Abstract

A study on economic loss due to clinical mastitis in cross bred dairy cattle and effectiveness of mastitis control measures was conducted at Pavithreswaram Panchayat of Kollam district.

A sample survey was conducted on Ward 8 and control measures on mastitis like extension education, teat dipping, dry cow therapy and vitamin E & selenium supplementation was implemented at that ward. Only 1.15% of farmers of the ward were aware of mastitis control programs and only 1.15% were doing post Milk Teat Dipping.

Details of mastitis cases occurred over a period of one year at the panchayat was collected with the help of a research assistant. From February 1st , 2001 to January 31st 2002, there had been 131 mastitis cases at Pavithreswaram panchayat and of these 119 were fresh cases and 12 were repeat cases.

Of the 119 farmers affected with the disease in the panchayat,56.3% were doing agriculture and 51.26 % were doing dairying as main occupation. Dairying was profitable for 14.29% farmers. Incidence of mastitis was more during June and July months.In 74.05 % of cases attention of the animal at the time of affection was done by husbands. There was no difficulty in getting proper treatment to 96.18% cases showing the easy availability of Veterinary services.

The time of identification of the disease was before 7 AM in 79.39% cases and in 84.87 % of cases the gap between milking was more than 8 hours indicating a need of rescheduling in milk collection times by milk societies..

Loss due to mastitis was Rs.258890 for a period of one year for the Panchayat. Loss due to mastitis per animal was Rs. 1976. Of this 47.95% was due to decrease in yield of milk up to one month succeeding the infection, 21.37% was due to medicine cost, 9.24% was due to veterinary and travel expenses and 2.92% was due to loss of feed due to wastage and 18.52% was due to culling loss.

Among the affected farmers, only 11.76% were aware of mastitis and they were from the control group, were awareness campaign was conducted and this shows the need of awareness program. Usage of vitamin E and Selenium can be recommended as a control measure against mastitis. Teat dipping should be practiced as a regular event and thrust should be given during rainy seasons. Dry cow therapy should be practiced .Increased stress in renovation of cattle sheds as a part of local self government planning will lead to proper hygienic measures in cattle rearing.

STUDY ON ECONOMIC LOSS DUE TO CLINICAL MASTITIS IN CROSSBRED DAIRY CATTLE AND EFFECTIVENESS OF MASTITIS CONTROL MEASURES

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STUDY ON ECONOMIC LOSS DUE TO CLINICAL MASTITIS IN CROSSBRED DAIRY CATTLE AND EFFECTIVENESS OF MASTITIS CONTROL MEASURES

Introduction

Mixed farming combining crop husbandry with animal husbandry is the best strategy for maximization of income for small and marginal farmers who contribute bulk of the farming community in Kerala. The planned development of livestock sector can solve to a greater extent some of the basic and chronic problems of the state like low rate of growth and high incidence of unemployment, under employment, malnutrition and food deficit. As a result of the successful cattle development programmes undertaken in the state, Kerala could convert about 67 percentage of its cattle population into high yielding crossbred. The crossbred are having high production potential compared to the non-descript desi breeds and hence the value of livestock wealth has also increased. These changes have contributed to rapid increase in the production and consumption of milk.The growth in milk production has also contributed to an increase in the percentage share of income from dairy sector to the state domestic product from agriculture.(George and Nair , 1990)

Though cross breeding helped in increasing the production potential of cattle, it decreased the disease resistance ability of the cattle making them vulnerable to many production diseases, causing considerable loss in the state's economy. In terms of economic loss mastitis is one of the most important disease in the diary sector (Blood & Radostits ,1989).

Estimates show that on the average a quarter affected with mastitis results in a 30% reduction in productivity and an affected cow is estimated to loss 15% of its production (Blood & Radostits ,1989). In most countries surveys on the incidence of Mastitis irrespective of the cause shows comparable figures of about 40% morbidity among dairy cows. Reports available in the Directorate of Animal Husbandry, Kerala shows that there were 90336 reported cases of mastitis in Kerala during 1998-'99. It accounts to about 5% of female cattle population of Kerala. There can be at least a similar number of non-reported cases of clinical Mastitis and much more number of non-reported sub clinical Mastitis cases during

the same period. So a study on the economic loss due to mastitis in crossbred dairy cows is very important.

Background

The term Mastitis refers to inflammation of the mammary gland regardless of the cause. It is characterized by physical, chemical and usually bacteriological changes in the milk and by pathological changes in the gland (Blood & Radostits, 1989). The economic losses occurring due to mastitis varies with the severity of the case. W.B.Faull, et al has devised a classification of mastitis as follows;

A quarter with sub-clinical mastitis	---	The quarter feels normal. The milk has pathogens and many neutrophils but look normal Such mastitis is difficult to be diagnosed and usually will not be reported and so the economic loss could not be assessed.
A quarter with clinical mastitis.	---	Such cases are classified to 3 grades
Grade 1	---	The milk looks abnormal (usually a few clots in the fore milk) and has many neutrophils. The quarter, however feels normal and cow is not ill.
Grade 2	---	The quarter looks and feels abnormal but cow is not ill.
2A	---	The quarter is Swollen, hot painful and sometimes discolored. (Acute)
2B	---	The quarter is hard and lumpy and not painful. It may be enlarged or contracted.
Grade 3	---	The quarter has acute mastitis & cow is ill.

In clinical cases the loss due to mastitis comprises of the cost of drugs, the milk discarded, decrease in production, and veterinary expenses. In much severe cases there can be partial loss of production of cow (loss of quarter) or total loss due to death or culling. In addition to these, there is loss in manpower. A study on

the economic loss due to mastitis will be helpful in devising control measures against this dreadful problem.

Review of literature

In terms of economic loss mastitis is undoubtedly the most important disease with which the dairy industry has to contend (Blood & Radostits. , 1989). Most estimates show that on the average an affected quarter suffers a 30% reduction in productivity and an affected cow is estimated to lose 15% of its production (Morris,R.S. , 1973). An American figure suggests that mastitis costs $ 90 to $ 250 per cow per year in that country (Dobbins,C.N . ,1977).

Clinical mastitis has been reported as causing an overall decrease in production (covering all stages of lactation) of between 5.9% and 6.4%, whereas an 11% reduction was seen if mastitis occurred before peak milk production (Wood et al 1983). Mastitis may also decrease the length of lactation. In the USA, reduced milk production, including milk withheld because of antibiotic use, represented 85% of the loss per clinical case, drugs and veterinary fees represented 13% of the loss and increased labor 2% of the loss (DeGraves et al 1993).

The dairy survey conducted in three important dairy states yielded the following costs of prevention and treatment of mastitis per cow: a) Michigan ($34.36), b) Ohio ($48.29), and c) California ($31.24). These differences in costs most likely are due to differences in the respective dairy industries. The monetary losses due to mastitis fall into 7 major categories: 1) loss in milk production, 2) discarded milk, 3) increased replacement costs, 4) monies invested in therapeutic agents (antibiotics, etc.), 5) extra facilities and labor for treating the patients and cleaning the facilities, 6) veterinary fees, and 7) loss of the production unit (the cow) and the important genetic elements possessed by this resource. The National Mastitis Council estimates the monetary loss in discarded milk to be $ 1.0 billion, with an overall loss to animal agriculture of $2 billion (approximately $180.00 per cow) due to mastitis (NE 112 , USDA , 2000).

Mastitis is the costliest disease of the dairy industry today. Losses are estimated to be as much as $200 per cow annually. Mastitis can decrease total milk production by 15 to 20%. ((David R. Bray etal).

In India Dhanda and Sethi (1962) reported a financial loss of Rs.52.9 crores per year due to mastitis.

Milk losses due to mastitis exceed $1 billion yearly in the United States. Sub clinical cases, in which the udder and milk appear normal, are responsible for approximately 70 percent of these dollar losses, due to reduced production. In an average dairy herd of 100 cows, for each known clinical case, there are generally 15 to 40 sub clinical cases. Because of the sub clinical form and other characteristics of this disease, control measures must be applied on a herd, rather than individual cow, basis. Treatment and involuntary culling costs increase annual losses to the U.S. dairy industry to nearly $2 billion per year. Milk quality losses are more difficult to measure but increase the losses even more. (12).

Although mastitis is identified as a cause of massive wastage in dairying, the awareness of farmers of the importance of mastitis, especially subclinical mastitis is poor (Bushnell , R . B. , (1980) .

An Ohio State study in the early 1980s looked at the effects of supplemental vitamin E and selenium on mastitis incidence and severity. The greatest benefit was found when vitamin E and selenium were supplemented together at a rate of 1000 international units (IU) vitamin E per day and an injection in the dry period 21 days before calving of 0.045 mg of selenium per pound of body weight. This study and others completed by Ohio State University researchers have shown that supplementation with vitamin E decreases the incidence of mastitis, and selenium decreases the duration of these infections. Combining the two supplements results in the greatest increase in defense against mastitis (Smith et al 1984).

Research has shown that certain vitamins and minerals are important in fighting infections. Deficiencies of selenium, vitamin E and vitamin A increase both the number of new infections and clinical cases of mastitis. A balanced ration containing recommended levels of all nutrients improves the cow's resistance to all infections including mastitis. Selenium at 0.3 parts per million, vitamin E at 15 international units per kilogram and vitamin A at 3,200 to 4,000 international units per kilogram of dry matter in the total diet are recommended. The formulation of mineral supplements in many typical diets, especially for dry cows, is often inadequate to meet these levels (J. Rodenburg (1990).

Vitamin E and selenium serve to protect the integrity of cell walls from the harmful and destructive effects of free radicals, which are produced during energy metabolism. This is crucial for the proper functioning of healthy epithelial tissue, such as the reproductive tract and mammary system.. More recently, there has been an increase in interest in the role of vitamin E and selenium in reducing clinical and sub-clinical mastitis. One study showed a 30% reduction in clinical mastitis

when 1000 International Units (IU) of vitamin E was supplemented daily during the dry period. Another study indicated that vitamin E and selenium supplementation reduced the number of cows with somatic cell counts over 200,000 by 70%. These studies have led to the recommendation of adding 1000 IU's of vitamin E per head per day during the dry period, 500-1000 IU's during lactation, and 0.3 ppm selenium to the diet at all times. The addition of selenium to livestock feeds is strictly regulated by the Food and Drug Administration, and 0.3 ppm is the maximum amount allowed. It is important to supply all of the recommended vitamin E from supplemental sources when feeding stored forages, as the naturally occurring vitamin E can be extremely variable and quite low (Ron Meyer).

There is only one way to effectively stop the spread of mastitis in the dairy herd, and that is by applying teat dip to every quarter of every cow after every milking. Teat dips are used to remove milk residue left on the teat and kill organisms on the teat at the time of dipping. They also leave a residual film of sanitizer between milking. Teat dips have been shown to effectively reduce mastitis caused by S. aureus and S. agalactia, the most common types of mastitis Post milking teat dipping is effective in eliminating environmental organisms E. coli and Strep. uberis on the teats after milking.(David R. Bray et al) .

Zehner et al (1986) reported excellent results in preventing new mastitis infections by the use of suitable teat dips.

Dipping teats with a disinfectant is considered one of the most important steps in the prevention of new mastitis infections. When the practice of teat dipping is employed, the rate of new infections during lactation can be reduced approximately 50 percent within one year. After a two-year period, up to 75 percent of the infections can be prevented. If teat dipping is discontinued, the infection rate increases rapidly (Dan N. Waldner).

Keeping cattle on their feet for the first hour after milking will reduce the exposure of the teat end to bacteria during a period when the risk of infection is high. The risk of infection is greater after milking because the sphincter muscle at the end of the teat is relaxed permitting easier bacterial invasion. Providing fresh feed during and after milking is a simple way to keep cows standing. Proper fly control, both on the cows and in the stable, is also important. Flies cause stress and also carry mastitis causing bacteria from teat end to teat end. Teat injuries, nearly always result from damage inflicted by the dewclaws and hooves of the injured cow, and not by other animals. The frequency of teat injuries can be reduced by

providing adequate sized stalls, and by eliminating pendulous udders through selection and culling (J. Rodenburg, (1990).

During the early dry period tremendous stress is exerted on the udder because the gland must break down and absorb retained milk as well as millions of dead milk secreting cells. It is during this time and two to three weeks prior to calving that approximately 40 to 50 percent of new udder infections occur. Research has shown dry cow therapy can reduce the number of new infections during this period by up to 30 percent (Dan N. Waldner).

Treatment at drying off is important because dry cow therapy both cures existing infections caused mainly by contagious pathogens, and prevents the development of new infections caused mainly by environmental pathogens. Effectiveness of dry cow treatment is improved by the use of slow-release products that maintain effective levels of antibiotics for long periods in the no lactating udder (Stephen C. Nickerson).

Objectives

(1) To study the economic loss caused by mastitis in crossbred dairy cattle.

(2) To study the awareness of mastitis preventive measures among farmers.

(3) To suggest suitable control measures against mastitis.

(4) To find the most prevalent micro organisms causing mastitis in the selected panchayat

Methodology

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Pavithreswaram panchayat situated at kollam district was selected for the study. Of this panchayat, Edavatttom ward (Ward 8) was selected to study the effectiveness of mastitis control measures as the veterinary dispensary is situated at that ward. Discussions were held with panchayat president and officials regarding the conduct of the study and voters list and map of the panchayat were collected.

With the help of panchayat officials and veterinarians of that panchayat a VHSc certificate holder in animal husbandry subject was selected for conducting the survey works at Edavattom ward. Propaganda about the survey and study was conducted at the ward using notices. A survey of dairy farmers was conducted

from 26-01-01 to 10-02-01 at Edavattom ward after giving training to the surveyor. On 09-02-01 the survey report was presented at farmers club of SDAET at Edavattom and corrections were made.

The dairy farmers of the ward were divided to three groups and awareness camps were conducted and following medicines were distributed

a) Guardine 400ml (Povidone Iodine 0.5% solution , was given along with 100ml plasic bottle and the farmers were advised to use it for teat dipping after ten times dilution)
b) E care SE (Vitamin E & Selenium powder)
c) Floclox L (Ampicillin and Cloxacillin combination of intramammery preparation was used for dry cow therapy)

Altogether 66 farmers participated in the awareness camps. Classes on mastitis control measures and group discussions were conducted at these camps. On 5th July the farmers who had not attended the training classes were visited and medicines were distributed to them and they were made aware of mastitis control measures.

Veterinarians of the panchayat and nearby panchayats and livestock inspectors of the panchayat were briefed about the study. Separate registers were distributed to them to record cases on mastitis. From February onwards data collection from mastitis cases was also done with the help of a research assistant. Up to January 31st , 2002 there had been 131 mastitis cases in that panchayat. Loss in milk production at weekly and monthly intervals was noted to calculate the economic loss occurring due to this disease. Labor involvement, medical expenses, and other details were also collected by these field visits.

A review meeting of farmers of the ward was conducted on 14th July mainly by using participatory approach. Twenty-nine farmers attended the meeting. Following were the methods used.

1) Semi Structured interview:- Details of mastitis control measures being adopted by the farmers as per the advise was analyzed by using this technique (Chambers , R .1992)

2) Daily routine analysis and Gender analysis:- the daily routine of three farmers and their wives were compared in this method. (Chambers , R .1992)

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3) Historical Time line analysis:- Different aspects of cattle rearing at Edavattom ward for the period from 1960 to 1990 was analyzed with the help of elders of the ward (Chambers , R .1992)

4) Matrix Study:- The economic importance of different cattle diseases according to farmers and their views on different treatment methods to mastitis was analyzed using this method (Chambers , R .1992)

A feedback session was conducted and the results of the PRA technique was explained to the farmers (Chambers , R .1992)

Laboratory analysis was conducted on 13 Mastitis cases and the organisms causing the condition were also studied.

Results and discussions

Results of Survey

The total number of house holds in the ward was found to be 481. Of these 18% of house holds were rearing cattle. The total number of dairy cattle in the ward was found to be 115 and among them 87.83% were milking animals.

The demographic characters of the farmers, awareness on mastitis control measures and milking practices followed by them were noted during the survey. Only one farmer was aware of mastitis control measures and only one was doing post milking teat dipping to control mastitis.This clearly indicates the need of awareness campaigns for preventing mastitis.

24% of farmers were having mud floor for their cattle sheds and they were unhygenic. 35% were having dirty floor with improper drainage and 43% farmers were having sheds with improper ventilation . This clearly indicates the need of increased stress on introduction of modern cattle sheds for reducing economic loss due to mastitis in Local Self Government planning.

Hired labourers were employed in 29.89% cases. 11.49% of farmers were having animals yielding more than 10 liters. Only 2.3% of farmers were of below high school level and majority were above high school level.

Details of survey conducted at Edavattom ward

Data	Number	Percentage
Total No of households	481	
No of households with cattle	87	18.09
Total No of cattle	115	
Total No of yielding animals	101	87.83
Total No of yielding and pregnant animals	22	19.13
Total No of not yielding but pregnant	13	11.30
Total No of not yielding and not pregnant	1	0.87
Milking done by labourers	26	29.89
No of farmers with mud floor	21	24.14
No of farmers with unhygienic floor and not proper drainage	31	35.63
No of farmers with no proper ventilation	38	43.68
No of farmers doing teat dipping	1	1.15
No of farmers aware of mastitis control measures	1	1.15
No of farmers for whom dairying is the main occupation	7	8.05
No of farmers having animals yielding more than 10 liters	10	
Educational qualification of farmers		
Below high school	2	2.30
High school	60	68.97
Matriculation & above	20	22.99
Others	5	5.75

Results of Review meeting of farmers

A review meeting of farmers of the ward was conducted on 14th July mainly by using participatory research methodology. A feedback session was conducted and the results of the PRA technique were explained to the farmers.

1)Semi Structured interview:-
The results of interview is tabulated as follows

Post milking Teat Dipping						Vitamin E supplement (E care SE)					
Usage		Dilution		Used by whom		Usage		Dilution		Used by whom	
Using	25	Normal	19	Husband	16	Using	26	Normal	18	Husband	18
Not Using	2	Over dilution	6	Wife	6	Not Using	1	Over dilution	4	Wife	6
No idea	2	Not using	2	Son	2	No idea	2	Under dilution	4	Son	2
		No idea	2	Employ	1			Not using	1	Not using	1
				Not using	2			No idea	2	No idea	2
				No idea	2						

The percentage of adoption was of the order of 86.2% for Post Milking Teat Dipping and 89.6% for Vitamin E supplementation. The percentage of proper adoption for PMTD was found to be 65.5% and for Vitamin E supplementation to be 62%. Among farmers, 6% of the population was not using PMTD and 3.4% were not using supplementation. Again, 6% of the population has no idea on using both. Even though extensive extension work was done percentage of adoption was not satisfactory showing the need of constant reinforcement and monitoring in extension work. Regarding PMTD, 55%of the usage was by husbands and for supplementation it was 62%. This indicates that husbands play a major role in the adoption of scientific techniques .

2) Daily routine analysis and Gender analysis:-

Of the three families considered for the study, husbands were involved in cattle rearing activities in two cases and wife was actively involved in one case. The time spent by the families was as follows;

	Time spent by husband	Time spent by wife
Case 1	3 hours & 30 minutes	30 minutes
Case 2	3 hours	Nil
Case 3	Nil	7 hours & 30 minutes

The husband was spending 1 hour per day in the 1st case for marketing milk to society. The wife was spending 1 hour 30 minutes to carry the milk to society in the 3rd case.(Appendix – 1)

3) Historical Time line analysis:-

Incidence of mastitis was found to be more from 1970 onwards as milk production was more. Production further increased from 1990 onwards. Mastitis increased mainly due to milking according to the timings of the society and due to irregular attendance of milkers. Irregular attendance of labourers can be a serious problem as 32.7% of farmers affected with the problem were depending on labourers for milking. From the incidence pattern it can be clearly understand that as the gap between two milking increases to more than 10 hrs the incidence decreases (Appendix - 2)

3) Matrix Study:-

a)The economic importance of different cattle diseases

The economic importance of different cattle diseases according to farmers and their views on different treatment methods to mastitis was analyzed using this method. Mastitis ranked first in economic importance to farmers followed by FMD, Dermatitis, Enteritis, Aflatoxicosis, Ketosis and Fever. The reasons for this ranking were also found. Mastitis was considered most important due to the permanent production loss and due to the economic loss it causes. (Appendix - 3)

b)Comparison of different treatment methods

Comparison of different treatment methods and the preferences of farmers to these treatments were studied using Matrix method. Farmers preferred Allopathic treatment followed by Homoeo, Ayurveda and least importance was given to native methods. Since mastitis occurs mostly as an acute condition leading to rapid loss of milk production, allopathic treatment is suitable. (Appendix - 4)

4) Seasonality analysis:-

Occurrence of various diseases when compared to seasonality was also studied. Though mastitis could occur always it was found to be more during June and July. Seasonality study of other diseases was also studied. Since it will be rainy seasons during June and July animals will be stall fed and kept indoors. This indicates the need of increased attention regarding hygienic measures and teat dipping during this periods. Feeding schedule should be adjusted so that fresh feed should be given soon after milking so that cows will remain standing. Keeping cattle on their feet for the first hour after milking will reduce the exposure of the teat end to bacteria during a period when the risk of infection is high.(J. Rodenburg, 1990) (Appendix - 5)

Results of field visits

Information were collected from 131 mastitis cases and they were as follows;

1) Types of Mastitis cases

Fresh cases	119
Repeated twice	10
Repeated thrice	2

Of the 131 cases 119 were fresh cases and 12 were repeat cases. Of the repeat cases 10 cases repeated twice and 2 cases repeated thrice.

2) Using labour for milking

Using labour for milking	39	32.77%
Milking by self /family members	80	67.23%

Percentage of farmers employing hired labourers is similar in both sample survey and mastitis affected population. This shows that there is no correlation between hired labourers and incidence of mastitis.

3) Educational qualifications of farmers

No formal education	2	1.68%
Below H.S	51	42.86%
H.S	19	15.97%
Metric	37	31.09%
Above metric	8	6.72%
Degree & above	2	1.68%

Sample survey shows that only 2% of dairy farmers are having below high school education level. But among mastitis affected farmers 45% are from this group. So further study is required to establish the relationship between education level and dairy management.

4) Dairying as occupation

Main occupation	61	51.26%
Subsidiary occupation	57	47.90%
None of the above	1	0.84%

51% of affected farmers are having dairying as main occupation . This may be due to maintenance of high producing animals.(Graph 2)

5) Profitability of dairying

Profit	17	14.29%
Loss	60	50.42%
None of the above	42	35.29%

6) Awareness on Mastitis control measures.

Aware	14	11.76%

Not aware	105	88.24%

Among affected farmers 88% are not aware of mastitis and 11% are from the ward were awareness campaign was conducted. This shows the need of strengthening of extension works for the control of mastitis.

7) Attention at the time of mastitis.

Attention by husband	97	74.05%
Wife	26	19.85%
Both husband & wife	12	9.16%
Children	6	4.58%
Relatives	2	1.53%

Attention of the animal at the time of disease was done in 74% cases by husbands. This shows males are more involved in cross bred dairy management than females.(Graph 4)

8) Whether there was any difficulty in getting proper treatment.

Difficulty in getting proper treatment	5	3.82%
No difficulty in getting proper treatment	126	96.18%

In 96% of cases there was no difficulty in getting proper treatment. This shows the efficiency of veterinary service at grass root level.

9) Time of identification of disease.

Before 7 AM	104	79.39%
7-10 AM	6	4.58%

10-12 AM	2	1.53%
12-3 PM	14	10.69%
3-6 PM	3	2.29%
6 and above	2	1.53%

The time of identification in 79% cases is before 7 AM. This is due to retention of milk for a long period due to milking time, synchronized to milk collection schedules of milk societies.(Graph 3)

.10) Hygienic conditions

Mud floor	6	5.04%
Unhygienic floor and not proper drainage	42	35.29%
Ventilation not proper	25	21.01%

11) Stage of lactation

Early	70	53.43%
Mid	21	16.03%
Late	40	30.54%

In 53.43% cases incidence of mastitis is in early stage of lactation indicating that incidence of mastitis is more in early stage of lactation.(Graph 1)

12) Gap between milking in hours

7 to 8 hrs	18	15.13%
8 to 9 hrs	52	43.7%
9 to 10 hrs	41	34.45%
More than 10 hrs	8	6.72%

In 84% cases the gap between milking is more than 8 hours. This indicates that an interval of milking for more than 8 hours predisposes incidence of mastitis.

13) Month wise occurrence of mastitis

Month	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
No: of cases	6	13	8	15	23	15	10	15	12	4	6	4

As revealed by the seasonality analysis done by PRA technique , occurrence of mastitis was found to be most during June followed by May, July and September. This is due to the stress induced as a result of change in climatic conditions and due to keeping the animals stall fed during the rainy seasons.

Estimated economic losses

Up to 31st January 2002, there had been 131 mastitis cases in Pavithreswaram Panchayat. Loss in milk production and other details at weekly and monthly intervals from 1/2/2001 to 31/1/2002 was noted to calculate economic loss occurring due to these diseases.

Source	Loss	Loss Per average Mastitis case	Loss in terms of money	Total loss	Percentage
Decrease in Yield for one month succeeding the incidence of mastitis	12413,5 Liters	94.76 L	947.6 @Rs.10/Litre milk	124135	47.95%
Cost of medicine	55333 Rs	422.39 Rs	422.39	55333	21.37%
Loss of feed due to wastage.	755 Kg	5.76 Kg	57.6 @ Rs.10/ Kg cattle feed.	7550	2.92%
Veterinary and travel expenses	23922	182.61 Rs	182.61	23922	9.24%
Total time loss	1657.75 Hrs.	12.65 Hrs			
Loss due to culling	47950			47950	18.52%
Total expense for one Mastitis case			1610.20	258890	

The total loss due to mastitis in the panchayat for one year can be found to be Rs.258890 (Rupees Two lakhs fifty eight thousand eight hundred and ninety).Total loss per cow can be found to be Rs 1976.This huge figure warrants to the need of extension for controlling the incidense of mastitis.

The total cost of medicine comes to be Rs.55333 for 131 cases and the average cost of medicine per affected animal is Rs.422.39.This indicates the need of making available adequate supply of medic ines in Veterinary hospitals and increased investment in veterinary aid and modern infrastructure development in modern dairying. Change in time of milk collection by milk societies will lead to a decrease in interval between milking and can thus reduce mastitis. A huge amount of loss due to culling points to the need of introduction of insurance and mediclaim policies to livestock farmers.. An American figure suggests that mastitis costs $ 90 to $ 250 per cow per year in that country (Dobbins,C.N . ,1977).

Effectiveness of Mastitis control measures

While it is not possible to completely eliminate losses due to mastitis, there are recommended herd health practices that minimize the occurrence of mastitis. The following control measures were adopted at the Edavattom ward.

1. Extension education
2. Teat dipping
3. Dry cow therapy
4. Supplementation of Vitamin E & Selenium

Of the 131 mastitis cases that occurred in the panchayat 15 were from the Edavattom ward were control measures were taken. It was found that farmers were not following the control measures properly. The 15 farmers could be grouped as follows.

Details of farmers	Number	Percentage
Those who had given Vitamin E alone	2	13.33
Those who had given Teat dipping alone	1	6.67

Those who had given both Teat dipping & Vitamin E	4	26.67
Those who had not given both	8	53.33

Of the 9 cases in which dry cow therapy was done only 1 was affected with mastitis.

Of the affected farmers of the ward, only 26.67% were using the correct control measures even after trainings and extension works. This clearly indicates the poor percentage of adoption among the farmers and shows the need of constant reinforcement and more effective extension works like repeated field visits, modern training methods and use of audio visual aids.

Of the four control measures adopted, usage of vitamin E as supplement is costly but can be recommended to elite farmers. Teat dipping should be practiced as a regular event and thrust should be given during June and July seasons. Dry cow therapy should be promoted and practiced. Intensive extension education using leaflets,groupdiscussions and door step delivery of information with the help of NGOs should be practiced. Increased stress in renovation of cattle sheds as a part of local self government planning will lead to proper hygienic measures in cattle rearing.

Results of Laboratory analysis

Of the 13 cases, four were due to Klebsiella organism, three were due to E Coli organism, and six were due to other organisms. Sensitivity of major antibiotics were also studied.

Conclusion

Economic loss due to mastitis per animal was found to be Rs.1976 and for the panchayat it was Rs.258890 for a period of one year. . Awareness of mastitis control methods were very poor among farmers and was of the order of 1% among sample survey and 11% among affected farmers of which all were from the ward were awareness campaign was conducted. This warrants to the need of

strengthening of extension activities as a means of controlling mastitis. Intensive extension education using leaflets,groupdiscussions and doorstep delivery of informations with the help of NGOs should be practiced.

Of the four control measures adopted, usage of vitamin E as supplement can be recommended to elite farmers. Teat dipping should be practiced as a regular event and thrust should be given during June and July seasons. Dry cow therapy should be promoted and practiced. Increased stress in renovation of cattle sheds as a part of local self government planning will lead to proper hygienic measures in cattle rearing.

Further study is needed to assess the economic loss occurring due to sub clinical mastitis in cross bred cattle. The importance of scheduling the interval of milking and the incidence of mastitis also should be looked into.

Further study is needed in comparing the cost of inputs in controlling mastitis as suggested in the study and the resultant economic gain. The social impact of loss due to mastitis among dairy farmers also should be studied.

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Appendix - 1
Daily Routine Analysis

1.
Husband

Milking		Milk to society		Cutting grass		Feeding		Milking		Milk to society		Feedir
4	4.30	5.30	6	7	7.30	10	10.30	12.30	12.45	2.15	2.45	
6	6.30	8	8.15									

Wife

2.
Husband

Cleaning shed		Milking		Feeding & Watering		Watering & Milking		Feeding		Straw feeding		Feeding	
5.30	5.45	6		6.15	8	8.30	12	12.30		1		1.30	5
		5.30	7.30		8								

Wife

3.

Husband

Cleaning shed		Milking		Milk to society		Feeding & watering		Grass cutting & grazing		Milking		Milk to society		Feeding & watering		Feeding grass	
4	4.15	4.30	5	6.30	7.15	7.45	8	10		12.30	1	1.15	2				
2.45	3	5	7.30	7.45													

Wife

Appendix – 2

Historical Time Line

Year	Activity
1960	Key village started. Only insemination facilities were available. Breeding bulls were also used
1970	Most of the cows were desi breeds. There were 4 to 5 cattle in each house. Incidence of diseases was low.
1975	English medicine became popular.
1980	Milk society started. Cattle rearing flourished as milk procurement was started. Since milk was not fully taken in the society, people used to go to up to Pangodu society.
1984	Edavattom milk society was made as an Apcos society considering the request of farmers.
1990	Milk production increased. Jersey, HF and Swiss Brown became popular. Since milking time was adjusted based on milk collection time of society and since milkers became irregular, incidence of mastitis increased. Old cattle sheds were also a reason for mastitis. Veterinary dispensary started functioning.

Edavattom ward,
Pavithreswaram panchayat,
Venue: - K.S.M. Higher Secondary School, Edavattom.
Date: - 14/07/01
Time: - 10 A.M to 12.30 P. M.
No: of participants: - 30

Appendix - 3
Economic importance of different diseases

Pairwise and Matrix ranking

	Mastitis	FMD	Dermatitis	Enteritis	Aflatoxocosis	Ketosis	Fever
Mastitis							
FMD	1						
Dermatitis	1	2					
Enteritis	1	2	3				
Aflatoxicosis	1	2	3	4			
Ketosis	1	2	3	4	5		
Fever	1	2	3	4	5	6	

Criteria
Mastitis:- Permanent production loss leads to economic loss.
FMD:- Vaccination is possible.
Dermatitis:- Lasts longer and spreads quickly.
Enteritis:- Occurs seasonally. Causes economic loss.
Aflatoxicosis:- Lasts longer. Causes economic loss.
Ketosis:- Treatment cost is higher.
Fever:- Not much effect on production.

Appendix - 4

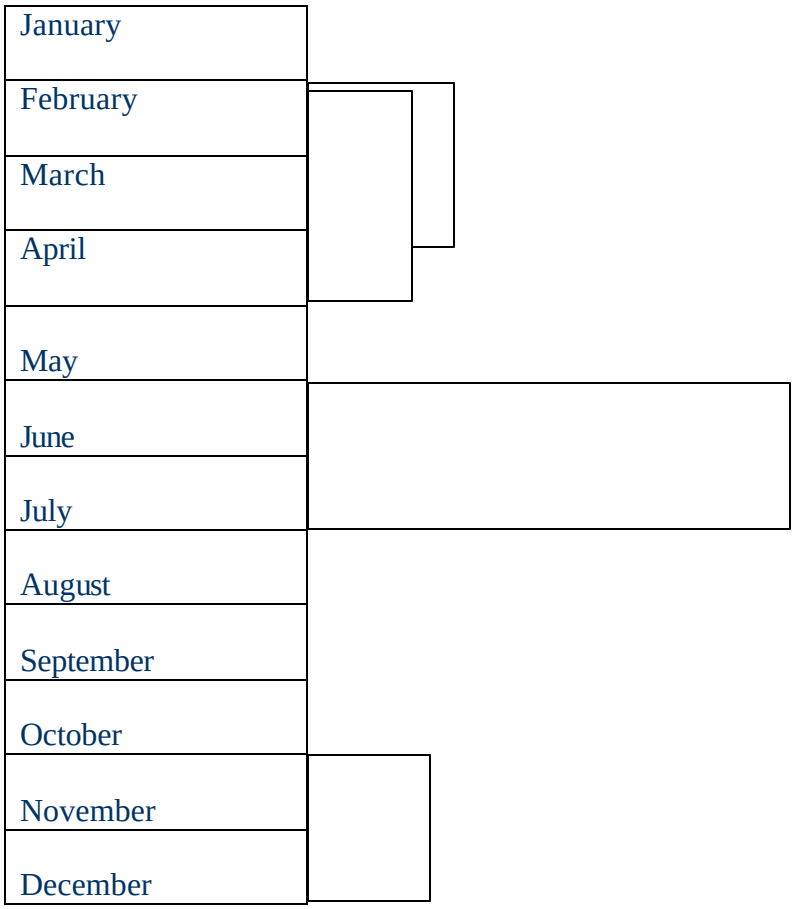
Comparison of different treatment methods in mastitis.

Pair wise and matrix ranking.

	Allopathy	Homoeo	Ayurveda	Manthra	
Allopathy					3
Homoeo	1				2
Ayurveda	1	2			1
Manthra	1	2	3		

(Done at Edavatttom Ward,Pavithreswaram Panchayat, on 14-7-01.
Number of participants – 30).

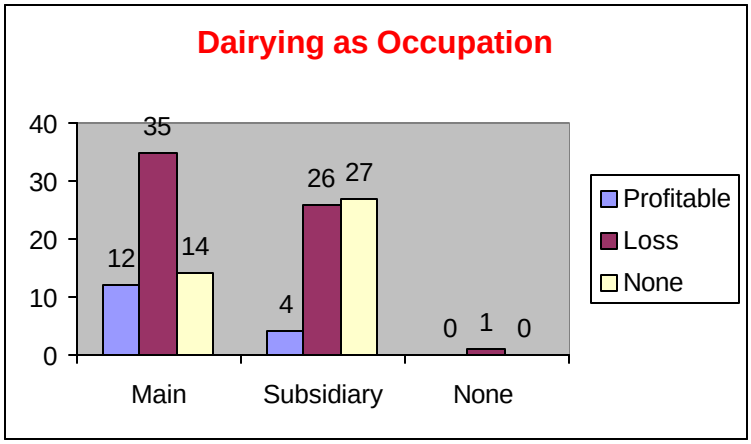
Appendix-5
Seasonality Analysis.



(Venue – KS M H S S.
Date – 14 – 7 – 01.
Time – 10 to 12.30
No of participants – 30).

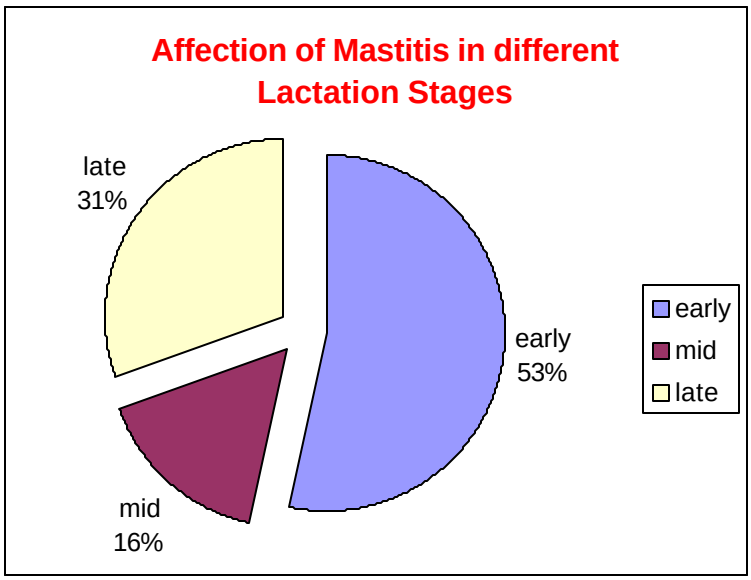
GRAPH 1

	Profitable	Loss	None
Main	12	35	14
Subsidiary	4	26	27
None	0	1	0



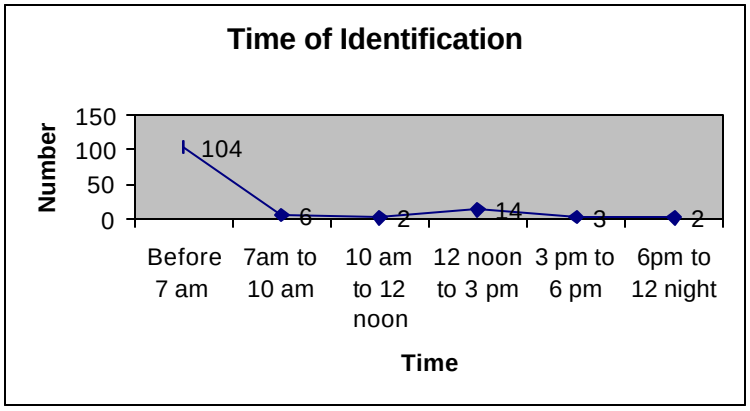
GRAPH 2

early	70
mid	21
late	40



GRAPH 3

Before 7 am	104
7am to 10 am	6
10 am to 12 noon	2
12 noon to 3 pm	14
3 pm to 6 pm	3
6pm to 12 night	2



GRAPH 4

Husband	97
Wife	26
Children	6
Relatives	2