ANALYSIS OF MANAGEMENT SYSTEMS IN HOMESTEAD DAIRY PRODUCTION UNITS

By

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THESIS

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Faculty of Veterinary and Animal Sciences
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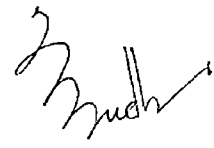
DECLARATION

I hereby declare that this thesis entitled "ANALYSIS OF MANAGEMENT SYSTEMS IN HOMESTEAD DAIRY PRODUCTION UNITS " is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree diploma associateship fellowship or other similar title of any other University or Society



Mannuthy S Sudheer

CERTIFICATE

Certified that this thesis entitled "ANALYSIS OF MANAGEMENT SYSTEMS IN HOMESTEAD DAIRY PRODUCTION UNITS " is a record of research work done independently by Sri S Sudheer under my guidance and supervision and that it has not previously formed the basis for the award of any degree fellowship or associateship to him

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S Sudheer

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Introduction

INTRODUCTION

Indian economy is mainly based on agriculture as nearly 80 per cent of the population is engaged directly or indirectly in it But agriculture alone is unable to provide necessary employment and income to the people Hence dairying constitutes an important activity of the rural population mostly as a subsidiary occupation The National Commission on Agriculture observed that next to agriculture dairying is the most important subsidiary occupation In India more than 80 per cent of the cattle population is in rural areas and about 76 per cent of the rural population is contributing towards milk production Dairy farming along with crop husbandry as mixed farming provides continuous income and full employment to all the members of a family Dairying is also labour intensive Dairy development has been acclaimed as an effective instrument capable of bringing about speedy economic and social transformation of the weaker sections of the rural community

Dairying is considered as an important source of income to the rural households of Kerala About 11 per cent of the state domestic product is contributed by the goods and services produced by livestock sector (Government of Kerala 1987) A better appreciation of the contribution of livestock

to the state s economy is reflected in the fact that about two third of the per capita animal protein consumption is derived from livestock products like milk meat and eggs The availability of draught power and manure from the livestock sector continues to remain as important inputs in crop production in the state

The status of animal husbandry sector in Kerala cannot be compared with that of other states in India Majority of cattle owners in the state maintain only one or two milch animals as an integral part of the mixed farming system Most of the cattle owners in the state who maintain animals belong to low and middle income groups They may not be able to spend much money for adopting high cost technologies Similarly they are utilizing family labour for various practices concerned with dairying All the members of the family will be involved in one way or other in activities connected with dairying As a result of the social change the joint family system has diminished Due to repeated division of landed properties the land availability per family has also reduced considerably which has affected cattle rearing to a great extent

The introduction of crossbreeding technology in the state has resulted in considerable increase in the proportion

of crossbred cattle in the state s cattle population According to the latest Livestock Census (1987) the percentage of crossbreds in the cattle stock is about 51 This technological change has boosted the milk production from about two lakh tonnes in the mid sixties to 14 lakh tonnes by the eighties About 70 per cent of the source of growth in milk output has been due to the improvement in breed and the remaining 30 per cent due to increase in the population of milch animals (Nair 1988)

Though the infrastructure and supporting facilities built up over the years helped in attaining a break through in the production of milk the productivity remained far below the potential The average productivity of crossbred cattle in Kerala is 5 25 kg which is below the potential of 9 10 kg easily attainable through better management practices The low productivity of milk in Kerala was due largely to the rising milk production costs inability to fully commercialise dairy units tiny holdings and poor husbandry practices Kerala state has a very fragile fodder base to support a vibrant dairy industry In addition to this the cattle feed supplies is not only inadequate but also exorbitantly costly

Under homestead farming system only a few heads of cattle are generally maintained when compared to organised

dairy enterprise As a result the quantum of inputs in dairy under homestead will be very much different from that of organised farms Only a few attempts have been made to study the structure and composition of this unique system especially under field conditions (Murthy and Naidu 1992)

The present study was carried out with a view of estimating objectively and with precision the exiting practises of management components of inputs and cost of milk production in the rural unorganised and organised areas The study was also intended to provide basic information regarding the economics of milk production in rural areas The analysis was to bring out lacunae if any in the production system so that correctives can be applied to further improve the profitability of the farming system

The study had the following specific objectives

a To quantify the feeding health and management inputs of small scale dairy units of Kerala

b To study the mode of procurement and disposal of milch animals by small scale producers

c To study the changes in herd strength pattern over a period of time

d To evolve optimal management package for small scale dairy units

Limitations of the study

Due to the non availability of time and resources the study had to be restricted to a sample of hundred households of Kalady panchayat So the findings of the study can be generalised to the area of the study and other areas where identical farming systems and conditions prevails Since the farmers do not keep any records of animal husbandry activities the responses will be based on their recall basis The data will be based on expressed responses which might not be completely free from individual biases and prejudices In spite of the above limitations thoughtful attempts have been made to make the study as objective and systematic as possible

Review of Literature

REVIEW OF LITERATURE

A close review of past research studies is essential in a scientific investigation as it will provide a clear insight into the prevailing situations and thus helps in formulating a sound conceptual frame work for the study The intention of this chapter is to review the theoretical and empirical information available from similar or at least related studies Such a recapitulation will serve as a basis for relating the empirical findings of the present study with those of earlier investigations An earnest effort however has been made to review the available literature and they are presented under suitable sub heads

* Land holding
* Livestock holding
* Trend of cattle population
* Procurement of dairy animal
* Housing management
* Feeding management
* Breeding management
* Health care management
* Milk production consumption and disposal
* Division of labour in dairying
* Economics of milk production
* Disposal of cows
* Constraints in dairying

2.1 Land holding

George and Nair (1990) studied the livestock economy of Kerala drawing a sample at random from among the cattle keepers of Kerala and revealed that the average size of land holding was 1 47 acres Further the pattern of the total cattle keeping households according to the size of holdings indicated 21 4 per cent households with less than 10 cents of land 35 per cent with 11 50 cents 16 7 per cent with 51 100 cents 16 5 per cent with 101 250 cents and 10 4 per cent with more than 250 cents

Singh and Ardeshana (1990) studied the economics of mixed farming in Gujarat The farmers were grouped into four categories viz marginal (0 87 ha) small (1 77 ha) medium (3 28 ha) and large (6 88 ha) with average land holding being 3 19 ha

Rao and Rao (1991) divided the cultivator household into five groups as those possessed upto 3 0 acres between 3 01 to 6 00 acres 6 01 to 10 00 acres 10 01 to 15 00 acres and above 15 00 acres respectively as marginal small medium large and big farmers in their study on income and employment generation of crop and dairy enterprises comparison conducted at Nagarjunasagar in Andhra Pradesh

The classification given by Shiyani et al (1992) was landless with no land small with below 2 ha land medium with 2 0 to 3 5 ha land and large with 3 5 ha land and above

Chauhan et al (1994) revealed that the average size of land holding per household came upto 0 87 hectares among the sample cattle keepers in Himachal Pradesh

Sharma et al (1994) in a study in Haryana found that more than half of the respondents (55%) possessed medium sized land holding that is 5 to 20 acres of land Those with large size land holding (more than 20 acres) were 27 5 per cent There were only 17 50 per cent crossbred animal owners who owned small size of land holdings (less than 5 acres)

2.2 Livestock holding

Raut and Singh (1973) conducted a survey in Krishna delta area in Andra Pradesh and revealed that about 54 2 per cent households in the village had bovines Of those having bovines 22 per cent were non cultivators and 55 per cent possessed land less than 4 ha The number of bovines increased with the size of holding

Prabhakaran and Surendran (1978) revealed in a survey of outlook of the people of Trichur taluk on animal husbandry that labourers were found to have the smallest farm size of 9 per ten households The cultivators wrested the largest farm size which was 28 in ten households While for those in caste occupation had an average farm size of 2 per family the remaining three groups had on an average 25 to 26 cattle in ten households

Vaidyanathan (1978) conducted an analysis of the Indian bovine economy and revealed that the average number of bovine stock per unit of cultivated area in holding with less than one acre carry over 6 times as many bovines per unit area of holdings of 30 acres and more Again there is a preponderance of adult females in the very small holdings which suggest that they concentrate more on milk production

Mahanta et al (1988) in their study on animal holding size cost of milk production and net income by different categories of farmers in Orissa state indicated that the herd size increased as the size of land holding increases

Gangwar et al (1989) reported that the dairy farming size of an average Haryana farmer was 5 54 milch animals out of which 2 56 was adults 1 98 young stock and 1 0 was calf

George and Nair (1990) reported that among the total cattle keeping households samples for study in Kerala 33 per cent had kept only one cattle 7 per cent had more than one cattle of the same type and the remaining 60 per cent had more than one animal of different types The composition of cattle in the total cattle population indicated 30 per cent adult crossbred cows 18 per cent adult local cows 6 per cent buffaloes 7 per cent bullock and 39 per cent young stock

Sharma and Singh (1992) used the basis of milch animal numbers to classify the livestock farmers into small medium and large

Arunachalam (1995) in a study in Tamil Nadu revealed that cow buffalo work bullock sheep goat pig and poultry were the seven species/classes of animals that were maintained and they were found either as a single species or in various combinations totalling to 52 farming structures

2.3 Trend of cattle population

Livestock census (1987) of the Government of Kerala revealed a decline in the requirement of work animals in agriculture and an increase in the requirement of milch animals has resulted in significant changes in the composition

of cattle population While the adult male population showed a sharply falling trend (32%) the adult female cattle population had shown an increasing trend (37%)

Gincy et al (1988) revealed that immediate requirement of cash and distress sale was the main reason for the disposal of animals in a farm level case study conducted in selected villages of Kerala

George and Nair (1990) found that immediate requirement of cash of the family change in family labour availability and death of animal were the important reasons attributed to the decline in the cattle population

2.4 Procurement of dairy animal

Gincy et al (1988) brought out in their farm level case study on cattle holding of Kerala the nature of procurement of dairy animals for herd building and replacement It was observed that herd building and replacements are by purchase and sale by breeding and rearing own stock or a combination of both The predominant pattern in cattle holdings is that one or two cows are kept male crossbred calves are invariably sold and female crossbred calves in excess of the desired stock are also sold

The study also identified three different procedures for herd replacement

1 Some households sell their cows after one lactation and then purchase fresh stock

2 Second system is to keep a cow for a few lactations and then go for a better yielding one

3 Third category farmers who, after initial acquisition starts breeding their own stock of replacement

George and Nair (1990) opined that the poor resource base for raising cattle and its high maintenance cost has resulted in a large majority of farmers in the state depending on the purchase of milch animals for building their milch animal herd

2.5 Housing management

Starr (1981) while signifying the housing needs of livestock has questioned the wisdom of providing shelters in areas that are hot and humid For humid tropics it is suggested that the more suitable system would be to provide access to shade during the warmer part of the day and to leave

the animal in the open after sunset to promote the loss of heat accumulated in the animal body

KAU (1987) has stated that each dairy cow requires a standing space which is kept variable from 1 5 to 1 7 metres and 1 0 to 1 2 metres per animal respectively The inner width of the manger should be a minimum of 75 cm

Regarding housing of cattle Gincy et al (1988) reported that majority of the studied households had only less than ideal shelter basically pole construction with a floor made of mud or of rough wooden planks which is difficult to clean and a thatched roof requiring routine replacement Most of these sheds are small in size and exposed to wind and rain Some of the sheds are attached to houses A minority of the households own a good size brick shelter with a tiled roof

George et al (1990) suggested that correct measurement and hard flooring of the cattle shed as well as proper manger and manure pit will help to reduce the labour in cattle keeping

ICAR (1990) while describing the housing requirement for dairy cattle has recommended a standing space of length 1 5 metres and 1 2 metres width and a manger of width 0 75 metres

Thomas and Sastry (1991) reported that thatched roofgives better thermal comfort to animals than concrete and tiled roofs

2.6 Feeding management

2 6 1 Type of feed resources

Thiagarajan (1984) suggested that sufficient thought should be given for making the feeding part as economical as possible Evolving a feeding system wherein all the locally produced agricultural commodity and their by products were combined with adequate fodder was necessary to ensure economical over all production of milk

Gincy et al (1988) indicated that the universal components of cattle feed fed in the sample households of Kerala were native grass paddy straw and usually a selected oil cake Compounded cattle feed is fed in only a few households Many incorporate rice gruel in the diet during lactation period The roughages fed included green fodder paddy straw and limitedly fodder crops The item of concentrate was groundnut cake and that of compounded feed were OK Milma and Mysore feed The crop residues fed

included leaves stems rhizomes etc while kitchen waste fed included peelings and left over vegetables rice soup etc

Pachuri and Upadhyay (1989) opined that an integrated feeding system following use of range land herbage leguminous shrubs and fortified low quality fodder crops and concentrate can provide balanced diet to milch animals

George and Nair (1990) in their study of livestock economy of Kerala reported that the type of feed resources available to the farmers were roughages concentrates compounded feed crop residues and kitchen wastes

Muraleedharan (1992) studied the feed ingredients fed to calves in the progeny testing areas of Kerala and reported that compounded cattle feed oil cakes grams and peas starchy feeds paddy straw cut fodder and agricultural wastes were the commonly fed items

Bhaskar et al (1994) opined that there is an immediate need for a revolutionary change in the concept of feeding dairy animals The approach should aim at reducing the cost of feeding by way of incorporating concentrates hay straw other agricultural by products molasses etc in a single block as a complete feed for animals

2 6 2 Source of feed and fodder

Gincy et al (1988) reported that the source of concentrates for the studied households were either local shops or milk co operatives whereas that of paddy straw was self produced purchased from fellow farmers or traders who imported straw from neighbouring states

Agarwal et al (1989) revealed that green fodder and dry fodder available to the animals were generally home grown while concentrates were mostly purchased in a study carried out at Karnal

George and Nair (1990) revealed that cattle keeping households of Kerala purchased feeds from four sources viz local market private traders co operative societies and from other farmers Households purchasing green fodder from local market and other farmers were 69 per cent and 31 per cent respectively Twenty five per cent households purchased dry fodder from local market 7 per cent from private shops and 68 per cent from other farmers Concentrates to the tune of 19 per cent households 76 per cent 1 per cent and 4 per cent were purchased from local market private shops co operative societies and other farmers respectively When cattle feed

was purchased by 15 per cent households from local market 66 per cent purchased it from private market 17 per cent from co operative societies and 2 per cent purchased from other farmers

Rajendran and Prabaharan (1992) brought out that 45 83 26 67 and 27 50 per cent of the total households procured concentrates from milk co operative societies private shops and own source respectively In the case of dry fodder 47 5 per cent was purchased from private shops and the rest 52 50 per cent was home grown Green fodder 26 67 per cent households purchased from private shops and 73 33 per cent had home grown fodder

Singh (1994) conducted a study in Punjab and found that the major source of cattle feed supply to the dairymen was the wholesaler/distributor which formed about 41 per cent of the total feed supply

2 6 3 Quantity of materials fed

Nataraju and Channegowda (1986) revealed that as high as 74 per cent of farmers had known about the recommended quantity of concentrates followed by recommended quantity of dry fodder (52%) while it was only 22 7 per cent of dairymen

who had the knowledge about the recommended quantity of green fodder to be fed to cattle

Singh et al (1987) studied the feeds and forages supplemented and their shortage for livestock feeding with small and marginal farmers The average feed supplemented per day per animal by small farmer was 4 2 kg green fodder 0 14 kg concentrate while marginal farmers supplemented 4 94 kg green 2 58 kg dry fodder and 0 1 kg concentrate Scarcity of the dry matter requirement was found to be 69 per cent

Kunju et al (1988) conducted a survey of feeding pattern in buffaloes for different levels of milk production in different milk sheds of Uttar Pradesh and observed that for 3 5 kg milk production the green fodder oil cakes and other by products and concentrates fed ranged from 13 to 28 1 kg 0 75 to 2 55 kg and 0 40 to 2 0 kg respectively For 5 kg and above the green fodders oil cakes and other by products and concentrates fed ranged from 15 0 to 36 8 kg 1 4 to 4 13 kg and 0 8 to 2 1 kg respectively

Agarwal et al (1989) estimated daily milk yield of bovines and their feed availability in rural areas of Karnal The average daily availability of fodder and feed was estimated at 16 2 kg green fodder 4 1 kg dry fodder and

160 g of concentrate during lactation period for a cow whereas during dry period consumed 13 6 kg of green 4 6 kg of dry fodder and 10 g of concentrate

George and Nair (1990) studied the average daily consumption of green fodder roughage and concentrate by different classes of animals Cows in milk were given 9 6 kg green fodder 6 58 kg roughage 1 87 kg concentrate and 1 02 kg compounded feed Pregnant dry cows received 10 4 kg green fodder 5 94 kg roughage 0 89 kg concentrate and 0 38 kg compounded feed Dry cows not pregnant were allotted 13 2 kg green fodder 4 81 kg roughage 1 01 kg concentrate and 0 09 kg compounded feed

Feed allowance for cows in milk was higher followed by dry and pregnant cows pregnant heifers and female calves The estimated total daily consumption of green fodder roughage and concentrate by cattle of different classes indicated that animals in milk received higher quantity of all the feed items

2 6 4 Quantity of nutrients fed to animals

Virk et al (1978) studied the comparison between the utilization of nutrients and the milk production efficiency at different levels of energy intake in Zebu (Sahiwal) and

crossbred (Sahiwal x Brown Swiss) cattle and concluded that providing energy over and above the NRC requirement is not economical at a milk production level of 10 15 kg/head/day

Thiagarajan (1984) revealed that animals lacked feed forage and pasture resources During short periods of nutritional inadequacy the animals strived to maintain milk output at the risk of its body needs the milk yield fell and animals adjusted their yield to the low plane of nutrition After a few generation the structure as well as the performance got itself adjusted to the state of malnutrition

Agarwal and Sharma (1986) studied the feeding practices of bovines in key village and non key village areas around Karnal and found that the nutrients both digestible crude protein (DCP) and total digestible nutrients (TDN) fed to calves were higher than Morrison standards Average DCP and TDN available was more in key village areas than in non key village areas

Singh et al (1987) observed that there was a shortage in the feeding of feeds and fodder to livestock resulting in a dry matter scarcity of 69 per cent

Agarwal et al (1989) observed that a cow on an average consumed 250 g of DCP and 4 1 kg of TDN per day during

lactation period and a cow got 200 g of DCP and 3 6 kg of TDN during dry period The difference in the availability of nutrients between lactating and dry periods were significant for cows A comparison of availability of nutrients with Morisson standards showed that the availability of nutrients was just sufficient for milking cows

Muraleedharan (1992) reported that the overall deficiency of TDN in milking cows was 29 4 per cent in a study in selected areas of Kerala whereas DCP was fed in excess of the requirement in most of the areas studied

2 6 5 Knowledge about feeding

Planning commission report (1972) pointed out the absence of scientific knowledge about feeding of balanced diet among cattle owners

Tripathi (1991) reported that majority of women of both member co operative and non member co operative systems had medium level of knowledge about feeding of concentrates to their dairy animals whereas women of non member co operative system had only a poor knowledge about feeding of green fodder

Rajendran and Prabaharan (1992) revealed that only 26 67 per cent of the sample farmers fed their milch animals

based on the milk production Majority of the households failed to feed the dry animals properly Likewise feeding of pregnant animals also did not receive much attention from the farmers indicating a lack of awareness of scientific feeding of dairy cattle

2 6 6 Rearing of calves

Fink (1980) studied mortality rates in calves aged upto 9 weeks Death rate decreased when the calves were fed three times instead of twice a day

Jenny et al (1981) observed that the mortality rate was lower when the owner or his family were responsible for rearing the calves than hired labour

Umoh (1982) reported that suckled calves survived better than bucket fed calves

George and Nair (1990) studied the calf rearing practices in the cattle holdings in Kerala and revealed that weaning was practised in six per cent of the total number of calves at third month of calving About 7 per cent of the calves were weaned after the middle and late stages of lactation The calves weaned were all crossbred calves born out of artificial inseminations

2.7 Breeding management

Sohi and Kherde (1980) found that the reasons for non adoption of artificial insemination (AI) were risk unprofitability and lack of quality semen

Balasubramaniam and Knight (1982) concluded that poor conception was the most important reason for partial and non adoption of AI Other reasons were easy availability of facilities for natural service (NS) more distance to veterinary hospital and unsuitability of the method in buffaloes

Thiagarajan (1984) opined that there were always a paucity of proven and progeny tested bulls Breeding was invariably done indiscriminately and disposal of unproductive cattle was not prompt As a result the country had a vast cattle population producing lowest per capita milk yield A well knit co ordinated regional and national breeding involving most of the dairy farmers are needed to be effectively implemented

Singh and Singh (1989) revealed that on an average the number of AI services per conception under field conditions was worked out to be 2 6 Cows with longer open period required less services and efforts should be made to reduce the number of services per conception by bringing cows in heat within 4 months after calving

George and Nair (1990) in their study in the cattle keeping households of Kerala found that artificial insemination was practised in 42 per cent of the houses In 24 per cent of the cows natural service was practised and for the remaining 34 per cent the breeding practise was not known The age at first calving lactation length dry period and calving interval were 33 30 months 11 26 months 5 64 months and 16 89 months respectively

Gopakumar (1992) conducted a field study in the progeny testing areas of Kerala and found that the number of AI services for conception was 2 6 The age at first calving service period and calving interval were 43 7 months 7 8 months and 16 7 months respectively

Rajendran and Prabaharan (1992) in their study in Dharmapuri district of Tamil Nadu found that the percentage of adoption of artificial insemination and natural service were 85 53 and 14 47 respectively revealing the overwhelming response of modern techniques for breeding Poor conception rate and long distance to the AI centre were the reasons for non adoption of AI

Bhaskar et al (1994) pointed out that on an average the number of AI per conception was 2 36 in a study carried

out at Bangalore The mean service period was 163 2 days and the calving interval was 439 2 days

2 7 1 Knowledge about breeding

Dubey and Singh (1976) found that 93 per cent of the crossbred cattle owners were not aware of oestrous cycle and 71 per cent about the right time of insemination in dairy animals

Rath (1977) observed that 88 per cent and 12 per cent of farmers possessed medium and high level of knowledge respectively about the breeding practices

Nataraju and Channegowda (1986) revealed that 80 per cent of the dairymen were familiar with improved milch breedsand artificial insemination

2.8 Health care management

Disease Surveillance Report (1986) showed that nearly 19 per cent of cattle were affected by parasitism resulting in a loss of 10 per cent productivity annually 28 per cent of cattle were affected by mastitis and 6 per cent by reproductive disorders resulting in 13 per cent of production loss per year in Kerala

Regarding health care of animals Gincy et al (1988) reported that the basic pattern was that farmers first tried home treatment When this was not successful the veterinary hospital is approached Availing the service of the veterinary hospital in the first instance was not relied upon perhaps because the hospital was far off Also bringing the veterinarian to the farmer s doorstep was expensive

Singh et al (1989) studied the age specific economic losses due to diseases in livestock under field conditions and found that haemorrhagic septicaemia caused maximum loss in adult animals of 3 to 6 years age group followed by 1 to 3 years age group Foot and mouth disease (FMD) caused maximum loss in animals above 6 years age group followed by animals in 3 to 6 years age group The economic loss in cattle and buffaloes were maximum in animals below one year of age

Singh and Thomas (1992) found that the important constraints faced by farmers in dairy farming pertained to veterinary aid in emergency at doorstep problem of longer distance of stockman centre and veterinary hospital

Bhaskar et al (1994) in a study in Bangalore revealed that majority of the farmers neglected preventive health care measures like regular vaccinations deworming and control of external parasites Other important aspects neglected by

farmers were neonatal care of calves mastitis control measures and post partam health management

Anthony (1994) in a field study in Kerala observed that all dairymen dewormed their calves in the first month in the second month 89 per cent of female and 68 per cent of male calves were dewormed In the third month 81 per cent of females and 68 per cent of male calves were dewormed In the fourth month 12 per cent female calves were dewormed and no male calves received deworming drugs

2 8 1 Knowledge about health care

Kapse (1976) found that among cattle owners knowledge level about health care was lower as compared to their knowledge about feeding and management practises of dairy animals

Garde (1980) and Gite (1980) observed that villagers lacked in the systematic knowledge of diseases of livestock

George and Nair (1990) opined that there was a high degree of awareness among farmers regarding veterinary care While vaccinations were carried out by both livestock inspectors and veterinary doctors for treatment purposes doctors were approached both at home and in the hospitals

2.9 Milk production, consumption and disposal

2 9 1 Milk production

Agarwal et al (1989) revealed that the average daily milk yield per day of lactation under rural management conditions was 3 06 kg for cows and 3 74 kg for buffaloes from a survey conducted during 1977 79 around Karnal

Kaur and Gill (1989) found that the overall average milk production was 14 57 litres per day in the rural areas of Ludhiana

Singh and Roy (1990) revealed that the average milk production per milch animal was higher (4 13 kg) in the organised sector than the unorganised sector (2 92 kg)

Gopakumar (1992) pointed out that the average standard lactation milk yield of the crossbred was reported as 2427 kg among cows reared in the KLDB farms and 1726 kg among cows raised by farmers in the field conditions of Kerala

Tripathi and Kunzru (1994) found that the average milk production among the members of dairy co operative system was 5 55 litres per day compared to 3 29 litres per day in non member co operative system in Bareilly

2 9 2 Home consumption of milk

Prabaharan and Sivaselvam (1986) conducted a study in Chengalpattu district in Tamil Nadu and revealed that milk consumption increased with increase in size of landholdings Ram et al (1973) also found that per capita consumption of milk increased with increase in size of holding

George and Nair (1990) observed that out of the total daily milk production in Kerala about 37 per cent of the milk was consumed at home and only 63 per cent was sold The percentage of milk production retained for home consumption increased with the size of holding

Gupta (1992) reported that 32 per cent of the milk produced by the dairymen is consumed by them as such or in the form of curd and ghee

Goswami (1994) studied the consumption pattern of milk and milk products among different income groups in Shillong town of Meghalaya district and found that above rupees four thousand income group consumed most milk and the lowest consumption was by the low income group

Shah and Sharma (1994) observed that the percentage of milk consumed as fluid milk decreased with the increase in household category while the percentage of milk converted into products increased with the increase in household category

Tripathi and Kunzru (1994) observed that a major portion of the milk produced by the farmers of non milk co operatives was consumed at home in liquid and product form Similar results were also reported by Patel et al (1984) and Gangwar et al (1989)

2 9 3 Milk disposal

Arora and Kumar (1981) conducted a study on market structure and marketable surplus of milk in Meerut district of Uttar Pradesh They pointed out that structural changes are taking place in the milk marketing system mainly due to the introduction of dairy development programme of AMUL model The co operative network was not only able to benefit milk producers but was also able to safeguard the interests of milk consumers

Bal et al (1982) revealed that there existed a large surplus of milk on the farm holdings of Punjab state which can be tapped for the market by improving the existing market and providing remunerative prices to the milk producers

Gajja and Vyas (1984) in their study on the cost structure of milk marketing in the co operative sector revealed that the price paid to the producer formed a large share in the total cost of milk processing

Kaur and Gill (1989) conducted a study in Ludhiana and reported high disposal of milk in this area may probably be due to high milk production

Gupta (1992) in a study observed that the commercial milk producer households sell 62 68 per cent of milk to individual consumers milk men and milk plants

Tripathi and Kunzru (1994) reported that all members of milk co operatives were selling milk to dairy co operatives whereas most of the non members were selling liquid milk to middle man and products directly to consumers in the town market According to farmer s category small farmers were selling large quantity of milk than medium and large farmers Similar results were also observed by Patel et al (1984) and Gangwar et al (1989)

2.10 Division of labour in dairying

Achanta (1982) reported that in many places the entire management of livestock starting from cutting collection carrying and chaffing of fodder feeding milking preparation of milk products cleaning of shed and collection of urine and dung for the manure pit was all done by women

Bhatnagar (1982) reported that apart from work in home and farm rural women were also responsible for taking care of cattle They collected fodder for their animals from distant places Other related activities done by rural women were cleaning of cattle and cattle shed feeding of animals and milking

George et al (1990) in their study of the cattle keeping households of Kerala observed that on the whole the participation of women in dairying activities was slightly higher than male In the maintenance of cattle there was very little use of hired labour

Singh and Rani (1991) found that the female labour absorption was higher than males and children put together in almost all dairy operations

Singh and Sharma (1991) studied the level of participation of females of hills and plains in livestock rearing The level of hill women s participation was reported higher It was also reported that the level of female and male participation in the plains in livestock rearing was statistically at par

2.11 Economics of milk production

Rao (1986) studied the economic analysis of milk production in cows and found that the net cost of maintenance per year was highest for big farms and lowest for marginal farms The returns from milk is highest on big farm and lowest in marginal farm The rate of profit was highest on big farms (27%) and lowest in medium farm

Singh et al (1986) studied the relative contributions of different factors contributing to the cost of milk production They found that feeds and fodders formed the major components of the gross cost of production followed by labour interest on fixed capital depreciation on animals miscellaneous recurring expenditure and veterinary and AI costs Sardiwal (1974) Ram and Singh (1975) Reddy et al (1980) studied the economics of milk production with cattle in different parts of the country and recorded a similar trend

Vashist and Katia (1988) studied the economics of milk production in different species and found that the cost of production was the least in crossbred cows followed by Murrah buffaloes local cows and local buffaloes Similar results were also observed by Ram et al (1974) Acharya and Pawar (1980) Reddy and Mathur (1980) and Singh and Yadav (1982)

Gangwar et al (1989) pointed out that the net returns per litre of milk was highest (Re 0 52) on the small farms followed by medium (Re 0 46) and large farms (Re 0 09)

Sharma and Rajpali (1989) revealed that feeding expenditure on various items and human labour have emerged as major factors influencing economics of milk production Concentrate was the principal factor affecting returns from milk in the semi urban dairy units

Singh and Roy (1990) conducted a comparative study of the cost of milk production in organised and unorganised sector and found that the overall average annual income per animal was higher (Rs 5385 21) on organised sector than that of unorganised sector The overall average return per rupee per milch animal per day was 1 34 in organised sector and Rs 1 19 in unorganised sector Overall average milk production per animal per day was higher on member group than that of non member

Mattigatti et al (1990) undertook a study in Dharwad district to estimate the cost and returns of milk production and found that the cost per litre of milk production was lower in the unorganised sector as compared to organised sector But the returns per litre of milk was higher for organised sector because they received a higher price for milk than non

members Feed cost formed the major component in both the sectors

Goswami and Rao (1992) observed that the total cost of production of milk was highest in large farms and lowest in marginal farms Higher cost of milk production in medium and large farms was due to the rearing of improved breeds of cattle and adoption of better management practices Milk yield was highest in large farms Net income from lactation was lowest in marginal farms and highest in large farms Cost of production of one litre of milk was lowest in large farms (Rs 2 46) and highest in marginal farms (Rs 2 92) The input output ratio was 1 1 37 in marginal farms (lowest) and 1 1 62 (highest) in large farms Thus the cost of milk production per litre showed a decreasing trend and the input output ratio showed an increasing trend as the farm size increased Similar results were also observed by Kumar and Gupta (1988) and Mahanta et al (1988)

Tripathi and Kunzru (1994) reported that the average milk production among the members of the organised sector was 5 55 litres per day compared to 3 29 litres per day in the unorganised sector

2.12 Disposal of cows

Chikkara and Balaine (1977) investigated the culling pattern of cows and found that low milk production old age and reproductive disorders were the important reasons for disposal of cows The results agreed with that of Fosgate (1965) White and Nicholas (1965) Van Vleck and Norman (1972)

Arya and Nadkarni (1987) opined that the major reason for disposal of animals in Punjab was financial consideration accounting for 49 and 58 per cent of disposals in the two areas under study Shortage of fodder and gifting of animals were the other prominent reasons

Gincy et al (1988) revealed that immediate requirement of cash and distress sale was the main reason for the disposal of animals in a farm level case study conducted in selected villages of Kerala

Reddy and Nagarcenkar (1989) studying the disposal pattern of cows in different herds revealed that 81 per cent of the cow disposals were through culling and 91 per cent through deaths Main reason for culling of cows were found to be low production poor reproduction and udder problems which accounted for 28 88 18 46 and 11 98 per cent of the total culling respectively Senility and diseases and other

inabilities accounted for about 13 per cent of the wastage in pooled data

George and Nair (1990) found that immediate cash requirement of the family was the most important reason responsible for 42 per cent of the sales and change in the family labour availability was the next important reason attributed in 27 per cent of the sales Shortage of feeding material and uneconomic nature of cattle keeping were the other important reasons for the disposal of animals

2.13 Constraints in dairying

Jothiraj (1974) pointed out that high cost of cattle feed was the main reason for non adoption of feeding commercial feeds

Sohi and Kherde (1980) found that the reasons for non adoption of AI were risk unprofitability and lack of quality semen High cost was the reason for non adoption of commercial cattle feed Major reason for poor management was higher capital investment

Balasubramaniam and Knight (1982) concluded that poor conception was the most important reason for partial and non adoption of AI Other reasons were easy availability of facilities for natural service more distance to veterinary hospital and unsuitability of the method in buffaloes The

reason for non adoption of feeding commercial cattle feed was high cost Non adoption of green fodder production was due to limited farm size lack of income and non availability of water for irrigation Non adoption of the practise of vaccination was due to the availability of ayurvedic and local medicines scarcity of vaccines at proper time and non relevance of disease

Bhoite and Shinde (1987) opined that the major constraint in respect of breeding was non availability of crossbred cattle in local market followed by high breeding charges inadequate knowledge of AI costly treatment of repeat breeders and unavailability of timely AI facilities High cost of feeds and fodders inadequate knowledge of scientific animal management shortage of capital and low price of milk were the most serious constraints to successful dairy enterprise

Malik and Patel (1987) in their study observed that the rearing of only small herds of cattle by landless producers was due to inaccessibility both socially and economically to bulk fodder and crop residues lack of funds for purchase of animals and inadequate space for housing the animals

Gincy et al (1988) revealed that lack of finance to buy and maintain cattle was found to be the most important constraint Non availability of family labour non availability of credit and high feed cost were the other constraints As regard to health care high cost of veterinary service and medicines were serious constraints

George and Nair (1990) found that shortage of land non availability of family labour inadequate facilities for growing fodder and non availability of credit were the most important constraints faced by dairy farmers

Singh and Thomas (1992) found that the important constraints faced by farmers in dairy farming pertained to veterinary aid in emergency at doorstep problem of longer distance of stockman centre and veterinary hospital and lack of finance

Sharma et al (1994) conducted a study in 9 villages of Bhiwani district of Haryana and revealed that non availability of separate manger and water trough for animals lack of marketing facilities for milk non availability of green fodder through out the year and lack of fresh and clean water for animals were the major constraints felt by the farmers of the area

Materials and Methods

MATERIALS AND METHODS

The materials and methods employed in this study are furnished under four major sections

* Research setting
* Sampling design
* Data collection and analysis
* Concepts and definitions used

3.1 Research setting

3 1 1 The state

The state of Kerala is located on the southern tip of India It lies between 8°18 N 12°48 N 74°52 E and 77°22 E covering an area of 38 855 sq kms It has a coastline of 580 km along the Arabian sea in the west The Western ghats make the dominant topography of eastern Kerala and 56 per cent of the total area of the state is covered by Western ghats Topographically the state is divided into three regions viz costal lowlands interior midlands and eastern highlands Of late the state has been declared fully literate

The performance of agriculture sector in the state is largely influenced by climatic conditions of which rain is the

most important factor There are two distinct rainfall seasons the South West monsoon (June to mid August) and the North East monsoon (September to November) The dry season from January to April is the most critical period of the year for the cultivation of crops and fodder The average annual rainfall is approximately 3000 mm the North and the highlands getting above average and the southern part getting below average

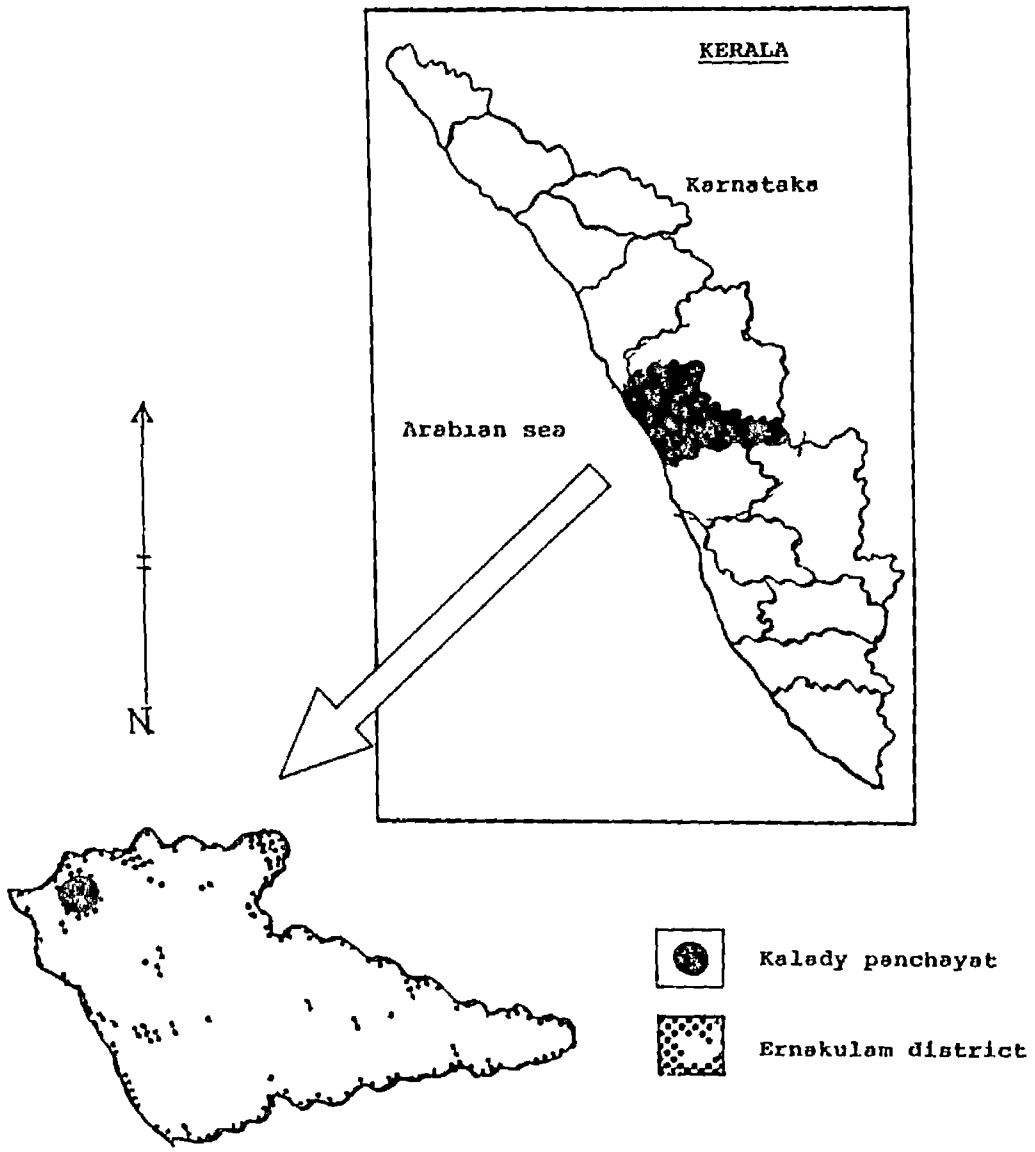
Animal husbandry is a common activity throughout the state of Kerala Livestock census 1987 enumerated 34 24 lakhs cattle 3 29 lakhs buffalo 15 81 lakhs goats and 17 09 lakhs fowls indicating that cattle holding is the most important animal husbandry activity While the need for animal draught power is continuously decreasing a shift towards intensified dairying has taken place during the last two decades The number of both bullocks and he buffaloes decreased by 32 per cent from 1961 to 1982 thus reflecting the diminishing demand for animal draft power On the other hand during the same period population of female cattle increased by 37 per cent and she buffalo by 16 per cent The increase in milk production has increased from 2 21 lakh MT in 1964 65 to 18 89 lakh MT in 1992 93 The per capita availability of milk for the corresponding period increased from 33 g/day to 175 g/day

3.1.2 The District

Ernakulam district is bounded by 30 km. of coast line of the Arabian Sea on the west, Kottayam and Alappuzha districts on the south, Idukki on the east and Trichur on the north. It measures 38 km. north south and 48 km. east-west, between latitude 9°42'38" to 10°18'00" north and longitude 76°12'00" to 76°46'00" east. The area is 2407 sq.km. which is roughly 6.19 per cent of the total area of the state. The district now ranks eighth in size in the state. The district can be divided into three natural divisions, the highland, the midland and the lowland region. The district has a tropical humid climate with almost uniform temperature throughout the year. The total annual rainfall per year in the district is more or less the same as the total average rainfall per year in the state.

According to the 1991 census the total human population of the district is 2,817,236 out of which 1,408,649 are males and 1,408,587 are females. Livestock census 1987 enumerated 323854 cattle, 18507 buffalo, 116382 goat, 944 sheep and 15900 pigs in the district. The district comprises 15 Community Development Blocks.

Fig 1 Location of the study area in Ernakulam district



3 1 3 Panchayat

Kalady panchayat comes under Angamaly Community Development Block and is located 6 miles east of Aluva town in the northern bank of Periyar river (Fig 1) The panchayat has an area of 16 44 sq kms and a human population of 24 707 This panchayat was purposefully selected for the study since this is the area of operation of the People s Dairy Development Project (PDDP) a voluntary organisation and the Anand pattern co operative milk societies (APCOS)

3.2 Sampling design

The panchayat consist of 2 villages viz Matoor and Kalady Three major co operative societies are functioning here which have dairy farmer co operaters drawn from 10 wards out of a total of 11 wards With the help of member co operaters of these milk co operative societies and other key informants a list of dairy farmers owning cows in milk during the period of study was prepared Nevertheless this list of milk producers included both members of milk co operative societies and nonmembers From this sample frame a sample of 100 households was drawn using Tippett s random number table

3.3 Data collection and analysis

The study was carried out from September 1994 to May 1995 Each of the household was visited three times on successive months The required data was collected from the households by direct observation and personal interview supported by a structured and pre tested schedule Appendix I)

The information on socio economic characteristics and livestock position was obtained as on the date of interview Information relating to husbandry practices like procurement and disposal of animals housing feeding breeding health care labour and other expenses and details of cash farm income from milk dung etc were collected The milk yield was recorded both in the morning and evening once in thirty days and the total lactation yield was estimated as per Deb et al 1994

Using the data collected the cost of milk production was calculated for each cow in terms of net cost of maintenance of a cow for every 1 kg of milk she produced

3.4 Concepts and definitions used

3 4 1 Fixed cost

Fixed costs consisted of depreciation on animals sheds equipments and interest on the value of animals and assets (fixed capital) relating to milk production and taxes and insurance if any paid

The depreciation on cattle shed was charge fixed at the rate of 2 per cent per annum for pucca and 5 per cent per annum for kutcha sheds (Grover et al 1992)

The depreciation on milch cattle was computed by the straight line method as per Grover et al 1992

The interest on the owned fixed capital comprising the value of cattle sheds milch cattle and equipments was worked out at a fixed rate of 12 per cent per annum which is the rate at which farm loans are available from banks while the interest on the capital borrowed for the purchase of fixed assets were taken as the actual payments made by the respondents

The interest on working capital was not computed as there was regular income flow from the milk which was utilized for the working expenses

3 4 2 Operational cost/variable cost

Operational cost consisted of feed cost labour veterinary and breeding charges and other miscellaneous expenses

The value of purchased feed was recorded as reported by the respondents whereas farm produced feeds were evaluated at the prevailing market prices of the selected villages

The value of hired labour was recorded as reported by the respondents while the family labour value was calculated at the prevailing wage rate of casual labour in the study area Veterinary charges include the fee paid to technician towards insemination and expenses incurred in purchasing medicines The actual cost incurred by the farmer in connection with the treatment or connected activities are also included in veterinary charges

3 4 3 Total cost

This included the fixed cost as well as operational cost

3 4 4 Net cost

The net cost was worked out by deducting from the total cost the value of dung and empty feed bags

3 4 5 Gross income

Gross income include income from milk produced dung and empty gunny feed bags

An adult cow excretes on an average about 20 kg of wet dung daily (Reddy et al 1972) The inome from manure was calculated as reported by the respondents whereas in households were dung is not sold the prevalent market rate was considered The price of gunny bags were taken as the average price that prevailed in the market at the time of study The general practice is that male calves are weaned at birth or immediately after birth and disposed of Females are either reared for sale at a certain age or to be retained as replacement stock for which farmers had to invest first On the assumption that the income from the calf would be more or less equal to the expenditure over their raising none of these factors were taken into account while calculating economics of milk production from a cow (Singh et al 1986)

RESULTS

The results on the findings of this study are presented in this chapter The socio economic characteristics of households animal husbandry practices followed disposal of milk economics of milk production and the constraints in dairying faced by the farmers are presented

The location of the study and the number of households selected were as shown in Table 1 In all hundred sample households engaged in dairying were selected Out of this 36 per cent households were members in milk co operative societies and the remaining (64%) were non members All these households belonged to two villages viz Matoor and Kalady in Kalady panchayat

Table 1 Number of households studied n Kalady panchayat

n 100

Sl No	Name of village	Organised sector (Members)	Unorganised sector (Non members)	Total
1	Matoor	13	11	24
2	Kalady	23	53	76
	Total	36	6	100

4.1 Socio-economic characteristics of households studied

4 1 1 Age of head of family

The distribution of the respondents based on age is given in Table 2

Table 2 Distribution of households according to the age of head of family

n 100

Sl No	Age group (yrs)	Number of households (f)	Percent to total
1	<44	41	41
2	44 60	48	48
3	>60	11	11
	Total	100	100

Majority of the dairymen (48%) belonged to the age group 44 to 60 Forty one per cent were less than 44 years and the remaining eleven per cent were above 60 years of age

4 1 2 Occupation of head of family

Table 3 revealed that majority (47%) of the respondents were engaged in agriculture Eighteen per cent were daily wage labourers both agricultural and non agricultural thirteen

per cent were service personnel (government and private) and 13 per cent were engaged in animal husbandry The rest of the respondents (9%) were running their own business

Table 3 Distribution of households according to occupation of the head of family

n - 100

Sl No	Occupation	Number of households	Percent to total
1	Agriculture	47	47
2	Wage labourer (Agriculture & non agriculture)	18	18
3	Animal husbandry	13	13
4	Service	13	13
5	Business	9	9

4 1 3 Experience in dairying

It can be seen from Table 4 that more than half of the studied households (52%) had 10 to 20 years experience in dairying Twenty five per cent of the households had more than twenty years of experience whereas 23 per cent of households had only less than 10 years experience

Table 4 Distribution of households according to experience in dairying

n - 100

Sl No	Experience	Number of households	Percent to total
1	<10 years	23	23
2	10 20 years	52	52
3	>20 years	25	25
	Total	100	100

4 1 4 Land holding

For the purpose of the present study the households were categorised (Table 5) on the basis of the size of land

Table 5 Distribution of households according to family land holding

n 100

Sl No	Land holding	Category of holdings	Number of households	Percent to total
1	<1 acre	Marginal	69	69
2	1 2 acres	Small	20	20
3	>2 acres	Medium	11	11

holding as marginal holdings (<1 acre) small holdings (1 2 acres) and medium holdings (>2 acres) Among the studied households 69 per cent households possessed marginal holdings 20 per cent households possessed small holdings and 11 per cent possessed medium holdings The land holding ranged from 0 04 acres to 4 16 acres with a mean of 85 95 ± 10 39 cents

4 1 5 Livestock holdings

The livestock holding of 100 households were studied (Table 6) It shows that all the households studied had cows in milk Majority (75%) of the houses had calves Twenty one per cent of the houses had heifers and only 10 per cent of the households had dry animals Three households had bullocks which were mainly used for ploughing paddy fields

Only 7 0 per cent of the houses possessed buffaloes in milk 6 0 per cent houses had buffalo heifers and 2 0 per cent households each had buffalo calves and bullocks Only one house had a dry buffalo

Twenty per cent of the houses owned goats in milk and 8 0 per cent households each owned dry goats and kids Out of the 117 milch cows studied 68 38 per cent were kept in the marginal holdings 19 66 per cent in the small holdings and 11 96 per cent in the medium holdings

Table 6 Livestock holding of the studied households

Sl No	Category	Number of households (100)	Per cent
A	**Cattle**		
1	In milk	100	100
2	Dry	10	10
3	Heifer	21	21
4	Calf	75	75
5	Bullock	3	3
B	**Buffalo**		
1	In milk	7	7
2	Dry	1	1
3	Heifer	6	6
4	Calf	2	2
5	Bullock	2	2
C	**Goat**		
1	In milk	20	20
2	Dry	8	8
3	Kid	8	8

4.2 Trend of herd strength pattern

The trend of herd strength pattern was studied (Table 7) In the base year (1990) there were 114 milch cows in the marginal holdings 40 milch cows in the small holdings and 22 milch cows in the medium holdings as against 80 25 and 15 milch cows in the respective holdings during the reference year (1995) This clearly illustrated a substantial reduction in herd strength The trend observed was a reduction of 29 82 per cent 37 50 per cent and 31 82 per cent respectively in marginal small and medium holdings

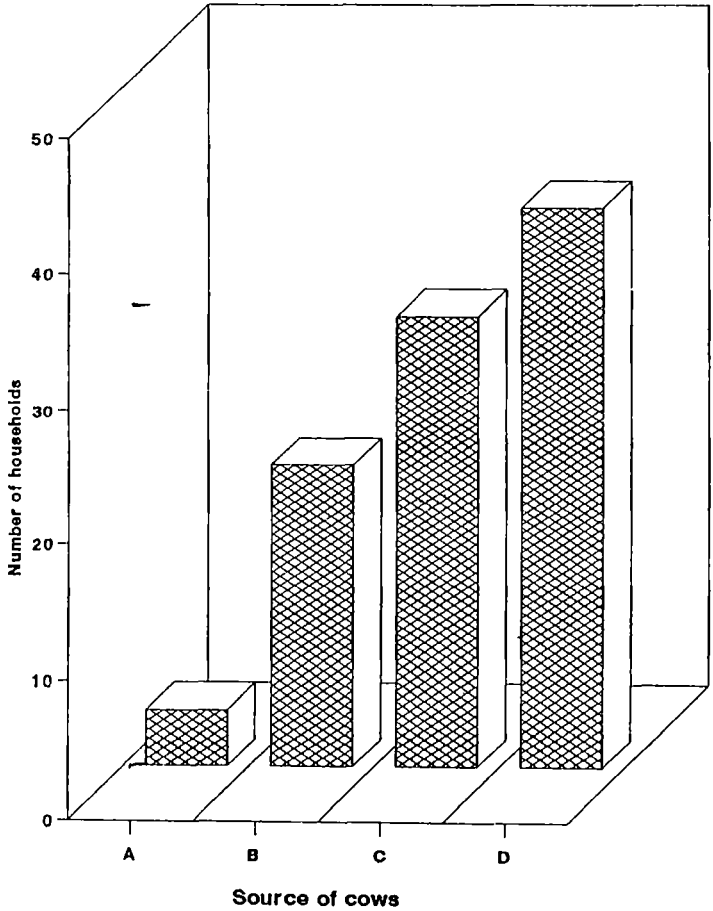
Table 7 Trend of Herd strength pattern

n 100

Category	No of milch animals		% change
	1990	1995	
Marginal holdings (n 69)	114	80	29 82
Small holdings (n 20)	40	25	37 50
Medium holdings (n-11)	22	15	31 82

Figures in parenthesis denotes the number of households in each category of holdings

Fig 2 SOURCE OF PROCUREMENT OF COWS



A - Own farm and shandies

B - Purchased from other farmers

C - Own farms

D - Own farms and purchased from other farmers

4.3 Procurement of cows

The major source of procurement of cows is presented in Table 8 and Fig 2 Majority of farmers raised their own replacement stock Purchase from other farmers and shandies were the other main sources for procurement of milch cows

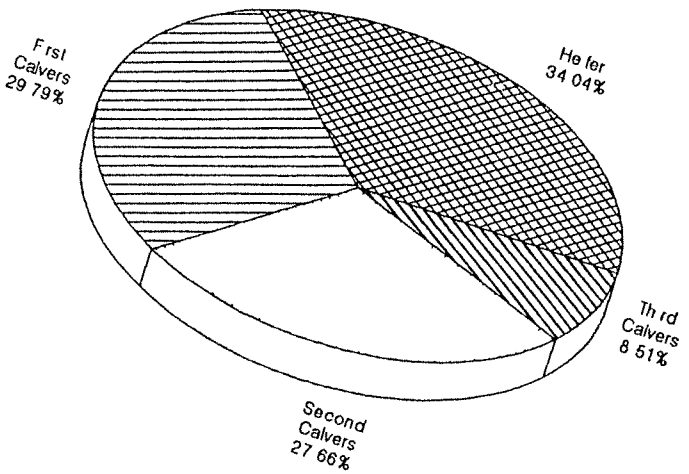
Table 8 Source of procurement of cows

n 100

Sl No	Source	Number of households	Per cent to total
1	Own farms	33	33
2	Purchased from other farmers	22	22
3	Own farms and purchased from other farmers	41	41
4	Shandies		
5	Own farm and shandies	4	4
	Total	100	100

It can be observed that 33 per cent of the dairymen raised their own replacements Forty one per cent of farmers raised their own animals as well as bought animals from their fellow farmers whereas 22 per cent of the farmers mainly purchased animals from other farmers Only a few dairymen

Fig 3 STAGE OF COWS AT THE TIME OF PURCHASE



(4 0%) procured their animals from shandies or raised their own stock It was observed that none of the dairymen purchased cows exclusively from shandies

4 3 1 Stage of cows at the time of purchase

The cows were either purchased as heifers first calvers second calvers or third calvers The stage of cows at the time of purchase is given in Table 9 and Fig 3

Table 9 Stage of cows at the time of purchase

n 47

Sl No	Stage	Number of cows purchased			Total	%
		Marginal holdings	Small holdings	Medium holdings		
1	Heifer	12	3	1	16	34 04
2	First parity/ calvers	10	2	2	14	29 79
3	Second parity/ calvers	12		1	13	27 66
4	Third parity/ calvers	4			4	8 51
	Total	38	5	4	47 (100)	

From the table and figure it can be observed that majority of the cows were purchased at heifer stage (34 04%)

This was closely followed by cows of first parity (29 79%) and cows of second parity (27 66%) Only 8 51 per cent of cows were purchased at third parity The cost of the animals at the time of purchase varied from Rs 2000 to 9000 with a mean cost of Rs 5673 59 ± 134 40 The age of cows at purchase varied from 1 5 to 8 years with a mean age of 4 38 ± 0 271 years

4 3 2 Selection attributes

The selection attributes that were looked into while purchasing cows by the dairymen studied are presented in Table 10 It could be seen that the basic attributes emphasized were milk production appearance and conformation colour and temperament Some of these factors were looked alone or looked together while making selection The criteria milk production appearance and conformation were looked into by 36 per cent households followed by appearance and conformation (18%) milk production (16%) milk production appearance and conformation temperament (13%) milk production and temperament (10%) and milk production and colour (7%)

Table 10 Selection attributes of cows followed by the households

n 100

Sl No	Attributes	Number of households (f)	Percent to total
1	Milk production	16	16
2	Appearance and conformation	18	18
3	Milk production appearance and conformation	36	36
4	Milk production and colour	7	7
5	Milk production and temperament	10	10
6	Milk production appearance and conformation temperament	13	13

4.4 Housing

All the studied households were having cattle sheds The major types of cattle sheds seen in the households are depicted in Table 11

The table reveals that a majority (59%) of the households had pucca cattle sheds and the remaining 41 per cent had only kutcha cattle sheds Among the pucca cattle sheds 31 per cent were independent and 28 per cent were lean to type Among the kutcha cattle sheds 6 per cent was independent and 35 per cent were lean to type In the aggregate there were 37 per cent independent cattle sheds and 63 per cent lean to type cattle sheds

Table 11 Type of cattle shed and nature of floor

n = 100

Sl No	Type of cattle shed	Independent	Lean-to-type	Total	Nature of floor			Total
					Slopping	Levelled	Uneven	
1	Pucca	31	28	59	31 (31 0)	20 (20 0)	8 (8 0)	59
2	Kutcha	6	35	41	8 (8)	16 (16 0)	17 (17 0)	41
Total		37 (37 0)	63 (63 0)	100	39 (39 0)	36 (36 0)	25 (25 0)	100

Figures in parenthesis shows percentage to total

Table 12 Sub type of cattle sheds in the studied households

n 100

Sl No	Type of cattle shed		Number of households (f)	Per cent to total	Rank order
Pucca					
a	Independent				
1	tiled roof	mud floor	1	1 0	IX
2	tiled roof	stone paved floor	4	4 0	VI
3	tiled roof	concrete floor	19	19 0	II
4	concrete roof	concrete floor	3	3 0	VII
5	concrete roof	stone paved floor	4	4 0	VI
b	Lean to type				
1	tiled roof	stone paved floor	8	8 0	IV
2	tiled roof	mud floor	12	12 0	III
3	tiled roof	concrete floor	8	8 0	IV
Kutcha					
a	Independent				
1	thatched roof	mud floor	3	3 0	VII
2	thatched roof	stone paved floor	2	2 0	VIII
3	thatched roof	concrete floor	1	1 0	IX
b	Lean to type				
1	thatched roof	concrete floor	8	8 0	IV
2	thatched roof	mud floor	7	7 0	V
3	thatched roof	stone paved floor	20	20 0	I

Out of the cattle sheds 39 0 per cent had slopping floors 36 0 per cent had levelled floors and twenty five per cent had uneven floors

The subtypes of the cattle sheds are presented in Table 12 They are ranked according to the number of each subtypes of cattle shed in the studied households It could be seen that the most common (20%) subtype of cattle shed was the one kutcha lean to type with thatched roof and stone paved floor This was closely followed by pucca independent with tiled roof and concrete floor (19%) The least common subtype of cattle sheds was found to be the pucca independent with tiled roof and mud floor (1%) and kutcha independent with thatched roof and concrete floor (1%)

4.5 Washing

All the households studied washed their animals daily It was noted that all of them washed the animals using well water No other source of water such as ponds canals etc were reported

4 6 Feeding

The type of feed resources available to the farmers are compounded feed concentrates roughages and crop by products and residues The main items fed under each category are given in Table 13

Table 13 Types of feed resources for animals

Sl No	Category	Items fed
1	Compounded feed	Commercial brands like KS Prima and Godrej
2	Concentrates	Groundnut groundnut cake coconut cake gingelly cake rice and wheat gruel
3	Roughages	Straw cultivated green fodder grass shrubs and weeds
4	Crop by products and residues	Rice bran wheat bran maize bran tamarind seed cotton seed leaves stems and rhizomes

A perusal of the table showed that the farmers fed commercial brands of compounded cattle feeds like K S Prima and Godrej Groundnuts groundnut cake coconut cake gingelly cake rice and wheat gruel are the commonly fed concentrates Straw cultivated green fodder grass shrubs and weeds were the main sources of roughages available to the livestock The common crop by products and residues available included rice bran wheat bran tamarind seed cotton seed leaves stems and rhizomes

4 6 1 Source of feeds and fodders

Major source of feeds and fodders is presented in Table 14 The sample households purchased feed stuffs mainly from local shops and milk co operatives

Table 14 Major source of feeds and fodder

Sl No	Feed items	Source of feeds and fodder					
		Feed		Fodder			
		Purchase from local shops/ markets	Milk co operatives	Cultivated		Collected	Grazing
				Self sufficient	Not self sufficient		
1	Compounded cattle feed	64	36	-	-	-	-
2	Concentrates	100		-	-	-	-
3	Green fodder	-		-	14	100	44
4	Paddy straw	68	-	5	27		-

The table illustrated that 64 0 per cent of the households purchased compounded cattle feed from local shops and 36 0 per cent from milk co operatives All the studied households had to depend on local shops for the purchase of concentrates None of the households studied purchased green forages Eventhough 14 0 per cent of the households cultivated grass in small areas of land it was not sufficient Bulk of the green fodder used was in the form of grass and fodder collected from field bunds and other agricultural lands Grazing was practised in 44 0 per cent households Paddy was purchased by a majority of farmers (68%) from local markets Eventhough 32 0 per cent of the households cultivated paddy only a meagre (5%) proportion of the households were self sufficient in straw

4 6 2 Quantity of feed materials fed

The quantity of feed materials fed to the animals were studied (Table 15) The estimated total daily consumption of compounded cattle feed in the households ranged from 1 6 kg with a mean of 3 32 ± 0 98 kg Concentrates like coconut cake groundnut cake cotton seed cake tamarind seed etc were fed in quantities up to 3 0 kg 2 0 kg 1 0 kg and 1 5 kg respectively with corresponding mean values of 1 36 ± 0 11 kg 1 14 ± 0 17 kg 1 kg and 1 ± 0 20 kg Coconut cake was the most important item of concentrate fed The feeding of other items was not widespread Rice gruel and wheat gruel were fed up to

Table 15 Quantity of feed materials feed to cows

Materials fed		Range (kg)	Mean (kg)	SE
A	Compounded feed	1 6	3 32	±0 98
B	Concentrates			
	Coconut cake	0 3	1 36	±0 11
	Groundnut cake	0 2	1 14	±0 17
	Gingelly cake	0 0 3	0 3	
	Cotton seed cake	0 1	1 0	
	Tamarind seed	0 1 5	1 0	+0 20
	Rice gruel	0 2	1 12	±0 06
	Wheat gruel	0 0 5	0 5	
C	Roughages			
	Green grass	7 20	10 13	±0 24
	Paddy straw	1 5	2 88	±1 13
D	Crop by products and residues			
	Rice bran	0 4	2 02	+0 18
	Wheat bran	0 4	2 07	±0 12
	Maize bran	0 4	1 97	±0 28

2 0 kg and 0 5 kg respectively The average quantity fed was 1 12 ± 0 06 kg in the case of rice gruel and 0 5 kg in the case of wheat gruel The crop by products like rice bran wheat bran and maize bran were fed up to 4 0 kg each with corresponding averages of 2 02 ± 0 18 kg 2 07 ± 0 12 kg and 1 97 ± 0 28 kg The quantity of green fodder fed to animals ranged from 7 20 kg with a mean of 10 13 ± 0 24 kg Paddy straw fed to animals ranged from 1 5 kg with a mean of 2 88 ± 0 13 kg

4 6 3 Proportion of farmers providing concentrate feed ingredients

Table 16 shows the proportion of different concentrate ingredients fed to cows during milch and dry periods

It was observed that compounded feed was the only item fed to milch cows in all the households studied But only 55 0 per cent of these farmers fed the item both during milk and dry periods rest of the farmers (45 0%) did not feed the item to animals during dry periods Out of the 35 0 per cent households which fed coconut cake during milk only 14 29 per cent fed during both milk and dry periods the rest (85 71%) did not feed when dry Gingelly cake cotton seed cake and groundnuts were fed in a single house each during milch period Groundnut cake was fed during milch period by 9 0 per cent of the households None of them was found feeding this ingredient either both

Table 16 Proportion of farmers providing different concentrate feed ingredients to cows during milch and dry seasons

n 100

Sl No	Items	Fed during milk	Fed during milk and dry	Not fed during dry
1	Compounded feed	100	55 (55 0)	45 (45 0)
2	Coconut cake	35	5 (14 29)	30 (85 71)
3	Gingelly cake	1		
4	Cotton seed	1		
5	Groundnut cake	9		
6	Ground nuts	1		
7	Rice bran	22	13 (59 1)	9 (40 9)
8	Wheat bran	37	26 (70 27)	11 (29 73)
9	Maize bran	15	9 (60 0)	6 (40 0)
10	Rice gruel	41	18 (43 9)	23 (56 1)
11	Wheat gruel	1		

Figures in parenthesis denote the percentages to the total number of households feeding a particular feed item

during milk and dry or during dry periods alone Wheat bran rice bran and maize bran were fed in 37 0 per cent 22 0 per cent and 15 0 per cent of the studied households respectively during milk but only 70 27 per cent 59 1 per cent and 60 0 per cent respectively of the corresponding households fed these items both during milch and dry periods Further 29 73 per cent 40 9 per cent and 40 0 per cent respectively did not feed wheat bran rice bran and maize bran during dry period Rice gruel was fed in 41 0 per cent of the households out of which only 43 91 per cent farmers fed the item during both milk and dry periods In 56 1 per cent of households rice gruel was not fed during dry period Wheat gruel was fed in a single house and that too during milk only

The frequency of feeding cows varied from house to house The frequency of feeding various feed items is presented in Table 17

Table 17 Frequency of feeding resorted by the households

n 100

Sl No	Item	Frequency of feeding			
		Two times	Three times	Four times	Five times
1	Concentrates	78	22		
2	Forages	36	29	25	10
3	Water	33	62	5	

As far as concentrate feeding is concerned majority of the farmers (78 0%) fed their animals twice a day and the remaining (22 0%) resorted to three times feeding With regard to forages 36 0 per cent resorted to two times feeding 29 0 per cent to three times feeding 25 0 per cent to four times feeding and 10 0 per cent to five times feeding Majority of the farmers (62 0%) gave drinking water three times a day followed by 33 0 per cent two times a day Only 5 0 per cent of the dairymen gave drinking water four times a day

4 6 4 Quantity of nutrients fed to cows

Average quantity of nutrients required and fed to cows during milch and dry periods is presented in Table 18

Table 18 Average quantity of nutrients fed to cows during milch and dry periods in organised an unorganised sectors

Sl No	Category	Nutrients during milch periods						Nutrients during dry periods					
		Required (g)		Fed (g)		Difference (g)		Required (g)		Fed (g)		Difference (g)	
		DCP	TDN	DCP	TDN	DCP	TDN	DCP	TDN	DCP	TDN	DCP	TDN
1	Organised sector (Mean milk yield 7 71 L)	573 95	5136 36	959 39	6821 67	+385 44	+1685 31	227 00	2700 00	296 96	3485 44	+69 96	+785 44
2	Unorganised sector (Mean milk yield 6 63 L)	525 35	4795 08	843 37	6333 03	+318 02	+1537 95	227 00	2700 00	269 06	3255 59	+42 06	+555 59

It can be seen from table that the mean yield obtained for cows belonging to the organised sector was 7 71 litres and that of the unorganised sector was 6 63 litres The nutrient requirements of the animals was calculated based on NRC standards assuming an average live body weight of 350 kg and an average of 4 0 per cent fat in milk Based on the average daily milk yield the nutrient requirements of animals in the two sectors were calculated and compared with the nutrients fed It is seen that in both the sectors the DCP and TDN fed were in excess than the quantity required

In the case of organised sector an excess of 385 44 gm DCP and 1685 31gm of TDN were fed daily to animals in milk Whereas an excess of 69 96 g of DCP and 785 44 g of TDN were fed daily to dry animals In the unorganised sector an excess of 318 02 gm of DCP and 1537 95 gm of TDN were fed to animals in milk whereas 42 06 g of DCP and 555 59 g of TDN were fed in excess to dry animals per day

The t test was applied to know the difference if any in the feeding of nutrients to milch and dry cows in the organised an unorganised sector The results of the t test are presented in Table 19

Table 19 Results of t test applied to know the difference in the feeding of nutrients in the organised and unorganised sectors

Sl No	Aspects in feeding	Organised sector Mean	Organised sector SE	Unorganised sector Mean	Unorganised sector SE	t value
1	DCP during milk	959 39	45 65	843 37	32 43	2 0696*
2	DCP during dry	296 96	296 96	269 06	16 82	0 8569 NS
3	TDN during milk	6821 67	6821 67	6333 03	213 50	1 9370 NS
4	TDN during dry	3485 44	3485 44	3255 59	103 54	1 2697 NS

* Significant at 5 per cent level

NS Non significant

From the table it can be seen that the quantity of DCP fed by the households during milk in the organised sector and the unorganised sector were differing This difference was found to be significant at 5 0 per cent level Nevertheless the difference observed in the quantity of DCP fed during dry period bythe households in the organised and unorganised sector was not significant

In the case of feeding TDN the difference in the quantity fed both during milk and dry periods by the farmers of organised sector and unorganised sector was not significant

4 6 5 Rearing of calves

The duration of feeding milk to calves is presented in Table 20

Table 20 Duration of feeding milk to calves

n 100

Age of calves in months	Number of households			
	Male		Female	
	Number	Per cent	Number	Per cent
1	18	18		
2	23	23		
3	37	37	17	17
4	13	13	12	12
5	3	3	8	8
6	4	4	44	44
7			9	9
8	2	2	10	10

None of the households studied practised total weaning of calves In the case of female calves it was found that weaning is practised only at 3 months of age and above In the case of male calves weaning is practised from the first month and above A good number of households (44%) were found to wean

the female calves only at the age of six months as against a good number of them weaning the male calves at the age of 3 months However it could be observed that 2 0 per cent households were weaning the male calves only at 8 months of age But in the case of female calves 10 per cent of the farmers are feeding milk to the calves even at the age of 8 months Majority of the dairymen (78%) followed preferential feeding of male and female calves But 22 per cent of farmers did not follow preferential feeding

4.7 Nature of breeding practice followed

The practice followed in breeding by the households is furnished in Table 21 On the whole the picture that emerges from the households studied was that AI is preferred and practised over natural service It can also be observed that majority of the households (62%) practised AI to impregnate their cows This was followed by 25 per cent households practicing either AI or NS according to their convenience and choice However there were 13 per cent households who adopted only NS

Table 21 Practice followed in breeding by the households

Sl No	Breeding practice	No of households (f)	Per cent to total
1	Only NS	13	13
2	Both NS and AI	25	25
3	Only AI	62	62
	Total	100	100

The number of AI required for conception ranged from 1 6 with a mean of 2 6 ± 0 27 From the data it was observed that the farmers took their animals for AI/NS with in 6 24 hours after the onset of heat with a mean of 15 3 ± 0 86 hours

Reproductive traits like age at first service age at first calving service period lactation length dry period and calving interval were studied (Table 22)

Table 22 Reproductive traits of the cows studied

Sl No	Reproductive parameters	Range (months)	Mean (months)	SE
1	Age at first AI	14 48 (90)	32 1	±0 10
2	Age at first calving	28 57 (90)	40 7	±0 27
3	Service period	3 0 8 5 (52)	7 14	±0 44
4	Lactation length	7 0 15 5 (55)	11 56	±0 57
5	Dry period	2 0 7 5 (55)	5 18	±0 43
6	Calving interval	12 24 (55)	16 53	±0 51

Figures in parenthesis shows the number of observations

It revealed that age at first AI ranged from 14 48 months with a mean of 32 1 ± 0 10 months Age at first calving ranged from 28 57 months with a mean of 40 7 ± 0 27 months Service period of the cows ranged from 3 0 8 5 months with a mean of 7 14 ± 0 44 months Lactation length and dry period ranged from 7 0 15 5 months and 2 7 5 months respectively with corresponding means of 11 56 ± 0 57 and 5 18 ± 0 43 months The calving interval ranged from 12 24 months with a mean of 16 53 ± 0 51

4.8 Health care

Although there are no disease present in Kerala which threaten the mere survival of cattle several diseases impede obtaining full productivity The incidence of disease during the year of the study as reported by the respondents themselves is given in Table 23

Table 23 Diseases reported by the respondents

n 100

Sl No	Diseases reported	Households (f)	Per cent to total
1	FMD	1	1
2	Mastitis	12	12
3	Infertility & reproductive problems	15	15
4	Others (Anorexia parasitism pyrexia etc)	33	33
5	None reported	39	39

The table revealed that 39 0 per cent of the dairymen did not report about any disease Infertility and reproductive problems such as dystokia prolapse of uterus retention of placenta endometritis etc was reported by 15 per cent of the

sample households Mastitis was the major problem for 12 per cent of the respondents Thirty three per cent of the dairymen reported about minor ailments like anorexia parasitism diarrhoea pyrexia foot diseases etc Only one farmer reported about FMD

4 8 1 Vaccination

Only 23 per cent of the farmers vaccinated their animals against diseases (Table 24) This was against FMD

Table 24 Households vaccinating animals against diseases

n 100

Sl No	Disease	Households (f)	%
1	FMD disease	23	23
2	Not vaccinating	77	77

4 8 2 Deworming

Internal parasitism especially during calf hood causes incalculable loss Table 25 presents the schedule of deworming in calves practised by the households The table showed that only 56 0 per cent of the farmers dewormed their calves Majority of them (53 57%) dewormed their calves in the first month only Out of the remaining dairymen 16 07 per cent

dewormed their animals monthly up to 2 months of age 17 86 per cent up to 3 months of age 7 14 per cent up to 4 months of age and 5 36 per cent upto the age of 6 months It was further observed that no households reported stopping deworming at the age of 5 months

Table 25 Schedule of deworming in calves

n 56

Sl No	Age (months)	Households (f)	%
1	1 m	30	53 57
2	2 m	9	16 07
3	3 m	10	17 86
4	4 m	4	7 14
5	5 m		
6	6 m	3	5 36
	Total	56	100

Out of those who practised deworming (56 0%) a small proportion (14 29%) used indigenous medicines to deworm their calves Others however used modern medicine

4 8 3 Source of veterinary service

The sources of veterinary service available in the study area are presented in Table 26

Table 26 Source of Veterinary Service

Sl No	Source	No of households (f)	%
1	Veterinary Hospitals/ Dispensaries of Animal Husbandry Department	64	64
2	Veterinary Service from milk co operatives	36	36
3	Both	11	11

From the table it can be observed that majority of the households (64 0%) mainly depended on the services offered by the veterinary hospitals or dispensaries of the animal husbandry department Thirty six per cent of the dairymen resorted to the veterinary service of the milk co operatives However 11 per cent households depended on both these institutions for veterinary service The distance from the farmer s house to these institutions ranged from 1 6 km with a mean of 3 90 ± 1 30 km

Among the milch animals studied 14 5 per cent were insured against diseases The insured animals belonged to 11 0 per cent of the total households studied

4.9 Milk production, consumption and disposal

4 9 1 Distribution of cows in milk

The distribution of cows in milk according to the production per day in both organised and unorganised sector is given in Table 27

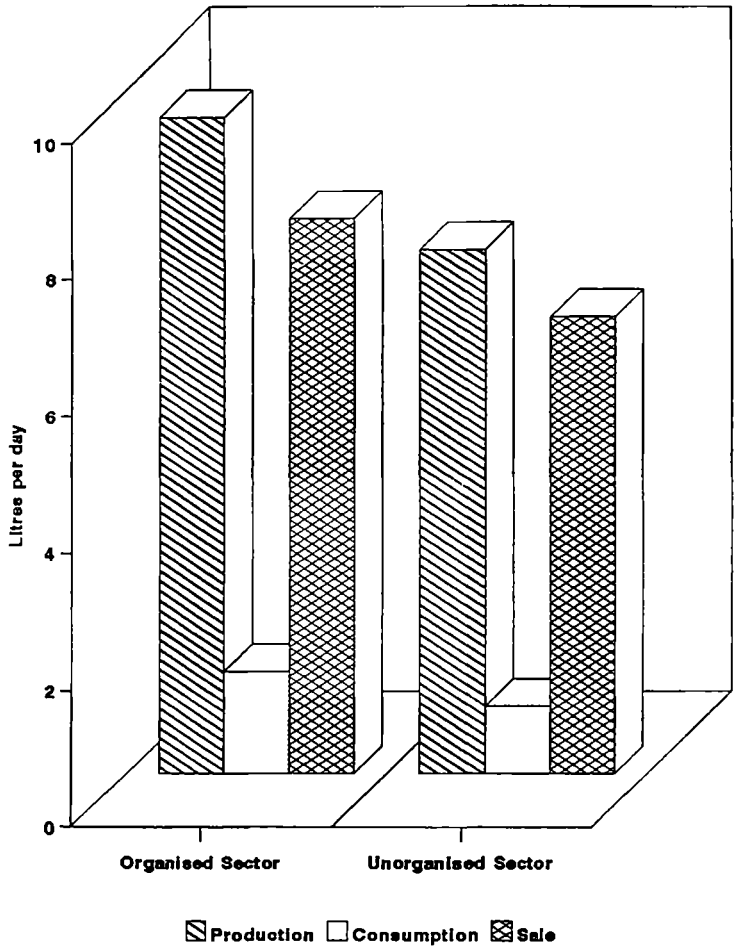
Table 27 Distribution of cows in milk according to milk production

Category	Organised sector (n 45)	Unorganised sector (n 72)	Total (n 117)
Low producer (<4 83 L)	6 (13 38)	12 (16 67)	18 (15 38)
Medium producer (4 83 9 65 L)	31 (68 89)	51 (70 83)	82 (70 09)
High producer (>9 65 L)	8 (17 78)	9 (12 50)	17 (14 53)

Categorization is based on mean milk yield/day and standard deviation (SD)

Low Mean SD
Medium Mean ± SD
High Mean + SD

Fig 4 PRODUCTION, CONSUMPTION AND SALE OF MILK PER DAY



The table showed that the total cows in milk (117) of the studied households were categorised as low producer medium producer and high producer based on mean milk yield per day and standard deviation In all 70 09 per cent were medium producers (4 83 9 65 L) 15 38 per cent were low producers (<4 83 L) and 14 53 per cent were high producers (>9 65 L)

Further it was noted that high producers were more (17 78%) in the organised sector than the unorganised sector (12 50%) However there were nearly equal percentage of medium producers in organised and unorganised sectors viz 68 69 per cent and 70 83 per cent respectively

4 9 2 Milk production, consumption and sale

In Table 28 and Fig 4 the average production consumption and sale of milk per day by the households are given The mean home consumption in the organised and unorganised sector were respectively 1 49 and 0 98 litres per day The milk sold per day for the corresponding sectors were 8 09 litres and 6 64 litres per day Of the total milk produced 15 55 per cent and 12 86 per cent respectively were only consumed at home per day in the organised and unorganised sector whereas 84 45 per cent and 87 14 per cent of milk produced was sold per day by the corresponding sectors

Table 28 Production consumption and sale of milk per day

Sl No	Category	Milk production/ day (L)	Home consumption/ day (L)	Milk sold/day (L)
1	Organised sector (n 36)	9 58 (100 0%)	1 49 (15 55%)	8 09 (84 45%)
2	Unorganised (n 64)	7 62 (100 0%)	0 98 (12 86%)	6 64 (87 14%)

The values are means

4 9 3 Sale outlets for milk

The sample households have used three principal outlets for selling milk (1) to milk co operatives (2) to milk vendors and (3) direct to consumer households The surplus milk after home consumption is marketed as shown in Table 29

Table 29 Volume of milk sold through different outlets (litres/day)

Group	Volume of milk sold/ day (L)	Mode of disposal		
		Milk co operative	Direct to consumers	Milk vendors
Organised Sector (Member)	292 2 (100 0)	242 6 (83 03)	49 6 (16 97)	
Unorganised Sector (Non member)	434 39 (100 0)		326 54 (76 94)	97 85 (23 06)
Overall	716 59 (100 0)	242 6 (33 85)	376 14 (52 49)	97 85 (13 66)

Figures in parenthesis shows percentage to total

From the table it can be observed that in the case of organised sector major share of the milk produced (83 03%) is sold to the milk co operative society The balance milk (16 97%) is sold directly to consumers None in the category sold milk to vendors In the case of unorganised sector 76 94 per cent of the milk produced was sold directly to consumers and 23 06 per cent to milk vendors

The price realised by the milk producers is influenced by the type of outlet and quality of milk The highest price was realised from sale to the consumers directly (current market rate was Rs 9 00 per litre) and the lowest price was obtained

from sale to the co operative societies (ranged from Rs 6 70 to 8 00 based on fat and SNF content) The mean price obtained for milk in co operative societies was Rs 7 804 ± 0 05 Milk sold to vendors fetched a price of around Rs 8 00 to 8 50

4.10 Division of labour in dairying

A number of daily and seasonal chores had to be carried out for the maintenance of dairy animals These activities can be broadly classified into in door and out door activities The major in door activities included feeding milking shed cleaning washing of animals and calf care The main out door activities included purchase and sale of cows purchase of feed fodder cultivation sale of milk taking animals for service and health care Table 30 shows the division of labour in various operation of cattle keeping based on member performing a particular activity most often It was observed that women s involvement in in door activities relating to cattle keeping was found to be more than that of men When 87 42 58 71 and 76 per cent of women performed the activities feeding milking shed cleaning washing of animals and calf care 11 41 39 25 and 20 per cent of men performed the corresponding activities in the households studied

Table 30 Division of labour in various operations of cattle keeping

n 100

Sl No	Activity	Member performing the activity most often			
		Husband %	Wife %	Children %	Hired worker %
A	Indoor activities				
1	Feeding	11	87	1	1
2	Milking	41	42	2	15
3	Shed cleaning	39	58	1	2
4	Washing of animals	25	71	2	2
5	Calf care	20	76	2	2
B	Out door activities				
1	Purchase of cow	80	18	2	
2	Sale of cow	75	21	4	1
3	Purchase of feed	57	34	8	1
4	Fodder cultivation	8	4	2	
5	Sale of milk	55	35	8	2
6	Taking the animal for AI/NS	55	32	8	5
7	Health care	60	30	7	3

As far as out door activities were concerned male participation was dominant over that of females When 80 75 57 8 55 55 and 60 per cent of men performed the activities purchase of cow sale of cow feed purchase fodder cultivation sale of milk taking animals for service and health care 18 21 34 4 35 32 and 30 per cent of women performed the corresponding activities in the households

Generally the involvement of children was found to be negligent in the households The percentage of households resorting to hired labour to carry out cattle keeping activities were very few in general except for milking the cows To milk the cows 15 per cent of the households engaged hired labour paying a monthly remuneration of Rs 100 110 per milker

4.11 Economics of milk production

The cost of milk production in the marginal small and medium holdings are presented in Table 31 and Fig 5 A perusal of the data showed that the cost of production of one litre of milk worked out to Rs 6 81 in marginal farms Rs 6 61 in small farms and Rs 6 37 in medium farms

Fig 5 COST OF MILK PRODUCTION PER COW IN THE DIFFERENT FARM HOLDINGS

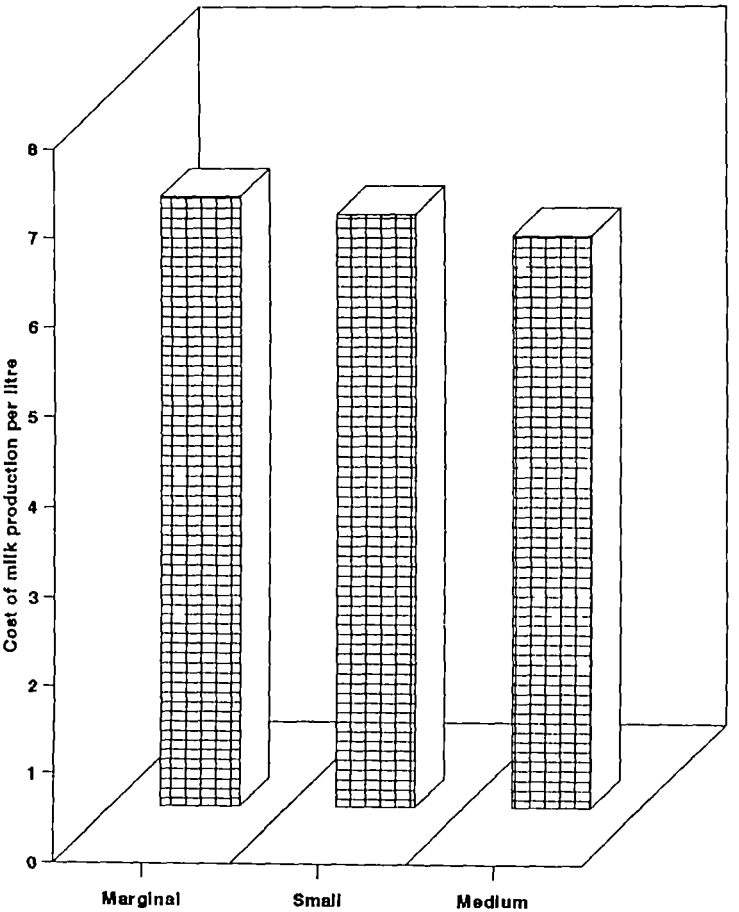


Table 31 Cost of milk production per cow in the marginal small and medium holdings

Particulars	Marginal holdings	Small holdings	Medium holdings
Value of green fodder	2146 93 (13 67)	2144 28 (12 93)	2324 54 (15 24)
Value of dry fodder	2547 86 (16 22)	2864 35 (17 27)	2668 75 (17 49)
Value of concentrates	5614 63 (35 74)	6495 15 (39 15)	4751 68 (31 14)
Labour charges	3267 89 (20 80)	2875 54 (17 33)	3353 57 (21 98)
Medicines and other miscellaneous charges	171 59 (1 09)	161 47 (0 97)	97 98 (0 64)
Depreciation	1025 59 (6 53)	1014 82 (6 12)	1098 73 (7 20)
Interest on fixed capital	935 50 (5 95)	1033 64 (6 23)	961 84 (6 30)
Total cost	15709 99 (100 00)	16589 25 (100 00)	15257 09 (100 00)
Value of dung and gunny bags	2701 01	2941 20	2980 16
Net cost	13008 98	13648 05	12276 93
Milk yield per lactation (litre)	1910 80	2063 67	1926 33
Cost of milk production per litre (Rs)	6 81	6 61	6 37

Figures in parenthesis indicate percentage to total cost

4 11 1 Cost of milk production

The total cost of production of milk was worked out to Rs 15 709 99 in marginal holdings Rs 16 589 25 in small holdings and 15 257 09 in medium holdings per lactation After deducting the income received from dung and empty feed bags the net cost came to Rs 13 008 98 in marginal Rs 13 648 05 in small and Rs 12 276 93 in medium holdings The cost of feed accounted for the highest share in expenditure being 65 63 per cent 69 35 per cent and 63 87 per cent for marginal small and medium holdings respectively Labour charges were the next major expenditure in all the holdings followed by depreciation (animals cattlesheds and equipments) interest on fixed capital and medicines and miscellaneous charges

The average yield of cows value of milk net income and input output ratio are worked out and presented in Table 32 The total milk value realised were Rs 15 986 23 in marginal Rs 17 281 75 in small and Rs 15 732 83 for small holdings Net cost in rupees per lactation in marginal farms was 13 008 98 whereas net income was 2977 25 Net cost in small farms per lactation was 13 648 05 while net income was Rs 3633 70 Similarly the net cost in rupees per lactation and net income per lactation in medium farms were Rs 12 276 93 and Rs 3455 90 respectively

Table 32 Economics of milk production per lactation in the marginal small and medium holdings

Particulars	Marginal holdings	Small holdings	Medium holdings
Yield in litres	1910 80	2063 67	1926 33
Value in rupees	15986 23	17281 75	15732 83
Net cost in rupees	13008 98	13648 05	12276 93
Net income in rupees	2977 25	3633 70	3455 90
Input output ratio	1 1 23	1 1 27	1 1 28

The input output ratio indicated that one rupee investment in milk production generated a return of Rs 1 23 in marginal holdings Rs 1 27 in small holdings and Rs 1 28 in medium holdings

In Table 33 and Fig 6 the cost of milk production in organised and unorganised sectors are presented It can be observed from the table and figure that the cost of production of one litre of milk worked out to Rs 6 63 in organised sector and Rs 6 89 in unorganised sector Total cost of production was worked out to Rs 16 402 93 in organised sector and Rs 15 744 23 in unorganised sector Feed cost was the highest share in expenditure in both sectors followed by labour cost depreciation interest on fixed capital and medicines and miscellaneous charges

Fig 6 COST OF MILK PRODUCTION IN ORGANISED AND UNORGANISED SECTOR

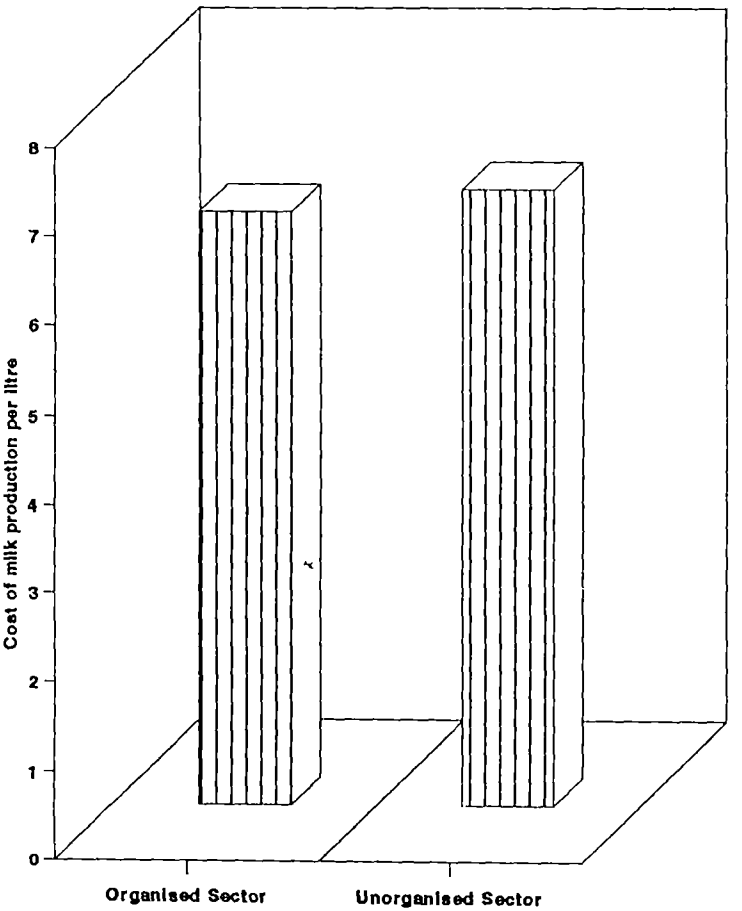


Table 33 Cost of milk production per cow in the organised and unorganised sector

Particulars	Organised sector	Unorganised sector
Value of green fodder	2179 92 (13 29)	2159 99 (13 72)
Value of dry fodder	2572 16 (15 68)	2686 84 (17 07)
Value of concentrates	6436 62 (39 24)	5760 45 (36 59)
Labour charges	2799 69 (17 07)	3155 43 (20 04)
Medicines and other miscellaneous charges	148 13 (0 90)	164 55 (1 05)
Depreciation	1230 91 (7 50)	908 04 (5 77)
Interest on fixed capital	1035 50 (6 31)	908 93 (5 77)
Total cost	16402 93 (100 00)	15744 23
Value of dung and gunny bags	2863 99	2771 88
Net cost	13538 94	12972 35
Milk yield per lactation (litre)	2041 35	1881 07
Cost of milk production per litre (Rs)	6 63	6 89

Figures in parenthesis indicate percentage to total cost

Economics of milk production per lactation in organised and unorganised sector was studied (Table 34) The total milk value realised was Rs 15 932 34 in organised sector and Rs 16 384 49 in unorganised sector Net income was Rs 2393 40 and 3412 14 in the two sectors respectively The input output ratio indicated that one rupee investment in milk production generated Rs 1 18 in organised sector and Rs 1 26 in unorganised sector

Table 34 Economics of milk production per lactation in the organised and unorganised sector

Particulars	Organised sector	Unorganised sector
Yield in litres	2041 35	1881 07
Value in rupees	15932 34	16384 49
Net cost in rupees	13538 94	12972 35
Net income in rupees	2393 40	3412 14
Input output ratio	1 1 18	1 1 26

4.12 Disposal of cows

The reasons for the disposal of cows are depicted in Table 35 The reasons indicated by the respondents were ranked based on the increasing percentage of cows disposed for a specific reason Old age was the reason reported for the

maximum percentage (28 27%) and ranked first followed by immediate requirement for cash (27 23%) poor production (15 71%) diseases (11 52%) lack of household labour (11 51%) and bad temperament (5 76%)

Table 35 Reasons for disposal of cows

n 191

Sl No	Reason	No of cows	Per cent to total	Rank order
1	Old age	54	28 27	I
2	Diseases	22	11 52	IV
3	Poor production	30	15 71	III
4	Immediate requirement for cash and distress sale	52	27 23	II
5	Bad temperament	11	5 76	VI
6	Lack of household labour	22	11 51	V

4.13 Constraints in dairying

The constraints in dairying perceived by the farmers were studied (Table 36) The constraints were ranked on the basis of the percentage of farmers expressing the same The constraints were classified into four major domains viz feeding health care breeding and other management constraints

Table 36 Constraints in dairying as perceived by the farmers of the studied households

36a Feeding constraints

Sl No	Constraints	Per cent to total	Rank order	Overall rank
1	High cost of feed and fodder	56 0	I	I
2	Quality of commercial feed is not satisfactory	31 0	IV	VIII
3	Frequent change of feed supplied through the milk co operatives	11 0	VII	XXI
4	Non availability of suitable land for fodder cultivation	27 0	V	X
5	Lack of irrigation facility for fodder cultivation	19 0	VI	XV
6	Lack of facility for grazing	32 0	III	VII
7	Inadequate knowledge about scientific feeding	42 0	II	III
8	Inadequate knowledge about fodder cultivation	6 0	VIII	XXV

4 13 1 Feeding constraints

Table 36 (a) revealed that majority of farmers (56 0%) reported that feeds and fodders were costly followed by poor knowledge of scientific feeding of their herd (42 0%) lack of grazing facility (32 0%) inferior quality of commercial feeds (31 0%) lack of land for fodder cultivation (27 0%) lack of irrigation facility for raising crops (19 0%) frequent change of feed supplied through milk co operatives (11 0%) and inadequate knowledge about fodder cultivation (6 0%) Thus the most felt constraint regarding feeding was the high cost of feeds and fodders and the least felt constraint was inadequate knowledge about fodder cultivation

4 13 2 Health care constraints (Table 36 (b))

High cost of medicines was reported by 34 0 per cent followed by higher disease incidence in crossbreds (28 0%) non availability of vaccination facilities when required (25 0%) veterinary service at door step is costly (25 0%) lack of space for isolating sick animals (25 0%) poor knowledge of disease control measures (24 0%) distant location of veterinary hospitals/dispensaries (18 0%) and delay in getting veterinary aid (6 0%) The most important constraint felt by the farmers was high cost of veterinary medicines and least felt one was delay in getting veterinary service

36b Health care constraints

Sl No	Constraints	Per cent to total	Rank order	Overall rank
1	Veterinary hospitals/ dispensaries are located at distant places	18 0	V	XVI
2	High cost of veterinary medicines	34 0	I	VI
3	Veterinary experts services at the door step are expensive	25 0	III	XI
4	Inadequate knowledge about diseases and control measures	24 0	IV	XII
5	Vaccination facilities are not available as and when required	25 0	III	XI
6	Higher incidence of diseases in crossbreds	28 0	II	IX
7	Delay in getting veterinary services	6 0	VI	XXV
8	Lack of space for isolating sick animals	25 0	III	XI

36c Breeding constraints

Sl No	Constraints	Per cent to total	Rank order	Overall rank
1	Inadequate knowledge about AI	13 0	VII	XX
2	Low conception rate in AI	23 0	II	XIII
3	Timely AI service is not available	38 0	I	IX
4	Curtailment of free of charge repeat AI	21 0	III	XIV
5	Preference for natural service	8 0	VIII	XXIII
6	AI centres are located in distant places	16 0	V	XVIII
7	Breeding charges are high	17 0	IV	XVII
8	Inadequate knowledge to detect heat	6 0	IX	XXV
9	Treatment of repeat breeders and infertile is costly and often unsuccessful	14 0	VI	XIX
10	Calves born are often males than females to the cow inseminated	14 0	VI	XIX
11	Lack of time to take the animals for AI	13 0	VII	XX

4 13 3 Breeding constraints (Table 36 (c))

Thirty eight per cent respondents reported the non availability of timely AI facility followed by poor conception rate in AI (23 0%) curtailment of free repeat AI (21 0%) high breeding charges (17 0%) distant location of AI centres (16 0%) treatment of repeat breeders costly and unsuccessful (14 0%) lack of time for taking animals for AI (13 0%) inadequate knowledge about AI (13 0%) preference for natural service (8 0%) and poor knowledge in heat detection (6 0%) The most felt constraint was non availability of timely AI and the least felt one was poor knowledge in heat detection

4 13 4 Other management constraints (Table 36 (d))

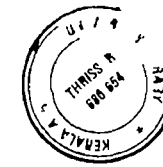
Majority of the farmers (50 0%) reported low price of milk followed by lack of finance/subsidy (39 0%) lack of family labour (35 0%) high maintenance cost of crossbreds as compared to local cows (28 0%) high cost of crossbreds (17 0%) wide fluctuations in the price of milk offered by milk co operatives (10 0%) high cost for constructing animal houses (7 0%) and insufficient amount of bank loans for purchase of good milch animals (3 0%) Low cost of milk was the most felt constraint and insufficient amount of bank loans for purchase of

36d Other management constraints

Sl No	Constraints	Per cent to total	Rank order	Overall rank
1	Lack of finance or subsidy	39 0	II	IV
2	Bank loans are not sufficient to buy good animals	3 0	IX	XXVII
3	Maintenance cost of crossbred cows is higher than local cows	28 0	IV	IX
4	Lack of family labour	35 0	III	V
5	Immediate requirement for cash and distress sale	25 0	V	XI
6	Price of milk is low	50 0	I	II
7	Wide fluctuation in the price of milk offered by milk co operatives	10 0	VII	XXII
8	Good crossbred cows are costly and not easily available	17 0	VI	XVII
9	Cow sheds are now a days expensive to construct	7 0	VIII	XXIV

milch cows was the least felt constraint Further the constraints viz feeding health care breeding and others were ranked (Table 36) according to the percentage of households indicating a particular constraint It showed that high cost of feed and fodder and insufficient amount of bank loans for purchase of cows were the most and least felt constraints indicated by the dairymen of the studied households

Discussion



DISCUSSION

Out of the households studied in the two villages viz Matoor and Kalady 36 per cent were members of the milk co operative societies and the remaining 64 per cent were non members (Table 1)

Majority of the dairymen studied (48%) belonged to the age group of 44 60 (Table 2) Forty one per cent were less than 44 years and the remaining were above 60 years of age

Table 3 revealed that majority of the respondents (47%) were engaged in agriculture and allied activities 13 per cent in animal husbandry activity 18 per cent were labourers 13 per cent service personnel in the government or private sector and the remaining were running their own business

It may be seen from the Table 4 that more than half of the households studied had 10 20 years of experience in dairying 25 per cent had more than 20 years of experience and 23 per cent had only less than 10 years of experience

5.1 Land holding

Sixty nine per cent of the households studied were having only less than one acre of land (Table 5) Twenty

per cent had 1 2 acres and the remaining 11 per cent had more than 2 acres of land The range of land holding studied ranged from 0 04 acres to 4 16 acres with a mean of 85 95 ± 10 39 cents

The land holding size observed in the present study is not in agreement with the observation of George and Nair (1990) who reported the same in Kerala as 1 47 acres

The present study is also not in agreement with Chauhan et al (1994) who observed 0 87 hectares in Himachal Pradesh and Sharma et al (1994) as 5 20 acres

Since the land holding of the majority of farmers were not sufficient for cultivation of fodder they depended upon purchase of these items resulting in an increase in the cost of feed

5.2 Livestock holding

Out of the hundred households studied 75 per cent of the houses had calves 21 per cent had heifers and only 10 per cent had dry cows These households also had bullocks maintained for ploughing (Table 6)

In the case of buffaloes only 7 per cent households had it in milk 1 per cent had dry buffalo 6 per cent heifers 2 per cent calves and 2 per cent had bullocks

Twenty per cent of the households possessed goats in milk The house holds studied did not possess any pig or sheep

Table 7 showed a reduction in the herd strength from 1990 1995 In the marginal holding a reduction of 29 82 per cent was noticed in the milch animals (114 80) The decrease shown in the milch animals in the small holdings and medium holdings was 37 50 per cent (40 25) and 31 82 per cent (22 15) respectively

Among the households studied the herd distribution showed that a majority (85%) had a one cow unit 13 per cent had two cow unit and 2 per cent had a three cow unit

The distribution trend of livestock in the area of study revealed only cattle buffalo and goats Other types of livestock were not preferred by the farmers Whereas in an extensive study of the distribution of livestock Arunachalam (1995) observed cattle buffalo goat sheep and pigs in Tamil Nadu

The herd strength observed in this study is not in agreement with Gangwar et al (1989) who have reported an average herd size of 5 84 milch animals in Haryana The present study is also not in agreement with George and Nair

(1990) who observed an average size of one animal in only 33 per cent cases

The declining trend of milch cows observed in the present study is in agreement with the study of Gincy et al (1988) and George and Nair (1990) They have also observed a similar trend in a study of selected village farmers

But the overall reduction trend of cattle population observed in this study is in contradiction with the trend of cattle population in general in Kerala Milch animals in Kerala is reported to be increasing as per the livestock census (1987)

The reduction in the strength of animals observed may be due to sale of animals lack of family labour death of animals poor financial resources to replace the animals and high cost of maintenance of animals

In the case of marginal holdings distress sale due to immediate requirement of cash was reported to be the reason in 48 per cent cases studied whereas in 31 per cent cases death of the animal is the main reason for decline in the herd strength Once the animal is dead there is no possibility of replacement because of the poor financial position of the farmers

5.3 Procurement of cows

Majority of the farmers raised their own replacement stock (Table 8) The remaining of the farmers procured the animals from other farmers and shandies It was also observed that none of the dairymen purchased cows exclusively from shandies

The observations made in the present study is in agreement with Gincy et al (1988) who observed that replacement raising by the farmers were either from their own stock or nearby farmers or from shandies

It was observed that only 40 17 per cent of the cows were bought as replacement stock Farmers preferred purchase of animals because of the poor resource base for rearing replacement and also due to high cost of raising the replacement It was also noticed that high calf mortality was also found to be a factor discouraging the farmers in raising their own replacements But farmers showed a keen interest in raising female calves The findings observed in the study is contrary to that of George and Nair (1990) who were of the opinion that a large majority of farmers in the state of Kerala purchased animals for building their herd

It was observed that majority of the cows were purchased as heifers (34 04%) first parity cows (29 79%) and second parity cows (27 66%) (Table 9)

The study clearly indicated that farmers preferred adult cows in the area of study than heifers or calves

Mainly four attributes were looked into while selecting dairy cows (Table 10) viz milk production appearance and confirmation colour and temperament From the study it was observed that majority of the farmers always looked for more than one attribute while selecting their animals

Milk production and appearance and confirmation were the most important attributes considered by majority (36%) of dairymen A small percentage of farmers considered the temperament and colour of animals also In addition to these attributes most of the farmers considered the age of animals price and also his financial position before deciding to purchase

The price of milch cow depended on a number of factors such as type breed stage of lactation parity milk yield age etc The highest price was paid to cows in milk of the first and second parity followed by animals in milk of third parity and heifers The mean price of the cows

purchased was 5673 94 ± 134 40 rupees and the mean age at the time of purchase was 4 38 ± 0 271 years

5.4 Housing management

The result of the study indicated that a majority (59%) of the households had pucca cattle sheds The remaining 41 per cent had kutcha cattle sheds (Table 11)

This finding does not agree with that of Gincy et al (1988) who reported that majority of the studied households in Kerala had cattle sheds that were predominantly kutcha type

The cattle sheds in the study area was found to be of two types viz (1) lean to type and (2) independent sheds The lean to type sheds were extensions of the roof of a main building often the residence of the owner to provide a simple shelter for the cows and calves Others were independent sheds for cattle In the studied households there were 63 per cent lean to type sheds and 37 per cent independent sheds Lean to type sheds were more in number probably because it was easier to construct and incurred lower construction cost

This however agrees with the observation of Gincy et al (1988) who reported that majority of the cattle houses were lean to type

These houses were further sub classified on the basis of the type of floor and roof The floors were either of mud or stone paved or concrete The roofs were either thatched or of earthern tiles or concrete The distribution of the sub types of cattle sheds with different types of floors and roofs have been presented in Table 12 They are ranked according to the number of each sub type of shed in the studied households

The most common(20%) sub type of cattle sheds was the kutcha lean to type with thatched roof and stone paved floor followed by pucca independent with tiled roof and concrete floor (19%) Least common type seen was the pucca independent with tiled roof and mud floor (1%) and kutcha independent with thatched roof and concrete floor (1%)

Among the cattle sheds studied 39 per cent had concrete floors Thirty eight per cent had stone paved floors and 23 per cent had mud floor Concrete and stone paved floors were preferred over mud covered floors

George et al (1990) opined that labour involved in cattle keeping will be minimised if the floors are hard and

if proper mangers and manure pits are provided in sheds These floors will be long lasting easier to clean and hygienic

Forty two per cent of the sheds had slopping floors 33 per cent had levelled floors and 25 per cent had uneven floors Slopping floors are better than levelled and uneven floors as they facilitated drainage and helped to reduce labour and time required for cleaning the sheds

Similarly there were 52 per cent sheds with tiled roof 41 per cent sheds with thatched roof and 7 per cent sheds with concrete floors It is well known that thatched roof gives better thermal comfort to animals than concrete and tiled roofs (Thomas and Sastry 1991)

The length of sheds ranged from 135 cm to 556 cm with a mean of 318 01 ± 4 11 cm and breadth of the house (excluding manger) ranged from 125 cm to 410 cm with a mean of 188 5 ± 4 11 cm Majority (85%) of the sheds had feeding mangers The length of the manger ranged from 83 cm to 556 cm with a mean of 295 ± 11 55 cm and width of the manger ranged from 35 70 cm with a mean of 52 26 ± 1 27 cm In 15 per cent of the sheds feeding mangers were not provided The average standing space provided per animal was 188 5 ± 4 11 cm x 287 07 ± 9 27 cm

The results of the study revealed that the standing space provided for cows in the cattle sheds were more than KAU (1987) and ICAR (1990) recommendations for dairy cattle housing But the width of the manger was below the recommendation

Manure pits were present in only 11 per cent of the households Majority of the dairymen (89%) were just heaping the dung outside the cattle sheds which would be a breeding ground for harmful flies and a potential source of diseases to both livestock and human beings

5.5 Feeding management

5 5 1 Types of feed resources

The feeding regimes varied from house to house The types of feed fed to livestock are compounded feed concentrate cakes roughages and crop by products and residues (Table 13) From the table it can be observed that farmers fed commercial brands of compounded cattle feeds like KS Godrej and Prima All the dairymen studied fed compounded cattle feed to their milch cows Coconut cake groundnut cake rice and wheat gruel are the commonly fed concentrates Among the concentrates fed coconut cake was the most popular one

The main source of roughages available to livestock in the study area are cultivated green fodder grass shrubs weeds and paddy straw All the households fed roughages both green and dry to all classes of cattle

Rice bran wheat bran maize bran tamarind seed cotton seeds leaves and rhizomes were the most important crop residues and by products fed to animals Generally the feeding of crop residues and by products was found to be in low quantities except in the case of bran In the homesteads farmers practised a combination of stall feeding and controlled grazing

Similar pattern of feeding was also observed by majority of workers in related research study in different parts of Kerala (Gincy et al 1988 George and Nair 1990 Muraleedharan 1992)

5 5 2 Source of feeds and fodders

The dairymen of the studied households purchased feed from local shops or markets and milk co operatives It was observed from Table 14 that the majority (64%) of the farmers bought compounded feed from the local markets or shops whereas 36 per cent of the dairymen (all members) bought it from societies From the societies compounded feed was sold to members on credit basis at concessional rates Hence all

members of co operatives resorted to societies for the supply of cattle feed All the households had to depend on local shops for the purchase of concentrates as they are not sold through societies

The findings that dairymen resort to the local markets and milk co operatives agree with the findings of Gincy et al (1988) in Kerala George and Nair (1990) also in Kerala and Rajendran and Prabaharan (1992) in Tamil Nadu

None of the dairymen of the study area purchased green fodder Bulk of the green fodder fed was in the form of grass and fodder collected from field bunds and other agricultural land

This finding disagreed with George and Nair (1990) who reported that majority of farmers were purchasing green fodder and Rajendran and Prabaharan (1992) who reported that some of the dairymen purchased green fodder

Out of the studied households only 14 per cent of them cultivated green fodder that too in a limited scale in small areas of land This quantity of cultivated grasses was not sufficient for feeding their livestock

This finding disagreed with Agarwal et al (1989) who reported that green fodder available to the animal was generally homegrown in a study carried out at Karnal Here

sufficient land was available to the farmers for cultivation of fodder

About 44 per cent of the households practised controlled grazing of animals On an average animals were allowed to graze for about 3 5 hours a day Eventhough 32 per cent of the households cultivated paddy only a very small proportion (5%) of the households were self sufficient in straw

5 5 3 Quantity of feed materials fed

The quantity of feed materials fed to milch and dry animals were studied (Tables 15 and 16) It can be observed that the daily consumption of compounded feed varied from 1 6 kg with a mean of 3 32 $\pm$ 0 98 kg

This finding was contrary to the reports of Singh *et al* (1987) Kunju *et al* (1988) Agarwal *et al* (1989) and George and Nair (1990) who recorded the feeding of small quantities of compounded feed to the cows

Only 55 per cent of the farmers fed compounded feed both during milk and dry periods The remaining farmers did not feed compounded feed to dry animals From the present study it can be observed that the animals in milk pregnant and dry cows and heifers in that order were fed decreasing quantities of compounded feeds

The findings of the study are in accordance with George and Nair (1990)

Coconut cake groundnut cake cotton seed cake tamarind seed etc were fed in quantities upto 3 kg 2 kg 1 kg and 1 5 kg respectively with corresponding mean values of 1 36 ± 0 11 kg 1 14 ± 0 17 kg 1 kg and 1 ± 0 20 kg Out of the 35 households which fed coconut cake during milk only 14 29 per cent fed during dry periods also The remaining farmers (85 71%) did not feed during dry period Groundnut cake was fed during milch period by 9 per cent of the households But none of the above dairymen fed the items either both during milk and dry or during dry period alone Only in a single house each gingelly cake cotton seed and groundnuts were fed and that too when the animals were in milk

Rice gruel and wheat gruel were fed upto 2 kg and 0 5 kg respectively The average quantity of rice gruel fed was 1 12 ± 0 06 kg Wheat gruel was fed in one household only and that too during milk

Among the households studied 41 per cent was feeding rice gruel out of which only 43 90 per cent farmers fed the item both during milk and dry periods In majority of the households (56 10%) rice gruel was not fed during dry period The study revealed the allocation of concentrate feed It

was higher for animals in milk followed by pregnant and dry cows

This preferential feeding of animals was also reported by George and Nair (1990)

During milk crop by products like wheat bran rice bran and maize bran were fed upto 4 kg each in 37 per cent 22 per cent and 15 per cent of the households respectively with corresponding averages of 2 07 ± 0 12 kg 2 02 + 0 18 kg and 1 97 ± 0 28 kg But only 70 27 per cent 59 1 per cent and 60 per cent respectively of the corresponding households fed these items during milch and dry period Further 29 73 per cent 40 9 per cent and 40 0 per cent respectively did not feed wheat bran rice bran and maize bran during dry periods

Roughages like green grass and paddy straw were found to be fed in all households to both milch and dry animals The consumption of green fodder ranged from 7 20 kg with a mean of 10 13 ± 0 24 kg

This result agrees with that of George and Nair (1990) who observed that on an average cows in milk received 9 6 kg green fodder

However Singh et al (1987) reported that the average quantity of green fodder fed was 4 2 kg which is far less than the average quantity of feed fed in this study

But Agarwal et al (1989) revealed that the average quantity of green fodder fed was higher than the average quantity fed in the present study

Paddy straw fed to animals ranged from 1 to 5 kg with an average of 2 88 ± 1 13 kg

The results of the study were similar to the observations of Singh et al (1987) who reported that farmers fed 2 58 kg of dry fodder to their dairy cattle

However Agarwal et al (1989) and George and Nair (1990) revealed that the daily average quantity of dry fodder fed to cattle was higher than the average quantity fed in this study

The results showed that with regard to the feeding of fodder to milch and dry animals the former received more quantity than latter

George and Nair (1990) also reported a similar trend in the feeding of dry fodder

But Agarwal et al (1989) observed that the average quantity of dry fodder fed per day was higher during the dry

period as compared with the milch period which disagreed with the results of the present study

The usual practise in the feeding of concentrates was that it was fed immediately after milking in a liquid form with sufficient quantity of water (Table 17) Thus majority of the farmers (78%) fed concentrates to their animals twice a day whereas the remaining (22%) resorted to three times feeding

With regard to the feeding of forages 36 per cent 29 per cent 25 per cent and 10 per cent resorted to two times three times four times and five times feeding respectively

Majority of the farmers (62%) gave drinking water three times a day followed by 33 per cent two times a day It was seen that 5 per cent of the dairymen gave drinking water four times a day

5 5 4 Quantity of nutrients fed to cows

It can be observed from Table 18 that the dairymen of organised and unorganised sectors fed DCP and TDN in excess of NRC recommendation to cows during milch and dry periods

This result agreed with that of Agarwal and Sharma (1986) who pointed out that the DCP and TDN fed to cows are

higher than the Morisson standards in selected villages around Karnal

But Agarwal et al (1989) observed that the quantity of nutrients fed to milking cows was just sufficient which disagreed with the present study

The results of the study are also contrary to the observation of Muraleedharan (1992) who reported that the overall deficiency of TDN in milking cows was 29 4 per cent in a study in selected areas of Kerala Whereas DCP was fed in excess of the requirement in most of the areas

In the organised sector of the present study an excess of 385 44 g of DCP and 1685 31 g of TDN were fed daily to cows in milk Whereas 69 96 g of DCP and 785 44 g of TDN were fed in excess daily to dry animals

In the unorganised sector an excess of 318 02 g of DCP and 1537 95 g of TDN were fed daily to animals in milk whereas 42 06 g of DCP and 555 59 g of TDN were fed in excess to dry animals

Virk et al (1978) studied the comparison between the utilization of nutrients and milk production efficiency at different levels of energy intake in cows and concluded that providing energy over and above NRC requirement is not economical at a milk production level of 10 15 kg/head/day

The t test was applied to know the difference if any in the feeding of nutrients to milch and dry cows (Table 19) The results of the t test showed that the quantity of DCP fed to milch animals in the organised sector was higher than that fed to the milch animals in the unorganised sector

Nevertheless there was no significant difference in the quantity of DCP fed during dry period between the two sectors Similarly in the case of TDN also no significant difference was noticed between the two sectors during milch and dry periods The results of the study shows that animals in both the sectors were being fed more than the NRC recommendations

The results disagreed with Singh et al (1987) who reported that there was underfeeding in animals resulting in dry matter scarcity of 69 per cent

Overfeeding of animals when the resources were limited to the farmers could be due to lack of knowledge about the scientific feeding of animals

Planning Commission report (1972) Tripathi (1991) and Rajendran and Prabaharan (1992) also pointed out the absence of scientific knowledge about feeding of balanced diet among cattle owners

Feeding of mineral mixture to cows was practised in 38 per cent of the households only at a rate of 15 30 g per day

5 5 5 Rearing of calves

In none of the households studied total weaning of calves was practised All the calves of the study area were allowed to suckle their dams In none of the households pail feeding was practised

Umoh (1982) reported that suckled calves survived better than bucket fed calves

Weaning started in female calves at 3 months of age and above (Table 20) whereas male calves were weaned from the first month and above The general trend was to wean the female calves at a later stage as compared to male calves (preferential feeding)

Preferential feeding was practised by a majority of dairymen (78%) But 22 per cent of the farmers did not follow preferential feeding A good number of households (44%) were found to wean female calves only at 6 months as against a good number of them weaning male calves at the age of three months More attention was bestowed on female calves because majority of the farmers were interested in rearing their own replacement stock They felt that raising one s own

young stock was more economic than buying replacements After milking the calves were let to suckle their dams for a period ranging from 15 minutes to 1 hour depending on the stage of lactation and sex of calf Younger calves were allowed to suckle for a longer time as compared to older calves Similarly female calves were allowed to suckle for a longer time than male calves

5.6 Breeding management

In the study area AI was widely accepted by the farmers for cattle breeding Eventhough 13 per cent of the households practised only natural service for impregnating their animals breeding by AI was the predominant practise followed by the majority of livestock owners (62%) Nevertheless there was 25 per cent households practising either AI/NS according to their convenience and choice

The results were in agreement with that of George and Nair (1990) and Rajendran and Prabaharan (1992) who also observed that AI was the dominant practise in breeding followed by the dairymen

The dairymen opined that quality of the progeny was the main consideration influencing the adoption of AI, whereas failure rate in AI and presence of a breeding bull in

the vicinity were the most important reasons for non adoption of AI

Balasubramaniam and Knight (1992) and Rajendran and Prabaharan (1992) in their study also found that poor conception rate and long distance to insemination centre as reasons for non adoption of AI

Timely heat detection and the timely production of animals for AI were of paramount importance for successful conception The farmers of the study area took their animals for AI or NS within 6 24 hours after the onset of heat with a mean of 15 3 ± 0 86 hours The result of the present study revealed that a large proportion of dairymen were not aware of heat signs and the right time for inseminating their animals

Dubey and Singh (1976) and Rath (1977) also observed in their study that the majority of farmers had poor knowledge about oestrus cycle and the right time for AI in dairy animals

Nataraju and Channegowda (1986) stated that 80 per cent of the dairymen were familiar with artificial insemination

In the study it was observed that 1 6 AI were required for conception with a mean of 2 6 ± 0 27

Similar results were also observed by Singh and Singh (1989) and Gopakumar (1992)

The results did not agree with Bhaskar et al (1992) who pointed out that on an average the number of AI per conception was 2 36 in a study carried out at Bangalore

For exploiting the potential of dairy animals and thereby maximising the profit from dairying apart from milk production reproductive management should be given utmost importance In order to make cattle keeping more economic heifers should calve at the lowest possible age and cows should calve at regular intervals with a short calving interval

The mean age at first AI was 32 1 ± 0 10 months and age at first calving was 40 7 ± 0 27 months in the study area (Table 22) The high age of puberty and high calving interval may be because calves are generally neglected after weaning resulting in low nutrient intake and retarded growth

The results disagreed with George and Nair (1990) who revealed that age at first calving was 33 30 months and Gopakumar (1992) who reported that age at first calving was 43 7 months

The mean calving interval of the cows studied was 16 53 ± 0 51 months The longer calving interval may probably be due to poor heat detection of animals conception failure and deliberate skipping of heat The study has revealed that a sizeable proportion of the farmers in the study area skipped a few heats fearing that the milk yield will drop if animals conceived early in lactation

The results were in accordance with George and Nair (1990) and Gopakumar (1992)

But Bhaskar et al (1994) observed that the calving interval of crossbred cows in Bangalore was lower than that observed in the present study

The poor reproductive performance of cows resulted in heavy financial loss to the farmers

5.7 Heath care management

Veterinary service is one of the vital elements in the dairy development package Formerly the department of animal husbandry was the only agency concerned with veterinary service in the state They are carrying out prophylatic vaccinations and treatment through out the state Of late the milk co operative societies are rendering veterinary service though in a limited scale Veterinary

service from the milk co operatives is restricted to its members only The majority of farmers in the study area had strongly felt the need to give health care to their animals

George and Nair (1990) also reported that farmers are aware about the need for health care

But Kapse (1976) Garde (1980) and Gite (1980) revealed that dairymen lacked in the systematic knowledge of health care to animals

In this study it was observed that the households had relatively poor knowledge about the need for vaccinations and deworming of their livestock

Similar observations were also noticed by Bhaskar et al (1994) in a study carried out at Bangalore

5 7 1 Diseases reported by respondents

Often disease acts as a restraining factor in expressing the full productivity of livestock The households reported the incidence of infertility reproductive problems mastitis and other minor ailments during the study year (Table 23) The reproductive problems (15%) included dystokia prolapse of uterus retention of placenta endometritis Mastitis was a major problem in 12 per cent of the households The minor ailments included

anorexia parasitism diarrhoea pyrexia and foot diseases Only a single farmer reported the incidence of FMD

Disease surveillance report (1986) Singh et al (1989) and Bhaskar et al (1994) also reported similar results

Most of the dairymen studied were not aware of vaccination practises (Table 24) It was observed that only 23 per cent of the farmers vaccinated their animals and that too against FMD

Bhaskar et al (1994) also revealed that majority of the farmers neglected vaccinations

5 7 2 Deworming

Internal parasitism especially in the early stages of calfhood causes incalculable loss Diarrhoea is noticed in most cases of internal parasitism

Singh et al (1986) studied the age specific economic losses due to disease in livestock under field conditions and found that diarrhoea caused maximum loss in cattle and buffalo below one year of age

Although preventing parasitism is impracticable yet with modern drugs effective treatment is possible It was observed that only 56 per cent of the farmers were deworming

their livestock (Table 25) Surprisingly 28 per cent were not even aware of deworming practise in cattle

Similar findings were also reported by Bhaskar et al (1994)

But Anthony (1994) observed that farmers had good awareness about deworming of their livestock

Majority of the dairymen (53 57%) dewormed their calves only during the first month of calfhood whereas the remaining farmers dewormed their calves monthly and among them 16 07 per cent upto 2 months of age 17 86 per cent upto 3 months of age 7 14 per cent upto the age of 4 months and 5 36 per cent up to the age of 6 months The farmers bestowed more attention in deworming their female calves than the male calves This was because farmers were interested in rearing up female calves that being the replacement stock

Similar findings were also observed by Anthony (1994) in related studies in selected areas of Kerala

It was further noted that majority of the farmers (85 71%) used modern drugs for deworming their livestock while a small proportion of farmers (14 29%) used indigenous medicines only

Majority of the dairymen in the study area (64%) were getting veterinary service from the hospitals and dispensaries of the animal husbandry department (Table 26) Dairymen who were members of the co operative societies mainly depended on the veterinary services rendered by the societies At times the member farmers also approached institutions of the animal husbandry department for veterinary aid Bringing the veterinarian to the door step is expensive and is further compounded by high cost of medicines that has to be purchased at such instances In this context it is worth mentioning that the facility of emergency and weekly visits by veterinarian for a nominal charge arranged by the milk co operative has been a solace to farmers and is gaining wide acceptance at least in the study area

Data from the study area revealed that only 14 5 per cent of the animals were insured against diseases Some of the farmers deliberately kept away from insuring their animals for the premium was high and lot of formalities had to be observed if and when insurance settlement is claimed

Strangely enough a good number of farmers were not even aware of livestock insurance schemes Cattle insurance should be popularised among farmers

5.8 Milk production, consumption and disposal

5 8 1 Milk production

The average production of milk in the organised and unorganised sectors were 9 58 and 7 62 litres respectively per day (Table 28) The milk production per day was more in organised sector than the unorganised sector This must be because the organised sector had better producers (Table 27) which were fed regularly as the supplies and services from the societies were assured

Similar results were reported by Singh and Roy (1990) and Tripathi and Kunzru (1994) who pointed out that the average milk production in organised sector was more than the unorganised sector

5 8 2 Home consumption of milk

Milk is an important source of nutrition being a natural whole food Household consumption of milk is in the form of liquid milk as a whitener for tea and coffee or as milk products such as curd ghee and butter milk It was also observed that the quantity of milk retained for home consumption was very less in all the categories as compared to the quantity of milk sold in the market both among the members and non members The average home consumption of milk

(Table 28) in the organised sector ranged from 0 5 to 3 5 litres with a mean of 1 49 ± 0 20 litres whereas in the unorganised sector the home consumption ranged from 0 5 to 3 0 litres with a mean of 0 98 ± 0 07 Thus the milk consumption of member households was more than that of non member households

This result was contradictory to the reports of Patel et al (1984) Gangwar et al (1989) and Tripathi and Kunzru (1994) who reported that farmers of non milk co operatives consumed a major portion of the milk produced

The higher milk consumption in member households may probably be due to their higher milk production as compared to non members and also because of their better socio economic status

Gowswami (1994) also studied the consumption pattern of milk and milk products and found that high income group consumed most milk and the lowest income group consumed least milk

The portion of milk consumed at home had remained static even when the total milk production in the household increased However the quantity of milk sold increased with an increase in total household milk production among both members and non members Also it was observed that marginal

farmers were selling a larger portion of the milk produced than medium and large farmers

Similar results were also reported by Patel et al (1984) Gangwar et al (1989) and Tripathi and Kunzru (1994)

In the aggregate the average milk consumption per household was 1 16 litres per day Out of the total daily milk produced only 13 88 per cent was used for home consumption

Kaur and Gill (1989) in their study also reported high milk disposals in Ludhiana village which may probably be due to high milk production in these areas

But the results of the present study disagreed with the study of George and Nair (1990) who observed that 37 per cent of the milk produced was consumed at home as against 13 88 per cent observed in this study

5 8 3 Milk disposal

The sample households used three principal outlets for selling milk (Table 29) In the case of members everyone sold the major portion of the milk produced (83 03%) to the milk co operatives which they are obliged to do Though this is the case a proportion of the member households sold a portion of the milk produced (16 97%) directly to consumer

households But Tripathi and Kunzru (1994) reported that all members of milk co operatives were selling milk to dairy co operatives whereas in this study 16 97 per cent of the milk produced was sold directly to consumer households by the members of milk co operatives

Non members sold 76 94 per cent of the milk produced directly to consumers and the remaining 23 06 per cent to milk vendors In the overall sample 89 per cent of households were selling milk to either the milk vendors or the local consumers or both This proportion of farmers included 25 per cent from among the members who resorted to sell milk both to local consumers and the milk co operatives

One of the important reasons for this preference for local markets is due to the reason that the farmers were fetching a higher price from local sales than from the milk co operatives as observed in this study The price per litre of milk obtained from local sales was Rs 9 00 as against an average of Rs 7 80 paid by the milk co operatives The possible other reasons for local sales could be the following

1 milk price fluctuates as price paid from the milk co operatives is based on double axis pricing system

2 Social obligations as farmers are compelled to sell milk to their friends and neighbours as a social commitment

3 When production is substantially less especially towards the end of lactation period the households do not bother to carry the milk all the way to the milk co operatives

5.9 Division of labour in dairying

Unlike agricultural operation dairying demands routine labour for carrying out the scientific management practises In the maintenance of cattle there was very little use of hired labour in the study area This was clear from the percentage of cattle holdings that had engaged hired labour in the sample households (Table 30) But in 15 per cent of the households hired labour was engaged for milking the cows In all the dairy activities both male and female members participated but strikingly outdoor activities were predominantly done by males in general

It could be seen that in the case of outdoor activities like purchase and sale of cows purchase of feed sale of milk taking animals for service health care and fodder cultivation the involvement of husbands were significantly higher than wives But in the case of feeding shed cleaning washing of animals and calf care the involvement of wives was more This indicates that the involvement of wives is more in practises that are adopted indoors except in milking where there was an equal contribution

Finding of this study in the case of involvement of women in dairy chores in the village level is partly in agreement with Achanta (1982) who reported that the entire management of livestock was done by women whereas Bhatnagar (1982) reported that rural women were collecting fodder for the animals and performing activities like feeding of animals milking shed cleaning and collecting urine and dung for manure pit

George et al (1990) and Singh and Rani (1991) revealed that the participation of women in dairy activities was slightly higher than that of the male

But Singh and Sharma (1991) reported that the participation of females and males in livestock rearing was statistically at par

All the above studies reveal that there is an appreciable contribution of women by virtue of the physical involvement in cattle rearing

Another notable feature in the household labour utilization was the low level of participation of children The participation of children however was confined to purchase of feed sale of milk and taking animals for service and health care

For instance in eight households studied children performed activities like sale of milk taking animals for AI and purchase of feed Children were involved in the health care management in 7 per cent households In all other aspects of dairying the contribution of children was meagre

5.10 Economics of milk production

The analysis of costs and return is very important to know the economic viability and efficiency of any enterprise Therefore it is necessary to have information on economics of milk production so as to judge the profitability and feasibility of dairy enterprise

5 10 1 Cost of milk production in different farm holdings

A comparative economics of milk production in different categories of farm holdings have been worked out and shown in Table 31 Total cost of production of milk worked out to be Rs 15 709 99 in marginal holdings Rs 16 589 25 in small holdings and Rs 15 257 09 in medium holdings per lactation Net cost came to Rs 13 008 98 in marginal Rs 13 648 05 in small and Rs 12 276 93 in medium holdings Higher cost of milk production noticed in marginal and small holdings was because of higher production of cows

and cost of feed But when the cost of milk production was calculated the difference per litre was found to be not significant

The cost of feed accounted for the highest share in expenditure being 65 63 per cent 69 35 per cent and 63 87 per cent for marginal small and medium holdings respectively Labour charges were the next major expenditure in all the holdings followed by depreciation interest on fixed capital and medicines and miscellaneous charges

A similar trend in expenditure was also reported by Sardiwal (1974) Ram and Singh (1975) Reddy et al (1980) and Singh et al (1986) in different parts of the country

The cost of concentrate accounted for the highest share in expenditure viz 35 74 per cent in marginal holdings 39 15 per cent in small holdings and 31 14 per cent in medium holdings Highest expenditure on concentrates in small holdings could be due to the presence of better milk producers Lowest expenditure on concentrates was in medium holdings as they fed more of green and dry fodder from their own fields to their livestock

Dairymen of both small and medium holdings invested more on fodder than the dairymen of marginal holdings Because of their poor economic base farmers of marginal

holdings spent less to purchase fodder including straw Further these items were costly too

Labour charges were highest for medium holdings followed by marginal and small holdings The higher expenditure towards labour in medium holdings was because of their higher economic status and hence could engage more of hired labour for milking and fodder cultivation

Depreciation and interest on fixed capital did not show much variation between the holdings

The cost of production of one litre of milk worked out to Rs 6 37 in medium holdings Rs 6 61 in small holdings and Rs 6 81 in marginal holdings The lower cost of milk production noticed in the medium holdings may be due to the lower expenditure on feed and other miscellaneous cost The possible reason behind incurring lesser expenditure towards concentrates could be that the dairymen of medium holdings could cultivate fodder and judiciously use it by virtue of the availability of land for fodder cultivation

The results of the study agree with Rao (1986) Kumar and Gupta (1988) Mahanta et al (1988) and Goswami and Rao (1992) who also reported that cost of milk production decreased with the increase in size of land holding

5 10 2 Economics of milk production in different holdings

Average milk yield of cows its value net income and input output ratio are worked in Table 32 The milk yield per cow during lactation was 1910 80 litres valued at Rs 15 986 23 in marginal 2063 67 litres valued at Rs 17 281 75 in small holdings and 1926 33 litres valued at Rs 15 732 83 in medium holdings Net income per lactation was found to be Rs 2977 25 in marginal holdings followed by Rs 3633 70 in small holdings and Rs 3455 90 in medium holdings Input output ratio indicated that one rupee investment in milk production generated the highest return of Rs 1 28 in medium holdings followed by Rs 1 27 in small and Rs 1 23 in marginal holdings Higher net income noticed in the small holdings may be due to the higher production of their animals whereas the increase in the net income noticed in the small holdings is due to their lesser expenditure on feed cost

The results agreed with the findings of Rao (1986) Kumar and Gupta (1988) Mahanta et al (1988) and Goswami and Rao (1992) who reported that the input output ratio increased with the size of the holdings

However the results disagreed with Gangwar et al (1989) who pointed out that the net returns per litre of milk

was highest on small farms and lowest in large farms in a study carried out at Haryana

5 10 3 Cost of milk production in organised and unorganised sectors

A comparative study of the economics of milk production of organised and unorganised sectors are as shown in Table 33

The total cost of production of milk was worked out to Rs 16 402 93 in organised sector and Rs 15 744 23 in the unorganised sector The net cost came to Rs 13 538 94 and Rs 12 972 35 in the organised and unorganised sectors respectively

Higher cost of milk production in organised sector was mainly due to the maintenance of higher milk producers and adoption of better management practises

Singh and Roy (1990) and Tripathi and Kunzru (1994) also reported that the average milk production per day was higher in the organised sector than the unorganised sector

The cost of concentrates accounted for 39 24 per cent of the overall expenditure in the case of organised sector and 36 59 per cent in the case of unorganised sector Higher investment on concentrates in organised sector was due to the

better economic position of the farmers and also because they possessed better animals High expenditure on fodder in the unorganised sector was because the farmers were restoring to feeding more of roughages as compared to concentrates as concentrates were more expensive than forages

The results agreed with Mattigatti et al (1990) who reported that feed cost formed the major component of the expenditure for the maintenance of animals in both organised and unorganised sectors

Labour charges were more in the unorganised sector because the dairymen had to spend more labour for purchase of feeds health care and breeding of their animals The cost of medicines was lower in the organised sector because veterinary service was available to them from societies at a nominal charge Depreciation and interest on fixed capital was more in the organised sector because they possessed costly animals and invested more on infrastructures

The cost of production of one litre of milk worked out to Rs 6 63 in organised sector and Rs 6 89 in unorganised sector

The results of the study disagreed with Mattigatti et al (1990) who reported that the cost per litre of milk

production was lower in the unorganised sector as compared to organised sector

5 10 4 Economics of milk production in organised and unorganised sector

The milk yield per cow during a lactation was 2041 35 litres valued at Rs 15 932 34 in organised sector and 1881 07 litres valued at Rs 16 384 49 in unorganised sector as shown in Table 34 The net income from unorganised sector (Rs 3412 14) was more than that from the organised sector (Rs 2393 40) This was because dairymen in the unorganised sector could sell the milk to the local consumers for a better price The average price realised by farmers in the co operative societies was Rs 7 804 per litre In contrast the unorganised farmer sold their milk mostly directly to consumers at an average rate of Rs 8 710 per litre

The input output ratio indicated that one rupee investment in milk production generated Rs 1 18 in organised sector and Rs 1 26 in unorganised sector

The results of the study are contradictory to the reports of Mattigatti et al (1990) and Singh and Roy (1990) who observed that the net returns per litre of milk was higher in the organised sector than the unorganised sector

5.11 Disposal of cows

In the past five years majority of the households had sold their animals (Table 35) A number of reasons were indicated by dairymen for selling their animals These reasons were ranked based on the increasing percentage of cows disposed of for a specific reason The reasons reported by the respondents were old age (28 27%) followed in that order by immediate requirement for cash (27 23%) poor production (15 71%) disease (11 52%) lack of family labour (11 51%) and bad temperament (5 76%)

Old age and poor production accounted for 43 98 per cent of the disposals

The results of the study agreed with Fosgate (1965) White and Nicholas (1965) Van Vleck and Norman (1972) Chikara and Balaine (1977) and Reddy and Nagarcenkar (1989) who also observed a similar trend in the disposal of cows

In the study immediate requirement of cash was the reason influencing the sale of about 27 23 per cent of the cows and ranked second

The result of the study partly agreed with Gincy et al (1988) Arya and Nadkarni (1987) and George and Nair (1990) who found out in their studies that immediate cash

requirement was the most important reason for the disposal of animals

Lack of family labour was the reason cited for the disposal of 11 51 per cent of animals in the study In the management of livestock the utilization of hired labour was very low in the study area This was because hired labour was expensive

Only a meagre proportion (5 76%) of the cows were sold because of their bad temperament Maintaining such animals will be difficult for the family especially when women has to handle these animals

Out of the cows disposed 62 30 per cent 27 23 per cent and 10 47 per cent belonged to the marginal small and medium holdings respectively

5.12 Constraints in dairying

Various constraints have been identified by researchers as responsible factors for the lack of success in improving the productivity of dairy animals These constraints often impede the adoption and practise of dairy technologies Hence an attempt was made to pool together the various constraints as perceived by the farmers of the study area to know about the intensity of these constraints and to

pin point the important ones The constraints were ranked separately under four major domains viz feeding health care breeding and other management constraints and were also overall rank ordered after pooling them

5 12 1 **Feeding constraints**

For successful dairy farming proper and balanced feeding is of paramount importance Any short comings in feeding will impede optimal utilisation of the genetic potential of animals in regard to their growth reproduction and milk production Table 36(a) showed the constraints faced by the respondents in the feeding of their dairy animals Majority (56%) of the farmers reported that feeds and fodders were costly followed in that order by poor knowledge of scientific feeding of their herd (42%) lack of grazing facility (32%) inferior quality of commercial feeds (31%) lack of land for fodder cultivation (27%) lack of irrigation facility for raising crops (19%) frequent change of feed supplied through societies (11%) and inadequate knowledge about fodder cultivation (6%)

Thus high cost of feeds lack of knowledge about scientific feeding of livestock lack of grazing facility and poor quality of commercial feeds were the major constraints felt by the dairymen

Similar constraints were also reported by majority of workers in related research study (Jothiraj 1974 Sohi and Kherde 1980 Balasubramaniam and Knight 1982 Bhoite and Shinde 1987 Malik and Patel 1987 Gincy et al 1988 George and Nair 1990)

5 12 2 Health care constraints

Veterinary care is one of the important elements of the dairy development package For a successful dairy enterprise this service should be made available at an affordable cost and in a manner convenient to the farmers

High cost of medicines was reported by 34 0 per cent followed in that order by higher disease incidence in crossbreds (28%) non availability of vaccination facilities when required (25%) veterinary service at door step was costly (25%) lack of space for isolating sick animals (25%) etc were the important constraints felt by farmers (Table 36(b))

The results of the study agreed with the reports of Gincy et al (1988) and Singh and Thomas (1992)

5 12 3 Breeding constraints

The unsatisfactory reproductive performance of animals may result in heavy economic loss The constraints

faced by the dairymen in breeding are depicted in Table 36(c)

Non availability of timely AI facility was reported by 38 per cent followed by poor conception rate in AI (23%) curtailment of free repeat AI (21%) and high breeding charges (17%) were the major constraints reported by the farmers

Similar findings were also observed by Balasubramaniam and Knight (1982) and Bhoite and Shinde (1987)

The results of the study has revealed that the AI services rendered need to be revitalised so as to minimise the problems faced by the farmer

5 12 4 Other management constraints

From Table 36(d) it was observed that majority of farmers (50%) reported low price of milk followed by lack of subsidy (39%) lack of family labour (35%) high maintenance cost of crossbreds as compared to local cows (28%) are the major management constraints

The results of the study were in accordance with Bhoite and Shinde (1987) Gincy et al (1988) and George and Nair (1990)

The overall ranking of constraints revealed that the most important five constraints in their order of intensity were the high cost of feed and fodder (56%) low price of milk (50%) inadequate knowledge about scientific feeding (42%) lack of finance or subsidy (39%) and lack of family labour (35%)

It could be very well seen from the above that except for the constraint lack of family labour all others need policy making from the part of government organizations concerned with milk production in the state

5.13 Package of recommendations

1 From the study it was observed that majority of dairymen preferred to rear up their own calves Further it was seen that both age at first service and age at first calving were high In view of these observations it can be recommended that there has to be proper follow up of the management of these calves This can be made possible by enrolling these calves under schemes like calf subsidy scheme The local milk co operative societies can take leadership in this regard

2 Those who purchased the cows preferred to buy cows of either first or second parity But marginal farmers preferred to buy cows of third parity because they were

unable to mobilise the required capital to buy cows of either first or second parity which was costlier Because of their comparative old age third parity animals were poor producers In view of this it can be recommended that financing agencies may liberally assist the marginal farmers with the required capital to purchase cows of either first or second parity

3 Majority of the cattle sheds were lean to type with concrete floor and thatched roof Such a cattle shed is the most ideal under local conditions But provisions for disposal of cattle shed wastes dung urine etc was too inadequate Hence the dairymen need to be trained in hygiene and in providing dung pits urine channel etc

4 The finding that DCP and TDN were fed in excess of what is recommended by NRC to both milch and dry cows necessitates imparting knowledge about scientific feeding of cows to farmers This training element cannot be overlooked as feeding is the most important determinant of cost of production as revealed in this study A feeding regime should be formulated by scientists taking into consideration the cost and locally available resources Such a recommendation for the study area is given below

a Ration for a cow weighing 350 kg

Compounded cattle feed	0 75 kg
Paddy straw	2 kg
Green grass	15 kg

b Ration for a cow weighing 350 kg and producing 5 kg milk with 4 per cent fat

Compounded cattle feed	2 5 kg
Rice bran	1 kg
Paddy straw	2 kg
Green grass	15 kg

5 Although AI remained the predominant breeding practise the conception rate was poor This was because farmers were less skilled in detecting heat and were unaware of the right time to inseminate So also farmers seldom practised inseminating the animals in the first few heats after parturition fearing loss of milk production thereby prolonging the inter calving period The farmers therefore need to be appropriately educated in the scientific breeding practices to make dairying more economical

6 Though a majority of dairymen were deworming their animals yet many were not doing it periodically A few farmers were not even aware of deworming practise Only a few farmers vaccinated their animals against infectious diseases So also a good many farmers were

not even aware of cattle insurance schemes All these point to the inadequate extension educational efforts prevailing in the area A suitable training package need to be formulated and recommended to extension agencies concerned with dairy development Proper linkage should be established between the milk co operatives and the local veterinary institutions such as hospitals AI centres etc The policy makers in the insurance department should positively think of further subsidising the cattle insurance premium as many farmers kept away from insurance because of the high premium rates

7 The labour involved in dairying can be considerably reduced by adopting labour saving management practises For instance the floor of the cattle shed shall be preferably made of cement with recommended slope providing proper drainage channel for urine and waste water easy to clean manger proper disposal pit for cattle shed waste and dung at a safer distance from the cattle shed etc have to be recommended So also frequent purchase of feed could be avoided and all these will reduce the drudgery of labour considerably

Summary

SUMMARY

Under homestead farming system only a few heads of cattle are generally maintained when compared to organised dairy enterprise As a result the quantum of inputs in dairy under homestead will be very much different from that of organised farms The present study was carried out with a view of estimating the existing practises of management components of inputs and cost of milk production in the rural unorganised and organised areas

The study was carried out at Kalady panchayat of Ernakulam district The area was purposefully selected for the study since this is the area of operation of the people s dairy development project (PDDP) and the Anand pattern co operative milk societies (APCOS) A list of milk producers owning cows in milk during the period of study was prepared From this sample frame a sample of hundred households was drawn at random The required data was collected from the households by direct observation and personal interview supported by a structured and pre tested schedule

Out of the households studied in the two villages viz Matoor and Kalady 36 per cent were members of milk societies and the remaining 64 per cent were non members Majority of the dairymen were above 44 years Most of the

respondents were engaged in agriculture and animal husbandry activities Sixty nine per cent of the households studied had less than one acre of land (marginal holdings) 20 per cent had 1 2 acres of land (small holdings) and 11 per cent had more than 2 acres of land (medium holdings)

The livestock species reared by the households were cattle buffalo and goats Majority of the dairymen (85%) had a one cow unit 13 per cent had two cow unit and 2 per cent had three cow units There was a reduction in the herd strength from 1990 95 in all the holdings The reduction in the strength of animals may be due to sale of animals lack of family labour death of animals and high cost of maintenance of animals Majority of farmers raised their own replacement stock The rest of the farmers procured animals from other farmers and shandies The farmers of the study area showed a keen interest for raising female calves Majority of the cows were purchased as heifers (34 04%) followed by cows of first parity (29 79%) cows of second parity (27 66%) and cows of third parity (8 51%) The study clearly indicated that farmers preferred adult cows than heifers or calves Mainly four attributes were looked into while selecting dairy cows viz milk production appearance and confirmation colour and temperament Most of the farmers looked for more than one attribute while selecting cows In addition to these attributes farmers also

considered the age of animals price and also his financial position before purchasing animals Highest price was paid to cows in milk of first and second parity followed by cows in milk of third parity and heifers The average price of cows purchased was Rs 5673 94 and average age at purchase was 4 38 years

Majority of the households (59%) had pucca cattle sheds and the remaining (41%) had kutcha cattle sheds Lean to type sheds were more in number than independent sheds because it was easier to construct and incurred low construction cost The floors of the sheds were either of mud or stone paved or concrete The roofs were either thatched tiled or concrete The most common sub type (20%) of cattle sheds was the kutcha lean to type with thatched roof and stone paved floor The least common type seen was the pucca independent with tiled roof and mud floor (1%) and kutcha independent with thatched roof and concrete floor (1%) The mean length of shed was 318 01 cm and the breadth of sheds excluding manger was 188 5 cm Majority of sheds (85%) had feeding mangers In 15 per cent sheds feeding mangers were not provided The standing space provided for cows in the sheds was more than the space recommended and the width of the manger was less than the space recommended by both KAU and ICAR

Farmers fed commercial brands of compounded cattle feed like KS Prima and Godrej Coconut cake groundnut cake rice and wheat gruel are the commonly fed concentrates Cultivated green fodder grass shrubs weeds and paddy straw were the commonly fed roughages Crop residues and by products fed to animals included rice bran wheat bran maize bran tamarind seed cotton seed leaves and rhizomes In the households farmers practised a combination of stall feeding and controlled grazing Majority of farmers bought compounded feed from shops or markets But all farmers who are members of milk societies purchased compounded feed from societies at subsidised rate on credit basis But all farmers bought concentrates from shops or markets None of the dairymen purchased green fodder Bulk of the green fodder fed was collected from field bunds and other agricultural lands Only a few farmers (14%) cultivated green fodder About 44 per cent of the households practised controlled grazing Only a few farmers were self sufficient in paddy straw

The average daily consumption of compounded cattle feed was 3 32 kg The average quantity of coconut cake groundnut cake cotton seed cake and tamarind seed fed were 1 36 kg 1 14 kg 1 kg and 1 kg respectively The average quantity of rice gruel fed was 1 12 kg The study revealed the allocation of concentrate feed It was higher for

animals in milk followed by pregnant and dry cows Wheat bran rice bran and maize bran was fed in 37 per cent 22 per cent and 15 per cent of the households with corresponding averages of 2 07 kg 2 02 kg and 1 97 kg respectively Roughages like green grass and paddy straw were fed in all households to both milch and dry animals at a rate of 10 23 kg and 2 88 kg respectively The milch animals received more quantity of forage than dry animals

It was observed that dairymen of organised and unorganised sector fed DCP and TDN in excess of NRC recommendations to cows during milch and dry periods The results of t test showed that the quantity of DCP fed to milch cows in the organised sector was higher than that fed to milch animals in unorganised sector There was no significant difference in the quantity of DCP fed during dry period and TDN fed during milch and dry periods between the two sectors

In none of the households total weaning of calves was practised Weaning started in female calves at 3 months of age and above whereas male calves were weaned from the first month and above More attention was bestowed on the feeding of female calves as majority of the farmers were interested in rearing their own replacement stock

In the study area AI was widely accepted by farmers for cattle breeding But 13 per cent of the households practised only NS In the study it was observed that 2 6 AI were required for successful conception The farmers of the study area took their animals for AI or NS within 6 24 hours after the onset of heat The results revealed that a large proportion of dairymen were not aware of heat signs and the right time for inseminating their animals Delayed puberty and high age at first calving are because calves are generally neglected after weaning resulting in low nutrient intake and retarded growth The longer calving interval was due to poor heat detection conception failure and deliberate skipping of heat by farmers fearing that the milk yield will drop if cows conceived earlier So farmers have to be appropriately educated in the scientific breeding practices to make dairying economical

The dairymen of the study area mainly depended on the hospital and dispensaries of the animal husbandry department for veterinary services But farmers who were members of the milk co operative societies mainly depended on the veterinary services rendered by societies The households reported the incidence of infertility reproductive problems mastitis and minor ailments like anorexia parasitism diarrhoea pyrexia and foot disease Only one farmer reported the incidence of FMD The study revealed that dairymen had relatively poor

knowledge about the need for vaccinations and deworming of their livestock So also a good many farmers were not even aware of cattle insurance schemes All these point out the lack of proper extension education in the area A suitable training package need to be formulated and recommended to extension agencies concerned with dairy development The insurance department should think of subsidising the insurance premium so as to attract more farmers towards this scheme

The average daily milk production was more in organised sector (9 58 litres) than in unorganised sector (7 62 litres) This was because the organised sector had better producers which were fed regularly as the supplies and services from the societies were assured The quantity of milk retained from home consumption was less in both sectors when compared to the quantity of milk sold The home consumption of member households was more than non member households The portion of milk consumed at home had remained static even when the total milk production in households increased But the quantity of milk sold increased with an increase in total household milk production in both sectors In the case of members the major portion of milk produced was sold to co operative societies and a small portion of milk was sold directly to consumer households Non members sold milk mainly to household consumers and some

quantity to milk vendors A small portion of members sold milk to local consumers due to the reason that they are fetching a higher price from local sales than from the milk co operatives as observed in the study

In the maintenance of cattle there was very little use of hired labour in the study area Hired labour was engaged for milking the cows In all dairy activities both husband and wife participated In the case of outdoor activities like purchase of feed sale of milk taking animals for AI etc the involvement of husbands were more But in the case of indoor activities like feeding washing of animals calf care etc the involvement of wives was more With regard to milking there was an equal contribution Another notable feature in household labour utilisation was the low level participation of children

Feed cost was the major expenditure in the maintenance of milch cows followed by labour charges depreciation interest on fixed capital and medicines and miscellaneous cost Highest cost of milk production was noticed in small and marginal holdings was because of higher production of cows and cost of feed But when the cost of milk production was calculated the difference per litre was found to be non significant Depreciation and interest on fixed capital did not show much variation between the holdings The cost of production of 1 litre milk worked out

to Rs 6 37 in medium holdings Rs 6 61 in small holdings and Rs 6 81 in marginal holdings The lower cost of milk production noticed in the medium holdings may be due to the lower expenditure on feed and other miscellaneous cost The results of the study showed that cost of milk production decreased with the increase in size of land holding

One rupee investment in milk production generated the highest return of Rs 1 28 in medium holdings followed by Rs 1 27 in small and Rs 1 23 in marginal holdings

Higher cost of milk production in organised sector was mainly due to the maintenance of higher milk producers and adoption of better management practises Feed cost was the major expenditure in both sectors Labour charges were more in unorganised sector because the dairymen had to spend more labour for purchase of feeds health care and breeding of animals Medicine cost was lower in organised sector because veterinary service was available to them from societies at nominal charge The cost of production of one litre of milk worked out to Rs 6 63 in organised sector and Rs 6 89 in unorganised sector One rupee investment in milk production generated Rs 1 18 in organised sector and Rs 1 26 in unorganised sector This was because the dairymen in the unorganised sector sold milk to the local consumers for a better price

A number of reasons were indicated by dairymen for the disposal of animals The reasons were old age followed in that order by immediate requirement for cash poor production disease lack of family labour and bad temperament of animals Old age (28 27%) was the most important reason for disposal of animals Only a meagre proportion of cows (5 76%) were sold because of their bad temperament Out of the cows disposed majority (62 30%) belonged to marginal holdings

The constraints felt by the dairymen with regard to the various domains of animal husbandry viz feeding breeding health care and other management constraints were studied It was observed that in the case of feeding high cost of feeds and fodders poor knowledge about scientific feeding of animals and lack of grazing facilities were the most felt ones Higher disease incidence in crossbreds non availability of vaccination facilities when required high cost of veterinary service at door step etc was the most felt health care constraints With regard to breeding poor conception in AI curtailment of free repeat AI and high breeding charge were the major constraints felt by dairymen Low price of milk lack of subsidy and high maintenance cost of crossbreds as compared to local cows were the major management constraints reported by the farmers The overall ranking of constraints across all the domains revealed that

the most important constraints in their order of intensity were the high cost of feed and fodder low price of milk inadequate knowledge about scientific feeding lack of finance or subsidy and lack of family labour

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* Originals not seen

Appendices

APPENDIX I

I Interview schedule for the analysis of management systems in homestead dairy production units

a Name of farmer
b Age
c Occupation
d Address
e Village
f Experience in livestock rearing

II Land holding

Cents/acres

III Species and number of livestock owned
(i) (a) cattle (b) buffalo (c) goat (d) others
(ii) Cow (a) in milk (b) dry (c) heifer (d) calf (e) bullock
(iii) Buffalo (a) in milk (b) dry (c) heifer (d) calf (e) bullocks

IV Source of cows
(i) a Own farm b Purchase from other farmers c Shandies d Own farm and shandies
(ii) Year of purchase
(iii) Stage of lactation at the time of purchase
(iv) Approximate age at the time of purchase
(v) Cost of animal at the time of purchase
(vi) Present value as assessed by the farmer

V Selection attributes of cows purchased

A (a) Milk production (b) appearance and conformation (c) Temperament (e) Colour

B Insurance of animals (a) Yes (b) No
(a) If yes amount spent
(b) Source of finance (1) Own (2) Bank

VI Feeding

Sl. No	Item	Source	Qty.(kg)	Cost/kg	Total

a What is the basis of feeding milking cows
b What is the basis of feeding dry cows
c What is the basis of feeding pregnant cows
d Time of feeding concentrate
e Time of feeding roughage
f Number of times concentrate fed/day
g Number of times roughage fed/day
h Number of times watered

i Time and quantity of mineral supplement fed/day
j Whether animals are taken for grazing (a) Yes (b) No
k If yes the approximate period/day

Feeding of calves
a Is weaning practised (a) Yes (b) No
b Do you practise preferential feeding of milk to male and female calves (a) Yes (b) No
c Upto what age milk is fed to calves (a) M (b) F
d Mode of feeding (1) Suckling (2) Pail feeding
e Time of feeding

VII Health care and reproduction
a Common diseases encountered
b Distance to the nearest veterinary hospital
c Details of vaccination carried out
(a) Disease (b) Season (c) Cost
d Details of deworming carried out
a Age at first AI/Natural service
b Nature of service
(a) Natural service (b) Artificial Insemination
c When is AI performed
d Number of AI/conception
e Cost of AI
f Common reproductive disorders encountered
g Post partum complications encountered
h Calving interval

VIII a Labour (a) Hired (b) Family
b Charges for hired labour in the locality (Male/Female)

Who does the various operations of cattle keeping

	Husband	Wife	Children	Hired worker
a Purchase of animals				
b Sale of animals				
c Purchase of feed				
d Fodder cultivation				
e Feeding				
f Milking				
g Shed cleaning				
h Calf care				
i Reproductive management				
j Sale of milk				
k Health care				
l Washing				

IX Housing
A (a) Independent (b) Lean to type
Roof (a) Thatched (b) Tiled (c) Asbestose (d) Concrete
Floor (a) Mud (b) Stone paved (c) Wooden (d) Concrete
Hygiene (a) Good (b) Bad (c) Satisfactory
B Year of construction of the building

C Cost of building
D Total housing space
E Space provided per adult animal
F Space provided per young animal
G Type and size of manger
H Whether animal is housed throughout the day
(a) Yes (b) No
I Depreciation of building

X Disposal of animals (last 5 years)
(a) Old age (b) Disease (c) Poor production
(d) Bad temperament (e) Want of money (f) Others
a Stock position 5 years back
b Stock position as on today
c Change in stock position over years

d Whether any animal was disposed during the last year
(a) Yes (b) No
e If yes number disposed
f Reason for disposal

XI Returns to farmers
I Production particulars
a Quantity of milk produced Date
b Stage of lactation
c Parity
d Peak yield
e Stage of lactation (days) at which peak lactation is obtained
II Previous lactation details (recall data)
a Peak yield
b Average daily yield
c Lactation length

A Disposal of milk

	Home use	Local sale	Milk vendors	Total
a Quantity				
b Cost				

B Sale of dung
Quantity of dung obtained
Amount of dung used in the farmer s field
Cost of dung
C Sale of gunny bags

APPENDIX II

Market rates of items studied under cost of milk production at the time of survey

Items	Cost/Price
Compounded feed	Rs 4 20/kg
Coconut cake	Rs 5 25/kg
Groundnut cake	Rs 6 50/kg
Gingelly cake	Rs 7 00/kg
Cotton seed	Rs 12 00/kg
Tamarind seed	Rs 6 20/kg
Rice gruel	Rs 4 50/kg
Wheat gruel	Rs 5 50/kg
Rice bran	Rs 2 00/kg
Wheat bran	Rs 4 00/kg
Maize bran	Rs 3 75/kg
Green grass	Re 0 70/kg
Paddy straw	Rs 2 50/kg
Empty feed bags (cattle feed)	Rs 11 50/bag
Empty feed bags (bran)	Rs 6 50/bag
Dung	Re 0 40/kg
Labour charge	Rs 5 00/hour

ANALYSIS OF MANAGEMENT SYSTEMS IN HOMESTEAD DAIRY PRODUCTION UNITS

By

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ABSTRACT OF A THESIS

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ABSTRACT

The present study was carried out with a view of estimating objectively the existing practices of management components of inputs and cost of milk production in the rural unorganised and organised areas The study was carried out in Kalady panchayat of Ernakulam district The required data was collected from the households by direct observation and personal interview using a pre tested schedule

Cattle buffalo and goats were the livestock species mainly reared by farmers Most of the dairymen had a single cow unit A reduction in herd strength was noticed in all the holdings during the last five years Majority of farmers raised their own replacement stock Regarding purchase of animals farmers generally preferred adult cows than heifers or calves Farmers considered attributes like milk production appearance and confirmation colour temperament and age of animals price and also his financial position before purchasing animals

Majority of households had pucca cattle sheds and the remaining had kutcha sheds Lean to type houses were more in number than independent houses as it was easier to construct and incurred low construction cost Most of the sheds had feeding mangers The standing space provided for cows in the

sheds were more than the space recommended and the width of manger was less than the space recommended by both KAU and ICAR

The types of feed fed to livestock are compounded feed concentrate cakes roughages and crop by products and residues The feed stuffs were mainly purchased from private shops markets or co operative societies None of the farmers purchased green fodder they mainly depended on fodder collected from field bunds and other agricultural lands The study revealed the allocation of feed stuff It was higher for animals in milk followed by pregnant and dry cows and heifers

It was observed that dairymen of both organised and unorganised sectors fed DCP and TDN in excess of NRC recommendations More attention was bestowed on the feeding of female calves than male calves as majority of farmers were interested in raising replacements

In the study area AI was the predominant practise in breeding The study revealed that a large proportion of dairymen were not aware of heat signs and the right time for inseminating their animals The longer calving interval was due to poor heat detection conception failure and deliberate skipping of heat by farmers

The households reported the incidence of infertility reproductive problems mastitis and minor ailments like anorexia parasitism diarrhoea pyrexia and foot diseases The study revealed that dairymen had poor knowledge about the need for vaccinations and deworming of their livestock So also a good number of farmers were not even aware of cattle insurance schemes

The average daily milk consumption was more in organised sector than unorganised sector The quantity of milk retained for home consumption was less in both sectors when compared to the quantity of milk sold There were three principal outlets for the sale of milk viz milk societies vendors and local consumers Farmers due to the reason that they are getting the highest price from local sales preferred to sell milk to local consumers

There was very little use of hired labour in the study area In all dairy activities family labour was engaged Outdoor activities were mostly done by husbands and indoor activities were mostly done by wives Another notable feature in household labour utilization was the low level participation of children

Feed cost was the major expenditure in the maintenance of milch cows followed by labour charges depreciation interest on fixed capital and medicines and

was highest in the marginal holdings and lowest in the medium holdings The result of the study showed that cost of milk production decreased with the increase in size of land holding One rupee investment in milk production generated the highest return of Rs 1 28 in medium holdings followed by Rs 1 27 in small and Rs 1 23 in marginal holdings

The cost of production of one litre of milk was lower in the organised sector as compared to the unorganised sector One rupee investment in milk production generated Rs 1 18 in organised sector and Rs 1 26 in unorganised sector

Old age immediate requirement for cash poor production disease lack of family labour and bad temperament were the reasons for the disposal of animals Out of the cows disposed majority belonged to marginal holdings

The most important constraints in dairying felt by the respondents were high cost of feed and fodder low price of milk inadequate knowledge about scientific feeding lack of finance or subsidy and lack of family labour