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Livestock Systems and Their Performance in Poor Endowment Regions of India

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Abstract

The study pertaining to the semi-arid tropic region of the country, which has maximum concentration of livestock, has identified livestock systems, investigated their performance, and determined their carrying capacity. Seven major livestock systems have been identified using cluster analysis: cattle, buffalo, cattle-buffalo-goat, cattle-goat, cattle-sheep, sheep-goat-cattle and the mixed. The cattle-livestock system has been found to be the most dominating system while sheep-goat-cattle system has been the least important system. Milk productivity and adoption of crossbred technology have been found highest in the buffalo-based livestock systems (buffalo, cattle-buffalo-goat, mixed), which are the systems prevalent in the agriculturally developed and socio-economically rich areas. Vast differences have been observed in the existing averages and exploitable potential in the milk productivity and adoption of the crossbred technology in cattle-based livestock systems (cattle, cattle-goat, cattle-sheep, sheep-goat-cattle). The research and development efforts need to be concentrated on these livestock systems in increasing the dry matter (DM) availability for which agricultural development is inevitable, and to develop a suitable crossbred technology thriving best in the marginal areas. The resultant increase in productivity will reduce the existing status of livestock units (LUs) per thousand hectares, which has been observed to be more than the carrying capacity in the cattle-based livestock systems.

Introduction

The livestock has special importance in areas having low agricultural income and poor resource-endowment. It provides alternative and stable

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income to the farmers of such areas, especially to those who are below the poverty line. Livestock and their products provide direct cash income and the animals are the living assets for many farmers (FAO/ILRI, 1995).

The area of maximum livestock concentration in India is its semi-arid region, comprising both good and poor resource-endowment areas. The region constitutes the developed areas of Punjab, Haryana and Uttar Pradesh, and the poor areas of Madhya Pradesh, Gujarat, Maharastra, Andhra Pradesh, Tamil Nadu and Karnataka, excluding the agriculturally developed coastal areas. The semi-arid tropic region provides a good opportunity to study the livestock system in developed vis-à-vis poor endowment regions. The present study pertains to this region of the country. It accounts for 40 per cent of the total livestock population and 35 per cent of the total milk production in India, while the geographic area of the region is more than 33 per cent. Nevertheless, the performance of livestock sector in this region is below average. It is also believed that the large livestock population is also responsible for deforestation and desertification of such areas. But, the empirical evidences in the study have not supported the contention that livestock population is contributing to these problems. It may be the problem of mismanagement of livestock and natural resources. The present study was undertaken with the following broad objectives: (i) to delineate important livestock systems in the region, (ii) to investigate the performance of these livestock systems on major accounts, and (iii) to determine the carrying capacity of each livestock system.

Methodology

Units of Analysis and Data

The study used district level data from 136 districts located in 12 states (before incarnation of 3 additional states) having characteristics of semi-arid tropic (SAT) environment, as delineated by International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The non-availability of up-to-date data for a uniform period on parameters under study for both livestock and cropping systems was a major constraint in this study. To fit the match between livestock and other related data, we have relied upon different sources for different sets of data during the period 1987-94. The district-wise data on livestock population was collected from the Livestock Census (1987), while information on milk production and breedable bovine population pertained to 1993-94 (Dairy India, 1997). District-wise agricultural information on gross cropped area (GCA) and gross irrigated area (GIA) were recorded as triennium (1988-90) averages. The district profile (CMIE,

1995) and general census, 1991 were the main sources of information for agricultural data and social factors (female and rural literacy, urbanization, etc.), respectively.

Livestock Systems

It was hypothesized that socio-economic reasons along with agro-climatic conditions determine the livestock combinations reared in a particular region. These combinations gave rise to livestock systems, which were identified using 'Cluster Analysis'. Each cluster having a unique livestock system was homogeneous for a meaningful analysis and performance of these systems. The livestock population data included in the analysis were on cattle, buffalo, goat, sheep and pigs. The method used in determining the cluster (livestock systems) was Squared Euclidean measure by activating SPSS software. Each livestock system was studied with respect to its socio-economic characteristics.

Performance Indicators

The performance of livestock system was estimated with respect to milk production and productivity, and adoption of crossbred technology. The parameters like production of meat, wool, skin and hide, milk by-products, etc. could not be included due to lack of district level reliable information. The coefficient of variation (CV) of performance indicators among districts of each livestock system was calculated to exhibit the potential that can be harnessed with diffusion of the existing technology and management practices, assuming uniformity of agro-climatic conditions.

The socio-organizational and techno-economic factors influencing the livestock performance were identified by constructing the overall correlation matrix. The socio-organizational factors chosen were female literacy and urbanization and the techno-economic factors were value of agricultural output (VOP) per hectare, bank credit per hectare, gross irrigated area, cropping intensity and veterinary infrastructure comprising veterinary hospitals and primary dispensaries. The higher value of correlation coefficient was taken as a criterion to identify the factors influencing the particular performance indicator.

Carrying Capacity

The carrying capacity is the availability of dry matter (DM) in an area to feed the standard livestock units (LUs) for a year. The population of different animals in a livestock system was converted into LUs (for procedure, *see* Table 6). Thus, the carrying capacity of a livestock system was equal to (1/1533) multiplied by (DM production/ forage area), where 1533 kilograms was the DM requirement of one LU from forage. The DM production in a particular livestock system was determined as 90 per cent of the crop residue from the gross cropped area (GCA) and 25 per cent of forage production from the area under fodder and pasture (Ramachandra *et al.*, 2001). The forage area was the sum of districtwise data on GCA, fodder area and pasture land.

Results and Discussion

Major Livestock Systems

Seven major livestock systems observed were: cattle, buffalo, cattle-buffalo-goat, cattle-goat, cattle-sheep, sheep-goat-cattle and the mixed (Table 1). The percentage dominance of a particular category of livestock in each system showed the appropriateness of the classification. The mixed livestock system was the one where all the animals under consideration were dominating in almost equal proportions. The most preferred animal in the SAT region was the cattle with domination in 22 per cent, followed by buffaloes in 18.4 per cent of the districts. These systems accounted for one-third of the livestock population in the area. The other important livestock system was the cattle-goat having dominance in 16.18 per cent, followed by cattle-sheep in 14 per cent of the districts. The preference for mixed livestock system and cattle-buffalo-goat in 13.2 per cent and 12.5 per cent of the districts, respectively indicated the availability of variety of forage in the area. There was a very small region (3.7% of the districts) where sheep-goat-cattle livestock system was practised.

The dominance of buffalo-based livestock systems such as buffalo and cattle-buffalo-goat, were located in agriculturally more developed regions

Table 1. Livestock systems and proportion of livestock population

Livestock system	Districts		Proportion of livestock population, %				
	Number	Per cent	Cattle	Buffalo	Sheep	Goat	Pig
Cattle	30	22.0	52.73	22.00	5.70	16.69	2.88
Buffalo	25	18.4	25.54	55.06	5.82	10.71	2.87
Cattle-buffalo-goat	17	12.5	34.83	33.58	5.01	23.92	2.66
Cattle-goat	22	16.2	51.45	13.52	5.31	28.82	0.90
Cattle-sheep	19	14.0	43.41	15.19	24.12	15.78	1.51
Sheep-goat-cattle	5	3.7	28.04	10.14	33.77	26.93	1.12
Mixed	18	13.2	32.10	20.38	20.94	25.43	1.15
Total	136	100					

of Punjab, Haryana, western Uttar Pradesh, Saurashtra (Gujarat) and the Rayalseema area in Andhra Pradesh. The dominance of all other livestock systems, viz. cattle-, goat- or sheep-based was confined to marginal and fragile environment of the Central and Plateau regions of the country. These are the regions which have scarcity of green and dry fodder inspite of larger landholding size and more pasture lands due to low productivity and degradation of pasture lands. Besides climate, crop residue and type of fodder available are the other determinants of a livestock system to be followed. The important cropping systems prevailing in different livestock systems are given in Appendix I to further clarify the point (Joshi *et al.*, 2001).

At the same time, following of a livestock system was the result of various underlying socio-economic characteristics, which have been presented in Table 2. A perusal of Table 2 further confirms that the buffalo-based livestock systems (viz. buffalo, cattle-buffalo-goat, mixed) pertained to the region with highest values of all the characteristics under study. High cropping intensity and gross irrigated area ensured a greater production of crop biomass on the supply side, high population density pulls demand and, high VOP and literacy facilitated better management practices. Generally, as the value of these characteristics went down, the cattle got mixed up with sheep and goat.

Performance of Livestock Systems

Milk Production and Productivity

The total milk production and the productivity per breedable female bovine (cows and buffalos) per day were estimated for each livestock system and have been given in Table 3 along with CV in milk productivity. As obvious, buffalo was the highest milk-producing livestock system not only because the breedable female bovine population (defined as a foot-note in Table 3) was more but also due to the highest milk productivity. The buffalo-based livestock systems (buffalo, cattle-buffalo-goat) were the only systems breaking the law of equalitarian by contributing to milk production more than its proportion in the breedable female bovine population. The 33 per cent of the breedable female bovine population of these systems contributed 44 per cent of the milk production. The contribution of all other livestock systems to the milk production was less than their share in the bovine population. The milk productivity in these livestock system was observed lower than the overall average (2.46 L/ day). This led us to infer that most of the cattle were indigenous and less productive. There is a need to increase the milk productivity of these livestock systems with emphasis on improving the breed of bovine and its nutritional intake.

Table 2. Average value of important socio-economic characteristics of districts representing different livestock systems

Livestock systems	Value of agricultural output (Rs/ha)	Population density (No./sq km)	Livestock density (No./sq km)	Rural literacy (%)	Cropping intensity (%)	Gross irrigated area (%)
Cattle	3788	377	222	40.3	124	38.85
Buffalo	5607	486	138	47.2	156	73.60
Cattle-buffalo-goat	4002	383	210	42.8	130	47.02
Cattle-goat	2351	206	158	44.0	121	18.11
Cattle-sheep	4002	275	228	44.1	114	32.31
Sheep-goat-cattle	2072	225	289	41.2	114	29.62
Mixed	3463	239	198	45.6	114	28.60

Source: The districtwise data were taken from Centre for Monitoring Indian Economy (1995), *The District Profile*, Mumbai.

Table 3. Milk production and productivity in different livestock systems

Livestock system	Breedable female bovine population*		Milk production		Milk productivity**	
	'000 No.	%	'000 tonnes	%	L/day	CV
Cattle	6985	19.25	3541.1	12.97	1.66	35.39
Buffalo	7356	20.28	8490.5	31.09	3.77	45.62
Cattle-buffalo-goat	4605	12.69	3658.5	13.40	2.60	23.77
Cattle-goat	4754	13.10	3318.8	12.15	2.28	43.35
Cattle-sheep	6228	17.17	4123.4	15.10	2.16	34.19
Sheep-goat-cattle	1412	3.89	871.4	3.19	2.02	21.99
Mixed	4940	13.62	3308.6	12.11	2.19	58.06
Total	36280	100.00	27312.3	100.00	2.46	

* Breedable female bovine population comprised female animals (cows and buffalos) both in-milk and dry of the age more than three years for indigenous cows and buffalos, and more than two and a half years for crossbred cows.

** Milk productivity was worked out in litres per day per breedable female bovine population. The average lactation period was considered to be of 306 days.

Source: Calculations based on districtwise population of breedable female bovine population and milk production (1993-94) taken from *Dairy India* (1997).

The highest CV in the mixed livestock system revealed that the untapped potential for increase in the milk productivity was about 58 per cent. The presence of more potential seems to have no relation with the existing high/low milk productivity. In the buffalo livestock system, the average milk productivity was the highest and potential to improve it further was also the second highest, as was reflected by the value of CV (45.62%). On the other extreme, milk productivity of the sheep-goat-cattle livestock system was the lowest (2.02 L/day) and its CV was also lowest (approximately 22%) providing, thereby, less opportunity to improve it further with the given technology and management practices. Following the same trend, the cattle-buffalo-goat livestock system also depicted a low potential. The potential in increasing the milk productivity of the cattle-goat, cattle and cattle-sheep livestock systems was found to be 43.35 per cent, 35.39 per cent and 34.19 per cent, respectively, and efforts need to be concentrated for achieving it.

The clustering of livestock systems in the homogenous agro-climatic conditions overruled the physical factors constraining milk productivity. There could be some technical and socio-economic factors, which need to be effectively overcome by the transfer of technology in livestock as well as by providing supporting institutions like training, infrastructural facilities and credit.

Adoption of Crossbred Technology

Among various technologies of the dairy sector, dissemination and adoption of the crossbred technology has been in the forefront. However, questions have been raised about its focus and success (Rao *et al.*, 1995; Ramesh, 1995), providing sufficient ground for the study on the adoption of this technology in different livestock systems (Table 4). The percentage of crossbreds was the highest in the buffalo livestock system (31.59%) assigning reasons to high income level and literacy (Table 1), and availability of excess fodder (Table 6). In the other livestock systems, adoption of this technology was just half of it or even less, with crossbred population of 16.30 per cent in the cattle-sheep and 13.59 per cent in the mixed livestock systems. The overall rate of adoption of this technology in the area under study was found to be about 12 per cent.

The unconvincing results that the proportion of crossbreds in all the cattle-based livestock systems was less, could be attributed to many factors. Subrahmanyam and Rao (1995) have identified priority for the draught animal power in agriculturally backward areas and crossbred animals were reported not good for this purpose. It is only the crossbred cows that excel buffalos in milk production and profitability, making the adoption of this technology quite obvious in the buffalo-livestock systems. However, in shifting from buffalo to crossbred cattle, the contribution of input-use was observed more than that of technical efficiency (Lalwani, 1989).

Table 4. Adoption of crossbred technology in different livestock systems

Livestock system	Breedable female cattle population* ('000 Number)			Crossbred (per cent)	CV (per cent)
	Crossbred	Indigenous	Total		
Cattle	261	3396	3657	7.13	155.41
Buffalo	467	1012	1479	31.59	79.92
Cattle-buffalo-goat	63	1545	1608	3.94	78.86
Cattle-goat	269	2813	3082	8.71	114.64
Cattle-sheep	586	3263	3849	16.30	86.42
Sheep-goat-cattle	81	828	909	8.94	134.88
Mixed	304	1930	2234	13.59	122.07
Total	2031	14787	16818	12.08	

* Breedable female cattle population comprised cows (crossbred and indigenous) both in-milk and dry of the age more than three years for indigenous cows and more than two and a half years for crossbred cows.

Source: Calculations were based on district-wise population of breedable cows population taken from *Dairy India* (1997).

A major setback to the crossbreeding program in some livestock systems can be attributed to the shortage of forage in meeting the DM requirement of crossbred animal than the focusing of the program, as is evident from the results on carrying capacity. The values of CV in the crossbred adoption rate among district of different livestock systems, viz. cattle (155.41%), cattle-goat (114.64%), sheep-goat-cattle (134.88%) and mixed (122.07%) revealed that in some districts having the same livestock systems, the adoption of crossbred technology was more than hundred-times higher than the average adoption of a system. A relatively high value of CV for buffalo (79.92%), cattle-buffalo-goat (78.86%) and cattle-sheep (86.42%) hinted at the existence of considerably high untapped potential.

Factors Influencing Performance Indicators

The values of correlation coefficient between factors and performance indicators— milk productivity and adoption of the crossbred technology— have been presented in Table 5. The cropping intensity (0.41), female literacy (0.39), bank credit per hectare (0.34) and gross irrigated area (0.36) were observed as the major factors contributing to the milk productivity in the region, while adoption of the crossbred technology was influenced by female literacy (0.51), VOP per hectare (0.44), cropping intensity (0.34) and cross

Table 5. Simple correlation coefficients between performance indicators and factors

Factors	Performance indicators	
	Milk productivity	Crossbred technology
Socio-organizational		
• Female literacy (per cent)	0.39	0.51
• Urbanization[a] (per cent)	0.17	0.13
Techno-economic		
• Gross irrigated area (per cent)	0.36	0.40
• Value of agricultural output (Rs/ha)	0.25	0.44
• Bank credit (Rs/ha)	0.34	0.42
• Cropping intensity (per cent)	0.41	0.34
• Veterinary infrastructure[b] (Breedable female bovine population per veterinary unit)	-0.20	-0.14

[a] Urbanization was taken as per cent of people living in urban areas in each district.

[b] Veterinary infrastructure factor was calculated as the number of breedable female bovine population per veterinary unit, where veterinary unit consisted of veterinary hospitals and primary dispensaries.

Source: CMIE (Centre for Monitoring Indian Economy), *The District Profile* (1995), Mumbai.

irrigated area (0.40). The veterinary infrastructure, which is breedable female bovine population per veterinary unit (hospital and dispensary), had a negative but small effect on both milk productivity and adoption of crossbred technology, meaning thereby, that as the number of milch animals per veterinary centre increased, the performance decreased.

Carrying Capacity of Livestock Systems

The results presented in Table 6 show the DM production, carrying capacity and the existing status of different livestock systems. The population of LUs was the highest in the cattle-livestock system, followed by the buffalo-livestock system and the forage area was the highest in the cattle-goat livestock system, followed by the buffalo-livestock system, thereby linking the latter livestock system with the highest DM production (31.40 million tonnes). The carrying capacity was found to be considerably higher than the existing status of LUs per thousand hectare in the case of buffalo (-228), cattle-goat (-185) and mixed (-138) livestock systems. It was marginally excelled in the cattle-buffalo-goat (+27 LUs per thousand hectare), cattle-sheep (+7) and sheep-goat-cattle (+24) livestock systems, while the existing LUs in the cattle livestock system were significantly higher (+226).

The overall picture emerged that there were 960 LUs per thousand hectares while the carrying capacity was 1024 LUs, indicating availability of DM for additional 64 LUs. . Keeping in view the lower size of body weight of animals in the semi-arid regions, there seems to exist sufficient unutilized carrying capacity, which contradicts the results of various studies (Pandey, 1995). Nevertheless, the availability of surplus carrying capacity was not uniform across different livestock systems, as mentioned above, restricting our leverage to increase milk production and adoption of crossbred technology simply on the basis of availability of DM, because cost and labour involved in collecting the forage in the latter livestock systems was more than equivalent quantity in the developed areas. The agricultural development emerged as a pre-requisite to improve the performance of livestock systems in the poor endowment regions.

Conclusions and Policy Implications

Seven major livestock systems have been identified in the semi-arid region of the country: cattle, buffalo, cattle-buffalo-goat, cattle-goat, cattle-sheep, sheep-goat-cattle and the mixed. Vast differences have been observed in the existing averages and the exploitable potential in milk productivity and adoption of the crossbred technology among the livestock systems. High milk productivity in the buffalo-based livestock systems (buffalo, cattle-

Table 6. Dry matter availability and carrying capacity of different livestock systems

Livestock system	Livestock units[A] ('000 No.)	Forage area ('000 ha)	Share (%) GCA	Share (%) Fodder	Share (%) Pasture	DM production[B] (Mt)	Carrying capacity[C] (LU/ '000 ha)	Existing status (LU/ '000 ha)	Surplus/ Deficit[D] (LU/ '000 ha)
Cattle	17737	14434.6	95.26	0.92	3.82	22.1873	1003	1229	+226
Buffalo	16335	18135.1	96.16	3.12	0.72	31.4013	1129	901	-228
Cattle-buffalo-goat	10763	9684.7	96.00	2.36	1.64	16.0978	1084	1111	+27
Cattle-goat	14701	18644.7	99.42	0.30	0.28	27.8244	973	788	-185
Cattle-sheep	14070	14116.5	92.36	0.76	6.87	21.4173	990	997	+7
Sheep-goat-cattle	2372	2417.1	100.00	-	-	3.5459	957	981	+24
Mixed	11819	13977.0	92.12	0.57	3.31	21.0789	984	846	-138
Total	87798	91409.7				143.5529	1024	960	-64

[A] The livestock units (LUs) were determined by taking breedable buffalo (1 LU), cattle (0.80 LU), sheep and goat (0.1 LU) and pig (0.2 LU) (FAO, *Production Yearbook*, 1973) . Non-breedable population in each category was uniformly taken as 25 per cent and their LU was counted as 50 per cent of breedable LU.

[B] The total dry matter production was calculated by multiplying areas under respective category by the average productivity. The average productivity was taken as 1.467 t/ha for GCA, 10t/ha for fodder area and 1.25 t/ha for area under pasture (Ramachandra *et al.*, 2001).

[C] Carrying capacity was estimated by dividing the total DM production by the DM requirement of a livestock unit (1533 kg/year/LU).

[D] Surplus/ deficit was calculated by subtracting the carrying capacity from the existing status.

buffalo-goat, mixed) has been traced to better cropping system and adoption of the crossbred technology. It could be enhanced further by genetic improvement and using surplus DM production present in the excess carrying capacity. The research and development efforts needed to exploit the potential in milk production and adoption of the crossbred technology in the cattle-based livestock systems (cattle, cattle-goat, cattle-sheep, sheep-goat-cattle) are to increase the DM availability for which agricultural development is inevitable, and evolve a high-yielding crossbred technology thriving best in the marginal areas. The resultant increase in productivity in the latter livestock system may reduce LUs per thousand hectares, which has been observed to be more than the carrying capacity. Policy interventions are required on further increasing the irrigated area to improve per hectare income besides forage production, concentration on veterinary infrastructure and improving the availability of bank credit; these factors have contributed substantially to the performance of livestock systems in the past.

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Appendix I

Important cropping systems in districts of livestock system

Livestock system	Cropping system
Cattle	Wheat-chickpea (5), Rice (6), Soybean (4), Ragi (1), Rice-wheat (8), Sorghum (1), Groundnut (1), Cotton-sorghum (1), Sugarcane (2), Pearlmillet-what-mustard (1)
Buffalo	Pearlmillet-wheat (5), Rice (2), Rice-wheat (8), Sugarcane (4), Pearlmillet-what-mustard (5), Maize-wheat (1)
Cattle-buffalo-goat	Rice-wheat (4), Wheat-chickpea (3), Pearlmillet-what-mustard (3), Cotton-sorghum (2), Rice (2), Maize-wheat (2), Pearlmillet-wheat (1)
Cattle-goat	Soybean (1), Maize-wheat (4), Sugarcane (6), Groundnut (1), Pearlmillet-sorghum (3), Cotton-sorghum (3), Pearlmillet-wheat (1), Wheat-chickpea (1), Sorghum (2)
Cattle-sheep	Rice (6), Groundnut (4), Ragi (5), Soybean (3), Cotton-sorghum (1)
Sheep-goat-cattle	Maize-wheat (1), Sorghum (2), Rice (2)
Mixed	Pearlmillet-sorghum (5), Groundnut (6), Maize-wheat (3), Rice (1), Sugarcane (1), Sorghum (1), Ragi (1)

Note: Figures within the brackets show the number of districts following a particular cropping system.

Source: Joshi *et al.* (2001).

Appendix II

List of states and districts having different livestock system

Livestock system	State	Districts
Cattle	Madhya Pradesh	Datiya, Dewas, East Nimar, Indore, Morena, Shajapur, Ujjain
	Tamil Nadu	Tanjavur, Kanyakumari
	Uttar Pradesh	Allahabad, Banda, Hamirpur, Hardoi, Jaunapur, Jhansi, Lucknow, Pratapgarh, Raebarelli, Unnao, Varanasi
	Andhra Pradesh	Adilabad, Khammam, Medak, Nizamabad
	Gujarat	Amreli, Surat
	Karnataka	Bidar, Chickmangalur, Shimoga
Buffalo	Maharastra	Kolhapur
	Punjab	Amritsar, Ferozpur, Kapurthala, Ludhiana, Patiala, Sangrur
	Rajasthan	Bharatpur
	Uttar Pradesh	Agra, Aligarh, Bulandshahar, Etah, Mathura, Merrut, Mradabad, Mauzaffarnagar
	Andhra Pradesh	Guntur, Krishna
	Gujarat	Kheda, Mahesana
	Haryana	Gurgaon, Jind, Karnal, Mahendragarh, Rohtak
Cattle-buffalo-goat	Madhya Pradesh	Bhind, Gwalior
	Rajasthan	Alwar, Jaipur
	Uttar Pradesh	Badaun, Etawah, Farrukhabad, Fatehpur, Jalaun, Kanpur rural, Shahajahanpur
	Andhra Pradesh	East Godavari, West Godavari
	Gujarat	Ahemdabad, Sabarkantha, Vadodara
Cattle-goat	Madhya Pradesh	Dhar, Jhabua, West Nimar
	Maharastra	Ahmednagar, Akola, Amaravati, Aurangabad, Beed, Buldhana, Jalgaon, Nanded, Nasik, Osamanabad, Parbani, Yavatmal

Contd

Appendix II (*Contd*)

List of states and districts having different livestock system

Livestock system	State	Districts
	Rajasthan	Banswara, Chittor, Jhalawar, kota
	Tamil Nadu	South Arcot
	Gujarat	Bharuch, Panchmahal
Cattle-sheep	Tamil Nadu	Chengai Anna, Madurai, North Arcot, Trichirapally
	Andhra Pradesh	Chittor, Karimnagar, Mahabubnagar, Nalgonda, Warangal
	Gujarat	Jamnagar, Rajkot
	Karnataka	Bangalore rural, Dharwad, Gulbarga, Hassan, Kolar, Mysore, Raichur, Tumkur
Sheep-goat-cattle	Rajasthan	Ajmer, Bhilwara, Tonk
	Tamil Nadu	Ramanathapura, Tirunelveli.
Mixed	Maharastra	Pune, Sangli, Satara, Solapur
	Rajasthan	Bundi, Dungarur, Udaipur
	Tamil Nadu	Coimbatore, Salem
	Andhra Pradesh	Cuddapah, Kurnool, Nellore
	Gujarat	Bhavanagar, Surendranagar
	Karnataka	Belgaum, Bijapur, Chitradurga, Mandya