Ind. Jn. of Agri. Econ.
Vol. 59, No. 2, April-June 2004

Technological Change in Livestock Sector of Haryana

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I

INTRODUCTION

India's livestock sector has had a significant impact on the growth of country's economy. The contribution of this sector is estimated to be about 25 per cent of the total value of agricultural sector. It is the principal source of draught power in rural areas and provides milk, meat, eggs, wool, hides and skins, manure and fuel. This sector also plays an important role in supplementing household incomes and generating rural employment, particularly among the landless, small and marginal farmers and women, besides enriching the national food basket to the millions of people. In fact, livestock provides regular employment to 9.8 and 8.6 millions in principal and secondary status, which together constitute 5 per cent of the total work force in India (Government of India, 2000). Traditionally, farmers keep livestock in proportion to the free crop residues and family labour available in their own household production systems and convert these into food, fuel and farm power, thus making each household a virtual self-contained production system with no purchased inputs and little marketable outputs. This age-old household practice has rapidly undergone a change in recent decades, due to integration of household production systems into input as well as output markets. As a result of this gradual transition from subsistence to marketisation, the economic dimensions of livestock keeping have assumed increasing significance in household behaviour (Kurup, 2000).

Haryana state has made rapid strides due to technological progress in its agricultural sector including livestock. In fact, it is famous as milk bowl state of India. Furthermore, it has been argued that technology has contributed to the growth and expansion of livestock sector, but empirical evidence is not available to support this contention. Moreover, indicators are available to measure and analyse the output and productivity changes in agriculture at disaggregated level in Haryana (Pandey *et al.*, 1985 and 1994). However, for livestock sector the output changes are only available at the all-India level (Kumar and Pandey, 1999). Accordingly, efforts have

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This is part of the first author's approved M.Sc. thesis entitled "Growth and Productive Performance of Livestock Sector in Haryana: The TFP Approach" completed under the supervision and guidance of the second author.

The authors are highly thankful to the anonymous referee for his valuable comments on the earlier drafts of this paper.

been made in this paper to analyse the productivity changes in livestock sector of Haryana due to technological progress at the disaggregated level. The specific objectives of the present study are: (1) to work out the factor shares and value shares of output in livestock sector under different periods across districts in Haryana and (2) to examine the residual productivity growth pattern in livestock sector of Haryana at disaggregated level during the last three decades.

II

DATA AND METHODOLOGY

The Data

The present study is based on 12 districts of Haryana, due to availability of time series data only for those districts. These districts include Ambala, Karnal, Kurukshetra, Sonepat, Rohtak, Jind, Hisar, Sirsa, Bhiwani, Mahendragarh, Gurgaon and Faridabad. The district-wise secondary data were collected from various sources such as *Statistical Abstracts of Haryana, Animal Husbandry Abstracts of Haryana, Integrated Sample Survey Report for Estimation of major livestock* products such milk, eggs, wool and meat, *Farm Management Extension Bulletins and Agricultural Engineering Today*, etc., for the period 1970-71 to 1998-99 (For details of data generation methodology see Appendix).

The Analytical Model

A concept closely related to the notion of technological change is that of productivity growth. The technical progress shifts the production function upward. The ratio of output to a single input is called the partial productivity of that input. However, single factor productivity is a misleading measure of gains in productive efficiency, because it does not allow for factor substitution. Consequently, economists had focused attention on Total Factor Productivity (TFP). It measures the increase in total output, which is not accounted for by increases in total inputs. The TFP index was computed as the ratio of the index of aggregate output to the index of aggregate inputs.

In the present study, the Divisia-Tornqvist index was used to construct aggregate output index and aggregate input index. This index has been widely used to estimate the Total Factor Productivity in Indian agriculture (Kumar and Mruthyunjaya, 1992; Kumar and Rosegrant, 1994; Mittal and Lal, 2001). The output index was constructed by covering major livestock outputs such as milk, eggs, wool, meat, draught power, dung, bone and hides and skin. The input index included feeds and fodder, human labour and others (value of veterinary services, vaccines, mineral mixture and composite dairy feed).

Total output index (TOI)

$$TOI_t / TOI_{t-1} = \Pi_j (Q_{jt}/Q_{jt-1})^{(Rjt+Rjt-1)1/2}$$

Total input index (TII)

$TII_t / TII_{t-1} = \Pi_i (X_{it}/X_{it-1})^{(Sit+Sit-1)1/2}$

where, R_{jt} is the share of output j in total revenue from livestock products, Q_{jt} is output of the j-th livestock product, S_{it} is the share of input 'i' in total input cost, X_{it} is quantity of i-th input, all in period t. With chain linking, an index is calculated for two successive periods t and t-1, over the whole period t_o to T (sample from time t=0 to t=T) and the separate indexes are then multiplied together.

TOI (t) = TOI (1). TOI (2)……..TOI (t-1)

TII (t) = TII (1). TII (2)……TII (t-1)

Total Factor Productivity Index (TFP)

$TFP_t = (TOI_t / TII_t)$

The above equations provide the indices of total output, total input and TFP indices for the period 't'. The aggregate index of input and output at the state level were computed as the weighted average of the district index. The district share in the state was used as weights.

III

RESULTS AND DISCUSSION

Changing Factor Shares and Output Shares in Livestock Sector of Haryana

Table 1 reveals the data about changing scenario of factor shares and livestock feeding pattern in Haryana. The share of feeds and fodder group ranked the highest followed by human labour and others at different points of time in Haryana. The share of feeds and fodder group in total inputs varied from 76.71 to 76.83 per cent during 1970-71 to 1998-99. Similarly, the share of human labour was about 15 per cent during the same period. These results indicate that over time, the relative shares of different inputs in total input value had almost remained stable but growth and technical change had affected the composition of livestock feed. Similar results were reported by Kumar and Pandey (1999) at all-India level.

TABLE 1. CHANGING SCENARIO OF FACTOR SHARES AND LIVESTOCK FEEDING PATTERN IN HARYANA

(per cent)

Particulars	1970-71	1980-81	1990-91	1998-99
(1)	(2)	(3)	(4)	(5)
I. Factor shares				
(a) Feeds and fodder group	76.78	76.73	76.71	76.83
(b) Human labour	15.37	15.43	15.39	15.38
(c) Others	7.85	7.84	7.90	7.79
(d) All	100.00	100.00	100.00	100.00
II. Feeding pattern				
(a) Green fodder	48.99	29.73	18.60	11.07
(b) Dry fodder	25.96	27.06	35.77	36.53
(c) Concentrates	25.05	43.21	45.63	52.40
(d) All	100.00	100.00	100.00	100.00

The percentage share of green fodder in total livestock feed consumption declined from 48.99 in 1970-71 to 29.73, 18.60 and 11.07 during 1980-81, 1990-91 and 1998-99, respectively. Pandey and Ram (1991) had not only observed a declining trend in area under fodder crops in Haryana but also shortages of green fodder in May-June and October-November. The share of dry fodder increased from 25.96 per cent during 1970-71 to 36.53 per cent during 1998-99. Similarly, the percentage share of concentrates also rose from 25.05 to 52.40 between the period 1970-71 and 1998-99. Thus, the feeding pattern in Haryana had shifted towards the mixture of dry fodder and concentrates with a declining proportion of green fodder, probably due to the adoption of stall feeding practices by the dairy farmers and shrinkage of area under fodder cultivation and/or pastures.

The spatio-temporal changes in estimated value shares of output from the livestock sector in Haryana are indicated in Table 2. Amongst various constituents of output values, the share of milk group had ranked highest followed by meat group, draught power, dung and others during different periods of time in Haryana. The share of milk group in the total value of output, by and large, increased across districts in Haryana during the period 1970-71 to 1998-99. Inspite of declining share of milk group in 1998-99, it dominated amongst livestock products in terms of its contribution to the total value of livestock output. The highest contribution of milk group into the total livestock output seems to be due to rearing of crossbred milch cattle with high milk production potentials along with murrah buffaloes yielding fat rich milk, in conjunction with adoption of scientific methods of rearing these animals by the dairy farmers across districts in Haryana. Such changes were also noticed probably due to phasewise implementation of "Operation Flood Programme" in the state, dissemination of scientific methods of animal husbandry practices by Haryana Agricultural University (HAU) and ICAR institutions, officials of Animal Husbandry Department engaged in the development of new techniques of rearing in the state and progressive outlook of dairy farmers who responded to these practices.

TABLE 2. CHANGING SCENARIO OF VALUE SHARES OF OUTPUT IN LIVESTOCK SECTOR OF HARYANA

(per cent)

Particulars	1970-71	1980-81	1990-91	1998-99
(1)	(2)	(3)	(4)	(5)
Milk group	45.47	58.91	70.15	59.22
Meat group	28.53	21.49	16.31	29.79
Draught power	17.31	10.48	4.95	3.16
Dung	6.54	7.43	7.23	6.25
Others*	2.15	1.69	1.36	1.58
All	100.00	100.00	100.00	100.00

* includes eggs, wool, bone and hides and skins.

The share of meat group into total output growth increased from 28.53 per cent in 1970-71 to 29.79 per cent in 1998-99. Despite a relative decline in the share of meat

group into the value of output during 1980-81 and 1990-91, it constituted the second largest dominant product into total value of livestock output. In fact, the decline in the share of milk group in total livestock output is offset by increase in the value share of meat. The percentage share of draught power declined from 17.31 to 10.48 in 1970-71 and 1980-81 while it was 4.95 and 3.16 in 1990-91 and 1998-99, respectively. It indicates the replacement of animal power by mechanical power in the state. By and large, the share of dung into total output growth was stable around 6 to 7 per cent. Yet, the contribution of other groups such as wool, eggs, bone, hides and skin to total output value shares was marginal. The relatively lower contribution of other constituents of livestock output could be perhaps due to lack of adequate policies and other infrastructural support by the government, generation of adequate technologies by the HAU and ICAR scientists on the one hand while dissemination of such technologies at the farmer's doorstep on the other.

Measurement of Total Factor Productivity and Its Growth

Table 3 presents the data about spatio-temporal changes in annual compound growth rates of output, input and total factor productivity (TFP) indices of livestock sector in Haryana. Over the entire period of study (1970-71 to 1998-99), the livestock output grew at the annual rate of 2.48 per cent while input index increased by 1.83 per cent and TFP grew at 0.65 per cent. However, sub-period-wise the results are more revealing. The TFP growth was 0.59 per cent per annum during period I (1970-71 to 1978-79), which moderately increased to 0.68 per cent per annum in the period II (1979-80 to 1988-89) and sustained 1.02 per cent annual growth during period III (1989-80 to 1998-99). By and large, similar trends in TFP growth existed across districts during different periods of study. All the districts under study showed positive TFP growth during the sub-periods. During 1970-71 to 1998-99 TFP growth was the highest in Jind district followed by Karnal. These results indicate that technical change has gradually become the driving force during the last three decades, thereby imparting dynamism to the livestock sector across districts in Haryana. These results are in conformity with those reported by Kumar and Pandey (1999) at all-India level.

Table 4 shows distribution of districts recording the relative gain or decline in residual productivity growth across periods in Haryana. Ambala, Karnal, Hisar, Sirsa and Mahendragarh districts recorded the relative gain in residual productivity growth between the periods I and II, while Kurukshetra, Sonepat, Jind and Bhiwani had declined. However, Rohtak and Gurgaon districts registered neither gain nor decline in residual productivity. Except for Ambala, Sonepat and Sirsa districts, all the districts observed gain in residual productivity growth between the periods II and III as well as in I and III. Interestingly, all the districts of Haryana observed an increasing output growth between the periods II and III. Likewise, all the districts except Ambala and Mahendragarh also had the positive output growth between periods I and III. Moreover, Ambala, Kurukshetra, Bhiwani and Mahendragarh

TABLE 3. ANNUAL COMPOUND GROWTH RATES OF OUTPUT, INPUT AND TFP INDICES OF LIVESTOCK SECTOR ACROSS DISTRICTS IN HARYANA

(per cent)

Districts	Period I (1970-71to 1978-79)			Period II (1979-80 to 1988-89)			Period III (1989-90 to 1998-99)			Overall (1970-71 to 1998-99)		
(1)	Output index growth (2)	Input index growth (3)	TFP index growth (4)	Output index growth (5)	Input index growth (6)	TFP index growth (7)	Output index growth (8)	Input index growth (9)	TFP index growth (10)	Output index growth (11)	Input index growth (12)	TFP index growth (13)
Ambala	2.29	1.85	0.44	1.69	0.45	1.24	2.04	1.77	0.27	1.91	1.32	0.59
Karnal	2.08	1.61	0.47	2.45	1.24	1.21	4.72	2.64	2.09	2.50	1.70	0.80
Kurukshetra*	1.56	1.18	0.38	1.46	1.15	0.31	3.81	2.59	1.22	2.22	1.86	0.35
Sonepat*	1.85	1.15	0.40	2.41	2.11	0.30	3.24	3.01	0.23	2.42	1.77	0.64
Rohtak	2.54	2.04	0.50	2.74	2.25	0.50	4.43	2.25	2.18	2.68	2.17	0.51
Jind	1.61	0.78	0.83	2.37	1.71	0.66	4.26	3.22	1.04	2.28	1.32	0.94
Hisar	2.18	1.71	0.47	3.59	2.90	0.69	3.88	2.63	1.25	3.32	2.69	0.62
Sirsa**	1.82	1.29	0.53	2.97	1.59	1.38	3.69	3.20	0.49	3.19	2.55	0.64
Bhiwani*	2.46	1.98	0.48	1.37	1.05	0.32	3.89	3.28	0.61	2.07	1.70	0.37
Mahendragarh	1.95	1.40	0.55	1.61	0.84	0.77	1.89	0.74	1.15	1.93	1.36	0.57
Gurgaon	2.43	1.85	0.58	2.89	2.31	0.58	3.80	2.60	1.20	3.19	2.48	0.69
Faridabad	-	-	-	2.75	2.02	0.73	3.30	2.28	1.01	3.00	2.24	0.76
Haryana	2.11	1.52	0.59	2.30	1.62	0.68	3.56	2.54	1.02	2.48	1.83	0.65

* Period I include 1972-73 to 1978-79. ** Period I include 1975-76 to 1978-79.

districts had observed the decline in output index growth rate between periods I and III. Likewise, Ambala, Karnal, Kurukshetra, Bhiwani and Mahendragarh districts in period I, Hisar and Mahendragarh districts in period II and Ambala and Mahendragarh districts in period III observed the decline in input index growth rate.

TABLE 4. DISTRIBUTION OF DISTRICTS RECORDING RELATIVE GAIN OR DECLINE IN RESIDUAL PRODUCTIVITY GROWTH ACROSS PERIODS IN HARYANA

Category	Between periods I and II	Between periods II and III	Between periods I and III
(1)	(2)	(3)	(4)
A. Output index growth rate			
(i) Gain	Karnal, Sonepat, Rohtak, Jind, Hisar, Sirsa and Gurgaon	Ambala, Karnal, Kurukshetra, Sonepat, Rohtak, Jind, Hisar, Sirsa, Bhiwani, Mahendragarh, Gurgaon and Faridabad	Karnal, Kurukshetra, Sonepat, Rohtak, Jind, Hisar, Sirsa, Bhiwani and Gurgaon
(ii) Decline	Ambala, Kurukshetra, Bhiwani, Mahendragarh	-	Ambala and Mahendragarh
B. Input index growth rate			
(i) Gain	Sonepat, Rohtak, Jind, Hisar, Sirsa and Gurgaon	Ambala, Karnal, Kurukshetra, Sonepat, Jind, Sirsa, Bhiwani, Gurgaon and Faridabad	Karnal, Kurukshetra, Sonepat, Rohtak, Jind, Hisar, Sirsa, Bhiwani and Gurgaon
(ii) Decline	Ambala, Karnal, Kurukshetra, Bhiwani and Mahendragarh	Hisar and Mahendragarh	Ambala and Mahendragarh
C. Productivity index growth rate			
(i) Gain	Ambala, Karnal, Hisar, Sirsa and Mahendragarh	Karnal, Kurukshetra, Rohtak, Jind, Hisar, Bhiwani, Mahendragarh, Gurgaon and Faridabad	Karnal, Kurukshetra, Rohtak, Jind, Hisar, Bhiwani, Mahendragarh and Gurgaon
(ii) Decline	Kurukshetra, Sonepat, Jind and Bhiwani	Ambala, Sonepat and Sirsa	Ambala, Sonepat and Sirsa

Note: Period I: 1970-78; Period II: 1979-88 and Period III: 1989-98.

IV

CONCLUSION AND POLICY IMPLICATIONS

The analysis of data presented in the preceding section clearly revealed the occurrence of technical change in the livestock sector across districts in Haryana. However, there is still scope for the exploitation of modern technologies across districts in the state so as to gain the residual productivity growth beyond 0.65 per cent per annum. The milk group dominated among the livestock products in terms of the percentage share in total value of livestock. However, the other constituents of output from livestock sector could not contribute as much as milk group, probably because of lack of adequate technical change on the one hand, and also suitable policies to promote them on the other.

Thus, the technology generating and disseminating activities like livestock research and extension have most critical roles to play in the state. Concerted efforts are needed to develop livestock technologies, dissemination of such technologies to

the farmers, thereby promoting the adoption rate among them and also revamping of livestock production and marketing policy prescriptions by the planners and policy makers so as to attain the desired technological progress in the state.

Received September 2001. *Revision accepted March 2004.*

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APPENDIX

OUTPUT AND INPUTS DATA GENERATION

Both output and input data series were not only compiled from various sources, but also generated based on realistic assumptions.

Output Data

The districtwise data on milk production (cows, buffaloes and goats), eggs and wool (Ram, Ewe and Lamb) were compiled from *Integrated Sample Survey Report for Estimation of Major Livestock Products:* Milk, Eggs, Wool and Meat. The average prices of milk, egg and wool prices were collected from *Agricultural Prices in India*. The meat data included mutton, goat meat, poultry meat, pork and beef. The estimates for meat were made as per assumptions given in Appendix Table 1.

The draught power from livestock was estimated in terms of horse power (HP) per animal. Based on Pandey *et al.* (1983), the following assumptions were made to estimate draught power: 0.5 HP per animal of bullocks, he-buffaloes, horses and ponies, mules and donkeys of above three years while those of camels above four years each 1 HP. Further, to estimate the value of draught power, the tractor prices (Model: 335, HP: 35, Escorts Ltd., Faridabad) were collected from various issues of *Agricultural Engineering Today*.

The dung (dry matter) estimates had been made as per assumptions (Maynard *et al.,* 1981) given in Appendix Table 2. The manure prices were complied from various issues of Farm Management Extension Bulletins of Haryana Agricultural University, Hisar.

The ash estimates as the percentage composition of body weight were considered for the computation of bone production (Maynard *et al.,* 1981). Thus, to estimate bone production the percentage composition of body weight considered were: calf new born 4.1 per cent, calf fat 4 per cent, sheep thin 4.4 per cent, sheep fat 2.8 per cent, pig (8 kg) 3.4 per cent, pig (30 kg) 2.5 per cent, pig (100 kg) 2.6 per cent, hen 3.2 per cent and horse 4.5 per cent.

To generate the estimates for hides and skin production, the average skin size of cattle and buffaloes, sheep and goats were assumed to be 14 and 4 sq. ft per animal, respectively.

Input Data

Dry Fodder

The districtwise dry fodder data were estimated based on crop-residues using grain to straw ratios (Nirman *et al.,* 1982). These cropwise ratios were: jowar 1:6, bajra 1:5, maize/gram/lentil 1:2, paddy/wheat/barley 1:1, tur 1:0.4, peas 1:1.5, urad and *moong* 1:2.3. Dry fodders, thus estimated were converted into wheat straw equivalent based on their respective Total Digestible Nutrients (TDN) contents (Ray and Ranjhan, 1978). The prices of wheat straw were compiled from *Farm Management Extension Bulletins* (*op. cit*).

Green Fodder

The districtwise green fodder estimates were separately computed for *kharif* and *rabi* fodders by multiplying the area estimates with that of yield estimates for the period 1970-71 to 1998-99. The cropwise area estimates (Pandey, 1995) are as under:

The entire area under jowar was considered for the fodder production across districts in Haryana. Likewise, one-fifth of the area under bajra while one-third of the area under maize was considered for the fodder production. Of the total area so worked out for *kharif* fodder, only one-third of it was considered for berseem crop. Likewise, one-twentieth, one-half, one-fifth and one-tenth area of barley, other cereals (oats), other pulses (peas) and rapeseed and mustard were, respectively, considered for these *rabi* fodder crops.

The per hectare yield estimates in quintals for various crops were as under:

Jowar: 275, bajra: 300, maize: 250, barley: 300, oats: 300, cowpea: 200, rapeseed and mustard: 300 and berseem: 600. *Kharif* green fodder and *rabi* green fodder were converted into jowar and berseem equivalents, respectively, based on their TDN contents and their prices were compiled from *Farm Management Extension Bulletins* (*op. cit*).

Concentrates

The districtwise availability of cakes/concentrates was worked out from the crop production data for the period 1970-71 to 1998-99 as under:

From the cotton production data, the ratio of cotton seed was estimated as 55 per cent and the cotton seed cake content was 75 kg per quintal of cotton seed. Similarly, the cake content in one quintal each of rapeseed and mustard, linseed, sesamum, groundnut and castorseed was 62, 70, 52, 53 and 52 kilograms, respectively. The flour content in one quintal of wheat was 98 kg and wheat bran content was about 2 per cent in the total quantity of wheat flour. One-fifth of barley production was considered as concentrate while that of gram, tur and other pulses as one-tenth. Similarly, the rice content in one quintal of paddy was 66 per cent and rice bran content was one-third of the total quantity of rice (Pandey, 1995). All these cakes and bran were converted into mustard cake equivalents based on their respective TDN contents (Ray and Ranjhan, 1978) and their prices were collected from various issues of *Agricultural Situation in India*.

Poultry Feed

The estimates of concentrates/cakes for livestock also included a part of poultry feed. From the districtwise crop production data 50 per cent maize, 25 per cent each bajra and jowar were considered as poultry feed. Then, these feeds were converted into maize equivalents based on their respective TDN contents. Further 1/20th gur production across the districts in Haryana was considered for estimating molasses production. Maize prices were compiled from the various issues of *Agricultural Situation in India* while those of molasses prices from various published sources.

Human Labour

The districtwise population census data about the cultivators and agricultural labourer were collected for the periods 1981 and 1991. Then 1/4th male and 3/4th female in each category was considered to be employed for livestock rearing and maintenance. And it was assumed that three women were equivalent to two men. The districtwise wages of these labourers were collected for period 1970-71 to 1998-99 from the various issues of *Statistical Abstracts of Haryana*.

Others

It consisted of value of veterinary services, vaccines, mineral mixture and composite dairy feed. To take into account the value of veterinary services, the districtwise number of Veterinary Surgeons and Veterinary Livestock Development Assistants (VLDA) were collected from the various issues of *Statistical Abstract of Haryana*. Then, their salaries were collected from the Office of Deputy Director of Animal Husbandry, Hisar. Thus, expenditures on Veterinary Surgeons and VLDA were considered as proxy for veterinary health care services and infrastructures across districts in Haryana.

The districtwise supply of vaccines and their prices were compiled for the period 1970-71 to 1998-99 from Haryana Veterinary Vaccine Institute, Hisar. The data on mineral mixture and composite dairy feed was considered as proxy, i.e., 10 per cent of total feeding cost will account for mineral mixture and composite dairy feed (Kakkar *et al*., 2001).

APPENDIX TABLE 1. ASSUMPTIONS FOR GENERATION OF MEAT STATISTICS

Particulars	Slaughtering (per cent)	Average body weight (kg)	Dressing (per cent)
(1)	(2)	(3)	(4)
1. Sheep	30	20	45
2. Goat	60	20	45
3. Poultry (a) Layer	100	1.25	65
(b) Broiler	100	1.5	65
4. Pig	100	70	70
5. Cattle (A) Indigenous			
(a) Adult males			
(i) Breeding bulls and bullocks	10	250	70
(ii) Others	100	250	70
(b) Adult Females			
(i) In milk + dry +Not calved	10	300	70
(ii) Others	100	300	70
(B) Cross bred (a) Adult males			
(i) Breeding bulls and bullocks	10	300	70
(ii) Others	100	300	70
(b) Adult Females			
(i) In milk + dry + Not calved	10	300	70
(ii) Others	100	300	70
(6) Buffaloes (a) Adult Males			
(i) Breeding he-buffaloes	10	400	70
(Breeding work and both breeding and work)			
(ii) Others	100	400	70
(Neither for breeding nor for work)			
(b) Adult Females			
(i) In milk + dry + Not calved	10	500	70
(ii) Others	100	500	70
(c) Young stock	90	300	70

APPENDIX TABLE 2. ASSUMPTIONS FOR GENERATION OF ESTIMATES FOR DUNG (DRY MATTER)

Animals	Average body weight (kg)	Feed intake (kg)	Digestibility (per cent)	Feaces (dry matter) (per day in kg)
(1)	(2)	(3)	(4)	(5)
Buffalo	500	15	50	7.50
Cattle	400	10	50	5.00
Camel	500	15	60	6.00
Horses and ponies	400	12	60	4.80
Mules and donkey	200	6	60	2.40
Pig	100	3	70	0.90
Sheep and goat	30	0.90	80	0.18
Poultry (Adult layer)	1.25	0.15	80	0.03