PROBLEMS AND PROSPECTS OF CATTLE FEED MANUFACTURING UNITS IN KERALA

Thesis submitted to the University of Calicut for the award of the Degree of Doctor of Philosophy in Commerce under the Faculty of Commerce and Management Studies

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CERTIFICATE

This is to certify that this thesis on "PROBLEMS AND PROSPECTS OF CATTLE FEED MANUFACTURING UNITS IN KERALA" is an authentic record of the bonafide research carried out by Smt. PHILO FRANCIS under my supervision and guidance and that no part of it has been presented before for the award of any degree, diploma or other similar title.

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DECLARATION

I declare that this thesis is the record of bonafide research work carried out by me under the supervision of Dr. K.C. VIJAYAKUMAR, Professor, Dept. of Commerce and Management Studies, University of Calicut, Malappuram and that no part of it has been previously submitted to this or any other university for the award of any degree or diploma

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LIST OF ABBREVIATIONS

BPF	-	Bypass Protein Feed
CATA	-	Current Assets to Total Assets
CCF		Compound Cattle Feed
CLFMA	-	Compound Livestock Feed Manufacture's Association
COW CB	-	Cross Breed
COW ND	-	Indigenous Breed/Non-descript
DCP	-	Digestible Crude Protein
DTR	-	Debtors Turnover Ratio
G/P	-	Gross Profit
HYV	-	High Yield Variety
ITR	-	Inventory Turnover Ratio
K.S	-	Kerala Solvent Extractions Ltd.
KCMMF	-	Kerala Co-operative Milk Marketing Federation
KFC	-	Kerala Financial Corporation
Kgs	-	Kilograms
KSIDC	-	Kerala State Industries Development Corporation
CB	-	Commercial Bank
MSE	-	Malayalam Solvent Extractions Ltd.
MTPD	-	Metric Ton Per Day
N/P	-	Net Profit
NDDB	-	National Dairy Development Board
O/P	-	Operating Profit
OF		Operation Flood
RBI	-	Reserve Bank of India
RDP	-	Rumen Degradable Protein
ROI	-	Return on Investment
SAARC	-	South Asia Association for Regional Co-operation
TDN	-	Total Digestible Nutrients
UDP	-	Undegradable Dietary Protein
UMMB	-	Urea Molasses Mineral Block

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INTRODUCTION

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Chapter 1
Introduction

CHAPTER – I

INTRODUCTION

India has a long tradition of keeping milch animals as a part of the farming household. Animals were cared for and considered a great wealth even at the time of Harappa civilization .The Aryans, who came to India by 1500 B.C. were also engaged in cattle rearing. Cattle rearing is believed to be one among the first steps towards civilization. Livestock has played a crucial role in the development and progress of mankind. They provided human beings with food, energy, clothing and nutrition in addition to their contribution to transportation and agricultural activities. Cattle rearing now-a-days is a means of livelihood for many households. The entire family devotes a lot of time for their upkeep. Milk and milk products enjoy great value in society as a source of nutrition.

India, a predominantly agricultural economy, has the largest cattle population in the world. In villages which constitute the soul of India, houses without cattle are rare. India with an annual milk production of 69.84 million tons in the year 1997 ranked third in the world, after Soviet union and the United States. Our contribution to cow milk production amounted to 7.3% in 1997 and buffalo milk production in the same year was 63.3% to that of the world production[1]. Livestock development and livestock production play a

vital role in our economy as the cattle form the second largest contributor to the gross agriculture products.

The livestock sector accounts for 21 percent of the value of output of combined crops, and is about 29 percent of total gross domestic product of the economy. The livestock sector has good export potential and its export exceeds total import significantly. While the growth rate in the exports of agricultural products was 5 percent, exports from the livestock sector increased at an impressive growth rate of more than 11 percent during 1974-98.[2]

For the purpose of national accounts, livestock and livestock products sector covers production of milk, slaughtering, preparation and dressing of meat and production of raw hides and skins, eggs, dung, raw wool, honey, silk cocoons etc[3]. To improve animal husbandry, the Government of India has set up the Department of Animal Husbandry and Dairying with its offices in all the States.

According to Gandhiji, the milch animal is not a milk delivering machine. He knew that under prevailing conditions of Indian farming, animal husbandry and agriculture go together. It was due to his effort that the Government of India formulated the 'Key Village Scheme'[4]

Providing proper cattlefeed poses problems for farmers. Non-availability of fodder and concentrates in required quantity and at the required

time emphasises the need for establishing cattlefeed units in the country. With the beginning of the five year plan, cattlefeed industry had its humble beginning in India.

Kerala was not an exception to this. The first cattlefeed unit on a large scale was started during the year 1970 under the Animal Husbandry Department in Palakkad district under the name, Livestock and Poultry Feed Plant, which, later on, came to be known as *Milma Feeds*. Now there are several large and small concerns namely, Kerala Solvent Extractions at Iirinjalakuda and its units at different parts of Kerala, Milma Cattlefeed Plant at Pattanacuad, Koyenco Feeds Private Limited,at Calicut, Prima Agro Products Limited,at Cochin, , Kerala Feeds Ltd,at Kalletumkara (a public sector undertaking), Vijaya Feeds at Kodakara and Silpi Agrotech Private Ltd.at Vazhakulam.

There are also many small units all over the State catering to the local needs. Important among them are Malayalam Solvent Extractions, Royal Feeds and Mother Feeds. Some milk co-operative societies also have their cattlefeed units to meet the demands of their members.

Livestock management and allied activities make substantial contribution to Kerala economy by way of income generation, creation of employment opportunities particularly for women, enrichment of soil through organic recycling, calorific value addition to the nutrition of people and as an

important source of farm power management of livestock. The back yard system which originated in Kerala may perhaps be the ideal one for livestock management. In fact, Kerala produces more milk than its staple food, rice[5].

Despite these plus points Kerala could not attract the dairy industry to its soil on a commercial footing. The deficit of actual procurement and sale of milk was to the tune of 58 lakh litres in the year 1995. Productivity of milch cattle in Kerala was only around 5.26kg per day which has to be increased through scientific feeding and better management[6]. Though green fodder is inevitable and economic in livestock production, the limited availability of land for fodder production is the main constraint. Production of cattlefeed by compound industry alleviates feed shortage. The present production of cattlefeed compounding industry meets only a small per cent of total requirements even for the organized livestock farming sector. So the method of increasing and improving feed resource ought to be more effective.

1.01 Importance of the Study

In order to achieve the targets of the Eighth Five Year Plan which gave a thrust to development of animal husbandry and dairying, Operation Flood Programme was launched in three phases. The important objective was to increase milk production. To increase milk yield per cattle, high quality 'cattle' and 'cattlefeed' are to be used. The main constraint is shortage of green fodder due to conversion of pasture lands to food crop or cash crop

lands, or conversion into industrial areas. The only solution to this problem is production of a 'complete feed' which increases milk yield per cow, and utilises agro-industrial by-products. The problem is not different in Kerala. Increasing the output of livestock and milk consumption calls for adequate availability of cattlefeed at reasonable rates.

Demand for cattlefeed has ever been on the increase in Kerala for the following reasons:-

(1) Encouragement given by Kerala government for livestock and dairy industries.

(2) Shortage of green pasture in the State.

(3) High level literacy leading to the scientific methods of animal feeding.

(4) Availability of agricultural products that can be used as an important ingredient of cattlefeed.

As a result of this, the cattlefeed manufacturers of other States were attracted towards Kerala to market their products. Though there are many viable raw materials in Kerala, till now they have not been properly utilised. Majority of raw materials are purchased from neighbouring States, which in turn increase the cost of raw materials and the price of cattlefeed. Cattlefeed is marketed at a lesser price by the manufacturers from other States, thereby posing stiff competition within the State. Attracted by the profitability of the

existing units, a large number of small and large units were started in Kerala. But most of these units have become unprofitable and are likely to be closed down. Reasons for this state of affairs may be high cost of production,lack of proper management, lack of finance, non-availablity of raw-materials, and acute competition.

Hence it seems reasonable to analyse the problems faced by the industry to assess its future prospects. An attempt is made in this study to analyse the major problems faced by cattlefeed industry in Kerala and to find out its future prospects.

1.02 Objectives

Cattlefeed manufacturing units in organised sector come under the purview of this study. They are registered under the Company's Act 1956 or Kerala Co-operative Societies Act of 1969 and the earlier Acts or as small-scale units.

The main objectives of the study are

1) To find out the problems faced by existing cattlefeed units.

2) To study the cost structure and over all profitability of the companies.

3) To assess the demand and supply gap for cattlefeed in Kerala..

4) To make recommendations on the basis of the findings.

1.03 Hypothesis

Based on the above objectives the following two main hypotheses are formulated. To have a proper testing of these hypotheses, sub-hypotheses are also framed.

HO_I The low profitability of cattle feed units in organised sector, both co-operative and private sector in Kerala is due to the high cost of production and financial charges.

Sub-Hypotheses

HO_{Ia} The raw material cost does not influence the profit and total cost.

HO_{Ib} The labour cost does not influence the profit and total cost

HO_{Ic} The overhead cost including depreciation, administration and selling expenses do not influence the profit and total cost.

HO_{Id} The financial charges does not influence the profit

HO_{Ie} There is no significant relationship between working capital and profitability of the firm.

HO_{II} The demand for cattle feed is not depending on the availability of green fodder, concentrate and on the geographical area, but depends on quality (milk yield and health of animal) and price.

Sub-Hypotheses

HO_{IIa} The demand for cattle feed is not depending on the milk yield, health of animal and price.

HO_{IIb} The consumption of cattle feed does not depend on the consumption of green fodder.

HO_{IIc} The consumption of cattle feed does not depend upon the consumption of concentrate.

HO_{IId} There is no significant relation between consumption of cattle feed in rural area and urban area.

1.04 Methodology

This study is a micro-level examination of the problems and prospects of cattlefeed units in Kerala. The strategy of the examination is such that it is studied from two angles. One is to analyse by probing into the problem and position of existing cattlefeed manufacturing units. The other is to measure the consumption of cattlefeed by dairy farmers and to find the gap between demand and supply.

1.05 Conceptual Clarifications

Explained here under are the various concepts used for the study.

1. Cattlefeed: The feed, also called animal feed, means food stuff grown or developed for livestock selected and prepared to provide highly nutritional diet that will both maintain the health of animal and increase the quality of end products like meat and milk.

2. Large Concern: Large concern is defined as a unit whose per day installed production capacity is more than 100 MT in all the shifts together.

3. Small Concern: Small concern is defined as a unit whose per day installed production capacity is 100 or less than 100 MT in all the shifts together.

4. Scale value: Scale value is a measure of the performance of the company. 'Good' means the performance is above standard level. 'Satisfactory' means performance is below the standard level and "fair"means it is at the standard level.

5. Priority Index: Priority index shows the marking of factors considered, on the basis of their degree of importance. Priority means the aggregate of the extent to which farmers attach importance to each factor considered for ranking.

1.06 Data Collection Procedure

For a proper analysis it is necessary to collect data from the units as well as from farmers. Units are classified into large concerns and small concerns. Both primary data and secondary data are used for the study.

Primary data is collected with the help of interview schedules. The two different schedules are first administered among sample respondents and based on the responses, the schedules are modified. These pretested schedules are used for collecting data relating to the units. Interviews are held with the general managers or owners of the companies in the case of large units. In the case of small units, the owners are contacted. Secretaries and presidents are the respondents in the case of small co-operative units. Data are also collected from the Director or Deputy Director of Animal Husbandry departments of various districts and office bearers of association of compound cattlefeed manufacturers. The Managing Director of Kerala Co-operate Milk Marketing Federation and other relevant persons in the field are met and discussions held. The researcher participated in the National symposium on "Strategies to Meet Challenges on Globalisation" held at GAO on 29-09-2001, organized by Compound livestock Manufacturers Association of India, and had discussions with the participants, both Indian and foreign.

Secondary data such as the Balance Sheet and Profit and Loss Accounts and other relevant documents of companies are studied in detail. The statistics published by Animal Husbandry Departments of the State and different districts in the State have also been studied.

Sampling Procedure: Cattlefeed units in the State are divided into

(1) large concerns with an installed capacity of more than 100 M T per day, in all the shifts together and

(2) small concerns with an installed production capacity of 100 or less than 100 MT per day, in all the shifts together.

In the case of large concerns census method is applied as there are only very few units in this category. The interview schedule is given in Appendix,i The five units under study have been christened A, B, C, D and E so as to maintain the confidential nature of the data provided.

In the case of small concerns, units are identified from the list provided by Directorate of Industries, Thiruvananthapuram. But as a number of units which have registered are not in a working condition at present, only the working units are identified and a sample of ten units are selected from those identified as working units hereafter referred as A, B, C, D, E, F, G, H, I and J.

To conduct the survey among the dairy farmers for identifing the demand for cattlefeed, a sample of 100 households having in-milk animals are selected. Multistage sampling technique is used here. The animal census conducted by the Animal Husbandry Department of the State in the year 1996 is taken as the basis for the survey. According to the census 95 per cent of cattle population come from rural areas and 5 per cent from urban areas. Therefore, out of 100 households, 92 are selected from rural areas and 8 from urban areas.

80 per cent of sample is selected using the multistage sampling . At the first stage, two districts are selected from the total of 14 districts. At the

second stage, 5 blocks and 2 municipalities are selected from the districts selected at the first stage. In the third stage, one panchayat or municipal ward is selected from each block or municipality. Finally, from a panchayat or municipal ward the required number of households are selected and the information collected with the help of the interview schedule.

The districts selected in the first stage are Trichur and Palakkad for the simple reason that two major cattlefeed units are situated in Trichur, and Palakkad has the largest cattle population in Kerala.

Blocks selected in the second stage are Mala, Irinjalakuda and Cherpu, and Irinjalakuda municipality is selected from among municipalities in Trichur district. Alathur and Kollengode are the blocks selected from Palakkad, and Shornur municipality is selected from Palakkad district. Selection is done as follows. The cattle population of both the districts is divided into different classes according to the total number of cattle in each block. The average number of cattle in these blocks included in each class is calculated. The blocks that had the number of cattle nearest to the average figures are selected.

In the third stage, selection of panchayat is also based on cattle population. Out of the different panchayats in a block, the panchayat that had a cattle population nearest to the mean population of the block is selected. Thus, the selected panchayats are Muriyad from Irinjalakuda block, Vallachira from

Cherpu block and Mala from Mala block (Trichur district), and Vandazhi from Alathur block and Kollenkode from Kollenkode block (Palakkad district).

In the final stage, 12 households are selected from each panchayat in Thrissur, and 18 households are selected from each panchayat in Palakkad district. Four households are selected from municipal areas of Irinjalakuda and Shornur.

The other 20 per cent of samples selected covered all other districts in Kerala on a random basis.The interview schedule is given in the Appendix–ii.

Methods of Analysis

Mostly tabular method has been resorted to. Ratio Analysis is used for measuring performance. The units are divided into two categories, small and large. Large units include those units which have a production capacity of more than 100 ton per day, and small units have a capacity of 100 or less than 100 ton per day. The large units are again divided into co-operative sector and private sector. Different types of ratios used include Short-term Solvency Ratios, Activity Ratio, Profitability Ratio and Long-term Solvency Ratio. Karl Pearson's correlation analysis is done to find out the correlation between profitability and liquidity of units. To test the significance of the correlation, 't' test is used at 0.05 level of significance.

A summary of the Ratio Analysis is done using scaling technique .A three-point scale is used. The average ratio for the industry is fixed as the standard for each ratio. That ratio is considered *good* if the calculated ratio is above the standard ratio, *fair* if the ratios are at or equal to standard level, and *satisfactory* if ratios are below the standard. G stands for good, F stands for fair and S for satisfactory. 3 points are given to Good, 2 points to Fair and 1 point to Satisfactory.

For Cost Structure Analysis, the total cost is divided into different elements and the percentage of each element to total cost is calculated. The cost elements considered are material, labour, manufacturing, staff and welfare, depreciation and selling cost. A correlation study is done to find the relation of these elements to total cost and the most significant element of cost is found with the help of correlation matrix. Taking this significant element as independent variable and total cost as dependent variable Multiple Regression Analysis is done. A prediction equation is developed.

The same Cost Structure Analysis is done in the case of small units but only one year is taken for analysis, since data for other years are not available.

A Priority Index is worked out to rank the factors in the order of importance and also to measure the degree of importance. This is based on the ranks assigned by respondents to each of the factors. The respondents are

asked to rank the factors depending upon the importance they attach to each factor. The index value is worked out as follows.

Suppose there are X_1 X_2 X_3. . .X_n factors to be ranked, the respondents are assigned 1 to 'n' ranks. Since the ranks as such cannot be used for further arithmetical operations, these ranks are converted into scores. This is done in such a way that 'n' score is allotted to the factor which the respondent ranked first, n-1 score to the second rank and thus 1 score to the nth rank. These scores so obtained for each of the factors are then added up separately. Thus the total scores for factors X_1, X_2. . .X_n is obtained. This is sufficient to rank the factors in the order of importance. But it does not give any idea about the degree of importance of factors. Hence Priority Index is worked out. This is done by expressing the total scores obtained by each factor as a percentage of the maximum total score obtainable. The maximum total score obtainable will be the numerical product of the number of factors to be ranked, and the number of respondents. Hence the index value can be completed by using the following formula.

$$P_{x_1} = \frac{\sum_{i=I}^{n} E_{S_i}}{Nxn} x100$$

Where

Px_1 = Priority Index Value for factor X_1

Es_i = The total score obtained by the factor X_i

n = The number of factors

N = The number of respondents

If the respondents assign the same rank to two or more factors, the corresponding scores are to be divided among such factors equally.

1) The hypothesis is tested using 't' test and χ^2 test.The formula for applying 't' test is

$$\text{'t'} = \frac{r}{\sqrt{1-r^2}} x\sqrt{n-2}$$

Where r = coefficient of correlation

n = number of pairs at (n-2) degrees of freedom

2) The formula for applying $\chi^2 = \sum(O-E)^2 / E$

where 0 is observed frequency, E is expected frequency at ν = degrees of freedom = (C-1) (r- 1) where C = Number of columns and r = Number of rows.

3) To study the correlation between the variables Karl Pearson's correlation coefficient is calculated using the formula. $r_k = 1 - \frac{6\sum D^2}{N^3 - N}$

where D refers to the difference of rank between paired items in two series and N = Number of items or pairs.

4) Estimation of demand for feed.

Demand for feed is estimated with the formula,

$D = a \times b$

Where D = Estimated demand in units

a = Average quantity of feed used in kilograms per day per cow

b = Number of animals

1.07 Study Period

The primary data were collected in the year 2002. The secondary data relate to a period of 5 years ranging from 1996- 2000 for large units and for the year 2000 for small units. A pilot study was conducted to test the interview schedule in November 2001 and the schedule was changed accordingly.

1.08 Literature Review

Many studies on cattlefeed with respect to the nutritional aspect have been conducted but public literature on the cattlefeed industry is very much limited. The only available literature is the study conducted by the government of Kerala before starting the Kerala Feeds Ltd. ,a public sector undertaking. The other available articles are those published by Compound Livestock Feed Manufacturing Association, which is the only association for cattlefeed manufacturers in India.

C.A. Gopalakrishnan and G. Muraly Mohanlal (1985) in their book on "Livestock and Poultry Enterprises for Rural Development" have mentioned the agro-industrial by-products and their utility as cattlefeed. Since cattle are mostly fed on the crop residues, a little of grazing and scavenging, and supplement the diet with small amounts of agro-industrial by-products, any improvement in their feeding value will be of immense help to the farmers. The by-products which can be used as cattlefeed have been classified as:

(1) Agricultural crop residues,

(2) by-products from the sugar industry,

(3) by-products from the forest,

(4) non-edible and other minor oil seed cakes,

(5) fruit and vegetable factory by-products,

(6) meat processing factory waste,

(7) marine wastes and by-products,

(8) animal organic waste,

(9) miscellaneous by-products,

(10) sea weeds and other by-products,

(11) water weeds[7].

The term cattle is derived from the middle English and old northern French word 'Catel',and later, from Latin 'Captable' meaning 'capital' in the sense of chief property. In 1981, the number of cattle, excluding buffaloes, in the world was 1210 million representing an increase of 101 million over the number recorded in 1969-71. India with 182 million cattle has the largest number in Asia, followed by China, with 53 million. Africa has 426 million, France, 24 million, USA ,114 million, Brazil, 93 million and Australia ,had 25 million. All the indigenous cattle of Indo-Pakistan are zebus breed primarily used for draught and also for milk[8].

Though our national production from livestock is one of the highest in the world, productivity is low. Two major factors are responsible for this:

(1) the inferior genetic quality and the low level of feeding. Over the years the quality of the stock has been deteriorating.

(2) the supply of feeds has not kept pace with stock size and low level of feed supply per animal and poor quality has aggravated the situation [K Narayanan Nair][9]

The shortage of feed is due to two reasons: (1) Non-availability of feed and fodder. (2) The abundance of bovine population. The following studies recognize this.

While recognizing the role of economic forces in shaping the size and composition of bovine stock in India, Mishra sees Indian cattle population as being excessive (Mishra (1970, 1979)[10].

Hasten (1971) has observed surplus of cows in relation to the existing fodder resources of the country[11].

Sinocus (1979) has pointed out that ill fed low production cows are drain on Indian fodder resources, and slaughter of these cows will increase milk and productivity which will have positive effect on human nutrition in the country[12].

The high cost of feed was another difficulty faced by dairy farmers. The studies supporting these points are:

Rama Subban and Goel (1965)[13], Jacob *et al* (1971),[14] Kumar and Rant (1971),[15] Rant and Singh (1973)[16], Singh (1975)[17], Kumar *et al* (1975)[18], Madalia and Charan (1976)[19], Sing *et al* (1979)[20], Rao (1980)[21], Prabakaran (1980)[22], Kulandai Swamy (1986)[23], Grover *et al* (1992)[24], Singh (1992)[25], Singh and Paul (1992)[26] and Vasani *et al* (1992) observed that feeding is the major determinant of cost of milk production, but they are almost silent on the extent to which feed influences milk output.

Panse *et al* (1961)[27], Puri (1965)[28], Singh and Jho (1975)[29], Patel *et al* (1976) maintained that feed cost constitutes about 2/3rd of the total cost[30].

Dayakar *et al* (1991) opine that 71 per cent is the share of feed cost[31]. Tailer *et al* (1972) say 85 per cent of the production cost is spent on feeding animals[32].

Jha *et al* (1982) reported that the cost of feed and fodder constituted the most important item of the total maintenance cost accounting for 58 to 68 per cent[33].

George and Nair (1990) observed that for improving the economic viability of milk production, reduction in cost of production is inevitable through continuous monitoring of price of feed and by resources like subsidy, providing adequate and prompt health care to animals, purchase of high yielding animals etc[34].

Although feed has been an important factor of milk production there is an acute shortage of feed.

Amble (1965) reported that there is shortage in the production of by-products such as green cakes, bran, husk and straw. He recommended four steps to encourage farmers to cultivate green fodder[35].

Nair (1972) pointed out that the main bottleneck in increasing milk production is the shortage of feed specially concentrates[36].

Rayapurohit (1975) in his study revealed the mismatch between the requirement and availability of feed. According to his observation, there is a

vicious circle of low feeding and low yielding. Chronic shortage of feed and fodder and poor nutritive value of such feed available have lowered the production capacity and fertility of Indian livestock[37].

Later, Nair (1980) in a study predicted a shortfall in the cattlefeed requirement which is likely to get worsened during Operation Flood II period[38]. After the Operation Flood II, Nair (1982) noted again that while formulating this programme certain constraints were not considered and the important one was that of feed. A shortfall of feed resources will lead to malnutrition and under feeding[39].

Thomas George (1994) viewed that feed availability is on the decline because of multiple reasons: (1) Reduction in natural fodder and pasture land consequent on the ever increasing population (2) Insufficient production of hay which is hampered by the decrease in paddy cultivation and higher use of HYV seeds on the other[40].

Dr.M.P.G. Kurup (1997) was of the view that bovine population accounted for 65 per cent of all livestock in India in terms of number. They consume over 85 per cent of feed and fodder resources of the country[41].

U.K. Pandey (1995) conculded that both quantitatively and qualitatively there exists a large gap in the demand and availability of feed and fodder resources across India. Important sources of green fodder are forests, open grazing grounds, fallow lands, weeding of major crops, forage crops and

semi forage crop residues. For the past two decades, there has been no change in the cultivated area devoted to fodder production in India being 4.4 per cent of the total cropped area. There is little scope for increasing the area under green fodder production keeping in view the priority for food grains, pulses and oil seeds[42].

Importance of Concentrates

The importance of green fodder in economic livestock production is well recognized. However, one constraint faced is their limited availability. Methods available for increasing and improving feed resources need to be more expeditiously and effectively utilized.

Singh (1975), Kumar and Agarvall (1992) found that marginal value product of concentrates was the highest and hence highly significant indicating a scope for increased use of concentrates to enhance milk output[43]. Dayaker *et al* (1991) revealed that out of feed input, concentrates represent the highest portion of productive cost and have positive relationship with herd size[44].

Harind Gangwar, *et al* (1976) substantiated this argument in that exercise on the cost of milk production. They observed that concentrates did not figure as a significant factor which influences milk yield.

Thomas George (1994) came to the conclusion that, based on ranking done, concentrates, dry fodder and green fodder rank in order as an important

source of input in milk production, both in terms of their contribution of milk production and share of each to the total cost[45].

Dr. Pradhan (1997) stated that in India a large number of feed ingredients of variable chemical composition and digestibility from agriculture, forest, marine and industrial source are utilized as animal feeds. Good quality borage and concentrates are not usually available to animals[46].

The present study is different from the earlier studies. Here problems of large and small units are analysed and the causes listed with respect to the product. A demand forecast is also made to assess the scope for development of the industry in Kerala.

1.09 Limitation of the study

The size of the sample is small in the case of dairy farmer's survey. Cattlefeed alone is included in the study. Animal feed includes poultry feed, fish feed, pig feed etc. A period of 5 years is taken for study as the materials were available from all the units after 1996 and some units are started only after1996. The only unit in the public sector and some of the units in the private sector are not included as they started commercial production only after 1996.

1.10 Practical Utility

Academically the study throws light on the performance of cattle feed units. It is expected that the demand pattern of cattle feed projected in the study will be of practical utility to the planners and policy makers of the State.

It is hoped that the study will serve a useful purpose for the manufacturers in understanding their problems in a true and proper perspective.

1.11 Plan of study

The entire study is covered in five chapters.

Chapter I: The first chapter consists of introduction, scope, objective, methodology, importance, period and limitation of the study.

Chapter II: This chapter is divided into two sections, A and B .A explains the relation between agricultural and industrial sector and the role of agro-based industries in the development of both sectors. It explains the growth of cattle feed industry in India. Section B analyses the present agricultural situation in Kerala and the present position of Kerala economy, and evaluates the potentialities for cattlefeed industry on a commercial footing in the State.

Chapter III: Evaluation of financial performance of the existing units is done in this chapter. It comprises two parts. The first part critically examines the performance of existing large units and finds out their problems. The second part critically examines the performance of existing small units.

Chapter IV: The chapter deals with the study of demand aspects of cattle feed. With the help of survey conducted among dairy farmers, consumption pattern of cattle feed and feed habits are studied, and demand projection is done.

Chapter V: The concluding chapter Summarises the inferences and makes recommendations and suggestions.

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CATTLE FEED INDUSTRY

Philo Francis “Problems and prospects of cattle feed manufacturing units in Kerala ” Thesis. Department of Commerce and Management Studies , University of Calicut, 2003

Chapter II
Cattle Feed Industry

CHAPTER II

CATTLE FEED INDUSTRY

Introduction

Indian economy is basically an agricultural economy. Growth of Indian economy depends on the growth of the agricultural sector. Available evidence suggests that whenever there is a slowdown in agriculture growth, the overall growth rate of the economy follows the same pattern. Contribution of agricultural sector to gross domestic product is at 33 percent in 1998, thus there is a need for having a strong industry-agriculture relationship in India. Agro-based industries need to have a faster growth rate. It is at this juncture that we have to understand the role of cattle feed industry in India. In this chapter, an analysis of the role of cattle-cum-dairy farming industries in India, with special reference to Kerala is undertaken. The chapter is divided into two parts: Part A discusses the role from Indian perspective; Part B analyses the potential for Cattle Feed Industry in Kerala.

PART- A

2.01 Cattle Feed Industry in India

One of the thrust areas under agriculture and allied activities during the eighth plan was development of animal husbandry and dairying. Some

challenges more acutely experienced in the agricultural sector are (1) the country's ability to maintain food sufficiency (2) capabilities to meet demands arising from improvements in income of masses and (3) problems of unemployment and under employment in the rural areas which call for the on-farm and off-farm support[1].

Keeping in view the growth rate of population, income, demand for food, it is estimated that India would need around 215 million tons of food grains by the end of IX plan. Accordingly, augmentation of agricultural growth should be conditioned. One of the trends to be followed is that productivity in livestock sector continues to be guided by population, rather than increase in productivity levels per unit of production. Researches pertaining to intensive feeding, breeding and management need to be strengthened. India has one of the largest population of domestic animals that provide diverse products such as milk, meat, wool, eggs and skins. Domestic animals also contribute substantially to the draught power. The livestock sector is an integral part of the farming systems and lends sustenance to the rural economy in general[2].

India's millions led by Mahatma Gandhi, expected the emergance of a welfare State to follow the attainment of independence. Crores of rupees have been spent under the poverty eradication and related development programmes. But poverty could not be removed to the desired extent. It was to remove poverty through economic development that we adopted the

western idea of economic growth. It consisted of macro economic development with concentration on mega industrialization. Agriculture and small industries which have potential to provide jobs to millions were relatively marginalized. Mega industrialization approach necessarily leads to less employment generation. This is because it implies very low labour capital ratio. High technology also displaces labour. Consequently millions cannot get gainful employment. India has plentiful manpower but less capital accumulation[3]. Hence, it is necessary to develop a very wide network of improved agriculture, horticulture, forestry, animal husbandry, cottage and small scale industries based on resources available near about or within the village rather than taking away villagers from their home soil to mega cities. This will check migration to cities which causes urban explosion leading to grave environmental pollution and degradation of quality of life

Agriculture-industry relationship in a developing economy has been a subject of debate in development literature. This has been based on the role of agriculture in providing food and raw materials and in enlarging the market for industrial developments. But this relationship between industry and agriculture has weakened since the mid sixties due to a reduction in the relative share of agro based industries output and partly because of slower growth of employment and real wage rate reducing the demand for food and other agro-based industrial products. The total share of agro-based industries has declined from about 7.24 per cent in 1960-61 to about 4.06 in 1979-80[4].

This decline in the share of agro based industries could be the result of slow growth of demand for such products. Many of the present day advanced economies were able to develop with success mainly because of strong agriculture-industry linkage. The rural to urban migration cannot be stopped in an economically backward democracy with poor infrastructural facilities and few opportunities. In India, though importance was given to agriculture in the first plan period, availability of food grains was insufficient. But in mid sixties owing to green revolution, agriculture sector got a boosting by eliminating imports of food grains. On the other hand, there was a continued sluggishness in the performance of industry. This shows that there must be agriculture-industry growth which is possible through agro-based industries. So promotion and encouragement of such industries are very much important in an economy like India.

Dairying is one of such industries. It is rural based, land saving and gender related. Compared to crop production it offers more favourable opportunities of employment. Dairy farming provides a substantial source of income for the landless labourer as well as the marginal farmer. Cattle and buffaloes are integral part of mixed farming systems. Presently India is a non-entity in the international dairy market. The exports of livestock sector are picking up to an impressive growth rate of more than 11 per cent during 1974-98[5].

The basic secret of success of India's dairy development programme is the efficient milk production which is integrated with agriculture. Crop farming provides residues and by-products as feed and fodder for dairy animals. Another factor is the involvement of milk producers in the setting up of their own organizations. The producers in India are ensured of a guaranteed market at remunerative price which acts as an incentive for milk production. The organisation collecting milk from the milk producers now carries the responsibility of supplying them feed and inputs to increase milk production, which optimizes the transportation cost of cattle feed. Feed purchases account for the bulk of the out-of-pocket expenditure on milk production. Balanced cattle feeds are made available to producers at the village level price that provides good value for money spent on cattle feed[6].

Rakesh Malhotra has pointed out the strength and weakness of India in relation to the dairy industry of India. India's strengths are that she has a rich population of cattle and buffalo, good infrastructural and institutional support, increasing trend in per capita milk availability, higher producer share in consumer price in SAARC, availability of all kinds of machinery and equipment for dairy plants at most competitive rates in the world, successfully implemented white revolution and the people's extensive liking for milk and milk products. Weaknesses are objection to slaughtering of less and unproductive animals, limited beef market, acute shortage of feed and fodder,

competition between man and animals for scarce land resources and the fact that majority of milch animals are kept by small and medium farmers[7].

The animal feed and fodder industry is another agro-based industry, which helps the growth of dairy industry also. Acute shortage of feed and fodder, one of the weaknesses of Indian dairy industry, as pointed out by Rakesh Malhothra can be removed with the help of good animal feed production[8].

Because of recent technological advancement in the field of agriculture and animal husbandry, a change has occurred in the farming community which as a whole gradually drifted from traditional low productivity to high productive potential livestock farming system. The adoption of mixed farming is the solution for the problems of rural folk who are generally poor, underemployed and unemployed. There is an imperative need for development of integrated livestock production involving improvement of genetic make up, adequate nutrition, health programme, institutional credit facilities and an efficient marketing system. Production of dairy cattle in small land holding in conjunction with primary cereal production creates employment and adds to the domestic income. This could be a worthwhile occupation of women and possibly young people in these areas and can increase their buying power. The new strategy of rural development milk production will not only contribute to national health and wealth but also

provide substantial employment opportunities in the rural areas to solve problems of rural poverty and rural unemployment.

2.02 Cattle in India

Cattle are of different types in different parts of the country: the grey-white short horned type in the west and north, and the Mysore type in the south of India. While the majority of cattle are desi or unimproved, there are special breeds within each group. Later on, cattle were imported for cross breeding and there are now many research and development programmes for producing new breeds and promoting crossing schemes by which the tropical adaptation of the zebus can be combined with the high yield of the European breed like Jersey, Brown Swiss and Danish Red.

2.03 Breeds of Cattle in India

1) Sahiwal - Found in cities near River Ravi in west Punjab which is derived from the Red Sindhi. This is one of the most productive tropical dairy breeds. The milk yield is 1350 Kgs in one lactation period of 300 days. Adult bulls weigh 550 Kgs, cow 400 Kgs[9].

2) Red Sindhi - The original home of this breed is West Pakistan and derived from the hill type. The herds are found in Karnataka, Tamil Nadu, Kerala, Orissa and Punjab. This is one of the best dairy breeds in the Indian sub-continent. Milk yield is 1100 Kgs in one lactation period. Weight of adult bull is 450-500 Kgs, cow 300-350 Kgs[10].

3) Gir - This is found in the Mewali, Deoni and Krishna Valley[11].

4) Tharparkar - Which came into prominence during Ist World War, found in Sind and Cutch, and

5) Kankrej - found in Gujarat are some of the original breeds of India,. all of which are called desi[12].

Exotic Breeds of Cattle

(1) Jersey: It is developed on the island of Jersey in British Channel. Milk yield 4500 litres. Weight of adult cow 500 Kgs and of male 600-700 Kgs. Early maturity is its special feature[13].

(2) Holstien Friesion: The breed originated from Holland. 19000 litres of milk in one lactation. Male has a body weight of 800-900 Kgs. Cow has a weight of 500-650 Kgs. In India, cross breed cow yields 46 Kgs of milk per day. 6000-7000 litres of milk per lactation and mature between 28-32 months and once in 12-13 months the next delivery taks place[14].

(3) Brown Swiss: This is from Switzerland. The milk yield is 5000 litres per lactation. Mature in 28-30 months and once in every 13-14 months delivery takes place. The body weight of an adult male is 700-800 Kgs and that of cow 500-600 Kgs[15].

(4) Ayrshire: This is originally from Scotland. The milk yield is 12155 Kgs in 305 days of one lactation. The weight of the adult cow is 500-600 Kgs and that of male is 700-800 Kgs[16].

(5) Guernsey: The origin is from the Islands between France and England. The milk yield is 4000 litres per lactation. The weight of adult male is 600-800 Kgs and that of cow is 400-500 Kgs[17].

The justification for raising any livestock are

(1) More human demand for a mixed diet as man is an omnivorous species and majority are willing to pay higher prices for food of animal origin than for food of plant origin. e.g. milk and milk products and meat.

(2) There are many plant foods that cannot be properly digested by man and can be processed into food suitable for man by feeding them to ruminant stock.

(3) Ecologically, in a more stable agricultural system, plant and animal are complementary[18].

2.04 Livestock Production in India

Livestock is the largest productive resource in rural India. The value of livestock holding of the rural population is placed at about 8.6 per cent of the total value of the privately held productive assets in rural India. (RBI 1975).

The livestock sector contributes an estimated 5-6 per cent of the country's gross domestic product. (Planning Commission 1976). Animal labour constitutes 207.06 of the total cost of crop production in India (Mishra 1979). The country produces about 235 million tons of milk which supplies about 40 per cent of animal production consumption (Nair and Vaidyanath 1978)[19]. The importance of cattle in India's rural economy has long been recognized by the Royal Commission on Agriculture.

The value of export of livestock and livestock products has increased from 691.22 crores in 1987-88 to 9253.81 crores in 1996-97, which shows the importance of livestock for the country. It is a major foreign exchange earner for the nation.

Table 2.1

The Table showing the value of export of livestock and major livestock products during 1987-88 – 1996-97 (in Rs. crores)

Brood Groups	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97
Livestock	9.9	8.7	11.3	4.3	8.5	17.9	45.64	26.55	86.88	69.24
Meat & edible meat	888.9	945.7	1146.1	1397.1	2308.7	2565.8	3439.38	2945.75	6160.45	6927.31
Dairy and poultry products	41.0	32.2	32.0	45.0	208.4	248.4	215.49	466.20	504.49	1174.24
Animal fodder and feed	15.7	10.3	35.3	8.4	13.7	30.3	215.09	297.55	94.86	362.82
Leather	5936.5	6789.3	7453.9	8118.7	7301.4	8085.3	8477.77	1204.35	2419.95	690.21
Raw wool & animal hair	20.2	134.7	73.9	14.2	17.7	17	17.99	21.85	33.35	29.41
Total	6912.2	7920.9	8752.7	9587.7	9853.4	10965.1	12411.36	16792.24	9299.97	9253.81

Source:- DGCI & S Calcutta, Dairy India, 1997.

Export of dairy products also has increased during this period from Rs.247.75 lakhs to Rs.1536.53 lakhs in 96-97. This shows that the growth in livestock products in the country has been comparable to that achieved by other important sectors of the economy. From about Rs.5895 crores in 1950-51 ,the value of output of livestock has grown to Rs.17994 crores in 1991-92 at constant price (1980-81). This indicates three fold increase in 41 years[20].

Table 2.2 shows the estimate for feed and fodder availability and requirements in India.

The strategy for improved animal nutrition under Operation Flood Phase III would be to promote technical programmes designed to increase the utilization and conversion efficiency of the crop residue and agricultural by-product.

If animal production has to prosper in the country, it must continue to be based on feeding of agro-based industrial by-products and crop residue which are the major sources of energy and protein in livestock feed. New technology is being developed to utilize cellulose and semi cellulose in high cellulose materials as crop residues, fallen free leaves etc. There is a need to explore the possibility of cheap and balanced ration across regions and dissemination of such technologies among farmers[21].

Table 2.2

Table showing the estimates for feed and fodder availability and requirement in India (in million tones)

Particulars	1986-87		1991-92		1996-97		2001-02	
	Availability	Requirement	Availability	Requirement	Availability	Requirement	Availability	Requirement
Northern Region								
Cakes	3.80	115.16	5.77	120.87	7.27	132.14	8.77	154.40
Green fodder								
Kharif	79.26	217.52	71.59	228.31	69.14	249.60	66.69	291.64
Rabi	107.78	255	109.36	268.60	112.26	293.64	115.16	343.10
Dry fodder	84.00	179.13	104.85	188.02	120.30	205.55	135.75	240.17
Western Region								
Cakes	3.35	90.4	4.91	95.10	5.31	100.59	5.71	106.81
Green fodder								
Kharif	39.49	170.64	36.79	179.63	34.34	190.00	31.89	201.75
Rabi	33.58	200.75	28.22	211.33	29.32	223.53	30.42	237.36
Dry fodder	58.47	140.52	85.35	147.93	91.35	154.47	97.35	166.15
Southern Region								
Cakes	3.75	71.10	4.58	70.79	5.28	71.66	5.98	73.85
Green fodder								
Kharif	31.18	134.31	29.98	133.72	28.98	135.36	27.98	139.49
Rabi	27.25	158.01	20.14	157.32	22.09	159.25	24.04	164.10
Dry fodder	49.34	110.61	49.71	110.12	50.90	111.47	52.15	114.87
Eastern Region								
Cakes	1.87	101.05	2.38	138.27	2.88	192.19	3.38	272.15
Green fodder								
Kharif	2.81	190.87	2.64	261.17	2.49	363.02	2.34	514.05
Rabi	5.42	224.55	4.75	307.26	5.05	427.09	5.35	604.77
Dry fodder	34.55	157.18	40.85	215.08	46.95	298.96	53.05	423.34
All India								
Cakes	12.77	377.64	17.64	425.03	20.74	496.58	23.84	607.20
Green fodder								
Kharif	152.74	713.33	141.00	802.83	134.95	937.98	128.90	1146.93
Rabi	174.23	839.21	162.47	944.51	168.12	1103.50	174.97	1349.33
Dry fodder	226.36	587.44	280.76	661.16	309.50	772.45	338.30	944.53

Source: Dairy India, 1997.

2.05 Processing of Feeds

Mechanical processing of grains for proper utilization: Most grains are ground, rolled or crimpled before being fed to livestock. Grinding is usually accomplished in hammer mills. A hammer mill grinds by beating grain until it is fine enough to pass through a screen. The size of the screen will determine the degree of fineness. Flaking is effected simply by passing grain between a closely prefer flaked grain to ground grain in the form of a flake. Crimpling is accomplished in a manner similar to rolling except that rollers with corrugated surfaces are used. To young calves and animals too much fineness poses difficulty in feeding and further reduces the mixing of saliva and results in less inflow of saliva to rumen which affects digestion[22].

Pelleting Feeds

The ingredients are first ground, and pelleting converts the feed to a free flowing form. This greatly helps in handling. Further, through pelleting, adulteration can be also checked. Moreover addition of urea, molasses or trace minerals to the feed becomes more effective, and animals enjoy the feed while eating ,specially at the time of milking. They are less dusty, and therefore any balance or left over can be easily collected thereby reducing the wastage. Pelletting of hay and roughages can also be done. Cubes are sometimes preferred, and these are larger than pellets. They are used to supplement pastures under grazing conditions[23].

Cooking Feeds

Cooking means cooking with or without steam pressure, short period steaming associated with rolling or flaking and roasting and popping. Cooking is found to improve the palatability and nutritive value of feeds, but the cost of cooking may offset these benefits. Field beans, soyabeans, cotton seeds, tapioca and potatoes are better used after cooking[24].

Wetting Feeds

This is found suitable in very dusty feeds. Too much wetting should be avoided especially in mineralized and vitaminised feeds[25].

Soaking Feeds

Very hard grains which are not mechanized or pressed, like dried beat pulp, soyabean flakes, cotton seeds, tapioca are normally fed in wet form[26].

Liquid Feeds and Slurries

Supplemental nutrients can be added to feeds and fed in the form of liquid or slurries. Slurry or gruel is found helpful in calf feeding ration, especially weaned calves. It reduces dust and wastage.

2.06 Cattle Feed

In the 19th century companies sold 'straight' animal feeds to farmers as an extension of commercial merchantising. Initially, although the straights

included some imported cereals for animal feeding, most of the trade was in oil cakes. The early compound trade was an offshoot of oil crushing industry and most products were sold on a commodity basis for blending, by the farmer, with home grown pulses, cereals and root crops[27].

During the period 1925-50 compounds were produced in pelletted or nut form to replace the meal and coarse mixture. Feed companies, in the absence of objective nutritional specification, blended the compounds to a target formulation which had, by trial and error, satisfied the legal requirements in terms of oil albuminoids and fibre and crude production requirements of ruminant livestock[28].

Since 1950, the change from target to least cost formulation of diets manufactured to a strict nutritional specification has markedly increased the efficiency with which different types of purchased feed have been utilized by dairy cows (Wilson 1975)[29]

2.07 Role of Least Cost Formulation in Dairy Cows Diets

Cost of a dietary formation depends upon the specification of required nutrients which in turn depends on the identification of selected raw material. Different raw materials can be tested and whether they are rejected or accepted depends upon the specification of nutrition at least cost. Whether a specific material has to be included or not depends upon four factors.

(1) The price of the ingredient in relation to its nutritional specification.

(2) The price of other acceptable substitute for the ingredient.

(3) The upper and lower limits on the ingredient fixed by the company for reasons such as palatability, physical quality or the market availability of raw-material.

(4) Other considerations such as demand for other scarce resources, labour, finance etc.

From this, it is concluded that the cost or attributes of a single raw material are not taken. The raw material can be substituted one for another and any shortage of one can be compensated by redeployment of others. The economic value of raw materials used cannot be fixed. But a minimum level of raw material can be specified and because of special attributes, maximum level also may be prescribed.

Again, the decision to include a certain raw material can be made on the basis of the following points such as:

(1) Quantitative values of nutrient.

(2) The particular nutrient limiting the product specification.

(3) The cost- coefficient associate with the limiting nutrients.

With respect to the first factor, raw material nutrient value differs from place to place and year to year. With reference to the second factor, specified above, nutritional value differs from brand to brand within a company and between companies because of difference in interpretation of published research or internal confidential research finding. This is because of different marketing objectives, one company giving importance to higher quality and higher price capable of producing better yield. Another may be using cheaper raw materials to produce a low cost feed for less sophisticated sector of market. Coming to the third factor i.e. cost-coefficients, it can be analysed from two levels.

(1) The level of nutrient specified: when a low level nutrient is specified, the cost is zero. So there is no economic value

(2) The cost of other competing raw material which is complex as the price of raw material varies from one to the other.

So, a common feature in animal feed market is the wide swing in raw material price which results in change in price from time to time.

2.08 Definition of Animal Feed

Feed, also called Animal Feed, means food stuff grown or developed for livestock and poultry, selected and prepared to provide highly nutritional diet that will both maintain the health of animals and increase the quality of

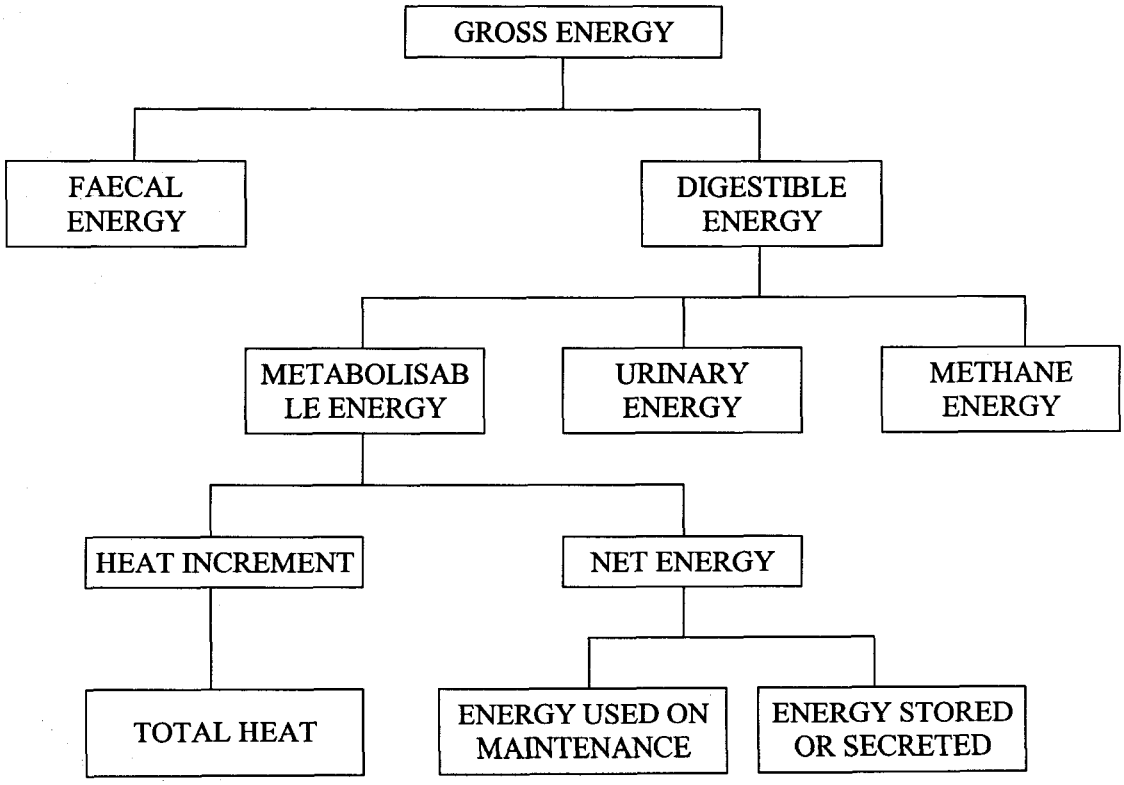
such end products as meat, milk and eggs. Feeds produced today are the result of research or experimentation and chemical analysis, and are the subject of continuing study by agricultural scientists[30] (Encyclopedia). According Dr. BT Upase, feeding of high yielding dairy cow is markedly different from that of the average milking or dry cow in the land[31]. The cross breeds are high producing animals. Their nutritional requirement is also proportionate to their level of milk production and is essential to exploit and maintain her full inherent genetic milk production potential. Milk production is governed by environmental factors, and nutrition is the most important one among them. The space in rumen is limited and once filled it cannot be refilled unless previous ingesta is digested, absorbed or propelled into the lower digestic rack. Full advantage of limited space available in the rumen is taken by maintaining optimum rate of fermentation in the rumen. The microbial activities in rumen and optimum rate of fermentation can be controlled by adopting stable feeding and management practices.

Scientific feeding of dairy cows has been practised for many years. The basis for scientific feeding is the understanding that animals have two functions to perform. (1) Maintenance: This involves keeping all the bodily processes going and keeping the animal in good health without any weight loss. (2) Production: Any nutrients in the ration which are surplus to those needed for maintenance will be available for their growth in young animals or increase in live weight gain in mature animals, the production of milk in

lactating cow or the performance of work in the case of bulls and other work animals. The new system was concerned with the use of Metabolisable Energy (ME) as a basis for formulation ratios on the farm. Feeding dairy cows can be described in the simplest way by matching up two basic factors (1) What does the cow need ? (2) How can farm food meet this requirement?. The chief limiting factor in the feed supply to the dairy cow is energy. This value may be expressed in various ways. To standardise the measurement of energy it must be measured on a dry matter basis.

Figure 2.1

Figure showing energy utilisation by the cattle



1.	Gross Energy	Total energy in a feed
2.	Faecal Energy	Energy lost in the faeces (dung)
3.	Digestible Energy	The Energy left which can be further used by an animal
4.	Metabolisable Energy	The energy extracted by the animal from feed to use in maintenance and production
5.	Net Energy	Collective name for energy used for maintenance and production
6.	Heat increment	Is the amount of energy used up by converting the ME into maintenance and production for digestion, transport and basic body processes like body temperature, blood circulation etc[32].

Feeding of Cow

(1) Protein story:- The protein is required to help chew. The required production level is available in two forms. Rumen Degradable Protein [RDP.] and Undegradable Protein [UDP].

(2) Dry Matter intake:- The cow's appetite in terms of dry matter intake per day is related to body weight and also amount of milk being yielded. In case of high yielding cows, the ability to eat is far more than theoretical quantity. The calculated ration is 50 Kgs of silage , 2 Kgs of sugar beet pulp,. 5.5 Kgs of medium energy and 4 % of protein concentrate.

(3) Importance of minerals:- A mineral mixture needs to be incorporated in mixed food. Most oil cakes are rich in phosphorous and low in calcium whereas grassland products are rich in calcium and low in phosphorous.

(4) Vitamins :- The cow and calf can both manufacture their own vitamin D. Deficiency can be avoided by feeding cod liver oil or vitamin A and D in powder form.

(5) Value of Home grown fibrous food.

In order to concentrate the diet of high yielding cows use feeding stuff high in digestible nutrients and low in fibre. Such foods are commonly known as concentrates and they include cereal grains and oil cake[33].

The current practice of feeding a very large number of low yielding cattle is to allow them to graze on quality grass or to feed them on grains mixed with hay, fallen leaves, dry stock of maize, jowar, bajara paddy and wheat straw and agro wastes such as vegetable or fruit. Sometimes dressing of cakes and bran are also given. Feeding cheap pellet containing 9 to 10% protein, 20% fibre and high sand silica is quite common. This will destroy the productive potential of the milch animals causing deficiency.

Table 2.3

Classification of feeding stuff in ascending order of concentrate

Group A	**Remarks**
Roughages (Low concentration)	
Fibre: 35% or over	Derived from nature
Cereal straws Hay,Law-quality silage,Law quality dried grass	Plant tissues, suitable only for 'maintenance' purpose
Group B	**Remarks**
Succulents and high quality roughages (Medium Concentration)	Suitable for maintenance and for low-level production
Fibre 15- 35%	
Grass and available silage	
Root caps	
Kale and sugar beet tops	
Group C	**Remarks**
Concentrates (high concentration)	
Fibre below 15%	Essential food for high production
Cereal grains and corn	
Milling offals	
Disletters and brewers grain	
Oil cakes and meal	
Meat and fish meals	

2.10 Bureau of Indian Standard

An earlier report of the committee on livestock feeds and fodder, by the Ministry of Agriculture, Government of India (1974) reveals that there was a deficit of 44% in concentrates and 38% in green fodder. It is estimated by Prasad (1994) that 334 million M T of crop residues and 286 million M T of green fodder are available providing 7.6 million M T of digestible crude protein [DCP] and 184 million M T of Total Digestable Nutrients [TDN].. The concentrate availability is 62.9 million M T providing 9 million M T of D C P and 39 million M T of TDN. A shortage of 378% of energy and 57% of digestable protein is identified. In order to bridge the gap of concentrate deficit, it is necessary to utilise several of the non-conventional feed resources and agro- industrial by-products which are abundantly available[34].

Table 2.4

The table showing the Specifications of Bureau of Indian Standard for cattle feed

Items	Type 1 1S: 2052, 1979 Re affirmed 1990	Type 11 IS. 2052, 1979 Re affirmed 1990
Moisture, % max.	11	11
Crude protein ,% min*.	22	20
Crude fat ,% min.	3	25
Crude fibre, % max.	7	12
Acid insoluble ash, % max.	3	4

Source: CLFMA standards for compound cattle feed.*-Except moisture all on dry matter basis

Table 2.5

Table showing raw materials specifications

Raw Materials	Moisture%			Protein%			Fibre%			Sand Silica%			Other
	G	M	R	G	M	R	G	M	R	G	M	R	
Maize	10	12	S										
		14	D										Aflatoxin Free
Jowar	10	12	S										
		14	D										Aflatoxin Free
Broken Rice	10	12	S							3	5	S	Aflatoxin Free
Broken Wheat	10	12	S							3	5	S	
Bajra	10	12	S										
Ragi	10	12	S										
		14	D										
Barley	10	11	S										
		12	D										
Rice Bran	10	12	S	12	10	S	10	12	S	5	6	S	Oil rebate on prorata basis Free from ransidity
Fat%								14	D		7	D	
G-16													
M-14.12													
R-S,D													
Rice Bran Ext.	10	12	S	14	12	S	14	16	S	5	6	S	
		14	D		10	D		18	D		7	D	
Wheat Bran	10	12	S	15	14	S	10	12	S	2	3	S	
Fat%					13	D		14	D		4	D	
G-40													
M-3.5,3.0													
Tapioca Chips	9	11	S	-	-	-				-	-	-	Carbohydrate
		12	D	-	-	-				-	-	-	70%minimum

Source: Compound Livestock feed Manufacturer's Association, Standard for Compound Cattle feed.

G = Guarantee, M = Maximum, R = Rebate, S = Single, D = Double.

In order to accept the various agro-byproducts available in the country it is necessary to stipulate specifications of raw material. According to BIS there are three categories of cattle feed Type 1 & Type 11 and Urea Molasses Mineral Block has been prescribed.

Compound feeds manufactured conforming to these specifications are suitable to feed cows / buffaloes yielding more than 10 ltr of milk if they have to be cost-effective. So, it is necessary to have type III and type 1V for less yielding cow, i.e., about 1 to 4 ltrs. The government of Karnataka has given specification for four types of cattle feeds. The Bureau of Indian Standards has not given the standards for agro-industrial by products. The Compound Livestock Feed Manufacturer Association of India has framed normal nutritional values for various raw materials which are shown in the table 2.5.

2.11 Balanced Food Ration

In order to balance a ration and to feed a lactating cow properly it is important to know the factors that affect the nutrient requirement of the cow. The most important factors are

1) body weight
2) milk production
3) composition of milk (percentage of fat)
4) stage of lactations of the cow and
5) number of lactations

For all feeds in the ration it is important to know the following.

1. Moisture content and chemical composition on a dry matter basis (energy, crude protein, minerals and vitamins).
2. The specific attributes of the feed and the maximum percentage allowed in the diet.

For the forages the following should be considered.

1. The stage of maturity is important because it influences the nutritive value of the forages.
2. The physical form of the fiber particles is important also because it influences rumination time.
3. The length of storage of forages influences the residual amount of certain vitamins.

The following should be known about the purchased feed.

1. Local availability
2. The cost per unit of nutrient
3. The quality of the feed (free of contamination, uniformity, length of storage etc.)
4. Degree of processing (heating, pelleting, extrusion etc.)

Calculations are needed to balance the nutrients supplied by the ovation with the cow's need. Some other aspects of feeding a cow are important but

difficult to quantify. The following is a series of characteristics of a feeding programme that shows how a balanced ration is utilised by a cow.

1. Palatability of the ration.

2. Frequency of feeding.

3. Method of feeding. (e.g. total mixed ration, computerised concentrate feeding, top-dressing of concentrate.)

4. Individual or group feeding and

5. Frequency of cleaning the manger

2.12 By Pass Protein Feed Technology

This is a new generation Indian cattle feed manufactured by National Dairy Development Board. By pass protein feed contains a large percentage of solvent extracted protein meals, grain by-produce, whole grains, molasses minerals and vitamins. Recognising the limitations of protein evaluation based on crude protein / digestible crude protein, UK and the USA have introduced systems based on Rumen Degradable Protein (RDP) and Undegradable Dietary Protein (UDP) to cover the two types of needs. The basic difference between conventional balanced cattle feed and by pass protein feed is that the basis for formulation is protein / DCP in the former and RDP/UDP besides protein, in the latter. This feed should have a minimum of 28 percent, crude protein, 18 percent undegradable protein and minimum 8% RDP. The

recommended allowance per litre milk is 250-300 gms which is almost half of the allowance recommended for conventional balanced feed[35].

The cost of by pass protein feed per kilogram is 1.3 to 1.5 times higher than that of conventional cattle feed but cost per litre milk is lower because of its lower allowance per litre of milk.

Table 2.6

Table showing comparative costs of By-Pass Protein Feed [BFF] and Conventional Cattle Feed [C C F] per Kg of milk produced

Animal	B P F		C C F	
	Q	C	Q	C
Cross breed cow	250	1.05	400	1.28
Buffalo	300	1.26	500	1.60

Q: Quantity of feed required in grams per Kg of milk produced.
C: Cost of this quantity of feed at the current price.
Source. Dairy India 1997

Sources of by pass protein available in Indian market are cotton seed meal, soyabean meal, maize gluten and guar meal. Solvent extracted meals are generally higher in U D P values than the expeller pressed cakes. The feed undergoes a degree of heat treatment improving the U D P values. This feed used along with Urea Molasses Mineral Block (UMMB) Lick, and / or, Urea treated straw has been found to show excellent response on milk production, and in economics of production. As only choice materials of high palatability are used in BPF manufacture, its acceptance by the animal is excellent. It can support the nutrient requirement of even high yielding animals. The UMMB

lick supplies most of the nutrients generally deficient in a straw based diet. These are urea molasses, mineral supplements, common salt and bran / cake. Gwar gum powder, sodium bentonite and lime are used as binding agents.

2.13 Raw Material Research

Agricultural Universities and Research Institutions have conducted research and established a host of conventional and non-conventional materials such as agro-industrial by products as versatile feed raw materials. As a result, solvent extracted products namely groundnut cake and extracted rice bran and its extraction, soyabeen extraction, sunflower extraction, coconut extractions have been increasingly used in animal feed. Major feed raw materials are seasonal which also depend on the vagaries of nature. They become scarce at times and are subject to variation in their price. Therefore, it is imperative that the compound feed industry should be able to substitute its raw materials' profitability so as to get uninterrupted production. Researches in India have established 35-40 raw materials which can be alternatively replaced fully or partially in feed compounding[36]. If any substitute raw material is deficient in any nutritive property this deficit can be overcome by enriching it through fortification. However there is one limiting factor, that is toxicity which is extremely difficult to mitigate completely, though it is not impossible to reduce it to harmless levels. For instance, the aflotoxin in ground nut extract cannot be totally eliminated but it is possible to bring it down to harmless or permissible level.

Biotechnology has invaluably contributed to livestock feeding through its animal health care products such as vaccine, antibiotics, antimould and antifungal products. Use of products like enzymes, acidulates, probiotics. vitamins, amino acid deodorants etc is very common in developed countries. Indian feed industry is just catching up with this trend and is expected to indigenize production of biotech products. (Kung. L- 1990 Dildey D 1988). It is pertinent to critically approve the research work done in the U.S.A. which seeks to reduce the total crude protein in the feed by carefully adjusting the concentration of essential amino acids like D.L. Methionine L- lysine tryptophane, leucine, cystein etc. (Hams 1991)[37]

In the present day normal nutrition science, percentage of essential amino acids is by itself the criteria in formulating the feed, and not mere protein levels. In fact protein molecule is made up of several amino acids both essential and non-essential: Essential amino acids are not synthesized. It may be possible that feeds having higher crude protein level may have unbalanced profile of amino acids. Such high protein feed would only add to the feed cost to farmers without any corresponding benefit.

India is deficient in green fodder. Increasing allocation of available land water and other natural resources for growing food grains, cereals and oil seeds for human consumption and cash crops for exports is bound to aggravate the problem of green fodder deficiency for animal feeding. The best course of option for India, therefore, is to utilise her abundant dry fodder sources

including straw, kadhis (crop residue) and industrial residues which can be enriched. Sugar cane bagasse, sugarcane tops, cereal straws, forest grass and leaves, tapioca pith are a few of them. These animal feed stuff can be used to advantage in case of low yielding cattle by adopting the complete feed system. A major effort being done in this sphere is that of using cellulosic substrates for solid State fermentation by fungi like trichoderms which increase the nutritive value of these substrates by reducing cellulosic contents and increasing the total protein. (Woodword ,1987)[38]

To increase the quality of feed, the Indian feed manufacturers have to provide facilities for carrying out proximate analysis and for testing amino acid composition ,afloatoxin level and antinutritional factors. There should be quality control laboratories attached to feed industry, employing highly qualified animal nutritionists, veterinary scientists and technocrats. They should constantly keep on updating their knowledge and experience by conducting research and participating in conferences, seminars and other programmes at national and international level

2.14 Growth of Cattle Feed Industry in India

The Indian feed industry is about 35 years old. It is mainly restricted to dairy and poultry feed manufacturing. Feed production got to a head start after the introduction of planned process of economic development. In the early sixties with a handful of feed factories at about a production of 50000

tonnes of feed animals it rose to a production of 2.5 million tonnes, 5000 per cent in three decades[39].

At present, in India, production is about 3.0 million tonnes which represent only 5 per cent of the total potential, and feed exports are not very high. The feed industry has modern computerised plants and the latest equipments for analytical procedures and least cost ration formulation, and it employs the latest manufacturing technology. In India, most research work on animal feed is practical and focuses on the use of by-products, the upgrading of ingrediants and the enhancing of productivity. Quality standards of Indian feeds are high and up to international levels[40].

Our country has a large number of animal feed manufacturers in small medium and large scale sectors. As per Table 2.7 the total production of co-operative sector on all India level comes to 4905 Tonnes / day.

The Compound Livestock Feed Manufacturers' Association of India popularly known as CLFMA is the sole all-India representative association of manufacturers of nutritionally balanced and scientifically compounded cattle poultry, other animal feed, and fish and prawn feed all over the country. Feed manufacturers in the public, co-operative and private sectors having small, medium and large scale production unit throughout the length and breadth of the country are members of CLFMA. This was formed in 1967 with the objectives of helping the promotion of overall animal husbandry,

including promotion of the concept of balanced feeding of animals in accordance with their nutritional requirements for deriving maximum output through productivity improvement.

Table 2.7

Table showing compound cattle feed plants under Operation Flood, 1994

State	Plant capacity (tonnes/day)
Andhra Pradesh	320
Assam	100
Bihar	100
Goa	50
Gujarat	1650
Karnataka	300
Kerala	**400**
Madhya Pradesh	200
Maharashtra	380
Orissa	100
Pondicherry	5
Punjab	200
Rajasthan	400
Tamil Nadu	300
Uttar Pradesh	200
West Bengal	200
All India Total	**4905**

Source: Dairy India, 1997.

It has about 100 animal feed manufacturers, 180 medium and large scale production units with a total installed capacity of around 6.0 million tonnes of compound animal feed per annum. Further, it has 80 associate members who are engaged in the manufacture trade and supply of feed additives and other feed inputs, feed plant and machinery, laboratory equipment and chemicals, dairying & breeding, hatcheries and so on.

Table 2.8

Table showing the Production of compound animal feed by CLFMA members from 1964 to 2001

All figures are in thousand tonnes

Year	Cattle Feeds	Poultry Feeds	Other Feeds	Total
1964	25.0	14.4		39.4
1974	275.4	164.6		440.0
1984	750.0	406.7		1157.2
1985	867.3	502.8		1370.1
1986	924.8	567.4		1492.2
1987	1119.9	609.4		1729.3
1988	1116.2	709.2		1825.4
1989	1150.4	772.5		1922.9
1990	1324.5	433.7		2161.2
1991-92	1479.2	942.8		2422.0
1992-93	1460.1	863.1	15.2	2338.4
1993-94	1356.0	876.5	14.8	2247.3
1994-95	1446.2	1074.6	18.9	2539.7
1995-96	1512.9	1267.8	29.9	2810.6
1996-97	1504.5	1409.0	24.1	2937.6
1997-98	1411.9	1345.0	18.8	2775.7
1998-99	1463.9	1695.6	24.3	3184.8
1999-00	1278.7*	1600.7**	23.6	2903.0
2000-01	1240.9*	1519.3**	33.9	2794.1

* Excluded cattle feed production by one prominent co-op sector member.

** Excluding poultryy feed production by two (in 1999-00) / three (in 2000-01) prominent private sector members (Integrators).

Source: Strategies to meet challenges of globlisation, national symposium held at Goa on 29-9-2001

Table 2.8 shows the production of cattle feeds by CLFMA members. Table indicating showing production of compound animal feed from 1964 to 2000-01 shows that the production of cattle feed starting from 25,000 tonnes has reached a level of 12,40,900 tonnes per annum and total production of 3225000 tonnes. It is projected that production will have reached 5 million tonnes by 2020. Production of cattle feed was at its zenith during the year 1995-96 - 1512000 tonnes. After that, production trends show a decreasing tendency.

2.15 Conclusion

From the above analysis, conclusions derived are

1. If the animal production has to prosper in the country it must continue to be based on feeding of agro-based industrial by-products and crop-residue which are the major source of energy and protein in livestock feed.

2. There is a need to explore the possibility of cheap and balanced ration across regions and dissemination of such technology among farmers.

3. Proper management and feeding of livestock with nutrious and balanced feed is of utmost importance today in the world of competitiveness wherein a farmer has to derive maximum profit for his survival.

4. Manufacturers of livestock feed, therefore, play a vital role of paramount importance in providing balanced and scientifically compounded animal feed to livestock thereby increasing productivity and profitability to farmers who use high quality feed.

With liberalization and many other economic reforms and globalisation of the Indian economy, many multi-national corporations and global giants in animal production are likely to start their business ventures in India. So we Indians have to open our eyes at this eleventh hour to have an overall development of this cattle feed industry. Coming to Kerala, an agriculture predominant State, which depends on the development of agro-based industry, there is a lot of potential for the development of cattle feed industry. It is discussed in detail in Part B.

PART-B

POTENTIAL FOR CATTLE FEED INDUSTRY IN KERALA

2.16 Introduction

Kerala is unique in that, it has a low level of industrialisation and income with high unemployment and literacy. Livestock rearing provides opportunities for augmenting income and employment in the rural households of Kerala. Management of livestock under the backyard system is unique in the State. Operation Flood was successfully implemented here by the Kerala

Co-operative Milk Marketing Federation. This has led to a change in the quality of cattle and milk production. There is shortage of green and dry fodder due to lack of fodder cultivation. Cattle feed is the major feed input of dairy farmers. This inevitable demand for cattle feed attracted enthusiastic entrepreneurs to start cattle feed units in the State. Not only that, many cattle feed manufacturers outside Kerala also saw this small State as a potential market for the sale of their products. This has helped to increase competition in the markets.

On the eve of launching of 8th Five Year Plan in 1992-93, economic growth rate in the State was 2 per cent; it went up to 7 per cent in 1998-99 at the end of the plan. The sectoral distribution of income shows that the share of primary sector declined from 33.83 per cent in 1993-94 to 28.72 per cent in 1999-2000 while that of the secondary sector has marginally increased. The share of tertiary sector has increased from 41.44 per cent to 50.64 per cent in 1999-2000[41].

Unemployment

There was a significant improvement in employment opportunity in 1994-95. The number of job seekers declined from 41.52 lakhs to 32.26 in 1995. Unemployment continues to be a serious problem of the State with the latest figures being 41.86 lakh in 2000. It is important to note that 52.27 per cent of job seekers are women[42].

Agriculture

Agriculture in Kerala is passing through a very difficult period as a result of the steep fall in price of coconut and rubber. In 1999-2000, the all State aggregate achievement in agricultural income was 78 per cent, but Kerala State's achievement was over 95 per cent. Production of rubber reached a new peak in 1999-2000. Area under rice cultivation has continued to decline but production has reached a peak of 2203 Kgs per hectare, higher than national average of 1930 Kg. Coconut, which is the major crop in coastal and midland Kerala, provides income and employment for millions of households. The fall in price of coconut has affected the livelihood of a vast majority of small and marginal farmers in the State[43].

Land Use

Availability of land for agricultural purpose has been considerably reduced on account of high density of population and diversion of agriculture. Yet data in 1994 shows that nearly 1.7 lakh hectares remain uncultivated for various reasons. Some of the food crops such as grount nut and cashew nut have lost their coverage in spite of the government effort through special programmes.

Livestock

Livestock rearing provides opportunities for augmenting income and employment in the rural households of Kerala. In view of its suitability for combining with crop sector and sustainability as a household enterprise with the active involvement of farm women, it is emerging as a very popular supplementary avocation in the small farm segment. Backyard system of dairy farming and poultry rearing has a very long tradition in Kerala. But today it faces new challenges as a result of the fast changes taking place in the farm front. Livestock friendly seasonal crops have been replaced by perennial cash crops. It is estimated that about 32 lakh, out of the total number of 55 lakh, households in Kerala are engaged in livestock rearing for supplementing their income[44]. The homestead settlement pattern, the relatively high level of literacy among women, the highly favourable agro climatic conditions conducive to bio-mass production and the long tradition in livestock rearing are the inherent strengths which the Kerala economy possesses in favour of livestock rearing. The fact is that Kerala produces more milk than its staple food rice. The total deficit of actual sales in excess of actual procurement during 1995 was to the tune of 58 lakh litres. The productivity of cattle in-milk in Kerala was only around 5.26 Kg. which has to be increased through scientific feeding and better management

2.17 Bovine Holding in Kerala

Historical data on bovine population in Kerala and India are available from 1921. Kerala State came into existence on 1st November 1956. It was in 1951 that a livestock census was conducted in the Travancore-Cochin area by the Department of Statistics of the former Travancore Cochin State. The 9th, 10th, 11th, 12th, 13th and 14th livestock census in 1961, 66, 72, 77, 82 & 87 were entrusted to the Animal Husbandry Department. The 9th Quinquennial Livestock Census was the 1st livestock Census of Kerala[45].

Before Independence, very little attempt has been made to improve the quality of bovine population. But after the introduction of planning during the first three plans, key village scheme was the most important component of animal husbandry development programmes. The Bovine population rose from 2.1 million to 3.5 million from early twenties to mid seventies. Female population rose at a faster rate. A more comprehensive programme to improve productivity of cattle by giving attention to better feeding, improved breeding, effective disease control measures, scientific management practices and organised marketing facilities was introduced.

In order to achieve this objective animal husbandry activities in the State started decades ago and are being continued with much attention and dedication, considering the potential of this sector. To ameliorate the living

conditions of the farming community and to increase livestock population and productivity, a number of programmes have been taken up.

2.18 Cattle Development Programmes

Planned development of livestock sector can generate additional income, new employment opportunities, supplementary food, extra energy in the form of bio-gas and organic matter. Therefore, this vital sector, if developed systematically, can solve to a great extent, some of the chronic problems of the State particularly the problem of unemployment under employment, rural poverty, malnutrition sub-optional utilisation of resources and even energy crisis.

The main objectives of cattle development programme are;-

a) Upgradation of the nondescript and low producing cattle of the State

b) Increasing milk production in the State

c) Increasing meat production and making available animal protein to the masses

d) Increasing nutritional standard of the people of the State.

e) Providing self-employment to the rural population.

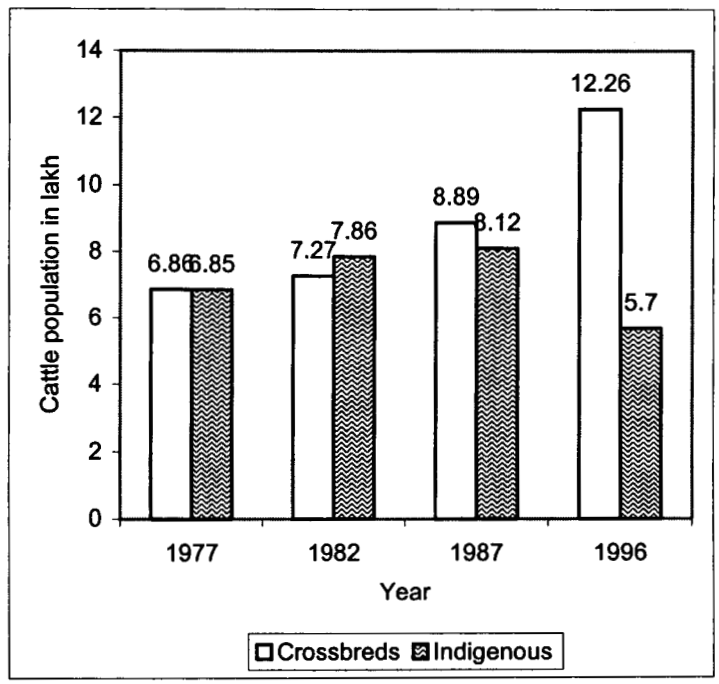
In order to achieve these objectives the following schemes are implemented by the Department.

1. Intensive cattle development projects
2. Calf rearing schemes
3. Livestock farms
4. Fodder development programmes
5. Cattle sterility scheme
6. Extension and training programmes

1. Intensive Cattle Development Projects: This is an integrated scheme with the specific object of stepping up overall milk production in a particular area to targeted level within the specific period by improving the quality of the local cattle using superior germplasm. The project normally covers a population of about a lakh of breedable cows and all aspects of cattle development.

Graph 2.1

Graph showing change in adult female cattle population (1977-1996)



The increase in crossbred cattle in Kerala is primarily due to the successful implementation of scale programmes conducted through this scheme.

2. Calf Rearing Scheme: The objective envisaged in this scheme is providing assistance to selected identified small/marginal farmers and agricultural labourers to supplement their income through rearing of cross breed heifer. The selected beneficiaries are provided with a package of service and inputs besides subsidised supply of balanced feed. Subsidy for the feed is given from 4 months of age to 32 months of age or till calving, whichever is earlier. There is provision for providing adequate health cover and insurance benefits to the calves identified. The scheme is implemented with the full participation of the co-operative milk societies.

3. Livestock farms: The livestock farms serve as demonstration units to educate the farmers in the various aspects of management of dairy cattle and handling of milk and milk products.

4. Fodder Development Programme: Raising nutritious fodder is an important activity promoted by the department with an eye on improving the cross breeding programmes successfully. For economic milk production, availability of good quality fodder is a must, and if it succeeds in filling this gap through cultivation of good quality grasses and legumes, it will help to reduce the dependence on concentration for milk production. The fodder development

programmes are aimed at propagating intensive cultivation of nutritive fodders to meet the demands of the improved cattle population of Kerala. Measures are taken to augment fodder production which include:

a) Establishment of model demonstration/fodder production plots in the departmental institutions and other private agencies.

b) Distribution of fodder slips, fodder seeds and leguminous seed mixture, fertilizers etc at subsidised rates to farmers.

c) Propaganda and training facilities in fodder production.

5. Cattle Sterility Scheme: Infertility or sterility is fairly widespread among cross-bred cattle and is a major source of economic loss. The object of the scheme is to find out the causes and chalk out necessary remedial measures.

6. Extension and Training Programmes: The important objectives of any development department is to carry the fruits of research to the rural population and for this, a well organised and effective extension service is absolutely essential. If the development programmes undertaken are followed with the extension support, maximum production potential can be achieved in the Animal Husbandry sector. With this in view, Livestock Management Training centers were established by the department. The major objectives of the programme are:

a) Imparting training to farmers on scientific management parctices of Animal Husbandry.

b) Arranging special training programmes to economically and socially weaker sections of society namely, Scheduled Castes / Scheduled Tribes, women, unemployed youths, Ex-servicemen etc.

c) Providing induction training to para veterinary personnel required for the department.

d) Imparting re-orientation training about the latest dairy developments.

2.17 Dairy Development Department

The Dairy Development Department undertakes programmes aimed at increasing milk production and consumption. The thrust areas of functioning of this department are fodder development, dairy extension and promotion of rural milk marketing.

I Rural Dairy Extension and Advisory Service

Dairy extension activities are mainly carried out by the Dairy Farm Instructors of the Department. Group discussion classes and indigenous milk products manufacturing demonstrations are held to benefit dairy farmers and rural consumers. Assistance is given for setting up Model Cattle Sheds and

Dairy Farm Units. Cattle shows at block and district levels are organised to provide motivation for farmers.

II Dairy Training Centre

There are four Dairy Training Centres functioning under the Department located at Thiruvananthapuram, Kottayam, Palakkad and Calicut. Dairy farmers from different places are brought under one roof and imparted scientific knowledge in cattle management, manufacture of milk products, co-operation etc. Housewives and unemployed women are trained in farm management and manufacture of milk products. Special thrust on fodder cultivation is given in the training programmes for farmers.

III Fodder resources development programme

The Department provides inputs for cultivation of fodder in the State. It extends assistance to sustain and develop these primary organisations.

Technological innovations in the Animal Husbandry sectors to Departmental officers on various extension activities carried out through the Department are:

(a) Preventive inoculation to livestock is carried out free of cost through the work of Departmental Institutions of the State

(b) Prohylactic vaccinations

(c) Goreksha camps are conducted to identify and to give support to the elite cows in the rural areas.

(d) Infertility camps and systematic follow-up are conducted to reduce the economic loss in dairy cattle rearing and

(e) Livestock shows, calf rallies, seminars, group discussion, film shows, AIR programmes and TV programmes are being conducted regularly to motivate and educate the farmers.

Farmers are provided assistance for taking up non-conventional feeding practices like enriched straw etc. Fodder programmes are being carried out involving grama panchayaths and Dairy Co-operatives.

IV Modernisation of Dairy Co-Operatives

There are 2553 Dairy Co-operatives functioning in the State. The Department extends assistance to sustain and develop these primary organisations. The Dairy Co-operatives are assisted to purchase modern milk testing equipment, milk cans, chemicals for testing and sanitation for setting up cattle feed mixing units, building for milk collection cum office room, purchase of furniture, working capital, managerial grant for secretaries etc.

V Indigenous Milk Products Manufacturing Units

The Department is extending assistance for setting up of units of manufacture and marketing indigenous milk products. This programme provides gainful employment opportunity to rural women.

2.18 Kerala Livestock Development Board Limited

The Kerala Livestock Department Board is a registered company fully owned by the State government. The Board is responsible for implementing cattle breeding policy of the State with the aim of developing new breed of cattle Sunandhini, for economic milk production under Kerala conditions, to develop fodder resources, to make dairying economical and to impart training to technicians in livestock sector, the input service for cattle breeding programme in the form of frozen semen from different breeds and a testing scheme for the selection of the best breeding bulls to maintain continued genetic improvement of the milch cattle. Under the fodder development programme, the Board selects suitable species of tropical grasses for fodder cultivation under different agro climatic conditions on the basis of the results of screening traits. The selected varieties are multiplied first in the fodder seed farm and then through registered seed growers. The seeds are subjected to quality control. Large-scale fodder seed production through registered seed growers is carried out. About 1000 farmers in Idukki and Palakkad districts are involved in the seed production programme. About 50 tons of fodder seeds are collected annually.

2.19 Kerala Co-operative Milk Marketing Federation

Kerala Co-operative Milk Marketing Federation popularly called MILMA was established in April 1980 with its head office at Trivandrum for

the successful implementation of this programme in Kerala. The main activities of the Federation is organising of infrastructure work for milk production, enhancement, procurement, processing and marketing of milk products, development and expansion of other allied activities for the promotion of dairy industry and improvement and production of milch animals, manufacture of good quality balanced cattle feed and supply to the milk producers co-operative societies and imparting of technical input facilities. It is the implementing agency of Operation Flood Programme in Kerala. The underlying concept of Operation Flood is all round development instead of single purpose activities. Hence, along with the thrust in procurement and marketing activities, a well planned and time phased effort was made to strengthen the organisational infrastructure.

2.20 Livestock of Kerala Economy in 2000

In 2000, about 68 percent of the breedable cattle of the State was cross bred and 13.91 lakh artificial inseminations were done. As a result, milk production increased from 10.78 lakh tonnes in 82.83 to 25.25 in 99-2000. The livestock population of All India and Kerala is given in Table 2.9.

Management of livestock under the backyard system is facing new challenges as a result of fast changes taking place in the farm front replacing the seasonal crops by perennial cash crops. It is estimated that about 32 lakh out of the total number of 55 lakhs households in Kerala are engaged in

livestock rearing for supplementing their income. The percentage of workers in Kerala engaged in livestock and allied activities was 8.65 in 1961; it increased to 10.23 in 1991.

Table 2.9

Table showing livestock population of all India and Kerala in lakhs

Species	1987 India	1987 Kerala	% share of Kerala	1996 India	1996 Kerala	% share of Kerala	% increase in the previous census
Cattle	1958.70	34.24	1.75	2045.16	33.96	1.61	-0.8
Buffalo	769.70	3.29	0.43	842.39	1.65	0.20	-50.0
Goats	994.10	15.81	1.59	1152.81	18.61	1.61	17.7
Pigs	107.60	1.37	1.27	127.88	1.43	1.12	4.4

Source: Livestock census all India and livestock census Kerala.

Milk production in Kerala has registered a growth rate of 9.3 percent per year as against 47 percent at national level during the last two decades. The per capita availability of milk stood at 214 grams per day. Milk is the only product which could maintain its growth rate in relation to increase in demand. Meat production in Kerala comprises beef, mutton, pork and broiler chicken. Out of this, beef is almost entirely from the culled animals brought from neighbouring States. Meat production can be met by internal production if proper policies are laid down for the slaughter of animals in the State. Table 2.10 shows the requirement and availability of livestock products.

Table 2.10

Table showing requirement and availability of livestock products

Year	Milk (Lakh tonnes)		Egg (Million Nos.)		Meat (000 Tonnes)	
	Require-ment	Availabi-lity	Require-ment	Availabi-lity	Require-ment	Availabi-lity*
1981	18.62	9.82	29.52	1618	177	5081
1991	21.24	17.85	3471	1710	208	12065
2000	23.73	25.25	5063	2054	304	155.08

Source: Economic Review, 2000.

* Authorised sector only.

Supply of meat is more or less steady around 50 gm per capita per day. Despite considerable increase in the proportion of high yielding crossbred cattle average milk yield per animal per day remains low at six litres compared to its potential of 8-10 litres. The average productivity attained by Kerala is higher than the national average of 2.78 litres[46].

2.21 Feeding of Cattle in Kerala

The feed resource available to the dairy farmers are roughage, concentrates, compounded feed, crop residues and by products from kitchen waste. Roughage includes green fodder, paddy straw,. Concentrate meals, groundnut cake, coconut cake, tamarind seed, cotton seed etc. Compounded feed includes cattle feeds as Milma, KS, Kerala Feeds, Vijaya feeds, Prima Feeds etc.

Animals are fed by grazing and stall feeding. Since grazing land is limited, stall feeding is the most popular method. On an average animals are grazed for about 3 to 4 hours depending upon the seasons. For stall feeding variety of food items are given which are grouped under (1) green fodder (2) dry fodder (3) concentrate (4) compounded feeds and (5) mineral mixture.

Because of high population, pressure for non-agricultural use is increasing. Barren and uncultivated land percentage decreased from one percent in 1997-98 to 0.73 percent in 1998-99 which shows a change of 0.27. percent whereas permanent pasture and grazing land decreased by 17.3 percent in 1998-99 which highlights the decrease in green fodder for cattle population. Realising the importance of fodder development in optimising economic returns from dairy activity, the Kerala Livestock Development Board took up fodder development. The total area covered under fodder cultivation is 5331 hectares in 2000 compared to 10026 during 98-99. However, the shortfall in the production of fodder seeds had been made good by stepping the production of root slips/stem cutting.

Cattle rearing has been integrated with rice farming system to the advantage of both. Availability of straw for cattle combined with the demand for organic manure motivated the farmer community to own cattle. With the shift in cropping pattern, the area under rice has come down by 50 percent over the last two decades leading to drastic reduction in the availability of straw for feeding cattle. The present level of supply is estimated to be around

20 lakh tonnes which constitute only 30 percent of the estimated requirement. As green fodder is negligible, the entire reliance is on straw supplied from internal and external sources. The internal production of straw has declined and in the absence of any major technological innovation or major development effort to augment fodder or roughage resources it is to be presumed that the State had been resorting to import of straw on an enhanced scale from external sources for sustaining the cattle population as well as milk production. This implies that supply from the neighbouring States has scaled up by 4000 tonnes of straw per day as per the data of Animal Husbandry Department[47].

In the matter of concentrate, two of cattle feed industries in the co-operative sector increased their capacity to 500 tonnes. Another cattle feed plant was started in 1998 in the public sector with a 500 tonne capacity. This production is insufficient to meet the internal demand. The total production of two cattle feed units during the year 1999-2000 was 1.32 lakh MT. This is higher by 44.67 percent over the previous year. Even if production in the private sector is considered, it is not enough to meet the requirements of cattle feed within the State.

Cattle and buffaloes have to be fed on coarse fodder of low nutritive value. On the basis of livestock census figures for India from 1961-82, the projection of different species of livestock population has been made for 2000 A.D. For this estimated population the feed and fodder requirements were

calculated. As per the estimation, demand for concentrates, green fodder and dry fodder for 2000 AD will be 98.14, 835.09 and 552.62 million tonnes respectively. Estimates of supply are 77.05, 575.00 and 356.80 million tonnes. As such, the supply will fall short by 21.44 percent for concentrates, 31.45 percent for green fodder and 35.44 for dry fodder. Table 2.11 shows the availability and requirement which also shows the shortfall in feed production[48].

Table 2.11

Table showing the availability requirement and shortfall of feed and fodder in million tonnes

Feed and Fodder	Availability	Requirement	Shortfall
Concentrates	77.05	98.14	21.49
Green fodder	575.00	835.09	31.45
Dry fodder	356.80	552.62	35.44

Source: Indian Journal of Animal Science.

Report of the Task Force on Livestock in 1997 gives the view that more than 65 percent of animals in the State are cross breeds. Full exploitation of the genetic potential is possible only with better feeding and management. Schemes taken up in the past for fodder development failed to use available land for planting fodder trees, Social forestry programmes and fodder market establishment of inter cropping with perennial crops like coconut should be considered[49]. As on today, nearly 67 percent of breedable dairy animals in Kerala are crossbreeds with yield potential ranging from 8 to 10 litres per day

but the actual average milk yield of cross breed animals in Kerala is only 5.6 litres per day. Tables 2.12 and 2.13 show the number of milch animals and average milk yield per animal.

Table 2.12

Table showing estimated number of milch animals in 1997-98 and 1998-99 in lakh

Year	Cow ND	Cow CB	Cow Total	Buffalo
1997-98	5.057	11.877	16.934	0.502
1998-99	3.995	12.291	16.236	0.495

Source: Dept. of Animal Husbandry, Government of Kerala.

Table 2.13

Average milk yield per milch animal per day in 1997-98 and 1998-1999 in Kg.

Year	Cow ND	Cow CB	Cow Average	Buffalo
1997-98	1.401	4.357	3.474	4.041
1998-99	1.869	4.358	3.746	4.140

Source: Dept. of Animal Husbandry, Goverment of Kerala.

Increasing reliance on purchased inputs, particularly concentrate feed makes production of milk in Kerala less competitive compared to the neighbouring States. The following table 2.14 gives the price of input for cattle.

Table 2.14

Table showing average price of feeds in the State from 1993-94 to 1999-00

Item	Unit	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	% increase over 97-98	99-00	% increase over 98-99
Ground nut cake	Kg.	5.77	7.2	8.25	10.5	10.95	11.00	0.46	11.20	1.82
Coconut cake	Kg.	6.51	6.7	7.5	9.5	10.70	10.83	1.21	11.21	3.51
Gingerly nut cake	Kg.	-	7.25	8.25	10	10.01	10.00	-0.10	10.93	9.30
Straw	Kg.	1.4	1.9	2.6	3	3.44	4.04	17.44	4.19	3.71
Grass	Kg.	0.6	0.9	1.3	1.5	1.99	2.87	49.22	2.88	0.35

Source: Economic Review, 2000.

The above table shows that the cost of production of milk is increasing. Cost of production can be reduced only by increasing productivity through efficient management of crossbreed cattle and increasing the availability of fodder through organised efforts including the utilisation of bio wastes and by-products that originate from the farm. The recent trend reveals that the farmers are reluctant to maintain even high yielding crossbreed cows during the dry period.

Looking from the angle of future prospects for overall animal production and compound feed production, India offers voluminous working animals supplemented with small quantities of concentrates. The semi starved animal can never become fully productive even if the deficiencies are made up during production period. This places heavier reliance on compound feed and

oil cake. Compound feed is seen used as a ready to feed alternative to other forms of feed and fodder. Hence higher production of compound feed of good quality is absolutely essential. Better utilisation of local resources such as cassava and coconut cake for feed manufacture also need to be explored.

V.H.Kalbande and C.T.Thomas revealed that the cotton seed–cake, coconut cake and yellow maize were comparatively resistant to rumen degradation and are better source of by-pass protein compared with other concentrate feed ingredient[50]. This is an encouragement to our State in the field of cattle feed Industry.

Replacement of cashew nut meal for ground nut cake in pellet diets will help to reduce the cost of feeds. The cashew nut meal (CNM) was obtained from the cashew nut processing factory. This is also a cordial data for the cattle feed Industry in Kerala, which is an important producer of cashew nut, specially in the northern districts of Kerala.

Our country has enormous livestock population, an alarmingly large portion of it being low production. They can be made to yield more through genetic improvement and better feed which is nutritionally balanced and scientifically compounded animal feed. Secondly vast portion of our human population is unnourished and when income increases due to economic development they always look for nutrious animal food products.

2.22 Cattle Feed Industry in Kerala

The first cattle feed production plant was set up in Kerala in the year 1970 under the Animal Husbandry Department in the name Livestock and Poultry Feed Plant (L& P) with a capacity of 30 tons per day near Malampuzha. Subsequently the plant was handed over to Kerala Livestock Development Board, and the production capacity was enhanced to 100 Metric tons per day in 1977. On implementation of dairy activities of the State under Operation Flood Programme by National Dairy Development Board, the plant was handed over to Kerala Co-operative Milk Marketing Federation in 1983. Plant production capacity was enhanced to 200 MT / day in 1996.

Meanwhile in 1976 Kerala Solvent Extractions Ltd, located at Irinjalakuda, started production of cattle feed which was initially started as the first solvent extraction plant in Kerala in the year 1963. The last three decades have seen KSE became the leader in solvent extraction and ready mixed cattle feed in the State. It started cattle feed production with a capacity of 50 MT per day which has enhanced to fully automatic and modern livestock feed plant of 120MT/day capacity in 1983. In 1987 the production capacity per day increased to 180MT/day and now there are four units, three in Kerala and one in Tamilnadu. The total capacity comes to 1,56,000MT/per year. The distinct features of KSE Ltd are:(1) It is the front ranker in mixed cattle feed production in India, (2)It has been accorded recognition from Animal Nutrition Society for contributions in cattle feed manufacturing. (3)It is

Kerala's first to export mixed cattle feed. (4)It is the first in South India to manufacture and distribute bypass protein cattle feed. It shows that prudent financial management and a futuristic outlook can be the abiding principle in turning the initial setbacks into strength. Consistant growth has been producing good returns. The financial future of KSE is secure and bright.

In the year 1985 another cattle feed plant was installed under Kerala Co-operative Milk Marketing Federation at Pattanamkad known as MILMA Cattle feed Plant Pattanacuad with a capacity of 300 MT / day.

In the year 1986, to cater to the needs of northern districts of Kerala, a cattle feed plant was started at Calicut with a capacity of 240 MTD, under the name, Koyenco Feeds Private Limited. The company has shown very good progress in all areas of operation in spite of all the problems including the tough competition from multinational companies and other competitors. During the year 1997, the company exported cattle feed to other countries. It was modernised by the year 1997. The future of the company looks very bright after the completion of modernisation.

In 1995, Prima Agro Products Limited at Cochin started production of animal feed with a production capacity of 60000 MT per year under the brand name of Prima Feeds. Prima Feeds is covered by quality certification of the Bureau of Indian Standards. The company has introduced a quality control system. The Prima Industries Ltd started a solvent extraction unit in 1996 in

Palakkad which is expected to supply a substantial portion of the raw material requirement for the Animal Feed unit.

Another landmark in the cattle feed production is the starting of 'Kerala Feeds Ltd, at Kalletumkara in Trichur district, a public sector undertaking under State government in the year 1997 with a production capacity of 500 MTD. It started commercial production on 8th Jan 1999. Considering the fact that the company is a relatively new one, it is hoped that it will utilise its optimum capacity in the years to come. The future of the company looks bright.

Apart from these, there are quite a few other units also, 'Vijaya Feeds' has a 100 ton capacity. Silipi Agrotech Private Ltd started production in 1996 with 400 ton capacity. Malayalam Solvent Extraction with 75 MTPD started commercial production in 1999. There are a large number of small and tiny units including 12 milk societies which manufacture and sell limited quantities of cattle feed. Many units which have been registered even from the year 1979 are not in a working condition today.

For the purpose of study the units are divided into two categories, large concerns and small concerns. The large units include those units with a production capacity of more than 100 tons per day and small units include units with a production of 100 and less than hundred tons per day.

2.24 Large Concerns

2.24.1 Reason For Starting

All the large concerns have been established on company basis. The reasons for starting the units were to meet the needs of locality for cattle feed, to make use of locally available raw materials, to maintain the quality of cattle feed as an input to dairy farmers and to meet the competition in the cattle feed market.

2.24.2 Policy Frame Work

Policies of these companies are formed by Board of Directors and Heads of the Departments. The companies on the basis of ownership can be divided into the private sector and the co-operative sector. In the co-operative sector there is an internal audit system which is done by a qualified chartered accountant, appointed by the company, who submits the report to the management on a quarterly basis.

2.24.3 Source of Finance

The source of financing consists of both borrowed capital and owned capital. In the case of private companies the borrowed capital comes from commercial banks, Kerala State Financial Corporation and from the other sources. In the case of co-operative sector, the main source of funding is from National Dairy Development Board and nationalised banks. Most of the

companies have only the initial borrowing and no subsequent borrowings whereas the co-operative sector has subsequently borrowed or obtained subsidy from Dairy Corporation. The rate of interest on these loans varies from company to company from 14 to 19 percent. The companies have given securities for the loan taken by them in the form of land and properties and inventories.

Table 2.15

Table showing loans obtained by the units under study

Source	Amount of loan (Rs.lakh)	Rate of Interest	Security given
N D D B	212.18	18%	stock
C B	78.52	19%	Fixed Asset
KSIDC	87.60 6.80	Varying	unsecured
Directors	18.00 9.00	Varying	stock of movable properties
C B	88.43	14%	Fixed Assets
SIPcot	27.21	Varying	Immovable properties
C B	105.98 272.23	14%	Fixed asset Inventories and Book debts
K F C	9.84	Varying	Fixed asset
Private agencies	26.42	Varying	Plant & Machinery with computers
Private agencies	57.61	Varying	unsecured

Source: Compiled by the researcher.

For the co-operative sector, the government has given land on lease for 99 years. The loan repayment is made on an yearly basis. All the companies are in the habit of repaying the loan. The clients are satisfied with the financial position of companies.

2.24.4 Capacity

The installed capacity is not fully utilised by most of the units. The Table 2.16 shows the installed capacity and utilised capacity.

Table 2.16

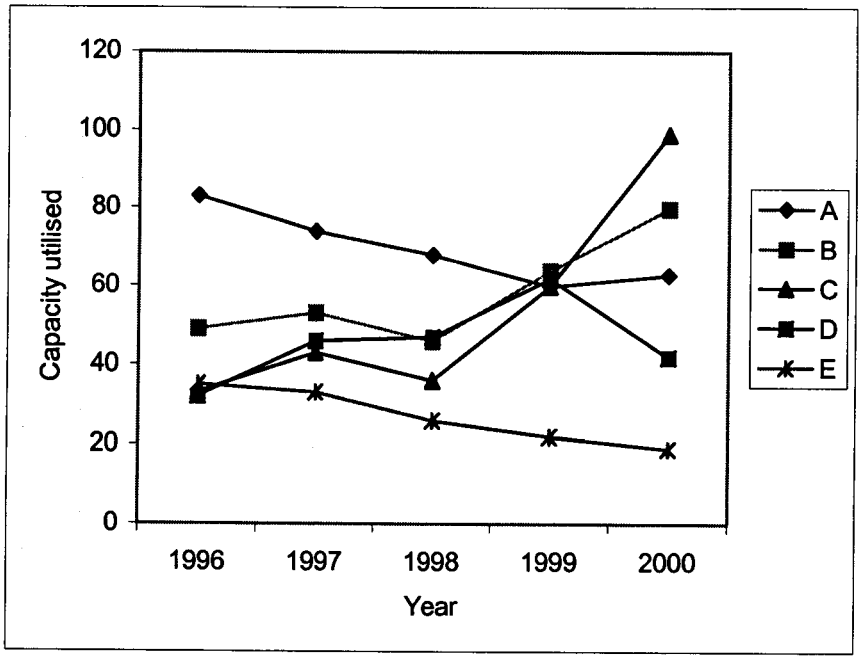
Table showing the installed capacity and utilized capacity of the units

Units	Installed capacity (MT)	Utilized capacity [in percentage in italics]					
		96[%]	97	98	99	2000	Avg
A	1,56000	130643 *83*	115505 *74*	106127 *68*	93547 *60*	97645 *63*	108693 *70*
B	90000	44210 *49*	47309 *53*	41314 *46*	57983 *64*	72403 *80*	52644 *59*
C	60,000	20210 *33*	25586 *43*	21538 *36*	36247 *60*	59620 *99*	32640 *54*
D	60,000	19112 *32*	27575 *46*	28251 *47*	37539 *62*	35382 *42*	27572 *46*
E	72000	25246 *35*	24071 *33*	18856 *26*	15500 *22*	13492 *19*	19444 *27*
Total	438000	239421 *55*	240046 *55*	216086 *49*	240896 *55*	278543 *64*	240998 *55*

Source: Compiled by the researcher.

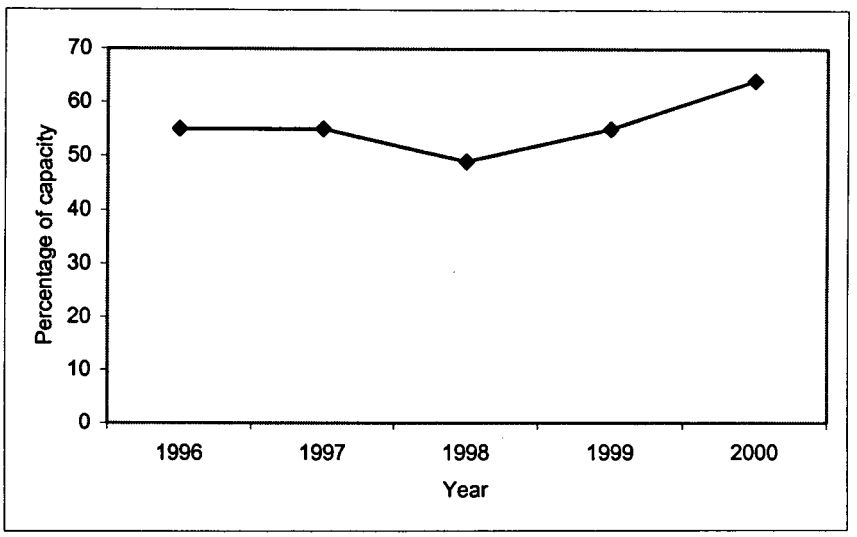
Graph 2.2

Graph showing the percentage of capacity utilised for the period under study by the unit



Graph 2.3

Graph showing the average capacity utilization of the industry for the period 1996-2000



From the table, it is clear that full capacity is not utilised by the units. Only unit C has utilised 100% of capacity during the year 2000. In the case of company A, in the year 96, 83 % of capacity was utilised. Later on, for all the years it shows a decreasing trend. On an average the capacity utilised by the company A is 70%. In the case of company B, there is seen an increasing trend from 49% in 1996 to a position of 80% in 2000. In the case of company C from 33% in 1996, it has reached the level of 100% in 2000. Company D also shows an increasing trend up to 1999. From 32 percent in 1996 it has gone to 60% level. But in 2000 again it went down to 42. It has achieved only 46% on an average. Company E it has registered a continuous decrease. From 35% in 1996 it has decreased to 19% in 2000. On an average it has only 27 % of utilisation. The overall production of five units together is 55% in 1996, 97 and 99, increased to 61 % in 2000 showing an overall 55% capacity utilisation. The average utilisation of company A is the highest. The co-operative sector has an average of 56.25. In the private sector it is only 48%.

Reasons pointed out for under utilisation of capacity were the high price of raw material, lack of finance and lack of demand during rainy season. Electricity failure, another reason for low production, has been overcome by using generators which again has increased the cost of production.

2.24.5 Production

The units are in a habit of preparing production budget. It is prepared on the basis of past budget and based on forecast about the future. To the question of stoppage of production only company A agreed there was no stoppage of production during the period under study. All other units agreed that there was stoppage of production. The reasons pointed out were delay in the supply of raw materials and lack of demand during rainy season. There were no strikes and lockouts in any company during the period under study.

2.24.6 Raw Material

A large number of raw materials required and the raw material used can be divided in to four categories: Bran, oil cakes, grains, molasses and others. Bran includes de-oiled rice bran, rice polish maize bran etc. Oil cake includes sunflower cake, soyabeen cake, groundnut cake, coconut cake and rapeseeds. Grains include jowar, maize, wheat etc. Molasses include sugar beat; others include tapioca, mango kernel, tamarind powder, calcium powder, mineral mix. salt and vitamins. The annual requirement is according to the percentage of capacity utilisation and is different for different units. The material requirement of company A is given in the table 2.17.

Table 2.17

Table showing Requirement of Raw material in tons for one year

Material\Year	I	II	III	IV
Coconut oil	50719	49442	45501	45567
Rice bran	57998	61985	67293	60725
Cholam	15772	16320	14757	9092
Cotton seed cake	7449	6472	8541	4542
Sunflower	19905	25091	26050	29083

Source: Compiled by the researcher.

The materials mixed by units depend upon the formula used by the industry according to the Material Specification and BIS standard. Research is done on a continuing basis to find out the proper mix to get the maximum benefit from minimum cost. Table 2.18 shows the requirement of raw material in quantity and price with percentage of change in price with 1996 as base year.

The table 2.18 shows that the raw material cost has increased by 42 per cent during the five year period on an average. In the case of company A, the material price is increased by 7 per cent in 1997, 28 per cent in the year 1998. The increase is less during the year 1999 and is only 15 per cent, but it is as high as 42 per cent in the year 2000. In the case of company B, the material cost increased by 7 per cent in 1997, reduced in 1998 by 8 per cent, again decreased to 6 per cent in 1999 and was increased by 31 per cent in 2000.

Table 2.18

Table showing the raw material requirement in quantity and price of raw material with percentage of change in price (1996 as base)

Unit code	1996		1997			1998			1999			2000		
	Qty	Rate	Qty	Rate	% of change	Qty	Rate	% of change	Qty	Rate	% of change	Qty	Rate	% of change
A	57673	3086	63120	3300	7	67325	3950	28	65981	3546	15	67210	4380	42
B	44374	3680	48422	3952	7	46133	3370	-8	62348	3905	6	72403	4827	31
C	20286	3426	25743	3978	16	21569	3665	7	36719	3951	15	59620	4798	40
D	19324	2887	28061	4102	42	28723	3885	35	37750	3970	38	25509	4830	67
E	25996	2906	24963	3481	19	19583	3575	23	15831	3525	21	13812	3885	34
Avg.		3197		3763	18		3689	15		3780	18		4544	42

Source: Compiled by the researcher.

In the case of company C, the price increased by 16 per cent in 1997. It is reduced in 1998 and again increased in 1999 by 15 per cent. In 2000, the increase is 40 per cent above the 96 price. In company D, the price is always higher than the price of the other units. The price increased by 42 per cent in 1997, 35 per cent in 1998, 38 per cent in 1999 and 67 per cent during the five year period. In the case of company E, the price increased by 19 per cent in 1997, 23 per cent in 1998, 21 per cent in 1999 and 34 per cent in 2000.

2.24.7 Purchase of Raw Material

Raw material is purchased through agents and by direct purchases. Majority of raw materials are from other States. Coconut extracted cake is the only raw material that is available in Kerala in plenty. Even for rice brans the units are depending on other States. The rice bran available here has oil content which has to be extracted. Otherwise, the oil content present in the bran will decay the cattle feed produced. As there is no solvent extraction plant in Kerala all the units have to depend on other States. Most of the units have their agents in other States through whom they purchase raw material. Sometimes, the company purchases directly from producers and eliminates the agents so that the cost of raw material can be reduced.

2.24.8 Terms of Purchase

Only company A makes cash purchases. They are not availing credit facilities. All other firms are making use of credit purchases. Payment for

raw materials is not made in lumpsum, it is paid on deferred basis. In the case of company B, it seems that advance will be paid for about 80% of raw material cost. A certain per cent of the rest will be paid at the time of delivery and the rest will be paid with a credit of three months. In the case of company C, credit purchases are made. The credit period allowed is 30 days in D & E. The main problem of raw material is the inadequacy of it within the State, because of which the units face delay in getting the raw material and so bulk quantity of raw material has to be kept as stock. About the price of raw material the units have difference of opinion. Three of them opine that it is high whereas two units are of the opinion that it is medium. The high cost of raw material is due to the import of oil seed from other countries. Oil cake is obtained by extraction of this oil seed. The extraction units are situated not in Kerala but outside Kerala. Usually their charges are high. Another reason is the taxes to be paid on such raw material; central sales tax and general sales tax have to be paid. Transport cost adds to increase of raw material cost.

2.24.9 Marketing

According to Table 2.19, the units sold their products within the State itself, except in the case of company E, which exports the product to a foreign country. No unit sells the entire production within the district alone.

Table 2.19

Table showing the products marketed and their sales coverage

Unit	Product	Within the District	State percentage	Outside State percentage
A	Coconut deoiled cake	Not specified	100	-
	Cattle feed	Not specified	100	-
	CN Oil	Not specified	10	90
B	Smash	Not specified	100	-
	Pellet	Not specified	100	-
	High energy feed	Not specified	100	-
C	Cattle feed smash	15	85	-
D	Animal feed	Not specified	100	-
E	Cattle feed	Not specified	80	20

Source: Compiled by the researcher.

2.24.10 Sales Turnover

The variation in selling price is noted in all the companies. In the case of company A, the change in price is by 18% in 1997, 30% in 1998, 28% in 1999 and 41% in 2000. For the company B, it is 17% in 1997, 32% in 1998 again only a slight increase in 1999, 32%. But in 2000 it increased to 36%. In the case of company C, it is 18% in 1996, 29 in 1998 again the same in 1999 and 24% in 2000; the price is lesser than company B, 32 in 2000. In the case of company E, the change in price is 17% in 1994, 32% in 1998, decreased to

29% in 1999 but increased to 42% in 2000. In the case of company D, there is a slight difference; instead of increasing tendency in price, it shows a decreasing trend towards 1999 and 2000, the overall increase being 32%. The cooperative sector shows an average increase of 34% and the private sector shows an average of 32%.

The selling price variation is due to increase in material cost, labour cost, overhead cost and also increase in sales tax. All the five units agreed that the variation in price is due to increase in material cost. Four units agreed that along with increase in material cost labour cost also affected the variation in price. Two units pointed out that it is also due to increase in overhead, while two other units pointed out that the increase is also due to changes in sales tax; that is, sales tax is raised to 5%, decreased to 2% and again increased to 5%. Price determination is by the principle of marginal cost as well as total cost. The co-operative sector did it on the basis of marginal cost plus fixed cost plus profit, whereas in the private sector it is based on total cost. All the expenditure plus a profit margin gives the selling price.

2.24.11 Brand Name

All the five units market their products using their particular brand name and they think that the brand name is helpful in selling the product. On being asked how the brand name helped the units, they pointed out that the brand name gives an image and reputation to the product. It increases the

goodwill and quality assurance is made possible. Well-known brand names are MILMA, K.S., Kerala Feeds, Sunandhini, Prima, Silpi, MSE, Royal Feeds, Ksheera, Menma etc.

2.24.12 Marketing Channel

Marketing is mainly through wholesalers, retailers and direct to consumers.

Table 2.20

Table showing the marketing channel of the units under study

	Wholesaler	Retailer	Direct sales
No. of units	3	5	2

Source: Compiled by the researcher.

All the companies sell their products through retailers or agents of the company. They purchase the product from the company and sell through their shop. In the case of the co-operative sector, products are sold through co-operative societies and traditional societies, and to the members of co-operative societies and traditional societies. The products are given at a subsidy rate by the State government and the price will be deducted from the milk supplied by the consumers. The societies are given the product by the cattle feed plant for a 12 days credit. In the case of private sector also, they have started certain milk societies of their own and milk is collected from members and cattle feed is given to them by adjusting with the price of milk.

When it was asked to point out the marketing problems faced by the units, the main problem mentioned was competition from outsiders and enterpreneurs inside the State. And about demand, it is a mixed phenomenon. During the rainy season there is lack of demand for the product whereas in the summer season there is over-demand. What is remarkable is that during the raining season production of milk is higher but as demand for milk is lesser, the farmers give less feed to their cattle and the shortage of feed is compensated by green fodder. Whereas in summer, the production of milk is lesser but the demand for milk is higher and the farmers use more feed as the green fodder is not available. Again the quantity of cattle feed will have to be increased.

Sales promotion is done through advertisements, poster, and slides and personal contacts. Gifts or any other type of sales promotion are not popular in cattle feed industry.

2.24.13 Market Research

All the units are aware of the importance of research. Research has to be conducted on raw material which contains adequate nutritious value and at the same time is available in the market in required quantity. That is both quality aspect and cost aspect have to be taken into account. Quality specification should be a must for the company. This will help the units to face competition from low quality and low price products.

2.24.14 Personnel (Human Resources)

The cattle feed units give employment opportunities directly and indirectly. Skilled and unskilled and semiskilled workers are needed to run the units. They come under direct employment. Indirectly, it gives employment by the distribution network across the State. If 1000 are engaged in direct work, 3000 are engaged in indirect work as agents and distributors, all over the country. The farmers who are engaged in milk production activities as well as the dealers who supply raw material for the cattle feed industry depend on these units indirectly.

Table 2.21

Table showing the strength of employees in the units

Units	skilled	semi-skilled	unskilled	Total
A	225	-	640	865
B	6	18	86	110
C	30	32	38	100
D	10	20	80	110
E	15	20	40	75
Total	286	90	884	1260

Source: Compiled by the researcher

Table shows direct employment opportunity to 1260 employees and that about 4000 persons get employment opportunity indirectly as distribution agents in loading and unloading activities etc. Self employment opportunities

in the field of dairy farming is outside this. Workers are recruited by conducting interviews and, in certain units, by test. The workers are paid on the basis of Time wages. Eight hours is considered as a shift. Four units work on shift basis, and there are three shifts in a day. Even though the workers are more than 100 in number no unit has reported any labour problem. The attitude of management towards the workers is friendly and this leads to good and cordial relation between workers and the management. In all the units, the workers reported that they were satisfied with their employers. Though there is no incentive scheme in any of the units no strikes or lockouts were reported. Problems of workers are supposed to be solved through works committee in the co-operative sector and through negotiation in the case of private sector units.

2.24.15 Power

All the units had the same thing to say about availability of power, which is inadequate, due to the power cut during the summer season. But the units have installed their own generators to overcome power failure and break in production. The rate of electricity is also high and unreasonable, they said. Only one unit got electricity at concessional rates.

2.24.16 Government attitude towards the industry

The units are not at all satisfied with the help given by the government. Only the co-operative sector units have been given any help by way of land on

lease. Subsidy was given to the industries during the initial period. Financial help came to co-operative sector by National Dairy Development Board. The government assisted in the marketing of the product of the co-operative sector. 25 percent of the production is purchased and sold by the government through co-operative milk societies and given at subsidised rates under the calf betterment programmes of Animal Husbandry Department. During certain years a reduction in sales tax rate was given to co-operative units.

Both the private and co-operative sectors are not expecting any sales tax rebates. Exemption from sales tax is not feasible for the State Government. But a reasonable reduction in the tax rate is expected. They also do not expect any marketing help from the government. The co-operative sector expects continued help from the government.

2.25 Procedure of Production of Cattle Feed

Most of the raw material used for the production of cattle feed is purchased from outside the State. The sample of material is taken to the lab for checking the material according to the material specifications given. As the availability of material is seasonal a list of materials with material specification is kept. According to the availability and specification as per the BIS standard the materials are selected. Every raw material should be in the smash form. The grains, cereals, and even coconut cakes should be powdered. All the raw materials are fed into "Intake conveyor" and lifted up with the help

of an elevator to the top floor. The materials pass through a vibroscreen to be separated into grindable and non-grindable. The grindable goes to the grinding bin. There are three grinding bins. After the grindable material is ground in the grinding bin, it again goes to the distribution conveyor by means of the elevator. The non- grindable raw material also reaches the distribution conveyor directly after passing through vibroscreen. Now the raw material is ready for mixing. Six different products are manufactured. Each product will have its own formula for the mix. The materials is transferred to weighing hopper where the raw material is weighed according to the formula with the help of Microsoft computers. This raw material reaches the Batch Mixer whose capacity is one ton.

The product quantity to be produced is as per the requirements of the sales department. Everyday the demand will be projected by the sales department. Accordingly production will be carried out. Along with raw material, mineral salt and additives are added in the weighing hopper. This mixture will be in the batch mixer for a particular time. Number of minutes will be specified. The batch elevator takes the mixture to the pre-molasses Bin. molasses mixture is added by molasses mixer. This is done by spraying molasses. This material again is elevated to the top by molasses elevator. After that if the formal mix is for mash it is directly passed to the pre bagging bin of mash called Mash Bin. If it is for pellet, it will be passed to pre-pelleting bin for pelleting or producing pelletised feeds. This will be passed through a feed

container in which the feed will be steam cooked. Again it passes to pellet mix. The temperature of pellet will be about 95° C, then it passes through a pellet cooler. The cooled pellet will again be elevated to the top by pellet elevator. This will pass through pellet sieve to the pre-bagging bin of pellet. From these pellet bin and smash bin, pellet and smash will be bagged according to the requirement of the company. From there, through the slat conveyor it passes to the stitching machine where bag is stitched according to weight. This will move to the godown through the conveyor belt where it is sorted and stored into the godown according to the product differentiation. The loading is done straight from the godown to the transporting vehicle.

2.26 Conclusion

From the above analysis it is clear that Kerala has the potential for the development of cattle feed units. The agricultural relationship of cattle feed industry and the presence of viable raw material for the industry is the strength of State for the growth of the industry within the State. The encouragement from the part of government of Kerala towards the livestock development, the steps taken by the Animal Husbandry Department towards betterment of quality of cattle, successful implementation of Operation Flood by Kerala Co-operative Milk Marketing Federation and the non-availability of green fodder due to the decrease in the pasture and graze land and paddy cultivation, increase the demand for compound cattle feed.

Yet there is no commercial footing in Kerala for the cattle feed industry. There are only a few large scale units in Kerala and the existing units are not satisfied with their present profitability position. At the same time the outside manufacturers are attracted to Kerala as a potential market for their products. This situation leads to have an analysis of working of the units. To have an in-depth study, financial statement analysis and cost structure analysis are done in the next chapter.

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FINANCIAL ANALYSIS OF UNITS

Philo Francis “Problems and prospects of cattle feed manufacturing units in Kerala ” Thesis. Department of Commerce and Management Studies , University of Calicut, 2003

Chapter III
Financial Analysis of the Units

CHAPTER III

FINANCIAL ANALYSIS OF UNITS

3.01 Introduction

A study on cattle feed industry cannot ignore the study of the financial health of the units in the industry. An analysis of financial statements is essential to understand the financial problems, if any, faced by the units. In this chapter an attempt is made to analyse the financial statements of cattlefeed units.

Analysis of cattle feed manufacturing units is done in this chapter. For the purpose of analysis, the units are divided into large concerns and small concerns. A large concern is defined as a unit whose per day installed production capacity is more than 100 MT in all the shifts together and a small concern is defined as a unit whose per day installed production capacity is 100 or less than 100 MT. The chapter is divided into two parts. Part A deals with the analysis of large scale units and data relating to small units figure in Part B.

PART A

In this part, all the large scale units with a per day production capacity of more than 100 MT and which started commercial production during the

period under study are considered. Private sector and the co-operative sector companies are covered by the study. Since such units are less in number census method is used for collection of data. Collection of data is done with the help of interview schedule, and discussions are held with persons in the field of cattle feed production. Interview schedule are filled in by direct interview held with the managing director or general manager. The only company in the public sector is excluded as commercial production there had started only in the year 1997-98.

The financial statement is analysed using ratios. Cost Structure Analysis is done with the help of correlation and multiple regression. After finding the important ratios of the financial statement, a summary of ratios is prepared on the basis of which, companies are divided into three categories, namely, *Good Fair* and *Satisfactory*. The industry average for the five year period is taken as standard and scaling technique is used to rank the units under study.

3.02 Financial Analysis

The financial position of a company can be analysed with the help of financial statements, which include the Balance Sheet and Profit-Loss Account for the year. This analysis can be done with the help of ratios like liquidity, solvency, profitability and activity. For all the ratios an industry average is worked out. Units in private sector are named as A, D and E, and companies named B and C are in the co-operative sector. Before analysing the various

ratios. Mentioned above it seems necessary to analyse the pattern of investment and composition of fixed assets of various units

The analysis that follows throws light on the pattern of investments and structure of various assets.

2.03 Capital Output Ratio

Efficiency of capital invested in any industry depends on the relationship between the total investment and the output. The term capital here refers to productive capital invested in fixed assets and working capital. Output means the value of commodity turned out over a period of one year. A lower ratio indicates a higher rate of growth of output. Table 3.1 shows the Capital Output Ratio of companies under study. The average Capital Output Ratio over a period of five years is 0.18 for company A, 0.23 for company B, 0.12 for company C, 0.58 for company D and 0.32 for company E. The ratio is the the lowest for C, which shows the capital invested is justified by the output. For one unit of output 0.12 is the amount invested. Company D has the most unfavorable position, its investment being as high as 0.58. The average ratio for co-operative sector is 0.18, and private sector 0.36. When considering all the units of the industry average is 0.29. The ratio is low for the co-operative sector.

Table 3.1

Table showing the average Capital Output Ratio of the units under study for a period of five years

Units	96	97	98	99	2000	Average
A	0.16	0.15	0.16	0.21	0.22	0.18
B	0.25	0.22	0.24	0.24	0.22	0.23
C	0.15	0.10	0.17	0.11	0.06	0.12
D	0.67	0.50	0.56	0.55	0.60	0.58
E	0.20	0.22	0.35	0.39	0.40	0.32

Source: compiled by the researcher

Average for the co-operative sector is 0.18 and for private sector is 0.36. The overall average of Industry is 0.29. The ratio shows that for one rupee of output or sales 0.29 is the amount invested.

Total assets position can be analysed by going through the fixed assets and current assets of the companies. The proportion of fixed assets and current assets in the total assets can be analysed as follows:

3.04 Composition of Fixed Assets and Working capital

Table 3.2 shows the ratio of fixed assets to total assets.

The average for Co-operative sector is 28.57, and for Private sector is 51.24. Industry has an average of 42.12 for a period of 5 years.

The investment of company A in fixed assets ranges from 40.18 % to 70.57 % of total assets, and on an average 55.11 % of total assets is in fixed

assets during the period of 1996-2000. For company E also, the investment varies from 41.57% to 64.68 %. Even though there is a difference in the range, the average for both companies is 55.05%. The the lowest average is in the case of company C which varies from 16.99 % to 32.64%. The average investment in the case of the co-operative sector is 28.57 and that of the private sector 51.24 which is higher than the industry average of 42.17 percent.

Table 3.2

Table showing the average ratio of Fixed Assets to Total Assets

Units	96	97	98	99	2000	Average
A	40.18	61.31	51.83	70.57	52.19	55.11
B	42.17	41.19	35.31	31.98	10.47	32.22
C	32.64	24.23	24.83	16.99	25.91	24.92
D	56.90	48.95	48.19	35.43	28.35	43.56
E	41.57	49.22	62.54	64.68	57.26	55.05

Source: Compiled by the researcher

Gross capital employed is considered to be the total assets and net capital employed is calculated as fixed assets plus net working capital. Net working capital means current assets minus current liabilities. Table 3.3 shows the relation between fixed assets and working capital. As is evident from the table, the average fixed assets to working capital is the highest for company C and the the lowest for company D.

Table 3.3

Table showing the average Fixed Assets to Net Working Capital Ratio

Units	96	97	98	99	2000	Average
A	1.72	1.46	2.11	2.45	2.01	1.95
B	2.91	3.54	2.09	0.62	0.29	1.84
C	1.92	4.75	15.48	1.40	4.08	5.53
D	1.97	1.20	1.27	0.80	0.64	1.18
E	4.50	3.15	5.40	6.25	2.92	4.44

Source: Compiled by the researcher.

The average ratio for the co-operative sector is 3.71 and that of private sector is 2.52. For the industry as a whole, it is 3.00. Hence it is inferred that a part of long-term fund is utilized to finance the net working capital needs of the company.

3.04.1 Structure of Fixed Assets

A detailed study of the different items of fixed assets gives a clear picture of the investment. Components of fixed assets are land and building, plant and machinery, furniture and fixtures and other assets. Relation of each component to total fixed assets helps to assess the importance of each item.

3.04.2 Land and Buildings

Land and buildings is an important item of fixed capital. Table 3.4 shows the percentage of investment in land and buildings to the total fixed

assets of the companies. Company A has on an average of 62.13 % of total assets which is the highest during the period under study. For all other companies percentage ranges from 1.63 to 62.13. The the lowest is that of company B. The co-operative sector has an average of 9.61 whereas the private sector has 49.21 per cent. This is because value of land for private sector is high, whereas for co-operative sector it is given by the government on lease for 99 years. So the value of land is nil for those companies.

3.04.3 Plant and Machinery

Another important item of fixed assets is plant and machinery. For a manufacturing concern, it is the highest part of fixed assets. Table 3.4 shows the percentage of plant and machinery to fixed assets. The highest per cent is for company B, 74.57%. And for company A, it is only 22.44%. The average investment in plant and machinery is 64.94 % for the co-operative sector and 32.26% for the private sector. For the industry as a whole it comes to 45.93%.

Table 3.4

Table showing the average percentage of Land and Buildings, Plant and Machinery, Furniture and Fittings and Other Assets to Fixed Assets over a period of 5 years, - 1996-2000

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Land and building	62.13	1.63	17.60	34.10	51.40	9.61	49.21	33.31
Plant and machinery	22.44	74.57	55.50	47.45	29.85	64.94	33.26	45.93
Furniture and fitting	5.40	20.34	25.04	8.25	11.53	.23..65	8.39	14.51
Other assets	10.03	3.46	1.86	10.20	7.22	2.66	9.15	6.55

Source: Compiled by the researcher.

3.04.4 Furniture and Fittings

Furniture and fittings account for 23.65% of fixed assets for the co-operative sector and 8.39% for the private sector and 14.51% for the industry as a whole. Generators have been installed by the companies as there is power failure or power cut declared by the government. Most of the office and related departments are computerized. So the furniture and fittings has a dominant role in the fixed assets of the companies.

From the analysis of fixed assets of the companies it is inferred that of the total fixed assets, land and building occupies 33.37 %, plant and machinery 45.03 %, furniture and fittings 14 %and rest of the assets together 6.5 %. About half of the fixed assets is invested in plant and machinery. From the analysis, it is clear that in private sector, land and building and plant and machinery both occupy prominent roles, whereas in the co-operative sector, plant and machinery occupies 65% and all other components of fixed assets occupy only 33 per cent.

From this analysis of investment in total assets of the companies it is clear that 42 per cent of total assets is invested in fixed assets and 58 per cent is in current assets. Of the 42% in fixed assets, plant and machinery comprises 48%. This again confirms that,

(1) Units have high proportion of working capital

(2) The working capital is financed by long term loans and advances and

(3) Of the capital employed, plant and machinery forms the principal component.

3.04.5 Management of Working Capital

Manufacturing concerns require a large amount to be invested in working capital. Gross working capital includes current assets like raw materials and finished goods, debtors, cash balance etc. An appropriate level of current assets and their efficient utilization is a must for the companies.

For a proper analysis of working capital, the percentage of each component to the total current assets and net working capital is calculated. This is followed by calculation of the following groups of ratios.

3.05 Analysis of Various Component of Current Assets

Important elements of current assets of cattle feed units are inventory debtors, cash and loans and advances.

3.05.1 Inventory

Total inventory consists of stock of finished goods, stock of raw materials and stock of other materials. But significant items like raw materials and finished goods are analysed as components of inventory. Table 3.5 shows the percentage of total inventory to net working capital and current assets.

From the table, it is seen that company C has the maximum percentage of inventory [281.89%] and the the lowest is accounted by company D [86.41%]. The average investment in inventory for the co-operative sector is 202.76% and for private sector 117.03%. The industry average works out to be 151.32%. Table 3.5 shows the percentage of inventory to working capital and current assets

Table 3.5

Table showing the average percentage of Inventory to Net working capital and Current Assets during the period under study

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Percentage to Net Working Capital	137.52	123.62	281.84	86.41	127.15	202.76	117.03	151.32
Percentage to Current Assets	57.30	29.46	35.10	64.93	33.37	32.28	51.9	44.05

Source: compiled by the researcher.

Table 3.5 also shows the percentage of inventory to net working capital and current assets. It is clear that majority of current assets is comprised of one item, inventory, in the private sector [51.90%] while in the co-operative sector investment in inventory is second to debtors [32.28].

Raw Material Stock

Percentage of raw material to the current assets of the company is given in table 3.6. The percentage is the highest for company D [51.50%], and the

lowest for E [24.06%]. For companies A, B and C the percentages are 32.33, 27.07 and 26.07 respectively. This implies that more than 1/5 of the current assets is less liquid. The average percentage for the co-operative sector is 27 % for private sector it is 35.96% and for the industry as a whole it comes to 32.20%. The high percent of raw material stock is due to the seasonal nature of raw material. Raw material consists of agricultural products, which are mainly available in other States. Therefore in order to safeguard from shortage of raw material high quantity is purchased and stocked

Table 3.6

Table showing percentage of Raw material to Net Working Capital and Current Assets on an average for the period under study

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Percentage to net working capital	78	127	197	69	91	162	79	112
Percentage to Current Assets	32	27	26	52	24	27	36	32

Source: compiled by the researcher

Ratio for the co-operative sector works out to be 162% of raw material to net working capital, which is higher than the private sector of 79%. The private sector maintains in raw materials only less than 100% of net working capital. Industry as a whole has an average of 112.4% of net working capital.

Finished Goods Stock

Table 3.7 shows that the percentage of finished goods to net working capital is very low. It shows an average of 17% for private sector companies, 30.2 for the co-operative sector, and for the industry on an average of 22.75%. Except for company C, the percentage is low for every company. The ratio on an average is 31%, 7.22%, 3.8%and 16% for companies A, B, D and E respectively.

Table 3.7

Table showing the percentage of Finished Goods stock to Net working capital and Current Assets on an average for the period1996-2000

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Percentage to Net Working Capital	31	8	53	4	16	31	17	22
Percentage to Current Assets	13	3	5	3	4	4	7	6

Source compiled by the researcher.

While the percentage of finished goods to current assets is calculated during the same period the highest is for company A [13%] and the lowest for company B and D [3%]. The percentage for company C and company E is 5 and 4 respectively. This gives the inference that finished goods stock does not

affect the working capital or current assets. There is adequate demand for the product and there is no excessive production of finished product.

3.05.2 Sundry Debtors

Percentage of sundry debtors to net working capital and current assets is shown in table 3.8. Percentage of debtors to net working capital is 282.05% for the co-operative sector, 24.36% for the private sector and for the industry as a whole, it works out to be 127.42% This reveals that credit sale in the co-operative sector is higher when compared with the private sector. According to the survey results, it has been found that the credit period allowed by the co-operative sector is higher than that of the private sector. Though only 12 days credit is allowed by cattle feed plant to the co-operative societies, it takes more time to get the cash. The company C has the highest percentage of 432.07 and company D has the least, 11.83%. Companies A, B and E have an average of 23%, 132% and 38% respectively during the period under study.

Table 3.8

Table showing the average percentage of Sundry Debtors to Net Working Capital and Current Assets for the period under study

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Percentage to Net Working Capital	23	132	432	12	38	282	24	127
Percentage to Current Assets	9	37	51	9	9	44	9	23

Source: compiled by the researcher

Percentage of debtors to net working capital is 282.05 for the co-operative sector, 24.36 for the private sector, and 127.42 for the industry as a whole, which reveals that in the co-operative sector credit sales are higher than in the private sector and that credit period allowed by the co-operative sector is higher than that of the private sector. The company C has the highest debtors percentage, 432.07, whereas company D has the least, 11.83. Percentage of debtors to current assets is the highest again for company C (50.66) and the lowest for company E (9.01). For company D it is 9.03, for company A 9.40 and for company B (36.93). The co-operative sector has an average of 43.80 of current assets to sundry debtors. Private sector has an average of 9.18 and the industry as a whole has an average of 23.02 percent which confirms the liberal credit policies by the co-operative sector and restricted policies of the private sector.

3.05.3 Cash Balance

Cash balance is an idle assets: so the company has to maintain a proper balance between profitability and liquidity.

Table 3. 9

Table showing the average percentage of Cash Balance to Net Working Capital and to Current Assets over a period of 5 years

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Percentage to Net Working Capital	22	21	93	5	13	57	13	31
Percentage to Current Assets	9	8	12	4	3	10	5	7

Source: Compiled by the researcher.

As shown by the table, company C has the highest percentage of cash balance to Net Working Capital (93.15%) and company D, the lowest (5%). The co-operative sector has an average of 57%, the private sector 13.33% and, the industry, as a whole, 30.8% for the period under study. When cash is considered as a percentage of current assets it is only 3% to company D which is the lowest and 12% for company C which is the highest. The average for the co-operative sector is 10%, for the private sector 5% and for the industry, as whole, 7%. The units keep a low per cent of current asset and working capital in cash.

3.05.4 Loans and Advances

Loans and Advances are another item of Current Assets. Loan refers to loan given to employees, which includes items like advance bonus, festival advances , education advances etc. Table 3.10 shows the percentage of Loans and Advances to Net Working Capital and to Current Assets.

Table 3.10

Table showing the percentage of Loans and Advances to Net Working capital and to Current Assets over a period of 5 years on an average

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Percentage to Net Working Capital	62	96	33	20	196	65	93	82
Percentage to Current Assets	24	26	3	15	54	15	31	24

Source: compiled by the researcher.

Percentage of Loans and Advances to Net Working Capital is the highest for company E which is 196% and the lowest for company D - 20%. For companies A B and C it is 62% , 96% and 33% respectively. The co-operative sector has an average of 65 % and the private sector 93%. Industry as a whole has an average of 82% of Net Working Capital for the period under study

When percentage of Loans and Advances to Current Assets is taken, the highest is for company E, 54% and the lowest for company C, 3%. The variation is from 3% to 54%. When all the units are taken loans and advances for company E is far in excess of other units. A consolidated statement of various current assets is shown in Table 3.11. It is seen that company A and company D have higher percentage of investment in stock which is more than 50%. For company B, inventory and debtors are 29% and 37% respectively. Company E has the lowest investment in stock 33%, whereas it has more investment in loans and advances (54%). Investment in debtors is the highest for company C, 50%, which shows it has a liberal credit policy. The investment in loans and advances is also the highest for company C (12%) and company E (3%) has the lowest.

When the average of all the five units is found out, investment in inventory is 44% percent, debtors 23%, loans and advances 24%, cash balance 7% and other assets 2%. In the inventory, raw material stock is 32% of current assets. The overall analysis of current assets shows that the investment in the

liquid assets is low due to the high inventory percentage to the total current assets particularly raw material. The inference that the raw material is a problem for the units.

Table 3. 11

Summary of percentage of components of Current Assets to Total Current Assets over a period of 5 years on an average

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Inventory	57	29	35	65	33	32	52	44
Debtors	9	37	50	9	9	44	9	23
Loans	24	26	3	15	54	15	31	24
Cash balance	9	8	12	4	3	10	5	7
Other assets	1	Nil	Nil	7	1	Nil	3	2

Source: Compiled by the researcher.

An analysis of fixed and working capital reveals that 58% of the investment of industry is in Current Assets and 42% in Fixed Assets. Out of 42% of fixed assets, plant and machinery comprises 45.93%. Fixed assets is 3.03 times of net working capital. Out of 58% current assets, investment in inventory for the industry is 44%. Of the investment in inventory, major share is in raw materials, 32% of the current assets.

A summary of Assets structure of Industry is shown in the following table.

Table 3.12

Table showing the average percentage of share of components of Fixed Assets and Current Assets

Fixed assets	42%	Current Assets	58%
[1] Land and Buildings	33%	Inventory	44%
[2] Plant and Machinery	46%	Debtors	22%
[3] Furniture and fittings	15%	Loans and advances	24%
		Cash Balance	7%
[4] Other assets	6%	Other Assets	3%

Source: Compiled by the researcher.

3.06 Ratio Analysis

3.06.1 Liquidity position of units

Liquidity means the firm's ability to meet its current liabilities when they become due. These are used to measure the ability of the firm in short term.. The following ratios are worked out for different units. The ratios are (a) Current Ratio, (b) Working Capital Turnover Ratio, (c) Stock Turnover Ratio, (d) Debtors Turnover Ratios and (e) Fixed Assets Turnover Ratios.

(a) Current Ratio

This is defined as the ratio of current assets to current liabilities. It shows the relationship between total current assets and total current liabilities. It is calculated as follows.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\text{Liquid Ratio} = \frac{\text{Current Assets-Stock}}{\text{Current Liabilities}}$$

The items included in current assets are those items, which can be converted into cash within a year, including cash in hand and at bank,. marketable securities, stock, sundry debtors, bills receivable and prepaid expenses. Current liabilities are those liabilities that are to be repaid within a year and include sundry creditors, bills payable, and bank overdraft. The ratio explains the strength of working capital. The higher the ratio, the greater the firm's ability to meet short-term debts. An unusually high ratio indicates that the funds are not being economically used. Very low ratio indicates that the firm has some difficulty in paying off its short-term debts. Table 3.13 shows the current ratio of the units for the period under study on an average

Table 3.13

Table showing the average Current Ratio and Liquid Ratio of five units for the period under study

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Current ratio	1.75	1.65	1.20	3.92	1.48	1.37	2.38	2.00
Liquid ratio	0.73	1.15	0.77	1.46	1.02	0.96	1.07	1.03

Source: Compiled by the researcher

Taking the average of industry as standard to be satisfactory the units are analysed. From the table it is clear that only company D [3.92] has a ratio higher than industry average of 2:1. The ratio is lower for company C [1.2.] Company A [1.75] and company B[1.65] and company E[1.48] which are all below the standard.

The co-operative sector has an average current ratio and liquid ratio of 1.37% and 0.96 which is below the standard and the private sector has an average current ratio 2.38 and liquid ratio 1.07. The low current ratio of the co-operative sector shows that there is shortage of short-term funds and liquidity. This shows that the liquidity position of co-operative sector is lower than that of private sector. The overall ratios of the industry are satisfactory.

The efficiency of utilisation of working capital can be found using Working Capital Turn Over Ratio.

(b) Working Capital Turnover Ratio

The ratio indicates whether working capital is productively utilised. The working capital turn over ratio is calculated using the following formula

$$\text{Working Capital Turnover Ratio} = \frac{\text{Net Sales}}{\text{Net Working Capital}}$$

The ratio depends on net sales and net working capital and increases when there is an increase in net sales or decrease in the net working capital.

The ratio decreases when there is a decrease in net sales or increase in net working capital. Table 3. 14 shows the working capital turnover ratios.

Table 3.14

Table showing the Working Capital Turn Over Ratio of all the units for a period of 5 years on an average

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Working Capital Turn Over Ratio	16.86	14.03	39.51	4.05	17.90	26.77	12,94	18.46

Source: compiled by the researcher.

Table shows that ratio is the lowest for company D, [4.05], and the highest for company C [39.51]. Company A, company B and company E have a ratio of 16.86, 14.03 and 17.90 respectively. Though company C has a low current ratio as seen earlier, it is justified by the sales of the company which show the efficiency of the unit. As for company D, it is having a high current ratio but a low working capital ratio which reflects that the working capital is not justified by the sales. Taking the industry average of 18.46 as standard the co–operative sector having an average of 26.77 is above the standard and the private sector has an average of 12.94 which is below the standard, which means that the working capital is effectively utilized in the co-operative sector.

(c) Inventory Turnover Ratio [ITR]

This establishes the relationship between the turnover ratio and inventory held by the companies. It helps to determine the liquidity and indicates how many times the units has turned its inventory. A high ratio indicates that the inventory is sold quickly ,a low ratio reflects over investment in inventories.

The ratio is calculated as

$$\text{Inventory Turnover Ratio} = \frac{\text{Net Sales}}{\text{Average Inventory}}$$

Alternatively cost of goods sold may also be taken instead of net sales.

It is observed while calculating the ratios that Inventory Turnover Ratio shows a fluctuating trend through out the study period from 1996 to 2000.Table 3.15 show the average Inventory Turnover Ratio of the five companies for the study period.

Table 3.15

Table showing the average Inventory Turnover Ratio of the units for a period of five years

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Inventory Turnover Ratio	12.45	12.66	14.03	4.66	15.60	13.35	10.90	11.88

Source: Compiled by the researcher.

The mean value of Inventory Turnover ratio is the highest for company E [15.60] and the lowest for company D [4,66]. The company C has a ratio of

14.03 followed by company B [12.66] and A [12.45]. The co-operative sector has an average of 13.35 which is above the industry average of 11.88. But the private sector has an average of 10.90 which is below the industry average.. However the Inventory Turnover Ratio of all companies is higher, in all the years under study. It indicates that the efficiency of inventory management of all the five companies under study is satisfactory.

(d) Debtors Turnover Ratio (DTR)

It is also a tool to aid in the analysis of efficiency of liquidity management. It measures the quality of debtors and the speed of collectibility. The higher the Debtors Turnover Ratio, the better is the quality of debtors, as a high Debtors Turnover Ratio implies the prompt payment by debtors. This ratio also shows efficiency of credit and collection policies of the unit. An average of 11 is considered satisfactory in an Indian manufacturing company. Table 3.16 shows the Debtors Turnover Ratio maintained by the companies.

Table 3.16

Table showing the average Debtors Turnover Ratio of the units for the 5 year period

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Debtors Turnover Ratio	76.09	9.58	9.47	58.64	60.56	9.53	65.01	42.68

Source : Compiled by the researcher.

The Debtors Turnover Ratio is lower than the standard ratio of 11 in companies B and C. It signifies slackness of collection efforts and inefficient debt management of the company B and company C. The Debtors Turnover Ratio of company A is 76.09, company D is 58.64, and E 60.56, which are above the standard. The average Debtors Turnover Ratio of the co-operative sector is 9.51 which is below the industry average of 42.68 and DTR of the private sector is on an average 65.01 above the industry average. When this ratio in the private sector is related to debtors to working capital ratio calculated earlier, it re-affirms the fact that credit sales are less in private companies

From the analysis of turnover ratios relating to working capital it may be concluded that the working capital is justified by the sales of the companies except for company D. The Inventory Turnover Ratio is high for all the companies and it is encouraging. The Debtor Turnover Ratio of the co-operative sector is not satisfactory, whereas, in the private sector, though debtors, occupy only a less percentage to current assets the ratio is satisfactory. It is positive to see that finished goods stocks of all the companies are very small which reveals the demand for the product.

The Fixed assets utilisation of the company can be analysed using Fixed Assets Turnover Ratio.

(c) Fixed Assets Turn over Ratio

Fixed Assets Turn over Ratio shows the relationship between sales and fixed assets. It reflects whether fixed assets are fully utilised or not. The efficiency with which a company utilises the fixed assets in generating sales is measured through this ratio. A high ratio reflects over trading whereas a lower ratio indicates idle capacity and excessive investment in fixed assets.

Calculation is done with the formula

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Sales}}{\text{Fixed Assets}}$$

Table 3.17 shows the Fixed Assets Turnover Ratio of the companies under study. The ratio on an average ranges between 3.72 and 14.09. The highest ratio is for company C which is [14.09] and the lowest for company D [3.72]. The ratio of company C is much higher than the standard and it shows the effective utilisation of fixed assets. The companies A, B and E have a ratio of 8.91, 10.11 and 4.13 times respectively.

Table 3.17

Table showing the average Fixed Assets Turnover Ratio for the 5 year period

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Fixed Assets Turnover Ratio	8.91	10.11	14.09	3.72	4.13	12.1	5.58	8.19

Source: Compiled by the researcher.

The average ratio of the co-operative sector is 12.10 times and private sector has an average of 5.58 times. The industry as a whole has an average of 7.79 times. Even though fixed assets percentage to total assets is the lowest for company C, as seen earlier, the turnover ratio is the highest [14.09]. This shows that there is excessive investment in fixed assets of other companies.

Analysis of efficiency ratios of the companies leads to the following conclusion. High investment in fixed assets by private companies is not justified by the sales. Average investment of private companies in Fixed assets is 51%, whereas turnover ratio is only 5.58. The working capital ratio is also high for the co-operative sector [26.77%]. The debtors collection policy seems to be inefficient in the co-operative sector, but at the same time, liberal credit policy has increased the sales of the co-operative sector.

3.06.2 Profitability Ratios

Profit is the engine that drives the business enterprise. It is the magic eye that reflects all aspects of the entire business enterprise including the quality of output. The profit is the test of efficiency and a measure of control. It is required to see if adequate profit is being made to sustain the growth of the organizations. The main profitability ratios are Gross Profit Ratio, Net Profit Ratio, Operating Ratio and Return on Investment.

(a) Gross Profit Ratio

This ratio measures the relationship between gross profit and sales. Gross profit is Sales minus Cost of goods sold. Cost of goods sold is the sum of cost of material consumed, wages and all direct manufacturing expenses.

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Sales}} \times 100$$

The gross profit should be sufficient to cover all operating expenses, fixed interest charged, dividend and appropriation of reserves. A high Gross Profit Ratio is a sign of profitability.

It also indicates higher sales price without a corresponding increase in cost of goods sold. A low Gross Profit Ratio is a danger signal. It may be due to increase in the cost of production without a corresponding increase in sales price.

Table 3.18 shows the Gross Profit Ratio of various companies under study during the period 1996 to 2000.

Table 3.18

Table showing the average Gross Profit Ratio for a period of 5 years under study

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Gross profit ratio	7.12	11.85	18.21	18.53	17.57	15.03	14.41	14.66

Source: Compiled by the researcher.

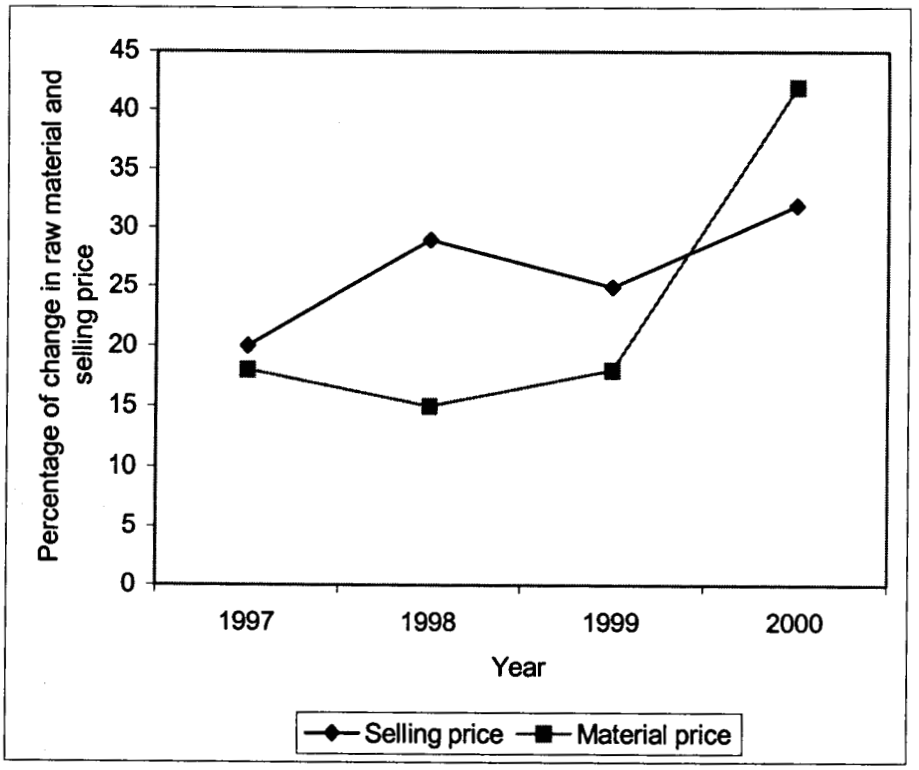
From the table it is seen that companies D and C have got an average Gross Profit Ratio of 18.5 and 18.21 followed by company E with 17.57. Companies A and B have a low average of 7.12 and 11.85 respectively. The co-operative sector has an average of 15.03, private sector 14.40 and Industry as a whole an average of 14.66 during the period under study.

When average Gross Profit Ratio for the industry for each year under study is analysed it shows a fluctuating trend. It is 11.36, 10.75, 19.58, 17.78 and 13.85 during the years 1996, 1997, 1998, 1999 and 2000.

A relative analysis of selling price and raw material price gives the reason for this variation. The following graph 3.1 shows the percentage of change in selling price and material price. From the graph it is seen in the year 1997 the selling price increased by 20% while the material price increased only by 18%. But in the year 1998 the selling price increased by 29% and material price by 15%, leaving an increase in the gross profit ratio to the tune of 19.58. In the year 1999, selling price decreased by 25% and material price increased by 18%. As a result, gross profit ratio decreased to 17.78%. In the year 2000, material price increased by 42% and selling price also increased by 32%. As a result the gross profit ratio declined to 13.85%. This reveals that the gross profit variation is due to the increase in the material cost.

Graph 3.1

Graph showing the percentage of changes in raw materials price and selling price



The profit of the company is also affected by other operating expenses such as administration, staff and welfare, and selling expenses. The effect of these expenses can be analysed by studying Operating Profit Ratio.

(b) Operating Profit Ratio

Operating Profit Ratio can be calculated by dividing operating profit by sales. Operating profit is Earning before Interest and Tax. Therefore

$$\text{Operating Profit Ratio} = \frac{\text{Earning Before Interest and Tax}}{\text{Net Sales}} \times 100$$

A high ratio is favourable as it leaves a margin to meet interest and tax and have a fair return to owners. A low ratio indicates a less amount to meet the Financial charges.

Table 3.19 shows the Operating Profit Ratio of the companies under study. The Operating Ratio of company B (5.71 %) is reportedly higher during the period under study and company C has the lowest (1.89%). The ratio for companies A, D and E are 5.52, 4.89 and 2.80 respectively. It shows that the companies are unable to meet the financial charges and leave a fair return to the owners.

Table 3.19

Table showing the average Operating Profit Ratio of all the units for the period of 5 years

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Operating Profit Ratio	5.52	5.72	1.89	4.90	4.20	3.80	4.87	4.46

Source: Compiled by the researcher.

From this, the conclusion is that the operating expenses of the units are increasing. The average ratio for co-operative sector is 3.80, Private sector 4.87 and Industry as a whole 4.46. The Co-operative sector has more operating expenses than the private sector.

(c) Net Profit Ratio

Net Profit Ratio is a measure of overall profitability. A high ratio indicates more profitability.

$$\text{Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Net Sales}} \times 100$$

Table 3. 20

Table showing the average Net Profit Ratio during the period under study

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Net-Profit Ratio	3.79	4.12	1.19	2.04	0.06	2.66	1.96	2.34

Source: Compiled by the researcher.

Company B and company C have incurred losses during 1996 and 1997, and company E has incurred losses during 99 and 2000. All the companies have only a nominal amount of profit. On an average, the highest ratio is for company B (4.12 %). Fluctuations are seen in profits of all the companies during the period 1996-2000. The net profit for all the companies shows a decreasing trend during this period. The co-operative sector has an average of 2.66% and for the private sector 1.96%. The industry has an average of 2.24% for the period under study. The higher levels of profits in the co-operative

sector are due to the low level of financial charges. For the private sector, these charges are slightly high.

The net profit depends on sales value and sales volume and the selling price. The decline in net profit can be made clear by analyzing the sales value and selling price.

Table 3.21

Table showing the growth rate in sales price and sales volume of cattle feed Industry with 1996 as base year

Units	96		97			98			99			2000		
	sales qty M.T	Rate on M.T	sales qty	% change in qty	% change in price	sales qty	% change in qty	% change in price	sales qty	%change in qty	% change in price	%change in qty	% change in qty	% change in price
A	130313	4052	115381	-11.46	18	106362	-18.38	30	93380	-28.34	28	97500	-25	41
B	446312	4290	47254	+5.87	17	41505	-7.00	32	58105	30	32	71735	61	36
C	24422	4338	25368	+3.87	18	21805	-10.72	29	36441	49	29	59620	144	32
D	19065	4892	27492	+44.20	29	28367	48.38	24	374160	97	9	24967	31	14
E	25286	4053	24316	-3.84	17	18868	25.38	32	15504	-39	29	13467	-47	42
Total	243722	4325	239811	-1.60	20	216910	-11.00	29	240891	-1.00	25	267289	10	32

Source: Compiled by the researcher.

Comparison of Gross Profit, Operating Profit and Net Profit

The comparison of Gross Profit Ratio and Net Profit Ratio reveals a different trend. The Gross Profit ratio shows a substantial increase while similar changes are not seen in Net Profit ratio due to the changes in operating expenses.

Table 3.22

Table showing the comparison of Gross-Profit, Operating Profit and Net Profit Ratio for the period under study

Company	A			B			C			D			E		
Year	GP	OP	NP	GP	OP	NP	GP	OP	NP	GP	OP	NP	GP	OP	NP
96	6.3	5.20	3.43	6..23	1.57	-0.01	9.63	-3.66	-3.93	20.60	7.76	5.32	14.04	1.92	0.92
97	3.56	2.05	1.45	6.34	1.81	-0.24	13.75	-0.65	-0.82	16.67	3.41	0.31	13.41	2.43	0.35
98	11.87	11.41	6.96	17.41	12.60	10.45	26.33	9.11	7.63	22.11	7.27	2.49	20.16	4.96	2.72
99	10.75	6.49	6.09	13.54	8.98	7.92	22.02	3.27	2.29	16.65	5.23	2.00	20.95	1.39	-3.38
2000	3.13	2.45	1.04	15.72	3.62	2.49	14.34	1.40	0.77	16.69	0.81	0.06	19.27	3.31	-0.33
Avg	7.12	5.52	3.79	11.85	5.32	4.92	18.21	1.89	1.19	18.53	4.90	2.04	17.57	2.80	0.06

Source: Compiled by the researcher.

In the case of company A, for all the five years a change in gross profit is followed by a change in operating profit and net profit. This shows that both manufacturing expenses and operating expenses are increasing. In the case of company B, the gross profit has increased from the year 1996 to 98. Along with it, operating profit and net profit also have increased. In the year 1999, gross profit decreased, operating profit and net profit showed decreasing trend. But in 2000, though gross profit increased, the operating profit and net profit have decreased which shows an increase in operating expenses and financial charges. In the case of company C, gross profit along with operating profit and net profit increased till 1998. The increase in operating profit is not at the same rate as in the case of gross profit. It reflects that the operational expenses

increase at a faster rate than the raw material and manufacturing expenses. The net profit also behaves in the same way thereby showing that the financial charges are also increasing. In 1999, gross profit has increased but operating profit and net profit have not been increasing, which again shows that operational expenses, other than raw material and manufacturing expenses, are increasing and financial charges are also high. In the year 2000, gross profit has also decreased along with other profit. As far as company D is concerned, it had a high gross profit ratio in 1996 [20%], but it decreased to 16% in 1997 along with operating profit and net profit. But in 1999, it has decreased to 16%. In the year 2000, gross profit is the same but operational profit and net profit have decreased which reveals an increase in indirect expenses and financial charges. In the case of company E, the gross profit of 14% in 1996 decreased to 13% in 1997 but operating profit increased and net profit decreased during the same period. It shows that the indirect expenses have not increased. In 1998 gross profit along with operating profit and net profit increased. Again in 1999, gross profit was the same but operating profit got reduced resulting in net loses. The indirect expense and financial charges were very high during 1999. In 2000, gross profit decreased but there was a slight favourable change in operating profit and net profit.

Conclusion of the above analysis is that material cost is high along with operational expenses and financial charges for all the companies. The overall profitability of a company can be measured with the help of Return on

Investment Ratio. The objective of any business is to have a satisfactory earning on capital invested. The rate of earning on capital employed is referred to as Return on Investment.

(d) Return on Investment [ROI]

$$\text{Return On Investment} = \frac{\text{Operating Net Profit}}{\text{Capital employed}}$$

It is an index of the operational efficiency as well as profitability. The higher the ratio, the more efficient is the use of capital employed and better the management efficiency. Table 3. 23 shows the Return On Investment of the companies under study.

Table 3.23

Table showing the average Return on Investment of the units under study for a period of 5 years

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Return on Investment	32.13	23.17	14.51	7.14	8.89	18.84	16.05	17.17

Source: Compiled by the researcher.

The Table reveals that company A has the highest Return on Investment, and it is high above 30 for the years 1996, 98 and 1999 and the average for five years is 32. In the year 1998 it has reached 70.49, which shows the efficiency of management. In the case of company B, the ratio is low

during the years 1996 and 97. In the year 1998, it increased to 48.05 and decreased in the years 1999 and 2000. The return was satisfactory only during the year 1998. Though the sales of the company are high net earnings are not enough to meet the operating expenses of the company C. Company C is experiencing a negative result during the year 1996 and 97. But it shows a high return on investment during the year 1998. Later on it decreased during the year 1999 and 2000. For A, B and C the year 1998 shows high return on investment and then decreased in the later years. As far as company D and company E are concerned, the ratio is very low for all the years. The highest ratio for D is 11.52 in the year 1996, and it decreased to 4.37 in 1999 and slightly increased during 2000. Companies C, D and E have comparatively low return on investment which reveals the inefficiency of the management in the effective utilisation of the capital employed in the business.

Companies A and D have made profit all through the five years. B and C incurred losses during 1996 and 97, but gained the position during 1998. Company E started incurring losses from 1999 to 2000. The co-operative sector has higher average of net profit than the private sector, which means the financial charges of private sector are higher than those of the co-operative sector. The comparison of gross profit, net profit and operating profit shows that an increase in the gross profit is not followed by a corresponding increase in operating profit, and net profit of B, C, D and E, in certain years during the study, reveals the operating expenses other than raw material and direct

expense. Financial charges are high during those years. The analysis shows a high degree of variation on the net profit of the companies.

From the Profitability Ratios Analysis the main conclusions that can be drawn are

(1) The gross profit ratio is low due to variation in material price being higher than the variation in selling price. The co-operative sector has high Gross Profit than private sector.

(2) Operating profit of the companies are very low indicating that the operating expenses are high. The private sector has higher operating profit than co-operative sector.

(3) The net profit of the units are very low because of high amount of financial charges. The net profit of co-operative sector is higher than private sector.

The working capital of the companies is high, and utilisation of current assets of the companies is also efficient. The profitability position of the companies are not satisfactory. A comparison between working capital and profitability will be helpful.

HO_{Ie} There is no significant relation between working capital and profitability of the company.

To test this hypothesis, Karl Pearson's Rank Coefficient is computed and to find out whether this computed value is significant or not the 't' test is done.

In this regard, current assets to total assets ratio (CATA) has been used as the liquidity indicator and Return On capital employed (ROI) has been taken as the profitability measure. Table 3.24 shows the rank correlation co-efficient between CATA and ROI of five companies.

Table 3.24 shows that the Rank correlation coefficient between Current Assets to Total Assets Ratio and Return on Investment of company B is 0.6, that of company C is 0.5 that of company E is 0.4 and that of Company A is 0.5. These values though not statistically significant, indicate that although the degree of association is positive, it implies favourable association of the working capital on their profitability. The degree of influence of working capital on their profitability is very low and insignificant. It confirms inefficiency of their working capital management as a whole. In the case of company D, there is a negative (–0.7) association between working capital and profitability, which implies unfavorable impact of working capital over profitability. It reveals over-investment in current assets and very inefficient working capital management. The co-operative sector companies has a sufficiently high degree of positive correlation which shows that the efficacy of working capital management is higher in the co-operative sector than in the private sector.

Table 3. 24

Table showing the Rank correlation between working capital and profitability of the companies during the period under study

	A Ltd				B				C				D				E			
	Current Assets Total Assets		Return on capital Employed		Current Assets Total Assets		Return on capital employed		Current Assets Total Assets		Return on Capital employed		Current Assets Total Assets		Return on capital employed		Current Assets Total Assets		Return on capital employed	
	%	Rank L1	%	Rank P1	%	Rank L2	%	Rank P2	%	Rank L3	%	Rank P3	%	Rank L4	%	Rank P4	%	Rank L5	%	Rank P5
96	59.82	1	32.80	2	57.83	5	6.24	5	67.36	5	-24.55	5	43.10	5	11.52	1	58.25	1	9.60	2
97	38.69	4	13.90	4	58.81	4	18.07	4	75.71	2	-6.45	4	51.05	4	6.87	2	50.78	2	8.95	3
98	48.17	2	70.40	1	64.69	3	48.05	1	75.17	3	52.25	1	51.81	3	6.20	4	37.46	4	14.12	1
99	29.43	5	32.75	3	68.98	2	36.91	2	83.01	1	29.30	2	64.57	2	4.32	5	35.32	5	3.60	5
2000	47.81	3	11.12	5	89.53	1	16.59	3	74.09	4	21.98	3	71.65	1	6.76	3	42.74	3	8.17	4
	Rank correlation between Working capital and profitability (L1P1) is 0.5 and 't' value of (L1P1) is 1.005 being insignificant at 0.05 level				Rank correlation between Working capital and profitability (L2P2) is 0.6 and 't' value of (L2 P2) is 1.297 being insignificant at 0.05 level				Rank correlation between Working capital and profitability (L3 P3) is 0.5 and 't' value of (L3 P3) is 1.005 being insignificant at 0.05 level.				Rank correlation between Working capital and profitability (L4 P4) is –0.7 and 't' value of (L4 P4) is 1.71 being insignificant at 0.05 level.				Rank correlation between Working capital and profitability (L5 P5) is 0.4 and 't' value of (L5 P5) is 0.760 being insignificant at 0.05			

Critical value of 't' at 0.05 level with (n-2), 3 degrees of freedom is 3.182.

This conclusion to a certain extent is contradictory to earlier conclusions of working capital turnover ratio. Considering both of this conclusions the units are justified in the use of capital in generating sales but not able to make sufficient profit. This leads to the acceptance of hypothesis HO_{Ie} that there is no significant relationship between working capital and profitability of the firm.

3.06.3 Long Term Solvency Ratio

The term solvency refers to the firm's ability to pay the interest regularly and repay the principal amount of debt on due date. The ratio for solvency test used in the analysis is debt-equity ratio i.e. External and Internal Equity Ratio. This indicates the relative proportion of debt and net worth.

$$\text{The ratio is } \frac{\text{Total Debt}}{\text{Net Worth}}$$

Total Debts include long-term debts, and Net Worth is the shareholders fund which includes equity and reserves and surplus. High ratio indicates the creditors have invested more; the greater the ratio, the more is the risk to creditors. Both high and low ratios are not desirable. Table 3. 24 shows the debt to net worth ratio.

Table 3. 25

Table showing the average Debt to Net worth Ratio of the units for the period under the study

Average	A	B	C	D	E	Co-op. Sector	Pvt. Sector	Industry
Debt to Net Worth Ratio	o.4	1.94	0.43	0.71	1.44	1.19	0.85	1.53

Source: Compiled by the researcher.

The average of company A is 0.40 and, except in 1997, it is less than 0.50, which reveals the fact that the company has a very low debt, or it is not trading on equity. In the case of company B, the ratio is as high as 3.54 in 1997. In the case of company C, the ratio is very low during the year 1996. The highest is 0.65. In the year 1997, the ratio is 0.50, in the year 1998, it is 0.16. For company D, the debt to Net worth is not satisfactory. The maximum ratio comes to 0.87 during 2000 and minimum is during the year 1998, 0.56. In the case of company E, except during the year 1996, the ratio is well above the standard of 1:1. The highest is during 2000 coming to 1.70 and the least during 1996, 0.73 and an average of 1.44. The co-operative sector has an average of 1.19, the private sector has an average of 0.85. The industry as a whole has an average of 1.53. The solvency ratio of the companies when analysed shows that the position of the companies in the private sector is highly satisfactory.

3.07 Summary of Ratio Analysis

A summary of ratios for the study period can be analysed to see the overall position of the companies. For this, current assets ratio, working capital ratio, fixed assets turn over ratio, net profit ratio, return on investment ratio and debt to net-worth ratio are taken. The average of the industry as a whole is taken as the standard. For current ratio, the industry average is 2:1. Therefore the criteria is if the units' ratio is greater than 2 the unit is included in the criterion "*good*". If it is between 1.5 and 2.0 the unit is included to "*fair*" and if the ratio is less than 1.5, it is added to "*satisfactory*".

In the case of activity ratios, working capital turn over ratio is taken. The industry average is 18:1. Therefore, the criterion is if the unit's ratio is above 18, it is considered as '*good*'. If it is between 15 and 18, it is considered to be *'fair'* 'and if the ratio is less than 15 it is regarded as *'satisfactory'*. As inventory turn over ratio and debtors turn over ratio are part of working capital turn over ratio they are not taken separately.

In the case of fixed assets turn over ratio the industry average is 8. Therefore a ratio above 8 is considered to be *'good'* and a ratio between 5 and 8 is considered to be *'fair'* and if it is les than 5 it is included in the '*satisfactory*' level.

For the profitability ratio, net profit ratio is taken, as net profit is the ultimate effect of gross profit and operating profit. The industry average for the

five-year period is 2.24. The criteria for the unit to be considered '*good*' is if the ratio is above 2.25 and if the ratio is between 1.75 to 2.25 it is considered *'fair'* and if it is below 1.75, the unit's position is '*satisfactory.*'

To consider the overall profitability as efficiency, return on investment is also taken. The industry average is 17.71. Therefore, if the ratio is above 17.71 it is considered to be '*good* 'and if the ratio of units is between 15.00 and 17.71 it is considered to be *'fair'* and if the ratio is below 15 the unit is included in the *'satisfactory'* criterion.

To find the solvency position the debt to net worth ratio is taken. The industry has on an average 1.53:1, which is taken as the standard. The unit, which has a ratio above 1.5, is considered to be *'good'*. To attain a '*fair*' level the ratio should be between 1 and 1.5 and if the ratio is less than 1 it is '*satisfactory*'.

The average of the particular ratio for the period under study is taken for categorisation. Table 3.26 shows the score obtained by the scaling technique. The '*good*' category is given a point of 3, '*fair*' 2 points and ; *satisfactory* '1 point.

For the Current Ratio, company A has an average of 1.75, which means it is included in the *'fair'* category. Company B has an average of 1.65; it is included in the '*fair*' category. Company C and company E have 1.20 and 1.48 respectively which is below 1.5, included in the '*satisfactory*' and company D

which alone has a rate of 3.92 is included in the '*good*' category. The Co-operative sector has an average of 1.37 and is included in the '*satisfactory*' while the private sector has an average of 2.38 and is included in the '*good.*'

Table 3. 26

Table showing the summary of Ratios of the units under study

Ratios	Criterion for ranking			Averages						
	Good	Fair	Satisfactory	A	B	C	D	E	Co-op. sector	Pvt. sector
Current Ratio	>2	1.5-2	<1.5	F	F	S	G	S	S	G
WCT	>18	15-18	<15	F	S	G	S	F	G	S
FATR	>8	5-8	<5	G	G	G	S	S	G	F
Net Profit	>2.25	1.75-2.25	<1.75	G	G	S	F	S	G	F
ROI	>17.75	15-17.75	<15	G	G	S	S	S	G	F
D/E	>1.5	1-1.5	<1	S	G	S	S	S	G	S
Score				14	15	10	9	8	16	11
Zone	X 75% (13.5-18)	Y 50-75% (7.5-13.5)	Z <50%	X	X	Y	Y	Y	X	Y

G = Good, F = Fair, S = Satisfactory
Source: Compiled by the researcher.

In the case of Working Capital Turnover Ratio, company C has a ratio of 39.51 which is above 18, and is included in the '*good*' criterion. Company A and company E have ratio 16.86 and 17.90 and as it is above 15 is included in the '*fair* 'level and company B which has a ratio, slightly below the minimum level 14.03 is included in the '*satisfactory* level'. Co-operative sector with an

average of 26.71 is included in the 'good' and the private sector which has 12.94 is included in the '*satisfactory*' level.

For the Fixed Assets Turnover Ratios, companies A, B and C have a ratio of 8.91, 10.11 and 14.09 respectively. They are included in the 'good' category as the ratios are above 18. But companies D and E having the ratio, of 3.72 and 4.13 are included in the 'satisfactory' level as they are below the maximum of 15. The co-operative sector has an average of 12.1 and is included in the 'good' and private sector has 5.58. So it is included in the 'fair' category.

In the case of Net Profit Ratio, companies A and B have ratios above 2%, i.e., 3.79% and 4.12% and are included in the '*good*' criterion. Company D having an average ratio of 2.04% is included in the criterion '*fair*', and companies C and E having ratios lesser than 1.75% (1.19 and 0.06 respectively) are included in the '*satisfactory*' level. The co-operative sector having an average of 2.66 is included in the '*good*'. The private sector has 1.96% and is included in '*fair*' category.

For Return On Investment ratio, companies A and B are included in the '*good*' criteria as they have ratios of 32.13 and 23.17 (higher than the industry average). Companies C, D and E are included in the category *'satisfactory'* as they have ratios below 15%. The co-operative sector has an average of 18.84

and is included in '*good*'. The Private sector has an average of 16.05, and is included in the '*fair*' level.

In the case of Solvency Ratio, the industry average is 1.5 and only company B has an average above it and is included in the '*good*' category. Companies A, C and D have low ratios and are included in the category '*satisfactory*'. Company E having a ratio of 1.44 is included in the '*fair*' level. The co-operative sector has an average of 1.19 and is included in '*good*'. The private sector has an average of 0.85 and is included in '*satisfactory*'.

From the score table, it is seen that company A has obtained 3 '*good*', 2 '*fair*' and 1 '*satisfactory*' altogether. When points are added A gets 14 points. Company B has obtained 4 '*good,*' 1 '*fair*' and 1 '*satisfactory*'. When points are added B gets 15 points. Company C has obtained 2 '*good*', 4 '*satisfactory*' When points are added C gets 10 points. Company D has obtained 1 '*good,*' 1 '*fair*' and 4 '*satisfactory*'. When the points are added D gets 9 points. Company E has obtained 2 '*fair*' and 4 '*satisfactory*'. When points are added E gets 8 points. The co-operative sector has 5 '*good*'' and 1 '*satisfactory*'. When the points are added the co-operative sector gets 16 points, and the private sector has 1 '*good*', 3 '*fair*' and 2 '*satisfactory*'. When points are added the private sector gets 11 points.

According to the points obtained, the companies are divided into three zones' X' 'Y' and 'Z'. 'X 'zone includes companies which have obtained more

than 75% of total score of 18 (6x3). 'Y'zone includes companies which have obtained between 50% and 75% of 18 (7.5-13.5) and 'Z' zone includes companies which have obtained less than 50% of total 18.

It is seen that company B has obtained 15 points and is included in zone 'X'. Company A has obtained 14 points and is included in zone' X'. Company C has obtained 10 points and is included in Zone' Y'. Company D has obtained 9 points and is included in zone 'Y'. Company E has obtained 8 points and is included in zone 'Y'. The co-operative sector has obtained 16 points and is included in zone X. The private sector has obtained 11 points and is included in zone Y. It is encouraging to see that no company has been included in the zone Z or no company has scored less than 50%.

3.08 Conclusion

From the analysis of financial statements of the companies the following conclusions emerge.

1) The capital output ratio of the industry is 0.29 and the co-operative sector has a lower ratio than the private sector.

2) The investment in fixed assets of the industry is 42 and the private sector has a higher investment in fixed assets than the co-operative sector. Of the fixed assets investment in land and buildings, it is high for private sector,

whereas plant and machinery is high for the co-operative sector, as the land is given on lease to the co-operative sector by the government.

3) The investment in current assets has a pattern of more investment in less liquid assets, stores and inventory and mainly in raw materials. More than 32% of the current assets is in raw material stock. The finished goods stock is negligible. This is common for both the private and the co-operative sector. The debtors are important source of current assets for the co-operative sector. Whereas in the private sector sales are conducted mainly on cash. There is no idle cash kept by the companies. Loans and advances given to the workers are also prominent in the case of one or two companies.

4) The Liquidity positions of all the companies are satisfactory. The working capital efficiency is higher in the co-operative sector. Efficiency of inventory utilisation is encouraging for all the five companies. Debtor's collection policy is more efficient in the private sector than in the co-operative sector, which follows a liberal attitude. The fixed assets turnover is higher for the co-operative sector, which shows efficient utilisation of fixed assets on capital invested.

5) The gross profits of the companies are low, showing a high cost of production. The operating expense of the co-operative sector is higher than that of the private sector leaving a lesser operating profit ratio to the

former. The Net profit of co-operative sector is higher than the private sector, showing high financial charges for the private sector. Overall profitability positions of all five companies are not satisfactory.

6) A comparative study of working capital and profitability shows that the working capital of the companies has a positive association with profitability, but is not significant. This shows the inefficiency in the utilisation of working capital as a whole. This accepts the hypotheses HO_{Ie} that there is no significant relationship between working capital and profitability of the firm. The working capital utilisation though justified by sales is not justified by profit as the profit is low due to high cost of production.

7) When score point table is consulted, the score of the co-operative sector is higher than those of the private sector companies. Only one of the private sector company is able to compete with the co-operative sector.

From the analysis, it is seen that the operating expenses of the companies are high. By an analysis of different items of cost of the production, the problem of cost structure can be studied. So the cost structure analysis is done in the second part.

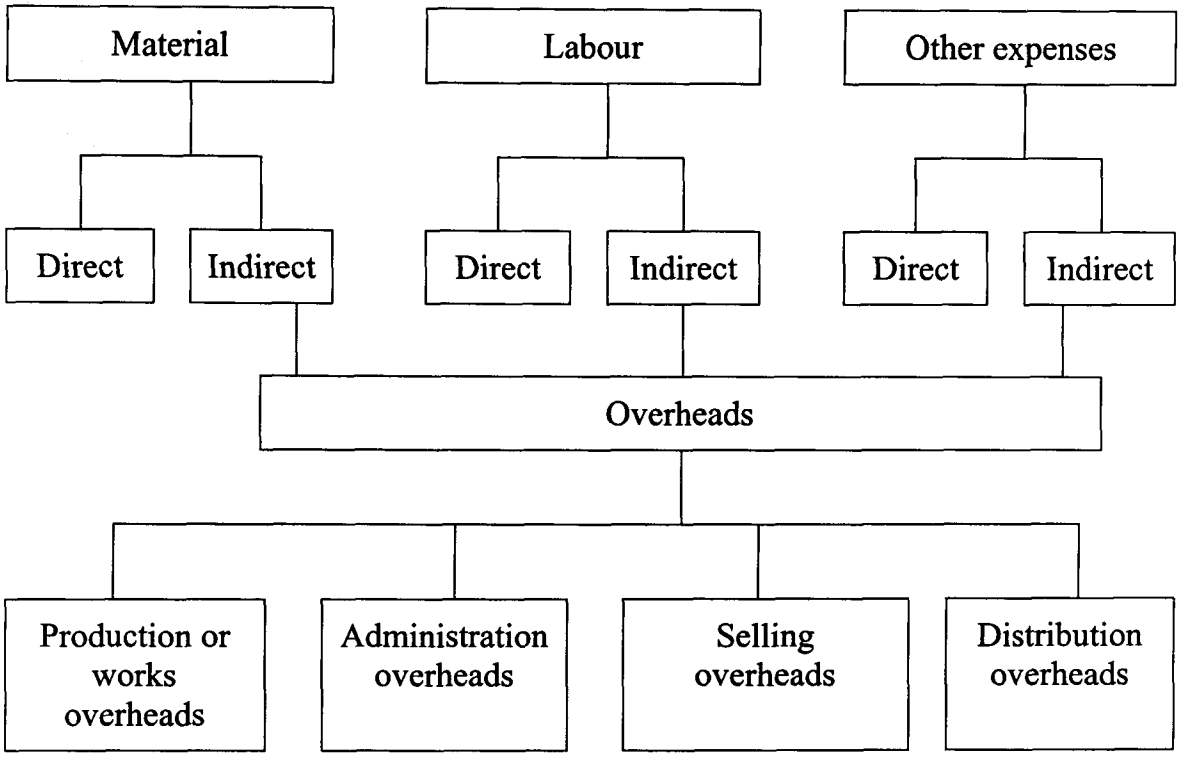
PART II

3.09 Cost Structure Analysis

Knowledge of total cost alone cannot satisfy the needs of management. Cost has to be analysed by elements of cost, i.e., material, labour and overhead expenses or direct and indirect expenses.

Figure 3.1

Figure showing Elements of Cost



Material Cost: Direct materials are those that can be identified in the product and can be conveniently measured and directly charged to the product. This includes all kinds of raw material, specifically purchased material for a specific job, part or components purchased or produced and preliminary packing materials.

Labour Cost: Direct labour cost includes all labour expended in altering the construction, composition, confirmation or conduction of the product, i.e., the labour that can be identified or attached to a product job, or process expended in converting raw material into finished products.

Overheads: It is the total of the cost of indirect material, labour and other expenses. The main groups into which overheads may be sub-divided are manufacturing, administration, selling overheads etc.

Relation of this element to cost can be verified to find out how they affect the cost. Once the contribution of each of the items of expenditure is known the organization in general can locate the control points and proper method of controlling them can be thought of. An attempt is made to develop a prediction equation and to assess the contribution of each item to the total cost.

Details of expenditure are made under the following head.

Raw Material Cost: It is the cost of direct material consumed by the units for producing the product. Raw material consumed is found by taking in opening stock plus purchases minus the closing stock. Raw material includes the cost of packing material as it is a direct expenditure.

Direct Labour: This includes the wages and salaries given to the employees.

Manufacturing Expenses: This includes all the expenses incurred in the factory where production is done, including electricity charges, water charges, repairs and maintenance for plant etc.

Depreciation: It is taken as a separate expense to find out the effect of depreciation on total cost.

Administrative Expenses: The expense incurred outside the factory and expenses of service department, for example, repairs and maintenance, office equipment, telephone charges, stationery, consultation fee, rent, postage and telegram are certain items included..

Staff Welfare: includes the indirect benefits, given to the employees other than wages and salaries. Benefit to employees includes expenses such as pension and other benefits such as ESI, PF, annual leave, encashment, production incentive, bonus, other allowances and welfare expenditure incurred for the staff.

Selling Expenses: The expense incurred for the sales of the product include advertisement, printing and licensing charge, carriage outward, trade discount business promotion expenses etc.

Total cost comprises raw material consumed + direct labour + depreciation + manufacturing expenses + administrative expenses + staff welfare give cost of production. The adjustment of opening stock and closing

stock is done as per cost accounting principle along which the selling expenses are added which gives total cost.

In this analysis, an attempt is made to develop a prediction equation to total cost in each year from 1996 to 2000 separately, and combining all the data for five years.

A prediction equation is developed using suitable independent variables and total cost as a dependent variable. Correlation matrix for the variables under study for each year and combining all the years are worked out separately.

(The size of the correlation on the whole is high. These conditions are needed to be interpreted carefully.)

For developing prediction equation only those independent variables which are highly and significantly correlated with total cost are taken.

3.09.1 Year 1996

As per the correlation matrix of the component cost and total cost for the year 1996, only material cost is correlated with total cost. Hence prediction equation is developed using material cost as an independent variable. Analysis of variation is done while fitting a regression equation. The table 3.27 shows the results of analysis of variance.

Table 3.27

Table showing the results of analysis of variance while fitting a regression equation during the year 1996

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	4645410.43376	4645410.68169
RESIDUAL	3	65483.04508	21827.68169
			F=212.82198

The prediction equation is

Total cost = 254.15 + 1.1469 materials cost R^2 = 0.9861. Adjusted R^2 = (Rc-2) = 0.9814

Since R^2 = 98.61 per cent of variance of total cost is accounted for in terms of material cost.

3.09.2 Year 1997

In this case, as per the correlation matrix, material cost and depreciation cost are found to be correlated with total cost. Hence two variables are taken as the independent variable while predicting total cost. Estimation of the coefficients is done by step-wise regression. Effect of depreciation along with material cost is not significant. Hence it is not included in the equation through step-wise regression. Analysis of variance is done while fitting the regression equation. Table 3.28 shows the results of analysis of variance.

Table 3.28

Table showing the results of analysis of variance

while fitting the regression equation during the year 1997

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	3649510.11446	3649510.11446
RESIDUAL	3	115631.70990	38543.90330
			F=94.68450

Source: Compiled by the researcher.

The prediction equation is

Total cost = -24.8845 +1.2090 (material cost) $R^2 = 0.9693$

Adjusted $R^2 = 0.9590$

96.93 per cent of variance of total cost is accounted in terms of material cost.

3.09.3 Year 1998

As per the correlation matrix, the only significantly correlated variable at. 01 level is material cost. Hence prediction equation is developed using that variable. Analysis of variance is done while fitting the regression equation. Table 3. 29 shows the results of analysis of variance.

Table 3- 29

Table showing the results of analysis of variance

while fitting a regression equation during the year 1998

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	2	2515513.52600	1257756.76300
RESIDUAL	2	4201.02716	2100.51358
			F=598.78535

Source: Compiled by the researcher.

Total cost = -13.5984 + 1.2638 (material cost) $R^2 = 0.9774$.

Adjusted $R^2 = 0.9699$

97.74% of variance of total cost is accounted in terms of material cost.

3.09.4 Year 1999

As per the correlation matrix, material cost and other costs are correlated with total cost at 05 level. These two variables are used as independent variables while predicting total cost. Prediction is done by step-wise regression. In this method, the most prominent variable is entered into the equation first. Here material cost is the most prominent which constitutes 90.44% of the total cost. While adding other cost to the equation about 99.8% of the variation in total cost could be explained. Results of the analysis of variance while fitting the regression equation is given in Table 3.30.

Table 3.30

Table showing the results of analysis of variance while fitting a regression equation during the year 1999

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	2	2515513.52600	1257756.76300
RESIDUAL	2	4201.02716	2100.51358
			F=598.78535

Source: Compiled by the researcher.

The prediction equation is

Total cost = 338.3447 + 0.9436 (material cost) + 1.0396 (other cost)

$R^2 = 0.9983$

Adj $R^2 = 0.9967$

90.44% of the variance in total cost is due to material cost.

3.09.5 Year 2000

As per the correlation matrix, material cost and labour costs are correlated with total cost. But by fitting a multiple regression for relating total cost with material cost and labour cost, the only significant variable coming into the equation is labour cost. Results of analysis of variance while fitting the regression equation is given in the table 3. 31.

Table 3.31

Table showing the results of analysis of variance

while fitting a regression equation during the year 2000

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	1989941.32710	1989941.32710
RESIDUAL	3	408638.89360	136212.96453
			F=14.60904

Source: Compiled by the researcher.

The prediction equation is

Total cost = 8929.8804 - 21.6086 labour cost R^2 =. 82963

Adj. R^2 = 0.7728

82.96% of variation in total cost is due to labour cost.

3.09.6 Combined

In this case, all the data for all the years including year 2000 are taken into consideration in the analysis. So there are 25 observations. In this case

total cost is significantly correlated with material cost, manufacturing cost, depreciation cost and selling cost. Hence all these costs are taken as independent variables and prediction is done by stepwise regression. Table 3.32 shows the results of analysis of variance.

Table 3.32

Table showing the results of analysis of variance

while fitting a regression equation during the years 1996-2000

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	4	22904840.51675	5726210.12919
RESIDUAL	20	264202.11915	13210.10596
			F=433.47193

Source: Compiled by the researcher.

The prediction equation is

Total cost = 542.1278 + 1.4164 depreciation + 0.9468 material + 0.9561 selling + 1.0864 manufacturing R^2 =. 93640

Adj R^2 = 0.98632

93.64% of variance in total cost is due to material cost.

When a study is made to find out the relation of net profit and total cost as per financial accounting during these five years, it is found that there is no relation between net profit and cost as per financial book. Similarly, when an attempt is made to find out the relationship between financial charges, which is

mainly inclusive of interest charges, and net-profit, there is no significant correlation between the two during the five years. The tables from 33 to 38 show the correlation matrix of this analysis for the period under study.

3.09.7 1996

Table 3.33

Table showing the correlation matrix for the year 1996

	PROFIT	COST	FINANCIAL CHARGES
PROFIT	1.000 (5) p=	5826 (5) p=.303	6588 (5) p=.277
COST	.5826 (5) p=.303	1.000 (5) p=	6588 (5) p=.277
FINANCIAL CHARGES	.6588 (5) p=.277	.0020 (5) p=.998	1.0000 (5) p=

Source: Compiled by the researcher.

1997

Table 3.34

Table showing the correlation matrix for the year 1997

	PROFIT	COST	FINANCIAL CHARGES
PROFIT	1.000 (5) p=	.0958 (5) p=8.78	4080 (5) p=.495
COST	.0958 (5) p=8.78	1.000 (5) p=	4001 (5) p=.505
FINANCIAL CHARGES	.4080 (5) p=.495	.4001 (5) p=.505	1.000 (5) p=

Source: Compiled by the researcher.

1998

Table 3. 35

Table showing the correlation matrix for the year 1998

	PROFIT	COST	FINANCIAL CHARGES
PROFIT	1.000 (5) p=	8672 (5) p=.057	-.1304 (5) p=.834
COST	.8672 (5) p=.057	1.000 (5) p=	.1173 (5) .851
FINANCIAL CHARGES	-.1304 (5) p=.834	.1173 (5) .851	1.000 (5) p=

Source: Compiled by the researcher.

1999

Table 3.36

Table showing the correlation matrix for the year 1999

	PROFIT	COST	FINANCIAL CHARGES
PROFIT	1.000 (5) p=	.8622 (5) p=.060	-.1798 (5) p=.772
COST	.8622 (5) p=.060	1.000 (5) p=	0565 (5) p=.928
FINANCIAL CHARGES	-.1798 (5) p=.772	.0565 (5) p=.928	1.000 (5) p=

Source: Compiled by the researcher.

2000

Table 3.37
Table showing the correlation matrix for the year 2000

	PROFIT	COST	FINANCIAL CHARGES
PROFIT	1.000 (5) p=	1.000 (5) p=	0591 (5) .925p=
COST	-.2413 (5) p=.696	1.000 (5) p=	0511 (5) p=.935
FINANCIAL CHARGES	.0591 (5) .925p=	.0511 (5) p=.935	1.000 (5) p=

Source: Compiled by the researcher.

Combined

Table 3.38
Table showing the correlation matrix for the years 1996 to2000

	PROFIT	COST	FINANCIAL CHARGES
PROFIT	1.000 (5) p=	.2939 (25) p=1.154	.0158 (25) p=.940
COST	.2939 (25) p=1.154	1.000 (5) p=	1830 (25) p=.381
FINANCIAL CHARGES	.0158 (25) p=.940	.1830 (25) p=.381	1.000 (5) p=

Source: Compiled by the researcher.

In all the cases, there is no correlation between the net profit and cost as per financial book and financial charges and cost as per financial book.

When the combined effect of 5 years is taken no significant relationship is found between financial charges and total cost, and between net profit and total cost. So multiple regression analysis is not done in this case.

3.10 Conclusion

The main conclusion of the multiple regression analysis of the cost structure is that the main reason for variation in total cost is due to change in material cost. Labour cost, depreciation, selling expenses and manufacturing expense also have some effect on total cost. The main problem is the high material cost.

From analysing financial statements and cost structure the hypotheses HO_{Ia}, HI_{Ib}, HO_{Ic}, and HO_{Id} are rejected and HO_{Ie} is accepted. This indicate that the low profitability of cattle feed production units are due to the effect of high material cost, labour cost, overhead expenses and financial charges. This also have an influence on total cost which leads to the acceptance of main hypotheses HO_I.

The large concerns are viable for the economy but small concerns exist in the State, which have problems similar to those of large-concerns. So analyses of small concerns are also necessary for a complete study.

PART B

3.11 Small Concerns

Small concerns include the units that have production capacity of 100 and less than 100 MT per day. As per list of registered units in Kerala till 2000, obtained from DIC, Thiruvananthapuram the cattle feed units in small scale started from the year 1971 onwards. Most of these units are at present not working. Some of them changed the names and registered under other names. So out of the identified working units, a sample of ten is taken at random so as to cover one unit from one district leaving as far as possible, the district where large units are located. Apart from private units, milk societies which have started production of cattle feed are also included in the sample.

Data is collected with the help of schedule and financial statement of 1999-2000 alone has been taken for analysis. Mainly cost structure analysis is done. Correlation matrixes for the variables under study are done. With the help of suitable independent variable and total cost as depended variable a prediction equation is developed.

Different elements of the total cost are raw material cost, manufacturing expenses and selling expenses. Raw material cost includes all materials used for production of the finished product. Manufacturing expenses included the indirect expenses incurred in the factory inclusive of labour charges and administrative charges. As administration charges are negligible they are not

studied under different heads. Selling expenses mean all the expenses for selling the product including advertisement and promotion expenses. Table 3.9 shows the correlation of different cost elements to total cost and step regression is made with total cost as dependent variable and most significant cost, as independent variable. The correlation study shows that there is a high correlation between total cost and raw material cost. Hence a regression equation is fitted to relate total cost and raw material cost. The analysis of variance while fitting the regression equation is given in Table 3.39.

Table 3.39

Table showing the results of analysis of variance while fitting a regression equation during the year 2000

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1	342.77623	342.77623
RESIDUAL	9	7.40087	.82232
			F=416.84079

Source: Compiled by the researcher.

Total cost = 1.2412 raw material cost

The prediction equation is

Total cost =1.2412 raw material R^2.97887

Adj. R^2 = .9765 indicates that about 97% of the variation in total cost is due to raw material cost.

The analysis leads to the conclusion that both in large and small concerns, high raw material cost is the major problem. If raw material cost is reduced, the total cost can be reduced and product can be sold at a lesser price with a reasonable margin so that both the producers and consumers will be satisfied.

The analysis of questionnaire gives a picture of capacity licensed and capital invested and owned capital and borrowed capital relationship and profitability of the firm. The following table gives a general view of the units under study.

Table 3.40

Table showing the capacity of capital invested and profit of the unit

	Installed capacity	Capacity utilised	Capital	Owned	Borrowed	Profit	Debt/Equity
A	4	56%	600000	660000	-	2.8%	-
B	5	39%	685000	685000	-	8.2%	-
C	8	60%	900000	900000	-	8.4%	-
D	20	30%	2500000	2500000	-	2.0%	-
E	12	8.3%	1613555	888555	725000	-2.0%	.82
F	2	100%	675000	75000	600000	65%	8.0
G	4	12.3%	900000	400000	500000	1.0%	1.25
H	12	2.96%	1500000	640000	860000	-2.25%	1.34
I	8	66%	1800000	1744874	55126	1.8%	0.03
J	14	75%	598656	594493	4163	-0.14%	0.01

Source: Compiled by the researcher.

From the table it is clear that almost all the units are utilizing only a small proportion of the installed capacity. The reason behind this is, as explained in the schedule, lack of adequate capital. The finance is not even adequate to purchase raw material; debtors form another difficulty. In the case of societies, they are giving cattle feed to the milk societies on credit. The cash is collected from the farmers from the cost of milk and so to the societies who fail to pay off the debt no more cattle feed is supplied. As a result production of cattle feed is also reduced.

When debt/equity ratio is taken for study it varies from .01 to 8, which shows no uniformity in the debt-equity ratio of the concern or units.

3.12 Conclusions

The efficiency of capital invested in the industry as per Capital Out-put Ratio is 0.29 which shows for one rupee of output 0.29 is the amount invested. 42% of total investment is in fixed assets and 58% is in gross working capital. Investment in raw material stock is 32% and is negligible in the case of finished goods. Investment in debtors are high in the case of co-operative sector, whereas, in private sector sales are conducted mainly on cash. The Working Capital Turnover Ratio of the industry is 18.46. Fixed Assets Turnover Ratio of the industry is 8.19. Regarding the profitability ratios Gross Profit Ratio of the industry is 14.66%. The Gross Profit Ratio of the industry for each year when analysed shows a fluctuating trend. The gross profit

variation is due to the increase in the raw material cost. The Operating Ratio of the industry is only 4.46% and the Net Profit Ratio is as low as 2.34%. A comparison of Gross Profit Ratio, Net Profit Ratio and Operating Profit Ratio leads to the conclusion that material cost is high along with operational expenses and financial charges. Return on Investment Ratio for the industry is 17.17%. The comparison between working capital and profitability shows the degree of influence of working capital on their profitability is very low and insignificant. The Long Term Solvency Ratio of the industry is 1.53. The Solvency Ratio of the private sector is highly satisfactory in comparison with the co-operative sector. When summary of Ratio analysis is made, the score of the co-operative sector is higher than the private sector.

The cost structure analysis done with the help of multiple regression leads to the conclusion that the main reason for the variation in the total cost is due to the change in material price. In the case of small units also there is a high correlation between total cost and raw material cost.

From analysing financial statements and cost structure of the units, the hypotheses HO_{Ia}, HO_{Ib}, HO_{Ic} and HO_{Id} are rejected. This indicates that the low profitability of cattle feed production is due to the effect of high material cost, labour cost, overhead expenses and financial charges. This have an influence on the total cost also. Which leads to the acceptance of main hypotheses HO_{I}.

A further analysis of the questionnaire shows that only a small proportion of the installed capacity is utilized. At this juncture a study of the existing demand and supply gap is inevitable and it is done in the following chapter.

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PROSPECTS OF CATTLE FEED INDUSTRY IN KERALA

Philo Francis “Problems and prospects of cattle feed manufacturing units in Kerala ” Thesis. Department of Commerce and Management Studies , University of Calicut, 2003

Chapter IV
Prospectus for Cattle Feed Units in Kerala

CHAPTER IV
PROSPECTS OF CATTLE FEED INDUSTRY IN KERALA

4.01 Introduction

Demand for cattle feed has increased in Kerala due to the change in the composition of cattle population. Operation Flood has been successfully implemented in Kerala by Kerala Co-operative Milk Marketing Federation, popularly known as KCMMF. This changed the composition of cattle from indigenous to crossbreed which in turn increased the demand for cattle feed. The demand for cattle feed has again increased as a result of decrease in the availability of green fodder. Because of this, potential for the cattle feed industry has tremendously increased in Kerala. In this chapter, an attempt is made to anlalyse the demand potential and prospects of cattle feed industry.

4.02 Operation Flood

The approach and strategy of 7^{th} plan include the following objectives

(1) To provide infrastructure necessary to achieve accelerated growth in livestock production

(2) To enable a large section of the rural population including small and marginal farmers, labour tribals and weaker sections to improve their

nutritional and economic status by providing them gainful employment through livestock rearing.

(3) To make available good breeding material for increased productivity.

(4) To strengthen animal health facilities and bring them to the doorstep of the farmers.

(5) Make quality fodder seeds available.

(6) Increase the coverage of area and farm families under co-operative dairy programme and improve milk handling, processing and marketing.

The result of this organised attempt directed towards the development of dairy industry in India was Operation Flood. The Operation Flood was launched in four different stages.

4.03 Operation Flood I (1970-81)

The overall objective of Operation Flood-I was to lay the foundation of a modern dairy industry in India which would adequately meet the country's need for milk and milk products. The programme involved organising dairy co-operatives at the village level providing physical and institutional infrastructure for milk procurement, processing marketing and production enhancement services. Kerala Co-operative Milk Marketing Federation, popularly called MILMA, was established in April 1980 with its head office at

Trivandrum for the successful implementation of this programme in the State. The main activities of KCMMF is (1) Organisation of infrastructure for milk production enhancement, procurement, processing and marketing of milk and milk products (2) Development and Expansion of other allied activities for promotion of dairy industry and improvement and production of milch animals (3) Manufacture of good quality balanced cattle feed and supply to the milk producers co-operative societies and provide technical input facility in the form of veterinary care. The Operation Flood was popular in the State. The main reason for its popularity has been the package deal offer. The package deal included: (1) Veterinary service (2) Cattle feed plant at Pattanakkad in Alappuzha district and Malampuzha in Palakkad district (3) Training centres and (4) Co-operative Development Activity.

Along with KCMMF, the Cattle development programmes and the Animal Husbandry Department was able to launch the Operation Flood successfully in Kerala. The result of this programme can be studied from the table below. The Table 4.1 shows that the composition of cattle population changed. The number of cross breed cows has increased and indigenous cows decreased. Milk production has increased and consumption per capita also has increased.

Table No. 4.1

Table showing the composition of cattle before and after Operation Flood Phase I

Year	Composition	Male in lakh	per cent	Female in lakh	per cent	Total percent
1977	Crossbred	16.01	28.82	83.94	50.51	45.08
	Indegenous	32.47	71.18	67.53	49.49	54.92
	Total in percent	25.05	100	74.95	100	100
1982	Crossbred	14.93	32.93	85.07	50.70	46.92
	Indegenous	26.89	67.07	73.11	49.30	53.08
	Total in percent	21.28	100	78.72	100	100

Source: Livestock census report 1996, Govt. of Kerala.

Table 4.1 shows that cross breed cows were only 83.99 lakh in 1977; it increased to 85.07 in 1982. This shows that in Kerala there was a shift from the low yield variety cows to high yield cross breed, and hence milk production also increased.

4.04 Operation Flood II (1981 – 85)

This was designed to build on the foundation already laid down by Operation Flood I. Operation Flood II phase improved the quality of cattle in Kerala. The percentage of crossbreed cattle was 11.69 male and female 88.31, whereas the indigenous breed decreased to 17.99 of male and 82.06 in case of female. Of the total cattle population 39.17 were crossbred male, 51.54

females and total crossbred is 49.71 per cent. In the case of indigenous, male 60.831 and 48.46 female. The total was 50.29 per cent[2].

4.05 Operation Flood III (1985–96)

The third phase aimed at consolidation of the gains of earlier phases. The Operation Flood III was funded by a World Bank credit loan. Its major emphasis was to consolidate the achievements of the earlier phases by improving the productivity and efficiency of the co-operative dairy sector. Operation Flood III also had provision for productivity enhancement in inputs and institutional strengthening in the form of training, research, market promotion monitoring and evaluation. The role of National Milk Grid (NMG) is crucial in ensuring the availability of milk to consumers and a remunerative price to milk producers by levelling out regional and seasonal imbalances in supply and demand.

4.06 Impact of Operation Flood III in Kerala

As a result of the three phases of Operation Flood, in 1996 the cattle population of cross bred increased to 67.34 per cent and indigenous decreased to 32.66 per cent. The growth of female cross bred increased to 68.23 per cent and indigenous decreased to 31.77 per cent. This shows that the high yield variety became a majority of cattle population in Kerala[3].

Table 4.2

Table showing the average quantity of milk procured per day per animal

Year	N.D. Cows	C.B. Cows	Total
1985-86	1.715	3.998	3.089
1986-87	1.694	3.943	3.109
1987-88	1.757	4.523	3.323
1988-89	1.844	4.612	3.417
1989-90	1.622	4.991	3.513
1990-91	1.725	5.187	3.672
1991-92	1.749	5.259	3.781
1992-93	1.863	5.372	3.938
1993-94	1.864	5.385	4.024
1994-95	1.864	5.388	4.089

Source: Report on 15th quinquennial livestock census 1996, Govt. of Kerala.

Table 4.2 shows the increase in milk production. The average total production per day has increased from 3.089 to 4.089 Kg. per day.

The Operation Flood also increased the per capita availability of milk. Thus, it achieved the target of Operation Flood III which is a movement of members of milk co-operatives who by their income from milk are progressively able to improve their standard of living.

To improve the productivity of dairy cattle and thereby milk production the Operation Flood provided animal health and breeding facilities. The by

pass protein feed developed by National Dairy Development Board has now been increasingly adopted by farmers. This increases protein conversion efficiency of the cattle feed by 33 per cent and dry matter conversion by 30 per cent and minimises dry matter requirement for milk production by 24 per cent. Balanced cattle feed compounding capacity of 4,905 tonnes per day has been set up and 34576 District co-operative societies are marketing cattle feed to their farmer members in India[4].

Table 4.3

Table showing cattle feed production in Kerala by KCMMF under the Operation Flood and the milk production per day

Year	Average milk procured per day in tonnes	Production of cattle feed in MT
1994	415	34213
1995	465	35102
1996	485	28367
1997	465	37843
1998	477	43480
1999	536	83071
2000	609	76885

Source: KCMMF Economic Review 2000.

Table 4.3 shows that by Operation Flood both the production of milk as well as production of cattle feed have increased due to the change in the composition of cattle and their feeding habit. The cattle feed produced by the

co-operative sector is distributed only through co-operative milk societies, to the farmers who supply milk to the society. The price of feed is deducted from price of milk. The increase in production of milk has increased the production of cattle feed.

4.07 Operation Flood IV

The fourth stage aimed at transforming the threats faced by co-operatives into an opportunity. Today India is one of the world's largest milk producing countries. Twenty five years after launching Operation Flood, milk production has increased and per capita consumption has doubled,

Table 4.4

Table showing per capita per day availability of milk (grm) in Kerala

Year	Per capita per day availability				Human population in lakh
	Cow milk	Buffalo milk	Goat milk	Total	
1985-86	109	9	10	128	274
1986-87	112	8	11	131	278
1987-88	119	10	8	137	283
1988-89	125	10	9	144	288
1989-90	136	10	9	155	283
1990-91	143	10	9	162	286
1991-92	149	10	10	169	290
1992-93	156	10	10	176	294
1993-94	164	10	10	184	298
1994-95	172	10	10	192	302

Source: Report on 15th quinquennial livestock census, 1996, Govt. of Kerala.

the project adopted novel and innovative measures to boost milk production; the investment made is by no means small. It is necessary therefore that no effort be spared to ensure that optimal returns are achieved in the future. Delicensing of the dairy industry and the consequent mushrooming of private sector plants made environment more competitive. The future of Operation Flood though full of challenges and uncertainties, is receiving careful thought and attention. It will have to see all threats and challenges as opportunities and strive to convert them as such.

The impact of Operation Flood on Kerala economy in increasing the demand for cattle feed is studied by conducting a survey among the dairy farmers giving importance to the change in the composition of cattle population and feeding habit of the people. The objective is to find out the use of cattle feed among the dairy farmer and thereby find out the growing demand for cattle feed.

4.09 Methodology

A survey of 100 households which kept milch animals is done for gaining insight to feeding pattern and use of compound cattle feed. To select the households the following procedure is adopted. From 1996 census it is seen that only 5 per cent of the total population is from urban area and so out of 100 households 8 are from urban areas, 92 are from rural areas. 40 households are selected from Palakkad district where there is the highest cattle

population in Kerala. 40 households from Thrissur district where two major cattle feed plants are located and the remaining 20 households covering all other districts of Kerala are selected. The Thrissur and Palakkad districts are divided into Blocks and there are 17 blocks and 7 municipalities in Thrissur district, 13 Blocks and 4 municipalities in Palakkad district. According to the cattle population, each Block and municipality is divided into equal classes and one block from each class is selected which has the average population in each class. From each such Block on the basis of average population one panchayat is selected and equal number of households are selected from each panchayat.

4.10 Households Selection

The household selected is as shown in the Table 4.5 below.

Table 4.5

Table showing the distribution of households surveyed

District/Block / Municipality	Area covered	Number of households
Thrissur		
Irinjalakuda	Muriyad	12
Cherup	Vallachira	12
Mala	Mala	12
Municipality	Irinjalakuda	4
Palakkad		
Allathur	Vandazhi	18
Kollamkode	Kollankode	18
Municipality	Shornur	4
Other districts		20
Total		100

Source: Compiled by the researcher.

4.11 Milch animal holdings

The average milch cattle holding is 2.45 per household and in-milk animal is 74 per cent. The percentage of cross breed is 96 per cent which is a proof of success of Operation Flood in Kerala. Buffalo holding is negligible and adult males are almost non-existent.

Table 4.6

Table showing average milch animal holding

Cattle	Muriyad	Vallachira	Mala	Irinjalakuda	Vandazhi	Kollankode	Shornur	Other	Total
Cross breed									
In-milk	20	24	31	9	25	30	7	32	178
Dry	7	8	7	14	13	7	2	10	54
Indigenous									
In-milk	1	2	1	-	2	3	1	-	10
Dry	-	-	-	-	-	3	-	-	3
Buffalo									
In-milk	-	-	-	-	-	-	-	-	-
Young cattle									
Male	6	9	2	1	3	9	2	10	42
Female	13	10	11	4	18	20	6	22	104
Avg.	3.92	4.41	4.3	4.5	3.3	4.0	4.5	3.71	3.91

Source: Compiled by the researcher.

4.12 Use of Feed and Fodder

Green fodder is used by most of the household, only 6 per cent does not use green fodder. The fodder is mainly from own field or open space near the household. Grazing hours are 3 to 6 hours. It is not a practice nor practicable to measure the green fodder consumed by the cow. In certain cases, green fodder is collected in bundles and given to the cow. In such cases an idea can be had about the consumption of green fodder. The average consumption of green fodder comes to 11.63 Kgs for in-milk cows, 7.04 Kgs for dry animals and 2.54 Kgs for young calves.

Mainly paddy straw is given during summer season as a substitute for green fodder. As against green fodder whose price is nil or negligible the farmers have to pay highly for dry fodder, so average consumption is lesser. For in-milk animals average consumption is 5.11 Kgs, for dry animal 2.93 Kgs and for young calves 3.13 Kgs per day.

Apart from fodder, concentrates are also given to milch animals. Usually it is given to in-milk animal and the waste or remaining will be given to calves. Concentrates include oil cakes and bran. Oil cakes include groundnut cakes, coconut cakes, cotton seed cakes and gingelly cakes. Consumption of oil cake on an average is 1.45 Kg for in-milk animal 1.15 for dry animal and 0.34 Kg for the young.

Along with oil cakes bran of different corns are given to animals. Bran includes rice bran and raw rice, maize bran, tamarind seed, wheat bran etc. The consumption of bran by in-milk animals on an average is 1.37 Kgs, 0.9 Kg for dry animals and 0.34 Kg for young ones. Raw Rice is given only to the in-milk animals.

Next important ingredient is cattle feed which is given in all seasons, that is, irrespective of rainy, summer or winter seasons. A slight variation will be in case of in-milk and dry animals, and between rainy and summer seasons according to the availability of green or dry fodder. The quantity of cattle feed given is 3.16 Kgs for in-milk animal 2.97 Kgs for dry animal and 0.66 Kgs per day for young ones.

Table 4.7

Table showing the consumption of feed and fodder per day on an average

Items	Green fodder	Dry fodder	Oil cake	Bran	Compound cattle feed
In-milk	11.63	5.11	1.45	1.37	3.16
Dry	7.04	2.93	1.15	0.90	2.97
Young	2.54	3.13	0.34	0.34	0.66

Source: Compiled by the researcher.

4.13 Use of Cattle feed

In the total animal population as per the sample study 14.2 percentage of in-milk animals are given or fed only on cattle feed and 19.12 percentage of

animal are not given compound cattle feed. 66.68 percentage of animals are given compound cattle feed along with concentrates.

Table 4.8

Table showing the use of cattle feed on an average by milk producers

Items	Number	Given only CCF (per cent)	Not given CCF (per cent)	Given CCF and concentrates (per cent)
In-milk	188	14.2	19.12	66.68
Dry	57	20	26	54
Total	245	16	21	63

Source: Compiled by the researcher, CCF compound cattle feed.

Table shows that the percentage of animals given only compound cattle feed is higher in case of dry animals than in-milk animals, and that of animals not given compound cattle feed is higher for dry animals than in-milk animals. 66.68 percentage give both concentrates as well as cattle feed for their in-milk animals. The reasons for combining cattle feed along with concentrates are that cattle feed itself is not felt as a complete feed and should be supplemented with oil cake and grains to get maximum yield. Some are of the view that the health of the cow which consumes only compound cattle feed will deteriorate in the long run. To avoid this, concentrates are given. The farmers who are not using compound cattle feed use their own feed mix using the traditional formula of oilcakes and bran available.

4.14 Source of Purchases of cattle feed:

Members of co-operative societies get compound cattle feed from the dairy societies as they give milk to the society. The mode of payment is deduction of the cost of feed from the sales of milk to the society. The period of credit is from one week to one month. Farmers who are not members of any societies purchase from retail shops and make cash payments. In certain cases credit is allowed by the shopkeeper. 51 per cent of farmers use the services of the society. Societies include both private and co-operative societies, and co-operative societies include traditional and Milma societies. The following Table shows the shares of purchase by the dairy farmers as per the survey.

Table 4.9

Table showing the sources of purchases of cattle feed

Area	MILMA and APCOS	Private society	Retail shop	Own field	Total
Rural	40	8	38	6	92
Urban	1	2	4	1	8
Total	41	10	42	7	100

Source: Compiled by the researcher.

42 percentage of farmers purchase feed from retail shops and 7 per cent make use of their own sources, those who do not use compound cattle feed turn to traditional mix of concentrates.

4.15 Brands of cattle feed used

51 per cent of households are making purchase from dairy co-operatives. They have no choice of purchase other than what is available in the society as credit facility is given by the society. Even in the case of retail shops the choice depends on the shopkeeper choice as there may be only one agent for a particular locality.

Table 4.10

Table showing brand used at present and previously by the dairy farmers

Brand name	Present percentage	Previous percentage
Kerala Solvent	40	47
MILMA	27	20
Sunandhini	-	4
Prima	-	1
Kerala Feeds	17	-
Feed from other States	8	12
Not making use of CCF	8	16
Total	100	100

Source: Compiled by the researcher.

CCF – Compound Cattle Feed.

The Table shows that Kerala Solvent itself is the market leader. Next comes Milma. Percentage of households making use of Kerala Solvent feed is

40 and that of Milma is 27. But previously it was 47 and 20 per cent respectively which shows that the Kerala Solvent is losing its hold, and Milma is gaining. Kerala Feeds, though started only in 1998, is gaining importance in the field. It is also seen that the feed from other States has decreased from 12 per cent to 8 per cent. Another important point is that the percentage of households not making use of cattle feed has decreased by 8 per cent i.e. from 16 per cent to 8 per cent which reveals the awareness about cattle feed among the dairy farmers. It is also seen that some of the previously sold products are out of the market.

4.16 Factors influencing the farmers while selecting cattle feed

The farmers are asked to rank the factors affecting the purchase of a particular brand of their choice. A priority index Table is calculated using the ranks given to various factors. The priority index is calculated as follows: The first preference is given rank I and second preference rank II and so on till the least preference. The Ist Rank is given a weightage of 11 marks as there are eleven factors, 2^{nd} rank is given 10 marks and so on. The total score assigned to each factor is considered, and a percentage of total is computed. The following table shows the priority index scored by each factor.

Table 4.11

Table showing the priority index of present brand

Factors	Score in per cent
Milk yield	93
Health of animal	83
Feed acceptability	80
Availability	75
Price	69
Compensation to package	46
Quality of gunny bag	37
Credit period	31
Mode of delivery	29

Source: Compiled by the researcher.

From the Table it is clear that farmers give priority to milk yield, and had given scores as 93 per cent. The second goes to health of animal which is given 83 per cent. Apart from health, the feed acceptability is also given due attention, 80 per cent. As many of the farmers are members of co-operative society and credit facilities obtained are given the fourth place, 75 per cent. Price of the product gets the V^{th} place only i.e. only 69 per cent of farmers give importance to price over other factors. It also reveals that the other factors are given less priority and the least is given to mode of delivery.

The farmers are also asked to rank the priority among the factors needed for a good quality cattle feed. They are given four factors: milk yield, health of the animal, feed acceptability and price. The priority index is also calculated. The table 4.12 shows the priority index.

Table 4.12

Table showing the priority index of an ideal cattle feed

Factor	Percentage	Rank
Milk yield	80	I
Health	64	II
Feed acceptability	50	III
Price	50	IV

Source: Compiled by the researcher.

The Table shows that the most important factor for an ideal cattle feed is milk yield. The milk yield increases with the usage of cattle feed. The second rank is given to health of the animal. Use of cattle feed should not result in the deterioration of the health of the animal. The next is shared between price and feed acceptability of the cattle. Though price increases the input cost of farmers, still they give importance to health and milk yield. It shows that even when the price increases the farmers are ready to use good quality cattle feed which will increase milk production.

From the priority index it is concluded that the dairy farmers gives importance to milk yield, health of the animal and price, which is depending on the quality of cattle feed. From this, it is inferred that demand for cattle feed is depending on quality. So the null hypothesis HO_{IIa}, the demand for cattle feed is not depending on the milk yield, health of the animal and the price is rejected.

4.17 Demand For Cattle Feed

Demand for cattle feed is depends upon the usage and availability of green or dry fodder. The best feed for the cattle is green fodder which is scientifically proved. But as there is shortage of green fodder due to lack of pasture lands and that fodder cultivation is not successful in the State fodder seeds have been distributed among the farmers through co-operative societies. But the farmers are not able to cultivate it successfully.

Enquiry about the cultivation of green fodder shows 24 per cent of the farmers are engaged in cultivation of green fodder. They used to cultivate it as a perennial crop, only 22 per cent agreed that they are able to cultivate successfully. About the dry fodder most of the farmers purchase straw from others and the price is increasing and they have to pay higher price which increases the cost of input for dairy farming. 64 per cent of the farmers agree that the cost of straw is increasing due to reduction in the cultivation of paddy within the State. 80 per cent of the farmers agree that the decrease in fodder

grass availability and increase in price of straw have increased the demand for cattle feed.

4.17.1Green fodder and cattle feed

A correlation study has been done to find out the relationship between green fodder consumption and cattle feed consumption for testing the hypothesis.

HO_{IIb}: Consumption of cattle feed does not depend on the consumption of green fodder

Table 4.13

Table showing the correlation between green fodder consumption and cattle feed consumption

X	Y	x	x^2	y	y^2	xy
9	4.16	-2.04	4.16	0.68	0.46	-1.39
13	4.16	1.96	3.84	0.68	0.46	1.33
16.6	4.27	5.56	30.91	0.79	0.62	4.39
6.75	5.5	4.29	18.40	2.02	4.08	-8.67
10.60	2.33	-0.44	0.19	-1.19	1.37	0.52
12.00	2.75	0.96	0.92	-0.73	0.53	-0.70
8.75	2.60	-2.29	5.24	-0.88	0.17	2.20
11.60	2.10	0.56	0.31	-1.33	1.90	-0.77

Source: Compiled by the researcher.

To test the significance of the correlation 't' test is applied. t value at 0.05 level of significance is 0.32. The table value of t 0.05 for (n-2) degrees of freedom is 2.447.

r = -0.13 shows that there is negative correlation between the consumption of green fodder and cattle feed which reflects that as consumption of green fodder decreases consumption of cattle feed increases. As the table value of 't' at 5 per cent level of significance is greater than the calculated value of 't' 0.32, it infers that the correlation is not significant. This leads to the conclusion that the demand for cattle feed does not depend on the availability of green fodder. More specifically, even if green fodder is available in plenty due to increase in fodder cultivation the demand for cattle feed will be continuing. Hence the hypothesis HO_{IIb} is accepted.

4.17.2 Concentrate and Cattle Feed

An analysis is done to find out the demand for cattle feed due to the consumption of concentrate. Again, a correlation analysis and 't' test is done to test the significance of the relation between the consumption of cattle feed and concentrates. This is done by testing the null hypothesis,

HO_{IIc}: The consumption of cattle feed does not depend upon the consumption of concentrate.

Karl Pearson's co-efficient of correlation between the two variables is +0.35 as shown by Table 4.14 which shows that the consumption of cattle feed and concentrates are moving in the same direction. When 't' test is applied computed value of 't' is 0.92 which is lower than table value of 't' at 0.05 level of significance which is 2.447. Though the 't' value is not significant, the positive correlation between the two variables shows that concentrates are

used as a supplementary to the consumption of cattle feed. That is, consumption of concentrate does not affect the demand for cattle feed negatively. Hence the hypothesis HO_{IIc} is accepted.

Table 4.14

Table showing the correlation between cattle feed consumption and consumption of concentrate

X	Y	$x^2=(x-x)^2$	$y^2=(y-y)^2$	xy
2.42	4.16	0.144	0.46	-0.25
2.20	4.16	0.36	0.46	-0.28
4.60	4.27	3.24	0.62	1.42
2.50	5.50	0.09	4.08	-0.61
2.50	2.33	0.09	1.39	0.36
3.15	2.75	0.12	0.53	-0.26
2.60	2.60	0.04	0.77	0.18
2.40	2.10	0.16	1.92	0.55

Source: Compiled by the researcher.

$x = 2.80$ $y = 3.48$ $\Sigma x^2 = 424$ $\Sigma y^2 = 10.26$ $\Sigma xy = 1.11$

$r = +0.35$

't' value = 0.92

4.17.3 Geographical Area and Cattle Feed

The Operation Flood has increased the demand for cattle feed, 89 per cent of the households opine. 92 per cent of the dairy farmers agree that the

use of cattle feed increases milk yield. The usage of cattle feed depends on the particular area. This is studied by conducting λ^2 test for testing the null hypothesis HO_{IId}.

HO_{IId}: There is no significant relation between consumption of cattle feed in urban and rural area.

Table 4.15

Table showing the relation between consumption of cattle feed in urban and rural area

Area	No. of households using cattle feed	No. of household not using cattle feed	Total
R	86	6	92
U	7	1	8
Total	93	7	100

Source: Compiled by the researcher.

λ^2 value = 0.52 R = Rural area U = Urban area

Table value of λ^2 at 0.05 level of significance is 2.91.

As the computed value of λ^2 is less than critical value or table value, the null hypothesis HO_{IId} is accepted. Hence, there is no significant relation between the consumption of cattle feed in urban area or rural area.

4.18 Price of cattle feed

Price of cattle feed is affordable to 21 per cent of farmers and 72 per cent disagree with this. They think that the price of cattle feed cannot be met

from the price of milk. 95 per cent of the farmers are of the view that the government should try to reduce the price of feed and it is a must on the part of government to do so. 91 per cent farmers also think that the cost of feed is the key factor in dairy farm management. As cattle feed is the main input for the farmers, the higher the cost of cattle feed the lesser will be the profitability for the farmers. 82 per cent believe that the cost of the cattle feed can be reduced by using ingredients available within the State. As cattle feed is inevitable for farmers as opined by 93 per cent research has to be conducted in the field to find out raw materials which are available within the State. The existing demand can be increased by reducing the price. This reaffirms the conclusion that demand for cattle feed is depending on price.

4.19 Quality of the Feed available

There are mainly two types of products: smash and pellets. 33 per cent of farmers strongly agree that pellet feeds are superior to smash, 51 per cent express no opinion as they are not using pellet feeds and 16 per cent who use pellets strongly disagree, 28 per cent declare that the cattle feed produced within the State is superior in quality to feeds from other States. 64 per cent have no opinion mainly because they are not in the habit of using feeds of other States. 8 per cent strongly disagree that feed produced within the State is superior to that of the other States. 75 per cent agree that there are sufficient brands available in their area whereas 6 per cent strongly disagree and 19 per cent are of no opinion. The mode of payment for the feed is acceptable for 73

per cent of farmers. 12 per cent strongly disagree with this and 14 per cent is without an opinion. 81 per cent agreed that there is no lack or shortage of feed whereas 6 per cent are of the view that feed is not available as per their choice. The size of the bag is convenient for 78 per cent of farmers. They are of the view that a bag once purchased, can be used for one week so that transportation cost can be reduced to the minimum. 16 per cent is of the view that the size of the bag should be reduced to 25 kgs so that, it is handy. About the awareness of the ingredients of cattle feed, only 19 per cent could get from the sack, 44 per cent are not aware of the ingredients and have no opinion.

58 per cent of the farmers are of the opinion that the conventional feed is better in quality than the compound feed. But as the cost of raw material is high they are not using it. 17 per cent are against this view.

4.20 Projection of Demand

Quantity of cattle feed required by the consumers of the State or demand for cattle feed in the State can be estimated from two angles. The first is according to the quantity required to realise the genetic potential of the animal.

4.20.1 Nutritional Requirements of Cattle Feed

From the side of nutritional requirement an adult cow requires 2.5 Kgs of cattle feed for the body maintenance and 1 Kg for every 2 to 3 litres of milk. Table 4.16 shows the nutritional requirements of cattle feed per day.

Table 4.16

Table showing nutritional requirements of cattle feed per day

	Body maintenance	Milk production	Total (Kg.)
Young (1 year)	2	-	2
Cow (Prg)	2.5	-	2.5
Cow in-milk	2.5	2.5	5

Source: Compiled by the researcher

The average milk production per cattle according to the sample survey conducted by Animal Husbandry Department in 1998 is 6.357 litres for cross breed animal and 2.52 litres for indigenous animal and the average is 5.29.

Quantity of cattle feed requirement can be calculated by

Demand = Consumption required per animal per day x Number of animals.

Table 4.17 shows the estimated number of milch animals according to the sample survey conducted by Animal Husbandry Department of Kerala in the year 1998.

Table 4.17

Table showing the estimated number of milch animal (in lakh) 1998

Items	Cross breed	Average Milk Prodn per cow in ltrs	Indigenous	Average Milk Prodn per cow in ltrs	Total	Average milk Prodn
Cow in-milk	8.556	6.357	2.927	2.552	11.483	5.295
Cow dry	3.685	-	1.068	-	4.753	-

Source: Compiled by the researcher.

From Tables 4.16 and 4.17, the quantity of cattle feed required by the State can be calculated and Table 4.18 shows the quantity of cattle feed required to be produced one day.

Table 4.18

Table showing the estimated quantity of cattle feed required for one day

	No. of cows (in lakh)	Consumption per day (in kg)	Total in ton
Cow in milch	11.483	5	5741.5
Cow in dry	4.753	2.5	1188.3
Total	16.236	-	6929.8

Source: Compiled by the researcher.

The Table shows that theoretically, the State has to produce 6929.8 tons of cattle feed daily for feeding the cattle population of the State.

4.20.2 Present Production capacity of the State

Production of cattle feed in the State is from three sources. The co-operative sector known as organised sector, the private sector which is in large scale production, and the small units which produce less than 100 ton daily. Table 4.19 shows the estimated production of cattle feed from these three sectors. In the case of small units, though actual figures are not available, an estimation can be made with the help of the list of number of units registered.

Table 4.19

Table showing the estimated production of cattle feed within the State

Name of unit	Installed capacity in ton per day
Kerala Solvent Extraction	500
MILMA, Malampuzha	200
MILMA, Pattanacuad	500
PRIMA	200
KOYENCO	240
KERALA FEEDS	500
Other small units	500
Total	2640

Source: Compiled by the researcher.

From the Table 4.19, it is clear that the State has a production capacity of 2640 tonnes per day if all the units within the State produce the full installed capacity. This is possible only in an ideal situation.

4.20.3 Production Gap of Cattle Feed

Table 4.18 and 4.19 show the demand and supply of cattle feed within the State. The difference between the demand and supply is the production gap. The quantity of cattle feed required per day is 6929.80 tonnes and supply of cattle feed is only 2640 tonnes per day. Hence there is a gap of 4289.80

tonnes per day. This gap to a certain extent is filled by the producers outside the sates. Still a portion of the cattle may be remaining under fed.

4.21 Production gap as per Actual demand and Production

The production gap can again be found out by taking the actual consumption of cattle feed by the farmers as per the sample study conducted and actual production of cattle feed by the producers within the State. The actual consumption of cattle feed by the farmers is the quantity of cattle feed given per cow per day, multiplied by the total cattle population in the State. Table 4.20 shows the estimated quantity of cattle feed required as per the sample survey conducted by the researcher.

Table 4.20

Table showing the estimation of cattle feed required per day as per the survey

	No. of cow in lakh	Quantity of cattle feed per day per cow	Total in ton
Cow in milch	11.483	3.16	3628.63
Dry cow	4.753	2.97	1411.64
Total	16.236	-	5040

Source: Compiled by the researcher.

Table 4.20 shows that as per the quantity given to the cattle by the farmers in the State, total quantity of cattle feed required or demanded in the State is 5040 tonnes per day.

4.21.2 Actual Production of cattle feed within the State

The actual production by the cattle feed units during the year 2000 is taken and the cattle population studied according to 1998 census. The production by co-operative sector and private large units is taken for finding the actual production of cattle feed within the State. In the case of small units the product for one year of the sample units under study is taken. Table 4.21 shows the actual production of cattle feed by the units under study.

Table 4.21

Table showing the actual production of cattle feed by the units under study for the year 2000

Code of the units	Quantity produced in ton for the year
A	97645
B	72403
C	59620
D	35382
E	13492
Small units	10218
Total	288760

Source: Compiled by the researcher.

4.21.3 Production gap of cattle feed as per the study

The total production of cattle feed for the year is 2,88,760 tonnes. Table 4.20 shows the demand for cattle feed per day is 5040 tonnes. Production for one day is 963 tonnes. Thus, there is a production gap of 4077 tonnes per day. According to the survey only 8 per cent of the households use feed produced by other States. 8 per cent of 5040 is equal to 403 tons. Even if it is deducted from the gap, there is a margin of 3674 tons. This is a potential for cattle feed units in Kerala.

Apart from this, cattle population is seen to increase year after year due to the following reasons: (1) Operation Flood (2) Farmers are having a change from cultivation to dairy farming due to decrease in agricultural cultivation (3) the standard of living of people has increased and the per capita consumption of milk has also increased.

4.22 Increase in Demand due to Operation Flood

Consumption of cattle feed has increased in the State due to Operation Flood. As per George and Nair (1988) about 70 per cent of cow, in-milk and pregnant were fed by compound cattle feed at an average rate of 1.02 Kg every day. As per the sample survey conducted for the study the per day consumption has increased to 3.11 per day (Table No.4.20) which means per day consumption has increased by 2.095 Kg. The composition of cattle population also has improved according to Table 4.1 in Operation Flood.

Again, according to the survey only 8 per cent of farmers are not using cattle feed at present. Previously it was 16 per cent. This shows more farmers who were not using cattle feed before have started to use cattle feed. This is due to awareness created among the farmers.

Formation of a large number of primary dairy co-operative societies provided marketing units to dairy farmers, so that the farmers find no difficulty in selling their milk and milk products. Farmers are given cattle feed on credit basis through these societies , and at a reduced rate to the young ones of cattle through different schemes of Animal Husbandry Department to improve milk production, and this increases the demand for cattle feed.

All this leads to the conclusion that there will be sufficient increase in demand for cattle feed, and the manufacturing units have a bright future. Even new units can enter, or are welcome to this industry, without affecting the profit of the present units, if certain problems of the industry are solved.

4.23 Conclusions

From the analysis of schedule given to the dairy farmers the following conclusions are derived:

(1) The percentage of cross breed animal among dairy farmers is 96 per cent, among them average of in-milk animals is 74 per cent.

(2) Green fodder is given during rainy season on an average of 11.63 Kgs per day per cow, whereas consumption of dry fodder is only 5.11 Kgs per day per cow. Dry fodder costs higher than green fodder and it is increasing.

(3) Along with cattle feed, concentrates are also given on the belief the cattle feed alone is not a complete feed and it will adversely affect the health of animals in future.

(4) 21 per cent of cattle are not given compound cattle feed and 16 per cent of cattle are given only cattle feed.

(5) 51 per cent of households make use of societies for selling milk and purchasing cattle feed.

(6) The feed from other States are losing the market. The households using those feeds have decreased from 16 per cent to 8 per cent.

(7) The farmers consider milk yield, health of animal, feed acceptability and price as important factor in determining the brand of cattle feed.

(8) Consumption of green fodder does not affect the demand for cattle feed significantly.

(9) Consumption of concentrates supplements consumption of cattle feed.

(10) Consumption of cattle feed does not depend upon urban area or rural area.

(11) Cost of cattle feed is an important factor in the input cost of dairy farming.

(12) Dairy farmers prefer smash against pellet feeds and the feed produced within the State is superior in quality. The size of the bag and mode of delivery is acceptable to farmers.

(13) There is substantial production gap. The demand for the product is higher than the supply and so more units can enter into the market.

To conclude, the demand for cattle feed is ever on the increase as the percentage of crossbreed animals is increasing green fodder availability is decreasing and consumption of dry fodder is expensive. On the other part, consumers are making use of societies for selling their product and so is making use of credit facilities available for purchase of cattle feed. This reduces the market for feed from other States. The quality of cattle feed produced within the State is beyond any doubt and so the consumers though the cost of such feed is high, is not for low priced low quality feed of other States.

From the analysis of survey among the farmers, it is seen that the demand for cattle feed is depending on quality and price and not on the

availability of green fodder and concentrate, and is independent of rural area or urban area, which leads to the acceptance of hypothesis HO_{II}, that the consumption of cattle feed is depending on quality and price and not on the consumption of green fodder and concentrate or consumption in rural area or urban area.

As per the demand projects, a bright future is awaiting the cattle feed industry. The suggestions and recommendations leading to this is given in the next chapter.

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CONCLUSIONS, SUGGESTIONS AND RECOMMENDATIONS

Philo Francis “Problems and prospects of cattle feed manufacturing units in Kerala ” Thesis. Department of Commerce and Management Studies , University of Calicut, 2003

Chapter V
Conclusions, Suggestions and Recommendations

CHAPTER V

CONCLUSIONS, SUGGESTIONS AND RECOMMENDATIONS

Looking from the angle of future prospects for overall animal production and compound feed production, India offers voluminous opportunities on many considerations. Our country has enormous livestock population, an alarmingly large portion of it being low productive. They can be made to yield more through gender improvement and better feed i.e., nutritionally balanced and scientifically compounded animal feed. Secondly vast portions of our human population are under-nourished and they always look up to nutritious animal food products, provided their propensity to consume is stepped up. All this promises future prospects for animal husbandry promotion in our country.

Conclusions

This study on cattle feed units in Kerala is mainly from two points of view: (1) the problems of present units in Kerala and (2) the prospects of the industry in Kerala.

I. Problems of present units in Kerala

From the analysis done on the present situation of the industry, it seems that the industry is facing many problems. The researcher has tried to point out the following:

The raw material price has increased by 42 per cent during the period under study from 1996 to 2000. On analysis, it is found that (1) Most of the raw materials are available only from other States. The producers charge high prices for their materials and they are depending on the vagaries of nature. The only available raw material inside the State is coconut extraction. Even for rice bran, the manufacturers depend on other States. Available rice bran within the State cannot be used because of oil content, which will deteriorate quality. To remove the oil content, there are no solvent extraction plants within the State. (2) The central sales tax that the units have to pay on purchase of raw materials from outside the State, and the sales tax imposed by the State governments again increase the cost of raw materials as revealed by the survey. (3) The transportation cost of raw materials from other States also increases the cost of raw materials. (4) As the raw materials are seasonal in nature the units have to invest a large amount of money in stocking the raw materials.

Regarding the selling price, it shows an increasing trend during the period under study. The change in average price of cattle feed during the

period under study is 32 per cent. It is noted that the increase in selling price is not in line with increase in raw material cost. Again increase in selling price is not affecting the demand for the product as is proved by the negligible percentage of finished stock. This again points out that there is a gap between incremental cost and incremental selling price which lead to a reduction in profit of the company.

Gross-profit, operating profit and net profit of the units are not satisfactory. It is seen that in some years one or two units are incurring losses during the period under study. During certain years the increase in gross profit of certain companies is not followed by an increase in operating profit which reveals an increase in operating expenses. Among the operating expenses as revealed by cost structure analysis, some expenses namely labour cost and, selling overhead expense have a prominent role in the cost structure. In certain years, especially for the co-operative sector, the operating expenses are high. When considering net profit, private sector companies having high gross profits are not making enough net profit. This reveals that financial charges in the private sector units are higher than those of the co-operative sector. This is one of the reasons for decrease in net profits of the companies.

Finished goods are absorbed by the market which is proved by the finished goods stock. In the co-operative sector, the finished goods are fast moving. The sales volume has increased by 9.6 per cent from 1996 to 2000, which reveals that the demand for the product is on the increase.

The overall capacity utilization of the units is 55 per cent. Capacity utilization of units in the co-operative sector is almost 100 per cent towards the end of the study period. But capacity utilization of private sector companies is decreasing. The contradiction is that without decrease in demand, private sector companies are reducing production. This reveals the fact that the companies are not satisfied with their profit position. They are selling at a higher price than that is affordable by the consumer market. Even at such a high price they are not able to make enough profit due to high cost of production. The other reason is competition from the co-operative sector. The co-operative sector is selling their product through milk co-operative societies. The milk co-operative societies are selling cattle feed at subsidised rates to their members on the basis of milk sold to the society. The dairy farmers approach these societies so that the sale of their product (milk) is assured and feeds are obtained at reduced rates. This keeps them away from private sector feeds. Over and above, as a common factor for both the sectors there is also competition from feed manufacturers of other States who can sell their product at a low price due to the reduced cost of production, as they are able to get raw materials at a reduced price. This again severely affects the private sector companies. On the contrary the co-operative sector is also not making profit though there is assurance of sales. Cattle feed is supplied to milk co-operatives at subsidized rates on a credit basis. The large investment in sundry debtors as

shown by the balance sheet of the co-operative sector reveals that there is delay in collection of debts.

This reduction in capacity utilization increases the fixed cost for the companies. Fixed cost includes administrative expenses and depreciation. When production decreases the fixed cost per unit increases again leading to increase in cost of production. This is yet another reason for increase in the operating expenses and leads to decrease in operating profit.

Financial charges are very high for the units. The units have taken loans from commercial banks, National Dairy Development Board and from financial institutions, and they have to pay interest. These charges will not affect the cost price of the product nor selling price but is affecting the net profit of the company. This is revealed by the cost structure analysis. The financial charges have not affected total cost of production, but profit is affected by financial charges.

All the units are producing high quality product and have got the ISI recognition also. To increase the quality of feed, the manufacturer has to provide facilities for carrying out proximate analysis and for testing amino acid composition, afloxitation level and anti nutritional factor. Quality control laboratory attached to feed industry employ slightly qualified animal nutritional veterinary scientists and technocrats, who should constantly keep on updating their knowledge and experiences. These increase the expenses of

the companies. But due to lack of quality specification, other units are producing low quality products at low price and are capturing the market through low price of their product.

The financial statement analysis reveals that 42 per cent of total investment of the units is in fixed assets and 58 per cent in current assets. Of the current assets, inventory comprises 32 per cent. In the case of co-operative sector 44 per cent is in sundry debtors, while the private sector invests only 9 per cent in sundry debtors. The loans and advances given to the employees are 31% for the private sector and 15% for the co-operative sector. For the industry as a whole, 44% of current asset is in inventory. This shows that raw material is a problem for the units whether in the co-operative sector or in the private sector.

Out of the investment in fixed assets, plant and machinery is an important item. 46% of fixed assets comes under this head. Next is in land and building (33%). In the co-operative sector, investment in land is not significant as the land is given on lease. In general, long-term investment is financed by long term loan. The fixed assets of the units on an average is 3.03 times of net working capital.

Ratio Analysis is done to evaluate efficiency, liquidity, profitability and solvency positions of the units. Current and Liquidity ratio is low in the co-operative sector when compared with the private sector. This shows that

there is shortage of short-term fund and liquid asset in the case of the co-operative sector. The efficiency ratios used are working capital ratio, stock turnover ratio, debtor's turnover ratio and fixed assets turnover ratio. These working capital turnover ratio indicate that the efficiency with which working capital is utilized in generating sales is higher in the case of the co-operative sector, and in the private sector the working capital is not justified by sales.

Inventory Turnover Ratio shows a fluctuating trend. This ratio is above 11 times in the case of most of the units. The industry average is 11.88, which indicates that the inventory management in the companies is efficient.

Debtors Turnover Ratio is lower in the case of the co-operative sector, which indicates slackness of collection effort and inefficient debt management. The ratio is very high in the case of the private sector, which reveals that the credit sales are less in the private sector. This influences sales of the product.

Fixed Assets Turnover Ratio which reveals high investment in fixed assets are justified by the turnover in the case of the co-operative sector. Where as it is not satisfactory for all the units in the case of the private sector. The overall ratio is 8.19.

Efficiency Ratio reveal that the units are efficiently utilizing the amount invested in total assets for generating sales.

Return on Investment Ratio reveals that though the investment in capital is justified by the sales turnover, it is not justified by the profit. Though there is adequate amount of sales turnover, the profit obtained is not adequate. This leads to the conclusion that cost of production and financial charges which come under non-operating expenses, are high for the companies. It reveals the inefficiency of the units to control the expenses incurred.

Working capital Vs Profitability Analysis leads to the conclusion that the degree of association of working capital and profitability is positive, which means that the influence of working capital on their profitability is favourable. But the degree of influence is very low and insignificant and it confirms inefficiency of their working capital management as a whole. The units are efficient in having a good turnover but not having a good profit which shows that the raw material cost, labour cost, overhead cost and financial charges are high.

Summary Ratio Analysis shows that for current ratio, company D has a better position. Comapanies B and C have a fair position and C alone has a satisfactory position. The private sector has a more advantageous position than the co-operative sector. For Working Capital Turnover Ratio, company C has a good position which shows the efficient utilization of working capital. Companies A and E have fair positions. But companies B and D are not able to utilize their investment in working capital. In the case of Fixed Asset

Turnover Ratio, companies A, B and C are in good position whereas D and E are only satisfactory which again shows the inefficiency of company D in generating sales. For the Net Profit Ratio companies A and B have good positions whereas companies C and E are not fair. In the case of Return on Investment, companies A and B are good whereas all others, C, D, and E are not fair. For Debt to Net Worth Ratio, except company B, all others are not in a good position. When the units are divided into different zones companies A and B are in the 'X' zone, companies C,D and E are in the 'Y' zone. The conclusion is that no company is included in the 'Z' zone. All the companies have performed quite well though none of them showed excellence.

From the Cost Structure Analysis, it is seen that during the year 1996 material cost is correlated with total cost, 98.16 per cent of variance of total cost accounted for material cost. In 1997, the material cost is accounted for 95.95 per cent of total cost. In 1998, the material cost accounted for 96.99 per cent of variance of the total cost. In the year 1999, also only material cost is variable to the extent of 90.44% to the total cost. In the year 2000, the total cost is correlated with labour cost and material cost.

In the case of small concerns also, correlation study shows that there exists a high correlation between total cost and raw material cost. 97 per cent of variation in total cost is due to change in raw material cost.

In the case of small concerns also, only a small proportion of the installed capacity is utilized. The main reason is lack of working capital. When Debt-Equity Ratio is found for small concerns, it varies from .01 to 8.00, which shows no uniformity in the Debt-Equity Ratio.

From the analysis of financial statement and cost structure the sub-hypotheses HO_{Ia}, HO_{Ib}, HO_{Ic} and HO_{Id} are rejected inferring that the material cost, labour cost, depreciation, staff and welfare, administration, selling and distribution and financial charges are influencing profit and increasing total cost. This leads to the acceptance of the main hypothesis HO_I that the low productivity of cattle feed units in organised sector in Kerala is due to high cost of production and financial charges.

The above findings lead to the conclusion that there is a chain effect, that is, high raw material cost leads to high selling price leading to less profit which leads to a decrease in production which in turn leads to high operation cost resulting in an increase in cost of production that leads to low production.

High material cost → High price → Low production →Increases fixed cost→Increases Cost of production.

II Prospects of the industry in Kerala

Management of livestock under the backyard system is facing new challenges, because of the replacement of seasonal crops by food crops. 32

lakh of households out of 55 lakh are engaged in cattle rearing in Kerala. This gives job opportunity for a number of persons. The number of workers depending on livestock has increased from 8.65 lakh in 1961 to 10.23 lakh in 1991.

Milk is the only product which could maintain its growth. Average milk yield per day in Kerala is 6 litres. This should be increased to 8-10 litres. Percentage of barren and uncultivated land has been decreasing from 1 per cent to 0.73 per cent. The decrease of pastureland is by 17.3 per cent. This has decreased the availability of green fodder.

Cattle rearing is integrated with rice farming. Cultivation of rice has come down by 50 per cent, which has led to a drastic reduction in the supply of straw. We are depending on the neighbuoring States for straw supply.

67% of breedable animals in Kerala are crossbreed with high potential, which have to be fed heavily on nutritious feed. The cost of production of milk is increasing. Farmers are reluctant to maintain high yielding crossbreed cows.

The survey among the dairy farmers throws light on the following points:

The percentage of cross breed animals among the sample is 96 and among this 74 per cent are in-milk animals.

The green fodder given to animals is on an average of 11.36 kg per day per cow. Consumption of dry fodder is 5.11 kg per day per cow. As the cost of dry fodder, mainly straw, is high, consumption of dry fodder depends on the availability of green fodder. 64 per cent of sample agreed that the high cost of dry fodder is due to the reduction in the paddy cultivation within the State.

Dairy farmers also give concentrate along with cattle feed. This is on the belief that cattle feed alone is not a complete food. A few also think that cattle feed alone will result in the deterioration of the health of animals in future.

16 per cent of households give only cattle feed to their animals. 21 per cent of cattle under survey are not given compound cattle feed. They make their own compound feed mixture.

8 per cent of population use cattle feed of other States. The commercial footings of manufacturers of other States are decreasing. Proof of this is that earlier 12% of households were using feeds from other States; it has come down to 8% at present, as per the survey.

Comparative study of consumption of green fodder and cattle feed shows that the increase or decrease in the availability of green fodder does not change the quantity of consumption of cattle feed. Even in the rainy season when green fodder is available in plenty, the in-milk animals are given cattle feed in the same quantity. 80% of the farmers strongly believe that cattle feed

increases productivity of cattle. Thus the sub-hypothesis HO_{IIb} that the consumption of cattle feed does not depend on availability of green fodder is accepted.

Consumption of concentrate also does not affect the consumption of cattle feed. The concentrates are given to supplement the cattle feed. The commonly used concentrates are coconut cake, groundnut cake, bran, tamarind seed, sometimes raw cooked rice. Thus, the sub-hypothesis HO_{IIc} that the consumption of cattle feed does not depend on the consumption of concentrate is accepted.

There is no difference in the consumption of cattle feed in urban and rural areas leads to the acceptance hypothesis HO_{IId}.

The priority given by the farmers to different aspects of cattle feed are (1) Milk yield; 93% of farmers give first preference to this. (2) Health of the animal: 83% of farmers give second preference to this. (3) Feed acceptability to animal; 80% of the sample give the 3rd priority to this factor. (4) Availability; 75% of the sample studied give the fourth place. (5) Price; 69% of farmers give importance to this factor.

The same is the effect when the performance of an ideal brand is studied. The index points of 80% is obtained by milk yield. Health of the animal scored 64% and price is given 50%.

This leads to the rejection of the sub-hypothesis HO_{IIa} that the demand for cattle feed is not depending on the milk yield, health of the animal and price. The conclusion is that the demand for cattle feed is not depending on the availability of green fodder, concentrate and geographical area but depends on quality and price which means the main hypothesis HO_{II} is accepted

The brands that are commonly used in the sample survey are Kerala Solvent (KS), Milma, Sunandhini, Prima Feeds and Kerala Feeds. Among the brands used KS was the market leader. But their relative importance is getting reduced, where as Milma and Kerala Feeds are gaining importance in the market. 75 per cent agree that there are sufficient brands available in Kerala, whereas 6% disagree.

33 per cent of farmers strongly agree that pellet feeds are superior to smash. They believe that it can reduce wastage, and easy handling without weight loss is an advantage. 16 percent strongly disagree with this view. 28 percent strongly affirm that cattle feeds produced within the State are superior to feeds from other States.

81 per cent of farmers agree that there is no shortage of cattle feed in Kerala as feeds from other States are readily available. Nearly 44 per cent of farmers are not aware of the ingredients of cattle feed.

72 per cent of the sample population agree that the price of cattle feed cannot be met from the price of milk. They are of the view that price of cattle

feed is not high but that of milk is low. As the cattle feed is the main input for the farmers, the high cost of cattle feed will reduce profitability of farmers.

91% of households are of the view that the government has to do something for the uplift of dairy farmers. Either the price of milk has to be increased or price of cattle feed has to be reduced.

82% are of the belief that using the raw materials available within the State can reduce the cost of production of cattle feed. Now as a result of purchase of raw materials from other States cost of production is high.

As per the demand projected it is seen that the quantity of cattle feed required as per the nutritional aspect and number of cattle is 6929.80 tons per day. The daily production of cattle feed by the units in Kerala is 2640 tons per day as per the installed capacity. Even if a margin is left for feeds coming from other States, there is a production gap of around 4000 tons per day. This means that a portion of cattle in Kerala is underfed.

Production gap is also determined by taking the actual consumption and actual production. As per the survey the cattle feed consumed per day on an average for in-milk animal comes to 3.16 kg and dry animal 2.97 kg. Thus the total requirement per day is 5040 tons. The actual production of cattle feed taking into account the utilized capacity comes to only 963.00 tons per day. Thus there is a production gap of 4077 tons per day. According to the survey 8 per cent of the household use feed from other States, 8 per cent of 5040 comes

to 403 tons. Even after deducting this there is a gap of 3674 tons per day. This shows the potential for cattle feed industry in Kerala.

Cattle feed consumption of the State before the Operation Flood according to the study done by P.S.Geroge and Nair in 1988 was that about 70% of cows were fed by compound cattle feed at an average rate of 1.02kgs per day[1]. But as per the survey conducted by the researcher about 79% of cows were fed on cattle feed, an average of 3.12 kgs. It shows that the per day consumption has increased by 2.095 kgs. The composition of cattle population also has changed. Instead of indigenous cattle the percentage of cross breed cattle has increased. As per the survey 96% of cattle population are cross breed animals. These crossbreed animals have to be fed heavily on cattle feed to increase their productivity.

From the survey it is seen that at present only 8.5% of farmers are not using cattle feed whereas in the past 16% were not using cattle feed. This reveals that the farmers who were not using cattle feed have been attracted towards giving cattle feed to their animals to increase the productivity.

As a result of Operation Flood programme many co-operative societies have been started in Kerala under Kerala Co-operative Milk Marketing Federation (KCMMF) to serve dairy farmers. These societies increase milk marketing capacity of the farmers. Now-a-days farmers find no difficulty in

[1] P.S.George and K.N.Nair (1988), "Livestock Economy of Kerala", p.88.

selling their products. These societies not only help the farmers to market their products but also supply them with cattle feed at a subsidized rate and on credit by adjusting the cost of cattle feed from the sale of milk. Apart from these, they are supplying cattle feed to calves as per the different programmes of the government. This helps both the dairy farmer and the cattle feed producers specially under the co-operative sector.

51% of farmers are members of societies. Societies include both private sector and co-operative sector societies. Co-operative sector includes both traditional societies and Milma societies. 40% in rural area are members of co-operative sector and 8% are members of private sector. In urban area, 1% are members of Milma, and 2% of the private sector. In the private sector also the societies supply cattle feed through the societies and give credit facilities to farmers.

The study leads to the conclusions that if the problems of cattle feed units are solved, there is a bright future for the cattle feed industry in Kerala. This will lead to the solution of many other problems faced by Kerala government specially the unemployment problem. The reduced price of cattle feed will increase profitability of dairy farming which will attract unemployed youth, specially women. Not only that, dairy farming can be started as an industry in place of the conventional backyard system. The following recommendations are put forward on the basis of the study.

Recommendations and Suggestions

1. Raw material cost of industry has to be reduced. This can be done in two ways. (a) Finding out possible raw materials available within the State by conducting researches and making use of them. Research should bring out new raw material available in Kerala .Some of these raw materials are already used by the cattle feed units in Kerala. But the contradiction is that for the raw materials available in plenty in Kerala, units are depending on other States. For example for mango kernels, rice bran etc. units depend on Tamil Nadu. It is seen that rubber seed, which is available in Kerala, is not used on a large-scale. If proper channelisation of researches is done, cost of production can be reduced. (b) As the units are depending on other States for raw materials they have to pay more tax on raw material, purchased from other States. They have to pay Central sales tax as well as State sales tax. This makes the difference between the costs of production within the State and outside the State.

2. Solvent extraction plants are to be started in Kerala. Rice bran, which is abundantly available in Kerala, cannot be used, due to its oil content. This can be removed by solvent extraction plants. Similar is the case of coconut and other materials. The units that are having solvent extraction plant find it profitable to use their extracted cakes for their cattle feed plant.

3. Subsidiary units like rubber seed extraction units and mango kernels extraction units, tapioca units, cashew nut meal which is a famous feed must be started, to make use of available raw materials in Kerala.

4. Quality standards must be fixed by the government of Kerala as done by the Karnataka government so that the sale of low quality feed can be checked. While fixing the quality, the feed for low yielding variety and feed for high yielding variety should be separately considered.

5. Demand for cattle feed increase if farmers use cattle feed as per the nutritional requirement of cattle. The farmers have to be made aware of this by giving the awareness classes. If the cost of cattle feed is reduced farmers will be encourage to use of it. If so, the dairy farmers can sell their product at reduced price, which will check the flow of milk from other States even without government regulation.

6. Marketing capacity of dairy farmers can be increased if there is demand for their products specially milk. The milk produced by them should be absorbed by the State. Panchayat can be entrusted with the work of finding out ways and means of increasing demand for milk They can make use of institutions in their panchayats, for example the school children can be given milk and egg instead of rice. This will meet the nutritional need of children. The same can be adopted in hospitals, where milk and egg can be supplied at reduced rates. All this will lead

to an increase in the per day consumption of milk, which will indirectly increase the demand for cattle feed.

Proper planning on the part of policy makers to reduce the price of cattle feed will not only save the cattle feed units, but will also give employment opportunities to thousands of unemployed youth in the State by saving the dairy industry and also the agricultural sector.

These recommendations are made to improve the present position of cattle feed industry in Kerala. It is hoped that these recommendations will be useful for planners and those associated with cattle feed industry. If properly implemented it will go a long way in improving the industry and the farmers.

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Appendices

APPENDIX - i

SCHEDULE FOR INTERVIEWING THE PRODUCERS
(CONFIDENTIAL FOR ACADEMIC PURPOSE ONLY)

1. GENERAL INFORMATION

1	Name of the organization	:	
2	Date of incorporation	:	
3	Locality: Town	:	District.
4	Form of organization	1.	Company
		2.	Partnership
		3.	Sole trader
5	The products produced by the company/unit	1.	
		2.	
		3.	
		4.	
		5.	
6	Reasons for starting the company/unit	1.	Competition in the field attracted you
		2.	
		3.	To meet the need of locality
		4.	To make use of locally available raw material profitably
			Any others
7	The policies of the company are framed by the	1.	Board of Directors
		2.	Board of Directors and Heads of
		3.	Dept.
		4.	Government
			Any other
8	Is there any internal audit system	:	Yes/no
9	If yes briefly explain the system	:	
10	Please supply the organization chart of the company		

11. FINANCIAL IN FORMATIONS

Fixed Assets	Years					
1. Land	1	2	3	4	5	6
2. Plant						
3. Builders						
4. Others.						
Working Capital						
1. Raw Material Stock						
2. Debtors						
3. Finished good						

stock

4. Cash in hand /Bank
5. Others

2.	The source of Finance	1.	Owned capital
		2.	Borrowed capital
3.	If borrowed from which sources	1.	Bank
		2.	Government
		3.	Others.
4.	The amount of initial borrowing	:	
5.	Is there any subsequent borrowing	:	
6.	What is the rate of interest	:	
7.	Is any security offered If yes give details	:	Yes/no
8.	Give the period and condition of Repayment	:	
9.	Did you repay the loan as per schedule	:	Yes/no
10.	If no give reasons	:	
11.	Are you satisfied with the present financial health	:	Yes/no
12.	If no give reasons	:	
13.	Please give the cost details of your products		

Items	Product	Year 1	2	3	4
Material	1				
	2				
	3				
	4				
	5				
Labour	1				
	2				
	3				
	4				
	5				
Factory overhead	1				
	2				
	3				
	4				
	5				
Cost of production	1				
	2				

	3
	4
	5
Administration Cost	1
	2
	3
	4
	5

Items	Product	1	2	year	3	4
Selling cost	1					
	2					
	3					
	4					
	5					
Total cost	1					
	2					
	3					
	4					
	5					
Gross profit	1					
	2					
	3					
	4					
	5					
Net profit/	1					
percentage of Np	2					
on total	3					
investment	4					
	5					

14. Please supply the annual reports of the company for the past 5 years.

RAW MATERIAL

1. The different types of raw material	1
used by the company/units	2
	3
	4
	5

2. The annual requirement during the period Material / year 1 2 3 4 5

1
2
3
4
5

3.	Mode of purchase	1.	Agents
		2.	Direct purchases
		3.	Prepared by you
4.	The terms of purchase	1.	Cash
	If credit, the period allowed	2.	Credit
5.	Whether you get the raw material without delay	:	Yes/no
	If no give reasons		
6.	Is raw material available in sufficient quantity/quantity within the State	:	Yes/no
7.	What is your opinion about raw material price	:	High law Medium
8.	If high what are the probable reasons	:	

CAPACITY

1.	The capacity of the company	1.	Licensed
		2.	Installed
		3.	Utilized
	Reasons for under utilization if any	1.	Lack of raw material
		2.	Lack of finance
		3	Lack of skilled labour
		4.	Lack of demand
		5.	Lack of power
		6.	Any others

PRODUCTION

1.	Does the company prepare any production Budget	:	Yes/no
2.	If yes, how is it prepared	1.	Based on past budget
		2.	Based on forecast alone
		3.	Based on forecast and past budget
3.	If no give reasons	:	
4.	Had the company faced stoppage of production	:	Yes/no
5	If yes, give reasons	1.	Strike and lack out
		2.	Lack of Raw Material
		3.	Lack of demand
		4.	Lack of power
		5.	Lack of finance
		6.	Others

MARKETING

1. Products marketed and their sales coverage in percentage.

Products	District	State	Outside State
1			
2			
3			
4			

2	Please give information relating to the sales turn over	: a) b) c)	Below 5,00.000 5,00.000 – 10,00.000 10,00.000 and above				
3	Product price for the past Five years	Product 1 2 3	Price/unit year 1	2	3	4	5
4	Is there any price valuation in the product	:	Yes/No				
5	If yes give reasons	1. 2. 3. 4. 5.	Increase in material cost Increase in labour cost Increase in overhead cost Increase in sales tax Any other				
6	The mode of price determination of the product	1. 2. 3. 4.	Total cost Marginal cost Average cost Any other				
7	Please give the computational procedure	:					
8	Do you sell the product under any brand name	:	Yes/No				
9	If yes give the brand name	:					
10	Do you think the brand name help you	:	Yes/No				
11.	If yes in what ways	:					
12.	Please give the merits & demerits of the brand Name	:					
13.	Through whom do you sell your product	1. 2. 3.	Whole sale Retailer Direct to consumers				
14.	If you sell through whole/retailer what are the facilities provided by you	:					
15.	Mode of sales	:	1. Cash			2. credit	
16.	If credit, the period allowed	:					
17.	Do you face the problem o	: 1. 2. 3.	Lack of demand Over demand Other problem				

25

18.	If so give reasons	:		
19.	Do you have competitors in the market	:	Yes/No	
20.	If yes	: 1.	Inside the State	
		2.	Outside the State	
		3.	Small firms	
21.	Which method do you adopt for sales promotion	: 1.	Advertisements	
		2.	Poster and sliders	
		3.	Personal contacts	
		4.	Gifts	
		5.	Any other	
22.	Please Rank your marketing problem	1.	Competition	
		2.	Lack of demand	
		3.	Package not attractive	
		4.	Distribution problem	
		5.	Govt. policies	
		6.	Any other	
23.	Does the company make any market Research on Development	:	Yes/No	
24.	If yes	(a) amount spent	(b) achievement	(c) future prospe cts

PERSONAL

1.	What is the strength of employees in your company/unit		1. Skilled (2) semiskilled (3) unskilled
2.	Mode of Recruitment	:	a. External source 1. Conducting test (2) conducting interviews (3) Both b. Internal source 1.Relatives of employees/ partners 2. Candidates of near by locality
3.	Do you pay the workers on time basis / piece basis	:	
4.	Do you have any incentive system for workers	:	
5.	What are the working hours of the factory	:	
6.	Are the workers satisfied with their wages	:	
7.	How do you propose to solve the labour problems in your organization	:	

8. What is your attitude towards labour :
9. Do you get sufficient electric power :
10. Do you think that electricity charges are reasonable :

GOVERNMENT POLICIES

1. State the help obtained from the government:

1. Subsidy for starting industry yes/no :
   If yes give the mode of subsidy :
2. Loan given by government yes/no :
   If yes, Amount of loan :
3. Seed capital :
4. Electricity subsidy yes/no :
   If yes mode of subsidy :
5. Sales tax exemption yes/no :
   If yes the period :
6. Marketing help :
7. Ant others :

2. Do you expect full sales tax exemption for the product : Yes/ No
3. Do you expect any reduction in the rate Yes/No
   If yes give details:
4. Do you think that the govt. can help in making your product: Yes/No
5. What suggestion can you offer for the improvement of the present situation from the side of the government.

General suggestions for the growth of the industry.

APPENDIX - ii

SCHEDULE FOR INTERVIEWING THE DAIRY FARMERS

(Confidential, for Academic Purpose only)

1. Name (Individual / Organisation :
2. Main occupation :
3. Income from sources other than dairying:

   a. Salary ☐ b) Agriculture ☐ c) Wages ☐ d) Business e) Others ☐
4. Number of cows in the stable or farm:

   a) < 5 ☐ b) 5-25 ☐ c) 25-50 d) >50 ☐
5. The breed of cow:

   a) Sindhi ☐ b) Jerssy ☐ c) Swiss Brown ☐ d) Others ☐
6. What are the regularly used feed ingredient per day?

Name	Kg.	Value
a. Green fodder		
b. Dry fodder		
c. Compound cattle feed		
d. Oil cake		
e. Others		

7. Sources of input

   a) From agents ☐ b) From retail shop ☐

   c) From your own field ☐ d) Others (specify) ☐
8. How you sell your milk and milk products

   a) to the agents ☐ b) to the co-operative society ☐

   c) Individual ☐ d) Others ☐

9. Are you a member of any co-operative society? Yes / No

10. If Yes, what are the facilities provided by the society?

a) Supply of cattle feed ☐ b) Veterinary services ☐

c) Fodder seeds ☐ d) Others ☐

11. Which brand of cattle feed you are commonly using?

12. Which are the other brands of cattle feed you have used earlier?

1 2 3 4 5

13. Are you in the habit of cultivating fodder grass? Yes / No

14. What are the different kinds of seeds provided by the society?

a) b) c) d) e)

15. You are able to cultivate these seeds successfully

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

16. These seeds are cultivated as an intercrop.

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

17. These seeds are provided in appropriate time

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

18. The seeds are of good quality so that the yield is sufficient for you

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

19. The price of the seeds are reasonable

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

20. Do you feel fodder is an important ingrident in cattle feed

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

21. Decrease in paddy cultivation led to the increase in price of dry fodder

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

22. Shortage of green fodder and dry fodder led to the increase in usage of compound cattle feed

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

23. Due to white revolution or operation flood, the demand for compound feed has been increasing

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

24. Usage of compound cattle feed increase the yield of milk from animals

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

25. Sufficient number of brands are available in your locality, so that you can exercise brand choice

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

26. What are the factors that influence your brand choice, rank them in order.

1. Price ( ) 2. Milk yield ( ) 3. Health of animal ( )

4. Feed acceptability to cattle ( ) 5. Compensation package in case of quality complaints ( ) 6. Availability ( ) 7. Quality of gunny bags ( ) 8. Compliments or discounts attached to it ( ) 9. Size of the package ( ) 10. Credit period allowed ( ) 11. Mode of delivery ( )

27. The price of feed supplied by the manufacturer is always affordable to you.

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

28. The mode of payment for the feed is acceptable and convenient to you

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

29. There is no shortage or lack of availability of your choice

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

30. The demand for compound cattle feed is depending on seasons

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

31. The size of bag is convenient for you.

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

32. The appropriate size of the bag is

a) ☐ <10KG b) ☐ 10 to 25Kg c) ☐25 to 50Kg d) ☐ 50 to 100Kg

e) ☐ Above 100Kg.

33. The pallet feed is more appreciable than smash

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

34. The feed produced within the State is superior in quality than feed from other State.

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

35. The price of local feeds are higher than the feeds from other State

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

36. What are the factors that you consider while determining the quality of a feed, rank them in order

a) ☐ Milk yield b) ☐ Health of animal c) ☐ feed acceptability to cattle

d) ☐ Price

37. Govt. intervention to reduce the price of feeds is a must

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

38. The cost of feed is the key factor in farm management

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

39. You are aware of the ingredients of compound cattle feed so that it can be used without fear.

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

40. The u se of local agricultural products as ingredient can reduce the cost of production to large extent.

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

41. The usage of compound cattle feed is inevitable for the farm management

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

42. Using your own formula to mix the different ingredient gives you better yield.

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

43. Demand for dairy and dairy products and cattle will increase in the near future

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

44. The government can/have to do a lot in the upliftment of dairy farmer Which will lead to the growth of dairy and dairy products.

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

45. For a State like Kerala dairy farming can be brought up as an industry.

a) ☐ Strongly agree b) ☐ Agree c) ☐ No opinion

d) ☐ Disagree e) ☐ Strongly Disagree

46. What suggestions can you give for the development of cattle feed units in Kerala?