and principal paddy. The yield of early paddy is poor but it ripens early and provides sustenance till the principal paddy is harvested. The production of paddy has declined very sharply from 0.114 million MT in 2003–2004 to 0.107 million MT in 2004–2005 and further to 42,000 and 15,000 MT in 2006–2007 and 2007–2008 respectively. This steep fall in production was caused by destruction of crops by rodents during profuse flowering of bamboo. Bamboo flowering (which happens approximately every 48 years) locally known as *Mautam* increases the rodent population and other insects such as Thangnang, a treebug which multiply and cause extensive damage to crops. Such was the impact of the steep decline in paddy cultivation that hardly 10% of the food requirement of the state could be met from the harvested crop.

Other than paddy, maize, cowpea, French beans, sesame, mustard, soya bean and horticultural crops are also grown but the productivity of most of the crops is very low. The area under potatoes increased from 310 ha in 2000–2001 to 953 ha in 2005–2006 without a proportionate increase in productivity of the crop. The yield of potatoes has fluctuated from 7.8 t/ha in 2000–2001 to 1.96 t/ha in 2002–2003. As a result of massive flowering of bamboo, the production of all food and non-food crops has sharply declined in recent years causing distress in agriculture.

### 3.4 Income and poverty

During the last decade (1999–2009), the per capita income (at 1999–2000 prices) increased very slowly at a compound rate of 2.2% per annum (Figure 3). The average real per capita income is INR 20,483, which is about 24.5% lower than the national average annual per capita income of INR 25,494 in 2008–2009.



**Figure 3.** Trend in per capita income at 1999–2000 prices.

As per the last available statistics of district domestic product for the year 2005–2006, the per capita income was highest in Aizawl, closely followed by Mamit. The poorest districts as indicated by low per capita income were Champhai and Lawngtlai (Table 14). During 1999–2006, the highest increase of 25% in per capita income was recorded in Mamit district. In Serchhip district, the level of income increased by 20% while it was almost stagnant in Kolasib and Champhai districts.

**Table 14.** Per capita income across districts

District	Real per capita income (1999–2000 prices)	
	2005–2006	1999–2000
Aizawl	21,705	19,162
Mamit	21,381	17,073
Serchhip	19,499	16,291
Saiha	17,579	15,976
Lunglei	16,509	14,366
Kolasib	16,096	16,006
Lawngtlai	15,600	13,983
Champhai	13,952	12,940

Applying the Head Count Ratio (HCR) estimated for the state of Assam (as separate estimates for Mizoram have not been made by the Planning Commission), in 2004–2005, 102,000 persons in rural and 16,000 persons in urban areas were below the poverty line. The average monthly per capita expenditure (MPCE) in rural areas was INR 778, which was lower than the corresponding expenditure estimates for urban areas (Table 15). The incidence of poverty in the state is estimated to be only around 12% but the predominant proportion of population in both rural and urban areas report MPCE which is below the average MPCE, indicating that there are huge disparities between the high and low income groups.

**Table 15.** Household consumption expenditure across social groups: 2004–2005

Social group	Percentage of population having MPCE below the average MPCE	
	Rural	Urban
ST	62.7	62.4
SC	68.5	36.1
OBC	87.0	–
Others	–	43.2
All	63.2	62.4
	Average MPCE (INR)	
ST	780	1201
SC	1253	1285
OBC	688	800
Others	633	1570
All	778	1200

Source: NSSO Consumption Expenditure Survey.

Across the social groups, as about 95% of the population is that of STs, the overall state average broadly reflects their status. In rural areas, the condition of the OBC though small in number is worse than their ST counterparts as is indicated by MPCE which is below average and a higher proportion of population (87%) which is not able to meet the MPCE of INR 688. In urban areas, the households belonging to ‘Other’ social group are better-off than all other social groups as they are generally working as regular salaried/ wage earners.

Across the occupational categories in the urban areas, the casual labour households are the most disadvantaged while in the rural areas, the MPCE is lowest among the households that are self-employed in agriculture (Table 16), thereby highlighting the poor potential of income generation. In fact, contrary to the expected direct relationship between the size of landholding and the MPCE, no such pattern could be observed in the state (Table 17) which further indicates that land resources are not providing substantial income to the households engaged as cultivators.

**Table 16.** Average MPCE (INR) of ST households by household type in rural and urban areas

Household type: Rural	Average MPCE (INR)	Household type: Urban	Average MPCE (INR)
Self-employed in non-agriculture	1120	Self-employed	1055
Agricultural Labour	992	Regular wage/salaried	1373
Other labour	796	Casual labour	893
Self-employed in agriculture	713	Other households	1119
Other	918		

Source: NSSO Consumption Expenditure Survey.

**Table 17.** Average MPCE (INR) by size of landholding of ST rural households self-employed in agriculture

Land-size of ownership holding (ha)	Average MPCE (INR)
<0.01	641
0.01–0.40	786
0.41–1.00	741
1.01–2.00	651
2.01–4.00	650
4.01+	703

Source: NSSO Consumption Expenditure Survey.

The distribution of landholding across farm-size categories reveals that in accordance with the all-India pattern, there is predominance of marginal and small holdings representing 81%. The proportion of semi-medium and medium farmers is less than 20% but they cultivate over 33% of the area. Notwithstanding the disparities in access to land resources among the households engaged as cultivators, the agricultural income across all landholding categories is low as is reflected by the MPCE across these categories.

The household data collected from the survey of below poverty line (BPL) families conducted in 2002 throws additional light on the dimensions of rural poverty across districts. A very small percentage of households reported availability of sufficient food throughout the year (Table 18). The situation is particularly alarming in the southern-most districts of Saiha and Lawngtlai. About 33% of the rural households subsist on less than one square meal per day for a major part of the year. Except for Aizawl, Mamit and Serchhip, more than 20% of the rural households face a similar situation in all the other districts.

**Table 18.** *Situation assessment of rural households*

Districts	Percentage of rural households reporting						Percentage distribution of rural households according to income groups		
	Less than one square meal per day for major part of the year	Normally, one square meal per day, but less than one square meal occasionally	One square meal per day throughout the year	Two square meals per day, with occasional shortage	Enough food throughout the year	No response	Low	Middle	High
Aizawl	16.87	23.82	26.45	16.86	15.01	0.99	51	29	20
Champhai	24.92	31.37	16.71	14.01	11.76	1.23	58	28	13
Kolasib	21.81	18.76	27.06	16.62	14.80	0.94	41	34	24
Lawngtlai	34.77	27.30	15.87	14.48	6.81	0.77	57	35	8
Lunglei	27.28	30.43	14.61	15.99	10.62	1.08	64	24	11
Mamit	15.60	24.88	19.34	19.66	18.86	1.65	64	20	15
Saiha	24.26	32.00	33.05	4.01	5.37	1.32	87	12	0
Serchhip	18.21	30.94	20.60	9.73	20.09	0.43	55	22	23
Total of Mizoram	22.74	27.34	20.96	14.75	13.16	1.06	57	27	16

Note: 1. Low: monthly income < INR 499, Middle: Monthly income INR 500–2500, High, Monthly income >INR 2500.

2. Row total in last three columns may not add up to 100 due to rounding off to 0 decimal places.

The majority of households in rural areas have a low monthly income. The proportion of low income rural households is high in Saiha. The distribution of population in high income groups also indicates that the districts of Aizawl, Kolasib and Serchipp are economically better-off.

### 3.5 Livestock scenario

The livestock wealth comprises of about 43,000 large ruminants, 17,000 small ruminants, 0.267 million pigs and 1.24 million poultry birds (Table 19).

**Table 19.** *Livestock population*

Livestock	2003	2007
Crossbred cattle	8803	10,744
Indigenous cattle	26,767	24,244
Buffaloes	5732	5832
Mithuns	1738	1939
Sheep	1058	974
Goats	16,979	15,710
Pigs	217,184	267,361
Poultry	1,116,425	1,241,028



The state accounts for only 0.6% of the country's geographic area and 0.2% of the Indian population (2001 census). Yet the concentration of pig population is 1.61% of the total stock in the country (2003 livestock census), indicating the value of this species in the Mizo economy. During 2003–2007, the composition of livestock wealth in the state further increased by 23% and 11% respectively. Among the cattle population, there has been a distinct shift towards crossbred cattle with 22% increase in crossbred cattle stock and 9% decline in indigenous cattle stock. The state has a small number of mithuns whose population has also shown an increasing trend during the two census periods. The small ruminant stock of sheep and goats has recorded a fall.

The characteristics of the spatial pattern of livestock distribution are as follows:

**Pigs:** The major livestock species viz. pigs are distributed in all the 8 districts with density ranging from 8 animals/km<sup>2</sup> in Mamit and Lunglei to 21 animals/km<sup>2</sup> in Aizawl. The concentration of the total stock is highest in Aizawl (28%). Champhai and Lunglei account for about 14% of the population. In contrast to the all-India scenario, nearly 90% of the pigs are crossbreds (Table 20). In case of other livestock species, the percentage of improved/crossbreds in the total stock is much higher (45% in cattle, 58% in sheep and 60% in poultry) than the all-India averages (19% for cattle, 9% for sheep and 47% for poultry).

**Table 20.** District-wise livestock population: 2007–2008

Districts	Crossbred cattle	Indigenous cattle	Buffaloes	Mithun	Sheep	Goats	Pigs	Fowls	Duck
Mamit	135	1972	208	0	77	1780	23,351	109,823	499
Kolasib	2017	3947	112	11	43	2244	25,132	93,023	2843
Aizawl	5891	1486	263	107	86	1576	74,340	309,312	1445
Champhai	572	6556	3183	1105	564	706	36,705	265,884	502
Serchhip	436	1263	985	171	31	571	23,692	84,116	39
Lunglei	1293	2360	112	0	4	2799	37,384	175,412	183
Lawngtlai	183	2943	147	0	125	5231	24,901	92,601	906
Saiha	217	3717	822	545	44	803	21,856	103,979	128
Total of Mizoram	10,744	24,244	5832	1939	974	15,710	267,361	1234150	6545

**Poultry:** Nearly 60% of the poultry birds are concentrated in the districts of Aizawl (25%), Champhai (21%) and Lunglei (14%). In the first two districts, their density is 84–87 birds/km<sup>2</sup>. The density is also high in Saiha, although the number of birds is lower due to the small size of the district. Fowls are the major types of poultry birds. In Kolasib, there are a good number of ducks (about 2800) forming nearly 3% of the poultry population in the district.

**Cattle and buffaloes:** As in the case of pigs, cattle are also distributed in all the districts. However, their relative density is higher in Kolasib and Saiha. Aizawl has the largest number of crossbreds followed by Kolasib and Lunglei. Champhai district has a low crossbred cattle population, but it has a sizeable number of indigenous cattle and buffaloes, indicating the potential to increase milk production in the district. Except for Champhai, buffaloes are very few in number in the remaining districts.

**Small ruminants:** Goats are the major small ruminants except in Champhai district where sheep are also found. The economically poor district of Lawngtlai has the highest number of goats followed by Lungeli and Kolasib.

The ownership pattern of livestock across landholding categories shows that cattle are mostly owned by medium farmers, while poultry and pigs are important sources of livelihood for the landless, near landless, marginal and small farmers (Table 21). A small proportion of semi-medium and large farmers also own poultry and pigs.

**Table 21.** *Ownership of key livestock species according to land-size category*

Land-size category	% of households reporting ownership of		
	Cattle	Poultry	Pigs and rabbits
Landless and near landless	0.0	58.4	54.3
Marginal	4.4	69.8	50.3
Small	5.0	72.2	62.1
Semi-medium	9.4	84.4	80.4
Medium	33.3	33.3	–
Large	4.7	50.0	50.0
All-sizes	1.3	63.1	46.2

Source: Land and livestock holding survey (2003), NSSO.

### 3.6 Production performance of livestock

The livestock sector contributes 30% of the value of output from agriculture and its allied activities. The average real value of output from this sector has decreased from INR 1193 million (at 1999–2000 prices) in 2002–2003 to INR 1107.20 million in 2005–2006 (Table 22). The meat group accounted for 70% of the value of the output from livestock followed by milk (22%) and eggs (7%). During 2002–2003 and 2005–2006, the real value of the output from meat declined; egg increased; and milk remained stagnant.

**Table 22.** *Value of output from livestock sector at constant prices (1999–2000) (INR lakhs)*

Period	Milk	Egg	Meat	Wool and hair	Dung	Silkworm cocoon and honey	Increment in stock	Total value of output—livestock
2002–2003	2481	675	8753	0	165	67	–210	11,930
2005–2006	2488	818	7639	37	65	78	–53	11,072

Meat production is the major livestock activity and bovine meat is relished. The yield of pork is nearly three times the average productivity of the nation. Even the milk productivity of crossbred cattle which represents 45% of the cattle is higher than the all-India average (Table 23). However, the productivity of eggs especially of the desi fowls that comprise nearly 40% of the poultry stock, is low. Given the reasonably good yield levels of pork and milk from crossbred cattle, these two species of livestock can serve as viable instruments for enhancing the income of the households. At the same time, the low productivity of egg demands efforts to increase the performance of poultry.

**Table 23.** Yield of livestock and poultry: 2005–2006

Product	Species	Unit	Mizoram	India
Milk	Crossbred cow	Kg/day	8.12	6.44
	Local cow		1.1	1.97
	Buffalo		1.8	5.58
Eggs	Desi fowl	No./annum	74	200
	Improved fowl		206	258
	Cattle		110.3	
Meat	Goat	Kg/animal	8.97	9.63
	Pig		95.0	32.23
	Buffalo		141.34	
	Poultry		2.0	

The major milk producing district is Aizawl, followed by Kolasib and Lunglei (Table 24). Aizawl is the leading producer of other livestock products as well. In the other districts, the production of milk, meat and eggs is quite low.

**Table 24.** District-wise livestock production: 2007–2008

Districts	Milk production (in tonnes)			Egg production (No. in million)	Meat production (in tonnes)						
	Cross-bred cows	Indigenous cows	Buffaloes		Cattle	Buffalo	Mithun	Goat	Pig	Poultry	Total
Mamit	203	246	33	2.9	66	6	0	6	287	67	432
Kolasib	1707	303	42	2.9	123	5	0	8	435	76	647
Aizawl	8156	358	85	11.2	1025	20	1.89	28	4226	1430	6731
Champhai	560	788	391	6.8	142	14	2.16	3	437	99	697
Serchhip	531	165	123	4.2	83	5	0.81	2	360	65	516
Lunglei	1284	242	31	6.4	248	6	1.08	8	798	147	1208
Lawngtlai	219	211	23	3.0	118	5	0.54	5	419	60	608
Saiha	211	506	87	2.8	126	8	0.54	8	393	56	592
Total	12,871	2819	815	40.2	1931	69	7.02	68	7355	2000	11430

Source: Directorate of Animal Husbandry and Veterinary, Government of Mizoram (2007–2008).

### 3.7 Constraints/gaps in livestock production

The agrarian economy has largely been subsistence-oriented. Till the early 1970s, the population base was low compared to the natural resource base and hence the farming community could enjoy sustainable livelihood. In the subsequent period, increased population growth and changes in land-use pattern resulting in loss of fertility and natural forest, have adversely affected the economy. The increasing population pressure on land coupled with low productivity of agricultural produce makes it imperative for the masses to seek alternative non-farm livelihood opportunities. Over the years, the traditionally egalitarian tribal communities are becoming increasingly economically stratified.

One of the major constraints in livestock production is the lack of orientation and awareness among the farmers about the potential of livestock as a revenue generation activity. There is an overall shortage of nutritional feed as a result of which more than 90% of the feed ingredients

come from outside the state. The farmers either maintain their animals on unbalanced home-grown feed and common property resources or are compelled to buy expensive feed resulting in low economic returns. For instance, the price of milch cattle ration is about INR 12/kg (Table 25) and with an average intake of 10 kg feed, the daily cost is INR 120/animal. With an average yield of 6 litres per day and retail market price of INR 30/litre, the gross returns are only INR 150/day. Adding other expenses of maintenance, there is a very thin profit margin for the dairy producers. Thus, the high price of feed and fodder arising from shortage is the major constraint in income generation from livestock enterprise.

**Table 25.** Price of prepared animal feeds

Livestock feeds	Price (INR/kg)
Broiler/layer ration	16–17
Milch cattle ration	12
Pig ration	12–13

The livestock production also suffers from inadequate support services. The geographical spread of animal health care institutions and veterinary personnel is extremely poor (Table 26). The relatively better health care facilities in Aizawl and Lunglei are also not adequate to ensure effective health cover to the livestock population in the districts, particularly in difficult terrains.

**Table 26.** No. of veterinary institutions and personnel 2007–2008

Districts	Hospitals	Dispensaries	Rural animal health centres	AI centres	Doctors/surgeons	VFA/SUFA/JM/JEO/PI/LS
Mamit	0	4	14	1	4	15
Kolasib	1	4	8	5	11	17
Aizawl	1	6	30	20	44	80
Champhai	1	7	13	2	11	28
Serchhip	0	3	9	3	5	18
Lunglei	1	6	20	14	18	49
Lawngtlai	0	1	4	1	3	9
Saiha	1	4	8	4	6	10
Total of Mizoram	5	35	106	50	102	226

As a result of poor services, some districts have not been covered under the vaccination programme against contagious livestock diseases. The outreach of the AI programme is localized to Aizawl (Table 27).

**Table 27.** Coverage of AI and vaccination: 2005–2006

Name of district	No. of AI performed				No. of vaccinations						
	Cow	Pig	Foot and Mouth	Rabies	Sheep/goat pox	Ranikhet	Fowl pox	Hemorrhagic septicaemia	Black quarter	Anth-rax	Swine fever
Aizawl	3155	1383	2403	2673		31,571	2920				3950
Champhai	148		232	273		32,371		1595	25		1490
Kolasib	518		346	516		22,466					969
Lawngtlai	52										
Lunglei	412	137	4107	676		81,147					420
Mamit	49										1110
Saiha	45					19,145					
Serchhip	164		103	103		850					29
Mizoram	4543	1520	7779	4241		187,550	2920	1595	26		7968

Lack of credit facilities in the northeastern region in general and Mizoram in particular is a serious constraint for promoting development activities. Lending by formal financial institutions is insignificant and credit:deposit ratios are very low, indicating a large outflow of resources. At present, there is no banking system on either the demand or supply side. The tribals do not have the habit of saving. Access to credit is affected by the poor network of bank branches and communication and infrastructural facilities. In recent years, several loss-incurring banks in rural areas have closed down. The cooperative sector is almost non-functional with societies engaged in distribution of essential commodities but reluctant to disburse loans. As a result of the inadequacies of a formal credit system, communities are dependent on informal sources of credit such as relatives, friends, traders and moneylenders, for consumption and productive needs. The interest rates are also high at around 10–20% per month. Production loans from traders are a major source of exploitation as borrowers are committed to sell their produce to the trader at drastically reduced prices in addition to paying high interest rates.

Agricultural marketing is one of the weakest links in the economy. The marketing system is unregulated and dominated by private traders and middlemen. A major part of the marketable surplus is sold in small quantities by farmers at periodic markets at the village level or to itinerant traders. Factors such as perishable nature of produce, inadequate credit facilities, lack of information on the market etc. compel producers to sell their produce at low and frequently non-remunerative prices. The bargaining power of the farmers is weak and the prices are dictated by the traders. Farmers also borrow money frequently from traders and moneylenders, thereby increasing exploitation.

### 3.8 Opportunities for growth

Given the disadvantage of location and poor transportation network, it may not be possible for the livestock farmers to benefit from the increasing demand for livestock products in the country. However, as the preferences of consumers in the state are towards animal products, there is good scope to increase the production of food from animal origin thereby generating income and employment opportunities for the farmers.

Nearly, 100% of the rural and urban households consume eggs and meat. The monthly per capita consumption of these products is much higher than that all over India across all expenditure classes in rural and urban areas. Increasing trend in the average MPCE on non-vegetarian items with rise in expenditure classes, indicates that market-driven opportunities for growth will emerge in the state with increase in rural and urban per capita income.

Interestingly, although the average MPCE milk and milk products is quite low in the state, yet a large number of households in rural and urban areas have reported consumption of dairy products (Tables 28 and 29). The consumer awareness campaign about the benefits of milk consumption can increase the demand for dairy products and lead to adoption of suitable strategies to increase the supply to meet the demand and thereby ensure higher economic returns for the dairy farmers.

**Table 28.** Average MPCE (INR) on animal food-products: rural

MPCE classes	Mizoram		India	
	Milk and milk products	Eggs, meat and fish	Milk and milk products	Eggs, meat and fish
320–365	7.64	31.11	20.3	10.6
365–410	0.96	26.82	27.9	12.5
410–455	7.73	47.59	33.8	14.8
455–510	6.45	54.20	44.3	16.9
510–580	8.38	66.84	53.1	20.0
580–690	10.84	74.43	63.9	24.8
690–890	20.99	86.56	84.3	27.9
890–1155	28.57	94.06	113.6	33.4
1155 and more	45.99	124.29	137.9	54.2
All classes	18.63	80.86	47.31	18.60
Percentage of households reporting consumption	71.1	99.8	74.9	58.5

Source: NSSO Consumption expenditure survey 61<sup>st</sup> round (2004–2005).

**Table 29.** Average MPCE (INR) on animal food-products: urban

MPCE classes	Mizoram		India	
	Milk and milk products	Eggs, meat and fish	Milk and milk products	Eggs, meat and fish
335–395	11.67	33.33	25.6	12.4
395–485	4.85	44.42	32.6	17.2
485–580	6.69	61.76	44.3	19.3
580–675	19.33	77.03	55.1	23.3
675–790	19.59	81.83	66.2	24.0
790–930	27.88	94.95	79.4	25.9
930–1100	36.38	110.36	93.3	29.9
1100–1380	56.01	121.94	110.6	37.4
1380–1880	69.99	138.30	138.1	40.7
1880–2540	91.82	171.12	174.7	50.0
2540 and more	121.04	224.60	213.5	62.9
All classes	46.93	115.23	83.3	28.5
% of households reporting consumption	91.7	99.8	88.2	57.7

Source: NSSO Consumption expenditure survey 61<sup>st</sup> round (2004–2005).

Presently, there is a shortage in the supply of livestock products and other food products in the state. Hence, large quantities of fruits, vegetables, fish and livestock such as pigs, cattle, goats and poultry are procured (Table 30) from other states particularly the neighbouring states of Assam, Tripura and Manipur. Some quantity is also imported through informal border trade with Myanmar. Though accurate figures are not available, the Trade and Commerce Department, Mizoram has estimated that during 2008–09, food commodities worth INR 405 million were purchased.

**Table 30.** *Purchase of selected livestock items*

Items	Units	2004–2005		2006–2007		2008–2009	
		Units purchased	Av. purchase price (INR)	Units purchased	Av. purchase price (INR)	Units purchased	Av. purchase price (INR)
Cattle	No.	1334	12,000	429	14,000	3242	17,000
Pig	No.	4595	12,000	85	14,000	–	15,000
Goat	No.	1298	1800	521	2000	5931	2500
Poultry	Tukri	3130	4000	5932	4200	1989	4800
Fish	Tukri	11,613	2300	24,639	2500	10,971	3000
Egg	Boxes	132,462	400	31,269	450	41,411	630

Investment in this sector will not only be crucial for the state to attain self-sufficiency in food from animal origin but also to export to neighbouring countries. Additionally, it would keep the prices of livestock products that have increased very sharply in recent years (Table 31) at affordable levels.

**Table 31.** *Average retail prices (INR) of livestock products*

Items	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008
Pork (kg)	98.75	98.75	98.75	102.5	140
Beef (kg)	102.5	101.25	102.5	112.5	137.5
Mutton (kg)	108.57	118.57	102.5	133.33	143.75
Broiler chicken (kg)	113.01	120.71	120	118.75	140
Eggs (dozen)	28.75	30	30	36.25	67.5
Liquid milk (litres)	24.58	26.87	28.87	28.87	30
Milk powder (kg.)	69.5	74.62	77.08	88.75	105.63
Amul butter (100 g)	15.16	15.04	16.17	16.25	20.38

### 3.9 Conclusions

The livestock sector has several constraints which require immediate attention. The state government has launched a number of programs to improve this sector. Tribals being the predominant population in the state, the programs are focused on these ethnic groups. However, the small number of households from other social groups should also be covered in the livestock development programs as the economic status of these households particularly those in rural areas are even worse than the STs. The development efforts should include the households that are self-employed in agriculture and have landholding of less than 2 ha.

Based on the spatial dimension of per capita income, poverty and composition of livestock population, it can be inferred that the livestock investment strategy should focus on the high

potential districts of Aizawl and Lunglei and economically backward districts of Lawngtlai and Champhai. The target livestock species in these four districts are as follows:

- Aizawl: Crossbred cattle, pigs and poultry
- Lunglei: Pigs and poultry
- Champhai: Indigenous cattle, buffaloes and poultry
- Lawngtlai: Goats

The state government has been undertaking a number of programmes and measures for livestock development such as implementation of AI in pigs, provision of feed transport subsidy, setting up of dairy plants, feed production units, pig breeding units, hatcheries etc. However, in the absence of local institutions and essential service facilities such as credit, extension, inputs supply and marketing to sustain the development, the schemes will not ensure the desired results for the livestock farmers. Future investment efforts need to first improve access to the market and subsequently ensure availability of production inputs for increase in income.





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