

**DELIVERY OF ANIMAL HEALTH CARE
AND BREEDING SERVICES IN KERALA -
AN ANALYSIS**

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DECLARATION

I hereby affirm that the research for this dissertation titled "Delivery of Animal Health Care and Breeding Services in Kerala – An Analysis" being submitted to the Jawaharlal Nehru University for the award of the Degree of Master of Philosophy in Applied Economics, was carried out entirely by me at the Centre for Development Studies, Thiruvananthapuram.

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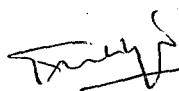
Certified that this dissertation is the bonafide work of S.Sandhya. This has not been considered for the award of any other degree by any other University.



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ABBREVIATIONS USED

NSS	National Sample Survey
AI	Artificial Insemination
M	Male
F	Female
CDS	Centre for Development Studies
R ²	R-squared
ND	Non Descript
CB	Crossbred
ICDP	Intensive Cattle Development Project
ISPK	Indo Swiss Project, Kerala
KLDB	Kerala Livestock Development Board
CME	Coconut Milk Extender
OF	Operation Flood
KCMMF	Kerala Co-operative Milk Marketing Federation
APCOS	Anand Pattern Co-operative Society
AHD	Animal Husbandry Department
DDD	Dairy development Department
VLU	Veterinary Livestock Unit
GOK	Government Of Kerala
GOI	Government Of India
FMD	Foot and Mouth Disease
RP	Rinder Pest
PG	Post Graduate
LI	Livestock Inspector

CHAPTER 1

INTRODUCTION

1.1 Livestock in Indian Economy

Livestock as a productive asset has gained considerable importance in the Indian economy. While estimates show that the share of agriculture in the Gross Domestic Product has been decreasing, the value of output from the livestock sector has been increasing. The contribution of the livestock sector to the total value of output from the agriculture sector was 24 per cent during 1988-89, which increased to 25 per cent during 1996-97 (Economic Survey, various issues). Milk has now emerged as the second largest agricultural commodity next to rice production, showing the significance of the milk production enterprise in the Indian Agricultural system and hence in the national economy. At present, the dairy sub sector contributes to nearly two-thirds of the total contribution from the livestock sector.

In a country like India, livestock is valued on several grounds. India has been regarded as a rural economy with 72 per cent of the population residing in rural areas. Animal husbandry is the most important activity in rural areas next to agriculture. In addition to the motive power, they are an important source of animal proteins for the human diet through milk, meat and egg. The dung produced by the animals is the most important source of manure and it is also used as a source of fuel for cooking in rural areas. Livestock rearing has also emerged as a subsidiary source of income and employment. The average annual growth rate for employment in the livestock sector during the period from 1972-73 to 1987-88 was 4.15% as against 1.1% in agriculture sector alone. (NSS, 1987-88) Land and livestock holding survey in NSS 48th round revealed that during eighties, there was a substantial growth of dairy farming in the country.

The livestock wealth of India is characterised by its enormous number and the genetic diversity within the species itself. But in the earlier period, they were the least productive

in the world, producing virtually little milk and meat. (Crotty, 1980) Considerable changes have taken place in the size and composition of the livestock particularly, the bovine stock. Animal power was a sine qua non for cultivation in most parts of India. The principal reason for maintaining bovines especially cattle was to provide this power. Studies on their composition from fifties to seventies showed that the breeding cows were maintained primarily for the production of calves needed to maintain the bullock herd at the desired level, and incidentally for milk. (Vaidyanathan, 1988) Buffaloes were primarily kept for milk. Most of the states witnessed the substitution of cows by buffaloes with a rising adult sex ratio for bovines (males / 100 females). West Bengal, Karnataka and Kerala were the exceptions for this trend. Data from the livestock censuses show that during the seventies and eighties, there was a tendency for the bullock population to stabilise and that of milch animals to rise. The overall growth of bovine population and more particularly that of work animals were quite small. However, there were regional variations in the pattern of adjustment in livestock holding.

1.2 Nature of the Problem

All parts of the country have witnessed significant improvements in the production and productivity of livestock along with the changes in the size and composition. A number of factors have facilitated these changes. These factors include the significant growth in agricultural production thereby contributing to increase in feed supply, increase in the intensity of agricultural mechanisation, and the role of the state in providing infrastructural support in terms of breeding, disease control and marketing. Over time the country has witnessed the evolution of a comprehensive policy for livestock development. The need for the formulation of a comprehensive policy to improve the quality and productivity of the bovines in India was extensively expressed in the report of the Royal Commission on Agriculture, 1928. Parallel to the achievements made in the sector, the Government has been pursuing a combination of different strategies to improve the production and productivity of the sector. The short term strategies included measures to step up the supply package of services like technology, improved breeding practices, feed and fodder, health cover, improved management and marketing. The long-term strategy aims at building up

nstitutions and expertise for efficient supply of these services and raising animal productivity. Effective animal health care support system has been identified as one of the necessary conditions to sustain the gains from the sector.

The need to evolve a cost effective livestock support system has also been emphasised in the context of technological changes in the sector. As a strategy for increasing production, new breeds of bovine stock has been evolved through cross breeding cattle and upgrading buffaloes. These breeds are more susceptible to disease and warrants intensive care and management compared to the indigenous breeds. In this context, it is also pointed out that the increased output from the sector through technological change will not accrue to the farmers; it will go to the industries producing pharmaceuticals and other veterinary inputs. It may be seen that as in many other developing countries, the livestock services in India are the domain of public sector. Most of the services are provided free of cost by the government to the farmers. These types of subsidies are rationalised since they play a crucial role in stimulating the development of the country. Livestock sector, being a source of income as well as employment for the rural poor, any programme in the sector is meant for the upliftment of the rural masses as a whole.

This “merit good” consideration as suggested above has been a strong base for the subsidisation of the livestock services. But of late, subsidies in general have become very much controversial in India. This is because of two reasons. Firstly it is argued that in India the subsidies have outlived their aims and become unsustainable. Secondly the rising burden of revenue deficit has created fiscal imbalance in the central and state budgets. (Gulati & Sharma, 1995). In this context, the financing of the publicly provided livestock services draws considerable attention. The policy of subsidisation has often resulted in a compromise of the quality of the services provided. There are also questions on the effectiveness of this kind of support. Of late, there are also arguments in favour of privatisation. The National Commission of Agriculture in its report submitted in 1976 has proposed that private practice of veterinarians should be encouraged.

The Central and State governments agree that a radical shift in the provision of services is long overdue. It is reported that the 8th Five Year Plan intervention in the livestock sector include programmes for the promotion of private veterinary practice. But this requires that, many issues and problems will have to be addressed rationally and objectively before any attempt is made in this direction (NRPP, 1996). The present study on the delivery of health care services is undertaken in this background, in the Kerala context.

1.3 Objectives and Approach

The present study basically aims at the analysis of the animal health care and breeding services in Kerala – the present system of supply of these services, the way in which it is delivered and the utilisation at the farm level. To be more specific, the objectives of the study are the following.

- 1) To review the patterns and trends in the livestock sector of Kerala
- 2) to examine the provision of animal health care and other support services in the sector – from the supply side and demand side
- 3) and to study the appropriation of services at the farm level.

A number of studies have been made earlier to characterise the features of the livestock sector. In order to map the salient features of the sector, a brief review of these studies are made, which gives an idea of the changes made in the sector during the past few decades. Based on the prevailing setup of the livestock sector, it was further assessed as to how the animal health care services are supportive both from the part of the providers and that of livestock owners who appropriate these services. It was then assessed as to how the provision of services was made. Examination of the services to improve the efficiency of the provision of services required a background information on the cattle holding households of Kerala and the economic nature of these services.

The nature of livestock services is studied based on the economic characters of these services. The different livestock services occupy different points in the private - public

good spectrum. The various types of livestock services have been classified based on the economic characters as shown in table 1.1. Review of literature shows that the channels through which the different services should be delivered depends on these economic principles. Services of public good nature will have to be performed by the public sector to insure its optimum availability. Theoretically, public intervention is justified for services involving externalities in order to reduce or raise the utilisation to socially optimal level. The extent and nature of the public sector involvement will depend upon the type of externalities involved and may vary from monitoring and regulation to ensure compliance, the imposition of penalties for non compliance, subsidisation of services to raise consumption to socially optimal level or in extreme cases, public provision of services. Those services, which are classified as private goods can be feasibly and efficiently provided by the private sector.

Veterinary surveillance, research and extension occupy the extreme end of the spectrum of public goods whereas clinical care, vaccination, artificial insemination and provision of veterinary supplies are private goods. Majority of the services occupies a position midway between these two extremes. The present study therefore attempts to develop an approach to see which of the services can be provided by the state and which can be provided by the private sector based on the economic characterisation of the livestock services.

Table 1.1
Economic classification of the types of livestock services

Service	Type of economic good		Measures to correct for		Sectoral delivery	
	Public	Private	externality	Moral hazard	Public	Private
I CURATIVE						
A Clinical Intervention						
Diagnosis		X *				YY
Treatment		X* *				YY
B Preventive						
Vaccination		X*			Y	YY
Vaccine Production		X				YY
Vector Control		X *			Y	YY
Veterinary surveillance	X				YY	
Diagnostic support		X *			Y	YY
Quarantine			X		YY	
Drug quality control				X	YY	
Food hygiene / Inspection				X	YY	
Veterinary research	X	X			YY	YY
C Provision of veterinary supplies						
Production		X				YY
Distribution		X				YY
II PROMOTIVE						
AI-Semen Prodn		X				YY
AI- Insemination		X				YY
Extension	X	X			YY	Y

- Private goods with externalities
- ** Private goods with externalities only in case of infectious diseases
- yy Economically justified
- yy Economically justified under special circumstance

Source: Umali et al (1994)

1.4 Methodology

The study was conducted in two stages. In the initial stage, data available from the different secondary sources were analysed to assess the salient features and trends of the livestock sector of Kerala as well as the State provision of animal health services. Appendix 1 gives the major sources of data and the limitations of data used in the study.

The second stage of the study consisted of a detailed household survey on the utilisation of animal health care and breeding services by the livestock owners at the farm level and an institutional survey to bring out the provision problems. The sample households were drawn by random selection from among the households with livestock in the three selected panchayats namely Maranellur, Kazhakuttom and Anad . These panchayats were selected giving due representation to the marketed surplus of milk. This was taken as a representative of the intensity of milk production and were graded as high, medium and low milk producing areas respectively.

The institutional survey was conducted in selected veterinary hospitals/dispensaries from among the 97 institutions in the government sector in Thiruvananthapuram district.

1.5 Chapter Outline

The results of the study are presented in the following manner. Chapter 2 presents a review of the main features of the livestock sector including the productivity and production and factors that have facilitated the changes in the sector.

Chapter 3 deals with the Animal Health Support system in Kerala, describing the infrastructure facilities like availability of veterinary of institutions and its supporting facilities and examines efficiency based on a few indicators. The chapter also reports the findings of an institutional survey that attempted to examine the constraints in the provision of services at the institutional level. The extent to which the investments in the sector have contributed to the growth in output is also analysed in this chapter.

The appropriation of services at the farm level is analysed on the basis of a survey conducted in three panchayats in the state. The issues examined include the socio-economic characteristics of the cattle keeping households, their interaction with the livestock support system, the cost of services availed and the difficulties faced by them. The findings of the survey are reported in chapter 4.

The final chapter gives the summary of the findings, conclusions and policy implications.

CHAPTER 2

LIVESTOCK HOLDING IN KERALA – A REVIEW OF PATTERNS AND TRENDS

Introduction

During the last three decades, Kerala has made significant progress in livestock development, especially in the area of dairying and milk production. Earlier studies have gone into the trends and patterns in the livestock economy of Kerala and the underlying factors. The purpose of this chapter is to provide a review of these studies and also to highlight the recent trends so as to provide a better appreciation of the role and importance of the livestock support services in promoting livestock development in Kerala.

The chapter is organised as follows. Section 1 outlines the characteristics of the livestock population in Kerala. Section 2 examines the changes in the production and productivity of livestock. The factors underlying the changes in the livestock population and its productivity and production are reviewed in section 3.

2.1 Characteristics of Livestock Population

2.1.1 Species composition of livestock

Compared to the rest of India, the species composition of livestock in Kerala is significantly different. Cattle are the most dominant species constituting 61%. This is followed by goats, which constitute 33 per cent. The proportions of other livestock are very low. Table 2.1 gives data on species composition of livestock in Kerala.

Table 2.1
Distribution of different categories of livestock- Kerala and India
(number in '000)

Category	Number and percentage				
	Kerala				India
	1977	1982	1987	1996	1992
Cattle	3006 (56.52)	3097 (54.86)	3424 (62.24)	3396 (60.90)	204533 (43.50)
Buffaloes	454 (8.54)	409 (7.24)	329 (5.98)	165 (2.96)	83499 (17.76)
Sheep	3 (0.05)	7 (0.13)	30 (0.54)	6 (0.11)	50799 (10.80)
Goats	1683 (31.64)	2004 (35.50)	1581 (28.74)	1861 (33.36)	115278 (24.52)
Pigs	172 (3.24)	127 (2.25)	137 (2.49)	143 (2.56)	12795 (2.73)
Other livestock	0.3 (0.01)	1.1 (0.02)	0.5 (0.01)	6.1 (0.11)	3241 (0.69)
Total	5318.3	5645.1	5501.5	5577.1	470145

Sources: 1) Report on quinquennial livestock census (various issues), Animal Husbandry Department, Government of Kerala.

2) Animal Husbandry department, Government of India

It is significant to note that the species composition of livestock in Kerala has shown a shift towards cattle. Unlike other parts of the country, the percentage of buffaloes in the total livestock population has shown a decline in Kerala. In most of the other states of the country (except Kerala, Assam, Orissa and West Bengal), buffaloes are valued as milch animals. In Kerala and a few of the East Indian states, they are raised mainly as draught animals. In these states, their role as draught animal has been on the decline due to the increase in the availability of mechanical power in agriculture and shifts in the cropping pattern. In other states, the role of she buffalo as a source of milk production has increased over years relative to the cows and therefore the ratio of cows to she buffaloes have shown a declining trend. In a state like Kerala, the cross bredes have started replacing the she buffalo population.

2.1.2 Sex and age

The decline in the number of work animals and increase in the milch animals was the most conspicuous change that has occurred over time. This change was accompanied by simultaneous changes in the sex composition of livestock also. The sex ratio of cattle changed from 2994 in 1977 to 7843 females per 1000 males in 1996. The corresponding ratio worked out for buffaloes are 790 and 1447 in 1977 and 1996 respectively.

The adult male cattle show a sharp decline while the adult female cows almost doubled during the period from 1956 to 1999 (table 2.2). Consequently, there has been a shift in the sex ratio in favour of females. The young stock of cattle also showed a similar trend. But the decline in the population of young males is not so sharp as in adults. The increase in the young female is much more rapid indicating a further change in the sex ratio more favourable for females.

The buffalo population has also been showing a declining trend, both for the male and female stock. However, the decline was more sharp in the case of males. The use of males as draught power is limited as is evident from the declining trend of the male population. The sex ratio is favourable to the males indicating the preference of male buffaloes as draught animals. The comparatively high number of adult males when compared to the young stock may be a reflection of the effect of inter-state trade. (Tara.S.Nair, 1988) In the face of wide spread cross breeding, buffalo population seems to be losing their importance in the milk production also. Another feature noticed is that there has been a sharp reduction in the population of buffaloes between the last two census periods. This reduction has its reflection in the cattle population also.

Table 2.2
Trends in bovine population

(‘000 numbers)

Year	cattle					buffalo					
	Adult		Young Stock		Total	Adult		Young stock		Total	Total bovines
	M	F	M	F		M	F	M	F		
1956	602	998	352	558	2510	257	138	45	47	483	2997
1961	566	1162	407	618	2753	285	135	35	30	485	3237
1966	519	1219	394	724	2857	254	135	41	42	471	3327
1972	311	1300	389	775	2857	225	156	43	46	472	3327
1977	371	1371	381	882	3006	219	157	35	43	454	3460
1982	266	1513	393	925	3097	183	139	34	53	409	3504
1987	157	1701	351	1214	3423	100	124	31	74	329	3752
1996	143	1796	241	1216	3396	43	58	24	39	164	3561

Source : Report on Quinquennial Livestock Census (various issues) , Animal Husbandry Department, Government of Kerala

It is interesting to note that for the country as a whole, there was a substantial rise in the population of adult female bovines between 1951 and 1972 except the three states of Assam, Bihar and Jammu & Kashmir, where there was a reversal of the sex ratio. The number of males far out numbers the females in other parts of the country indicating the difference in the pattern of utilisation. (Vaidyanathan, Nair and Harris , 1982) While in Kerala, she cattle are raised mainly for milk, in other parts of the country; milk production is only secondary. The primary purpose there is, to raise the male calves, which later are used as bullocks for work. Buffaloes on the other hand are raised primarily for milk except in the states of Kerala, Assam, Orissa and West Bengal.

Attempts have been made earlier to analyse the factors underlying the change in the composition of bovine population in Kerala. Mainly three factors are identified to have shaped the size and sex composition of bovines namely a decline in the requirement of

work animals, increase in the requirement of milch animals and widespread slaughter of cattle for beef.

Decline in work animals The requirement of work animals have been declining in Kerala over years. A decline in the average size of the cultivated holdings, shift in the cropping pattern and increase in the cost of rearing work animals were listed as the underlying factors for this decline in the work animals. An increase in the requirement of milch animals further accentuated the process. (George and Nair, 1990)

Increase in the milch animals The economic viability of the cross breeding programme, along with the reduction in the draught animal requirement and increased demand for milk are thought to have brought about this radical change in the livestock sector of Kerala. The change is evident from the sex ratio of the bovines. A sex ratio favourable to females has been seen as the feature of the bovine economy of Kerala. The factors responsible to the increase in milch animals would be dealt in detail later in this chapter.

Slaughter of cattle This was another factor believed to have shaped the size and sex composition of cattle population. The widespread consumption of beef by all the communities in Kerala and absence of any cultural or religious taboos were proved encouraging to this slaughter. (Nair and George, 1990) The increased demand for beef led to an increased price for beef. Also the male cross bred calves were to be eliminated since the preference was to rear only the female calves to adulthood for milk production. Thus the selective slaughter of the male calves was a factor responsible for moulding the shape and composition of bovines. But, it was seen that there was a major change in the breed composition of cattle, which can be said as the one underlying or the one which, initiated other compositional changes.

2.1.3 Breed composition

The changes in the breed composition of cattle were due to the cross breeding programme of the State. The extent of cross breeding in the state is evident from the trends in the breed wise population of cattle in the state. Indirect estimates of cross bred population making

use of the number of inseminations done annually, success rate of AI and survival rate of crossbreds show that the percentage of crossbreds in the State was only about 10 per cent in early seventies (K.N.Nair, 1981). They constituted 44 percent of the total cattle population in 1977, 60 percent in 1987 and 67 percent in 1996. (Quinquennial livestock census reports, Govt. of Kerala)

The most important factor for the widespread use of cross breeding was the distinctive advantages of the crossbreds in terms of their production traits. The field evaluation study in the Indo-Swiss Project area done in 1973-74 (R.K. Patel *et al.*, 1976) showed that compared to the indigenous breeds, cross bred have (1) earlier first age of calving (2) lower inter calving period (3) longer lactation period (4) higher milk production capacity and (5) higher feed conversion efficiency (lower cost of production of milk).

A breed wise analysis of trends in the distribution of cattle across districts according to 1977 and 1982 census had revealed that there was a striking difference in the adoption of cross breeding technology between northern and southern districts. (Tara S. Nair, 1988). The slow pace of development of infrastructure in the northern districts for popularisation of cross breeding and requirement of draught animals has been identified as the causes behind these inter-regional differences. According to the 1996 census, there has been a considerable increase in the crossbred population in almost all the districts but the overall picture shows that the regional dichotomy still exists between northern and southern states, but this gap has narrowed.

The southern districts including Thrissur have a lower percentage of crossbreds (58.48) when compared to the proportion of cross bred in the southern districts (76.43). The corresponding figures in the 1987 census were 33.62% and 64.2% respectively. It is seen that as per the latest census report, only two districts in Kerala are with a cross bred population less than 50% namely Kasargode (32.76%) and Kozhikode (48.68%). Both of them again belonging to the northern districts, as against the previous census report in which all the southern districts had only less than 50% cross bred population. The slow pace of adoption of cross breeding in the northern districts has been attributed to the poor

development of infrastructure in these districts and the greater need for draught animals (Tara.S.Nair, 1988).

A regional comparison with the other states of the country reveals the magnitude of achievement in the livestock sector mainly bovines in terms of the proportion of cross bred. Kerala is the state with the highest proportion of cross bred followed by Punjab. In the other states, the proportion of cross bred is still only in single digit even though cross breeding has been accepted as national policy for the improvement of cattle in the fifties itself. The percent contribution of buffalo population is highest for Uttar Pradesh and lowest for Kerala contributing to only 0.2 percent of the total buffalo population.

Goats

Along with the changes in the bovine population, the Kerala livestock sector also witnessed a change in the number and sex composition of goats. Goats popularly called the poor man's cow has been gaining significance in the state as is depicted from the last census in 1996.

Table 2.3
Distribution of goats in Kerala.

S.No.	Clarification	1987		1996	
		No.	%	No.	%
1.	Male Goats > 1 yr	116910	7.40	181804	9.77
2.	Female goats > 1 yr.	794428	50.26	883055	47.46
3.	Goats < 1 Yr.				
	Male	234056	14.81	301715	16.22
	Female	435168	27.53	493927	26.55
	Total Goats	1580562	100.00	186050	100.00

Source: Report on Quinquennial livestock census 1996, Animal Husbandry Department, Government of Kerala.

There has been a growth rate of 17.71% between the 2 census periods. The significant portion of this is contributed by an increase in the adult males. They recorded an increase of 55.51 %. In general, the sex ratio is highly favourable for females. The ratio of adult females to adult males is 4.86 according to the latest census in 1996. The state is utilising artificial insemination for goats only at Kerala Agricultural University. The area covered under this programme is relatively very small. Rest of the State depends on natural service alone. The higher number of males may be mostly maintained for breeding purpose and for meat (chevon).

The role of goat in the state is mainly as a milch animal. Usually it happens that male kids born are used for meat after they put up some weight. As in the case of bovines, goats are also mostly confined to the rural areas (95.67 %). A desegregated picture at the district level further shows a predominance of female goats in all the districts. Malappuram district is the one, which has the maximum goat population. This may be probably because of the predominance of Muslim community in that area. In Kerala, the raising of goats has been associated with the Muslim community from the earlier periods itself.

So far, this section examined the compositional changes of livestock. The features of the livestock sector would be incomplete without a mention on the changes in the pattern of cattle holdings over the past few years. This aspect was taken up next.

2.1.4 Pattern of cattle holdings

The pattern of adoption of cross bred cattle across the size of land holdings was studied in a survey conducted by CDS in 27 villages covering 1000 house holds. The distribution of villages according to the percentage of cross bred cows in the total cattle population in each size of holding category indicated that a lower percentage of cross bred cows was more dominant in the smaller land size groups. Higher land size groups had a higher tendency of adoption of cross bred cows. The data available from the National Sample Survey has also revealed a similar pattern.

Although inter group variation in the percentage of cattle was not so large, because of the differential ability to own the cattle, there is an association between the size of cattle and the land holding size. The distribution of cross bred cows in the different size groups indicated that the percentage of cross bred cattle in the total population tend to increase with the increase in the size of land holdings.

In a re-survey conducted in one of the villages covered in the above survey, it was observed that people with more than 50 cents constituted the major portion of cattle holdings. Though the absolute number of cross breeds declined in the survey area, the percentage of cross breeds in the total stock increased. (Babu.P.Ramesh, 1994). It was noticed that there was a reduction in the number of animals reared in the area, on re-survey. But the breed preference of the farmers was clearly established with a shift in the cattle holding households towards cross breeds.

2.2 Changes in Productivity and Production

The discussion on the productivity of livestock and its output in this section is largely confined to milk and meat. This is because of the lack of data on other species of livestock.

2.2.1 Productivity trends

Data of productivity of cow in milk and per milch cow is given in table 2.4. The yield rates are given both for non-descript cow and cross breeds separately. The yield rates show that it has increased both for cross bred and non-descript cows. However, it is significant to note that the yield of cross bred is almost thrice than that of non-descript cows and the difference continue to widen over time.

Table 2.4
Trends in productivity of in-milk and milch cows

Year	Average milk yield per day					
	Per in –milk cow (kg)			Per milch cow (kg)		
	ND	CB	Total	ND	CB	Total
1977-78	1.642	3.230	2.475	0.851	1.756	1.317
1979-80	1.625	3.414	2.567	0.848	1.998	1.419
1981-82	1.627	3.821	2.787	0.836	2.346	1.567
1983-84	1.695	3.800	2.861	0.901	2.779	1.710
1985-86	1.718	3.998	3.089	0.884	2.901	1.927
1987-88	1.577	4.523	3.323	1.037	3.162	2.151
1989-90	1.622	4.991	3.513	1.063	3.543	2.408
1991-92	1.749	5.259	3.781	1.155	3.755	2.611
1993-94	1.864	5.385	4.024	1.191	3.745	2.666
1995-96	2.208	5.625	4.482	1.662	4.124	3.314
1996-97	2.216	5.630	4.553	1.686	4.169	3.400

Source : Reports on Integrated Sample Survey for Milk, Egg and Meat (various issues) Animal Husbandry Department, Government of Kerala.

The rate of growth of productivity in the cross breeds is of a higher order both in the category of in-milk and milch cows. The non-descript cattle also shows a growth in productivity. This may probably due to the better feeding and management following the general pattern as is done for the cross breeds resulting in the “spill over effects” as mentioned by Babu.P.Ramesh earlier. The productivity of the cross bred animals has been increasing at a declining rate over the past few years. This can be attributed only to a reduction in the feeding of these animals. Immediately after the spread of the cross breeding programme, the awareness of the farmers increased gradually. Later, it is thought that a hike in the price of the feed ingredients during the last few years as is seen in the later part of this chapter, might have adversely affected the feeding of the animals.

The following table presents the regression results of the trends in productivity of bovines and goat.

Table 2.5
Regression output on the trends in productivity of bovines and goat

Dependant Variable	constant (A)	co-efficient of time (B)	co-efficient of time ² (C)	R ²	Growth rate
Cow in-milk – ND	0.5165	0.0138	0.0015 (0.0021)	0.79	1.38
Cow in-milk – CB	1.4966	0.0319	- 2.5274 (0.0021)	0.959	3.19
Cow in-milk – Total	1.1885	0.0330	3.8009 (0.0051)	0.995	3.30
Milch cow - ND	- 0.0273	0.0352	6.4697 (0.0043)	0.895	3.52
Milch cow - CB	1.1693	0.0419	- 0.0018 (0.0001)	0.976	4.19
Milch cow - total	0.7538	0.0489	- 8.6467 (0.7992)	0.983	4.89
Buffalo	1.1744	0.0229	0.0015 (0.0524)	0.755	2.29
Goat	- 0.6795	0.0274	- 4.0019 (0.2677)	0.942	2.74

The productivity estimates of buffaloes and goats also indicate that there has been a growth in their productivity of milch animals at the rate of 2.29 and 2.74 per cent respectively. This increase has been recorded in spite of the fact that not much conscious efforts have been made to improve their genetic quality as in the case of cattle. Therefore this improvement in the productivity may be an indication of the increased awareness of the farmers on scientific feeding and breeding practices.

The increase in the productivity meant an increase in the production also. The trends in the production of milk and meat are discussed below.

2.2.2 Production trends

The trends in milk production shows that there has been tremendous growth in the quantum of milk produced, the major share being contributed by cow milk. The increase in the productivity coupled with increase in the population has resulted in considerable gain in milk production (K.N.Nair, 1979, Thara S. Nair, 1988).

Table 2.6
Contribution of cows, she- buffaloes and goat to milk production

Year	Cow		Buffalo (%)	Goat (%)	Total '000 ton
	ND(%)	CB(%)			
1977	25.2	55.0	11.3	8.5	778
1982	22.1	61.0	9.0	7.9	1079
1987	19.8	66.6	7.2	6.4	1426
1992	17.2	71.5	5.8	5.5	1889
1996	14.0	77.1	3.6	5.2	2258

Source: Report on integrated sample survey for production of milk, egg and meat, AHD, Govt. of Kerala

The table shows that in 1977-78, 80 percent of the total milk production was obtained from cows and the rest from buffaloes and goats. Towards 1996-97, the contribution from cows has increased to almost 91 percent with a decline in the contribution of buffaloes and goat milk. The decline is more sharp for buffaloes, due to the reduction in the size of buffaloes, as suggested in table 2.1

Estimates of milk production by breed show that in 1977-78 nearly 69 % of the cow milk was produced by cross breeds. In the subsequent years, the relative contribution of cross breeds has been increasing. According to the sample survey report of 1996, cross breeds contributed to 85 % of the cow milk. An analysis in the trends of milk production by K.N.Nair (1979) showed that breed effect and yield effect contributed equally to the additional growth in milk output. Decomposition of the growth in milk output for the period 1977-78 to 1986-87 further showed that breed effect or in other words large scale cross breeding accounted for more than 70% of the growth in milk production (Tara S.Nair, 1988). The cross bred cow milk production shows the maximum growth in production during the period from 1978 to 1996-97.

Meat Production

The analysis of the contribution of the livestock sector to the state domestic product reveals that the share of meat and meat products to the total value of output from the livestock sector is only between 18-20 % during the last five years. Trends show that 85-90% of the population in Kerala are omnivores consuming both vegetarian and non vegetarian food. (Planning guide, Govt. of Kerala, 1998) The following table presents the meat production in the registered sector in Kerala during the past 18 years. The meat produced by the four species namely cattle, buffaloes, sheep and goat and pig are dealt with here.

Table 2.7
Estimate of meat production in Registered Sector – Kerala
(in MT)



Year	Cattle		Buffaloes		Sheep & Goat	Pig	Total
	Young	Adult	Young	Adult			
1977	234	8758	111	4010	2174	912	16199
1980	299	8906	194	4358	2589	577	16923
1985	604	14795	186	6681	3870	692	26828
1990	1363	18453	394	7933	3422	650	32215
1995	1576	21515	360	7720	3418	735	35324
1996	1634	22187	336	7643	3541	771	36112

Source: Integrated report on sample survey for the estimation of meat, milk and egg, Animal Husbandry Department, Govt. of Kerala.

The data provided by the sample survey represents only a part of the meat consumed in the state since this represents only the animals slaughtered in registered slaughterhouses. Illegal slaughter of animal is very common in Kerala. It is reported that nearly two-third of meat in Kerala is from illicit slaughter. The trend in the production of meat for the State shows the predominance of bovines that too cattle in the production of meat. Nearly 66 % of the meat comes from cattle and 22 % from buffaloes according to the 1995-96 sample survey (Govt. of Kerala). It may be noted that these figures are underestimates since it includes only the output of the registered sector.

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The output of meat is obtained not only from the slaughter of the bovines reared in the state, but also through large scale import from the neighbouring states of Tamil Nadu and Karnataka. The magnitude of this import is given in table 2.8. It may be noted that the numbers shown are likely to be lower than the actual. A fees is levied for each animal that enters the state which provides a point for conducting malpractice. Therefore it is likely that there is under reporting of the number of animals imported.

Table 2.8
Number of incoming animals - Kerala

Year	Cattle	Buffalo	Total
1980-81	251560	140568	392128
1984-85	506372	239225	745597
1988-89	527147	314679	841826
1992-93	451648	284356	736004
1995-96	381247	169786	551033
1996-97	330348	134931	465219

Source: Integrated Report on Sample Survey for the estimation of Milk, Egg and Meat, (various issues) Animal Husbandry Department, Govt. of Kerala.

2.3 Influencing factors

The discussion on the productivity and production of livestock in the preceding section clearly indicates that it has been due to the rapid diffusion and adoption of cross breeding technology. Therefore, in order to understand the changes in the livestock sector, it is important to analyse factors that contributed to this technological change. A number of studies in the past have examined this issue. In this section we will summarise the main findings of these studies.

2.3.1 Infrastructure development for cross breeding

There was no national policy for cattle development prior to 1951 though the need for co-ordination and proper guidance of the state activities so as to initiate cattle development on all India basis was first suggested by the Royal commission for agriculture in 1928. Later many scientists suggested that upgrading the local cattle with genetically superior exotic cattle was the best policy to improve local cattle. Although there were many debates on this, Govt. of India accepted cross breeding as its national policy to improve the performance of local cattle.

Organised attempts to develop Animal husbandry in Kerala was initiated during the first five year plan, when key village Scheme was introduced with facilities for artificial insemination. During the first 3 five year plans, Key Village Scheme was the most important component of the Animal husbandry Development Programme which emphasised the need for better feeding, breeding, disease control, scientific management and organised marketing. The demerit of the key village scheme was that it failed to make any impact on milk production. (George and Nair, 1990)

Simultaneously the demand for milk was increasing due to rapid urbanisation. This led to the formulation of Intensive Cattle Development Project (ICDP), where the main emphasis was on the breed improvement of cattle. Mainly three breeds were identified as being suitable to the climatic conditions of Kerala namely Jersey, Brown Swiss and Holstein-Friesian. The Indo Swiss Project, Kerala (ISPK) formed in 1963 as a joint venture of the government of India and Switzerland played a very crucial role in the success of the cross breeding programme of Kerala. The Indo Swiss Project Kerala presently known as the Kerala Livestock Development Board first formulated the cattle breeding policy for the state. The policy was aimed at the development of a cross bred using selected exotic breeds so as to evolve with a breed suited to the local climatic conditions. The level of exotic inheritance though earlier was fixed at 62.5 per cent, was later re-fixed at 50 per cent.

The Kerala Livestock Development Board (KLDB) is the sole agency for the implementation of the cattle breeding policy of the state. The breeding policy formulated by the Indo Swiss Project Kerala under the auspices of the Government is being implemented through a network of institutions starting from the Bull Stations, Bull Mother Farms, Regional Semen Banks and the Artificial Insemination centres. KLDB has 5 livestock farms to maintain breeding bulls and bull mothers. The frozen semen produced at the bull stations is taken to the regional semen banks, which are 7 in number. They are responsible for the distribution of frozen semen and liquid nitrogen to all the AI centres throughout the state on area basis. The insemination is done through the Animal Husbandry Department dispensaries and artificial insemination sub centres, AI centres under the Dairy Development Department of the Government of Kerala and a few private agencies.

The expansion of the infrastructure was associated with a subsequent increase in the number of AI. After the introduction of AI, there were significant improvements in the AI technique itself, by replacing chilled and CME semen by frozen semen. The introduction of frozen semen technology was a break through in the livestock sector. The number of inseminations, which were only one lakh during the period between 1956-57 and 1960-61 gradually, increased to 11.51 lakhs during 1996-97. The following table depicts the transformation in the AI technology from CME and chilled semen to frozen semen. Thus the frozen semen technology proved to be instrumental in containing and disseminating the cattle breeding programme of Kerala through planned cross breeding.

Table 2.9
Growth of AI in Kerala

(in lakhs)

Year	Total AI	Artificial insemination	
		Frozen semen	Chilled & CME Semen
1975-76	5.86	2.53	3.28
1980-81	9.87	6.75	3.13
1985-86	11.90	11.90	--
1991-92	13.76	13.76	--
1996-97	11.51	11.51	--

Source: Economic Review (various issues), State Planning Board, Govt. of Kerala .

The growth of AI has come down to a slower pace during early nineties and the number has actually reduced in the recent past. This has been due to the facts that (a) in areas where the programme was in operation for a long time, a stage of equilibrium was reached between the diffusion of technology and the prevailing socio-economic conditions and (b) expansion to new areas was limited as pointed out in an earlier study by George *et al* (1989).

Though the infrastructure development has led to the rapid diffusion of the AI technology, data show that there is still preference for natural service among farmers. Exact data on the number of cows taken for natural service are not available. The CDS survey conducted in 1987 showed that 24 per cent of the cows were taken for natural service. It was noted that the non-descript animals are more often taken for natural service. The probable reasons highlighted by George and Nair (1990) was the low success rate of AI, improper heat detection, early or late AI, inadequate growth of the reproductive organs, incidence of diseases and above all the location of the centre in urban areas.

The field studies indicate that the success rate of AI is somewhere near 25 per cent. It is most likely that the actual success rate is a value higher than this because the number of AI done shows the accurate number of AI since a fee is levied for each AI. But the number of calvings recorded are not exact, probably under recorded since there are no enforcement measures by the State or any other agency authorised by the state to record all the calvings regularly and routinely.

In sum, breeding policy adopted by the State and the subsequent development in the infrastructure has resulted in a rapid diffusion of cross breeding programme in Kerala. This in turn has resulted in a significant change in the size and composition of the cattle as mentioned in detail in the earlier section. Another factor that has contributed to this change is the change taking place in the agriculture sector, which is examined hereafter.

2.3.2 Changes in Agriculture sector

Earlier work by K.N. Nair (1981) argued that the compositional changes in the cattle population was facilitated by reduction in the requirement of work animals due to changes in cropping pattern in favour of tree crops and reduction in the average size of holdings. This part therefore examines how the changes in the agriculture were related to the changes in the livestock sector.

2.3.2.1 Changes in the cropping pattern

The maintenance of bovines is related to the farming system in India as a whole. In Kerala this has been associated with paddy cultivation from earlier periods itself. There existed a dual relationship between the bovines and paddy cultivation. While the bullocks and he-buffaloes provided the draught power for ploughing the paddy fields, the paddy straw obtained after the cultivation is an important source of roughage for the bovines. The cropping pattern of Kerala has been witnessing a substantial change since the seventies. The reports on the area under different crops show that since the seventies, there has been a gradual reduction in the area under paddy cultivation and increase in the area under

coconut and rubber. The change in the cropping pattern unfavourable to paddy is said to have exerted its influence on the livestock in two ways. Firstly, it reduced the availability of straw, a roughage which cannot be avoided in the feed of bovines. Secondly, this implied that when the area under paddy cultivation reduced, the requirement of draught animals also reduced.

Table 2.10
Area under important crops in Kerala since 1975-76
(area in '000 hactres)

Year	Paddy	coconut	Rubber
1975-76	876.02	673.00	206.70
1980-81	801.70	651.37	237.80
1985-86	678.28	704.68	336.32
1990-91	559.45	864.06	384.00
1995-96	471.15	914.37	448.99
1996-97	430.83(P)	1005.46	450.00

Source : Economic Review (various issues), State Planning Board, Government of Kerala

The change in cropping pattern unfavourable to paddy (Jeemol Unni, 1983) reduced the supply of paddy straw to the animals as was observed in many earlier studies. (Tara.S.Nair,1988; K.N.Nair,1990; George and Nair, 1990; Sunny Jose,1991) A farm level study made by Babu. P. Ramesh (1994) showed that there was a drastic reduction in the availability of natural fodder in the area surveyed especially paddy straw. The area under paddy cultivation decreased whereas the area under rubber was on the increase. Simultaneously, there was a reduction in the availability of paddy straw and other roughages.

The low availability of straw and green grass has compelled farmers to depend more on compounded feed available in the market. The cross breeds being more efficient converters of feed was therefore seen as a compromise to this situation of reduced supply of forages, thus facilitating the adoption of cross breeding. (K.N.Nair,1981)

The other side of the shift was its impact on the reduction in the requirement for draught animals. (K.N.Nair,1982; Tara.S.Nair,1982). This situation again warranted that the best option out, for the farmers was to rear cattle for milk production rather than for its motive power. The lower demand for work animals was also partly because of the reduction in the average size of holdings and the intensity of agricultural mechanisation.

2.3.2.2 Average size of cultivated holdings

During the past few decades, Kerala witnessed a noticeable decline in the average size of cultivated holdings. After the implementation of the Kerala Land Reforms (Amendment) Act in 1970 which abolished tenancy, there has been a decline in the average size of holding from 0.42 in 1971 to 0.36 hactre in 1981 (Nair *et al* , 1990). This meant that there was a fragmentation of the coconut and paddy fields resulting in decreased availability of straw. Ultimately, there was a rise in the price of paddy straw, which along with the rise in the cost of other feed inputs, led farmers to make use of the available feed and fodder optimally. This again had an implication for the choice of raising milch animals than draught animals where they could make rearing profitable. Beyond a point when the average size of cultivated holdings falls below the critical minimum needed to maintain a pair of work animals, there would be a tendency to do away with the work animals and cling to the milch animals (Vaidyanathan, Nair and Harris, 1982). Further, mechanisation in agriculture is thought to have reduced the requirement of draught animals in agriculture (Tara.S.Nair,1988 ; Babu P. Ramesh, 1994).

2.3.2.3 Mechanisation

The census reports show that over years, there has been an increased mechanisation measured in terms of the tractors in use in the state. According to the 1961 census, there were only 276 tractors in the state, which gradually increased to 1999 during the 1996 census. This invariably meant that there was a substitution of the work animals by the tractors further accelerating the shift from draught to milch animals.

Thus it is seen from the above features that there was a gradual shift of the focus of rearing bovines from that as source of motive power to that of milch animals over a period of time. This also accentuated the adoption of cross breeding in the state. The change in the composition of the livestock was further facilitated by the commercialisation of milk in Kerala.

2.3.3 Commercialisation of Milk

Various factors are believed to have functioned in conjunction leading to the commercialisation of milk in Kerala. The most important to be mentioned among them is the state intervention to develop the infrastructure for milk marketing. There were simultaneous changes in the demand and supply of milk that has accelerated the process. The assessment of various indicators of commercialisation has shown that the process achieved the maximum momentum during the eighties.

The sale and purchase of milk by the house holds can be a good indicator of the degree of commercialisation of milk. The early indication of commercialisation is evident from the NSSO estimates of 1978, which showed that 49 percent of the producer households reported sale of milk and milk products in rural Kerala and 63 percent in urban Kerala. The corresponding figures were 22% and 37% for rural and urban India respectively. In a study on the utilisation pattern of milk at the house hold level, it was found that the major share of milk from cross bred cows were sold and that from non-descript cows were utilised at

home. The following table presents the temporal change in the pattern of utilisation of milk in a micro level study.

Table 2.11
Utilisation pattern of milk in selected village

Year	Percentage of milk				Total	
	consumed as milk	converted to milk products	sold to			
			co-operatives	others		
1987						
	CB	25.63	3.33	48.24	22.80	100.00
	ND	34.19	27.26	22.48	16.07	100.00
	Total	26.61	5.86	45.38	22.16	100.00
1993						
	CB	27.02	1.02	55.94	16.02	100.00
	ND	40.04	15.34	30.97	13.65	100.00
	Total	28.06	2.30	54.18	15.46	100.00

Source : Babu. P. Ramesh (1994) Mphil thesis submitted at Jawaharlal Nehru University

The reports on the sample survey for the estimation of milk, meat and egg depicts the movement of milk among the households of Kerala. According to the latest sample survey report of Govt. of Kerala on the utilisation of milk, nearly 73 percent of milk is sold outside.

Table 2.12
Percentage of milk sold out to different agencies

Year	Percentage of milk sold to		Total
	Private Sector	Co-operative Societies	
1985-86	43.64	21.20	64.84
1988-89	51.50	17.77	69.27
1991-92	53.57	18.27	71.84
1994-95	55.36	17.32	72.68
1996-97	56.44	16.03	72.07

Source: Reports on Integrated Sample Survey (various issues), Animal Husbandry Department, Govt. of Kerala.

2.3.3.1 State intervention

The dairy co-operative movement in India is one which deserves attention because of the effective collaboration between the government, private sector represented by the farmers and international donors like World Bank, Danish government, European Economic Community and the World Food Fund (Martin Doornbos et al, 1990). The milk production enhancing activities were really strengthened by the Operation Flood Project undertaken at the national level by the National Dairy Development Board in three phases, the third one of which is still continuing. The major emphases of the programme were to develop a marketing infrastructure for milk, to link the rural production areas with the urban demand areas and to increase the per capita consumption of milk in the diet. The phase I (OF I) implemented during the period from 1970 to 1981 did not have much impact in Kerala since the area of operation was limited to the selected metropolitan cities of the country. The actual break through was made in the State in the eighties when the second phase of the Operation Flood Programme was implemented. The Operation Flood programme has led to the development of infrastructure through the establishment of dairy co-operatives.

2.3.3.2 Growth of co-operatives

The launch of Operation Flood Project in the State and the establishment of the Kerala Co-operative Milk Marketing Federation (KCMMF) as its apex body and nodal agency in Kerala accelerated the process of commercialisation. The growth of co-operatives pioneered the growth of infrastructure for milk marketing in Kerala. Table 2.13 clearly shows the growth of co-operatives in Kerala. The number of co-operative societies showed a ten-fold increase in the period from 1963 to 1995. This in turn emphasises the role of co-operatives in providing a consistent market to the milk produced in the households. Therefore this is believed to have played a role in attracting more households to adopt cross breeding by way of providing an assured market.

Table 2.13
Growth of dairy Co-operatives in Kerala

Year	Primary Co-operatives (Traditional)	APCOS	Total
1963 -64	204	--	204
1968-69	357	--	357
1973-74	425	--	425
1978-79	849	--	849
1983-84	1293	374	1667
1987-88	1870	1047	2917
1993-94	824	1670	2494
1995-96	504	1747	2251

Source: Annual reports of AHD, DDD, KCMMF (various years)

The commercialisation of milk meant that there was a considerable expansion of the market for milk. This would therefore imply upon the economic viability of rearing cattle for milk. The next part of this section examines the implications of this aspect in detail.

2.3.4 Economic viability of rearing cross breeds

The profitability resulting from the rearing of cross breeds which gave a higher yield with a better feed efficiency might have made a rational farmer to select cross breeding. This hypothesis is being tested here. Earlier work by Tara. S. Nair has studied this aspect of economic viability from two angles, one from the demand side and the other from the cost side.

2.3.4.1 Demand for Milk

The major determinants for milk are household income, price of milk, prices of close substitutes, population and their dietary habits and life style. Among these, growth in per capita income and population being more important, the demand was projected mainly based on these two variables. K.N.Nair (1981) found that there was always a mismatch between the demand and supply. Later, Tara. S. Nair confirmed this. According to her estimates, there was an increase in the supply of milk annually at the rate of 10.71 per cent whereas the demand showed a rate of growth of 14.06 per cent per annum.

Sunny K.P (1988) found that with the growth in the real income of people, the expenditure on the consumption of milk and milk products also increased both in rural and urban areas. Later, in 1994 he observed that the expenditure elasticity for milk and milk products showed a declining trend clearly indicating that milk was gradually becoming a necessary item in the consumption basket of the people of Kerala.

The increase in the demand was supposed to have resulted in a demand-pull resulting in an increased price for milk. When this increase was large enough to cover the input prices, the cattle rearing becomes profitable. The changes in the input and output prices are examined next.

2.3.4.2 Input and Output prices

The basic input required to rear the animals is feed. It constitutes nearly 70 – 75 % of the cost of maintenance and production in cattle. The relative price movements of the inputs and outputs give a different picture before the eighties and since the eighties. The profitability of milk production was increasing in the sixties and early seventies as the price movements were in favour of milk. (Nair, 1981)

The indices of input and output prices give a trend in their relative prices. The study by Babu.P.ramesh indicated that upto 1980, the price of milk was rising at a faster rate than the price of inputs. After 1980, the increase in the price of the inputs stand ahead of the price of milk, which has a direct bearing on the profitability of milk production. The faster rate of increase in the prices of inputs is also reflected by a change in the adoption rate of cross breeding. Thus in the seventies, when the price ratio was favourable for milk, the rate of diffusion was greater and after the eighties when the price movement was unfavourable to milk, there was a decrease in the rate of adoption of cross breeding.

2.4 Conclusions

The foregoing sections examined the salient features and trends of the livestock sector of Kerala. The following observations were made in the study

1. The livestock sector of Kerala is dominated by cattle followed by goats. The most conspicuous change in the species composition that has occurred over years is a significant reduction in the number of buffaloes.
2. The sex composition of bovines has also been undergoing significant changes. The number of adult male cattle showed a sharp decline; at the same time there was an increase in the female population. In other words, it shows that the requirement of work animals has declined while that of milch animals has increased.

3. The most important change noted in the sector is the change in the breed composition of cattle. The state is unique with its very high proportion of cross breeds, and is far ahead of the other states of India. The pattern of cattle holding also showed some changes. It was observed that the holding of cross bred cattle was higher among the households with a larger land holding size.
4. Corresponding to the changes in the size and composition of the livestock population, there were changes in the production of milk and productivity of milch animals. The source for the growth in output has been the increase in the yield, due to the increase in the cross bred population.
5. Various factors were found to have influenced the changes in the bovine sector. These factors include (1) the expansion in the infrastructure for artificial insemination (2) decline in the requirement of draught animals due to changes in the cropping pattern (3) increase in the commercialisation of milk production and (4) improvement in the economic viability of milk production.

In short, what follows from the foregoing analysis is that the shift in the animal composition was more favourable to the cross breeds, which constitute a major portion of the livestock sector in Kerala. This invariably points to the fact that there is a need for strengthening the veterinary services in the light of increasing crossbred cattle population that are prone to diseases more than the local breeds of cattle. An assessment of the health care services therefore becomes imperative in this context. An attempt in this direction is carried out in the analysis that follows.

CHAPTER 3

PROVISION OF LIVESTOCK SERVICES IN KERALA

Introduction

In the previous chapter, we have reviewed the major changes in the livestock sector in Kerala, and the factors contributing to these changes. More specifically, we have seen that the female cattle, used for breeding and milk production dominate the livestock population. We also noted the significant change in the composition of cattle breed in the state; from the non-descript low yielding to high yielding crossbred cattle. The cross breeds have inherited traits of the exotic breeds like increased production and productivity and decreased disease resistance. Maintenance of high proportion of crossbred cattle in the livestock population calls for an effective and well designed animal health support service including herd health management.

In this chapter, we have made an attempt to examine the provision of livestock services in Kerala. In section 1, we will provide a description of the agencies involved in the provision of livestock services in Kerala. This is followed in section 2, by a detailed analysis of the utilisation of livestock services as reflected in the secondary data. In section 3, we will examine the expenditure incurred by the state in the livestock support services and the extent to which it has significantly influenced the growth in output.

3.1 Agencies and Actors

Livestock services may be broadly classified as health services and production services. The former consists of curative and preventive services including the supply of veterinary pharmaceuticals, while the latter include research and extension services relating to improved livestock husbandry. In this section, we will provide a brief review of the agencies and actors involved in the provision of these services in the state.

3.1.1 Health services

The provision of curative and preventive health services is almost within the purview of the state. The curative service is extended to the farmers through a network of District Veterinary Centres, Hospitals, Dispensaries and Mobile Farm Aid Units. The state of Kerala is unique in the fact that all the panchayats excepting seven are provided with a veterinary dispensary and a qualified veterinarian and an auxiliary (Livestock inspector) man each of this. The auxiliaries are given a one-year training in animal husbandry with emphasis on the breeding activities, after they are selected for the job.

The government hospitals and dispensaries are equipped with some common medicine and little patent medicine. Every year, the department invite tenders and purchase these medicines from the lowest quotationer. Since a large amount is required to meet the demand of the whole population presented in the hospital, it is practically impossible to provide the entire requirement and therefore the supply made annually is sufficient to meet only a minor part of the hospital based requirement. However, the services provided in the hospital premises are free of cost to the livestock owners. But the State Animal Husbandry Manual which provides the directives for the functioning of the department, has laid down provision for the treatment of animals at the premises of the animal for which veterinarian can accept a nominal fee. The following table provides a list of institutions presently functioning under the Animal Husbandry Department, which is the main agency involved in the provision of health care services of livestock.

Table 3.1
List of Institutions under Animal Husbandry Department

Institution	Number
Administrative offices	56
Veterinary hospital/dispensaries	1131
Artificial Insemination Centres	980
Diagnostic Laboratories	14
Vaccine production	1
Poultry farms and other offices	28
Livestock farms	13
Training schools	5
Rinderpest Eradication units	29
Feed production units	3
Livestock products inspection office	1
Cattle sterility office	1
Special Livestock Breeding Programme	6
Disease Free Zone Units	3
Central Veterinary Store	3
□Kerala Veterinary Council	1
Total	2675

Source: Animal Husbandry Department

In addition to the Animal Husbandry department, the KCMMF had a veterinary wing, which was functional up to the last quarter of 1998. The wing extended curative service in established routes to the members of the APCOS. Though very useful to farmers, it was discontinued due to some technical reasons.

The Animal Husbandry Department of the Government of Kerala undertakes the preventive measures, mainly the immunisation of animals. The Institute of Animal Health and Biologicals is the only institution in the government sector that is involved in the production of vaccine in the State. / 1 The state provides vaccination to the livestock free of cost through the various institutions like dispensaries / hospitals and Livestock Disease Control Units. The state has also been involved in the eradication of the five major contagious diseases of the livestock which causes much loss in the sector namely Foot and

Mouth Disease, Rinder pest, Anthrax, Black Quarter and Haemorrhagic Septicemia. There are two main eradication programmes of the State AHD, targeted on the 2 major devastating contagions of bovines namely Rinderpest and Rabies. The Livestock Disease Control (LDC) under the AHD is a centrally sponsored scheme to make Disease Free Zones in respect of the two diseases namely Rinderpest and Foot and Mouth Disease. The Chief Disease Investigation Laboratory at Palode, Trivandrum controls and co-ordinates various disease investigation activities of the State. Besides, the Animal Disease Surveillance Scheme assists in the analysis of the diseases prevalent in the State. Other disease control measures like quarantine, slaughtering and movement restrictions are solely government functions.

The supply of pharmaceuticals is being undertaken by the private sector alone in the State. The government intervention in this sector is in the form of regulatory rules on production and quality control. The State government is involved in the supply of poultry vaccine free of cost through the government veterinary hospitals scheduled once in every week.

3.1.2 Production Services

The production services including research and extension activities are again under the purview of Government activities. The research in the field of Veterinary Science is being undertaken at the Kerala Agricultural University under the auspices of the Government of Kerala. Government is involved in the extension activities through print and electronic media, releasing magazines on agriculture and allied topics regularly, talks in radios and in the television. In addition, the state renders extension service to the farmers through the veterinarians and auxiliary staff employed in the government veterinary hospitals. The private sector is also involved in the extension activities but only to a small extent.

The four training centres of the department are engaged in providing training to farmers on scientific management practices of Animal Husbandry, special training to the weaker

sections of the society, induction training to the para veterinary staff and re-orientation training to the departmental officers.

The Government also undertakes the provision of inputs like feed and seed. The production of feed is only to a limited extent which would only cater the needs of Government farms alone. Rest of the feed is imported from the neighbouring states mainly Tamil Nadu where the feed ingredients are very cheap. The agricultural wing of the Government is supplying the seeds to a limited extent.

The Kerala Livestock Development Board (KLDB) is implementing the cattle breeding policy of the state. Frozen semen is produced by the KLD Board in their farms and they supply semen to the Artificial Insemination centres through their Regional Semen Banks. The semen is being supplied to the Government Hospitals via Animal Husbandry Department who purchase the semen from the Board and provide the service to the farmers at a subsidised rate. Below is presented a table showing the details of the AI centres to which the Board has supplied semen during the year 1995 within the state. There are other agencies also involved in the delivery of artificial insemination in the state.

Table 3.2
Artificial Insemination Centres in Kerala

Institution	No. of AI centres
Department of Animal Husbandry	2117
Dairy Development Department	50
Other voluntary organisations	38
APCOS	61
Tata tea	27
Total	2293

Source : Economic Review (1996), State Planning Board, GOK.

Though other agencies are involved, still a major proportion of the insemination is being delivered by the state itself. Under the government scheme, the semen was provided free of cost to farmers until 1972 and thereafter it is only partially subsidised. KLD Board, in addition to supplying frozen semen, also maintains a fodder seed farm to produce the basic seeds.

Table 3.3
Sectoral channel for delivery livestock services Kerala

	gg	ggp	gp	gpp	pp
Clinical care		#			
Vaccine Production			#		
Delivery of vaccinations		#			
Vector control				#	
Veterinary surveillance	#				
Diagnostic support		#			
Quarantine	#				
Drug Quality Control	#				
Food, Hygiene Inspection	#				
Semen Production	#				
Artificial Insemination		#			
Extension		#			
Veterinary Research	#				
Veterinary Production					#

gg Purely Government

pp Purely Private

ggp Mainly Government with some private participation

gpp Mainly private with some Government participation

gp Active participation of both Government and Private Sector.

The livestock services have several components. Table 3.3 presents a picture of the public and private sector participation in the delivery of different types of services based on the rating of these services. The channels for these services were classified according to whether they were supplied purely by the government (gg), purely by the private sector (pp), mainly by the government with some private-sector participation (ggp), mainly by the private sector with some government participation (gpp) equally by both government and private sectors (gp) or were not provided by both public and private sectors (na) (adapted from Umali *et al* 1990). The table is based on such an exercise attempted on the Kerala livestock service sector.

A similar exercise done has been done for different countries in the world. Umali *et al* (1990) classified the countries according to their stage of technological advancements in the livestock sector as highly developed (Germany, USA) moderately developed (Brazil) and developing livestock sectors (Indonesia, India). These countries range in their public and private sector involvement according to their level of technology. More advanced technologies are seen to adopt a higher degree of private sector participation and vice versa.

Veterinary Livestock Units per Personnel

A simple approach that has been used for measuring the livestock services availability is by estimating the number of Veterinary Livestock Units (VLUs) per veterinarian and per veterinary auxiliary. Since they are the primary providers of the livestock services, their number give a quick and approximate measure of the supply of the health services. The Veterinary Livestock Unit is an animal unit equivalent to 1 cow or 1 camel or 2 horses or 2 pigs or 2 donkeys or 10 small ruminants or 100 fowl (De Haan and Becure, 1990 cited from Umali *et al*, 1990).

The optimal ratio that has been recommended for an intensive production system like the one that is prevalent in India has been 5000 VLUs per veterinarian (Umali *et al* P.22). When compared to this standard fixed, it can be said that though upto 1980, there was a

shortage of veterinarians, thereafter the gap was filled and now the department is equipped with sufficient number of veterinarians and auxiliary staff.

India's figure during 1990 was 10,861 VLUs per veterinarian, which was significantly higher than the standard 5000 VLUs. When compared to this, the state is in a sound position as far as the supply of trained veterinarians is concerned.

Table 3.4
Supply of livestock services - Personnel

Year	VLU (lakhs)	VLU / Vet	VLU / Aux
1977	4017090	6797	3622
1981	3898060	4613	3101
1985	3995260	3564	2312
1989	4141720	3466	2341
1993	4104560	3409	1788
1996	4075670	2828	1615

Source : 1) Reports on Quinquennial Livestock Census (various issues), AHD, GOK (2) Reports on Integrated Sample Survey, AHD, GOK

Similar ratios worked out for different countries have shown that African Countries were terribly short of trained veterinarians and there was a substitution of this gap by the services of veterinary auxiliary personnel (Umali et al) Mauritiana registered the highest ratio of 229,607. Most of the European countries displayed ratios well within the standard. However it has to be remembered that these ratios are only very approximate measures. Accurate ratios of optimal supply require detailed information on veterinary practice, cost and returns, which are not available. Another indirect measure devised has been the ratio of veterinarians to the auxiliary. This gives an estimate of the quality of veterinary services that are potentially available. The auxiliary personnel are given only one year's formal veterinary training mainly on artificial insemination. They gain capabilities from their experiences but are never a substitute for a trained veterinarian. The ratio here seems to be comparatively low which can be an indicator of the quality of the service available to

farmers. But this has to be interpreted with caution in the case of Kerala, where there are sufficient numbers of veterinarians to take care of the present livestock strength.

Thus it can be summarised that the number of institutions and trained veterinarians seems to be sufficient to meet the demand of the existing livestock population theoretically. The extent to which this improved provision of services is utilized in the management of the livestock population will be examined in the following section.

3.2 Utilisation of Services

Data on the utilisation of services are examined on the basis of the secondary data available with the concerned agencies. In the case of health service, we have provided the data on the number of cases treated in both the curative and preventive categories. Table 3.5 gives a picture of the incidence of diseases among livestock in Kerala during the last few years. It may be noted that the animal disease surveillance unit was started in the state in 1982 and detailed information on the incidence of diseases is available only after this period.

Table 3.5
Number of cases treated annually
(numbers in '000)

Year	% of Institutions Responded	cattle	Buffaloes	Goat	Pig	Poultry	Others	Total
1984	59.6	1098 (56.22)	122 (6.29)	360 (18.45)	4 (0.22)	290 (14.84)	78 (3.98)	1953
1987	73.19	1806 (64.47)	149 (5.32)	368 (13.14)	11 (0.38)	386 (13.79)	81 (2.9)	2801
1993	92.9	1764 (55.56)	93 (2.92)	473 (14.85)	17 (0.54)	709 (22.29)	119 (3.75)	3175
1995	94.52	2191 (57.86)	97 (2.56)	544 (14.36)	34 (0.89)	761 (20.09)	160 (4.24)	3787

Source: Annual reports – Animal disease surveillance scheme (various issues), AHD, Govt. of Kerala.

Not all the units included in the Animal disease surveillance scheme have responded to the scheme. However, with the reported data, it seems that nearly 60 percent of the cases attended in the veterinary institutions relate to the treatment of bovines. Among bovines, nearly 95 percent of the cases are those relating to the cattle. The State is equipped with a veterinary hospital in every panchayat. In spite of the technical services provided through these institutions, the trends indicate that the existence of diseases among the livestock continue more or less at the same level.

Table 3.6 presents the number of animals affected by diseases during different periods as a percentage of their total population.

Table 3.6
Proportion of animals affected with diseases in the total population

Year	Cattle	Buffaloes	Goat	Pig	Poultry
1984	59.59	49.57	31.07	5.32	3.27
1987	58.32	36.51	18.37	8.22	2.58
1990	74.55	36.55	36.39	8.51	2.83
1993	42.28	21.69	33.40	13.01	3.83
1997	46.06	18.87	41.81	17.42	3.96

Source: Report of animal disease surveillance scheme AHD, Govt. of Kerala.

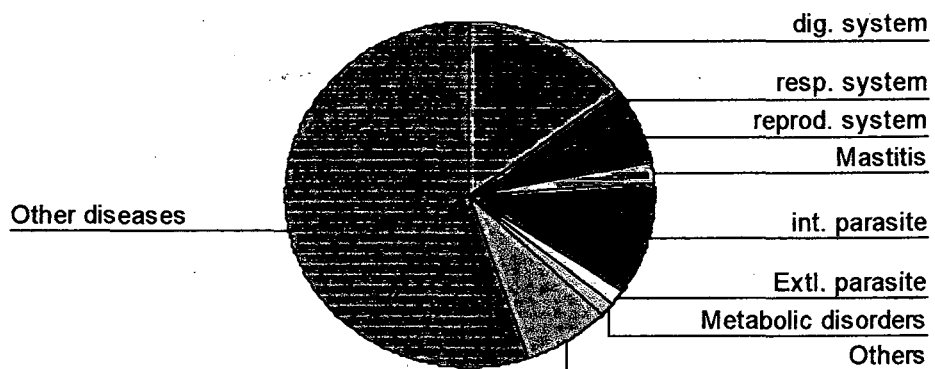
The fact that not all the institutions have reported, the above figures do not represent the actual numbers (refer the previous table). But still this gives an approximate measure of the proportion of animals affected in each species among the total population. There is no definite trend in the incidence but it says that nearly half of the proportion of cattle is in a morbid state throughout.

A cross sectional analysis of the diseases prevalent among cattle is given in the figure 3.1. The status of disease incidence among cattle deserves special attention since majority of them belongs to the improved variety of crossbreds. It follows that the cattle population is

not free from diseases of non-specific origin affecting their systems. Other diseases include bacterial and viral diseases. This therefore suggests that in spite of the services rendered at present on the health of livestock, a much more efficient mechanism is required to meet the increased demand for health coverage to crossbred cattle.

Figure 3.1

Diseases Affecting Cattle



3.2.1 Incidence of contagious diseases

Among cattle, the most contagious disease is Foot and Mouth disease, both biologically and economically. It is assumed that there is a minimum 20 days loss of production completely during the incubation and healing process when an animal contracts FMD. It takes another 60 days for the animal to come back to the normal during which period, the milk production is partial. And above all, the recovered animals suffer a permanent loss of productivity when affected by most of the contagious diseases. The other viral disease of zoonotic importance is rabies.

Rinder pest is another contagious disease prevalent in India, the disease being now confined to the southern states of Andhra Pradesh, Tamil Nadu, Kerala and Maharashtra. Important bacterial diseases of livestock, particularly of cattle are Haemorrhagic

Septicaemia, Black Quarter, Anthrax, and Enterotoxaemia. Tuberculosis and Brucellosis are both prevalent in India and are of zoonotic importance.

It is a fact that the reported incidence of many of the contagious diseases including FMD and RP are quite insignificant. The actual incidence is a figure much higher than the reported value. The following table indicates the prevalence and incidence of the major contagious diseases of the state.

Table 3.7
Outbreak of diseases in Kerala

		1970-71	1975-76	1980-81	1985-86	1990-91	1995-96
Anthrax	Attack	20	64	1	-	2	0
	Death	12	48	1	-	2	0
BQ	Attack	10	4	-	4	-	2
	Death	5	4	-	4	-	300
FMD	Attack	-	7218	1467	968	2175	159
	Death	-	112	50	7	6	1290
HS	Attack	71	105	19	15	447	5
	Death	41	62	11	-	4	5
RP	Attack	12	-	-	29	74	48
	Death	12	-	-	20	28	0

Source: Animal Husbandry Bulletin, AHD, GOK.

The state has been carrying out regular vaccination programmes to control these contagious diseases. Still, it has not been able to eradicate or control the occurrence of the disease. The interstate transport of animals might be a major obstruction in attaining this goal. Quite a number of animals particularly cattle and buffalo are being imported to Kerala every year and taken to the slaughterhouse. (See table 2.8)

In fact, the number of animals actually entering the state is quite large, only a small portion is reported to have entered in the official records. Though there are quarantine measures to

be adopted compulsorily, it is not seen observed in this trade under the banner that these are taken straight to the slaughterhouse. This is definitely detrimental to the state objective of eradicating the contagions.

To achieve the objective mentioned above, the state has been conducting massive vaccinations. Prevention and control of animal diseases are entirely under public interest. The government has recognised the significance of the preventive inoculations and is now directing large amounts of fund for disease control and prevention. The state at present is implementing an FMD control programme and a National Project on Rinder Pest eradication. Maximum numbers of inoculations are being carried out against FMD and RP. Antirabic exposures are mostly post exposure vaccinations.

Table 3.8
Statement showing vaccination of livestock - Kerala

Year	Anthrax	Black Quarter	Haemorrhagic Septecemia	Foot & Mouth Disease	Rinder Pest	Antirabic
1986-97	5048	33012	105077	561456	1033505	3954
1987-88	765	23576	76821	265699	1281730	3538
1988-89	2600	36060	-----	101661	1477282	2386
1989-90	1165	33175	109753	76965	473657	3817
1990-91	1279	38175	79389	84454	1869563	2637
1991-92	3953	25765	61237	71250	544776	1737
1992-93	13075	33247	46143	329311	1587810	6322
1993-94	12235	24386	24845	289376	1642685	1598
1994-95	21859	20545	26939	212112	200365	1681
1995-96	11903	12521	19467	110970	9844	2678

Source: Report on Quinquennial livestock census (1996), AHD, GOK

3.2.2 Breeding services

The private participation is seen to be higher in the delivery of artificial insemination. But still, records show that the government is the agency carrying out the breeding service for majority of the cattle population in the state.

Table 3.9
Agency wise utilisation of semen

(in '000)

Year	AHD	DDD	Others	Total
1982-83	522	347	30	899
1985-86	873	364	17	1254
1988-89	1190	155	18	1363
1991-92	1445	123	25	1593
1995-96	1353	80	130	1563
1996-97	1341	42	156	1539

Source: KLD Board – Annual Report, 1997

The number of inseminations recorded per calving shows that the success rate of artificial insemination under field conditions has centered around 4 to 5 in the state. While interpreting this data, it may be noted that the information on the number of inseminations performed is fairly reliable, since a payment is realised by the state to cover a part of the cost from the beneficiaries. But the information on the number of calves born is gross under estimate. The latter information is collected on a regular basis only from those areas, which fall in the Progeny Testing Scheme of the state. Therefore, the number of artificial inseminations noted per calving may be far below than what is reflected in the above table. According to the farm level data collected by earlier studies, it is around two AI per calving.

Table 3.10
AI done and calvings recorded

year	AI (‘000)	Calving (‘000)	AI / calving	year	AI done	calvings	AI / calving
1971-72	335	69	5	1984-85	756	146	5
1972-73	322	63	5	1985-86	804	165	5
1973-74	289	61	5	1986-87	1072	158	7
1974-75	251	60	4	1987-88	1171	196	6
1975-76	238	50	5	1988-89	1204	233	5
1976-77	477	88	5	1989-90	1251	243	5
1977-78	496	104	5	1990-91	1313	222	6
1978-79	565	114	5	1991-92	1377	263	5
1979-80	630	123	5	1992-93	1234	261	5
1980-81	608	124	5	1993-94	1353	303	5
1981-82	604	127	5	1994-95	1465	307	5
1982-83	667	130	5	1995-96	1240	324	4
1983-84	741	151	5	1996-97	1151	333	4

Source: Department of Animal Husbandry, GOK

Having seen various indicators of the utilisation of health care and breeding services by the Animal Husbandry Department of Kerala, we will examine the relationship between expenditure on the livestock sector and growth in livestock output.

3.3 Expenditure and Output

3.3.1 Expenditure pattern

The inputs provided by the government for the provision of the animal health care services are in the form of salary to the staff, purchase of medicines, chemical reagents and equipment, maintenance charges as rent, electricity charges, water charges, expenses on maintenance of motor vehicles, fuel charges and travel expenses to officers.

An effective service should spend about as much as other operational costs as it does on personnel. Table 3.11 provides information on the amount spend by the government in the animal health care sector through the Animal Husbandry Department in Kerala during the 1998-99.

Table 3.11
Expenditure pattern in Animal Husbandry , Government of Kerala

Item	expenditure	proportion
Salaries and wages	33,02,93,153	50.72
Travel and vehicle expenses	68,92,920	1.05
Rent, office expenses	4,50,29,268	6.91
Materials and supplies	2,15,90,449	3.32
Assistance to PSU, Local bodies	4,66,83,010	7.17
Minor construction	4,80,979	0.07
Farms, feed schemes	8,54,06,216	13.12
Extension and training	73,01,432	1.12
Computerisation	19,27,627	0.30
Capital outlay	10,55,97,312	16.22
Total	65,12,02,366	100.00

Source : Demands for Grants and Detailed Budget Estimates – GOK

The table shows that approximately 18 per cent are only spent on actual developmental activities. The major share of the expenditure is on establishment and contingent charges (58.68 %).

3.3.2 Values of output in relation to expenditure

In order to give insight to the extent, to which the expenditure incurred in the sector has been influencing the output of the sector, we used the following method.

Data were collected on the Government expenditure in the Animal Husbandry sector. The expenditure was categorised under different heads namely direction and administration, veterinary education and training, veterinary research, investigation and statistics, cattle development, poultry development, and fodder development.

The expenditure was then compiled under four major heads – expenditure on cattle development, poultry development, sheep and wool development and Piggery development. The general expenditure was divided in proportion to the expenditure on the above four individual heads and added to the four heads as mentioned above. Based on the assumption that the output from the livestock sector is a function of the investment made on the health and development of the respective sub sectors, these expenditures were then related to the respective outputs.

Table 3.12
Expenditure pattern in livestock sector through AHD (deflated value)
 Base year 1980-81 (Rupees)

Year	Cattle and buff. Expenditure	Poultry dev. expenditure	Sheep and wool dev. Expenditure	Pig dev. Expenditure
1977-78	17966931	33336621	395465	1742183
1978-79	22834287	26799389	348411	1319147
1979-80	25997845	35555210	686933	1871051
1980-81	34519066	36070813	904914	3251258
1981-82	36238599	51166967	3221433	3257562
1982-83	36671013	43277296	1510117	2364459
1983-84	52470572	45040210	6201072	3073931
1984-85	53299441	48289858	1267354	3719480
1985-86	59137681	44152936	1214991	2070525
1986-87	85650076	42651688	1254730	3730990
1987-88	122402784	3380407	10906213	25841642
1988-89	85867053	85215090	736162	2771586
1989-90	115407489	632282256	2055701	5994066
1990-91	175836433	50667215	3167267	6414135
1991-92	208274659	56497844	4050844	6414464
1992-93	197537431	60035698	2082532	7041206
1993-94	238583299	86381261	6421329	6834362
1994-95	281170329	90848841	13257949	25248131
1995-96	337370478	98975412	24778179	21935745
1996-97	419282769	97990487	5169768	22287334

The output values were then computed based on the procedure formulated by the Department of Economics and Statistics. Accordingly, the values of different products from the livestock sector were calculated, based on the information provided by the report on integrated sample survey for the production of milk, meat and egg in Kerala by the Department of Animal Husbandry. The value of output from the livestock sector computed at constant price (1981-81 price) is presented in the table.

Table 3.13
Value of output from the livestock sector at constant prices – Kerala
 1980-81 price (lakhs)

Year	Milk value	Poultry meat value	Egg-value	Total output
1977	924.51376	885.20561	3122.62	5545.2646
1978	592.03592	889.61872	3139.1769	5041.4637
1979	1247.73092	896.22198	3165.6678	5981.0802
1980	905.53908	902.79249	3185.536	5377.8647
1981	1040.95224	955.66572	3370.9726	5831.4437
1982	1543.8784	1100.1652	3880.9233	6951.0789
1983	1645.29256	1181.4911	4172.3237	7490.2587
1984	1622.04372	1228.403	4337.8921	7363.6669
1985	1624.69888	1275.3148	4503.4605	7855.6497
1986	1437.93104	1311.2619	4625.9811	7605.7937
1987	1866.3832	1351.2558	4768.3699	8647.2243
1988	2206.24368	1377.0769	4862.4128	9034.7117
1989	1553.98096	1408.8682	4971.0256	8766.9287
1990	1889.63204	1454.2507	5131.9581	8988.2151
1991	2206.24368	1603.8836	5663.1016	9005.1405
1992	1553.98096	1663.4294	5874.0357	9703.381
1993	1889.63204	1730.4883	6107.156	10368.708
1994	1304.97876	1913.7005	6756.8464	11421.741
1995	1942.00669	1864.7327	6580.3505	10606.404

An attempt is made here to examine the nature and magnitude of the relationships between the expenditures incurred and the output realised for the sector as a whole and the sub sectors. The bivariate regression estimates show that at the sectoral level, the relationship between the livestock total expenditure incurred and livestock total output realised is positive and significant. (see table 3.13) It is also true for the bovine sector as well. For the other sub-sector of poultry, it is found that there is no significant relation between expenditure incurred and the output realised. The expenditure elasticity suggests that there is a scope for increasing milk production in the bovine sector through expenditure

targeting. But this is not the case with the poultry sector where the expenditure incurred has not resulted in augmenting the production of poultry and eggs.

Table 3.14

Bivariate regression Estimates for the Livestock Sector

Independent variables	Dependant variables			
	Gross output from livestock	Milk production	Egg production	Total value of poultry
Constant	6.927	5.562	7.824	6.563
Total exp. on livestock sector	0.276 (7.684) *			
Exp. on cattle		0.257 (3.960) *		
Exp. on poultry			0.094 (1.527)	0.094 (1.527)
R squared	0.776	0.480	0.121	0.121

Note:- Figures in the parenthesis refer to t-values. * Indicates significance at 5% level

The fact that there is enough scope for improving the delivery of livestock services in the state has come out clearly from the case study of the constraints in the utilisation of a selected number of veterinary hospitals reported in Appendix 2. The main findings of this case study are the following. (a) Most of the hospitals have adequate trained personnel for the delivery of services. However, they are overburdened with activities during their normal working hours and therefore unable to discharge their responsibility properly.

(b) The inability to deliver the services are promoting widespread private practice by the veterinarians and the supporting staff outside the office hours and thus contributes to increase in the burden of treatment expenditures of animals incurred by the farmers.

(c) Most of the hospitals lack essential equipment and medicines.

3.4 Conclusion

The analysis in this chapter clearly indicates that the provision of livestock services like preventive and health services has improved considerably in the recent past. This is also reflected in the utilisation of services like preventive and health services and extension of artificial insemination. What is striking is the very high incidence of morbidity among cattle. We have also seen that the expenditure on livestock services has significant positive relationship with total livestock output and also with that of milk output. The regression results also indicate that the scope for improving the output with better targeting of expenditures. In this context, an examination of the quality of livestock services rendered by the agencies show that it is far below the desirable levels. The factors that influence the use of services at the farm level are examined in the following chapter.

Note

1. The Institute of Animal Health and Biologicals at Palode, Trivandrum is the institution under the department which produces different animal vaccines. The Institute is involved in the production of different poultry vaccines and bovine vaccines. More information on the production details shall be obtained from the reports on integrated sample survey for the estimation of production of milk, egg and meat.

CHAPTER 4

APPROPRIATION OF SERVICES BY THE FARMERS

Introduction

The state of Kerala has developed an extensive network of animal health support system for the provision of services to the farmers. The provision of such services has been utilised by the farmers and it has significantly influenced the output of this sector. However, there exists considerable scope for improving the effectiveness of the provision of services. In order to gain insight in to the strategies needed for improving the provision of services, it is important to examine the level and pattern of appropriation of the services, its influencing factors and constraints at the farm level. With this objective in mind, we have carried out a survey among a sample of livestock owners in three panchayats in Kerala. This chapter reports the results of this survey.

The organisation of this chapter is as follows. Section 1 will provide a profile of the study area and the sampling methodology adopted in the survey. This is followed in section 2 by an analysis of the socio-economic characteristics of the sample farmers. The pattern of livestock holding among the sample holdings and some of the influencing factors are highlighted in section 3. Section 4 will examine the utilisation of artificial insemination services at the farm level. The analysis in the next section is focused on the utilisation of animal health services. The attitude of farmers to the provision of services is examined in section 6.

4.1 Survey area and Sampling

The survey was conducted in three selected panchayats of Thiruvananthapuram district namely Maranellur, Kazhakuttom and Anad. The panchayats were selected giving representation based on the marketed surplus of milk. The underlying assumption is that in areas where commercialisation of milk production is high, the level of appropriation of

services will be high. One indicator of the commercialisation of milk production is the marketed surplus of milk. Since exact data on milk production and its commercialisation are not available separately for each ward, the milk collection recorded in the societies of these panchayats was taken as an indicator of the commercialisation of milk production in that particular area. The milk collection area of a society included different wards of a panchayat that contribute milk to the respective societies. Though the marketed surplus is considered as an indirect estimate of the commercialisation of milk production, this also presents the limitation of this study since the amount of milk that reaches the society is considerably low, much part being sold locally. However, this was the only way for judging commercialisation of milk production.

Maranellur panchayat represent the highest milk producing panchayat in Thiruvananthapuram district in terms of the milk procured in the societies. The traditional society in the panchayat is the society that procures maximum milk in the district (2800 litres per day). Kazhakuttom is one among the societies that procures medium quantity (622 litres/day) and Anad (Venkavila) society is one among those, which procure very minimal quantity of milk (121 litres /day).

4.1.1 Maranellur panchayat

Maranellur panchayat belongs to Neyyattinkara taluk of Thiruvananthapuram District. The Panchayat extended over in 12 wards, is a land of hills, slopes and plains. The acidic soil is conducive for the growth of coconut, rubber, banana, tapioca, vegetables and fruit trees. Earlier, paddy was the prominent crop. Now it is confined to only ten Hactres out of total 2984.35 Hactres of land in the panchayat. Tapioca has developed as an important cultivation presently, occupying nearly 295 hactres. Being an area with predominance of agriculture, livestock played an important role in the panchayat. In the earlier years, draught animals dominated the composition of livestock. Later cows for milk production replaced this. Presently, this is the panchayat in Thiruvananthapuram with maximum number of cows. The panchayat has three co-operative societies, two are of traditional type- at Maranellur and Russelpuram and one APCOS at Velloorkonam. The three

societies of the panchayat procure on an average 8400 litres of milk per day, which is the highest procurement in Thiruvananthapuram district. Nearly 25% of the milk procured by the society is being sold locally and the rest is taken to the Union. The establishment of Co-operatives and veterinary dispensary in the panchayat has attracted more and more farmers to enter this field of cattle rearing. A feed production factory also functions in the co-operative sector itself in the panchayat. Next to cattle, goat is the most common livestock. The rearing of buffaloes is not so popular. Pig rearing is undertaken in one part of the panchayat but is not extensive due to the lack of any effort to locate interested entrepreneurs and giving them incentives. Backyard poultry rearing is common and majority of the houses are involved in it.

4.1.2 Kazhakuttom Panchayat

Kazhakuttom Grama panchayat situated in Thiruvananthapuram taluk extends from an area nearly 300 Ft. above the sea level in the east to coastal area in the west. The north south borders include slopes and plains. 70 percent of the population depend on agriculture for livelihood. Coconut is the major agricultural commodity produced, cultivated in about 1090 hactres out of total 1947 hactres. Paddy cultivation is done in 129 hactres. Other agricultural commodities include vegetables, tapioca, pepper and beetal leaves.

Being primarily an agricultural panchayat, Animal Husbandry sector has made its own contribution to the development of the Panchayat. Cattle and goat are the major livestock in the panchayat. The number of buffaloes reared is only hand few. Nearly 80 percent of the houses rear poultry.

The Panchayat has four co-operative milk societies - Chanthavila,, Kazhakuttom, Kattaikonam, and Pulluvila. The four societies together collect nearly 2500 litres of milk per day. The panchayat is provided with a veterinary hospital and an artificial insemination centre.

4.1.3 Anad Panchayat.

This is a major panchayat of Nedumangad taluk of Thiruvananthapuram district. 80 percent of the population is associated with agriculture. Rubber, coconut, paddy, banana, tapioca and pepper are cultivated mainly. The rubber has replaced much of paddy and coconut cultivation. The livestock reared mainly is cattle followed by goats.

The Panchayat has 5 co-operative milk societies procuring nearly 250 litres per day. There is a veterinary hospital and two artificial insemination centres, one at Anad and another at Venkavila. The following table presents a comparative picture of the three panchayats.

Table 4.1

A comparative statement of livestock population across panchayats

Feature	Maranellur	Kazhakuttom	Anad
Cattle – Crossbred males	11	151	306
Indigenous males	15	28	114
Crossbred females	2992	1729	2675
Indigenous females	213	814	771
Total	3231 (54.0)	2722 (51.5)	3866(54.7)
Buffaloes – male	13	20	61
female	41	34	64
Total	54 (0.9)	54 (1.0)	125 (1.8)
Goats males	566	696	1505
females	1950	1810	1532
Total	2516 (42.1)	2506 (47.4)	3037 (43.0)
Pigs Crossbred	180	0	9
Indigenous	1	5	29
Total	181 (3.0)	5 (0.1)	38 (0.5)
Total livestock	5982	5287	7070

Figures in parenthesis indicate the percentage

4.1.4 Sampling and Survey.

The households supplying milk to the selected societies of the three panchayats were listed and the samples were selected from among them at random. A total of 124 households were surveyed. This included 50 households in Maranellur, 51 in Kazhakuttom and 23 in Anad.

Table 4.2
Sampling of households across the panchayats

	Maranellur	Kazhakuttom	Anad
Households registered in society	1251	302	399
Households supplying regularly	249	125	96
Proportion of households supplying regularly	19.9	41.4	24.1
Sample size selected from households supplying regularly	50 (20%)	51 (41%)	23 (24%)

It was seen that 19.9, 41.4 and 24.1 per cent of the households were supplying milk regularly from among the registered members to their respective societies. The sample households were selected at random from among the households selling milk to the societies regularly in the above proportion. The survey was conducted using a structured questionnaire, and was conducted during the months of February, March and April 1999.

4.2 Characteristics of households surveyed

Before moving on to the main analysis, it would be useful to examine the general characteristics of the households as revealed from the survey. This can give an assessment of the socioeconomic background of the households that rear livestock. These characteristics are described in terms of education, occupation, land holding and other socio economic characteristics relating to the livestock owners.

4.2.1 Subsidiary occupation

Households with livestock were subjected to the survey. 86 percent of the households surveyed in all the three panchayats together accepted livestock rearing as a subsidiary occupation. For the rest, livestock rearing was the main source of their income. This was a source of cash income for majority.

4.2.2 The Main rearer

The survey revealed that only one family member was mainly involved in the major livestock rearing activities. In 5.6 percent households, a second member was also involved in these activities. The main rearer was a male in 56 percent of households while females involved was only 44 percent. Hired labour was utilised for milking the animal in 99 percent of the households, for clearing the shed in 7% and 4% for cleaning the animal. However, free family labour was utilised in all the households in one way or the other. The following table presents the gender wise distribution of the main rearer across the three panchayats. Anad panchayat presents a different picture with more females involved in rearing than males.

Table 4.3
Gender-wise distribution of the rearers across panchayats

	Maranellur	Kazhakuttom	Anad
Male	32 (65.31)	29 (58.0)	11 (47.83)
Female	17 (34.69)	21 (42.0)	12 (52.17)

4.2.3 Education of the rearer

Among the total households, 14.4% were illiterate. 37 percent had an education more than 10th standard. A genderwise examination showed that the females involved in rearing cattle were better educated than the males involved. The proportion of females with college education was higher than the males. The higher level of education may be associated with a better awareness on the management practices.

An analysis across the panchayats on the education of the main person involved in rearing activities gave the following results.

Table 4.4
Education of the rearer across panchayats
(per cent)

	Illiterate	> 5 th std.	5-9 th std.	10 th std.	Predegree	Graduate	PG
Maranellur	14.29	16.33	22.45	36.73	10.20	-	-
Kazhakuttom	13.73	5.89	17.65	31.37	25.49	3.92	1.96
Anad	9.09	22.72	18.18	31.82	4.55	4.55	-
general	14.40	13.56	15.25	19.49	26.27	8.48	2.55

The modal class of education is the category of 10th standard in all the panchayats. Kazhakuttom and Anad panchayats are almost similar in this aspect of education while Maranellur is different in that the education status of majority of the rearers is below 10th standard.

4.2.4 Occupation of the rearer

The survey made an assessment on the occupation of the rearers, if livestock rearing was a subsidiary occupation otherwise. It was seen that among the rearers that 14.5 percent had no job.

Table 4.5**Distribution of rearers according to their primary occupation**

	No job	Unskilled worker	Skilled Worker	Petty shop	business	Professional	agriculture	Govt. servant	House wife
Maranellur	2.08	41.67	14.58	2.08	-	4.17	12.5	4.17	18.75
Kazhakuttom	19.62	3.92	25.49	3.92	3.92	-	7.84	9.8	25.49
Anad	31.82	27.26	-	-	4.55	-	4.55	13.64	22.73
General	14.5	23.4	16.9	2.4	2.4	2.4	5.6	5.6	21.8

Majority of rearers was concentrated in the occupation of unskilled workers, and those without job constituting 38 percent followed by housewives. This tendency may probably because of the fact that for unskilled work, they could move better, attending to cattle rearing activities like tethering the animal for grazing outside the house and take them back house. Also this might have offered to this category of people, a source of livelihood year round particularly for those involved in unskilled work. For the unskilled workers, the number of man-days of work available is only few. The picture above gives an indication that livestock rearing has been looked upon as a dependable source of income by the livestock owners. Though the profitability is reducing from livestock rearing, they say, the income from milk definitely provides a cushion for them in casualties. Even though the profitability issue exists, the fact that it provides some cash revenue is agreed upon by the fact, that more and more educated people enter this field as seen from the table 4.4. Another category is the housewife group who utilises their free labour for rearing livestock. Across the panchayats, there was not much variation from the general pattern.

4.2.5 Land holding size.

The distribution of the house holds according to the size of their land holdings indicated that 40 percent of the households were with less than 10 cents of land, 20 percent with land holding between 10-20 cents and 20 percent with land holding between 10-20 cents in general. Thus 60 per cent of the households were possessing below 20 cents of land. The

land holding size when taken as an indirect measure of the wealth of the households, this again indicates that majority of the households belong to the lower two categories, the results of which are consistent with the finding of monthly income.

Table 4.6
Distribution of households based on their land holding size

	0-10 cents	10-20 cents	20-50 cents	50-100 cents	<250 cents
Maranellur	20 (40.8)	6 (12.2)	12 (24.5)	8 (16.3)	3 (6.1)
Kazhakuttom	19 (39.6)	13 (27.1)	8 (16.7)	2 (4.2)	6 (12.5)
Anad	9 (39.1)	5 (21.7)	4 (17.4)	5 (21.7)	-
General	48 (40.0)	24 (20.0)	24 (20.0)	15 (12.5)	9 (7.5)

Figures in parenthesis indicate the percentage

The patterns of land holding do not show much variation across the panchayats. In all the panchayats, the majority (60-63%) belongs to the category of less than 20 cents.

Chi-Squared test showed that there is no significant association between land holding size and cattle holding. (level of significance 0.93) The study conducted by George and Nair in 1990 in selected villages of selected districts gave a result wherein the results showed a positive association between land holding size and cattle holding. According to their survey, cattle holding among households with less than 10 cents accounted for only 17 per cent of the households, 36% of households with 11 – 50 cents, 58% in the category of 51 – 100 cents, 72% for households in the group of 101 – 250 cents and 78% of the households with more than 250 cents. Later, in a re-survey conducted by Babu. P. Ramesh (1994), he found that people with more than 50 cents constituted the major proportion of the cattle holders. He also brought out that, over a period of six years after which he conducted the re survey, there was a dropout of nearly 86 per cent among the cattle holding in the land holding size of below 10 cents. The medium group was found to be more stable than the group with higher land holdings.

The present survey in contrast, gives a picture that majority of the cattle holders are of the category of less than 10 cents followed by the category of 10 – 20 cents. A vivid temporal

comparison cannot be made between the results of these two surveys. However, it is observed that there is a change in the relationship between the land holding and cattle holding, which may probably be seen as an effect of rapid urbanisation whereby the land holding size is also reducing simultaneously. Secondly the earlier view of looking upon cattle as a prestige symbol for the landlords does not exist anymore. Rather than a prestige symbol, people have started rearing cattle as a means of livelihood.

4.2.6 Monthly Income

An assessment of monthly income was made in the questionnaire in which the respondents were asked to choose the category of monthly income to which they belonged. Accordingly, 97 percent of the households surveyed had a monthly income less than Rs.5,000/-, in which 61% had an income between Rs.2000-5000 per month. This would imply that majority of the households with livestock surveyed, belonged to the category of low-income group. Therefore the role of livestock rearing in earning cash income to these households was further substantiated. There was no inter regional variation across the panchayats. 100 per cent in Maranellur panchayat, 98% in Kazhakuttom and 87% in Anad belonged to the category of income less than Rs. 5000/- per month. The reliability of such information though often described as poor, the observation made here was found to be consistent with the findings from the assessment on the land holding of the household.

Table 4.7
Distribution of households according to their monthly income

	>Rs 2000	2000 - 5000	5000 - 8000	8000 - 12000	<12000
Maranellur	21 (42.0)	29 (58.0)	-	-	-
Kazhakuttom	11 (21.6)	39 (76.4)	-	-	1 (2.0)
Anad	13 (56.5)	7 (30.4)	1 (4.3)	1 (4.3)	1 (4.3)
General	45 (37.19)	72 (59.50)	1 (0.83)	1 (0.83)	2 (1.65)

Figures in parenthesis indicate their percentage

4.3 Livestock rearing

4.3.1 Purpose of rearing

An attempt was made in the survey to assess the attitude of livestock owners towards the purpose for which they rear the livestock. When enquired about the purpose for which they reared cattle, the majority opinion was that they depended on the livestock for supplementary income. Most of them attributed more than one purpose for rearing livestock.

Table 4.8
Distribution of the households based on the purpose for which they rear the livestock

Purpose	Maranellur	Kazhakuttom	Anad	General
Milk/egg/meat	13 (26.0)	-	17 (73.9)	30 (24.2)
Subsidiary income	27 (54.08)	45 (88.3)	16 (69.6)	88 (71.0)
Self employment	10 (20.0)	4 (7.8)	10 (43.5)	24 (189.6)
Traditional	-	3 (5.9)	1 (4.3)	4 (3.2)
Farm byproducts	-	-	11 (47.8)	11 (8.9)
Free labour	-	-	7 (3.04)	7 (5.6)

Source: Survey data. (figures in parenthesis indicate percentage)

Inter regional variation was not so prominent among the three survey areas. While emphasis was given on rearing cattle as a means of supplementary income in Maranellur and Kazhakuttom panchayats, the households in the Anad Panchayat valued the livestock equally for being as a source of supplementary income as well as for the quality food products they supply. In fact, the value of livestock as a source of income cannot be ignored. This shift in the attitude from that of suppliers of quality food for the family members to a source of income has occurred over a period of time. In view of the fact that the pattern of cattle holdings is related to the farmer's attitude towards the purpose for which they rear cattle, similar studies were conducted earlier by George and Nair (1990) and Babu.P.Ramesh (1994). According to those surveys, a high proportion of farmers kept cattle for getting quality milk for their family members.

4.3.2 Livestock holding size

The average cattle holding size in the whole area surveyed was 1.72. It can be seen that the majority of the households kept only one or two cows (88 percent). In the whole area surveyed, only nearly 12 percent had a holding size of 3 – 5 cattle and only one out of 124 households had a cattle holding size of 13. The situation seems almost similar across all the panchayats.

The average cattle holding size was below 2 for Maranellur and Kazhakuttom panchayats. A higher value for the Anad Panchayat seems insignificant as is evident from the table 4.9. Firstly the sample size is comparatively small and secondly, there is a chance of magnification due to a household possessing more than 10 cattle. However, it can be inferred definitely that there has been a reduction in the cattle holding size over years.

Table 4.9
Distribution of households according to the livestock holding

Livestock holding size	Maranellur			Kazhakuttom			Anad		
	cattle	buffalo	goat	cattle	buffalo	goat	cattle	buffalo	Goat
0	1 (1.5)	48 (94.1)	39 (76.5)		48 (96.0)	40 (80.0)	1 (4.5)	21 (91.0)	21 (91.3)
>2	49 (73.1)	3 (5.9)	7 (13.7)	42 (96.9)	2 (4.0)	8 (16.0)	15 (68.4)	1 (4.5)	2 (8.7)
3 - 5	16 (23.9)	-	5 (9.8)	8 (4.0)	-	2 (4.0)	5 (22.6)	1 (4.5)	-
5 - 10	1 (1.5)	-	-	-	-	-	-	-	-
<10	-	-	-	-	-	-	1 (4.5)	-	-
Average size	1.82	-	-	1.35	-	-	2.38	-	-

figures in parenthesis indicate percentage

In all the panchayats, cattle holding was concentrated in 0-10 cents category of land holding.

4.3.4 Shifting away from livestock rearing

The livestock rearing is a field where there can be frequent movement of animals in and out. This is also evident from the fact that the number of years for which the households have been rearing cattle. 80 percent of the households have been rearing livestock for less than 2 years.

Table 4.10

Distribution of households based on the number of years involved in rearing bovines

	Maranellur	Kazhakuttom	Anad	General
> 2 years	45 (90.0)	49 (100.0)	2 (10.5)	96 (80.0)
2 – 5 Years	5 (10.0)	-	8 (42.1)	13 (10.8)
5 – 10 Years	-	-	4 (21.1)	4 (3.4)
> 10 years	-	-	5 (26.3)	7 (5.8)

Figures in parenthesis indicate percentages

The livestock owners were asked if they had any plan to reduce the number of animals reared or give up livestock rearing. The survey revealed that 44 percent already had made a reduction in the number of animals reared and 34 percent did not have any intention to reduce the number or stop rearing. 22 percent made no comments. However some revealed during the interview that they even had a plan to increase the number of animals, provided they had sufficient capital for investment. When it was enquired into the reasons for planning to shift away from livestock rearing to the 42 percent who opined so, 91 percent said that it was the high cost of maintenance and low returns that kept them away.

Table 4.11
Distribution of households according to the reasons for shifting away from livestock rearing

(in per cent)

REASON	Maranellur	Kazhakuttom	Anad
High cost of maintenance	96.6	93.5	71.4
Lack of time	-	-	28.6
Lack of free labour	-	3.2	21.4
Poor production	3.4	--	7.1

According to another survey conducted on the reasons for not rearing cattle among a general population by ERRC (1994), it was seen that 26.8% of the households kept back from cattle rearing because of the high cost of rearing and it was the lack of finance to invest that prevented another 26%.

However, it is an accepted fact that the livestock owners are put under considerable economic pressure. Feed is the major input for the production in animals accounting for 60-70% of the cost of maintenance. A study conducted on the expenditure incurred in rearing cattle (Impetus 1999) gave the following result.

Table 4.12
Break up of expenses in rearing cattle

Feeding	73.51	Infrastructure Maintenance.	1.62
Health Care	1.52	Value loss	13.76
Servicing	1.05	Interest	6.73
Insurance	0.21	Total	100.00
Paid Labour	1.60		

Source: Milk pricing in Kerala (Impetus , 1999)

There has been an obvious change in the agriculture sector of Kerala with a shift from paddy cultivation to rubber. The change in the cropping pattern of Kerala, and a reduction in the area under paddy, implied low availability of paddy straw to bovines, which is one of the major sources of roughage. (K.N.Nair, 1981, Tara S. Nair 1988, George and Nair 1990) This increased the dependence of the livestock owners on the concentrate feed, the raw materials for which are to be imported from outside the state. The average yield of crossbred cattle as per the latest sample survey report of Government of Kerala (1996) is 5.5 liters per day. If the average price that a farmer realises for the milk is on an average Rs.9/- per litre, what he receives on an average per day is Rs.51/-. Considering the cost of milk production, this does not seem to be an attractive proposition. Thus reducing profitability can have a profound impact on the decision of the farmers for livestock rearing. The attitude of farmers towards expenditure on health care is to be viewed in this background.

As mentioned earlier, the growth of co-operatives have taken both the nation and the state well ahead in the rapid commercialisation of milk. In this context, it would be interesting to take a note of the present set up of co-operatives in Kerala. The survey though was based on members of societies, it was seen that 26 percent among them did not prefer to supply the milk to the society. The low price offered at the society was the main reason behind it. According to them there was a great demand for milk in the neighbourhood and also the prices received in this direct sale of milk was high. For 17% of them, low milk either due to late stage of lactation or poor production was a reason for not preferring sales to society. The main attraction in maintaining a membership in the society was an ensured market for the milk throughout the year. During the interview most of them agreed that they did not want to give up their membership in the society and therefore they sold a very minimal quantity of milk to the society so as to keep their membership live. A fact noticed throughout the survey was the wide spread discontent on the functioning of the societies, mostly on a political background.

4.4 Breeding Services

4.4.1 Awareness

All the households preferred artificial insemination to natural service. This can be regarded as a major change in the attitude of farmers towards the breeding practice. In an earlier study conducted by George and Nair (1990), it was found that 39.2 % of the local cows and 15.2 percent of crossbred cows were taken for natural service. The preference to artificial insemination by all would imply that either there has been an increased access of farmers to artificial insemination centres via the establishment of a network of institutions and simultaneous reduction in the natural service centres or an increased awareness on the advantages of the AI technology.

4.4.2 Preference to AI

When it was probed into the reasons of why they accepted AI, 70 percent responded stating their preference to AI on the basis of the availability of the service in their proximity.

Table 4.13

Distribution of the households according to the reasons for preferring AI

Reasons	Maranellur		Kazhakuttom		Anad	
	number	percent	number	percent	number	percent
Quality of animal	33	46	24	47	8	42.1
Availability of service	27	54	26	51	2	10.5
Proximity to centre	-	-	-	-	6	31.6
Diseases contracted in NS					5	26.3

Availability of the breeding service centre in their proximity and quality of the calves born were the main features that attracted the farmers to adopt cross breeding for their animals. The preference was more or less similar in all the three panchayats. 71 per cent among the total households surveyed remarked positively on the availability of the breeding service

centre. In Anad panchayat, the preference to artificial insemination was explained mostly on the ground of the quality calves born.

4.4.3 Availability of breeding service centre

The panchayats surveyed had more than one breeding service centres in the vicinity. These were only government institutions. Maranellur panchayat was provided with a veterinary dispensary to which the breeding centre was also attached, and an ICDP sub centre which is manned by a livestock Inspector alone. The ICDP sub centres are mainly meant for artificial insemination in bovines.

The breeding service centres available at Kazhakuttom included a veterinary hospital at Kazhakuttom and an ICDP subcentre at Kattaikonam, situated in the same panchayat itself. Anad panchayat had 3 breeding service centres including a veterinary hospital and 2 ICDP subcentres.

4.4.4 Utilisation of service

The survey revealed that in almost all the households, animals were rarely taken to the hospital premises for insemination. The personnel, either the Veterinarian or the Livestock Inspector was taken to the premises of the animal. The transportation of the animal is a tedious job for the owners of livestock since the animals are to be taken along the busy roads. Besides finding a labour to take the animal is yet another problem. All such problems can be avoided if the personnel attending to the breeding service is taken to the premises of the animal almost at the same cost of taking the animal to the hospital employing a hired labour.

The breeding service was utilised 78 times in the 50 households surveyed in Maranellur panchayat during the one year period prior to the survey, 83 times in Kazhakuttom and 41 times in Anad.

4.4.5 Cost of insemination

The livestock owners had to incur not only the cost of semen for inseminating their animals. In addition, they had to pay for the labour if the animals are taken to the hospital and pay for the personnel and the transportation expenses if the personnel were taken to the house. Throughout the survey, it was found that majority preferred the latter due to reasons explained earlier. The average cost of inseminating a cow once was Rs. 90/- among the entire households surveyed.

Table 4.14
Cost of Artificial Insemination across panchayats
(in Rupees)

Panchayat	Cost of semen	Transportation expense & fees	Total
Maranellur	25.00	68.04	93.04
Kazhakuttom	25.00	52.10	77.10
Anad	25.00	38.04	63.04
General	25.00	65.04	90.04

The cost components of the fees paid to the personnel and the transportation expenses could not be separately analysed. This was because the farmers followed the practice of paying an amount as remuneration to the attending personnel especially when the personnel was a livestock Inspector, which was to cover both his fees and the cost of conveyance. There was a slight variation in the amount paid by the farmers in the three panchayats. There was no definite norm for the payment except for the cost of semen. Neither the attending personnel demanded their remuneration. May be because of the fact that earlier persons attending to the service has set a minimum standard of payment, a general norm is seen to be established regarding the remuneration to be paid for the service.

When it was further analysed for the difference in the cost of insemination between the panchayats, it was found that the average cost of insemination was significantly higher between the Maranellur and Kazhakuttom panchayats and also between Maranellur and

Anad panchayats. Kazhakuttom and Anad showed only a border line significance in the average values of their costs of insemination per animal. Independent t tests were conducted to test the null hypothesis that there was no significant difference in the average cost of insemination per animal between the panchayats, the results of which are presented in the table given below.

Table 4.15
Results of the test of significance for average cost of AI across panchayats

Panchayats	number	means	t value	level of significance
Maranellur & Kazhakuttom	50 50	93.04 77.10	2.45	0.016 **
Maranellur & Anad	50 23	93.04 63.04	3.91	0.00 **
Kazhakuttom & Anad	50 23	77.10 63.04	1.77	0.08 *

The average cost of inseminating an animal once was significantly lower for the Anad panchayat. Since the cost of a single dose of semen remains the same throughout, this difference can obviously be attributed to the expenditure related to the remuneration paid to the attending personnel and transportation expenses.

Either a veterinary doctor or Livestock Inspector performed the breeding services. On further analysis, it was seen that there was a definite variation in the average cost of insemination depending on the personnel that has attended. In all the panchayats there is a significant difference with the cost of insemination, the cost being significantly lower when performed by a Livestock Inspector. In the households surveyed in th Anad panchayat, all the cases were attended by the Livestock Inspector. The results show that the cost of insemination was very low at this panchayat.

Table 4.16
Test of significance for the average cost of AI personnel - wise

Panchayat	personnel	number	mean cost	t-value	level of significance
Maranellur	vet	19	107.89	2.75	0.008 **
	LI	31	83.94		
Kazhakuttom	vet	13	116.15	8.37	0.000 **
	LI	23	70.30		
Anad	LI	19	71.05		

Vet : veterinarian LI : Livestock Inspector

The above results reveal that the cost of insemination was significantly lower while utilising the service of a Livestock Inspector and that too this difference is attributed to the expenditure on transportation and remuneration. Though the farmers are not demanded to pay any fixed amount by the attending personnel, they generally pay a higher amount when the attending personnel is a veterinary doctor. Also, in most cases, when the doctor was called upon, he was usually provided with conveyance facilities also by the farmer. On the other hand, when a Livestock Inspector attended, usually he used his own two-wheeler to reach the site. Once they are informed of the animals in heat at their office on a particular day, they cover all the animals in the route in a single trip after their office hours. However, it was seen during the survey that the preference to the personnel was dependent on the proximity of the service centre and hence that of the personnel to the farmers house.

4.4.6 Quality of the service

The effectiveness or the quality of artificial insemination is usually measured in terms of the number of AI required for conception. There are also other factors that affect the conception. Still, this can be taken as an index of the quality of service provided. The average number of AI per conception in the whole area surveyed was 2.27. Region wise,

the average values were 2.04 for Maranellur, 2.63 for Kazhakuttom and 1.95 at Anad. The association between the breeding centre (whether a hospital or an ICDP subcentre) and the average rate of conception was found to be not significant using a Chi-squared test.

These observations together showed that the breeding services could be delivered with cost efficiency but at the same time with no compromise to the quality if delivered by a Livestock Inspector.

4.5 Health Services

It has been shown earlier how important the animal health care services are, for the maintenance of health and hence production in livestock. This is especially important for the new tropical breed of cattle evolved in the country, which constitute nearly two-third of the livestock population. There are quite a number of diseases inflicting the livestock including much dreadly and devastating ones. One has to note that the livestock owners besides incurring a direct loss on the treatment cost, has also to bear the indirect loss due to the fall in production. Further, on recovery, production is replaced only partially for many diseases as in the case of mastitis of any origin seen in bovines. Above all, this has to be viewed against a background situation where most of the livestock owners belong to the low-income group. This section of the chapter deals with the utilisation of health care services by the farmers and the cost involved in the utilisation of the service.

4.5.1 Health awareness

The health care includes both preventive (vaccination) and curative (treatment) care. The awareness among farmers on the different types of health care services were very high even back in 1987 as reported in the CDS survey in selected areas of Kerala. The survey areas included one of the panchayats of the present study namely Anad. Among the 668 respondents, only two were not aware of the veterinary care requirements. Thirty-three were not aware of vaccination requirements alone and four were not aware of treatment requirements alone out of both the clinical care.

It is noteworthy to see that there has been a tremendous change in the attitude of the farmers towards the need for increased health care in the case of cross bred cows as indicated in the CDS survey in 1987 and re survey by Babu.P.Ramesh in 1994. The farmers were aware of the higher need for the health care services for crossbred cows. The present survey showed that all the households surveyed were aware of both vaccination and treatment requirements of animals. The frequent outbreaks of Foot and Mouth Disease in different parts of Kerala every year has forced the livestock owners to get their animals vaccinated against this dreadful disease. Most of the animals were vaccinated against FMD.

4.5.2 Delivery of the service

The present situation as it exists does not entail a comparison between the public provision and the private delivery of the animal health care services. Private delivery of the veterinary health care service has not established itself in the pure form in Kerala. This is because, veterinary graduates coming out of the Veterinary College get a placement in the government institutions immediately after they pass out from the institutions. Including the last batch, which came out of the college, all the veterinary graduates are employed in the government sector. Therefore, as such there is no need for the veterinarians to go out seeking a job or setting a private clinic. However, a general trend of increased private practice is noticed in Kerala. The government doctors attend to the animals privately on request from the farmers after their office hours. People prefer the service of a government doctor since they rely on the quality of a government doctor very much. But the flourishing private practice shows that livestock owners prefer to utilise the service of the veterinarians privately. There might be quite a number of factors underlying this change, the after effects of urbanisation being the major one. On request from the public, the hospitals were located at an easily accessible place mostly on the main roadside. The roads are now very busy with an increase in the traffic. Usually, it becomes very difficult to manage the animals by a single person in these busy roads. The animals are frightened at the sight of these busy roads, which make them violent and unmanageable. Besides, finding somebody to take the animal to the hospital is yet another problem as mentioned earlier. Convenience is the

major factor that people look upon. Utilising the service of the veterinarian privately has been realised as a compromise to all these problems as well as for time management. When the disease condition involves treatment for more than two or three days, the transportation of the animal becomes a real problem.

4.5.3 Utilisation of services

The utilisation of the two types of health care services showed that both the services were commonly utilised by the households. Out of the 124 households surveyed, in 91 households, vaccination was done for the livestock atleast once and for 25 households they utilised the service twice. 9 households though aware of vaccination requirements could not avail the facility due to some other reasons.

An assessment of the number of times the clinical service was utilised showed that health services were utilised only once in 40 percent of the households, twice in 34 per cent, thrice in 16 per cent and four times in 4 per cent. 6 percent did not utilise the service at all during the last one year. The following table showed the utilisation of the health care service centre wise and panchayat wise in the survey area.

Table 4.17

Distributions of households according to the channel of utilisation of health care services - Maranellur panchayat

Disease category	At the hospital	At the house	Private veterinarian	total
Minor	44 (60.3)	29 (39.7)	-	73 (100.00)
Major	3 (23.1)	10 (76.9)	-	13 (100.00)
Total	47 (54.7)	39 (45.3)	-	86 (100.00)

Figures in parenthesis indicate percentages

Among the 86 cases of disease incidence in the households surveyed in Maranellur Panchayat, nearly 55 per cent were presented in the hospital and 45 cases were treated at the house itself. There were no private Veterinarians in the area surveyed. On further analysis after categorising the diseases as major and minor, the result was slightly different. Whether the cases were presented at the hospital or treated at house itself depended on whether the disease was a major one requiring more than three days treatment or a minor one requiring less than three days. In the category of minor diseases, majority (60.3%) was presented at the hospital. While for the major diseases, nearly 77 percent of the cases were treated at the premises of the animal itself.

Table 4.18

Distributions of households according to the institution of utilisation of health care services - Kazhakuttom

Disease category	At the hospital	At the house	Private veterinarian	total
Minor	54 (62.1)	18 (20.7)	15 (17.2)	87 (100.0)
Major	4 (50.0)	2(25.0)	2 (25.0)	8 (100.0)
total	58 (61.1)	20 (21.5)	17 (17.4)	95 (100.0)

Figures in parenthesis indicate percentages

Kazhakuttom panchayat also presented almost a similar picture, where in 62 per cent of the minor cases were presented at the hospital. The area had a private Veterinarian and he attended 17 per cent of the minor cases. Major cases were comparatively very few and the proportion presented at the hospital and house were almost equal.

Table 4.19

Distributions of households according to the channel of utilisation of health care services - Anad

Disease category	At the hospital	At the house	Private veterinarian	total
Minor	4 (30.8)	9 (69.2)	-	13 (100.0)
Major	-	9 (100.0)	-	9 (100.0)
total	4 (18.2)	18 (81.8)	-	22 (100.0)

Figures in parenthesis indicate percentages

In this panchayat, majorities of the cases whether major or minor was treated at the premises of the animal itself. 69 percent of the minor and 100 percent of the major cases were treated at the house. As already stated, the difficulties in transporting the animal to the hospital daily for more than 2 days and better availability of the personnel for private service may be the reasons behind this increased dependence of the major cases on private service. The trend with the minor cases does not necessarily mean that all the cases are presented in the hospital. The usual practice is that for minor illnesses, the farmers report at the hospital and treat at the house based on the prescription of the veterinarian or the medicines dispensed from the hospital.

Table 4.20

Distribution of households based on the utilisation of services and monthly income

Monthly income		hospital	house	Private vet	Total
Less than Rs. 2000	Minor	31 (54.4)	23 (40.4)	3 (5.2)	57 (100.0)
	Major	1 (10.0)	8 (80.0)	1 (10.0)	10 (100.0)
2000 – 5000	Minor	70 (61.4)	30 (26.3)	14 (12.3)	114 (100.0)
	Major	8 (40.0)	11(55.0)	1 (5.0)	20 (100.0)
6000 – 8000	Minor				
	Major				
8000 – 12000	Minor				
	Major		1 (100.0)		1 (100.0)
12000 - 16000	Minor				
	Major				
16000 - 20000	Minor	1 (100.0)			1 (100.0)
	Major				

Figures in parenthesis indicate percentages

The table depicts the utilisation of the health services and hence their preference towards the government and private delivery of services. Nearly 54 % of the minor cases were taken to the hospital and 46% treated at the premises of the animal in the monthly income category of less than Rs. 2000/-. The corresponding values for the major cases showed that they preferred to take the personnel for treating their animals to the premises of the animal rather than taking the animal to the hospital. 90% of the major cases were treated at the house of the farmer for this lowest income category. The percentage of animals treated at the farmer's house was comparatively lower for the next income group (Rs. 2000 – 5000). But, this also showed a clear preference for the utilisation of the private service especially for the major cases.

4.5.4 Cost of treatment

This part of the chapter deals with the expenditure incurred by the farmers for the treatment of their livestock during the last one year. Cattle constituting the major population of livestock, the cost is compared in different situations for the treatment of cattle. The number of visits and the extent of medication vary drastically with the severity of infection. Since the sample size does not entail a comparison between individual disease occurring in cattle, diseases were classified as major diseases and minor diseases for the sake of comparison. Minor diseases are those which require less than 3 days treatment and include ailments like simple pyrexia, anorexia, diarrhoea, deworming, injury, minor surgical interventions etc. The major diseases include various systemic diseases that require mostly antibiotic therapy. The cost of treatment at the hospital is being compared with that of the cost of treatment at the premises of the animal.

Table 4.21

Average cost of treatment- Institution wise

	hospital	house	private
Minor cases	166.98	334.67	453.75
Major cases	290.00	506.67	1400.00

The results showed that the costs of treatment were higher for major cases when a private veterinarian treated them at home than when presented in the hospital. A test of significance for these values using paired t-tests showed that there was significant difference between the costs of treatment of minor cases while utilising the service at hospital or farmer's house. But for major cases, the average cost of treatment was not significantly different whether treated at hospital or at home. But the previous table shows that though the cost of treatment was higher for taking treatment at home, farmers still preferred the same.

Table 4.22
Test of significance for the average cost of treatment under different institutions

Variables	pairs	t-value	df	2 tail significance
Minor-hospital Minor house	29	-2.67	28	0.013 **
Minor – hospital Minor – private	16	-4.60	15	0.000 **
Minor – house Minor – private	8	-2.63	7	0.034 *
Major – hospital Major – house	3	-0.91	2	0460

Significant differences were noticed in the average cost of treatment between the private veterinarian and that of a government doctor privately for treating minor cases. This difference was not there for the major cases.

Table 4.23
Cost of treatment-Breakup

	fee (Rs.)	Transp. Exp. (Rs.)	Med. Cost (Rs.)	Total (Rs.)
Minor-hospital	0	19.93 (11.02)	160.31 (88.98)	180.24 (100.00)
Minor-house	79.17 (24.84)	22.5 (7.06)	217.1 (68.10)	318.77 (100.00)
Minor-private	200.0 (37.6)	13.80 (2.6)	318.30 (59.8)	532.1 (100.00)
Major-hospital	0	83.33 (28.7)	206.67 (71.3)	290.00 (100.00)
Major-house	150.00 (29.6)	133.34 (23.52)	223.33 (44.08)	506.67 (100.00)
Major-private	500.00 (35.7)	50.00 (3.6)	850.00 (60.7)	1400.00 (100.00)

Figures in parenthesis give the percentage

A break up of the expenditure incurred for the treatment of the animals gave the following results. The treatment cost is incurred on account of the fee paid to the attending personnel, transportation expenses – either to take the animal to the hospital or the personnel to the house and cost of medicine. In general, it was seen that the cost of medicine contributed to the major share of the cost of treatment, varying from 44 – 89 percent. While the animals were taken to the hospital the share of medicine was comparatively high due to the lack of the remuneration component. Notably, the share of the amount paid for the transportation of the animal to the hospital for more than 3 days was high than taking the personnel to the premises of the animal. The general trend shows that the average treatment cost was high when the animals were treated at the house when compared to the treatment at hospital and

were still higher when the service of a private veterinarian was utilised than that of the private practice of a government doctor.

Table 4.24
Average cost of treatment component wise in different panchayats
Minor cases

(In Rupees)

Institution	Component	Maranellur	Kazhakuttom	Anad
Hospital	Fees	0	0	0
	Transportation	18.03	19.56	52.83
	Medicine	158.06	190.00	114.00
	Total	338.09	209.56	166.83
house	Fees	98.24	54.69	81.30
	Transportation	31.10	15.62	20.83
	Medicine	235.76	151.12	55.83
	Total	361.09	221.43	151.25
Private vet	Fees		145.00	
	Transportation		62.20	
	Medicine		326.10	
	Total		533.30	

The table presented above shows that the cost of treatment was comparatively lower at Anad panchayat in all the categories and highest at Maranellur region. Apart from other factors that might have influenced this, it was found during the survey that majority of the cases in the Anad panchayat where the treatment cost is the lowest, were attended by the para veterinarian.

The number of major cases was very few to make such a comparison.

Table 4.25

Average cost of treatment component wise in different panchayats
Major cases

	Maranellur			Kazhakuttom			Anad		
	hospital	house	private	hospital	House	private	Hospital	house	Private
Fees	0	280.7	-	0	312.5	850		28.6	
Transportation	100.0	103.8	-	25.0	81.6	50		115.6	
Medicine	425.0	518.8	-	306.0	727.5	1000		686.9	
Total	525	903.3	-	561.0	1121.6	1400		1070.1	

It was found that there was a significant difference in the remuneration paid to the doctor when the private veterinarian was utilised.

Paired t-test was done for testing the significance of the means of different components of the cost under different centres of treatment. The results showed that the cost of treatment was significantly different for that made at the dispensary and private set up in terms of the fees paid and medicine. This might be probably because of the fact that government dispensaries are equipped with some amount of common medicine and a small amount of patent drugs. This may reduce the burden of the farmer in that a part of the requirement is satisfied from the supply made at the dispensaries for minor ailments. Also, the service of the qualified personnel is not charged at the government institutions.

Table 4.26

Test of significance for the cost of treatment component wise

Variables	no. of pairs	t-value	df	2 tail significance
Minor – house – fees Private-fees	6	-2.69	5	0.043 **
Minor hospital-med House med	29	-0.99	28	0.331
Minor – hospital-transp. Minor-house-transp.	28	-0.54	27	0.593
Major-centre-fee Major-house-fee	3	-3.0	2	0.095 *
Major-hosp.-med Major-house-med.	3	-0.10	2	0.929

Independent t tests showed that there was no significant difference in the components of the treatment cost across the panchayats.

4.6 Attitude towards services

4.6.1 level of technical expertise

While 93 per cent of the households preferred to utilise the service of a qualified veterinarian, 7 % utilised the service of a para veterinarian. When specifically enquired about their preference to approach , 72% opined that they always would like to get the service of a veterinary doctor, while 38 % did not mind utilising the service of a Livestock Inspector depending on the seriousness of the illness or availability of a doctor. It was noted during the survey that, in some of the areas surveyed, the ICDP subcentre manned by livestock Inspector was located within a radius of 1 kilometre whereas the veterinary

dispensary was located more than 2.5 km. In such cases, the location of the health service centre had an important bearing on the choice of the centre by the farmers. The livestock Inspectors though have obtained only a formal education for nearly one-year, it is observed that they gain from their experience and are actively involved in providing health care. Besides, the service of a livestock inspector is cost efficient in that they need be paid only less and in most cases they reach the premises of the animal in their own conveyance. This avoids the delay and cost of taking a veterinary doctor to the site. But, whenever the farmer felt that the illness was serious enough at the initial stage itself or that it does not stand in the hands of a livestock Inspector, they immediately referred to a doctor.

4.6.2 Government service

The reasons for the choice of a government hospital were explained as given below. 81% of the farmers relied mainly on the quality of the service offered by the government veterinary hospital. For 19%, it was the convenience that attracted them. Another 4% attributed the proximity of the centre and 1% accepted the advantage of free medicine through government hospitals. The opinion about the service rendered through government hospitals was excellent for 1 percent, good for 87%, satisfactory for 9% and poor for 3%.

75% were satisfied with the time schedule of the hospital, that is, from 8.30 AM to 2 PM. 24% recorded their inconvenience in the present time schedule. This was especially so when the farmers had no other source to approach during out of office hours of the government institutions. Where there were veterinarians residing in the locality itself, this problem was not felt at all. For breeding services, this posed no serious problem, since a time of 12 hours is permitted between the symptoms of heat and artificial insemination.

4.6.3 Private sector

A comparison with the private sector delivery was not feasible to that extent due to the lack of purely private clinical setup. As per the situations already existing in the State, the more feasible solution was a comparison between the cases presented in the hospital and

those treated at the premises of the animal itself. However, 19% of the respondents had utilised the service of a private doctor in a so-called private clinical setup. They preferred private service mainly because of the timeliness of the provision of the service (50%). 38% preference was due to the time availability of the private practice. The service of the private veterinarian could be utilised at any time of the day. Whether the main rearer was a female or not, male members of the family were mainly involved in the activities outside the house. Taking care of the casualties like illness therefore mainly comes under the purview of male members. The male members who were otherwise employed could make use of private service as and when they required, after they come from other jobs. Door delivery of the service attracted 12%.

4.7 Conclusions

The household survey in selected panchayats of Thiruvananthapuram district revealed the following facts on the appropriation of animal health care services by the livestock owners.

1. The general characteristics of the households indicated that livestock was maintained as a source of cash income by majority rather than viewing it as a source of quality byproducts. The most dominant livestock was cattle and they were concentrated among the low-income groups especially with a land holding less than 20 cents. The level of education of the main individual rearing cattle was found to be better when compared to the earlier times which implies that the awareness on better feeding, breeding and management practices would also be high.
2. A tendency of shifting away from livestock rearing was indicated in the survey, the main underlying reason being the high cost of maintenance of the crossbreds and low profitability. However, over years, the average cattle holding size have been gradually reducing.
3. Though the co-operative sector has played a substantial role in the dairy development of the nation as well as the state, the milk societies has ceased to attract the attention of the dairy farmers. Though the societies can provide a consistent market for the milk produced throughout the year, it is doubtful whether the price paid by these societies

are attractive enough to make the farmers continue with the activity due to the low profitability.

4. An analysis of the utilisation of the breeding services in the panchayats revealed the following facts. Though the provision of breeding services are done by the private sector, no such centre was available in the area surveyed and all the households utilised the breeding service from government institutions, either a veterinary dispensary or an ICDP subcentre. The general awareness of the farmers on cross breeding and Artificial insemination was very high and all of them preferred to get their animals done AI.
5. An analysis on the cost of insemination showed that there was a significant difference in the cost of insemination of a cow across panchayats without any significant difference in the quality of service. This significant difference was attributed to the expenditure paid as remuneration to the attending personnel. Further, it was seen that, it was the personnel attending the service that influenced the cost. When a para veterinarian delivered the service, the cost was significantly low without affecting the quality of service than a more qualified veterinarian.
6. An analysis of the health care services gave the following results.
100 percent of the households surveyed were aware of the vaccination and treatment requirements of the livestock. The situation prevailing in Kerala is indicative of a flourishing private practice of government doctors in the absence of sufficient private clinics. Even then, it was found that nearly 55% of the cases were presented in the hospital and the rest were treated at the premises of the animal itself. Among the cases treated in the hospital, majority of the cases belonged to the category of minor illness, which did not necessarily mean that the animals were physically presented at the hospital. But invariably for the majority of the major cases, they were treated at the house premises.

Cost wise analysis showed that there was a significant difference in the cost of treatment when done at the hospital or the house for minor cases and major cases. Component wise, medicine was the major component in the treatment cost of the animals. The cost of medicine and the remuneration paid to the veterinarian were the

main sources of difference between treatment costs at the hospital and house, fee being more dominant since the service was not charged at all in the hospital.

The relationship between the utilisation of the private service and monthly income of the livestock owners showed that it was the low income category who were seen to own the livestock mainly and utilise the private service also. The preference to private service was related to the convenience factor rather than the cost incurred by the farmers which is also indicated by the fact that for minor cases they preferred the hospital and for major cases, private service of a veterinarian..

The comparison of the utilisation of the health and breeding services between the panchayats showed that there were no significant differences in the pattern of utilisation of the services across the panchayats, which thereby nullified the proposal of variation in the appropriation of services based on the degree of commercialisation.

CHAPTER 5

CONCLUSIONS AND POLICY IMPLICATIONS

The objectives of the study as laid down in the introductory chapter were (1) to review the patterns and trends in the livestock sector of Kerala; (2) to examine the provision of animal health care and other support services in the sector and (3) to study the appropriation of these services at the farm level. In order to realise these objectives, we have adopted a methodology that involves the use of both secondary and primary data. The main findings of the study and its policy implications are briefly outlined below.

Analysis of the patterns and trends in livestock population has shown that there have been significant changes in the size and composition of the livestock population. The significant changes noted in this context are the shift in the composition of livestock population in favour of female cattle and increase in the percentage of crossbred cattle. Technological change is the major contributing factor behind the growth in productivity of milch animals and production of milk in the state.

A number of factors have facilitated the diffusion and adoption of cross breeding technology in the state. In this context, the significant factors to be noted are the following: (a) Change in the effectiveness of AI due to improvement in the AI technology and expansion of AI infrastructure (b) the decline for the draught animals in agriculture and increase in the requirement of milch animals due to growing demand for milk resulting in substitution of draught animals by milch animals (c) the increase in the commercialisation of milk production and improvement in the economic viability of dairying. Since the crossbred cattle are more prone to diseases than the indigenous breeds, it warranted a significant improvement in the animal health support services.

Most of the services in the sector were found to be provided by the government either at completely or partially subsidised rate. Different indicators of the delivery of the services revealed that the provision of these services in the state was well above the standards fixed

for a production system like that of ours. The improved provision of the services was also reflected on the improved utilisation of these services.

Though the indicators pointed to a better standard of provision of services, it was observed from the secondary sources of data that, the morbidity rates of cattle were high. The state has also not succeeded in the control of the outbreak of the major contagious diseases. This indicates that the provision of services made at present has to be made more efficient. A significant positive relationship was noted between the investments made by the government in the livestock sector and output from the sector. The regression results further indicated that there was scope for expenditure targeting in the sector.

The institutional survey conducted in selected hospitals of Trivandrum district revealed that there exist a number of constraints in the provision of the support services at the institutional level. All the hospitals have enough technical hands, but they lack many of the basic facilities including medicine and essential equipment. Secondly, there has been an overburdening of the veterinarians with administrative and extension activities during their routine work hours. This in turn adversely affected the efficiency with which services are delivered at the hospital. This inefficiency in the delivery of the services has also contributed to the spread of private practice of the veterinarians and para-veterinarians.

Analysis of the appropriation of livestock services at the farm level based on the survey conducted in three panchayats has revealed a number of interesting findings: Majority of the cattle owning households owned only one or two animals. Their socio-economic characteristics revealed that they belonged to the marginal and sub marginal land size groups with low income. There is a high degree of instability of households in the rearing of cattle as reflected in the high entry and exit of livestock keeping. The decline in the economic viability of cattle keeping is the main reason underlying this. The smaller size of cattle holding and its concentration in the lower income strata of population has a significant bearing on the policy decisions to be made in the livestock sector.

Analysis of the appropriation of breeding and animal health services at the farm level showed that they utilised the services of a doctor at the hospital and at the premises of the animal privately almost equally. And it was also found that there was a significant difference in the cost of treatment, with the cost significantly higher for private service. This further shows that in spite of the fact that the services are provided free of cost to the farmers at the hospital, the trend to utilise the private service incurring high costs is an indication of the inefficiency with which the service is delivered in the hospital. This in turn points to the need to pursue a strategy for the efficient and economic delivery of these services to the farmers.

As outlined in the introductory chapter, countries with developed livestock sector has been following the economic principles of “public good-private good” nature of the services to determine provision of these services. The discussion on the privatisation of the provision of services in India has taken place in the context of the decline in the finances of the central and state governments. In this context, it may be noted that the livestock owners largely belonged to the poor strata of the society and therefore, it is necessary from the part of the state to provide these services to the farmers. What is required is to improve the effectiveness of the public service and not to privatise it.

The strategies and policies pursued by the state should be directed towards improving the effectiveness of the provision of the services by the public sector and its better appropriation by the farmers. This implies that the service reaches the farmers more efficiently at a lower cost. It can be achieved by the delivery of the services at the doorstep of farmers. Provision of telephone facilities and two-wheelers to each dispensary can prove to be a drastic measure in this direction.

The service of a veterinarian can be better utilised if the clinical and extension services of the animal husbandry department are bifurcated. This could increase the efficiency of the service of the veterinarians during their routine work hours. Provision of a hospital atleast at the taluk level, which can function on a 24 hour basis can assure service to the farmers at any time, which was one of the factors that forced the farmers to opt to the private service.

In short, it can be suggested that the delivery of livestock services have to be made an active service, which at present is delivered as a passive service. This means a change in the delivery of service pattern from that of delivery to those who approach the hospital for service to voluntary home delivery of the services.

Since there exist high morbidity among crossbred cattle, it is important to revamp the existing cattle insurance schemes. Cattle insurance, though has immense potential in a production system like that of Kerala, seems to be under utilised. The farmers can better utilise the scheme if they get the benefit at the time when they actually require it rather than they get it reimbursed. This requires that the cattle insurance shall be made more transparent to a situation wherein the farmers get the required medicine for their animals when they ail, than the reimbursement. The finance to invest for the medicine at the time when they actually require it, is a major constraint for the utilisation of the insurance scheme for the farmers. This therefore leaves the scope to improve the effectiveness of insurance scheme.

Appendix 1

Data Sources and limitations of the study

The secondary data sources used were

- a) Reports on the Quinquennial Livestock Census provided by the department of Animal Husbandry, Government of Kerala
- b) Report on Integrated Sample Survey for the Estimation of the production of egg, meat and milk provided by the Animal Husbandry Department, Government of Kerala
- c) Animal Disease Surveillance Scheme – Annual Report provided by the Department of Animal Husbandry, Government of Kerala
- d) Demands for Grants and Detailed Budget Estimates provided by the Finance Department, Government of Kerala
- e) Economic Survey provided by the Planning Board, Government of India
- f) Economic Review provided by the State Planning Board, Government of Kerala

This section gives a brief description of these major data sources.

(1) Reports on Quinquennial Livestock Census

The State Animal Husbandry Department under the Government of Kerala is conducting the Quinquennial census once in every 5 years. The first livestock census was conducted in 1951 in Travancore, Cochin and Malabar areas. The 8th Indian Quinquennial Livestock Census was conducted in 1956 in the Travancore-Cochin area by the Department of Statistics of the former Travancore-Cochin state. The livestock census as it is now conducted was done for the unified Kerala State in 1961 after the state was formed in 1956. The 9th Quinquennial Livestock census in 1961 was the 1st Quinquennial Livestock Census of the state. The 9th, 10th, 11th, 12th, 13th, and 14th Quinquennial Livestock Census in 1961, 1966, 1972, 1977, 1982 and 1987 were entrusted to the Animal Husbandry Department. The 15th Quinquennial Livestock Census is the seventh of its kind in Kerala and was carried out by the Animal Husbandry Department. It consists of five parts, including

information on livestock and poultry, Agricultural implements and machinery and fisheries. The species of livestock enumerated include cattle-both crossbred and indigenous, buffaloes, goats, sheep, horses and ponies, mules, donkeys, camels, pigs, dogs-both domesticated and stray and rabbits. The primary data collected by the enumerators are pooled and scrutinised at the state livestock office. The report is prepared in consonance with the directions issued by the Government of India.

(2) Report on Integrated sample Survey for Estimation of Production of Milk, Egg and Meat

Institute of Agricultural research Statistics (IARS) conducted the first sample survey of the kind in 1964-65. The National Sample Survey Organisation (NSSO) conducted a nation wide survey with similar objectives in the mid-seventies. Following this pattern, the state has also been conducting sample surveys for the estimation of the production of milk, egg and meat in the state. The sample survey is conducted in the state by the Animal Husbandry Department under the technical guidance of the Government of India. The survey is being conducted presently season-wise viz summer, rainy and winter with the sample size equally distributed among all the districts of the state except Wayanad and Kasargod. A stratified multi-stage random sampling design is adopted for the survey. The main objects of the survey are to estimate the production of major livestock products viz. Milk, meat and egg, to estimate the number of milch animals and layers during the entire census period, to work out the average yield per day of in milk cow, buffalo and goat and to study the various attendant and management practices adopted by the farmers.

(3) Animal Disease Surveillance scheme – Annual Reports

The Animal Disease Surveillance Scheme commenced from 1982 with the objective of setting up of Epidemiological Unit to collect, compile, analyse and interpret data of Animal Diseases prevalent in the State. The primary epidemiological units for the collection of data are the veterinary institutions under the Animal Husbandry Department. This gives a

comprehensive report on the animal disease status in the state. Most of the contemporary disease problems can be solved by an investigation of animal population rather than individual animals. The measurement of the infectious and non-infectious disease in a population assist in determining their importance and efficiency of control campaigns. Monthly data received from the epidemiological units are classified under five major category namely systemic diseases, infectious and contagious diseases, parasitic infestations, poultry diseases and canine diseases. The report is prepared under the auspices of the Animal Husbandry Department and published annually.

Limitations of the study

The present survey was conducted in three selected panchayats of Trivandrum district, involving only 124 households. The sample size selected for the household survey is too small to make any generalisation for the state as a whole. As such , this study presents the case study of Thiruvananthapuram district alone.

Another limitation of the study was on the selection of the households depending on the marketed surplus of milk. The milk sold to the societies were taken as an indicator of the marketed surplus of milk. But it was seen in the survey that not all the households producing more milk sold their milk to the society either because of the low price offered for the milk in the societies or the increased demand for milk in the neighbourhood. Therefore, the indicator selected is representative only to that extend.

Appendix 2

Institutional constraints for the Provision of Livestock services Findings from case studies

Introduction

In chapter 3, we have examined the various dimensions of the provision of health services in Kerala. In that process, we also noticed that there is scope for improving the provision of services through better targeting of expenditure. In order to provide further insight to this, we have done the case study of 15 hospitals in Trivandrum district. This appendix reports the results of this case study.

There are 97 dispensaries in Trivandrum district. The hospitals for the survey were selected on the basis of transportation facilities and accessibility. The hospitals in the district are homogenous in the viewpoint of the provision of facilities and infrastructure and the technical expertise. This is because, the state government, whose supplies are uniformly distributed, based on availability, mainly provides the infrastructure facilities. Regarding the personnel, the standard norm prescribes a veterinary surgeon and a livestock inspector as the technical hand in each hospital. Therefore the hospitals were selected with a representation of hospitals mostly in and around the areas chosen for household survey. 15 hospitals were surveyed for the purpose. The survey was conducted in May 1999.

Personnel

15 hospitals out of the 15 surveyed was provided with a qualified veterinarian and a para veterinarian designated as Livestock Inspector. Two of the hospitals had a temporary vacancy of Livestock Inspector, which was expected to be filled up very shortly. In addition, all the hospitals had either one or two attendants and a part times sweeper. The veterinarian in all the hospitals complained that the present staff strength was quite insufficient to meet the work requirements of the hospitals. 14 out of the 15 hospitals

surveyed suggested the need for a clerical staff in the hospital to attend to the paper works attached to the hospital as well as the decentralised planning works.

Facilities

An analysis of average number of livestock and poultry treated in the hospitals monthly during the last one year gave the following result.

Table 1
Average number of animals treated monthly

Species	Number
Cattle	209
Buffalo	13
Goat	87
Poultry	103
Total	412

The dogs and other species treated were in addition to these. 14 out of the 15 hospitals surveyed had the breeding activities also attached to the institution with an average of 66 cattle and 5 buffaloes brought for AI per month.

None of the hospitals surveyed had the facilities to treat the animals brought to the hospital according to the veterinarians attending the hospitals. 67 percent of the institutions surveyed were functioning in a rented building. Only 33 percent had a building of their own. 27 percent of them did not have enough furniture in the hospital even for the staff employed in the hospital itself. This was the situation in most of the hospitals till the recent past. However there were some favourable changes when the centralised planning was shifted to decentralised planning through which most of the hospital could gather the furniture through the hospital development scheme in the panchayats. 3 hospitals out of the 15 were devoid of a dispensing table to dispense the medicines at the hospital. The survey provided the following information on the equipment and instruments available in

the hospital that are preliminary for conducting the examination and treatment of animals, under field conditions.

Table 2
Equipment / Instruments available in hospitals
(percent)

Item	Yes	No
Examination table	46.7 (7)	53.3 (8)
Refrigerator	80.0 (12)	20.0 (13)
Stethoscope	46.7 (7)	53.3 (8)
Thermometer	80.0 (12)	20.0 (3)
Thermoflask	60.0 (9)	40.0 (6)
Trevice	86.7 (13)	13.3 (2)
Microscope	73.3 (11)	26.7 (4)
Slide	60.0 (9)	40.0 (6)
Cover slip	66.7 (10)	33.3 (5)
Catheter	53.3 (8)	46.7 (7)
Endo tracheal tube	6.7 (1)	93.3 (14)
Mouth gag	6.7 (1)	93.3 (14)
Speculum	73.3 (11)	26.7 (4)
Trocar and canula	66.7 (10)	33.3 (5)
1/v stand	12.3 (2)	86.7 (2)
Nose punch	20.0 (3)	80.0 (12)
Needle	80.0 (12)	20.0 (3)
Cotton	80.0 (12)	20.0 (3)
Forceps	100.0 (15)	-
Syringes	73.3 (11)	26.7 (4)
Operation table	40.0 (6)	60.0 (9)
Operation lamb	-	100.0 (15)
Scalpel	73.3 (11)	26.7 (4)

Suture thread	60.0 (6)	40.0 (6)
Concealed knife	33.3 (5)	66.7 (10)
Obstretic instrument	46.7 (7)	53.3 (8)
Teat correction ..	46.7 (7)	53.3 (8)
Autoclave	53.3 (8)	46.7 (7)
Steriliser	80.0 (12)	20.0 (3)
Med. Dispensing		
Mortar and pestle	86.7 (13)	13.3 (2)
Ounce glass	73.3 (11)	26.7 (4)
Ointment slab	66.7 (10)	33.3 (5)
Common balance		
Test tubes	66.7 (10)	33.3 (5)
Gloves	40.0 (6)	60.0 (9)
Spirit lamp	46.7 (7)	53.3 (8)

Figures in parenthesis indicate the actual number of respondents

The survey showed that the hospitals were very badly in need of several equipment and instruments essential for the treatment of animals under field conditions. Two out of 15 hospitals did not even have a trevice to control the animal while they are brought to the hospital for treatment or breeding (artificial insemination). With the introduction of people's planning programme, it was a fact that the hospitals are being equipped better. 80 percent of the hospitals were provided with a refrigerator.

The veterinary practice unlike other systems of practice is supposed to be a self contained one, wherein the different wings namely medicine, surgery, gynaecology and extension function together. This implies that there are certain primary requisites for the diagnosis and treatment of the animals, the treatment and diagnosis of which are to be done on the basis of subjective symptoms alone. Apart from the obvious symptoms, clinical tests using chemical reagents and microscopic examination are much reliable sources of

diagnosis in the veterinary clinical practice. During the survey it was found that nearly three-fourth of the hospitals were provided with a microscope and centrifuge.

Veterinary Services

As described earlier, the veterinary hospitals are manned by a veterinarian and assisted by a Livestock Inspector. The veterinarians were to attend a combination of activities namely clinical and extension activities. Veterinary service is a field where extension has somewhat equal or even more significance than clinical practice especially in the Kerala context, which have more crossbreds. With the inherent peculiarities of the crossbred, the management practices have a great deal to do in improving the productivity of the animals. The veterinarians while they are to attend to the cases presented at the hospital in the routine hours of work from 8.30 AM to 2 PM onwards, they had to attend to the extension activities connected with the decentralised planning from 2PM onwards. 20% were reported to work 6 hours while 80 percent work for nearly 9-11 hours a day. An inquiry into the problems encountered in the provision of services in the government institutions revealed the following.

Table 3
Problems encountered in veterinary hospitals/dispensaries

	Problems encountered	Percent
1	Lack of building	6.7
2	Lack of furniture	26.7
3	Lack of equipment	53.3
4	Lack of time for clinical work	60.0
5	Overtime work	66.7
6	Lack of lab facilities	73.3
7	Lack of medicine	93.3
8	Insufficient staff	100.0

The common opinion was that the implementation of various schemes under the people's planning programme occupied much of the time of veterinarians. Decentralised planning by the Government of Kerala made the veterinary hospital in the Panchayat, the local house of Planning for Animal Husbandry in that area. This required that the concerned veterinarian had to plan, formulate and implement different schemes for the development of the Animal Husbandry in a way suited to each locality. With the doubling of the work, it was noticed during the survey, that, there was an acute shortage of manpower to assist the veterinarian in these different activities. 14 out of the 15 hospitals were devoid of any clerical staff. Livestock Inspectors who are an important group of paraprofessionals and could assist or even in some case substitute for the veterinarians were seen confined to the artificial insemination and at the most some vaccination work in all the hospitals. Less than 50 percent reported some assistance in the form of clerical work, from Livestock Inspectors.

66.7 percent of the veterinarians were satisfied with the station where they were working at present. While 67 percent had job satisfaction 33 percent were not satisfied with their job.

Provision of services

It was noticed during the survey that though the services were expected to be supplied free of cost through the government institutions, practically what exists in the present situation is almost similar to that of a private provision. The livestock owners are forced to buy almost all the medicines and dressing materials required in the hospital for the treatment of their animals. In addition, it was also noted during the survey that, people gave preference to convenience than money when their animals suffered. The survey revealed that on an average the government doctors attended nearly 3 cases per day at the premises of the animal, while the average number of cases presented in the hospital was about 10 per day. This is inclusive of the animals treated at the premises of the farmers. It was also reported that the doctors receive on an average Rupees fifty per case attended at the premises of the

animal. The amount may go up to Rs 100/- to Rs 250/- depending on the nature of illness. It was like an established norm that doctors were paid high for gynaecological cases.

Another interesting feature noticed was that an equal or if not more number of cases were being attended by the para veterinarians in all the places. Among the 15 hospitals surveyed, only two livestock inspectors were not involved in this private practice. However, all those surveyed were reluctant to reveal the number of cases attended by them. This was because of the fact that private practice by livestock inspectors was something considered as against rule, their qualification in the field being limited to only an years training, that too in the breeding activities alone. But it was admitted that the cases attended by them was mostly of less serious nature. Either they themselves or the livestock owners referred to a qualified doctor when it was felt that the illness was serious in nature. It was also reported that the amount paid when a livestock inspector attended the cases was lower when compared to that paid to a veterinarian. This might have also served as an attraction in calling a livestock inspector when the conditions favoured that.

Suggestions for improvement

Though the veterinarians were to do a variety of extension activities, none of the hospitals were provided with a vehicle. Only one among the 15 hospitals had a telephone. The following were the suggestions given by the field veterinarians for the improvement of the existing government set up.

- (1) 20 percent suggested the need for a separate extension wing to carry out the extension activities. They stressed the need for a monitoring agency to see that the schemes are implemented properly, and to take care of the activities in the hospital in the absence of the regular veterinarian. They also recommended that there should be an institution in every block that could function throughout the day in shift system.

- (2) The need for adequate infrastructure was pointed out in the survey. This included proper building (7%), furniture (28%), equipment(53.3%), laboratory (73.3%), medicine supply (93.3%) and adequate staff (100%).
- (3) The mobility of veterinarian was another factor of concern pointed out during the survey. This was reflected by the lack of vehicle and even a telephone connection in these hospitals. As a part of extension activities these two being the minimum requirements, most of them suggested for the provision of these services during interview with them.

Public Action In The Provision of Services

The provision of free hospital services by the government was seen implemented as a result of the public action behind it. The Government of India has laid a norm that one institution shall serve 7000 livestock. Later in 1995, Government of Kerala prescribed as a matter of policy that there shall be a veterinary hospital in every panchayat and an ICDP subcentre (for breeding purpose alone) per 500 breedable bovines within a distance of 3 km. It has implemented this policy in the entire state except 7 panchayats as on this date. Most of these proposals were accepted based on the request from the public. An inquiry in this aspect revealed that two hospitals surveyed were started during the nineties on the basis of such public demand.

The formation of a new institution was found to be the end result of a series of action following the representations received from the public including the elected representatives of the panchayat, co-operative milk society, Member of Parliament, Member of Legislative Assembly or even voluntary organisations. The government generally accepts a proposal based on the condition that a rent-free building is made available and accepts the proposal considering other factors also like number of livestock in the area and distance from the neighbouring hospital.

Though the objective of the government is to provide service to livestock to the extent possible, it may not be apt to think that such a policy of providing a centre in every

panchayat fulfils the objective. The size of the panchayats are not uniform and therefore a more realistic approach in this direction shall be strictly based on the livestock population.

Cattle insurance

Most of the hospitals were involved in the active implementation of the newly formulated Kamadhenu Insurance scheme of the state government. So far, private insurance companies were involved in the scheme at the usual rate of premium as for any other insurance scheme. Government subsidy was offered only for those beneficiaries under the plan schemes. But of late, Government has implemented a scheme called Kamadhenu Insurance scheme with the assistance of a private insurance company, which offers insurance to livestock, livestock owners and their spouse under different situations at a lower rate of premium, that too with one-third to two-thirds of the premium amount being paid by the government. The scheme came into existence during June 1998. The premium payable is 6.6% of the sum insured for a 3-year policy as against 15% in normal scheme. The scheme essentially has three components namely (I) cattle insurance (ii) Accident Death Compensation to livestock owner (iii) reimbursement of hospitalised medical expenses to the farmer and the spouse.

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