CHAPTER 7
Conclusion

We began the study with the objective of examining the factors determining the size, composition and productivity of bovine holdings in Tamil Nadu. As a prelude to the analysis, we reviewed the empirical studies on India's bovine economy spanning over the past few decades. In the light of the review, we formulated the general hypothesis that the size, composition and productivity of bovine stock in India has been shaped by socio-economic, institutional, ecological and technological factors and not by religious factors. We have verified this hypothesis at length by undertaking an in-depth study of Tamil Nadu.

The study of Tamil Nadu roughly covered the twentieth century. The analysis of the historical evolution of the bovine economy during the first half of the 20th century indicated a steady increase in the size of the bovine population from 1920 onwards, significantly in the case of male cattle, thanks to increase in the requirement of work animals in agriculture. In fact, there existed shortage of male cattle for work a problem that used to be met by using female stock also as draught animals. But from 1935 onwards, a steady increase in the population of adult female bovines took place, reflecting itself in the slow decline in the sex ratio due mainly to the expansion of the urban demand for milk.

The trends in size, composition and sex-ratios of bovines in Tamil Nadu during the second half of the 20th century showed a differential pattern. The total bovine population increased up to the early 'sixties, remained unchanged up to the early 'eighties and declined slowly thereafter. The composition of bovines has been getting oriented towards the cattle stock, particularly, towards cows from the early 'eighties onwards. The reversal of sex ratios which began from the early 'sixties indicated that the importance of milch animals that gained momentum from the mid-1930s has increased in more recent decades. The density of work animals per hectare of gross cropped area had been increasing in the 1950s, remaining unchanged till the mid-1960s and declining thereafter. The dominant influence was agricultural mechanization especially tractorisation that led to reduction of the work animal stock. The reduction in the average size of landholding has been another factor that significantly influenced work animal density; but the influence of this factor seems to have been declining in recent years.
The role of cows as a producer of males for work has undergone change over time, in the context of the declining work animal requirements. To capture this dimension, the factors determining the density of breeding cows were examined. It was found that though the density of work animals continued to be the dominant factor determining the density of breeding cows, the influence of this factor has been declining over time, and that other (unexplained) factors gaining in importance in recent years. Both the price and the non-price factors, including technology have played significant roles in determining the density of breeding cows.

The trends observed in the work and the milch animal populations appear to have been taking place at varying rates across size classes of land holdings. The growing importance of milch animals, has been particularly striking in the marginal and small holdings. However, it was the reduction of the work animal stock that has been striking in the case of medium and large holdings. This contrast obviously was due to differential patterns of development and impact of agricultural mechanization across size groups of holdings. The replacement of work animals with milch animals in the lower size holdings has also been a reflection of the growing opportunities to take up milk production as a supplementary source of income and employment in rural areas.

Available estimates show significant increase in milk production in the state in recent decades. Growth in milk production is contributed by both increases in milch animal population and in the productivity of milch animals. Though the contribution of cow milk to the total milk production has been gaining in importance, both ‘population effect’ and ‘yield effect’ have contributed to the growth in milk production obtained from cows and she-buffaloes. However, the latter factor has been far more important than the former.

Growth in productivity has taken place due to improvements in breeding, feeding and other management practices of milch animals; the expansion of marketing and processing infrastructure for milk have facilitated the growth in productivity too. During the ‘eighties, there was considerable expansion in the artificial insemination (AI) facilities as a result of which significant increase was registered in the milch animal population covered by the AI programme. This development contributed to the increase in the population of crossbred cows and upgraded buffaloes in the milch stock. Along with the increase in the proportion of improved animals, the feeding practices of milch stock have also been undergoing change: from grazed and stall-fed to stall-fed with fodder and concentrates. Available estimates also show an increase in the per head availability of feed. Although the relative price of milk and concentrate feeds has not been very
favourable in recent years, farmers have not reduced the use of concentrates since marginal revenue was still higher than marginal cost.

Increase in commercialisation has been contributed to a large extent by the expansion of dairy cooperatives. The overall efficiency of the milch animal stock has been also on the increase not only because of the increase in the proportion of improved animals, but also reduction in the proportion of low productive and unproductive animals. The available estimates show that the aggregate demand for milk has been steadily on the increase. Milk has now moved from the category of a luxury to that of a necessary, as reflected in the sharp fall in expenditure elasticities. Milk prices have been increasing at a slower pace than of its close substitutes and complementary goods in the food basket. It is seen that, over time, the per capita consumption of milk has increased in both the rural and the urban areas.

The importance of bovines as an important source of draught power in agriculture has sharply declined; they are now considered mainly a source of milk production. Consistent with these changes, the reproductive role of female bovines has shifted to that of a producer of female calves to be raised as milch animals. There exist several constraints, which need to be resolved to sustain the growth and development of the bovine sector, especially dairying and milk production.

The decline in the draught animal population is accompanied by intensive input use of non-renewable sources of energy in various agricultural operations. The data thrown up by the 59th round of the National Sample Survey (GOI 2005a) show that out of the total farmer households in the state, 30 percent used non-renewable sources of energy on ploughing, 0.3 percent for irrigation, 13 percent for harvesting and 14 percent for threshing. The use of animal energy is confined only to a small proportion of farmers, especially in the small and marginal categories. While the intensive use of non-renewable energy has released feed resources in favour of milch animals, there have been often changes taking place in the agricultural economy that offset this advantage. The shift in the cropping pattern from food crops to commercial and tree crops and the near-stagnation in cropping intensity appear to be contributing to the slow growth of the overall availability of feeds and fodder for the bovine sector. The changes in the pattern of land utilisation, especially the decline in the proportion of area under permanent pastures and grazing land have reduced the access of the landless households to common grazing lands for raising their animals. In a situation of this kind, when milch animal holdings have been shifting to households with weak resource base, they have had to increasingly depend on the market for procurement of
feed resources for milk production. Thus, milk production has become increasingly sensitive to the relative prices of milk and feed. Sustaining milk production in such a situation would require increase in the supply of feed and enhancing its nutritive value, as also adoption of breeding and other complementary technologies for reducing cost of production per unit of milk output.

Augmentation of the supply of feed and fodder will become increasingly feasible if the link between agriculture and dairying is strengthened by promoting mixed farming that produces more by-products per unit of crop output. The possibility of promoting cultivation of green fodder is limited due to bleak prospects for expanding irrigation. Various types of technologies are available for enhancing the nutritive value of dry fodder that could reduce the requirement for concentrate feed to milch animals. However, the diffusion of such technologies is taking place at a slow pace due to weak links in the extension system.

There exists considerable scope for improving breeding efficiency by enhancing the effectiveness of artificial insemination. Though effective techniques like embryo transfer are available, their large-scale application in the field conditions in India is yet to come. Therefore, artificial insemination is likely to continue to play a major role for some more years. Improvement of AI efficiency would require not only the expansion of its infrastructure, but also improvement of the quality of the technical personnel delivering AI services and also of the level of knowledge of farmers in its effective adoption. Since the draught power constraint has disappeared, the choice of animals for cross-breeding has become easier. However, the attempt to introduce high-yielding exotic breeds of animals will make dairying a costly proposition to farmers. This is so not only because animals would be more expensive, but also because they are more prone to diseases and would need more expensive feed than indigenous breeds. Such technological up-gradation should therefore be accompanied by an effective system of animal insurance to compensate the farmers for loss of animals or fall in incomes due to diseases and other calamities like drought.

In the present situation, the formal extension system in the animal husbandry sector of the state appears to be weak. The data provided by the 59th round of the NSS (GOI 2005b) show that the proportions of farmer households receiving information on modern technology for animal husbandry in the state are 22 percent on breeding, 18 percent on feeding, 65 percent on health care and 8 percent on management. In order to improve effectiveness of the extension system and to provide more cost-effective supports to the dairy farmers, privitisation of veterinary and other related services is advocated by several international agencies (Ahuja et al 2000, Morrenhof
The issue is actively under the consideration also of the Central and State governments. However, in a situation characterised by households owning one or two animals with weak resource base, the extent to which privitisation of services would work in favour of the vulnerable segments of the animal owners is an issue that needs to be seriously considered. There exists scope for enhancing effectiveness of the public sector institutions in the animal husbandry sector if it can be made part of the local governance system and accountable to local communities.

In the years to come, demand for milk and milk products would tend to increase, not only because of income growth, but also changes in the consumption pattern. Therefore, demand constraints for milk are unlikely to emerge in the state. However, from the point of view of providing more income to farmers, the task of increasing the value per unit of milk produced through product diversification and effective marketing network will remain a major challenge. The cooperative sector has taken a leading role in the procuring and processing of milk in the state. However, with liberalisation, private investment in the dairy-processing sector is already taking place on a significant scale. Therefore, the cooperative sector has to work in a competitive environment.

At present, the elimination of unproductive animals in the state takes place largely through their export to the neighbouring state of Kerala for slaughter. While the meat is consumed in Kerala, the hides and skin are sent back to Tamil Nadu as raw materials for its leather industry. The possibility of development of the meat industry within the state itself is limited because of the relatively low demand for beef and the constraints of retaining unproductive animals. Given the severe constraints on feed resources, fattening of male calves for meat purposes is also a very difficult proposition. Therefore, development of the meat industry based on the bovine stock is unlikely to emerge as a viable proposition in Tamil Nadu. However, the state should initiate steps for effective organisation for marketing of live animals by bringing appropriate regulations and measures for transportation, disease control and more proper treatment of animals.

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