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## RAPPORTEURS' REPORTS

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### Rapporteur's Report on Livestock Economy

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The subject Livestock Economy has drawn considerable attention from researchers. This is evident from the number of papers received on the subject. In all, 91 papers have been accepted for discussion in the Conference. The range of issues covered in these papers includes (a) changes in the size and composition of bovine population and their pattern of utilisation, (b) milk production and dairying, (c) small ruminants and poultry, (d) livestock and environment, and (d) demand, consumption and trade in livestock products. The papers are of uneven quality and a number of them suffers from methodological flaws. However, the issues they raise are important and therefore needs closer examination. The papers are based on both primary and secondary data. About two-thirds of the papers are based on micro level studies conducted in different parts of the country and thus provide insights into the prevailing trends in the livestock sector and capture the farm level realities.

#### I

#### BOVINE STOCK AND UTILISATION

Analysis of the size and composition of bovine population across regions in the country has revealed a decline in the population of work animals. A number of papers have highlighted this aspect and attempted to explore the factors underlying this process. Papers by R.P. Singh on Bihar, P.K. Singh on Gujarat, Deepak Shah on Maharashtra, Puran Chand *et al.* (inter-state variations), P.M. Sharma and K.A. Verghese on Rajasthan, Inder Sain and A.S Joshi on Punjab have examined this issue. They have identified that the increase in the intensity of mechanisation in agriculture, reduction in the average size of cultivated holdings, changes in the cropping pattern and increase in the commercialisation of milk production as some of the factors responsible for the decline in work animal population. A few have attempted to quantify the relative importance of various factors on the decline in work animal stock. An important finding emerging from this exercise is that in most of the regions in the country, the level of tractorisation has reached a stage where it has resulted in significant displacement of work animals. In comparison to this finding, some of the earlier studies have argued that the growth in tractorisation has met the additional draught power requirement of the green revolution in agriculture by supplementing the work animal population (Mishra and Sharma, 1990; Nair and Dhas, 1990).

The decline in work animal population has contributed to a significant shift in the bovine sex ratios in favour of females. The species composition of the bovine stock has been shifting in favour of buffaloes for the country as a whole, primarily due to faster increase in she-buffalo population than in female cattle. Across states, except in Kerala, Orissa, Assam and West Bengal, this trend is sharply visible. In these states, the species composition has moved in favour of female cattle. The increase in the population of female stock and the shift in their species composition in favour of she-buffaloes have also been caused by the increase

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Discussions with Albert Christopher Dhas was useful in clarifying some of the issues discussed in this report.

in the opportunities for milk production. In those regions where agricultural growth has been taking place at a rapid rate, the supply of feed has increased and thus encouraged the rearing of more female stock. Since she-buffaloes are more efficient converters of feed into milk, in such regions the species composition has shifted in their favour. In feed scarce regions, the increase in the opportunity cost of feed due to the expansion of commercialisation of milk production has resulted in gradual elimination of unproductive stock to begin with and the substitution of draught animals by milch animals at a later stage.

Some of the papers have provided insight into the changes in the distribution of draught and milch animals across different size-groups of farms. Analysis of the farm level data for Punjab (Inder Sain and Joshi) has shown that in the eighties, the decline in the number of draught animals and increase in the number of milch animals have taken place in all size-groups of farms. It is also revealed that the position of she-buffaloes as milch animals has improved in all size-groups, whereas female cattle population has also increased in medium and large holdings. Farm level data from Haryana (R.K. Khatkar *et al.*) have also shown a similar trend. In general, the pattern observed is that the number of draught animal stock is relatively higher in the medium, and lower in the small and large farms. On the other hand, the number of milch animals has shown a positive relationship with the size of farms.

It is difficult to judge from the available studies whether the decline in draught animal stock is accompanied by improvement in their rate of utilisation. The data on the utilisation of work animals for Gujarat (P.K. Singh) show that the level of utilisation varied from 14.5 to 26 per cent of the availability across size-groups of land holdings. In the case of Himachal Pradesh, Amresh Sharma *et al.* have estimated that 60 per cent of the bullock labour is a surplus. Sharma and Varghese have estimated that the utilisation of draught animals ranged from 18 to 30 per cent in different agro-climatic zones of Rajasthan. Given the fact that 'plowing window' in agriculture is short, improvement in the level of utilisation of the reduced stock of work animals in tillage operations is limited and the scope for enhanced utilisation lies in operations like irrigation, transport, etc. But these are operations which have been rapidly getting mechanised. Farm level studies have revealed that households without draught animals prepared their land by hiring tractors and other equipments.

## II

### MILK PRODUCTION AND DAIRYING

In most of the regions in the country, the lactating efficiency and milk yield of cows and she-buffaloes have improved, with the buffalo milk yield increasing at a faster rate than that of cow in major milk tracts. The papers by Brahm Prakash and Sushila Srivastava, and A.K. Giri and D. Banik have highlighted these aspects. It is noted that the rapid increase in milk production has been largely due to growth in productivity rather than due to increase in milch animal population. The growth in milk production has taken place at a rapid rate in those regions where the growth of agriculture has taken place at a faster rate. The exception is only in the state of Kerala where rapid increase in milk production has been due to widespread diffusion of crossbred technology.

A number of papers have examined specific aspects of dairying and milk production in different parts of the country. The study by T.N. Datta and J.B. Murlidhar showed that in the agriculturally forward district like Bikaner, dairying is adopted as a means of generating a steady income round the year, whereas in the resource scarce district like Ganganagar it

has provided against crop failure. Another study for Rajasthan (S.S. Yadav) shows shift in milk economy from the northern to eastern region with shift in species composition in favour of she-buffaloes. S.K. Chauhan and Ravinder Sharma show that the milk production increase in Himachal Pradesh is due to the crossbreeding programme. The study for Bihar (R.K.P. Singh *et al.*) shows that the increase in milk production in the state is accompanied by increase in regional disparity. The bulk of the increase in milk production has taken place in Southern Bihar with buffalo-based dairying, whereas in the plains and plateau with cow-based dairying, the increase has been at a very slow rate. P.P. Dubey *et al.* have shown that in Uttar Pradesh, the number of milch animals and their yield increased at a linear rate. However, the population of she-buffaloes and their milk yield increased at a faster rate than that of cows in the state. The study for Kerala (Babu P. Remesh) reveals that though technological change has contributed to significant increase in the milk production, the state is unable to sustain this gain. This is reflected in the deceleration in the rate of growth of productivity of crossbred cows. The paper by R.S. Tripathi shows that in the Uttar Pradesh hills, though cow and she-buffalo population has declined, their productivity has increased due to the replacement of low yielder with cross-breds and high-bred buffaloes.

A few studies have attempted to look at various dimensions of milk production using farm level data. The study by J.P. Singh *et al.* shows that in Orissa, she-buffaloes are superior to milch cows in terms of milk yield, unit cost of production and net returns. The relationship between size of farms and milk production in Punjab is brought out sharply by S.S. Chahal and Randhir Singh. Their study shows that the production and consumption of milk are directly related to the size of land holding. V.N. Autkar *et al.* show that the cost and returns from milk production is lower in the smaller size-group of farms in Vidarbha region of Maharashtra. Khatkar *et al.* show that the net returns in milk production increased with the increase in the size of holding in Hisar district of Haryana and that the lower size holdings sold higher proportion of their milk. Further, the per capita milk consumption showed a positive relation with the size of land holding. D.K. Grover and S.K. Mehta showed that the returns from milk production if imputed for family labour, interest on capital, etc., are negative. M.V. Manbhekhar *et al.* compared the economics of milk production for local and crossbred cows in the vicinity of Akola city in Maharashtra and reinforced the existing finding that crossbred cows are more efficient than local cows. Baldev Singh examined the diffusion of crossbred technology using village level data in Punjab and showed that in situations where market for milk is growing at a slower rate, the diffusion of crossbred technology essentially replaces the local cows by crossbreds, whereas in situations where market expansion has taken place at a rapid rate, crossbred cows have supplemented she-buffaloes.

The importance of dairying as a source of income and employment is highlighted in a few studies. A.K. Sharma and S.K. Sharma showed that the introduction of dairy and poultry into the cropping system not only increased the household income, but also reduced the risk. S.K. Gupta *et al.* showed that the distribution of milch animals under the Integrated Rural Development Programme (IRDP) resulted in generation of additional income and employment to the marginal and landless households in Sehore district of Madhya Pradesh. However, they also argued that the quality of milch animals distributed were inferior and that the beneficiaries did not receive the complementary support to maintain their milch animals. M. Soundarapandian also highlighted the same point in a case study of Kamarajar

district in Tamil Nadu. Rajendra Singh, and B.K. Barooah and P.R. Goswami also highlighted the importance of dairying for the small and marginal farmers. D.S. Shukla *et al.* examined the impact of Operation Flood on income and employment of rural households by comparing the programme and non-programme areas in Kanpur-Dehat district of Uttar Pradesh. According to their findings, the productivity of milch animals, production of milk and the marketed surplus were higher in the programme area compared to the non-programme area. On the whole, their assessment is that the programme had a positive effect on income and employment. The study by Ashwani Kumar Sharma examined the reasons behind the low coverage of dairy co-operatives in Uttar Pradesh and found that the dairy co-operative members had satisfactory level of awareness of testing of milk, price fixation, etc., but were not adequately aware of the input services from the co-operatives. George Thomas and K.P. Mani in their case study conducted in Kerala showed that the co-operative members were not satisfactorily aware of the input services provided by the co-operatives.

### III

#### SMALL RUMINANTS AND POULTRY

The importance of sheep and goats in India is evident from the fact that about 38 per cent of the country's livestock population is constituted by these species. Over the years, the goat population has been increasing at a faster rate than sheep population. These species have played an important role in providing income and employment to poor households in the drought-prone areas. The paper by Syed Ajmal Pasha argued that in the economy of the landless and the poor farmers in the drought-prone area of Kolar district in Karnataka about 17 to 24 per cent of the household income was derived from sheep and goats. However, the livelihood from this source is being threatened by the continuously shrinking feed base. K.R. Chowdry *et al.* showed that the flock size is the major factor influencing the returns from sheep farming. D.R. Thakur *et al.* in their study conducted in Himachal Pradesh argued that in terms of bio-mass reduction, cattle and buffaloes are more harmful to environment/ecology than sheep and goats in hilly areas. According to them, in spite of some negative effects, the economic gains from sheep and goats far exceed the loss.

S.P. Bhardwaj *et al.* examined the inter-regional variations in the growth and development of poultry in India and showed that the massive increase in poultry production in the country was due to the substantial improvements in breeding technology. In the early sixties, the improved layers accounted for only 7 per cent and by 1990, it was about 60 per cent. The study also revealed that the poultry production is concentrated in a few states and identified the price of poultry products and the production of coarse grains as the major factors underlying this variation. A.M. Rajput *et al.* examined the cost and returns in poultry production in Indore district of Madhya Pradesh and showed that the large farms are more efficient than the small and medium farms and that the net returns in the former were higher than those in the latter two categories. However, the benefit-cost ratio was higher than one in all the size-groups, thereby indicating the viability of this activity among all size-groups of farms.

## IV

## LIVESTOCK AND ENVIRONMENT

The environmental consequences of livestock population is discussed very much in recent years. One of the basic factors behind this is the severe scarcity of feed resources in the country. A few papers have attempted to address this issue. K. Anantha Ram *et al.* estimated that the availability of feed and fodder resources at the district level in Rajasthan is about 30 per cent lower than the requirement. This deficit has contributed to excessive stocking rate on common property resources (CPRs), thereby creating hazardous effect on the environment. A similar argument is also presented in the paper by Rajesh Sharma and Madhu Sharma. According to M.S. Rathore and M.S. Jairath, overstocking in CPRs takes place because it has little private cost. According to them, the growth of small ruminant population damages the environment, but the more serious problem is the extension of cultivation to marginal and sub-marginal lands. Dalbir Singh in his study argued that in the absence of CPRs, it is not possible for the rural households in general and poor households in particular to undertake livestock rearing activities. The existence of CPRs makes livestock enterprise viable in hilly areas like Himachal Pradesh. However, excessive use of CPRs also has caused its degradation.

One way to reduce the pressure of livestock on environment is to encourage systematic culling of the livestock population. In this context, an interesting paper by R. Malhotra compares the livestock population of India and Pakistan and concludes that the livestock economy of the latter is more efficient than that of the former. Pakistan has maintained more number of cows and she-buffaloes in the bovine herd than India where legal ban exists on slaughter of cows and she-buffaloes. The productivity of livestock in Pakistan is higher than in India. It appears from this comparative study that the culling of livestock is unlikely to have negative consequences on the productivity, output and services obtained from them.

## V

## DEMAND, CONSUMPTION AND TRADE

Vasant P. Gandhi and Gyanendra Mani examined the behaviour of livestock product demand during the period 1970-71 to 1989-90. The analysis showed substantial increase in consumer demand for livestock products. Both in rural and urban areas, its demand outpaced the demand for pulses, edible oil and vegetables. The demand for livestock products has increased rapidly with increase in income, when compared to other food items. Among livestock products, milk dominated the demand, followed by eggs, fish and meat. Income elasticities of demand are found to be well above unity at mean for milk and egg; the elasticities are much above unity for the bottom quartile. Parveen K. Sardana *et al.* examined the inter-state variations in the consumption of livestock products. The study showed that consumer preference for milk is higher in northern India and that for meat, egg and fish is higher in eastern and southern India. Interestingly, the consumer preference for meat, egg and fish has been increasing in the northern states as well. K.N. Rai *et al.* examined the consumption of livestock products in Haryana and found that the share of consumer expenditure for milk, meat, egg and fish had substantially increased during the last two decades. There was an upward shift in elasticities in rural areas over time. The price of milk has negatively influenced the demand and the growth of population and income are the other two factors influencing demand.

A.K. Sharma and Smita Sirohi noted a strong relationship among the prices of milk and milk products and those of related commodity groups like foodgrains, pulses, edible oil, etc. In other words, the prices of milk and milk products are influenced by the prices of these commodities. Analysis of the prices of milk, milk products and other products showed that there exists unfavourable terms of trade for the milk producers.

Since the production of livestock products has been increasing rapidly in recent years, it is interesting to examine India's trade experience in livestock and livestock products. The paper by Kanchan Tewari showed that India's position in the world's trade in livestock products is insignificant. According to her, the scope for export of meat is limited. But she has identified live buffalo as a potential item for export from India. In this context, a study by G.S. Gill *et al.* shows that the trade in live buffaloes has been increasing in the state of Punjab. In terms of number, export value and unit price, it has increased rapidly during the last 10 to 15 years. The export earnings from this is currently around Rs. 1,000 crores.

## VI

### ISSUES FOR DISCUSSION

In the preceding review, we have highlighted the major issues addressed in the papers submitted for the Conference. While outlining the issues to be discussed, we have taken into account a number of aspects which are not covered by the paper-writers. The main issues to be discussed are as follows:

1. What is the extent to which the decline in the draught animals and increase in agricultural mechanisation has influenced the distribution of land and other related assets? How has the rental market for mechanical equipments like tractors helped the small and marginal farmers to meet their draught power requirements? With increase in mechanisation, agriculture is getting more and more energy intensive. What are the macro economic implications of this development?

2. One of the direct effects of decline in work animal stock is the increase in the milch animal population, especially in the small and marginal holdings. However, the larger holdings are better endowed in terms of complementary resources for rearing milch animals. In this situation, what is the extent to which the structural changes in the milch animal holdings are likely to affect the different segments of the rural households? The question assumes a lot of significance in the light of the finding that the larger farms are more efficient in the utilisation of resources in milk production.

3. For the poor strata of rural households, dairying has emerged as an important supplementary source of income and employment. In this context, the anti-poverty programmes have played a positive role. It may be noted that the crop residues and other agricultural by-products which were freely available earlier have now become a priced product. Apart from this, the access to common property resources has also declined significantly in recent years. In such a situation, the question that needs to be addressed is to what extent the poor people in rural areas will be able to sustain this activity.

4. The trends in the bovine composition clearly shows a systematic shift towards females all over the country. Since the population of adult male bovines is fast declining, the requirement of male young stock will also decline in future. In such a scenario, in what way can the male young stock be utilised? Is it possible to export the male animals for meat? or should we allow them to die by subjecting to deliberate starvation?

5. The bulk of the increase in milk production has taken place due to increase in productivity of milch animals especially that of she-buffaloes. State policy in the past has given

considerable emphasis in increasing milk production through crossbreeding in cattle. Except in a few regions in the country, the strategy has not produced significant results. What are the contradictions that exist between state policies and emerging composition of milch animal herd across different regions?

6. What are the constraints for the farm level adoption of crossbred technology? Is the constraint imposed by the size of the market for milk? or has it something to do with the limitations of the delivery system, or the attitude and awareness towards this technology, or with the technology itself?

7. What are the conditions needed for realising the potential yield of milch animals? Can it be achieved by changing the terms of trade in favour of milk producers or by changing the cropping system? In what way milk production may be made economically viable for the landless, small and marginal farmers?

8. What has been the impact of Operation Flood programme? Have milk yields increased significantly as a result of this programme? Have the size and composition of the dairy herd significantly changed as a result of the programme? As a result of the programme activities, has the number of crossbreds owned by the rural households and by the landed households in particular increased? In what way, the increase in the commercialisation of milk production has affected its consumption among the producer households in particular and rural households in general? To what extent, the supply of inputs and services under the programme were internalised by the beneficiaries?

9. What are the prospects for sustaining sheep farming if the common property resources are getting privatised through the various state initiated programmes? Is sheep farming based on long distance migration of flocks becoming an unviable proposition?

10. Will the excessive growth in goat population adversely affect the ecology? What are the prospects for raising goats under stall-fed conditions?

11. The scarcity of feeds and fodder resources is often cited as the primary reason for over-stocking in communal grazing land and for its negative effect on environment. This is also one of the major reasons for the low levels of productivity of livestock. One way out from this situation is to allocate more land under fodder crops than what exists now. What are the factors responsible for the near stagnation in the area under fodder crops in the country? What are the implications of bringing more areas under fodder for foodgrain production?

12. Sustaining the production of milk, eggs and meat implies increase in the availability of concentrate feeds from coarse grains, oilcakes, etc. Unfortunately, the production of coarse grains has been on the decline and the oilcakes find a lucrative market abroad. With the growth in demand for milk, meat and eggs, how can we meet the growing indirect requirement of foodgrains? What are the strategies for meeting this requirement?

13. What are the prospects for exporting buffalo meat and live buffaloes from India?

14. Is the data base of the animal husbandry sector geared towards providing a well informed discussion?

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