

## Symposium on Improvement of Livestock Statistics

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At the outset, Chairman stressed the importance of livestock and poultry in the development of rural economy of the country. The availability of reliable statistics on livestock and poultry numbers and on the production of livestock products and their rearing and management practices is essential for implementation of livestock development programmes. The papers presented at the symposium covered important areas like contribution of livestock sector to national income, present status of livestock products, statistics on feeds and fodder etc. The following recommendations emerged out of the papers presented at the Symposium.

1. A number of problems exist in the implementation of the methodology being followed in the integrated sample surveys for estimation of production of various livestock products and cost of production of livestock products. These relate to sampling, weighment/measurement of the product, data collection in the field etc. Suitable remedial measures are needed to overcome these problems.
2. While the integrated sample surveys provide estimates of major livestock products, there are a large number of by-products on which data are needed for filling the gap for national income estimation. Suitable action is needed for estimating the production of these by-products either through the existing surveys or by planning new surveys in these areas.
3. Data available from secondary sources may be used to supplement/validate the results obtained from primary data.

The extended summaries of the papers presented at the symposium are as follows.

## 1. Present Status of Livestock Statistics and Livestock Surveys

A.S. Chopra\*

The basic statistics in the sphere of animal husbandry comprise the data on number of different categories of livestock, their composition in terms of breed, sex and age and output of different livestock products and by-products.

### *Livestock Census*

The first livestock census was conducted in 1919-20 and the subsequent censuses were conducted after intervals of five years. Fourteen livestock censuses have been completed so far and the last such census was conducted in 1987 with 15th October as the reference date. Over such a long period, the scope and coverage of the livestock census has increased tremendously. At present, the livestock census covers not only livestock but includes information on fisheries, agricultural implements and machinery. The field work is conducted by primary workers, who are generally patwaris in the rural areas and staff drawn from municipalities/Animal Husbandry Departments or primary school teachers in the urban areas. Different agencies are involved in different states for conducting livestock census.

The time lag in the availability of final figures for the district level is more than 5 years and for the state level estimates it ranges from 3-5 years.

There has been no single reference date for the collection of data throughout the country inspite of best efforts and hence growth rate figures pertaining to different states are not comparable.

No efforts are made to provide advance tabulation of a 10% sample of the livestock households in respect of important items and to make suitable corrections, if required-technically called revalidation.

### *Livestock production*

The level of consumption or per capita availability of various livestock products in a country is a good index of development. Among the food items, the elasticity of demand to milk, eggs, fish and meat is much more than the other food items and it is more than one and in certain states it is nearly two. Thus, there is a need for reliable and comprehensive data of livestock products continuously and regularly.

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### *Cost of production of livestock products*

Studies on economics of livestock products are of considerable value for, policy makers as well as producers. Some methodological studies were conducted by IASRI for some products like milk, wool and poultry and eggs.

The IASRI have also developed methodologies for working out the economics of rearing calves and maintenance of adult cattle and buffaloes; economic of pig production ; and rearing of sheep and goats. No large scale surveys have been conducted for studying the changes over the period.

### *Data gaps*

A large number of surveys are being conducted regularly for the estimation of major livestock products and also for the cost of production studies ; but there are gaps both in coverage and methodology for some minor products and by-products. However, these data are needed for the estimation of value of output from this sector. Some of these gaps in basic statistics needing immediate attention are :

- Estimation of yield rates of other meat products, hair, pig bristles, bone etc.
- Estimates of quantum and value of cattle feed including salt etc.
- Production estimates of dungs specially of small animals and droppings of birds etc.
- Estimation of losses of various livestock products,
- Estimation of animal draught power.
- Production estimates of poultry meat.

### *Problems/difficulties experienced*

#### (i) Estimation of wool

Under the integrated sample survey, five households rearing sheep in each selected village are selected. For the purpose of wool yield, 2 rams, 2 wether, 2 ewes and 2 lambs are randomly selected. Experience has shown that only in exceptional cases the enumerator has been able to get information from 5 households. Either the selected householder has sheared the animals before the enumerator reaches the selected household or the householder has moved along with the sheep outside the village and got the sheep sheared without caring much about the wool. Farmer is interested in money and he gets it without going into the merits or demerits of the economics of rearing sheep for wool or mutton purposes.

(ii) Estimation of meat

Under the integrated sample survey, two animals of each species are to be selected in the selected slaughter house in each round and are to be weighed after slaughter. The average of these will provide the yield rate. Based on the average yield of each species in each slaughter house, the meat production is estimated. The problems faced are enormous viz. the basic concept/definition of a slaughter house/slaughter place; species-wise number of animals slaughtered daily; value of the by-products etc. There is a great deal of non-response from butchers.

(iii) Measurement problems

For the estimation of average yield of milk, wool and meat, weighment of actual produce is recommended under the integrated sample survey. Experience has shown that for item like milk, the farmers do not like the idea of actual weighment of milk from randomly selected animals. The choice left with the enumerator is either to record the yield as told by the farmer or by his judgement. Similarly, the wool when sheared also contains dust particles, dry grass/thorns, grease etc. There is hardly any provision to weigh big animals e.g., bovine etc. Thus, the quality of the production estimates is affected.

*Other constraints*

The other types of errors which are common in all agricultural field surveys are:

- (a) Specification error,
- (b) Omission, duplication of sampling unit or wrong identification,
- (c) Ambiguous schedules, concepts and definitions,
- (d) Inaccuracies or inappropriate methods of observation or measurement,
- (e) Investigator's bias due to lack of training and experience,
- (f) Memory lapse on the part of the respondents,
- (g) Compilation, tabulation and summarisation of results.
- (h) Publication/printing errors.

## 2. Some Issues Relating to Sampling Methodologies of Livestock Surveys

O.P. Kathuria\*

Two commonly known measures of the level of improvement of livestock are their numbers and productivity. Besides, data are also needed on rearing and management practices followed by the farmers such as feeds and fodders given to the animals, grazing facilities, veterinary and housing facilities, marketing and communication facilities etc. Appropriate statistical techniques are needed for estimating the availability of different kinds of feeds in relation to their costs and comparing them for their nutritional content.

### *Livestock Census*

The livestock census offers a single major source of the total count of livestock population and its composition. The Ministry of Agriculture in the Government of India coordinates the operation of livestock census and shares with the State Governments the expenditure incurred on livestock census. The 1987 livestock census was not conducted by many states due to occurrence of drought and could not be conducted for many years thereafter. A similar problems of funds was also observed in case of 1992 livestock census. While it is true that livestock census is an expensive statistical exercise but it must also be realized that it is indispensable for learning about the demographic structure of our livestock and for carrying out livestock improvement programmes in the country. While there has been talk of combining agricultural and livestock censuses in order to save on costs, the livestock census has suffered in the process.

### *Estimates of Intercensal livestock numbers*

Livestock census provides estimates of livestock numbers of different species of livestock, only for a given reference date. It is not possible to estimate change in the structure of livestock population between two livestock censuses. Certain categories of livestock have a much shorter life span. The change in the structure of these species of livestock can not be reflected during the livestock census. Therefore, it becomes essential to obtain intercensal estimates of livestock numbers. The methodologies of these surveys has been provided by the IASRI.

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### *Method of data collection*

A significant aspect of some of these surveys is that the data on major inputs like fodders and concentrates and the major outputs are collected through actual weighment by the field investigator. While the system ensures collection of fairly reliable data, however, it has often been observed particularly in case milk that the presence of the field investigator during both times (morning and evening) of milking of animals is expensive and time consuming. Moreover, it may perhaps to be much to expect the field investigator to go for data recording in the freezing morning hours in the winter or in the afternoons of scorching summer months. It may be possible to do so for a few days or weeks but not on all days year after year. It is understood that few states are enforcing physical observation for data collection. If so, then why adopt a methodology which can not be implemented and how does it affect the sample size which is dependent on method of data collection. While some studies have been made on alternative approaches for data collection, no conclusive method has been developed so far.

Slaughtering of animals in the households is a common practice in rural and semi-urban areas, while regular slaughter houses do normally have provision to weigh the slaughtered animals and may also be keeping records of the same, no such facilities exist in the rural and semi-urban areas. It may not be possible to record the weight of slaughtered animals particularly big animals like bovines in these areas. The weight of an animal is a function of measurement of its girth, length etc. The weight of slaughtered animal is sometimes reported based on these measurements. Some studies might be needed to perfect the functional relationship between body weight and measurements of different categories of animals.

### *Optimization of resources-a case for longitudinal surveys*

Presently, most sample surveys in agriculture including animal husbandry are planned every year and no effort is made to utilize the information gathered in previous years' surveys. The sampling design of these surveys has to be necessarily kept simple because of the complications in processing and analysis of data.

The advent of low cost and high speed computers has considerably removed the drudgery of data processing and data analysis. Softwares are available and wherever needed can be developed to handle problems of large scale data analysis. It should now be possible to plan sample surveys both over space and time so that the information generated in previous years (rounds) can be utilized. Thus the sample size over a given period can be considerably reduced without sacrificing precision. Integration of surveys was one such effort in this direction. The approach was not found to work satisfactorily, perhaps, because

all the parameters i.e., milk, meat, eggs, and wool were sought to be estimated simultaneously in a single survey which resulted in poor representation of some parameters in the sample.

#### *Training needs of statistical manpower*

Professional competence of statistical staff working in the Central Sector Schemes in the states is another important issue which needs to be given a serious thought. Many of them have basic qualifications in disciplines other than statistics or even mathematics to be able to understand and comprehend theoretical aspects of sampling and statistical methods. Many of them have undergone training of 6 months to one year duration which may be inadequate to handle the work of these projects efficiently. In order to improve the level of statistical manpower, it is essential that only graduates and postgraduates in statistics or mathematics with training in statistics should be appointed. Further, there should be a provision of periodical refresher training of these manpower at a research institution like IASRI or at agricultural universities in the state wherever such facilities for training exist.

### 3. Contribution of Livestock Sector to National Income and Data Requirements for the Purpose

A.C. Kulshreshtha\* and Ramesh Kohli\*

Livestock sector plays an important role in the Indian economy. Besides being an integral part in our day to day lives, their contribution to national income is invaluable. Output from milk and eggs, which are important sources of nutrition to our millions has been rising faster than any other sector. Their output has been increasing at higher growth rates, while their prices are rising at moderate rates as compared to the other sectors. Despite the importance of livestock in our economy, the development of statistics in animal husbandry is rather slow, vis-a-vis, the agriculture sector. There are considerable data gaps in livestock sector, particularly in respect of production, consumption, disposal and prices of livestock products, employment at different stages, inputs and operational costs.

Some of the areas of data gaps from the estimation of national income point of view are:

Estimates of meat products, viz. edible offals, glands, fats, guts, blood, bones, horns, hoofs, tail stumps, etc. for all categories of livestock separately both for slaughtered and fallen animals, alongwith percentage recovery from fallen animals and prices which accrue to producers.

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- The estimated number of fowls, ducks (adult and chickens) killed for poultry meat, average meat yield per bird, production of poultry meat and prices at which bird-meat sold;
- Estimated number, percentage recovery and prices in respect of fallen and slaughtered animals;
- Production and prices of milk from animals, other than cow, buffalo and goat.
- Utilisation rates of milk and conversion ratios of ghee, butter, etc. and their prices;
- Quantity of milk collected by the cooperative societies or other agencies for processing and prices paid to producers;
- Production and prices of goat hair, camel hair, pig bristles, etc;
- Annual data on number deaths of different categories of animals due to natural calamities, net addition to livestock for each category and average prices at which these animals are sold;
- Item-wise consumption (quantity and value) of roughages and concentrates consumed by different categories of livestock;
- Trade and transport margins and rural and urban price differentials for estimation of producer prices from the wholesale prices available for livestock products prevailing in the urban centres;
- Data on operational costs like repairs, maintenance of fixed assets, sheds, stalls and equipments, expenditure on material inputs and upkeep of equipment;
- Data on market charges incurred by the producers for the sale of meat and other livestock products (per cent to value of output); and
- For the purpose of construction of input-output transaction tables, which is an integration part of the National Accounts Statistics, itemwise material inputs, i.e. feeds such as fodder, cane trash, grass, straw and stalks, salt and medicines, types of concentrates for different categories of animals.

Thus, with the present availability of data it is not possible to provide separate estimate of GDP from livestock sector. Though most of the data is collected through integrated sample survey (ISS), only limited data is being compiled. Emphasis should, therefore, be laid on the compilation of data collected in ISS as much as on its collection. Also the possibility of utilising the services of NSSO need to be explored for conducting case studies, whereby proper indicators could be developed in areas where data gaps persist. There



is also need for strengthening the statistical cell in the Department of Animal Husbandry and Dairying on the lines of the system that exists on crop husbandry side. Similarly, efforts need to be made to strengthen the statistical cells in the State AHS's and State Directorate of Economics and Statistics so that the requisite data for regional planning become available.

#### 4. Trends and Status of Milk Production in Gujarat

T.D. Khatri\*

Gujarat contributes 6 to 8% of the total milk production of the country and ranks fourth among all the Indian States. Per capita availability of milk per day has improved from 179 grams during 1981-82 to 227 grams in 1989-90 in Gujarat. About two-thirds milk production of the State is buffalo milk.

Cross-bred cow is a high yielding animal; but the production of milk from cross bred cows constitutes only 1 to 5% of the total milk production in the State. It is recommended that data users may take full advantage from the estimates so produced.

#### 5. Cost of Production of Livestock Products

Shivtar Singh<sup>†</sup>

Livestock and poultry occupy places of importance in the economy of India. Their products such as milk, meat, eggs are a source of valuable animal protein for maintaining the physical health of the people. Studies on cost of livestock products are necessary because they furnish reliable cost estimates to the administrators and planners for formulating scientific price policy which keeps in view the interests of both the consumers and the producers. The basic data required for costing can be maintained in the organised farms but the same is not possible in the rural households, which do not maintain any systematic accounts of the inputs and the output of their enterprises. Thus, survey-cum-cost accounting approach for collection of requisite data is unavoidable as no other method can provide data of sufficient reliability for obtaining estimates of production cost. The Indian Agricultural Statistics Research Institute (IASRI) conducted a series of surveys in different regions of the country on the basis of which suitable methodology for estimating the cost of production of some of the important livestock products like milk, wool, poultry and eggs was developed.

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### *Cost of Production of Milk*

The IASRI carried out a number of sampling enquiries in the urban and rural areas of Delhi (1953 – 55), Madras (1957 – 59) and Calcutta (1960 – 62).

The sampling design adopted in these studies was two stage random sampling with wards/villages as primary stage units and stalls/households as second stage units. Selection at each stage was done with equal probability without replacement. In all, a sample of 54 stalls in the urban area and 96 milk producer households spread over 24 randomly selected villages in the rural area was selected. The selected units were kept fixed for collection of relevant data at weekly intervals for two years to cover one calving for majority of animals as also for providing data on two complete sets of seasons for studying seasonal variations. The data on milk yield and feeds were recorded by direct weighing and relating to other inputs through careful enquiry and physical observation.

The overall gross cost is the aggregate of costs on feed, labour both paid and unpaid, depreciation on milch stock, depreciation on assets and equipment, miscellaneous recurring-expenses and interest on capital. From the cost the income from sources other than sale of milk, mainly dung is subtracted so as to obtain the net cost including family labour. Home-grown feeds fed to animals were charged at market rates and purchased feeds at the purchase rates. Family labour was evaluated considering the wage rate for the comparable type of labour. In the case of paid labour when wages were paid partly in cash and partly in kind, its money equivalent was worked out. Depreciation on milch animals during a year was obtained by subtracting the sale proceeds and the market value of the milch animals present in the household at the end of the year from the purchase price, if purchased during the year and the market value of animals at the beginning of the year. Depreciation on assets and equipment was calculated considering the average price and average life of the equipment. Interest on capital was worked out at the prevalent rates for fixed and working capital.

### *Index of cost of production of milk*

The procedure of obtaining the index of cost of milk production consists in first working out appropriate indices for important components of cost viz. feed and labour etc. using Laspeyres method and then building up a composite index of gross cost by combining these indices through a system of weighting. The weighting coefficients are the proportions of different components of cost to the gross cost.

*Cost of Production of eggs*

## (a) Under commercial management

Surveys for estimating cost of production of poultry and eggs under commercial management were undertaken in Tanda and Dasua areas of Hoshiarpur district of Punjab during 1967-69 and in Delhi and its surrounding areas during 1969-71. A commercial poultry farms was taken as one which had at least 50 layers and habitually sold eggs and/or birds. About 130 farms of both organised on cooperative basis and operated individually were selected for the purpose of detailed enquiry. The information was collected at weekly intervals. The data on production of eggs, quantity of feeds issued to birds daily and number of birds maintained at the farm were recorded on the day of enumerator's visit to the farm through direct observation and careful enquiry.

A deeper study into the optimum frequency of recording revealed that collection of data at fortnightly intervals is quite suitable. Another important finding was that two-stage stratified sampling design with villages as first-stage units and poultry farms within a village as second-stage units which are stratified according to the number of birds maintained is more appropriate for costing study.

## (b) Under small scale farming

The survey was conducted in four taluks viz. Warangal, Mahbubabad, Jananagaon and Narsampet of Warangal district of Andhra Pradesh during 1979-80. A small scale poultry farmer was taken to be one who maintained 10-15 birds in the household.

The design adopted was two-stage stratified sampling design with villages as first-stage units and households keeping poultry as second stage units. To start with 150 villages which form around 25% of the total villages of the four taluks were selected for complete enumeration of households keeping poultry birds. Out of these 50% the villages (i.e. 75 villages) were selected for detailed enquiry. From each selected village 5 households were selected from among those keeping more than 10 birds. These households were kept fixed for collection of data at fortnightly intervals for one year.

*Cost of production of meat and wool*

The first pilot survey for the cost of production of wool was sponsored by the Indian Council of Agricultural Research in 1953 for nomadic and stationary flocks of sheep of the then Bombay state. Surveys were also conducted in Andhra Pradesh during 1959- 61 for mutton breeds of sheep and in low rainfall area of Rajasthan for sheep with good production of wool and mutton both. The last in the series was conducted by IASRI during 1963- 65 in hilly regions of Himachal Pradesh..

## 6. Improvement of Feeds and Fodder Statistics

K.C. Raut\*

In order to achieve growth of the livestock industry commensurate with the needs of the people for supply of milk, meat, eggs, wool etc., it is necessary that adequate measures are taken for production and supply of feeds and fodder for balanced nutrition of livestock. In planning to enhance livestock production, it is essential to know the present level of production, the target to be aimed at, different promotional measures envisaged and the potential increase through each measure. Better feeding is the one measure capable of creating immediate impact, as per experimental evidence. It is desirable to assess feed resources, supply and utilisation of quantity and quality of feedstuffs as well as nutritional requirements of animals for targetted increase in production through feeding. This requires construction of feed balance sheet whose aims is to determine the volume of animal feed stuffs and the consumption of various types of animal feed by animal production sectors.

### 1. Sources of Feed

Feeds of livestock consist of

- i. Concentrates (cereals, by-products of the cereals like bran, husk etc. starchy root products, sugar products, oilcakes, processed feed etc.)
- ii. Dry roughages (harvested by-products like straw, hay and chaff of cereal and pulses etc.) and
- iii. Green fodder (both cultivated and uncultivated)

In addition compound feeds and major additives are prepared and supplied particularly for dairy animals and poultry.

### 2. Estimation of Feed Resources

This requires proper estimation of

- a. Total production of grains, oilseeds etc. and the proportion of cereals, pulses and other crops utilized as animal feed;
- b. Extraction rates to assess indigenous production of by- products like bran, oil-cakes;
- c. The amount of straw, hay and silage available;
- d. Quantity and the nutrients available through grazing and pastures;
- e. The amount of animal feed imported as well as exported, if any.

In addition, information on the availability of household kitchen waste is useful as these are considered to be important sources of feed for poultry and pigs.

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### 3. *Estimation of Feed Availability*

The total availability of concentrates and dry fodders can be worked out at any given point of time from the corresponding production of agricultural commodities, if information on the amount of feed per unit of commodity is available. This ratio between feed and production of commodity is generally referred to as conversion factor. Thus, straw to grain ratio, percentage of bran and husk accruing from paddy and wheat, extraction rates of cake from oilseeds, percentage allowance for seed, feed, wastage etc. would play crucial role in working out the contribution of agricultural commodities for livestock feeds. These figures are worked out based on certain assumptions but without any objective method.

Green fodder includes cultivated fodder and grass either cut or grazed. Cultivated fodder crops again fall broadly into two classes, those like fodder-jowar in which one cutting is usually taken and those like berseen in which number of cuttings are taken. Crop cutting experiments similar to those for crop estimation surveys can be planned for estimating yield of fodder crops. Suitable sampling technique for estimating yield is being developed by IASRI.

The most difficult problem related to feed supplies lies in the estimation of grassland production, specifically the amount of grass utilized for grazing on pastures and meadows including forest grazing, seasonal pickings of stubbles and leaves etc.

Many methods of estimating grassland production and utilisation exist, but none is entirely satisfactory. The IASRI has developed a suitable sampling technique for objective estimation of area of grazing land and amount of herbage taken by animals through grazing.

4. Scientific feeding experiments on adequate scale have not been carried out in the country to determine in an efficient manner the feed needs of various classes of livestock for maintenance, growth, work and production. We continue to follow 'Morrison's Standards' modified to a certain extent by Sen for cattle. In case of livestock other than bovines, certain equivalent ratios between the feed requirements of these stock and cattle are determined on the basis of limited information available in various publications and then requirements of these animals are calculated.
5. Steps need to be taken to bridge the gap between availability and requirements of feed for livestock.

Similar to the slogan 'Food for All (human beings)', let us have another slogan 'Feed and Fodder for All Livestock'.

## 7. Improvement in Livestock Statistics

K.B. Singh\*

In the sample surveys being conducted at present by the State Governments for the estimation of production of milk, eggs, wool and meat the data collected involves the employment of whole time enumerators which makes it not only cost by but poses certain organisational problems which are, for example, the appointment and postings of the field staff, transfers of field staff which in turn leads to making arrangements for the training of the new incumbents, and also to make arrangements for a substitute if some one proceeds on leave so that no sampling unit is left uncontacted due to the absence of the enmerator. In some states the planning and conduct of the sample surveys, analysis of the survey data and writing of reports is not entirely with the department of Animal Husbandry but it is shared with the Directorate of Economics & Statistics of the state. On account of this problem certain states have even deviated from the sampling design recommended by the Ministry of Agriculture, Govt of India. Any Effort to overcome all such problems will ensure a timely and regular flow of data and will be a right step towards the improvement of livestock statistics.

With a view to reduce the cost of collection of data the possibility of using the data collected by enquiry which is far cheaper than that weighment was investigated through the sample surveys. A pilot sample survey for studying the relative merits of the data obtained by actual weighment and those through enquiry for estimation of milk production conducted by the Indian Agricultural Statistics Research Institute (IASRI) in the District of Rohtak (Haryana) & Barabanki (U.P.) during 1979-80 and in Pulwana district of Jammu & Kashmir during 1985-86. Both the investigations revealed that the enquiry method of data collection was no substitute to that of weighment. However, double sampling regression estimation with the data collected by enquiry from a large sample as an auxiliary variate and by weighment from a sub-sample of it as the main variate, with 10 per cent standard error at the district level required only 1/3rd of the sample observed for a simple estimate based on weighment data alone. So for a 60 to 65 percent reduction in the present cost of collection of data, a double sampling regression estimate is recommended provided the data to be collected by enquiry is entrusted to the live-stock assistants of the State Animal Husbandry Department in such a way that this additional work does not affect their daily routine duty and this will in turn reduce upto a fairly good extent the organisational problems also. To examine the possibility of such an adjustment. "A pilot sample survey for developing a sampling methodology for estimation of livestock products on the basis of data collected as a part of the normal work of the field agency of Animal Husbandry

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Department of the State" was conducted by IASRI in District Hoshangabad of M.P. during 1981-82 and District Trichur (Kerala) during 1985-86. The successful conduct of the field work itself demonstrated the feasibility of data collection by the livestock assistants of the State Animal Husbandry Department.

## 8. Statistics on Livestock Products — an Alternative Approach

K.C. Taneja\*

In the field of animal husbandry and dairying, the availability of reliable statistical data has been practically non-existent in the past. It is only recently that efforts have been initiated by the Ministry with the help of IASRI (ICAR) to develop a system/methodology and create suitable set up at different levels to ensure a regular flow of animal husbandry and dairying information.

Keeping in view the importance of these statistics some alternative sources have been suggested to have some information on the important aspect of livestock statistics. The alternative approach suggested in the study is using of an "input/consumption" approach instead of "output" approach on livestock products.

As an illustration, we have taken the milk production, identified the sources where the milk is used as input Dairy Product industry where data is collected regularly through Annual Survey of Industries is one such source. Other source of consumption statistics which would help us in building milk production estimation is consumer expenditure surveys conducted regularly by the National Sample Survey Organisation and published regularly by them in their reports. These reports present quantity of consumption of liquid milk per person for a period of 30 days for each monthly per capita expenditure class. The requisite information is available for all the regions and at All India level with the rural urban break up.

Similarly, data on other livestock products like meat and egg could also be obtained from industrial and consumer expenditure surveys. Consumption from both the sources could be combined and reasonable estimate of production obtained. In the case of those livestock products where no direct information is available from other sources, it is felt that one could still use, as illustrated in the case of dairy product industry, the Annual Survey of Industries.

From a brief review of the various sources as examined in the study, we could thus reasonably conclude that in respect of certain livestock products like milk, wool and meat, reasonable estimates could be arrived at through the industrial surveys and consumer expenditure surveys. Besides, an in-depth analysis could also be undertaken like the one on the dairy product industry.

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## 9. Inter-Regional Productivity and Wage Differences in the Dairy Product Industry

K.C. Taneja\*

An attempt is made to examine the pattern of the dairy product industry in the different regions and to study the inter-regional differentials in respect of the important parameters of productivity, wage and other related measures.

The study is based on the data collected through the Annual Survey of Industries (ASI) which, besides being the principal source of industrial statistics, is not affected by seasonal variation. It is also available annually on a uniform and continuing basis.

The study has amply indicated that productivity, wage and other related measures differ, and at times significantly, from region to region and those observed at the national level. As such no firm conclusions could be drawn from the analysis regarding the direct relationship about the productivity and wages. One thing could, however, be said that in some states entrepreneurs are neither paying the wages to the labour in proportion to their contribution made in the industry nor are sharing the gains with them. This in the long run, as the statistical studies have shown, may have an adverse impact on the industry, if it has not already started. It may not be out of place to mention here that this is the situation in the organised sector of the industry. One can visualise how dismal the situation would be in the unorganised sector. This phenomenon thus needs an urgent attention of planners, policy makers as also administrators. Similarly, the industry's running at losses in the important and large regions like West Bengal and Orissa need closer look and revamping of the policies to ensure the growth of such an essential industry, whose role in region, both in catering the needs of its population and development, hardly needs an emphasis.

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