CHAPTER III

INCOME FROM ANIMAL HUSBANDRY

The estimates of income originating in the animal husbandry sector, published by the CSO at present, are based on the methodology and source material described in paragraphs 2.91 to 2.110 of the Final Report of the NIC. They are based mainly on the official MRs on livestock products. Since the publication of these marketing reports many social, political and economic changes have taken place such as banning of cow slaughter in various States, redistribution of State boundaries and planned development of animal husbandry. These changes make it difficult to project[1] the bench-mark estimates of production year after year. Since 1954 the NIU has also succeeded in collecting a certain amount of additional material which makes it possible to improve and revise the empirical basis of the existing estimates. It has also been possible to give State level estimates of output and value for most of the items. These revised estimates together with methodological details and a brief critical review of the available data on the subject are presented in this chapter.

2. In preparing these estimates the 'inventory' or 'value added' method has been used. Accordingly the gross value of production has been estimated first and then deductions have been made for the inputs, viz. (i) feed cost of non-service animals and (ii) cost of materials and depreciation charged to current expense. The coverage of the sector includes (i) breeding and rearing of animals and poultry[2], (ii) production of milk and milk products, (iii) slaughtering, preparation and dressing of meat[3], (iv) production of raw hides and skins, wool, eggs, honey and raw silk, (v) services for animal husbandry and (vi) hunting, trapping and game propagation.

3. At present no direct information on output of various livestock products is available on annual basis. MRs on several commodities, published by the DMI do, however, furnish some rough estimates of outturn of a number of these products. The year to which a bench-mark estimate relates, differs from product to product. Besides, most of the information available in these MRs has become out-of-date and as such is not directly useful for arriving at the estimates of production for the current years. In the absence of any other reliable information on the subject, the only course available for estimating the current production has been to carry forward these bench-mark estimates by relating them to the movement over time in the numbers of livestock of the relevant categories. For example, the bench-mark estimate of milk relating to the year 1956-57 may be projected to the year 1958-59 in proportion to the change in number of female breeding cattle and buffaloes (both

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[1] The errors of projection over a larger period generally tend to have a cumulative effect which results in the estimates becoming less and less realistic.

[2] To include rearing of birds, silk cocoons, bees etc.

[3] According to International Standard Industrial Classification, however, such activities are included under 'manufacturing'.

over 3 years) and she-goats kept for production of milk. The process of projection is, however, greatly facilitated by the availability of data on the number of livestock from a regular livestock census conducted every five years throughout the country[4].

4. The last all-India quinquennial livestock census was conducted for the year 1956. Summary Tables of this (eighth) all-India Livestock Census (ILC), furnishing figures for the years 1951 and 1956 by various categories of livestock according to re-organised set up of States, were published early in 1959. The information presented in these tables related to number of (i) cattle classified as (a) male over three years (breeding, working and others), (b) females over three years (in milk, dry and not calved, working and others), (c) young stock (three years and under); (ii) buffaloes with similar classification as in the case of cattle; (iii) sheep (one year and above; under one year); (iv) goats (one year and above, under one year); (v) horses and ponies under the three heads, viz. (a) males over three years, (b) females over three years, (c) young stock (three years and under); (vi) donkeys; (vii) mules; (viii) camels; (ix) pigs; (x) poultry classified as fowls, ducks and other birds[5].

4.1. Figures for inter-censal years as also for post-1956 years, were estimated by different categories of livestock using the linear method of projection on 1951 and 1956 figures, as given in the Summary Tables referred to above. The linear method of projection was preferred to the method of geometrical progression mainly because the latter method is more time consuming and more susceptible to computational errors. These projections were made at State level. In the case of sheep and goats, however, these projections did not give satisfactory results for certain States mainly due to wide variation in the corresponding census figures of 1951 and 1956. Such abnormal variations might have resulted from mis-classification of sheep and goats during the two censuses. To smoothen such defective trends, therefore, certain modifications were effected[6] particularly for the States of Assam and Kerala.

4.2. The trends revealed by the 1951 and 1956 figures of animals in milk (sub-category of female breeding cattle and buffaloes), however, seem to suffer from one major defect. There has been a considerable rise in the proportion of milk bearing female animals to total female breeding animals over the period 1951–56. On detailed examination, however, it would appear that at least part of the rise is statistical rather than real. Whereas the reference period for the 1956 ILC spread over 1st February to 14th April of that year, the reference period for 1951 Census happened

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[4] The latest available livestock census data relate to 1956.

[5] Further break-up of fowls and ducks by cocks, hens and chicken and ducks, drakes and ducklings are available with the DESAg, from whom this information was obtained by the NIU directly from their records.

[6] As regards Assam the rate of growth worked out on the basis of 1945 and 1951 census figures of sheep were applied to 1951 figures for estimating pre-1951 numbers whereas the rate of growth worked out on the basis of 1945 and 1956 census figures of sheep were applied to 1956 census figures for extrapolating the numbers for post-1956 period. Similarly for Kerala State the rate of growth for sheep and goats (combined) was worked out on the basis of 1951 and 1956 census figures and the same applied to 1951 and 1956 figures for estimating the numbers for pre-1951 and post-1956 periods respectively.

to be May of that year. We shall again return to this point at a later stage (paragraph 5.1). Another major limitation regarding the census pertains to its order of reliability. In this connection the NSS during its 10th round conducted a survey by way of providing sample verification of the livestock census of 1956. Based on the survey, certain correction factors were indicated by the NSS. The report, however, states that such adjustment factors, worked out from the sample verification, can be properly applied to the census data at the collection stage and not to the census totals, since the totals are subject to tabulation and other errors that cannot be so adjusted[7]. In view of these considerations, the proposed adjustment factors can be regarded as indicators of the quality of census enumeration rather than be used for adjustment of the census totals. The 1961 ILC figures which are likely to become available in the near future, will enable revision of the basis of the estimates of livestock population by various categories for the post-1956 period.

5. In the following paragraphs the actual methods followed at present for estimating various livestock products are described. For the sake of convenience these products have been classified into the following groups, viz. (a) milk and its products; (b) meat, edible offals and other bye-products; (c) hides and skins; (d) wool, hair and bristles; (e) eggs and poultry meat; (f) bones, horns, hoofs etc.; (g) dung (used for the purpose of fuel, manure and other domestic use) and (h) increment in stock. The manuring services of sheep, goats and other animals have been completely ignored partly due to the fact that its value is mainly imputed and there is hardly any basis for such imputation and partly due to the fact that even if it is reckoned as an item of output here, it should again be deducted as an input item in 'agriculture' sector; the NIC did not take it into account while discussing the input items in 'agriculture'.

5.1. *Milk and milk products :* The estimates of production of milk, in the present revised series have been prepared at State level by applying the average milk yield rates per breeding animal to the total estimated number of breeding animals. As regards the average milk yield rates per animal, these were obtained from the DMI, who have also published the same in the Agricultural Situation in India, (October 1959) separately for breeding cows and buffaloes and milking goats. The estimates as published by the CSO in the current official series of 'Estimates of National Income' are based on the *ad hoc* surveys on milk yield rates etc. conducted by the DMI in the year 1941. The revised rates used for the present revision are based on a fresh survey conducted by the DMI during the year 1956. These new milk yield rates have in turn been computed on the basis of average 'lactational milk yield rates' and the 'proportion of milk bearing animals to total breeding animals'[8].

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[7] The NSS Report No. 25, viz. the Sample Verification of Livestock Census 1956, pp. 6-7.

[8] The exact formulae for arriving at the average milk yield rate per animal etc. are :—

(i) average lactational yield = (average daily yield) × (average lactational period).

(ii) average annual yield (per animal kept for breeding or milk production)

$$= \frac{\text{(average lactational yield)} \times \text{(percentage of animals in milk)}}{100}$$

(iii) total milk production

= (average annual yield) × (number of animals kept for breeding or milk production).

Estimates of output of total fluid milk and its various products, based on the fresh 'milk yield rates' have also been formulated by the DMI and published in their Report on the Marketing of Ghee and other Milk Products in India, 1957. This report also contains comparable figures for the year 1951. These estimates have been presented both according to the old and re-organised set up of States.

In the light of the formulae used for estimating total milk production in the country (vide foot note 8) any statistical change in the proportion of milk bearing animals to total female breeding animals is likely to result in undue increase in the average milk yield rates as well as in total milk production. In other words any variation in the average annual milk yield[9] per animal between 1951 and 1956 could directly be attributed to the variations in the percentage of animals in milk to total number of animals (cows and buffaloes) kept for breeding or milk production. On detailed examination of the relevant data, however, it was observed that 1951 proportions were significantly lower than those for the census years 1945 and 1956 particularly in respect of buffaloes. Even though the post-partition changes in the State boundaries make the task of inter-census comparisons[10] rather difficult, the changes in these proportions have, to some extent, been studied by the NIU for the years 1945, 1951 and 1956. Data contained in Appendix 3.1 would reveal that the proportion of animals in milk to total breeding animals has shown a fair degree of consistency for the years 1940, 1945 and 1956. On further examination, it was found that the reference period for various censuses has not been uniform which might explain major part of the observed differences in 1951 proportions of animals in milk to total number of animals kept for breeding or milk production. As stated earlier the reference period for the 1951 ILC was May 1951 (with the date of final checking as 31st May) whereas for 1956 the reference period was 1st February to 14th April, (with 15th April as the date for final check-up). The fact that milk yield generally starts falling from the month of April and reaches a very low level by the end of May, merits special consideration in the context of any comparison between 1951 and 1956 proportions. This question of comparability is important for any meaningful formula of projection of the observed data for the post-census period.

5.1.1. In view of these considerations, the application of the 1951 milk yield rates to the total female breeding population of cows or buffaloes does not seem to be statistically valid. The problem of adjustment of 1951 proportions of animals in milk to total number of breeding animals is rather difficult. A better alternative for estimating the production[11] of milk for the year 1951 would, therefore, be to adopt 1956 average milk yield rates and apply the same to the total number of breeding animals in 1951.

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[9] The DMI have assumed no change in the average lactational yield over the period 1951-56.

[10] To ensure inter-census comparability of these proportions for at least certain important States, use was made of the provisional census data for 1956, which was available according to old set-up of States.

[11] The effect of proposed adjustments would result in revising the estimated production of milk for the year 1951. Appendix 3.2 presents the revised estimates of total milk production for the year 1951 which also gives the corresponding estimates as published in the Report on Marketing of Ghee and Other Milk Products in India, 1957.

5.1.2. As stated earlier, these average milk yield rates by States were applied to the estimated population of female breeding cattle and buffaloes (over three years in both cases) and she-goats in milk[12] to arrive at the State-wise estimates of production of milk from the three categories of milk yielding animals. These were then aggregated to arrive at the total production of milk in India according to the reorganised States. The total milk production thus obtained was allocated to its various uses, e.g. milk consumed in fluid form, milk converted into ghee, butter, dahi, cream, khoa, chhana etc. on the basis of utilisation rates published in the MR on Ghee etc.[13]. The allocation of fluid milk by use was done separately for each State. The State-wise figures of milk consumed in fluid form were then distributed into rural and urban sectors on the basis of data on number of milch cattle and buffaloes in the respective areas given in the 1956 ILC Report. Such allocation was considered necessary for suitably weighting the rural and urban prices; there is considerable difference between the prices of cow's milk and buffaloes milk both in terms of magnitude and movement over time.

5.1.3. Having estimated the quantities of fluid milk required for various milk products, the output of these products were estimated by making use of appropriate conversion rates as published in the Report on Marketing of Ghee etc. Milk allocated for conversion into khoa, cream, ice-cream and chhana was, however, aggregated at State level to retain the fluid milk equivalent of these products. This is necessary as such conversion involves special skill and the activity is more in the nature of small scale manufacturing and cannot, therefore, be regarded as ancillary activity of the primary producers; this marks a minor departure from the view taken by the NIC. The production of *lassi* has been estimated by first deflating the quantity of milk apportioned for conversion into ghee and *deshi* butter by about 1-2 per cent (allowance for evaporation of milk while the same is converted into dahi) and then subtracting from it *deshi* butter equivalent of butter and ghee, the residue reckoned as quantum of *lassi; deshi* butter equivalent was arrived at by applying the appropriate 'conversion ratio of milk to *deshi* butter' to the total milk apportioned over ghee and *deshi* butter.

5.2. *Meat, edible offals and other bye-products:* The data on number of animals slaughtered and the average meat yield rates by type of animals, as used for the earlier series, were obtained from the DMI. These data, based on an *ad hoc* trade survey conducted by them in the year 1949, were later published in their Report on Marketing of Meat in India, 1950. These data pertained to the old set up of States and as such could hardly be regarded as satisfactory for projection of the estimates of output for later years particularly in view of the promulgation of various legislative measures banning cow slaughter in a number of States. These measures

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[12] The figures of goats in milk for the years 1951 and 1961 were obtained directly from the DMI. For other years the estimates were worked out by suitable interpolation.

[13] Report on the Marketing of Ghee and other Milk Products, 1957, pp. 80-81.

have affected the type of animals slaughtered. particularly the cows, with a consequential shift to production of meat of various types other than beef. Indirectly, they must have affected the magnitudes of output of hides and skins and other animal products also. On a special request by the NIU, the DMI undertook a fresh survey in the year 1958-59 whereby data have been collected on the number of slaughters and the average rates of meat yield per animal slaughtered. These data have been furnished by the DMI according to re-organised set up of States for different categories of animals such as cattle, buffaloes, sheep, goats, and pigs. Having obtained the number of animals slaughtered during the year 1958-59 by various categories of animals, the same were related to the estimated population of the relevant categories in order to work out the State-wise proportions of animals slaughtered to total animals. Application of these proportions to the estimated population of relevant categories of animals for each year gave the estimates of animals slaughtered during that year. The average yield rates of meat, edible offals, animal fats etc. were then applied to the State estimates of the number of animals slaughtered in order to obtain the annual estimates of output of meat and other products[14] for each of the re-organised States.

5.3. *Hides and skins:* Hides and skins are mostly obtained either from the animals slaughtered for production of meat or from the animals fallen due to natural death. As regards the former, the procedure for obtaining the estimated number of animals slaughtered during each year, has been explained in the preceding paragraphs. Regarding the latter category, information on mortality rates for different categories of animals was obtaind from the DMI according to re-organised set up of States. Application of these mortality rates to the estimated population in each year gives the number of animals fallen. The aggregation of the number of animals slaughtered and the number of animals fallen give the estimates of hides and skins. In this connection it may be stated that the bench-mark estimates of hides and skins as used for the conventional series were taken from the MRs on Hides and Skins published in the years 1952 and 1955 respectively. These bench-mark estimates for hides in particular are largely dependent on the livestock population of cattle and buffaloes for the year 1945, adjusted of course to the bench-mark years. As the former estimates related to undivided India, the DMI had adjusted them to arrive at the estimates for Indian Union on the territorial basis. This procedure is not likely to give reliable estimates due to the mobile nature of cattle population which are likely to migrate alongwith the households possessing them. To this extent, therefore, the estimates presented in the said reports could not be regarded as satisfactory. As regards the skins group, however, the output accrues mostly from slaughtered animals. These statistics were independently obtained by the DMI from various

[14] Besides the yield rates of various edible and non-edible bye-products which were obtained from the DMI on per animal basis, certain rates of wastage were also furnished by them. These rates of wastage were applied on the total estimated production in order to arrive at the quantities of such bye-products actually utilised for various purposes. As regards the animal fats extracted from dead animals, the yield rates as well as the mortality rates by States and by categories of animals, were also obtained from the DMI.

State governments and as such the estimates thereof may not be subject to errors of the former kind.

5.4. *Wool and hair :* The estimates of wool have recently been revised by the DMI on the basis of a fresh survey on (i) yield rates of wool per animal clipped, (ii) percentage of sheep and lambs clipped to their total number and (iii) the 1956 count of sheep and lambs. State-wise data on items (i) and (ii) above, namely, the percentages of sheep and lambs clipped to total sheep and lambs and the average annual yield of wool per sheep and lamb clipped were directly obtained from the DMI. These applied to the projected population of sheep and lambs gave the estimates of output of clipped wool according to re-organised set up of States. The provisional estimates of pulled wool, as obtained from the DMI, related to the year 1956. These were projected at State level to a given year in proportion to the change in projected population of the relevant group, viz. sheep and lambs. These estimates of clipped wool and pulled wool were then aggregated to arrive at the State-wise estimates of total wool production for each year.

5.4.1. Hitherto no account was taken of goat and camel hair while estimating the contribution to national income from this sector. This was primarily due to the lack of any reliable data on the subject. As the DMI have furnished data[15] similar to that on wool in respect of camel and goat hair also, it has been possible to estimate the State-wise production of goat and camel hair. As regards the pig bristles, however, similar information is not available for any of the recent years. According to the Brochure on the Marketing of Bristles in India, 1951, the total production of bristles in 1948-49 was 5.5 lakh pounds[16]. Figures for the years 1955-56 to 1959-60 have been obtained by projecting the 1948-49 figure by relating it to the growth in the population of pigs over the period.

5.5. *Eggs and poultry meat :* Data on the average number of eggs laid per hen and per duck were directly obtained from the DMI. Unlike the 1951 ILC Report, the 1956 Summary Tables provide information on total number of fowls, ducks and other birds. The necessary break-up by males, females and chickens was obtained directly from the DESAg. Applying the average yield rates of eggs per adult bird, the total number of eggs of each kind were estimated for each state separately. Production of eggs from other types of birds were estimated on the basis of relevant information given in the Report on Marketing of Eggs in India and Burma, 1938. Data on the rates of actual collection of eggs (that is after making allowance for wastage) and proportions of eggs available for consumption and retention for hatching were culled out from the Report mentioned above. These proportions were applied, without change, to the estimated number of eggs used for different purposes[17]. For the eggs retained for hatching, only 66 per cent were assumed to hatch into chickens, 50 per cent of which were regarded as net survivals. Poultry

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[15] All these data relate to the year 1956.

[16] Valued at over one crore of rupees.

[17] Out of every 1000 laid only 975 are actually collected of which 778 are directly consumed as eggs and the remaining 197 retained for hatching.

meat is assumed to be obtained from slaughtering 50 per cent of adult poultry plus the excess of the chickens produced during the year over the number required for maintaining the estimated growth rate of poultry.

5.6. *Bones, horns etc.:* Estimates of bones have been prepared on the basis of data on slaughter statistics and mortality rates both obtained from the DMI. The yield rates of bones per animal of each type were taken from the DMI Report on Marketing of Bones and Bonemeal in India, 1957. Similar information on average yield rates of horns, hoofs and tail stumps was obtained from the DMI. The outturn estimates were worked out for each category of animals by applying the all-India average yield rates on the estimated number of slaughtered and fallen animals in a given year.

5.7. *Dung:* The annual production of dung published from time to time by the DESAg are based on the evacuation rates given in Wrights' Report on the Development of Cattle and Dairy Industries of India. These evacuation rates seem to be quite high compared to those given in Burn's Report entitled 'Technological Possibilities of Agricultural Development in India'. As both these sets of data are rather national in character, the NIC had deflated the same arbitrarily before adopting them for estimating total outturn of dung[18]. In the absence of any better data, use has been made of these very adjusted rates as also wastage and utilisation rates adopted by the NIC[19]. The NSS have, during the past few rounds, collected certain data on the production and utilisation of dung for various purposes which is at the moment under tabulation.

5.8. *Increment in stocks:* As stated earlier livestock population was estimated separately for each animal category for each year. The net increase in population over each year is considered as the increase in stock during the given year. As the net increase takes account of animals born and animals fallen, no adjustment is considered necessary for stock depreciation.

5.9. Estimates of outturn of livestock commodities thus obtained are presented in table 3.1.

6. *Prices:* Data on prices used for estimation purposes in the earlier series were very scanty. They had mainly been taken down from various marketing reports and, therefore, could not be considered comprehensive for building up estimates at State level. During the past few years, more information on wholesale prices of different livestock products has become available. These data are regularly collected by the DESAg, the DMI, the SSBs, State Agriculture and Revenue Department and the NSS. All the available data on the subject were examined in detail and suitably

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[18] The deflated evacuation rates assumed by the NIC are 3.26, 1.63, 4.89 and 1.63 tons per annum per adult cattle, cattle young stock, adult buffaloes and buffalo young-stock respectively.

[19] The NIC assumed 20 per cent of dung as wastage, the rest being supposed to be actually collected and utilized for different uses; these are (i) manure: 45 p.c. (ii) fuel: 50 p.c. and (iii) cleaning etc. 5 p.c. To arrive at dry contents of green dung, evaporation was assumed at 60 per cent.

TABLE 3.1: PRODUCTION OF LIVESTOCK COMMODITIES: ALL INDIA

(in 000 metric tons)[a]

	1955-56	1956-57	1957-58	1958-59	1959-60
(1)	(2)	(3)	(4)	(5)	(6)
I. milk					
1. milk consumed as such					
a) rural	7331	7373	7415	7457	7500
b) urban	360	363	365	368	370
2. ghee	431	433	436	439	442
3. dahi	1539	1546	1553	1559	1566
4. butter	81	82	82	83	83
5. lassi	6990	7030	7071	7112	7152
6. other products[b]	1192	1197	1202	1207	1212
II. meat					
1. beef[c]	67	67	67	67	68
2. buffalo[c]	96	98	99	100	102
3. sheep[c]	130	130	131	131	131
4. goat[c]	255	260	264	269	274
5. pork[c]	25	25	26	26	27
6. head and legs	80	81	82	83	84
7. animal fat[d]	29	30	30	30	31
III. hides and skins					
1. cattle hides	156	156	157	157	158
2. buffalo hides	52	52	52	53	53
3. goat skins	281	287	292	298	303
4. sheep skins	152	153	153	153	153
IV. poultry and eggs					
1. poultry	1378	1413	1445	1478	1512
2. eggs: hens	136	140	145	149	154
ducks	27	27	28	28	28
others	3	3	3	3	3
V. wool and hair					
1. wool	30639	31300	31962	32629	33298
2. goat hair	3784	3969	4150	4334	4516
3. camel hair	387	393	413	426	439
4. pig bristles	287	292	297	303	308
VI. dung consumed					
1. as manure	223	224	225	226	227
2. as fuel	99	100	100	101	101
3. for other purposes	25	25	25	25	25
VII. bones	138	138	139	140	141

[a] with the exception of hides and skins, eggs and poultry where the production is in lakh numbers, wool and hair where the production is in metric tons and dung where the production is in million metric tons.

[b] milk equivalent.

[c] includes edible offals.

[d] excludes fat which is sold along with meat.

processed to work out State-wise average annual prices separately for each of the principal livestock products. The number of centres and the commodities covered by the different agencies in regard to collection of these prices, are set out in Appendices 3.3 to 3.5.

6.1. Data on wholesale and retail prices are collected by the DESAg and cover a large number of livestock products for all major States. These prices are collected on weekly basis and are published in its publications, viz. (i) Wholesale Prices of Agricultural Commodities (weekly), (ii) Agricultural Prices in India (annual) and (iii) Agricultural Situation in India (monthly). The DESAg has also got information on prices that is not published in these publications. To the extent the published prices were considered deficient, additional information was obtained from the records of the DESAg. Detailed information on contents and coverage of price material published by the DESAg in its publications is set out in Appendix 3.3.

6.2. The DMI also collect wholesale and retail prices from a number of centres in respect of certain selected livestock commodities every month through its Marketing Officers posted in different parts of the country. There is, however, no publication which gives all these prices at one place or on a regular basis. Such information, as was considered necessary, was obtained independently from the DMI. Appendix 3.3 presents details regarding the number of centres and number of commodities covered by the DMI.

6.3. Data on prices collected by various SSBs are usually published in their monthly/quarterly/annual publications. To the extent the published data were considered inadequate, special returns furnishing the unpublished data were obtained from different SSBs to ensure that maximum empirical coverage was secured so far as working out of most representative State-wise prices of important livestock commodities was concerned. Details about such unpublished data are furnished in Appendix 3.4.

6.4. Besides the sources mentioned above, certain useful information on wholesale and retail prices is available in various Statistical Supplements to State Gazettes. These prices are collected by the Agriculture and Revenue departments of State Governments regularly. The frequency of collection of such prices, varies from State to State. Details on the number of centres covered for each commodity are presented in Appendix 3.5. For our purposes, however, no use has been made of the retail prices except for dahi.

6.5. The Directorate of the National Sample Survey has also been collecting some useful data on wholesale and retail prices of a large range of consumer goods which include livestock products such as milk, ghee, butter, meat and various items of livestock feed. Prices thus collected by the NSS upto 14th round were published by the ISI in their Weekly Bulletin on Retail Prices. From 14th round onwards, however, the NSS have stopped collecting wholesale prices. It may be observed here that under the earlier scheme of NSS, it would have been possible to estimate gross trade margins between wholesale and retail stage for a number of consumer goods. Also,

the NSS surveys being repetitive in nature, such data would also have made it possible to examine annual changes in these trade margins. For our purpose, however, only limited use could be made of the NSS data on retail prices (only retail prices were published by the ISI in the said weekly bulletin) such as finding out rural-urban differentials of prices of livestock commodities. It would be extremely useful if all these data collected by the NSS in their past rounds are published in the form of a report.

7. For estimating the State-wise average prices of various livestock products, all the information, available in published or unpublished form, were pooled together and averages worked out over each financial year. The simple arithmetic average of the various available price observations was calculated. These wholesale prices, however, related mostly to urban centres (exceptions being ghee, butter, hides and skins). In order to make them fairly representative for the country as a whole, they were suitably deflated on the basis of the NSS data on retail prices for urban and rural areas. These retail prices were averaged at state level over 52 weeks of 1957-58 to arrive at the annual average retail prices for rural and urban areas for each State separately, which enabled us to work out suitable factors for deflation. The commodities covered thus were milk, mutton, goat flesh and eggs.

7.1. *The next step involved was to adjust these* average wholesale prices for gross trade margins between producer and wholesale prices. For this purpose, use was made of the margins presented in an unpublished occasional paper entitled *A Note on Urban Distribution Margins*, by A. Sanyal and N. Chattopadhyaya of the ISI. *The price differentials and trade margins used for purposes of adjusting the urban* wholesale prices as estimated from various sources mentioned above, are reproduced in *Appendix 3.6.*

8. *Value of output :* Estimates of gross income were obtained by aggregating the gross value of different commodities produced in the sector. The estimates of gross value were worked out by evaluating the State production at the corresponding average annual wholesale prices. The values thus obtained were then deflated suitably to allow for trade margins between producers' prices and wholesalers' prices, and for rural/urban differentials where the basic price data related exclusively to the urban areas. Item-wise details are, however, given below :

i) *Milk group* : Fluid milk consumed in urban areas has been evaluated at wholesale price duly deflated for trade margins. Fluid milk consumed in rural areas has, however, been evaluated at urban wholesale prices duly deflated for price differentials for rural and urban areas and trade margins. For ghee and butter[20], the available wholesale prices are fairly representative for each State as a whole and hence the State value figures are deflated for trade margins only. Due to lack of data on wholesale prices of dahi the same has been evaluated at retail prices. The value figures thus obtained have been suitably deflated for rural/urban differentials

[20] *The NIC assumed butter prices to be 200 per cent of ghee prices due to non-availability of any* independent data on butter prices.

as also for trade margins between retailers and producers. Hitherto dahi prices were imputed by relating the same to rural milk[21] prices. For evaluating other 'milk products' quantities of milk equivalent of such products at State level have been evaluated at estimated rural wholesale milk prices duly deflated for trade margins. The estimated production of lassi has been arbitrarily valued at a flat rate of 6 nP. per seer[22].

ii) *Meat, edible offals etc. :* Value of meat has been worked out separately for beef, meat, mutton, goat flesh and pork at appropriate average wholesale prices of meat duly deflated for trade margins. In the absence of relevant prices of edible offals and head and legs, however, the former have been evaluated at meat prices of appropriate kind whereas head and legs have been valued at a flat rate of Rs. 5 per maund. As regards non-edible bye-products[23] of meat, the estimated quantitites have been valued at prices calculated from data on output and value of the same supplied by the DMI; these data, however, related to the year 1955-56.

iii) *Bones, horns and hoofs :* Estimated quantity of bones actually collected has been valued at average wholesale prices of raw bones duly deflated for trade margins. As regards horns and hoofs, the estimated quantity has been evaluated at all-India prices implicit in the data on output and value for the year 1953-54, made available by the DMI.

iv) *Hides and skins :* The number of hides and skins, estimated as described in para 5.5, have been evaluated at average wholesale prices duly deflated for trade margins. The wholesale price data are quite comprehensive and fairly representative for the entire State territories and as such no deflation has been considered necessary for rural-urban price differences. Prices thus obtained have been compared with the CMI input prices on hides and skins. The latter are fairly high in comparison with those used by us for purposes of evaluation.

v) *Wool and hair :* Wool has been evaluated at the average wholesale prices of wool by States duly deflated for trade margins. Due to lack of similar data on prices of goat and camel hair, the same have been estimated from the adjusted prices of wool on the basis of ratios of prices of wool to prices of goat hair and camel hair, as given in the Report on Marketing of Wool and Hair in India, 1946. These estimated prices have been used for evaluation of camel and goat hair. For pig bristles, the value figures have been obtained by evaluating the estimated production at export price adjusted for trade margins[24].

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[21] For earlier series, the rural milk prices relating to the year 1948-49 and culled out from the MR on Milk, were just repeated for subsequent years without any change from year to year.

[22] Procedure followed hitherto was to evaluate milk equivalent of ghee and butter at rural milk prices and to subtract the aggregate value from the estimated value of ghee and butter. This procedure was very unsatisfactory as it involved anomalies like negative value of lassi during years when ghee and butter prices were comparatively less remunerative.

[23] These are animal fats excluding fat sold as part of meat, intestines, oesophagus, animal blood, useless meat, tail stumps and various kinds of glands.

[24] The export price per unit has been arbitrarily deflated by 33 per cent to cover gross trade and transport margins from the stage of production to the stage of export.

vi) *Eggs*: Eggs available for consumption have been evaluated at average wholesale prices of eggs duly deflated for trade margins between the producers' and wholesale prices. Poultry meat has, however, been evaluated by adopting the all-India prices of adult birds and chickens, assumed by the NIC[25].

vii) *Dung*: Due to non-availability of any fresh data on prices of dung the value of dung used for various purposes has been estimated by using the prices assumed by the NIC in their Final Report[26].

viii) *Increment in stocks*: Increment in livestock comprises of net additions to the capital stock during the year and the contribution from the same has been estimated by evaluating various components (by type of livestock as well as poultry) at the corresponding prices for each year.

ix) *Services of livestock*: There is practically no material available for evaluation of the services rendered by the livestock and we have, therefore, considered it desirable to evaluate the same at cost. Details of estimates of cost of upkeep of livestock are, however, given in para 9.9.3. The NSS surveys on cost of production in 'agriculture' and 'animal husbandry' sectors carried out in the various rounds[27] are likely to provide information which may improve the estimates considerably.

x) *Hunting*: In the absence of any fresh data on the subject the NIC estimate of Rs. 80 lakhs in 1950-51 has been repeated for subsequent years without any change. Indian Forest Research Institute, Dehradun has, however, been approached to explore the possibilities of providing necessary data on the subject.

8.1. Estimates of value of output thus derived are presented in Table 2.2 on all-India basis for each commodity separately.

9. *Derivation of net output*: As stated in paragraph 2, various deductions necessary for arriving at the value of net output from the sector are:

i) feed cost of non-service animals and

ii) cost of materials and depreciation charged to current expenses.

The existing data on the subject, however, are very inadequate. Besides some case studies and pilot enquiries conducted by the ICAR (new IARI) on cost of production of milk etc. the NSS have conducted sample inquiries in some of its rounds. After the final results become available it may be possible to improve the existing estimates of net output. For the present, therefore, the methods and the sources used for building up various cost items remain the same as described by the NIC in their Final Report [Para 2.110, sub-paras (viii) and (ix)].

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[25] Rupees 2 per adult bird and 75 nP per chicken.

[26] These are: (i) dung used as fuel, Rs. 10.37 per m. ton; (ii) dung used as manure Rs. 5.19 per m. ton; and (iii) dung used for other purposes Rs. 5.19 per m. ton.

[27] During 5th to 7th and 11th rounds some useful information was collected in schedule no. 2.1.

Income from Animal Husbandry

TABLE 3.2: VALUE OF LIVESTOCK PRODUCTS: ALL INDIA

(at current prices) (in lakh rupees)

	1955-56	1956-57	1957-58	1958-59	1959-60 (preliminary)
(1)	(2)	(3)	(4)	(5)	(6)
I. milk					
1. milk consumed as such					
a) rural	27885	29529	30929	31383	32410
b) urban	1893	2016	2074	2131	2201
2. ghee	17420	18613	20263	21094	23115
3. dahi	7612	8029	8264	8636	8905
4. butter	3165	3198	3217	3211	3527
5. lassi	4682	4709	4736	4763	4790
6. other products[a]	4239	4512	4659	4742	4888
II. meat					
1. beef[b]	496	530	513	581	585
2. buffalo[b]	435	423	448	459	465
3. sheep[b]	2156	2122	2204	2308	2313
4. goat[b]	3932	3976	4006	4562	4648
5. pork[b]	304	322	355	370	376
6. heads and legs	107	108	109	110	111
7. animal fats[c]	303	307	309	313	315
8. other products[d]	438	441	444	448	451
III. hides and skins					
1. cattle hides	1082	971	934	1018	1174
2. buffalo hides	416	399	386	483	559
3. goat skins	801	799	854	904	1317
4. sheep skins	455	435	419	477	683
IV. poultry and eggs					
1. poultry	1336	1371	1402	1436	1470
2. eggs: hens	852	941	1046	1183	1283
ducks	153	156	166	195	206
others	17	17	19	22	24
V. wool and hair					
1. wool	1215	1232	1204	1127	1226
2. goat hair	110	114	113	108	119
3. camel hair	7	7	7	7	8
4. pig bristles	105	97	95	97	92
VI. dung consumed					
1. as manure	11212	11261	11311	11361	11411
2. as fuel	9966	10010	10054	10099	10143
3. for other purposes	1246	1251	1257	1262	1268
VII. bones	135	136	137	138	139
VIII. increment in stocks	2440	2440	2440	2440	2440
total	106615	110472	114374	117468	122661

[a] includes ice cream, khoa, chhana, etc.

[b] includes edible offals.

[c] excludes fat which is sold along with meat.

[d] includes horns, hoofs, etc.

9.1. The method broadly comprises of estimating the total cost of upkeep of entire livestock population and then allocating the same between the service and non-service animals. Items included under feed cost are :—

i) roughages : fodder (green and dry);

ii) grains;

iii) concentrates, e.g. oilcakes and

iv) salt, ghee and medicines etc.

As regards (i) the entire value of fodder crops and grass, 50 per cent of the value of rice husk. 75 per cent of value of bran and 90 per cent of the value of stalks and straw[28], as given in Table 2.7 of Chapter II, have been assumed to contribute towards the feed of all livestock taken together. Grain is also sometimes fed in limited quantities to cattle. The relevant information on percentage of each of the foodgrains fed to cattle[29] has been obtained from the book *Population and Food Planning in India*, 1947, by Baljit Singh. As regards (iii), in the absence of any information on the actual offtake of oilcakes etc. for the purpose of feed, estimates have been prepared by evaluating the total output of oilcakes[30] at average wholesale prices duly adjusted for trade margins and then assuming certain percentages[31] of value of edible oilcakes as being fed to cattle. Information on oilcakes fed to cattle is given in the marketing reports on oil-seeds. The expenditure on medicines, ghee and salt etc. has been arbitrarily assumed to be Re. 1.00 per cattle. As regards the expenditure on costs incurred on different materials and depreciation of various implements used for converting milk into its products etc., the same was estimated by adopting the rates assumed by the NIC[32].

9.2. For allocating the total feed cost thus estimated between the service and non-service animals, use has been made of the information on classification of cattle and buffaloes by their broad use as given in the 1956 ILC Report. The main services of livestock are (i) for ploughing and carting in agriculture, (ii) for urban carting and as pack animals in trade and transport and (iii) for oil pressing in industry. The total working population of cows and buffaloes and the entire population of horses, ponies, donkeys, mules and camels have been regarded as being kept for the services[33]. On the other hand the entire adult female population of cattle and buffaloes less the working females and the entire population of all the animals, including young stock of cattle and buffaloes, have been considered as kept for purposes other than service[34]. The total cost has been divided between non-service animals and

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[28] The remaining 10 per cent is assumed to be used for thatching and other purposes.

[29] These are (a) rice and wheat : 1 per cent; (b) jowar, bajra, barley, maize, ragi and other cereals : each 2 per cent; (c) small millets : 5 per cent; (d) gram : 5 per cent and (e) other pulses : 10 per cent.

[30] Information on the subject is available in 'Oilseeds in India' a publication of the DESAg.

[31] These are (a) 55 p.c. of groundnut oilcakes; (b) 80 per cent of linseed oilcakes and (c) 60 p.c. of coconut and cotton-seed oilcakes.

[32] Rs. 10.00 per maund of ghee and butter; 0.25 p.c. of value of output in the case of milk, hides and skins, eggs and poultry, wool and hair, dahi and other products.

[33] Of the service animals group those considered under sub-category (i) are male and female working cattle and buffaloes belonging to the rural areas.

[34] It is admitted that this allocation is arbitrary as some of the goods considered in non-service part (e.g. meat, hides, bones, etc.) are derived from both parts. But apart from meat or hides, these goods are of small value which justifies the assumption that the primary motive of rearing up and maintaining non-service animals is the production of milk and its products—an assumption implicit in our allocation.

service animals under sub-category (i) relevant for the agriculture sector by using the estimated number of animals under these heads and an approximate equivalence scale suggested[35] by Prof. Gadgil in his book *Economic Effect of Irrigation*, published in 1948. It may be pointed out here that any inaccuracy in the scale will not have any significant effect on the estimates of national income, though the contribution to income by different sectors will be slightly affected. A large error in the scale would still leave the net value of output of the combined agriculture and livestock sectors almost unchanged.

9.3. The estimates of total feed cost and the share of 'agriculture' and 'animal husbandry' sector in the same are summed up in Table 3.3 whereas the estimates of net output from 'animal husbandry' sector are presented in Table 3.4.

TABLE 3.3: VALUE OF FEED COST OF LIVESTOCK

(at current prices) (in lakh rupees)

	1955-56	1956-57	1957-58	1958-59
(1)	(2)	(3)	(4)	(5)
1. roughages				
a) fodder crops	4535	6921	5927	7070
b) sugarcane tufts	568	633	635	600
c) grass	4215	3970	4364	4915
d) stalks and straw	22801	25752	26150	26409
e) rice husk	424	1016	558	531
f) rice bran	1424	1504	1366	1744
2. cereals and pulses	5034	6606	5665	8306
3. oilcakes	2202	4705	4552	6045
4. medicine, ghee, salt etc.	1767	1775	1785	1794
5. total feed cost	43981	52882	51002	57414
i) for non-service animals	23861	28717	27675	31236
ii) for animals required on farms and for rural carting	17236	20643	19972	22314
iii) for other service animals	2884	3522	3355	3864

TABLE 3.4: NET VALUE OF OUTPUT IN ANIMAL HUSBANDRY

(at current prices) (in lakh rupees)

	1955-56	1956-57	1957-58	1958-59	1959-60
(1)	(2)	(3)	(4)	(5)	(6)
1. total value of output	106615	110472	114374	117468	122661
2. less feed cost of non-service animals	−23861	−28717	−27675	−31236	−32617*
3. less cost of materials and depreciation	−1511	−1527	−1541	−1556	−1572
4. net output from animal husbandry sector	81243	80228	85158	84676	88472
5. net value of hunting	80	80	80	80	80
6. grand total	81323	80308	85238	84756	88552

* estimated by adopting the 1958-59 relationship between the feed cost of non-service animals and total value of output from livestock proper (i.e. excluding hunting).

[35] The scale suggested has been adopted with slight modifications and is reproduced in Appendix 3.7.

TABLE 3.5 : COMPARISON OF REVISED ESTIMATES WITH CONVENTIONAL ESTIMATES

(at current prices)

(quantity[a] in 000 metric tons)
(value in lakh rupees)

		1955-56		1956-57		1957-58		1958-59		1959-60	
		revised	conventional	revised	conventional	revised	conventional	revised	conventional	revised	conventional
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. milk and its products[b]	quantity	19668	21915	19776	22067	19889	22220	19999	22373	20109	22525
	value	66896	73823	70606	74500	74142	74943	75980	75491	79836	76112
2. meat and its products											
a) meat	quantity	493	538	499	542	505	546	511	550	518	553
	value	6236	6876	6308	7223	6413	6938	7056	7717	7144	7787
b) other products[c]	value	1855	—	1841	—	1894	—	2014	—	2038	—
3. hides	quantity lakh nos.	208	210	208	211	209	211	210	210	211	210
	value	1408	1881	1870	1970	1920	1889	1801	1889	1788	1767
4. skins	quantity lakh nos.	434	411	439	422	445	433	451	442	457	452
	value	1256	1294	1234	1434	1273	1562	1381	1566	2000	2293
5. dung all kinds	quantity[a]	4959	4956	4982	4976	5004	4997	5025	5015	5048	5033
	value	22424	22393	22522	22494	22622	22586	22722	22673	22832	22759
6. wool and hair											
a) wool	quantity metric tons	30639	31429	31800	32337	31962	33247	32629	34155	33298	35063
	value	1215	1573	1233	1649	1204	1739	1127	1671	1226	1824
b) hair and bristles	value	222	—	218	—	215	—	212	—	216	—
7. eggs and poultry	value	2358	2500	2485	2777	2633	2972	2836	3338	2983	3595
8. horns, hoofs and bones	value	215	1000	216	1000	218	1000	219	1000	221	1000
9. increment in stock	value	2440	2031	[illegible]	2031	2440	2487	2440	2520	2440	2520
10. total value		106615	113313	110472	114778	114374	115768	117468	117505	122661	119647

[a] with the exception of hides and skins where the quantity is in lakh numbers, dung where the quantity is in lakh metric tons and wool where the quantity is in metric tons only.
[b] in terms of milk equivalent.
[c] includes intestines, oesophagus, animal blood, edible offals, heads and legs, animal fat, useless meat, tail stumps, glands etc.

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10. *Comparison with the conventional estimates :* Table 3.5 sets out in detail comparable estimates of gross output, prepared on the revised as well as conventional lines. On the whole the estimates have undergone a downward revision for the entire period 1955-56 to 1958-59 mostly due to similar downward revisions of the output estimates in respect of various items except for the skins group. As stated earlier in this chapter the estimates of output of milk have undergone downward revision as a result of the latest available information on the average milk yield rates, made available by the DMI on the basis of their recent enquiry on the subject. In terms of value, however, the estimates have undergone upward revision due to upward revision in the average price per unit of production. This is mainly due to the fact that whereas in the earlier series the rural prices of milk were just repeated from the year 1948-49, they have now been adjusted for changes on the basis of independent data on prices obtained from various SSBs and other published sources. The estimates of outturn of meat group have undergone downward revision due to the availability of fresh material supplied by the DMI on the basis of the number of animals slaughtered during the year 1958-59. There has not been any appreciable change in the average price per unit of production. In terms of value, therefore, the extent of revision is proportional to the change in production. On the other hand, due to the inclusion of the value of edible offals, however, the overall value of the meat group has substantially gone up. The production figures of hides have changed only marginally, but the value figures have been revised downwards mainly due to the downward revision of the average prices used. This downward revision was considered necessary for adjusting the urban wholesale prices for rural/urban differentials and also for the gross trade and transport margins between the producer's and wholesale prices. Even though the outturn estimates of skins have gone up as a result of upward revisions in the number of goats slaughtered during the year 1958-59, the value figures have registered a fall mainly due to the downward revision of prices used earlier. The prices for the revised series, as stated earlier, have a wider empirical base and have now been adjusted for various trade and transport margins on the basis of latest available data. The estimates of production of wool, which are now based on the latest available yield rates, have also undergone downward revision. In value terms the fall is more than proportional to the fall in production, which is again due to the downward revision of prices used earlier. The overall fall is, however, partly offset by the inclusion of value of hair and bristles, which has been estimated here for the first time due to the availability of some independent data. The value of eggs and poultry has been revised downwards, partly due to similar revisions in production and partly due to revision of prices. In the case of horns, hoofs and bones the revision is as much as Rs. 8 crores. The earlier estimates were based on the potential production of bones whereas the revised estimates are based on actual data on their utilisation. There has also been a slight downward revision in the value of increment of stock, which is mainly due to a similar revision in the annual rate of growth of different types of animals, which are now based directly on the 1951 and 1956 livestock census data.