"AN ECONOMIC APPRAISAL OF DAIRY INDUSTRY IN JALGAON DISTRICT OF MAHARASHTRA"

A thesis submitted to the

Mahatma Phule Krishi Vidyapeeth, Rahuri- 413 722

Dist. Ahmednagar, Maharashtra State, India

By

Mr. BIDE AMOL YUVRAJ

(Reg. No. 015/215)

in partial fulfilment of the requirements for the degree

of

MASTER OF SCIENCE (Agriculture)

In

AGRICULTURAL ECONOMICS

DEPARTMENT OF AGRICULTURAL ECONOMICS

POST GRADUATE INSTITUTE

MAHATMA PHULE KRISHI VIDYAPEETH

RAHURI- MAHARASHTRA (INDIA)

2017

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Approved by

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RAHURI - MAHARASHTRA (INDIA)
2017

CANDIDATE'S DECLARATION

I hereby declare that this thesis or part there of has not been submitted by me or any other person to any other University or Institute for Degree or Diploma

Place : Rahuri

Dated : / / 2017 **(BIDE A.Y.)**

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C E R T I F I C A T E

This is to certify that the thesis entitled, **" AN ECONOMIC APPRAISAL OF DAIRY INDUSTRY IN JALGAON DISTRICT OF MAHARASHTRA"** submitted to the Faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra State, India in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE (AGRICULTURE)** in **AGRICULTURAL ECONOMICS**, embodies the results of a piece of *bona fide* research work carried out by **Mr. BIDE AMOL YUVRAJ** under my guidance and supervision and that no part of this thesis has been submitted for any other degree or diploma.

The assistance and help received during the course of this investigation and sources of reference have been duly acknowledged.

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Date : / /2017 Associate Dean(PGI)

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Place: Rahuri

Date : / /2016

(BIDE A. Y.)

ABSTRACT

"AN ECONOMIC APPRAISAL OF DAIRY INDUSTRY IN JALGAON DISTRICT OF MAHARASHTRA"

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of
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Research Guide	:	Dr. A. V. Gavali
Discipline	:	Agricultural Economics

ABSTRACT

The present study was undertaken to study the an economic appraisal of dairy industry in Jalgaon district of Maharashtra with the objectives, To evaluate the performance of selected private, co-operative and individual dairy units in Jalgaon district of Maharashtra, to estimate costs and returns of selected dairy unit, to study the problems of dairy industries and suggest measures to overcome.

The study was based on primary data as well as secondary data. For co-operative and private dairy unit data was collected from annual report for the year 2015-16. The data for individual dairy units were collected by with the help of special design schedules. The information on aspects like *viz.,* capital investment, working cost on collection, processing and distribution of milk and milk products, cost on manufacturing of milk and milk products, returns from dairy units for increase in milk production and problem faced by dairy units for the year 2015-16 of selected dairy units.

Abstract contd.... **BIDE A. Y.**

Total bovine population of the Jalgaon and Maharashtra decreased from 1086 to 809 thousand and 24624 to 21078 thousand, respectively during the period from 1997 to 2012. Total capital raised by JZSDUS was ₹ 9024.21 lakhs. The maximum share of capital was authorized capital (22.16 per cent). The annual milk procurement and milk sale of Yashoda dairy increased by 2.99 and 3.74 per cent during the period from 2011-12 to 2015-16.

Total quantity of milk procured by JZSDUS was 855 lakh litres per annum with an average daily procurement of 2.34 lakh litres. Total quantity of milk procured by Yashoda dairy was 409.04 lakh litres per annum with an average daily procurement of 1.12 lakh litres. The price paid to the milk producers by dairy units varied across the different seasons. The average price paid to the producers by JZSDUS and Yashoda dairy was ₹ 27.60 and ₹ 28.10, respectively and total quantity of milk purchased was 855 and 409.04 lakh litres respectively. Total procurement cost of milk worked out to ₹ 1535.68 and ₹ 674.91 lakhs during the year 2015-16 for JZSDUS and Yashoda dairy, respectively. The total processing cost of milk of JZSDUS and Yashoda dairy was worked out to ₹ 1927.89 and ₹ 867.16 lakhs, respectively. The total distribution cost of milk of JJSDUS and Yashoda dairy was ₹ 1396.31 and ₹ 634 lakhs, respectively. The total management cost of milk of JZSDUS and Yashoda dairy was worked out to 1638.52 and 703.55 lakhs, during the year 2015-16.

The average per kg manufacturing costs of milk products of JZSDUS such as milk powder, SMP, butter and ghee came to ₹ 140.93, ₹ 90.47, ₹ 251.93 and ₹ 257.40, respectively. The average per kg manufacturing costs of milk products of Yashoda dairy such as ghee, SMP, cheese and gulab jamon came to ₹ 259.84, ₹ 96.94, ₹ 219.92 and ₹ 72.94, respectively.

The total marketing cost of milk products of JZSDUS and Yashoda dairy was ₹ 52.05 lakhs and 153.57 lakh, respectively. The total management cost of milk products of JZSDUS and Yashoda dairy was ₹ 81.36 and ₹ 50.00 lakhs. The total cost of JZSDUS and Yashoda dairy amounted to ₹ 36110.48 lakhs and ₹ 19410.40 per annum. The B:C ratio of JZSDUS and Yashoda dairy worked out to 1:10 and 1.14, respectively.

The estimated break-even quantity of processed milk of JZSDUS was 796.40 lakh litre and actual quantity of milk was 851.88 lakh litres. It is clearly indicate that, actual quantity should be increased up to 796.40 lakh litres per year in order to cover the cost of production. The estimated break-even quantity of processed milk of Yashoda dairy was 313.55 lakh litre and actual quantity of milk was 407.61 lakh litres. It is clearly indicate that, actual quantity should be increased up to 313.55 lakh litres per year in order to cover the cost of production.

The total land holding of cow herd and buffalo herd were 3.20 ha and 5.20 ha, respectively. The cropping intensity of cow herd and buffalo herd was 200 per cent.

Abstract contd.... **BIDE A. Y.**

Total livestock population of cow herd and buffalo herd was 54 and 96 respectively.

The total value of assets inclusive of land was ₹ 194.25 and ₹ 548.82 lakhs of cow herd and buffalo herd respectively. The share of land value in total value of assets was 64.16 and 69.14 per cent in cow herd and buffalo herd, respectively. Total cost of milk production of cow herd was ₹ 76.63 lakhs. The estimated per animal per annum cost of cow herd was ₹ 14246 and per litre cost was ₹ 27.67. Total cost of milk production of buffalo herd was ₹ 96.93 lakhs. The estimated per animal per annum cost of buffalo herd was ₹10096 and per litre cost was ₹ 38.06. The estimated B:C ratio was 1:15 for cow herd and 1:09 for buffalo herd. The share of milk activity in annual income of individual dairy unit was 98.36 percent in cow herd and 99.51 per cent in buffalo herd. Adulteration in raw milk and high transport cost was the problems faced by dairy units.

It is advisable to dairy units increase procurement cost to attract milk producers, try to avoid losses during handling, increase the manufacturing of milk products to catch the demand. Training programme for dairy management should arranged.

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List of Abbreviation

%	:	Per cent
/	:	Per
et al.	:	Et alia
etc.	:	Etcetera
Fig.	:	Figure
Ha	:	Hectare
i.e.	:	That is
Kg	:	Kilogram
No	:	Number
Qtl	:	Quintal
Qty	:	Quantity
Viz.	:	Namely
Mt	:	Metric ton
CGR	:	Compound Growth Rate
B:C	:	Benefit Cost
Agril.	:	Agricultural
JZSDUS	:	Jalgaon Zilha Sahakari Dudh Utpadak Sangh
MH	:	Maharshtra
JLN	:	Jalgaon
IND	:	India
Sr. No.	:	Serial number
SNF	:	Solid Not Fat
TS	:	Total Solid
₹	:	Rupees

1.INTRODUCTION

1.1 General

India is predominantly an agrarian economy about 58 per cent of its population is engaged in agriculture and allied activities (Anonymous, 2011) and it contributes 17.4 per cent to the country's gross value added. The allied activities includes subsidiary occupation like dairy animal rearing, poultry keeping, goat and sheep rearing, vermicomposting, sericulture, bee keeping, etc. It provides a continuous income and employment to landless agricultural labors, farmers and unemployed youth. Livestock is an integral part of agricultural production system in India and plays an important role in national economy as well as in socio-economic development of rural households. The role of livestock sub-sector is crucial in respect of nutrition, employment and income in the economy of rural people of the country.

1.2 Importance of milk and milk products in human diet

Although milk from the cow is processed, it is not an engineered or fabricated food. It is about 87 per cent water and 13 per cent solids. The fat portion of the milk contains fat soluble vitamins. The solids other than fat include proteins, carbohydrates, water soluble vitamins and minerals. These nutrients in milk help to make it nature most nearly perfect food.

Milk products contain high quality proteins. The whey proteins constitute about 18 per cent of protein content of milk. Casein, a protein found only in milk, contains all of the essential

amino acids. It accounts 82 per cent of total proteins in milk and is use as standard for evaluating protein of other foods. Protein is needed to build and repair body tissue and to form an antibody which circulates in the blood and help to fight an infection.

Milk also contains nutrients like calcium, phosphorus, magnesium and potassium. The calcium found in milk is readily absorbed by the body. Phosphorus plays a role in calcium absorption and utilization. Phosphorus is needed in the proper ratio to calcium to form bone. Milk provides these two minerals in approximately in the same ratio found in bone. Milk is also significant source of riboflavin (vitamin B2) which helps to promote healthy skin and eyes, as well as vitamins A and D.

Fermented milk products of various types such as Dahi, Lassi, Shrikhand, etc. are highly nutritious and easily digestible because of breakdown of proteins in to peptides and free amino acids as a result of microbial action.

One serving of milk has about 250 mg of calcium. It is difficult to obtain adequate calcium without milk and milk products in the diet. About 73 per cent of calcium available in food supply is provided by milk and milk products.ICMR recommended the 250 gms of milk per capita per day in human diet.

1.3 Present status of dairy industry in India

India has been holding the position of leading milk producing nation in the world for the last several years with sustainable increase in the annual milk production where in the

research developments played a crucial role. The total bovine population of the India reached up to 299.98 million and stands first position in bovine population in the world. The cattle contribution is about 190.90 millions, the buffaloes are 108.70 million. The cattle population in India is decreased from 199.08 million to 190.90 million and buffalo population got increased from 105.34 million to 108.70 million. (Anonymous, 2012)

Demand of milk in the country is expected to reach up to 150 million tones by the end of the year 2016-17 and up to 210 million tonnes by 2021-22. The dairy sector has grown substantially over the years. As a results of prudent policy intervention, India ranks first among the world's milk producing nations, achieving an annual output of 145 million tones (provisional) during the year 2014-15 as compare to 137.68 million tonnes during 2013-14 recording a growth of 5.32 per cent. The anticipated milk production in the country for the year 2015-16 is about 148 billion tonnes. This represents a sustained growth in the availability of milk and milk products for growing population.

Dairying has become an important secondary source of income for millions of rural family and has assume the most important role in providing employment and income generating opportunities particularly for women and marginal farmers. The per capita availability of milk was at a level of 302 gms per day during the year 2015-16, which was more than the world average of 294 gms per day.

Most of the milk in the country is produced by small, marginal farmers and landless labours. About 15.46 million farmers have been brought under the ambit of 162186 village level dairy corporative societies up to march 2014. The co-operative milk unions procured an average of 39.2 million kg of milk per day during the year 2014-15 as compare to 34.2 million kg in the year 2013-14 with a growth rate of 12.5 per cent. The sale of liquid milk by co-operative sector has reached 29.9 million tonnes registering a growth of 6.8 per cent over the previous year. (Anonymous, 2017)

The performance of Indian dairy sector over the last three decades has been extremely impressive. This can be attributed to successful implementation of the "Operation Flood" programme and other dairy development programmes implemented by state and central governments. Before operation flood came into being, India was a net importer of dairy products, mainly milk powder.

1.4 Dairy development in India

Since independence, the government of India have planned number of dairy development programmes *viz.*, Cattle Breeding Programme with Foreign Collaboration, Progeny Testing Scheme, Fodder Development Projects, Operation Flood Programme I, II and III, etc., beside the government has establish Central Cattle Breeding Farms, Animal Health Centers and Artificial Insemination Centers for producing better cattle breeds. However, due to poor allocation of funds to plans, dairying has not improved to the level of its expectation.

In 1946, Khaira District Co-operative Milk Federation of the milk producer was established in Gujrat state. As a problemme of surplus milk during certain month of the year become serious, this federation undertook expansion activity and establish AMUL dairy in the year 1995. There are four types of milk producers co-operative societies adopted by AMUL,

1) Primary milk producers society.
2) District co-operative milk federation or Taluka co-operative union.
3) State level co-operative milk federation.
4) National co-operative dairy board.

Two streams have been observed in co-operative dairies one is clearly known as Anand Pattern and other one is co-operative but not strictly of Anand type.

With this success of Anand Pattern, the institute named "National Dairy Development Board" (NDDB) was established in the year 1965 by Government of India under the chairmanship of Dr. Verghese Kurien, father of " White Revolution in India". The main aim of NDDB is to fulfilling the desire of the then prime minister of India the late Lal Bahadur Shastri to extend the success of the Khaira Co-operative Milk Producers union (AMUL) to the other part of India.

Operation flood launched in the year 1970, was a project of India's NDDB, which was the world's biggest dairy development programme. It transformed India from milk deficient nation into the world's largest milk producer, suppressing USA in the year 1998, about 17 per cent of global output in the year 2010-11. In

30 years it doubled milk available per person and made dairy farming India's largest self-sustainable rural employment generator. It was launched to help farmers direct their own development, placing control of the resources they create in their own hands. All these was achieved not merely by mass production, but by production by the masses. The Anand pattern experiment at AMUL, a single co-operative dairy was the engine behind the success of the programme. This whole concept is known as "White Revolution" in the Indian history.

The efforts of the Department in the dairy sector are concentrated on promotion of dairy activities including nonoperation flood areas with emphasis on building up co-operative infrastructure, revitalization of sick dairy co-operative milk unions and creation of infrastructure in the country for production of quality milk and milk products. The NDDB continues its activities for overall development of sector with collaboration of government through different schemes. Some of the current ongoing schemes for dairy development are, National programme for bovine breeding and dairy development launched in the year 2014, National Dairy Plan Phase-I launched in March, 2013, Dairy Entrepreneurship development launched in September, 2010, National Livestock Mission launched in the year 2014-15,under that Sheep and Goat Development, Central Sheep Breeding Farm these sub-missions are included.

1.5 Dairy development in Maharashtra

The aim of providing clean and fresh milk to the citizens of Mumbai, the Government of Maharashtra established "Aarey

Milk Dairy" at Aarey milk colony, Mumbai in the year 1951. The Government of Maharashtra is separated the Dairy Department in the year 1958 with the view to develop better infrastructure for development of dairy sector in Maharashtra. Under this department the Government established 38 dairy units and 81 milk chilling units in the state. These action leads to proper planned development of dairy sector in Maharashtra.

To link the milk producer in the rural sector with the consumer in the urban sector the government develops different facilities like, milk collection centers, transportation, processing, packaging facilities in the state. For the easy going of collection of milk the government established primary co-operative societies at village level and co-operative milk unions at taluka and district level. This planned progress leads to distribution of excess milk to other cities like Pune, Nagpur, Nashik, etc. in the year 1960.

NDDB and government jointly planned the operation flood programme during period of 1975-85 which is covered in three phases in the country. In Maharashtra, the dairies were developed at Kurla, Kolhapur and Jalgaon which is run under district co-operative union in Ist phase. In IInd phase, this programme is spread over twenty one districts in the state in which chilling plants at Jalgaon, Kolhapur, Pune, Solapur and Akluj are established. In 1987-92, IIIrd phase were in action in which the programme were circulated all over the district of state. In all these three phases total investment in dairy sector of state is about 81 crore.

In the year 1991, the state government took the decision to merge all the government dairy schemes to co-operative dairy sector with a view to strengthening the co-operative dairy sector. The effect of this resolution is to merging the government dairy schemes at Baramati, Kolhapur, Sangamner, Pandharpur to co-operative sector immediately. In the year 1992, central government took the milestone decision to open the dairy sector for the private sector with the view to move out from the dairy sector. This decision largely affects the co-operative dairy sectors in Maharashtra.

The merging of government dairy schemes to the co-operative sector leads to the excessive milk collection at co-operative dairy units. To overcome such problem the government permits the co-operative dairy unit in the state to sale their milk in Mumbai city. This decision probably decreases the importance of Aarey Milk Dairy in Mumbai. The collection and distribution of these dairy reduced in between ten years of decision.

Today, the milk collection and distribution of government dairy units is negligible. The co-operative and private sector leads the market. The private sector from the year 2000, goes far from co-operative sector. The total milk collection in Maharashtra is about 115.89 lakh liter per day in year 2015-16. Nowadays the milk collection of the government, co-operative and private sector is about 2.46, 48.76 and 64.67 lakh liter per day. The distribution of milk for government, co-operative and private sector is about 0.96, 37.47 and 35.72 lakh liter per day. The remaining milk in all sector is used for processing. From the

above figures the future picture of the dairy industry in the Maharashtra will be dominate by private sector.

1.6 Dairy development in Jalgaon district

The Jalgaon district has ranked 7th in the milk production in Maharashtra after the Nasik district. Jalgaon contributes 277.5 thousand tonne which was 3.05 per cent of total milk production in Maharashtra in the year 2013-14. In Jalgaon presently only one co-operative dairy unit in working *viz.,* Jalgaon Zilha Dudh Utpadak Sangh Ltd., Jalgaon which has 935 societies, 85000 members and average milk procurement 70827 litre per day.

The total milk production of Jalgaon district given in Table 1.1

Table 1.1 Total milk production

("000''MT) (2013-14)

Sr. No.	Year	Bovine	Indigenous cattle	Crossbreed cattle	Buffalo
1	2012-13	292.70	72.90	59.10	160.70
2	2013-14	267.50	48.10	61.90	157.50

(Source- Integrated Sample Survey Report.,2013-14.)

The total milk production of Jalgaon district was 292.70 MT in the year 2012-13. Out of this cattle and buffalo milk production was 159 MT and 160.70 MT, respectively. The total milk production of Jalgaon district was 267.50 MT in the year 2013-14. Out of this cattle and buffalo milk production was 110 MT and 157.50 MT, respectively.

1.7 Research topic

There is a very large unfilled demand for milk and milk products in India. The demand for milk is inelastic to all classes of people. In recent years, in response to the increased demand for milk and high milk prices, the traditional approach towards dairying is changing and it is becoming a main occupation in certain pockets of the country.

In India and Maharashtra state, milk production is seasonal. There is lot of milk production during flush season and considerably less during the lean season. Dairy plants have began to face problems in utilizing flush seasons surplus milk in a useful way. Therefore, the Indian dairy industry today needs processing to convert the surplus milk into those products that can be preserved for long periods and extended into lean season.

Thus, the facilities have been created in the co-operative, government and the private dairy units to convert milk into powder during flush season and its reconstitution into milk during lean season in order to maintain the availability of milk throughout the year. Since government has to give priority to the availability of liquid milk, the private sector units are discouraged from manufacturing milk products. However, in areas where no government or co-operative sector units in operation, the private sector is allowed to manufacture milk products. In India, about 40 per cent of the total milk production is

converted into milk products, in which ghee alone accounts 85 per cent. The production of milk powder and infant milk was increased from 0.22 lakh tonnes in the year 1970 to 1.65 lakh tonnes in the year 1990.

There are several problems of dairy industry in procurement, processing and distribution such as perishability of milk, high transport cost, lack of cooling facilities, availability of milk, seasonal fluctuation in milk production, low purchasing power, lack of market intelligence, distant market places, inefficient management.

In the light of the above discussion, it becomes imperative to evaluate the past performance of the dairy industry in Jalgaon district of Maharashtra on one hand and to suggest suitable measures for further development of co-operative and private dairy industry on other hand. To able to accomplish this task, the study *viz.,* "An economic appraisal of dairy industry in Jalgaon district of Maharashtra" was undertaken.

1.8 Objectives

The present study was undertaken with the following specific objective:

1. To evaluate the performance of co-operative, private and individual dairy units in Jalgaon district of Maharashtra.
2. To estimate costs and returns of selected dairy units.
3. To study the problems of dairy industries and suggest measures to overcome

1.9 Scope and utility of study

As the study is centered on the economic appraisal of dairy industry in Jalgaon district of Maharashtra, the findings of study will be useful in understanding strengths and weaknesses of dairy industry in their right perspective. The study will help the dairy industry in determining ways and means for improving their efficiency in performing different activities so as to increase profitability of the business. The data will be useful in planning further efforts of dairy development in Jalgaon district. Findings that would be emerged out of this exercise will be useful to policy makers, executers, and the extension agents associated with development and growth of dairy industry, particularly for the betterment of all types of farmers which are mostly concerned with milch animals.

1.10 Limitation

As far as limitation of study is considered, the study is based on primary and secondary data. The secondary data is collected from published sources. There were certain difficulties in obtaining reliable secondary data on livestock from census reports, 2012 and the private dairy units are not provided any annual report for study only balance sheet is provided by only one private dairy unit. The private dairy units have not provided sufficient previous year data for analysis purpose as well as individual dairy units also not provided sufficient data. The difficulties were encountered in obtaining reliable data on the actual consumption of milk for previous years through different government reports. The study efforts was therefore, constrained

to some extent. In spite of these limitations, the study has facilitated depth understanding of the progress of co-operative, private and individual dairy industry in Jalgaon.

2. REVIEW OF LITERATURE

In any systematic research, the review of literature on relevant aspect under study forms an integral part of the research work. The exercise would help in highlighting the methodology and the result obtained by the different research worker in similar fields and would serve as a guideline for research to be carried out. Thus, it helps in proper understandingof concepts and the methodological and analytical issues related to the problems under study. Many times, it may be true that the previous research work might have been carried out under different set of conditions. Nevertheless, such knowledge is always useful for improving efficiency and effectiveness of all acts relating to the designing of research problem, adopting suitable methodology and interpreting result of research.

The major theme of project investigation was the “An economic appraisal of dairy industry in Jalgaon district of Maharashtra.” This chapter reviews the literature on different methodological issues and empirical research results brought out by the various researchers from similar studies for shake of convenience,the collected reviews have been grouped under the following major sub-heading.

2.1 Economic performance of dairy unit

2.2 Costs and returns structure of dairy unit

2.3 Problems faced by dairy unit

2.1 Economic performance of dairy unit

Singh *et al.* (1989) studied the operational efficiency structure of 50 milk co-operative societies in Uttar Pradesh. Seven independent variables that affect the co-operative efficiency were (i) composition and co-ordination of milk co-operatives, (ii) input services, (iii) communication and trade activities, (iv) attitude of milk co-operatives, (v) bye laws and role of officials, (vi) training and proper planning (vii) motivation. Correlation coefficient for all these seven variables indicated that this variable plays a greater role in bringing the efficiency of milk co-operative.

Baviskar (1990) studied dairy co-operative and rural development in Gujrat. He concluded that, the dairy co-operatives in Sanjaya and AMUL had brought many benefits to the milk producers in the villages. The provided guaranteed market for milk at fixed price, supply cattle feed at reasonable price and provided regular and efficient veterinary and extension services at village itself.

Jagtap (1992) in his investigation on an economical evaluation of dairy co-operative societies from developed and underdeveloped regions in Satara district, he work out efficiencies in dairy societies by estimating the economic ratios *viz.,* (i) Income expenditure ration and (ii) Expenditure income ratio. The two ratios indicated that the societies in the developed region were found to be less efficient than the societies in underdeveloped region. It was also seen that through the working societies was less, their total turnover seemed to be high

because dairy societies did not made payment to milk producers from their own funds but payments were made when the same were received from the government milk schemes and till with limited capital their rate of turnover was very high.

Sanap (1996) studied the economics of Shrirampur milk products of Babhaleshwar Dudh Sangh. He reported that the quantity of milk lost during procurement, handling and transport was tune of 0.63, 0.90 and 1.18 lakh liters i.e. 0.16, 0.15 and 0.18 per cent during the years 1991 to 1993-94, respectively at Babhaleshwar plant of Ahmednagar district.

Singh (1998) conducted a study on marketing of milk and milk products through Dudh Utpadak Sahakari Sangh, Varanasi, Uttar Pradesh. He observed that, the union has large strength and covered a big area by collecting 30000 kg milk per day. It had 327 milk societies with the membership of 14091 in the year 1997-98. The total turnover, milk sold after standardization of union was found increased. The milk union had active role to procure milk from its members through a milk societies and make it available to the consumer through its commission agents at prescribed rate.

Yadav *et.al.* (1998) conducted a study on role of co-operative union in increasing rural income and employment in districts Kanpur, Delhi, Uttar Pradesh. They observed that, investment on milk producing resources was higher. On member households the net income, family labor income and farm business income per member household were ₹ 11809.97, ₹ 18769.77 and ₹ 19913.90, respectively. whereas, on non-

member households were ₹ 3693.53, ₹ 8993.56 and ₹ 9577.66, respectively. The cost of production of per liter and input output ration on non-member household ₹ 7.34 and 1:1.17, respectively. The days of employment were also higher per households and per adult worker on member household (348 and 249 days, respectively), whereas, on non member household days of employment were 263 days and 155 days, respectively.

Bhattacharjee (2001) studied the progress of physical performance of Katraj Dairy. It was revealed that the membership was increased by 41.43 per cent while, the milk procurement declined by 29.60 per cent, i.e. from 1,28,527 thousand litres in 1990-91 to 1,90,481 thousand litres in 1999-2000. The total working capital was increased by 27.82 per cent, resulting in substantial increase in net profit (86.9 per cent). Although, the liabilities, and due to concerned effort of new management the performance of Katraj Dairy Unit in 1999-2000 showed good progress over previous year.

Gavali (2001) reported from his study on an economic analysis of co-oerative dairy industry in Western Maharashtra that, the growth rate of total milk collected, milk processed, milk used for milk products manufacturing, milk distributed and daily milk collection were highly significant and estimated to the rate of 11.03, 11.08, 14.89, 10.81 and 11.03 per cent , respectively, at the overall level. The growth rate of above different indicators were increased with size of co-operative dairy unions over the time period.

Rao and Sharma (2003) studied the financial performance of dairy co-operative (URMUL) in Bikaner district of Rajasthan. The study revealed that milk producers received ₹ 2.68 per kg. of milk in the year 1987-88, and it raise to ₹ 7.14 per kg. in the year 1997-98 recording an annual growth rate of 11.22 per cent in milk prices. The total amount paid to producers per year increased from ₹ 8.40 crores to ₹ 34.39 crores over the period depicting a compound growth rate of 14.84 per cent per year. Gross profit of URMUL went up from ₹ 24.70 lakhs in the year 1989-90 to ₹ 495 lakhs in the year 1997-98, registering a significant annual growth rate of 69.33 per cent.

Shaikh (2003) studied operational excellence in manufacturing. He advocated the need for the dairy industry in India to achieve operational excellence in manufacturing in order to be global player. The application of six sigma method in Mother dairy was given an example. Attitude on the part of management was foremost requirement as far as excellence was concerned.

Kaware (2011) studied the total investment in the capital asset in co-operative dairy units increased from ₹ 1059.96 to ₹ 6010.97 lakhs during the year 1999 to 2008. It had increased by 467.09 per cent over the base year 1999. The capital investment in the business include the investment in the assets such as land and buildings, machinery and equipment's, vehicles, milk cans, crates and booths, furniture, dead stock and other assets etc. The investment in machinery, tools and equipment's had increased by 859.10 per cent followed by furniture, dead stock

and library (164.38 per cent), land and buildings(121.96 per cent), cans/crates and booths together 44.93 per cent and vehicles 37.26 per cent and water supply schemes (15.82 per cent) over the period of time. On an average, the proportionate share of investment in machinery and equipment's was nearly 48 per cent of the total investment over the entire period. The major items of the capital investment were land and buildings which shared 12 to 34 per cent, respectively.

The total investment in capital assets of private dairy units had increased from ₹ 162.78 to ₹ 181.87 lakhs during the year from 2006 to 2008, indicating an increase of 11.73 per cent. The investment in machinery, tools and equipment's was more than 74 per cent followed by land and building (10 to 11 per cent) and cans/crates, booths shared 8 to 10 per cent during the years from 2006 to 2008, respectively.

2.2 Costs and returns structure of dairy unit

Arora and Singh (1991) examined the price trends of milk and milk products in 5 major dairy market in India and attempted to explain the extend of seasonal variation. The data on prices of milk and milk products, such as ghee and butter were analyzed for Bombay, Calcutta, Delhi, Kanpur and Madras markets for the year1963-64. In general, the prices in Delhi and Kanpur market were found to be more variable than those in Calcutta and Bombay. Madras also demonstrated some variation, but of a smaller magnitude.

Shah (1992) conducted study on dairy co-operation an instrument of social change. He studied the market cost,

transport cost and commission cost for period of 1978-1986. He reported that, the marketing cost of dairy mainly constitute transport cost and commission of milk distribution agents. It was stated that, both these costs were beyond the control of dairy, because their stability depends upon the price of petrol as well as general price level he also observed that there was a very slow rise in unit cost till 1980. There was a sudden jump in per unit cost mainly because of steep rise in both transport cost as well as agent commission. Thereafter, marketing cost never gone down beyond the 1981 level but increase quite slowly.

Patil (1994) studied the economics of manufacturing and marketing of milk products by the government and co-operative milk processing units in Western Maharashtra and found that the co-operative dairy has been observed to be relatively more efficient in performing all activities of the business as compare to the government dairy unit. The manufacturing and marketing of milk products has become an important aspect for increasing the efficiency of management system. At the same time efforts aiming at removal of existing drawback in the management of dairy unit would certainly enable them to additional profit in future.

Hange *et al.* (1995) studied economics of procurement, processing, distribution of milk and manufacturing products of Shrirampur Dudh Utpadak Sangh, Babhaleshwar. They found that variable cost accounted for nearly 92 per cent of total cost. The purchase price of raw milk had the lion's share (73 per cent) in the total cost. The average per liter total cost of milk worked

out to ₹ 8.46. The major share i.e. 78 per cent in receipts was from sale of milk.

Dorge *et al.* (1998) studied marketable surplus of milk in Konkan and Western Maharashtra. They reported that, the perform average marketable surplus of milk on sample farm in Western Maharashtra region was 31.85 liters per day, while Konkan region, it was 13.85 liters per day. The co-operative were the major buyer of milk in Western Maharashtra region. This was because of active participation of producers in co-operative movement having good network of milk co-operatives in entire region. They also observed that the cost of marketing of milk was ₹ 0.20 per liter in Konkan, while it was ₹ 0.11 per liter in Western Maharashtra region.

Agarwal (1998) conducted study on marketing cost, margins and price-spread for major agricultural commodities of Rajasthan. He observed that the milk producer got about three-fourth of price paid by their consumer in different channel. However, the share got by the producer had been much higher in sale of milk through the milk collection centers established by the co-operatives in the villages. He also concluded that dairy development programme has brought impact in terms of reduction in marketing cost and margin of middle man and providing a higher share to the producers in the price paid by the ultimate consumers. He suggested that there is a need to extend the dairy development programme in other villages by establishing milk collection centers and making arrangement of

transportation of milk from those villages which are situated in the remote areas from the roadside.

Yadav (2000) conducted and study on the relative efficiency in marketing of milk through private and co-operative agencies in Phaltan tehsil of Satara district. He worked out the procurement cost of milk to be ₹ 1.14 per liter and ₹ 0.89 liter in case of co-operative and private dairy units, respectively. The processing cost of ₹ 0.37 per liter and distribution cost was ₹ 0.42 per liter in case of private dairy unit, as the private unit performs all activities in milk processing. The management cost of milk was higher in case of co-operative dairy units (0.24 per liter) mainly due to salary and all allowances of excess number of workers.

Shelar (2000) studied management of Shrirampur Dudh Utpadak Sangh, Babhaleshwar in Ahmednagar district. He observed that from his study that the per liter procurement, processing and distribution cost were ₹ 0.80, ₹ 0.25 and ₹ 0.08, respectively and manufacturing and management cost of milk products was ₹ 100.96 lakhs, per liter marketing cost came to the ₹ 1.38. Total cost of sangh was ₹ 5482.81 lakhs in which fixed cost was ₹ 133.06 lakhs and variable cost was ₹ 5349.75 lakhs in the year 1998-99. Total income of sangh was ₹ 5210.46 lakhs in which income from sale, was ₹ 4726.18 lakhs and from milk products was ₹ 139.93 lakhs in the year 1998-99.

Gavali (2001) indicated from his study on economic analysis of co-operative dairy industry in Western Maharashtra that, per unit price received by dairy union ranged between ₹

4.08 to 9.87 for cow and buffalo milk. The annual gross returns amounted ₹ 814 lakhs and ₹ 5697.21 lakhs during the years 1987 and 1997, respectively. The share of purchase of milk was nearly 90 to 98 per cent over the period of time. The profitability of business over variable cost worked out ₹ 26.63 and ₹ 266.74 lakhs during the year 1987 and 1997, respectively.

Dalton *et. al.* (2002) studied fluid milk processing cost : current and comparisons. The study reported the findings of an economic-engineering model used to determine theoretically lowest achievable processing and distribution cost of white milk in the state of Maine. This model has indicated and important shift in processing cost. Labor cost exceeded the cost of packaging and plant supply. This was due to wide ranged inflation, plus dramatic increase in health care premiums paid by employers. Labor cost also has increase due to addition of highly educated plant employees with skills in computer driven plant automation and information technologies. Secondly, processing technology continued to evolve more sophisticated technology which was more expensive to implement. Equipment cost has been increased as percentage of total cost and may indicate a wider trend in industry practices to reduce human handling and labor costs. Land and building cost were 12.2 per cent, labor cost 31.4 per cent, equipment cost 17.7 per cent, electricity cost 30.2 per cent, fuel oil 4.5 per cent, water and sewer 1.2 per cent, product loss 1.0 per cent and operating capital 0.6 per cent.

Pawar (2003) conducted a study on management of procurement, processing and distribution of milk and milk products of Mauli processing unit in Ahmednagar district . She reported that, the per litre cost of procurement and the processing cost of milk increased due to high commission from collecting agents and high cost of materials and supplies, respectively. Both costs ranged between ₹ 0.09 to ₹ 0.56. The distribution and management cost of milk and milk products showed 128.57 per cent and 100 per cent change respectively over the period of time. The high distribution and management costs were mainly because of increase in outward transport charges, wages and salaries etc.

Mengade (2004) studied the management of procurement, processing and distribution of Parag milk and milk products, Manchar in Pune district. She observed that, overall work performance of selected dairy unit was economically viable in view of its net profit to the extent of ₹ 722.88 lakhs during the year 2002-03. The quantity of milk used for manufacturing of milk products was less than the quantity of milk used for liquid milk distribution. The loss of milk in the process of handling and transporting was to the extent of 1.22 lakh litre (0.3 per cent) during the year in study.

Patil (2005) studied the management of procurement, processing and distribution of Gokul Milk and Milk Products of Kolhapur Zilla Sahakari Dudh Utpadak Sangh Ltd., Kolhapur. She revealed that the quantity of milk used for manufacturing of milk and milk products was less than the quantity used for

liquid milk distribution. The actual quantities of processed milk and milk products *viz.,* skimmed milk powder, ghee and butter were higher than the estimated break-even quantities. The study concluded that, the Dudh Sangh derived higher revenue from sell of milk than the sell of milk products.

Babu and Verma (2010) have compared the cost of production and manufacturing dairy products of co-operative and private dairy plant and indicated that the co-operative dairy plant is more efficient in the manufacturing of tonned mik, standardize milk, full cream milk and ghee, whereas the private plat has an edge over co-operative dairy plant in the manufacturing of the butter and SMP. The distribution has been found lower for co-operative dairy plant for butter only, whereas for private dairy plants it is a lower for tonned milk, standardized milk, full cream milk, ghee and SMP.

Kaware (2011) studied the information of purchase, collection, processing, distribution and management cost of milk of selected co-operative and private dairy units in Western Maharashtra. For the co-operative dairy unit, The purchase cost of milk was ₹ 5618.14 lakhs in the year 1999, and its increased to ₹ 11888.64 lakhs in the year 2008 indicating 111.61 per cent rise during the study period 1981-2009. The per litre purchase price if milk for co-operative and private dairy units showed increasing trend mainly due to general rise in price level of commodities in economy. The total collection cost of milk was ₹ 455.18 lakhs in the year 1999 which increased by 100.44 per cent and its proportionate share was about 6 per cent, while its

estimated per unit cost increased by 50 per cent over the time period 1981 to 2009. The per litre collection cost of milk, was ranged in between ₹ 0.66 to ₹ 0.99. The cost was high due to the high cost of transports charges, commission given to the societies.

For private dairy the total cost of milk collection increased by 37.14 per cent. The total collection cost of milk was ₹ 95.65 lakhs in the year 2006, it increased by 16.96 per cent and its proportionate share was near about 5 per cent, while its estimated per unit cost increased by 1.54 per cent. The estimated per unit cost of processing and distribution increased by 1.79 and 5.88 per cent, respectively. The proportion of variable cost was higher and the materials and supplies, electricity charges, wages, salary formed the major items.

2.3 Problems faced by dairy units

Thombare and Pawar (1993) made an efforts to study the profile of cross-bred cattle owners in Maharashtra. They identified the problems and made suggestion for cross-bred cattle owners. Defunctioning of milk producers co-operative societies (81.67 per cent) was the major problem followed by more expenditure on ration (68.33 per cent) an lack of green fodder (61.67 per cent).

Yadav *et al.* (1994) studied the constraints in dairy farming of sub-mountain zone of Maharashtra which is spread over five districts of Nashik, Pune, Satara, Sangali and Kolhapur covering 19 tahsils. It was revealed from the study that the farmers were not getting good animals locally (as per opinion of 56 per cent

farmers). Because of poor financial status about 58 per cent farmers were not having adequate funds for purchase of animals also for purchase of feeds and fodder (33 per cent). About 85 per cent farmers have a express shortage of green fodder and concentrates, whereas 65 per cent farmers have express a shortage of dry fodder. It was also noticed that 85 per cent farmers could not provide proper housing to their animals. The need for availability of veterinary facilities in the village itself was expressed by 48 per cent of farmers.

Raskar (1996) reported in his study on economics of dairy farming in Karjat tehsil of Ahmednagar district that 91.52 per cent sample milk producer reported that there was high cost of animal feeds and fodder and 82.50 per cent sample milk producer reported low milk rate given bythe dairy society. Few producers reported complaints of inadequate transports facilities, inadequate management, knowledge, inadequate artificial insemination facilities, irregular payment by society, etc.

Sathe (1996) stated that the constraints faced by farmers in milk production were less availability of grazing land, less availability of green fodder, less knowledge regarding production ration, high cost of concentrates and maintenance of less productive animals, occurrence of disease, inadequacy of veterinary aid and high temperature during summer and non-availability of hygienic drinking water.

Patil (1998) studied constraints in milk procurement at Shrirampur Dudh Utpadak Sangh, Babhleshwar. He reported

that the low grade quality of milk, high procurement cost and cut throat competition by private sector were the major problems. He suggested the measures *viz.,* payment on quality basis, dairy extension activity, demonstration in procurement area etc.

Patil (1999) observed the major constraints of Tembhurni Chilling Centre. He stated that high procurement cost, collection of low grade milk, defective co-operative set-up, no correct testing of milk, no properly cleaned cans and no cooling facilities at milk collection centers (i.e. society) were the major constraints faced by Tembhurni Chilling Centre regarding milk collection. Further he studied, the problems of milk producers and reported that the low price of milk, high cost of cattle feeds, improper testing of milk by society, fluctuation in prices, lack of veterinary aids were faced by producers. He made suggestion on timely sanctions of loans, supply of quality feeds at reasonable rates, cattle insurance scheme and the payment of milk to be made in a time.

Shelar (2000) observed that the major constraints that high procurement cost, low grade quality of milk and the cut-throat competition by the private sector operating in the same area were the major problems of the dairy unit.

Kumar *et al.* (2000) conducted an economic analysis of production and disposal pattern of milk in Haryana and the study revealed that the majority of milk producers faced the problems like lack of good quality feeds and their higher prices, lack of finance, lack of health and insemination facilities etc, while major problems encountered on disposal of milk were

inadequate facilities of co-operative society, delayed payment, risk of payment and lower prices per unit of milk through milk vendors.

Gavali (2001) reported in his study of economic analysis of co-operative dairy industry in Western Maharashtra that, the irregularity of electricity supply, high procurement cost, administrative cost and overhead charges, low commission, heavy competition in procurement of milk, collection of low quality milk, increased marketing cost due to distant market were the major problems of co-operative dairy unions, while the constrains of milk producers in milk production activity were inadequate money for purchase of animals, inadequate loan facilities, loan not easily available, shortages of manpower for animal management.

Mengade (2004) reported in his study the major problems *viz.,* adulteration in raw milk, high transportation and procurement cost, seasonal variation in milk production, lack of applied research and development in procurement activity, high losses of milk in the procurement activity of milk, high acidic milk, low velocity milk, irregular supply of electricity, high price of materials and supply, increase in distribution cost due to distant market, fluctuation of demand of milk and milk products, lack of intelligent and efficient salesmen, commission agent. Make the adulteration in milk products, which reduces the quality of milk and milk products.

Rao and Sharma (2003) studied the problems of dairy co-operatives in Bikaner district if Rajasthan state. They observed

that the provision has been made for incentive for milk having more than 4.50 per cent fat and more than 8 per cent solid not fat. Whereas, such milk is not available in that area. The average fat and solid not fat available in milk is not more than 4.50 per cent and 8 per cent, respectively. As such the mass producers of the tract who supply large quantity of milk to URMUL are being deprived of a good incentive.

Rajput and Yadav (2004) observed that the large number of cross-bred cow dairy entrepreneurs complained that the weak financial status cost of fodder and management difficulties were the main constraints in not maintaining good quality of animals on the farms. The respondent farm families strongly expressed the dire need for finance for the purchase of animals and also for feed, fodder and veterinary aid. A large number of commercial cross-bred cow dairy entrepreneurs reported insufficient storage facilities on their farms. Milk and milk products fall under highly perishable group of commodities and have to be stored under controlled condition of temperature and humidity in cold storage and deep freezers.

Rangasamy and Dhaka (2007) reported that the inadequate quantity of milk was very serious problem faced by co-operatives and private dairy plants. Under utilization of transports vehicles at milk transporters level, under capacity utilization of chilling centers and also under capacity utilization of plant at a milk processing and manufacturing level was the most serious constraints faced by both the plants. At distribution level, higher sales commission to commission agents, wholesalers and

retailers and highly competitive market environment was the most serious problems faced by both dairy plants. In order to minimize the identified constraints and developed the dairy industry in sustainable manner, co-operative and private dairy plants should devise strategy and also focus on consumer oriented market research and development.

Gauradha (2007) studied the economics of milk marketing in Chhatisgarh and observed that the lack of veterinary facilities, lower prices of milk, high price of feed, lack of funds required to purchase feed and fodder for milch animals on the farms were the major constraints reported to be hindering the development of livestock enterprise in the rural areas while lack of green fodder, lack of appropriate place for dairy herds, high price of feed etc., were the major problems faced by farmers in urban areas.

Kaware (2011) studied the economic appraisal of dairy industry in Western Maharashtra and observed that the Economic efficiency of dairy unit is severely influenced by the variety of problems at three important value addition stages *viz.,* milk collection, processing and distribution of milk and milk products. Collection of low quality of milk due to adulteration with water, starch and bicarbonate etc. , losses in milk due to leakage of cans, crates, No cooling facilities are available at milk collection centers, lack of research and development facilities, irregularity of electricity supply causes spoilage of milk and milk products, high marketing cost lower the profit margins, high cost of packing material etc were major problem faced by dairy unit.

3. METHODOLOGY

Every research project was planned and executed with appropriate methods and procedures to get desire results of study. The methodology adopted for the study is describes under the sub heads *viz.,* requirement and source of data, selection of district, selection of dairy units, collection of data, analysis of data, etc. in order to fulfill the requirement of objectives of the study.

3.1 Data requirement and source of data

The requirement of data for study was varying in nature. Firstly, the data requirement of study was for broad indicators of dairy development activities of Jalgaon districts *viz.,* livestock population, milch animal population, animal husbandry, veterinary facilities, breeding and health care programs. Secondly, the data on performance of co-operative, private and individual dairy units dealing with procurement, processing and distribution of milk manufacturing.

The data was comprise through the primary as well as secondary data on different indicators of dairy development in Jalgaon district. The macro level data was collected from the various government reports of Department of Animal Husbandry, Department of Agriculture, Dairy development Department, co-operative, private and individual dairy units etc. The pattern of costs an returns, collection, processing and distribution of milk was collected from annual reports of respective selected co-operative and private dairy units and firm record gives data for individual dairy units.

3.2 Selection of the district

Jalgaon district was selected purposively because Jalgaon is the one of leading milk producing district in the Maharashtra state having total milk production 277.5 Thousand tonne in the year 2013-14.

3.3 Selection of dairy units

Presently in Jalgaon district there are 2 co-operative dairy unit, 26 private dairy units and 57 number of individual dairy units in functioning. Out of these one co-operative, one private and two individual dairy units was selected for the purposely study. In Jalgaon district there is only one co-operative dairy unit presently working due to this it was selected purposely and remaining two private and individual dairy units each was be selected randomly. They are as shown below.

a) Co-operative Dairy Units

1) Jalgaon Jilha Dudh Utpadak Sangh Ltd., Jalgaon.

(Which have 935 societies, 85000 members and average milk collection 70827 litre/day)

b) Private dairy units

1) Yashoda dairy, Chalisgaon

(Average milk collection 5000 litre/day)

c) Selection of individual dairy units

The two dairy units one cow and one buffalo having more than 25 milch animals was selected randomly.

1) Rupali dugdhalay, Hirapur Road, Chalisgaon.

2) Sudarshan dairy, Ghat Road, Chalisgaon.

3.4 Collection of data

The annual reports of selected private, co-operative and individual dairy units was collected from the office records. The data for individual dairy units will meet from feeling the schedules. The information on the aspects like *viz.,* capital investment, working cost on collection, processing and distribution of milk and milk products, cost on manufacturing of milk and milk products, returns from dairy units, development activities of dairy units for increasing milk production and problems of dairy units was collected from 2015-16 for co-operative and private dairy units obtaining from annual reports.

The data on livestock population, milk production and number of dairy co-operative society was get from animal husbandry department, dairy development department, co-operative and agriculture department, Livestock Census Reports of 1992, 1997, 2002, 2007 and 2012.

3.5 Analysis of data

The require data was obtain from the various Government reports such as Department of Animal Husbandry, Dairy Development And Agriculture will be collected and analyse to obtain magnitudes of different aspects of dairy development activities. Simple statistical measures like Arithmetic mean, percentage and ratios will be used to fulfilment of conclusion

3.6 Estimation of growth rates

The dairy development in Jalgaon district of Maharashtra was study with the help of growth rates for various selected parameters, following are the formulae,

Compound growth rate (CGR)

$$Y = ab^t$$

Where,

Y = Dependent variable,

a = Constant,

b = Trend value,

t = Time (census / year).

Logarithmic transformation of above equation is.

Log Y = Log a + t Log b

Compound growth rate (r) will be then estimated by the identity equation,

r = (Antilog 'b'- 1) x 1000

Where,

r = Per cent compound growth rate per year/ census

b = Trend value

3.7 Classification of costs

The present set up of milk scheme comprises of the following major cost.

i. Milk procurement cost.

ii. Milk processing cost

iii. Distribution cost on processed milk

iv. Administrative or overhead charges

v. Manufacturing/processing cost of milk products

Fixed cost

The fixed cost are those which do not change in their magnitude as amount of output of production charges and incurred even when production is not undertaken.The fixed cost included land rent, depreciation of building, machinery, equipment use, interest on fixed capital investment etc.

Variable cost

Variable cost refers to the expenses of using requisite inputs. These costs varies with the level of production. These items of variable costs will be wages and allowances of workers, electricity,commission, transport charges, costs of material supplies, etc.

3.8 Estimation of Benefit-Cost Ratio

B:C ratio is the ratio of total returns received from milk processing to its total cost. It was worked out by using the following formula,

$$\text{B:C ratio} = \frac{\text{Total returns (₹)}}{\text{Total cost(₹)}}$$

3.9 Estimation of Break-Even point of dairy units

The capacity of milk handling at which total revenue equates the total cost was taken as a break-even point. The break- even quantity of milk was estimate for dairy unit as,

$$Q = \frac{\text{TFC (₹)}}{\text{(Ps – AVC) (₹)}}$$

Where,

Q = Quantity of milk required for break-even (litres)

TFC = Total fixed cost (₹).

Ps = Price per litre of milk (₹).

AVC = Average variable cost per litre (₹).

3.10 SWOT analysis of dairy units

SWOT analysis was carried out for knowing strengths, weakness, opportunities and threats of a particular dairy units. The purpose of SWOT analysis is to help policy makers and management body to take strategic decisions within given situation. SWOT analysis will be work out by making use of quantitative data on various indicators those going to collect from the dairy units.

4. HISTORY AND PROFILE OF SELECTED DAIRY UNITS.

In Jalgaon district, different forms of dairy units are managed under government, co-operative and private sectors which are competition with each other. The Jalgaon Zilha Sahakari Dudh Utpadak Sangh, Jalgaon and Yashoda dairy, Chalisgaon are popular milk processing units in Jalgaon district. This dairy units has entered to business of manufacturing and marketing of milk products. It was decided to choose this unit for its economic and management study. The individual dairy units are randomly selected from Jalgan district having more than 25 milch animals. Considering these facts, the research topic *viz.,* " An Economic Appraisal of Dairy Industry in Jalgaon District of Maharashtra".

4.1 Jalgaon Zilha Sahakari Dudh Utpadak Sangh, Jalgaon.

The Jalgaon Zilha Sahakari Dudh Utpadak Sangh established on 23th November 1971 (Reg. No.- JGA/PORD/A/135) at Jalgaon. The JZSDUS located at Shivaji Nagar Road, Post box No.32, Jalgaon 425001. (Plate No.1)

Jalgaon Zilha Sahakari Dudh Utpadak Sangh is an ISO 9001:2008, 22000:2005, 14001:2004 and OHSAS 18001:2007 certified pioneering organisation involved in procurement, processing and distribution of milk and milk products in and around Jalgaon district known as Khandesh. "VIKAS", as it popularly known, has clear cut goals of uplifting the lot of farmers by giving prices. In fact, the Sangh has curved out a special niche for itself and its products in the public eye and has become market leader in region

Under active guidance and management of NDDB, "VIKAS" has acquired best equipments and latest technology to produce highest quality of milk and milk products. An experience work force is assets of Jalgaon Zilha Sahakari Dudh Sangh.

For efficient working of Dudh Sangh there was a different sections and for each section have one skilful, experience and intelligent manager to manage respective section efficiently. Following are the some experience seniors officers.

Table 4.1 List of officers in JZSDUS, Jalgaon

Sr. No.	Name of officer	Post
1	Shri. Manoj Limaye	Managing Director
2	Shri. Prakash Mungad	Head (plant operation)
3	Shri. Anant Ambikar	Manager (Sale)
4	Shri. Kashinath Patil	Manager (Finance& account)
5	Shri. Arun Shelkar	Manager (Administration)
6	Shri. Kailas Molak	Manager (Purchase)
7	Dr. Sudhakar Patil	Head, (Procurement and processing)
8	Dr. C. M. Patil	Head (Adminidtration)
10	Shri. Eknath Pimparkar	Assistant (Engineearing)
11	Shri. Bhushan Nemade	Assistant (Account)
12	Shri. Vikrant Ahale	Assistant Manager (quality & testing)

4.2 Yashoda Dairy, Chalisgaon

The Yashoda dairy is private dairy unit established in 2008 at Chalisgaon. The owner of dairy unit is Mr. Sardarsing Rajput. The Yashoda dairy unit located at Hirapur Road, Dairy Area, Chalisgaon, Dist- Jalgaon. The Yashoda dairy unit is one of the famous unit for its product in Chalisgaon Tahsil of Jalgaon District of Maharashtra. For efficient working of Yashoda dairy also have a different sections and for each section have one skilful, experience and intelligent manager to manage respective section efficiently. (Plate No.2)

4.3 Individual dairy unit

The individual dairy units are randomly selected from Jalgan district having more than 25 milch animals. The two individual dairy units which was selected for study as follows

4.3.1 Rupali Dugdhalay

The Rupali Dugdhalay is a individual dairy unit of buffalo herd which have total livestock population 96. This dairy unit located at Hirapur Road, Dairy Area, Chalisgaon Dist- Jalgaon. The owner of this dairy unit is Shri. Rakhmaji Gavali. (Plate No. 3)

4.3.2 Sudarshan Dairy

The Sudarshan Dairy is an individual dairy unit of cow herd which have total livestock population 54. This dairy unit located at Ghat Road, Chaudhari Wada, Chalisgaon Dist- Jalgaon. The owner of this dairy unit is Shri. Sagar Chaudhari. (Plate No. 4)

5. RESULTS AND DISCUSSION

The present chapter has been devoted to explain the results of data analysis, present certain linkages of facts to arrive at some meaningful interferences. an attempt is made to present the data in relation to objectives under study in order to maintain logical sequence.

The chapter has been designed to study the livestock population and milk production in Jalgaon and Maharashtra, management area of concerning to resources, financial, inventory, personnel and inventory of dairy unit besides aspects of procurement, processing and distribution of milk and milk products of selected dairy units. Further, an attempt is made to study the structure of organization, economic performance of dairy nit, cost of procurement, processing and distribution, total expenditure and total receipts of selected dairy units for the year 2015-16. To begin, different areas of management have been briefly outlined as follows.

5.1 Livestock population in Jalgaon and Maharashtra.

The details of livestock population in Jalgaon and Maharashtra are indicated on Table 5.1

It is seen from the Table 5.1 that, the total bovine population of the Jalgaon and Maharashtra decreased from 1086 to 809 thousand and 24624 to 21078 thousand respectively during the period from 1997 to 2012. The exotic cattle population of Jalgaon and Maharashtra increased from 84 to 86

thousand and 2457 to 3651 thousand respectively during the period from 1997 to 2012.

Table 5.1 Livestock population in Jalgaon and Maharashtra.

("000")

Particulars	**1997**		**2003**		**2007**		**2012**		**Per cent change over 1997**	
	JLN	MH	JLN	MH	JLN	MH	JLN	MH	JLN	MH
Total Bovine	1086	24624	934	22447	856	22256	809	21078	-25.5	-14.4
Total cattle	723	18071	603	16303	555	16183	552	15484	-23.6	-14.3
a)Exotic/crossbred	84	2457	86	2776	68	3122	86	3651	2.3	48.53
i)Females	56	1879	61	2238	46	2580	69	3207	23.2	70.67
ii)Males	28	578	24	538	22	542	17	444	-39.2	-23.1
b)Indigenous	639	15615	517	13527	487	13061	466	11833	-27.1	-24.2
i)Females	272	6832	201	5917	199	5430	164	5063	-39.7	-25.8
ii)Males	366	8783	316	7610	367	7631	290	6780	-20.7	-22.8
Total Buffalo	363	6073	331	6145	301	6072	257	5594	-29.2	-7.8
i)Females	315	5008	295	5227	240	5201	238	4997	-24.4	-0.21
ii)Males	48	1065	36	870	61	871	20	597	-58.3	-43.9

(Source: 16th, 17th , 18th, 19th Livestock census, Department of Animal Husbandry, Dairying and Fisheries) JLN= Jalgaon, MH= Maharashtra

The population of less productive bovines has declined where as that of productive animals like cross-breed cows has increased. The total livestock population of Maharashtra and Jalgaon was decreased at -14.4 per cent and -25.5 per cent, respectively over the base year 1997

5.2 Milk production of Jalgaon and Maharashtra.

The growth of milk production in Jalgaon, Maharashtra and India during last decades is shown in Table 5.2

The total milk production showed an increasing trend in Maharashtra and India and decreasing trend in Jalgaon over the period from 2006-07 to 2015-16. During the period of 2006-07 to 2015-16, the share of Jalgaon to Maharashtra had ranged between 3 to 5 per cent while, the share of Jalgaon to the India in milk production ranged between 0.20 to 0.35 per cent. The total milk production in the Maharashtra and India had increased from 6.98 to 10.15 metric thousand and 102.6 to 155.5 metric thousand respectively from year 2006-07 to 2015-16. The rate of growth of milk production of Maharashtra and India increased by 4.18 per cent and 4.54 per cent respectively during the period from 2006-07 to 2015-16. This is due to the fact that impact of the development of improved breeding technology of cattle and buffaloes resulting into increased in milk production in India and Maharashtra. The annual milk production of Jalgaon decreased by -2.65 per cent during the period from 2006-07 to 2015-16. This is due to the decrease in milch animals population in Jalgaon district.

Table 5.2 Milk production of Jalgaon and Maharashtra

('000'MT)

Years	Milk production			Per cent share of Jalgaon to	
	JLN	**MH**	**IND**	**MH**	**IND**
2006-07	0.348	6.98	102.6	4.98	0.33
2007-08	0.351	7.21	107.9	4.86	0.32
2008-09	0.358	7.45	112.2	4.80	0.31
2009-10	0.363	7.68	116.4	4.72	0.31
2010-11	0.283	8.04	121.8	3.51	0.23
2011-12	0.295	8.47	127.9	3.43	0.23
2012-13	0.305	8.73	132.4	3.49	0.23
2013-14	0.277	9.09	137.7	3.04	0.20
2014-15	0.290	9.54	146.3	3.03	0.19
2015-16	0.300	10.15	155.5	2.95	0.19
CGR	**-2.65*** **	**4.18*** **	**4.54*** **		

(Source: NDDB, Maharashtra report for livestock development.)

('***','**', and '*' = significant at 1,5, and 10 per cent level, respectively)

JLN= Jalgaon, MH= Maharashtra, IND= India.

5.3 Resource management

Land, labour and capital are the three resources or factors of production. There are two types of factor. The previously mentioned primary factors are land, labour and capital. Materials and energy are considered secondary factors in economics

because they are obtained from land, labour and capital. Primary factors never become part of product.

Land, Labour, water form the most important resources in any agro-based industry that needs to be managed.

The co-operative dairy unit Jalgaon Zilha Sahakari Dudh Utpadak Sangh, Jalgaon has been registered (Reg.No.-JGA/PORD/O/135) in the year 1971 and established at Shivaji Nagar Road, Jalogaon.

The private dairy unit Yashoda Dairy was established at Chalisgaon in the year 2008.

Keeping in view the availability of transportation facilities as well as water, the above said site was selected for establishment of this dairy unit.

5.3.1 Land

The Jalgaon Zilha Sahakari Dudh Utpadak Sangh and Yadhoda Dairy are spread over and area of 16 acres and 7 acres of uncultivated land, respectively. The units has separate section for each processing activities.

5.3.2 Water

Water forms one of the most essential resource for the processing industry. Water available for JZSDUS and Yashoda Dairy comes from "Hatnur Dam" constructed on "Tapi" river and "Girana Dam" constructed on "Girana" river respectively. The water available for dairy units comes from different sources, which contain suspended impurities which would be unsuitable for use in the milk processing. This type of water firstly treated

with different chemicals to remove the suspended impurities and also to reduce the hardness, thus making it suitable for its use for different purposes in dairy units.

5.3.3 Labour

Human resource is most important in any business, which is solely responsible for the success or failure of any enterprise. The area of Selected dairy units is surrounded by 5-7 villages, having more than 15000 population each and hence, there is no problem of availability of manpower but lack of skillful labour.

5.3.4 Capital

The details of Source wise capital raised by JZSDUS indicates in Table 5.3 and Figure 5.1

Table 5.3 Source wise Capital raised by JZSDUS

Sr. No.	Source of capital	Amount(₹ in Lakh)	Per cent
1	Authorized capital	2000	22.16
2	Recover capital	496.1	5.49
3	Revised funds and surplus	1085.68	12.03
4	Loans	1219.28	13.51
5	Gratuity	9.86	0.10
6	Deposits	641.78	7.11
7	Current liabilities and provisions	2110.64	23.43
8	Others	1220	13.51
9	Profit	240.87	2.66
	Total	**9024.21**	**100**

It is seen from the Table 5.3 that, total capital raised by JZSDUS was ₹ 9024.21 lakhs. The maximum share of capital

was authorized capital (22.16 per cent), while the share of revised funds and surplus was 5.49 per cent. Loans were obtained from SBI, Bank Of Baroda, SBH and JDCC banks. The total loans obtained was ₹ 1219.28 lakhs which is 13.51 per cent of total capital.

5.4 Plant and machinery management

The main function of plant and machinery management is to operate the plant and machinery at optimum level, with minimum down time and to process milk and milk products of better quality with an objective to minimize the input costs. In order to maintain optimum level of plant and machinery, selected dairy units divided technical department into three sub department as indicated below.

1. Milk processing department
2. Maintenance department
3. Production department

5.5 Financial management

Financial management of the selected dairy units are done by General Manager of finance and account section. It aims at proper utilization of funds in order to economise the resources for obtaining more returns to the dairy units.

5.6 Procurement management

The management aspects in the procurement of milk followed by dairy units are as follows

a. Raw milk prices

The JZSDUS procured raw milk at the rate of ₹ 27.60 per litre for 7.3 per cent milk fat and 9.0 per cent solid not fat (SNF). An additional increment at the rate of ₹ 3.00 is given for 1 per cent increase in milk fat.

The Yashoda Dairy procured raw milk at the rate of ₹ 28.91 per litre for 7.3 per cent milk fat and 9.00 per cent solid not fat (SNF). An additional increment at rate of ₹ 3.12 is given for 1 per cent increase in milk fat.

b. Quality

Fat percentages and SNF are the main parameters of quality of milk. Fat percentage and total solids (TS) are checked at milk collection centers. SNF is calculated by deducting fat percentage from TS.

c. Adulteration

In the quality assurance laboratory of selected dairy units, milk is tested for different adulterations like neutralizers, preservatives, salt, sugar, water etc.

5.7 Processing management

In the processing management of milk following aspects are covered in selected dairy units.(Plate No. 4 and 5)

a. Pasteurization

The milk procured by the dairy units is generally pasteurized by HTST (High Temperature Short Time) method of pasteurization; milk is heated to 72^0C (116^0F) for 15 seconds and quickly cooled to 5^0C or below.

b. Homogenization

In the process of homogenization, the milk is forced through the homogenizer for sub dividing fat globules at 2000-2500 psi pressure.

c. Chilling

After pasteurization and homogenization, the milk is stored at 2^0C before filling in the bags for maintaining the quality of milk.

d. Storage

In the JZSDUS, 6 storage tanks of 5000 litres capacity are used to stored raw and pasteurized milk. In Yashoda dairy, 4 storage tanks of 3000 litres capacity are used to stored raw and pasteurized milk.

Storage tanks are designed in such a way that, they are easy in sanitation by circulation-cleaning method and maintain temperature throughout holding period.

e. Filling of polybags

At the time of filling of milk in the polythene bags, the temperature of milk is maintained at 2^0C.

5.8 Distribution management

Distribution of milk and milk products is the last or final stage of dairy units. The quantity of the product alone will not ensure its wide distribution, but whole process of distribution has to managed intelligently. Management aspects, considered in the distribution by dairy units as follows.

a. Packing

Good quality packing materials is used for milk by dairy units. The milk of JZSDUS is packed in co-extruded multi-polythene milky white film, printed "Vikas Gold" for standardized milk and "Vikas Taza" for tonned milk. While milk of Yashoda dairy printed "Yashoda A1". The liquid milk is packed in the form of 250 ml, 500 ml and 1000 ml.

b. Transportation

Transportation is the crucial aspect in the distribution system, which transfers furnished products from the point of production to the point of consumption. For transportation, JZSDUS have 7 vehicles and Yashoda dairy have 4 vehicles.

c. Storage

Storage is an essential part of distribution system. The cooling facilities are provided in storage for maintaining the quality of finished products.

d. Advertisement

Now a days, there is more importance to the advertisement with an objective to increase the sale of products. The dairy units advertised its products through mass media such as television, newspaper, city cable, hoardings. roadside posters etc.

e. Places of sale

The JZSDUS sales its liquid milk at Jalgaon, Dhule, Nasik an Mumbai through its private distributors. However, the milk products are sold to Madhya Pradesh state. Yashoda dairy sales

its liquid milk at Malegaon, Nasik, Chalisgaon , Aurangabad and Mumbai through its distributors.

5.9 Performance of Selected dairy units.

Different variables are identified for studying the performance of selected dairy units. The physical and financial indicators of JZSDUS are studied while only Physical indicators of Yashoda dairy is studied.

5.9.1 Physical and financial performance of JZSDUS.

The physical performance based on physical indicators is presented in Table 5.4 and Figure 5.2 revealed that, there was a good progress in physical performance of JZSDUS. The Member societies increased continuously. It was 719 in 2006-07 and increased up to 799 in 2015-16 with 27.25 per cent to the base year 2006-07. As concerned with the quantity of procured milk and sale of milk, it showed the continuous growth in milk procurement and milk sale. In the year 2006-07 the milk procurement and milk sale was 557 lakh litres and 510 lakh litres, respectively. Which increased up to 855 lakh litres and 649 lakh litres in the year 2015-16. The members of JZSDUS was decreased from 719 in the year 2006-07 to 511 in the year 2015-16 because of more price of raw milk given by private dairy units. The annual milk procurement, milk sale and members societies increased by 4.29, 2.80 and 1.29 per cent during the period from 2006-07 to 2015-16. While annual Members decreased by -2.74 per cent during period from 2006-07 to 2015-16.

Table 5.4 Physical and financial indicators of JZSDUS (2006-15)

Year	Indicators						
	Physical indicators					Financial indicators (₹ In lakh)	
	Per day milk procurement (lakh litre)	Total milk procurement (lakh litre)	Total sale of milk (lakh litre)	Members (No.)	Members societies (No.)	Share capital	Turnover
2006-07	1.53 (100)	557 (100)	510 (100)	719 (100)	719 (100)	272.09 (100)	11457.73 (100)
2007-08	1.48 (-3.26)	541 (-2.87)	526 (3.17)	547 (-23.92)	738 (2.64)	245.35 (-9.82)	13417 (17.09)
2008-09	1.63 (6.53)	594 (6.64)	544 (6.66)	558 (-22.39)	766 (6.53)	263.99 (-2.97)	15910 (38.85)
2009-10	1.52 (-0.65)	555 (-0.35)	565 (10.78)	569 (-20.86)	796 (10.78)	280.21 (2.98)	17637 (53.93)
2010-11	1.37 (-10.45)	503 (-9.69)	590 (15.68)	484 (-32.68)	781 (15.68)	386.95 (42.21)	21138 (84.48)
2011-12	1.44 (-5.88)	528 (-5.20)	609 (19.41)	486 (-32.40)	822 (19.41)	399.33 (46.76)	26660 (132.68)
2012-13	1.99 (30.06)	727 (30.52)	610 (19.60)	490 (-31.84)	809 (19.60)	415.12 (52.56)	26579.68 (131.98)
2013-14	1.78 (16.33)	648 (16.33)	636 (24.70)	497 (-30.87)	814 (24.70)	430.91 (58.37)	28021 (144.55)
2014-15	1.96 (28.10)	694 (25.13)	638 (25.09)	509 (-29.20)	822 (25.09)	473.36 (73.97)	30819.32 (168.98)
2015-16	2.34 (52.94)	855 (53.50)	649 (27.25)	511 (-28.92)	799 (27.25)	496.11 (82.33)	36523 (218.763)
CGR	**4.38****	**4.29****	**2.8*****	**-2.74****	**1.29*****	**8.64*****	**13.26*****

((Figures in parentheses are percentages to the base year 2006-07)

(*,**,*** indicates 10, 5 and 1 per cent level of significance)

The performance of the JZSDUS, as per its financial management is concerned, could be judged by visualizing the trend of various financial indicators such as Share capital and turnover. The financial indicators also help in ascertaining the progress and prospects of Dudh Sangh.

It was evident from Table 5.4 that, there was a good progress in financial indicators of Dudh Sangh. The turnover and share capital of JZSDUS was ₹11457.73 and ₹ 272.09 lakh, respectively in the year 2006-07 increased up to ₹ 36523 lakh and ₹ 496.11 lakh in the year 2015-16.

The annual share capital and turnover increased by 8.64 an 13.26 per cent during the period from 2006-07 to 2015-16. This is due to increased in members societies ultimately the share capital and turnover increased.

5.9.2 Physical performance of Yashoda dairy

It is evident from the Table 5.5 and Figure 5.3 that, the milk procurement and milk sale have increased by 276.59 per cent and 227.83 per cent, respectively during the period from 2011-12 to 2015-16. The procurement of milk and milk sale has increased continuously from the base year 2011-12 to 2015-16. However, the rate of increase in procurement of milk was more than that of rate in increase in milk sale.

The annual milk procurement and milk sale have increased by 2.99 and 3.74 per cent during the period from 2011-12 to 2015-16. The physical indicators of selected dairy units indicated

that there is an increasing trend because of adoption of dairy business by farmers as an additional income sources with farming.

Table 5.5 Physical performance of Yashoda dairy

Sr. No.	Year	Total milk procured (lakh litre)	Total sale of milk (lakh litre)
1	2011-12	108.64 (100)	105.25 (100)
2	2012-13	190.08 (74.96)	185.75 (76.48)
3	2013-14	316.33 (191.17)	281.62 (167.57)
4	2014-15	338.26 (211.36)	296.74 (181.94)
5	2015-16	409.04 (276.59)	345.04 (227.83)
	CGR	**2.99*** **	**3.74*** **

(Figures in parentheses are percentages to the base year 2011-12)
(*,**,*** indicates 10, 5 and 1 per cent level of significance)

5.10 Size of business

The selected dairy units are actively involved in the activities of procurement, processing and distribution of milk as well as milk product. The size of business activity could therefore, be measured in terms of magnitude of the volume of milk products processed by selected dairy units.

Table 5.6 Quantity of milk procured and its disposal by JZSDUS, Jalgaon

(2015-16)

Sr. No.	Particulars	Qty of milk (lakh litrs)	Per cent
1	Total quantity of milk procured during the year	855	100
2	Daily average procurement of milk	2.34	-
3	Average milk quantity lost in procurement, handling and transporting during year	3.42	0.4
4	Actual Total quantity of milk processed	851.58	99.6
5	Quantity of milk distributed as liquid milk	649.14	75.92
6	Quantity of milk used for manufacturing milk products	202.44	23.68

The detailed size of business handled by JZSDUS during the year 2015-16 is presented in Table 5.6.

It is revealed that, the total quantity of milk procured by dairy unit was 855 lakh litres with an average daily procurement of 2.34 lakh litres. In the total quantity of milk procured in a year, the losses were to extent of 3.42 lakh litres i.e. 0.40 per cent in procurement, handling and transport. Thus, the quantity

of milk processed by this dairy unit was 851.58 lakh litres (99.60 per cent) of total milk procured by dairy unit. Out of this 75.92 per cent quantity of milk was distributed as liquid milk and remaining 23.68 per cent was used for manufacturing the different milk products.

Table 5.7 Quantity of milk procured and its disposal by Yashoda dairy, Chalisgaon Dist:- Jalgaon.

(2015-16)

Sr. No.	Particulars	Qty of milk (lakh litre)	Per cent
1	Total quantity of milk procured during the year	409.04	100
2	Average milk quantity lost in procurement, handling and transporting during year	1.43	0.35
3	Actual Total quantity of milk processed	407.61	99.65
4	Quantity of milk distributed as liquid milk	344.82	84.30
5	Quantity of milk used for milk products	62.79	15.35
6	Daily average milk procurement	1.12	-

The detailed size of business handled by Yashoda dairy during the year 2015-16 is presented in Table 5.7. It is revealed that, the total quantity of milk procured by dairy unit was 409.04 lakh litres with an average daily procurement of 1.12 lakh litres. In the total quantity of milk procured in a year, the losses were to extent of 1.43 lakh litres i.e. 0.35 per cent in procurement, handling and transport. Thus, the quantity of milk processed by this dairy unit was 407.61 lakh litres (99.65 per cent) of total milk procured by dairy unit. Out of this 84.30 per cent quantity of milk was distributed as liquid milk and remaining 15.35 per cent was used for manufacturing the different milk products.

5.11 Costs structure of business

The main activities undertaken by the selected dairy units are as under.

1. Procurement of milk
2. Processing of milk and manufacturing of milk products
3. Distribution of liquid milk
4. Marketing of milk products

For performing the activities such as procurement, processing and distribution more effectively, the selected dairy units incurred costs on account of many items.

The cost structure of business is analyzed separately for the following major activities.

1. Purchase of milk
2. Procurement cost of milk

3. Processing cost of milk
4. Distribution cost of milk
5. Management cost of milk
6. Conversion cost of milk into milk products
7. Marketing cost of different milk products
8. Management cost of milk products

The above activities are included under the fixed and variable cost categories.

5.11.1 Purchase cost of milk

The purchase cost of milk comprised of mainly the price paid to the milk producers. The raw milk price i.e. paid to the milk producer was the major item of total cost structure of business. Table 5.8 and Table 5.9 present the information regarding the total quantity of milk procured, per litre price of raw milk in different seasons and average per litre price of milk during the year 2015-16.

It is revealed from Table 5.8 that, the price paid to the milk producers by JZSDUS varied across the different seasons. The per litre average price paid to the milk producers during flush season was ₹ 25.11 and it was ₹ 29.82 during lean season. The average price paid to the producers by Jagaon Dudh Sangh was ₹ 27.60 and total quantity of milk purchased was 855 lakh litres. Out of the total quantity of milk purchased, per cent share of flush season was little lesser (47.27 per cent) than that of lean season (52.73 per cent).

Table 5.8 Season wise quantity of milk purchased and average price paid for milk by JZSDUS (2015-16)

Sr. No.	Season	Qty. of milk procured (lakh litre)	Average purchase pric (₹/Litre)	Total price of milk (lakh ₹)
1	Flush season (May- Oct)	404.15 (47.27)	25.11	10151.98
2	Lean season (Nov-April)	450.84 (52.73)	29.82	13446.29
	Total	**855 (100)**	**27.6**	**23598.27**

(Figures in parentheses are percentages to the total cost)

It is very clear that average per litre price paid to milk producers during lean season was relatively higher than flush season.

It is revealed from Table 5.9 that, the price paid to the milk producers by Yashoda dairy varied across the different seasons. The per litre average price paid to the milk producers during flush season was ₹ 27.20 and it was ₹ 30.20 during lean season. The average price paid to the producers by Yashoda dairy was ₹ 28.1 and total quantity of milk purchased was 409.04 lakh litres. Out of the total quantity of milk purchased, per cent share of flush season was litle lesser (42.80 per cent) than that of lean season (57.20 per cent). It is very clear that average per litre

price paid to milk producers during lean season was relatively higher than flush season

Table 5.9 Season wise quantity of milk purchased and average price paid for milk by Yashoda dairy.

(2015-16)

Sr. No.	Season	Qty. of milk procured (lakh litre)	Average purchase price (₹/Litre)	Total price of milk (lakh ₹)
1	Flush season (May-Oct)	175.06 (42.80)	27.2	4761.63
2	Lean season (Nov-April)	233.98 (57.20)	30.2	7066.19
	Total	**409.04 (100)**	**28.91**	**11827.82**

(Figures in parentheses are percentages to the total cost)

5.11.2 Procurement cost of milk

Procurement cost includes the expenses incurred by the dairy units to bring milk collected from different milk assembling centers to main dairy plant. (Plate No. 5 and 6)

The item wise cost of procurement of milk by JZSDUS and Yashoda Dairy are presented in Table 510 and 5.11 , respectively.

It is seen from Table 5.10 that, the total procurement cost of milk worked out to ₹ 1535.68 lakhs during the year 2015-16

for JZSDUS. In the total procurement cost, the share of fixed cost was hardly 2.49 per cent and that of variable costs was to the tune of 97.51 per cent. In fixed costs, the depreciation on plants, machineries and vehicles (1.11 per cent) and interest on investment (1.23 per cent) were the major items. As regards variable costs, commission of milk collecting agencies (42.47 per cent), transport charges (21.89 per cent), wages and bonus paid to the workers(15.86 per cent) and materials and supplies (7.12 per cent) were major items. The cost on account of milk handling losses and travelling allowances came to 0.92 per cent and 0.72 per cent to the total procurement cost, respectively. The average per litre procurement cost of milk incurred by the JZSDUS was ₹ 1.79. To sum up, it clearly indicates that the commission to the milk collecting agents and transporting charges were the major items of procurement cost contributing 64.36 per cent the total procurement cost.

It is seen from Table 5.11 that, the total procurement cost of milk worked out to ₹ 674.91 lakhs during the year 2015-16 for Yashoda dairy. In the total procurement cost, the share of fixed cost was hardly 6.61 per cent and that of variable costs was to the tune of 93.39 per cent. In fixed costs, the depreciation on plants, machineries and vehicles (4.56 per cent) and interest on investment (2.01 per cent) were the major items. As regards variable costs, commission of milk collecting agencies (46.02 per cent), transport charges (25.46 per cent), wages and bonus paid

Table 5.10 Item wise procurement cost of milk of JZSDUS

(2015-16)

Sr. No.	Item	Amount (₹ lakhs)	Per cent
A	**Total fixed cost**		
1	Land rent	2.15	0.14
2	Depreciation	17.04	1.11
3	Interest	19.04	1.24
	Total fixed cost (A)	**38.23**	**2.49**
B	**Total variable cost**		
1	Commission to milk collecting agencies	652.22	42.47
2	Transporting charges	336.17	21.89
3	Wages and bonus paid to the workers	243.56	15.86
4	Traveling allowances	11.05	0.72
5	Ice cost	130.99	8.53
6	Materials and supplies	109.34	7.12
7	Losses in milk handling	14.12	0.92
	Total variable cost (B)	**1497.45**	**97.51**
	Total cost (A+B)	**1535.68**	**100**
	Average procurement cost of milk	1.79	

Table 5.11 Item wise procurement cost of milk of Yashoda dairy

(2015-16)

Sr. No.	Item	Amount (₹ in lakh)	Per cent
A	**Total fixed cost**		
1	Land rent	0.26	0.04
2	Depreciation	30.77	4.56
3	Interest	13.56	2.01
	Total fixed cost (A)	**44.61**	**6.61**
B	**Total variable cost**		
1	Commission to milk collecting agencies	310.59	46.02
2	Transporting charges	171.83	25.46
3	Wages and bonus paid to the workers	54.12	8.02
4	Traveling allowances	3.44	0.51
5	Ice cost	21.93	3.25
6	Materials and supplies	42.11	6.24
7	Losses in milk handling	26.25	3.89
	Total variable cost (B)	**630.29**	**93.39**
	Total cost (A+B)	**674.91**	**100**
	Average procurement cost of milk	1.65	

to the workers(8.02 per cent) and materials and supplies (6.24 per cent) were major items.

The cost on account of milk handling losses and travelling allowances came to 3.89 per cent and 0.51 per cent to the total procurement cost, respectively. The average per litre procurement cost of milk incurred by the Yashoda dairy was ₹ 1.65. To sum up, it clearly indicates that the commission to the milk collecting agents and transporting charges were the major items of procurement cost contributing 71.48 per cent the total procurement cost.

5.11.3 Processing cost

The processing of raw milk is important activity of dairy units. Processing of milk is useful for enhancing keeping quality of milk and converting milk into milk products. Processing cost of milk comprised of all the costs incurred for pasteurization of milk by selected dairy units during the year 2015-16. The item wise cost of processing of milk by JZSDUS and Yashoda Dairy, are present in Table 5.12 and 5.13, respectively.

It seen from Table 5.13 that, The total processing cost of milk worked out to ₹ 1927.89 lakhs. In the total cost, per cent share of fixed and variable cost was13.93 and 86.07 per cent, respectively. In the fixed cost the share of depreciation was higher than that of interest and land rent. It is seen that percent share of depreciation, interest and land rent in the total milk processing cost of Jagaon Dudh Sangh was 8.54, 5.29 and 0.10 per cent, respectively. In the variable cost, materials and supplies had the maximum share to the extent of 23.15 per cent.

Table 5.12 Item wise processing cost of milk of JZSDUS (2015-16)

Sr. No.	Item	Amount (₹ In lakhs)	Per cent
A	**Total fixed cost**		
1	Land rent	1.92	0.1
2	Depreciation	164.64	8.54
3	Interest	101.98	5.29
	Total fixed cost (A)	**268.56**	**13.93**
B	**Total variable cost**		
1	Materials and supplies	446.32	23.15
2	Spares and repairs of dairy machinery	159.82	8.29
3	Electricity	404.84	21
4	Wages and bonus paid to the workers	354.36	18.38
5	Traveling allowances	17.15	0.89
6	Fuel	222.1	11.52
7	Water expenses	7.32	0.38
8	Others	47.42	2.46
	Total variable cost (B)	**1659.33**	**86.07**
	Total cost (A+B)	**1927.89**	**100**
	Average processing cost of milk	2.25	

Out of total processing cost of JZSDUS, the share of electricity charges was 21 per cent, while it was18.38, 11.52, 8.29, 0.89, 0.38 per cent, were on account of wages and bonus, fuel, spare and repairs to dairy machinery, travelling allowances and water expenses, respectively. The materials and supplies cost included the expenses on ammonia gas, acids and chemicals furnace oil, lubricant oil, caustic soda, plant cleaning expenditure, dress and dress cleaning expenditure in the JZSDUS.

The per litre processing cost of milk was estimated to ₹ 2.25. Which by and large included depreciation and interest as major fixed costs and material and supplies, electricity, wages and bonus, spares and repairs to dairy machinery as the major items of variable cost in processing.

It seen from Table 5.13 that, the total processing cost of milk worked out to ₹ 867.16 lakhs for Yashoda dairy. In the total cost, per cent share of fixed and variable cost was 46.92 and 53.08 per cent, respectively. In the fixed cost the share of depreciation was higher than that of interest and land rent. It is seen that percent share of depreciation, interest and land rent in the total milk processing cost of Yashoda dairy was 26.13, 20.74 and 0.06 per cent, respectively. In the variable cost, materials and supplies had the maximum share to the extent of 20.10 per cent. Out of total processing cost of Yashoda dairy, the share of electricity charges was 8.44 per cent, while it was 10.70, 11.97, 0.29, 0.11 per cent, were on account of wages and bonus, spare

Table 5.13 Item wise processing cost of milk of Yashoda dairy (2015-16)

Sr. No.	Item	Amount (₹ in lakh)	Per cent
A	**Total fixed cost**		
1	Land rent	0.52	0.06
2	Depreciation	226.58	26.13
3	Interest	179.84	20.74
	Total fixed cost (A)	**406.87**	**46.92**
B	**Total variable cost**		
1	Materials and supplies	174.29	20.10
2	Spares and repairs of dairy machinery	103.79	11.97
3	Electricity	73.18	8.44
4	Wages and bonus paid to the workers	92.78	10.70
5	Traveling allowances	2.51	0.29
6	Building maintenance and repairs	12.14	1.4
7	Water expenses	0.95	0.11
8	Others	0.60	0.07
	Total variable cost (B)	**460.28**	**53.08**
	Total cost (A+B)	**867.16**	**100**
	Average processing cost of milk	2.12	

and repairs to dairy machinery, travelling allowances and water expenses, respectively. The materials and supplies cost included the expenses on ammonia gas, acids and chemicals furnace oil, lubricant oil, caustic soda, plant cleaning expenditure, dress and dress cleaning expenditure in the Yashoda dairy.

The per litre processing cost of milk was estimated to ₹ 2.12. Which by and large included depreciation and interest as major fixed costs and material and supplies, electricity, wages and bonus, spares and repairs to dairy machinery as the major items of variable cost in processing.

5.11.4 Distribution cost

Distribution of milk is the final stage of the milk unit. The distribution cost includes all the costs incurred by sells department and transportation charges.

The item wise cost of distribution of milk by JZSDUS and Yashoda Dairy are presented in Table 5.14 and 5.15, respectively.

The liquid milk of JZSDUS is sold at Jalgaon, Dhule, Nasik and Mumbai. It is clear from Table 5.14 that, the total distribution cost of milk was ₹ 1396.31 lakhs. In the total costs, share of fixed and variable cost was 9.05 and 90.95 per cent, respectively. The share of interest, depreciation and land rent in the total milk distribution cost of the JZSDUS was 6.45, 2.50, 0.10 per cent respectively. In the variable cost, the packaging materials and their charges had the maximum share to extent of

32.98 per cent. Of the total distribution cost of JZSDUS, share of transport charges, commission to distributing agencies, wages and bonus of workers were 17.76, 12.89, 7.71 per cent, respectively. The per litre distribution cost of milk was estimated ₹ 1.63.

The liquid milk of Yashoda dairy is sold at Malegaon, Chalisgaon, Aurangabad, Nasik and Mumbai. It is clear from Table 5.15 that, the total distribution cost of milk was ₹ 634 lakhs. In the total cost, share of fixed and variable cost was 17.96 and 82.04 per cent, respectively. The share of interest, depreciation and land rent in the total milk distribution cost of the Yashoda dairy was 10.50, 7.43, 0.03 per cent respectively. In the variable cost, the packaging materials and their charges had the maximum share to extent of 40.82 per cent. Of the total distribution cost of Yashoda dairy, share of transport charges, commission to distributing agencies, wages and bonus of workers were 26.59, 6.88, 1.77 per cent, respectively. The per litre distribution cost of milk was estimated ₹ 1.55.

Table 5.14 Item wise distributing cost of milk of JZSDUS (2015-16)

Sr. No.	Item	Amount (₹ in lakh)	Per cent
A	**Total fixed cost**		
1	Land rent	1.39	0.1
2	Depreciation	34.9	2.5
3	Interest	90.06	6.45
	Total fixed cost	**126.35**	**9.05**
B	**Total variable cost**		
1	Packing materials and charges	460.52	32.98
2	Commission to distributing agencies	179.82	12.89
3	Transport charges	247.99	17.76
4	Wages and bonus paid to the workers	107.66	7.71
5	Traveling allowances	14.1	1.01
6	Electricity and Fuel	178.17	12.76
7	Repairs of motor vehicle	17.31	01.24
8	Ice cost	61.71	4.42
9	Others	2.51	0.18
	Total variable cost (B)	**1269.96**	**90.95**
	Total cost (A+B)	**1396.31**	**100**
	Average distribution cost of milk	1.63	

Table 5.15 Item wise milk distribution cost of Yashoda dairy (2015-16)

Sr. No.	Item	Amount (₹ in lakh)	Per cent
A	**Total fixed cost**		
1	Land rent	0.19	0.03
2	Depreciation	47.12	7.43
3	Interest	66.57	10.50
	Total fixed cost	**113.88**	**17.96**
B	**Total variable cost**		
1	Packing materials and charges	258.79	40.82
2	Commission to distributing agencies	43.61	6.88
3	Transport charges	168.58	26.59
4	Wages and bonus paid to the workers	11.22	1.77
5	Traveling allowances	1.33	0.21
6	Repairs of motor vehicle	3.80	0.6
7	Ice cost	27.12	4.28
8	Others	5.64	0.89
	Total variable cost (B)	**520.13**	**82.04**
	Total cost (A+B)	**634**	**100**
	Average distribution cost of milk	1.55	

5.11.5 Management cost

The management cost includes all the costs on account of taxes, audit fees, postage meeting and travelling allowances, wages and bonus rent etc.

The item wise cost of management of milk by JZSDUS and Yashoda Dairy are presented in Table 5.16 and 5.17, respectively.

It is seen from the Table 5.16 that, the total management cost of milk was worked out to ₹1638.52 lakhs, during the year 2015-16. In total management cost, the share of fixed and variable cost were came to 10.42 and 89.57 per cent, respectively. This has indicated relatively a large share of fixed cost as compare to variable cost, due to more interest and depreciation cost. In the variable cost, wages and bonus paid to workers, postage, telegram, telephone etc. were the major items of management cost 70 per cent to the total management cost. The per litre management cost of milk was estimated ₹ 1.91.

It is seen from the Table 5.17 that the total management cost of milk was worked out to ₹ 703.55 lakhs, during the year 2015-16. In total management cost, the share of fixed and variable cost were came to 47.52 and 52.48 per cent, respectively. This has indicated relatively a large share of fixed cost as compare to variable cost, due to more interest and depreciation cost. In the variable cost, wages and bonus paid to workers, postage, telegram, telephone, etc. were the major items

of management cost 30 per cent to the total management cost. The per litre management cost of milk was estimated ₹ 1.72.

Table 5.16 Item wise Management cost of milk of JZSDUS

(2015-16)

Sr. No.	Item	Amount (₹ In lakhs)	Per cent
A	**Total fixed cost**		
1	Land rent	2.45	0.14
2	Depreciation	1.6	0.097
3	Interest	166.72	10.17
	Total fixed cost	**170.77**	**10.42**
B	**Total variable cost**		
1	Wages and bonus paid to the workers	1122.08	68.48
2	Traveling allowances	5.21	0.31
3	Rent and taxes	68.15	4.15
4	Post and telephone	8.03	0.49
5	Printing and stationary	7.89	0.48
6	Audit fee	16.47	1.005
7	Office expenses	221.19	13.49
8	Miscellaneous	18.73	1.14
	Total variable cost	**1467.75**	**89.57**
	Total cost (A+B)	**1638.52**	**100**
	Average procurement cost of milk	**1.91**	

Table 5.17 Item wise management cost of milk of Yashoda dairy (2015-16)

Sr. No.	Item	Amount (₹ in Lakh)	Per cent
A	**Total fixed cost**		
1	Land rent	1.05	0.15
2	Depreciation	107.36	15.26
3	Interest	225.90	32.11
	Total fixed cost	**334.32**	**47.52**
B	**Total variable cost**		
1	Wages and bonus paid to the workers	145.63	20.70
2	Traveling allowances	42.21	6
3	Rent and taxes	58.39	8.30
4	Post and telephone Printing and stationary	76.96	10.94
5	Audit fee	20.82	2.96
6	Office expenses	17.16	2.44
7	Miscellaneous	8.02	1.14
	Total variable cost	**369.22**	**52.48**
	Total cost (A+B)	**703.55**	**100**
	Average Management cost of milk	**1.72**	

5.11.6 Conversion cost of Milk products

The conversion costs of milk products includes all the costs *viz.,* electricity, water supply expenditure, materials and supplies, wages and bonus etc.

The item wise conversion cost of milk products of milk by JZSDUS and Yashoda Dairy are presented in Table 5.18 and 5.19, respectively. (Plate No.7 and 8)

The break-up of product wise conversion costs of milk products of JZSDUS such as milk powder SMP, butter and ghee were indicated in Table 5.18.

It has been seen that, total conversion cost of milk products was estimated to ₹ 43.06 lakhs. Out of the total conversion cost, the per cent share of fixed cost was 17.34 per cent, while that of variable cost was 82.66 per cent. From the Table 5.18, it is observed that conversion costs of the products, such as milk powder, SMP, butter and ghee were estimated ₹ 1.30, 8.22, 32.28 and 1.24 lakhs, respectively. In the total conversion cost of milk products, maximum per cent share were electricity, materials and supplies, wages and bonus paid of worker contributing 51.69 per cent to the total conversion cost of milk products. The average per kg conversion costs of milk products such as milk powder, SMP, butter and ghee came to 0.93, 0.53, 1.96 and 2.55, respectively.

Table5.18 Item wise conversion cost of milk product of JZSDUS (2015-16)

(₹ in lakh)

Sr. No.	Item	Milk powder	SMP	Butter	Ghee	Total cost
A	**Total fixed cost**					
1	Land rent	0.0024 (0.19)	0.012 (0.15)	0.096 (0.3)	0.003 (0.31)	0.1134 (0.26)
2	Depreciation	01095 (8.36)	0.788 (9.58)	2.6 (8.07)	0.092 (7.49)	3.58 (8.54)
3	Interest	0.098 (7.52)	0.516 (6.27)	2.98 (9.26)	0.093 (7.56)	3.68 (8.54)
	Total fixed cost	**0.2099 (16.07)**	**1.31 (16)**	**5.67 (17.63)**	**0.188 (15.36)**	**7.38 (17.34)**
B	**Total variable cost**					
1	Wages and bonus paid to the workers	0.158 (12.12)	1.82 (22.12)	3.15 (9.76)	0.15 (12.22)	5.27 (12.26)
2	Electricity	0.24 (18.81)	2.85 (34.65)	6.17 (19.12)	0.4 (32.85)	9.66 (22.43)
3	Traveling allowances	0.104 (7.94)	0.424 (5.16)	2.12 (6.57)	0.055 (4.51)	2.70 (6.27)
4	Spares and repairs to dairy machinery	0.076 (5.85)	0.424 (5.16)	5.14 (15.94)	0.1 (8.4)	5.74 (13.33)
5	Faculty building maintenances	0.065 (5.02)	0.21 (2.58)	1.28 (3.98)	0.53 (4.28)	2.085 (4.84)
6	Materials and Supplies	0.43 (33.44)	1.15 (14)	8.36 (25.9)	0.26 (21.39)	23.69 (17)
7	Water supplies expense	0.0017 (0.13)	0.012 (0.15)	0.06 (0.2)	0.0004 (0.31)	0.74 (0.14)
8	Miscellaneous	0.008 (0.63)	0.014 (0.18)	0.29 (0.9)	0.0085 (0.69)	0.32 (0.74)
	Total variable cost	**1.1 (83.94)**	**6.90 (84)**	**26.57 (82.37)**	**1.052 (84.64)**	**36.07 (82.66)**
	Total cost (A+B)	**1.30 (100)**	**8.22 (100)**	**32.28 (100)**	**1.24 (100)**	**43.06 (100)**
	Average Conversion cost (₹/kg)	0.93	0.53	1.96	2.55	5.97

(Figures in the parenthesis are the percentages to total cost)

Table 5.19 Item wise conversion cost of milk products of Yashoda dairy (2015-16) (₹ in lakh)

Sr. No.	Item	Ghee	SMP	Cheese	Gulab jamon	Total cost
A	**Total fixed cost**					
1	Land rent	0.02 (0.9)	0.007 (0.10)	0.001 (0.03)	0.007 (0.30)	0.035 (0.07)
2	Depreciation	4.19 (12.75)	0.97 (12.77)	0.84 (12.65)	0.30 (12.70)	6.3 (12.91)
3	Interest	3.13 (9.52)	0.72 (9.51)	0.62 (9.38)	0.21 (9.20)	4.68 (9.59)
	Total fixed cost	**7.34 (22.36)**	**1.69 (22.38)**	**1.46 (22.06)**	**0.51 (22.20)**	11.01 **(22.57)**
B	**Total variable cost**					
1	Wages and bonus paid to the workers	12.66 (38.47)	2.92 (38.46)	2.57 (38.75)	0.90 (38)	19.05 (39.06)
2	Traveling allowances	0.23 (0.71)	0.11 (1.57)	0.10 (1.58)	0.04 (1.80)	0.48 (0.98)
4	Spares and repairs to dairy machinery	1.52 (4.63)	0.35 (4.64)	0.30 (4.63)	0.11 (4.93)	2.28 (4.67)
5	Faculty building maintenances	0.42 (1.30)	0.10 (1.30)	0.09 (1.36)	0.03 (1.41)	0.64 (1.31)
6	Materials and Supplies	10.31 (31.32)	2.38 (31.32)	2.08 (31.30)	0.74 (31.34)	15.51 (31.80)
7	Water supplies expense	0.03 (0.12)	0.01 (0.12)	0.007 (0.11)	0.002 (0.11)	0.05 (0.10)
8	Miscellaneous	0.06 (0.20)	0.10 (0.21)	0.01 (0.22)	0.004 (0.21)	0.17 (0.34)
	Total variable cost	**24.81 (76.75)**	**5.97 (77.62)**	**5.12 (77.95)**	**1.82 (77.80)**	**37.76 (77.43)**
	Total cost (A+B)	**32.15 (100)**	**7.66 (100)**	**6.61 (100)**	**2.34 (100)**	**48.77 (100)**
	Average Conversion cost (₹ /kg)	2.87	0.71	3	2.55	9.92

(Figures in the parenthesis are the percentages to total cost)

It has been seen that total conversion cost of milk products was estimated to ₹ 48.77 lakhs. Out of the total conversion cost, the per cent share of fixed cost was 22.57 per cent, while that of variable cost was 77.43 per cent. From the Table 5.19 it is observed that, conversion costs of the products, such as ghee, SMP, cheese and gulab jamon were estimated ₹ 32.15, ₹ 7.66, ₹ 6.61 and ₹ 2.34 lakhs, respectively. In the total conversion cost of milk products, maximum per cent share were materials and supplies, wages and bonus of worker contributing 70.86 per cent to the total conversion cost of milk products. The average per kg conversion costs of milk products such as ghee, SMP, cheese and gulab jamon came to ₹ 2.87, ₹ 0.71, ₹ 3 and ₹ 2.55, respectively.

5.11.7 Manufacturing cost of milk products

5.11.7.1 Manufacturing cost of milk products of Dudh Sangh

a) Manufacturing cost of ghee

The item wise manufacturing cost of ghee of JZSDUS is present in Table 5.20. The total production of ghee was 0.49 lakh kg during the year 2015-16. The total manufacturing cost of ghee was ₹ 126.12 lakh, in which share of raw material used i.e. cream and butter were 57.05 and 41.96 per cent respectively. While that of conversion cost was 0.99 per cent. The per kg manufacturing cost of ghee estimated to be ₹ 257.40.

Table 5.20 Item wise manufacturing cost of ghee of a JZSDUS (2015-16)

Sr. No.	Items of cost	Qty(lakh kg)	Unit cost (₹/Kg)	Total cost (₹ in lakh)
1	Raw materials Used			
A	Cream (fat)	0.28	257	71.96 (57.05)
B	Butter	0.21	252	52.92 (41.96)
C	Conversion cost	-	2.55	1.24 (0.99)
	Total cost	-	-	126.12 (100)
2	Total production of ghee (lakh kg)	0.49	-	257.40
	Manufacturing cost of ghee (₹/kg)			257.40

(Figures in the parenthesis are the percentages to total cost)

b) Manufacturing cost of Milk powder

The item wise manufacturing cost of milk powder is present in Table 5.21. The total production of milk powder was 1.41 lakh kg during the year 2015-16. The total manufacturing cost of milk powder was ₹ 198.71 lakh, in which share of raw material used i.e. whole milk was 99.34, while that of conversion cost was 0.66 per cent. The per kg manufacturing cost of milk powder estimated to be ₹ 140.93.

Table 5.21 Item wise manufacturing cost of Milk powder of JZSDUS (2015-16)

Sr. No.	Items of cost	Qty (lakh kg)	Unit cost (₹/Kg)	Total cost (₹ in lakh)
1	Raw materials Used			
A	Whole milk	7.05	28	197.4 (99.34)
B	Conversion cost	-	0.93	1.31 (0.66)
	Total cost	-	-	198.71 (100)
2	Total production of milk powder (lakh kg)	1.41	-	-
	Manufacturing cost of milk powder (₹/kg)			140.93

(Figures in the parenthesis are the percentages to total cost)

c) Manufacturing cost of SMP

The item wise manufacturing cost of SMP is present in Table 5.22. The total production of SMP was 15.53 lakh kg during the year 2015-16. The total manufacturing cost of SMP was ₹ 1405.07 lakh, in which share of raw material used i.e. skim and butter milk was 99.40 per cent, while that of conversion cost was 0.60 per cent. The per kg manufacturing cost of SMP estimated to be ₹ 90.47.

Table 5.22 Item wise manufacturing cost of SMP of JZSDUS (2015-16)

Sr. No.	Items of cost	Qty (lakh kg)	Unit cost (₹/Kg)	Total cost (₹ in lakh)
1	Raw materials Used			
A	Skim and Butter milk	64.97	21.5	1396.85 (99.4)
B	Conversion cost	-	0.53	8.22 (0.6)
	Total cost	-	-	1405.075 (100)
2	Total production of SMP (lakh kg)	15.53	-	-
	Manufacturing cost of SMP (₹/kg)			90.47

(Figures in the parenthesis are the percentages to total cost)

d) Manufacturing cost of Butter

The item wise manufacturing cost of butter is shown in Table 5.23. The total production of butter was 16.47 lakh kg during the year 2015-16. The total manufacturing cost of butter was ₹ 4149.42 lakh, in which share of raw material used i.e. cream was 99.22, while that of conversion cost was 0.78 per cent. The per kg manufacturing cost of butter estimated to be ₹ 251.93.

Table 5.23 Item wise manufacturing cost of Butter of JZSDUS (2015-16)

Sr. No.	Items of cost	Qty (lakh kg)	Unit cost (₹/Kg)	Total cost (₹ in lakh)
1	Raw materials Used			
A	Cream (fat)	16.02	257	4117.14 (99.22)
B	Conversion cost	-	1.96	32.28 (0.78)
	Total cost	-	-	4149.42 (100)
2	Total production of butter (lakh kg)	16.47	-	-
	Manufacturing cost of butter (₹/kg)			251.93

(Figures in the parenthesis are the percentages to total cost)

5.11.7.2 Manufacturing cost of milk products of Yashoda dairy

a) Manufacturing cost of ghee

The item wise manufacturing cost of ghee is present in Table 5.24. The total production of ghee was 11.20 lakh kg during the year 2015-16. The total manufacturing cost of ghee was ₹ 2910.20 lakh, in which share of raw material used i.e. cream and butter were 57.17 and 41.73 per cent respectively. While that of conversion cost was 1.10 per cent. The per kg manufacturing cost of ghee estimated to be ₹ 259.84.

Table 5.24 Item wise manufacturing cost of ghee of Yashoda dairy (2015-16)

Sr. No.	Items of cost	Qty (lakh kg)	Unit cost (₹/Kg)	Total cost (₹ in lakh)
1	Raw materials Used			
A	Cream (fat)	6.40	260	1664 (57.17)
B	Butter	4.80	253	1214.40 (41.73)
C	Conversion cost	-	2.87	31.80 (1.10)
	Total cost	-	-	2910.20 (100)
2	Total production of ghee (lakh kg)	11.20	-	-
	Manufacturing cost of ghee (₹/kg)			259.84

(Figures in the parenthesis are the percentages to total cost)

b) Manufacturing cost of SMP

The item wise manufacturing cost of SMP present in Table 5.25. The total production of SMP was 10.85 lakh kg during the year 2015-16. The total manufacturing cost of SMP was ₹ 1051.90 lakh, in which share of raw material used i.e. skim and butter milk was 99.27 per cent, while that of conversion cost was 0.73 per cent. The per kg manufacturing cost of SMP estimated to be ₹ 96.94

Table 5.25 Item wise manufacturing cost of SMP of Yashoda dairy. (2015-16)

Sr. No.	Items of cost	Qty (lakh kg)	Unit cost (₹/Kg)	Total cost (₹ in lakh)
1	Raw materials Used			
A	Skim and Butter milk	45.4	23	1044.20 (99.27)
B	Conversion cost	-	0.71	7.70 (0.73)
	Total cost	-	-	1051.90 (100)
2	Total production of SMP (lakh kg)	10.85	-	-
	Manufacturing cost of SMP (₹/kg)			96.94

(Figures in the parenthesis are the percentages to total cost)

c) Manufacturing cost of Cheese

The item wise manufacturing cost of cheese is present in Table 5.26. The total production of cheese was 2.21 lakh kg during the year 2015-16. The total manufacturing cost of butter was ₹ 486.03 lakh, in which share of raw material used i.e. cream and SNF were 35.30 per cent and 63.32 per cent, respectively. While that of conversion cost was 1.36 per cent. The per kg manufacturing cost of cheese estimated to be ₹ 219.92

Table 5.26 Item wise manufacturing cost of cheese of Yashoda dairy (2015-16)

Sr. No.	Items of cost	Qty (lakh kg)	Unit cost (₹/Kg)	Total cost (₹ in lakh)
1	Raw materials Used			
A	Cream	0.66	260	171.60 (35.30)
C	SNF	1.71	180	307.80 (63.32)
D	Conversion cost	-	3	6.63 (1.36)
	Total cost	-	-	486.036 (100)
2	Total production of Cheese (lakh kg)	2.21	-	-
	Manufacturing cost of cheese (₹/kg)			219.92

(Figures in the parenthesis are the percentages to total cost)

d) Manufacturing cost of Gulab jamon

The item wise manufacturing cost of Gulab jamon is present in Table 5.27. The total production of gulab jamon was 0.70 lakh kg during the year 2015-16. The total manufacturing cost of gulab jamon was ₹ 53.39 lakh, in which share of raw material used i.e. maida, SMP and vegetable fats were and 25.55 per cent, 55.05 per cent and 19.38 per cent, respectively. While that of conversion cost was 4.56 per cent. The per kg manufacturing cost of gula jamon estimated to be ₹ 76.27

Table 5.27 Item wise manufacturing cost of gulab jamon of Yashoda dairy (2015-16)

Sr. No.	Items of cost	Qty (lakh kg)	Unit cost (₹/Kg)	Total cost (₹ in lakh)
1	Raw materials Used			
A	Maida	0.29	45	13.05 (25.55)
B	SMP	0.29	96.94	28.11 (55.05)
C	Vegetable fats	0.09	110	9.90 (19.38)
B	Conversion cost	-	2.55	2.33 (4.56)
	Total cost	-	-	53.39 (100)
2	Total production of Gulab jamon (lakh kg)	0.70	-	-
	Manufacturing cost of gulab jamon (₹/kg)			76.27

(Figures in the parenthesis are the percentages to total cost)

5.11.8 Marketing cost of milk products

The item wise marketing cost of milk products of milk by JZSDUS and Yashoda Dairy are present in Table 5.28 and 5.29, respectively.

It is seen from the Table 5.28 that, the total marketing cost estimated was ₹ 52.05 lakhs in which the share of fixed cost was 2.39 per cent , while that of variable cost was 97.61 per

cent. Advertisements, transports charges, materials and supplies were the major items of cost sharing 42.10 per cent to total marketing cost. The product wise marketing cost of milk products such as milk powder, SMP, butter and ghee were ₹ 8.6, ₹5.23, ₹ 36.71 and ₹ 1.50 lakhs respectively, in which major items of costs were the packing materials, advertisement transport charges and wages and bonus of workers etc.

The average per kg marketing costs of milk products such as milk powder, SMP, butter and ghee came to ₹ 6.09, ₹ 0.33, ₹ 2.22 and ₹ 3.06, respectively.

It is seen from the Table 5.29 that, the total marketing cost estimated was ₹ 153.57 lakhs in which the share of fixed cost was 6.51 per cent , while that of variable cost was 93.36 per cent. Advertisements, transports charges, materials and supplies were the major items of cost sharing 90.86 per cent to total marketing cost. The product wise marketing cost of milk products such as ghee, SMP, cheese and gulab jamon were ₹ 57.32, ₹ 74.39, ₹ 17.87 and ₹ 3.90 lakhs respectively, in which major items of costs were the packing materials, advertisement transport charges and wages and bonus of workers etc.

The average per kg marketing costs of milk products such as ghee, SMP, cheese and gulab jamon came to 5.11, 6.85, 8.05 and 5.57, respectively

Table 5.28 Item wise marketing cost of milk products of JZSDUS

(₹ in lakh)

Sr. No.	Item	Milk powder	SMP	Butter	Ghee	Total cost
A	**Total fixed cost**					
1	Land rent	0.003	0.01	0.002	0.002	0.017
2	Depreciation	0.021	0.28	0.53	0.007	0.838
3	Interest	0.006	0.09	0.29	0.02	0.406
	Total fixed cost	**0.03 (0.36)**	**0.381 (7.23)**	**0.822 (2.24)**	**0.029 (1.98)**	**1.26 (2.39)**
B	**Total variable cost**					
1	Wages and bonus paid to the workers	1.04 (11.85)	0.75 (14.38)	2.89 (7.89)	0.06 (4.4)	4.75
2	Traveling allowances	0.09 (1.04)	0.17 (3.24)	0.30 (0.82)	0.01 (0.91)	0.57
3	Materials and supplies	1.31 (15.33)	0.72 (13.66)	5.54 (15.11)	0.14 (9.43)	7.71
4	Transporting charges	0.71 (8.36)	1.04 (19.78)	4.46 (12.16)	0.12 (8.17)	6.38
5	Packing materials and charges	2.94 (34.14)	0.8 (15.1)	14.47 (39.43)	0.66 (43.1)	18.87
6	Repairs to vehicle	0.14 (1.74)	0.13 (2.52)	0.78 (2.14)	0.04 (3.05)	1.095
7	Sell tax	0.27 (3.14)	0.33 (6.83)	1.74 (4.76)	0.78 (5.21)	3.127
8	Advertisement	2.04 (23.69)	0.74 (14.02)	5.43 (14.79)	0.34 (23.17)	8.55
9	Miscellaneous	0.03 (0.35)	0.17 (3.24)	0.242 (0.66)	0.008 (0.58)	0.45
	Total variable cost	**8.57 (99.64)**	**4.85 (92.77)**	**35.89 (97.76)**	**1.48 (98.02)**	**52.12 (97.1)**
	Total cost (A+B)	**8.6 (100)**	**5.23 (100)**	**36.71 (100)**	**1.50 (100)**	**52.05 (100)**
	Average Marketing cost (₹/kg)	6.09	0.33	2.22	3.06	11.57

(Figures in the parenthesis are the percentages to total cost)

Table 5.29 Item wise marketing cost of milk products of Yashoda dairy (₹ lakh)

Sr. No.	Item	Ghee	SMP	Cheese	Gulab jamon	Total cost
A	**Total fixed cost**					
1	Land rent	0.02	0.03	0.007	0.001	0.058
2	Depreciation	2.45	3.17	0.76	0.17	6.55
3	Interest	1.27	1.65	0.39	0.08	3.39
	Total fixed cost	**3.74 (6.54)**	**4.83 (6.53)**	**1.16 (6.51)**	**0.25 (6.64)**	**10.01 (6.51)**
B	**Total variable cost**					
1	Wages and bonus paid to the workers	1.10 (1.93)	1.44 (1.94)	0.34 (1.94)	0.07 (1.94)	2.96 (1.92)
2	Traveling allowances	0.18 (0.32)	0.23 (0.32)	0.05 (0.31)	0.01 (0.32)	0.48 (0.30)
3	Materials and supplies	3.81 (6.64)	4.94 (6.64)	1.19 (6.67)	0.26 (6.62)	10.20 (6.64)
4	Transporting charges	3.74 (6.53)	4.86 (6.53)	1.16 (6.52)	0.25 (6.40)	10.02 (6.51)
5	Packing materials and charges	37.61 (65.55)	48.78 (65.55)	11.75 (65.57)	2.59 (65.59)	100.73 (65.59)
6	Repairs to vehicle	0.33 (0.59)	0.43 (0.58)	0.11 (0.62)	0.02 (0.65)	0.90 (0.57)
7	Sell tax	0.80 (1.40)	1.05 (1.42)	0.25 (1.40)	0.05 (1.45)	2.15 (1.40)
8	Advertisement	5.93 (1035)	7.69 (10.34)	1.84 (10.31)	0.40 (10.17)	15.88 (10.33)
9	Miscellaneous	0.08 (0.15)	0.11 (0.15)	0.02 (0.15)	0.006 (0.16)	0.21 (0.13)
	Total variable cost	**53.58 (93.46)**	**69.53 (93.47)**	**16.71 (93.49)**	**3.65 (93.36)**	**143.47 (93.49)**
	Total cost (A+B)	**57.32 (100)**	**74.39 (100)**	**17.87 (100)**	**3.90 (100)**	**153.57 (100)**
	Average Marketing cost (₹/kg)	5.11	6.85	8.05	5.57	6.52

(Figures in the parenthesis are the percentages to total cost)

5.11.9 Management cost of milk products

The item wise marketing cost of milk products of milk by JZSDUS and Yashoda Dairy are present in Table 5.30 and 5.31, respectively

Table 5.30 Item wise Management cost of milk products of JZSDUS

(2015-16)

Sr. No.	Item	Amount (₹ In lakhs)	Per cent
A	**Total fixed cost**		
1	Land rent	0.1	0.13
2	Depreciation	2.82	3.47
3	Interest	5.68	6.93
	Total fixed cost	**8.6**	**10.53**
B	**Total variable cost**		
1	Wages and bonus paid to the workers	23.4	28.77
2	Traveling allowances	6.77	8.33
3	Post, telephone, Printing and stationary	19.38	23.58
4	Rent and taxes	15.35	18.57
5	Miscellaneous	8.06	9.91
	Total variable cost	**72.76**	**89.46**
	Total cost (A+B)	**81.36**	**100**
	Average Management cost of milk product (₹/kg)	2.4	

Table 5.31 Item wise management cost of milk products of Yashoda dairy

(2015-16)

Sr. No.	Item	Amount (₹ in lakh)	Per cent
A	**Total fixed cost**		
1	Land rent	0.15	0.13
2	Depreciation	9.12	18.24
3	Interest	17.06	34.13
	Total fixed cost	**26.33**	**52.68**
B	**Total variable cost**		
1	Wages and bonus paid to the workers	8.35	16.68
2	Traveling allowances	2.76	5.51
3	Post, telephone, Printing and stationary	8.86	17.73
4	Rent and taxes	2.82	5.65
5	Miscellaneous	0.88	1.75
	Total variable cost	**23.67**	**47.32**
	Total cost (A+B)	**50**	**100**
	Average Management cost of milk product (₹/kg)	2.4	

It is seen from the Table 5.30 that, the total management cost of milk products was ₹ 81.36 lakhs, in which share of fixed cost was 10.53 per cent, while that of variable cost

was 89.47 per cent. The per kg management cost of milk product was estimated to ₹ 2.40.

It is seen from the Table 5.31 that, the total management cost of milk products was ₹ 50 lakhs, in which share of fixed cost was 52.68 per cent, while that of variable cost was 47.32 per cent. The per kg management cost of milk product was estimated to ₹ 2.

5.12 Total costs, gross and net returns of dairy units.

The details of annual total costs of JZSDUS and Yashoda dairy are given in Table 5.32 and 5.33.

Annual total cost include cost on account of purchase price, procurement, processing, distribution and management cost of milk and conversion, marketing and management cost of milk products.

It is observed from Table 5.32 that, the total cost amounted to ₹ 36110.48 lakhs per annum. Out of total cost the share of fixed cost was 1.73 per cent, while that of variable cost was 98.27 per cent. Among the various items of total cost, cost of milk purchasing was the major item which shared 65.30 per cent.

It is observed from Table 5.33 that, the total cost amounted to ₹ 19410.40 lakhs per annum. Out of total cost the share of fixed cost was 4.84 per cent, while that of variable cost was 95.16 per cent. Among the various items of total cost, cost of milk purchasing was the major item which shared 60.94 per cent.

Table 5.32 Item wise fixed, variable and total cost of milk and milk products of JZSDUS (2015-16)

(₹ In lakhs)

Sr. No.	Item	Amount	Per cent
A	**Total fixed cost**		
1	Milk procurement	38.23	0.10
2	Milk processing	268.56	0.73
3	Milk distribution	126.35	0.34
4	Milk management	170.77	0.47
5	Milk product conversion	7.38	0.020
6	Milk product Marketing	1.26	0.003
7	Milk products management	8.6	0.023
	Total fixed cost	**621.15**	**1.73**
B	**Total variable cost**		
1	Purchase price of milk	23598.27	65.30
2	Milk procurement	1497.45	4.14
3	Milk processing	1659.33	4.59
4	Milk distribution	1269.96	3.51
5	Milk management	1467.75	4.06
6	Milk product conversion	36.077	0.10
7	Manufacturing cost of milk products	5836.27	16.16
8	Milk product Marketing	51.47	0.14
9	Milk products management	72.76	0.20
	Total variable cost	**35489.33**	**98.27**
	Total cost (A+B)	**36110.48**	**100**

Table 5.33 Item wise fixed, variable and total cost of milk and milk product of Yashoda dairy (2015-16)

(₹ In lakhs)

Sr. No.	Item	Amount	Per cent
A	**Total fixed cost**		
1	Milk procurement	44.61	0.22
2	Milk processing	406.87	2.09
3	Milk distribution	113.88	0.58
4	Milk management	334.32	1.72
5	Milk product conversion	11.01	0.05
6	Milk product marketing	10.01	0.05
7	Milk product management	26.33	0.13
	Total fixed cost	**947.03**	**4.84**
B	**Total variable cost**		
1	Purchase price of milk	11827.82	60.94
2	Milk procurement	630.29	3.25
3	Milk processing	460.28	2.38
4	Milk distribution	520.13	2.68
5	Milk management	369.22	1.91
6	Manufacturing cost of milk product	4450.73	22.93
7	Milk product marketing cost	143.47	0.74
8	Milk product management cost	23.67	0.13
9	Milk product conversion cost	37.76	0.20
	Total variable cost (B)	**18463.37**	**95.16**
	Total cost (A+B)	**19410.4**	**100**

Table 5.34 Costs and returns from milk of JZSDUS

(2015-16)

Sr. No.	Item	(₹/litre)	Total cost ₹
1	Purchase price of raw milk	27.60	23598.27
2	Procurement cost of milk	1.79	1535.38
3	Processing cost of milk	2.25	1927.89
4	Distribution costs of milk	1.63	1396.11
5	Management cost of milk	1.91	1638.52
	Total cost	35.20	30096.67
	Sale of milk	41	26614.6
	Returns from milk	5.79	-

It is observed from Table 5.34 the per litre total cost of milk was ₹ 35.20 where as the sale price of milk was ₹ 41. The per litre return was ₹ 5.79

Table 5.35 Costs and returns from milk of Yashoda dairy

(2015-16)

Sr. No.	Item	(₹/litre)	Total cost (₹)
1	Purchase price of raw milk	28.91	11827.82
2	Procurement cost of milk	1.65	674.91
3	Processing cost of milk	2.12	867.16
4	Distribution costs of milk	1.55	634
5	Management cost of milk	1.72	703.55
	Total cost	35.95	14707.45
	Sale of milk	43	14827.26
	Returns from milk	7.04	-

Table 5.36 Costs and returns from milk products of JZSDUS (2015-16)

Sr. No.	Particulars	Milk powder	SMP	Butter	Ghee
1	Total manufacturing cost of milk products (lakh ₹)	198.71	1405.07	4149.42	126.12
2	Quantity produced (lakh kg)	1.41	15.53	16.47	0.49
3	Manufacturing cost of products (₹ /kg)	140.92	90.47	251.93	257.38
4	Sale price of products (₹/Kg)	225	170	315	345
5	Returns from products (₹/kg)	84.07	79.52	63.06	87.61

It is observed from Table 5.35 that, the per litre total cost of milk was ₹ 35.95 where as the sale price of milk was ₹ 43. The per litre return was ₹ 7.04.

It is observed from the Table 5.36 that, the per kg returns from milk powder, SMP, butter and ghee was ₹ 84.07, ₹ 79.52, ₹ 63.06 and ₹ 87.61, respectively.

It is observed from the Table 5.37 the per kg returns from ghee, SMP, cheese and gulab jamon was ₹ 90.16, ₹ 103.06, ₹ 100.08 and ₹ 162.06, respectively.

Table 5. 37 Costs and return from milk product of Yashoda dairy (2015-16)

Sr. No.	Particulars	Ghee	SMP	Cheese	Gulab jamon
1	Total manufacturing cost of product (lakh ₹)	2910.2	1051.9	486.03	51.06
2	Quantity produce (lakh kg)	11.2	10.85	2.21	0.70
3	Manufacturing cost of product (₹/Kg)	259.83	96.94	219.92	72.94
4	Sale price of products (₹/kg)	350	200	320	235
5	Return from produce	90.16	103.06	100.08	162.06

5.13 Costs, returns and net returns of dairy units.

The total returns of the JZSDUS and Yashoda dairy are present in Table 5.38 and 5.39, respectively during the year 2015-15.

Table 5.38 Costs and returns of JZSDUS

(2015-16)

Sr. No.	Items	Qty (lakh lit or kg)	Unit price (₹/lit or kg)	Total cost (lakh ₹)
I	**Costs**			
i	Fixed costs	-	-	621.15
ii	Variable costs	-	-	35489.33
iii	**Total costs**	**-**	**-**	**36110.48**
II	**Returns**			
i	Sell of milk	649.14	41	26614.74
ii	Sell of milk products			
A	Milk powder	1.41	225	317.25
B	SMP	15.53	170	2640.1
C	Butter	16.47	315	5188.05
D	Ghee	0.49	345	169.05
iii	Difference in closing and opening stock			3499.35
iv	Other receipts			1316.3
	Total returns			39744.84
III	**Net returns**			
A	Over fixed cost			39123.69
B	Over variable cost			4255.51
C	Net returns			3634.36
IV	**B:C ratio**			1.10

Table 5.39 Costs and returns of Yashoda dairy

(2015-16)

Sr. No	Items	Qty (litre)	Unit price (₹/lit kg)	Total cost (₹)
I	**Costs**			
i	Fixed costs	-	-	947.03
ii	Variable costs	-	-	18463.37
iii	**Total costs**	**-**	**-**	**19410.40**
II	**Returns**			
i	Sell of milk	344.82	43	14827.26
ii	Sale of milk products			
A	Ghee	11.2	350	3920
B	SMP	10.85	200	2170
C	Cheese	2.21	320	707.2
D	Gulab jamon	1.33	235	312.55
iii	Difference between opening and closing stock			176
iv	Other receipts			68
	Total returns			22181.01
III	**Net returns**			
A	Over fixed cost			21223.98
B	Over variable cost			3717.64
C	Net returns			2770.61
IV	**B:C ratio**			1.14

It is observed from Table 5.38 that, the annual gross returns amounted to ₹ 3974.84 lakhs. The profitability worked out over fixed costs was ₹ 39123.69 lakhs and total returns over variable cost was ₹ 4255.51 lakhs. The B:C ratio worked out to 1:10.

It is observed from Table 5.39 the annual gross returns amounted to ₹ 22181.01 lakhs. The profitability worked out over fixed costs was ₹ 21223.98 lakhs and total returns over variable cost was ₹ 3717.64 lakhs. The B:C ratio worked out to 1:14.

5.14 Break-even analysis

The break-even analysis was carried out in order to estimate the minimum quantities of milk and processed milk which the dairy unit must handle during year to cover total cost. The break-even output is that output where total revenue equals the total cost.

The break-even analysis of JZSDUS and Yashoda dairy are present in Table 5.40 and 5.41 respectively.

It is seen from Table 5.40 that, The estimated break- even quantity of processed milk was 796.40 lakh litre and actual quantity of milk was 851.88 lakh litres. It is clearly indicate that, actual quantity should be increased up to 796.40 lakh litres in order to cover the cost of production.

It is seen from Table 5.41 that, The estimated break- even quantity of processed milk was 313.55 lakh litre and actual quantity of milk was 407.61 lakh litres. It is clearly indicate that,

Table 5.40 Actual and break-even quantities of milk products of JZSDUS

(2015-16)

Sr. No.	Particulers	Qty
1	Actual output(lakh litre)	683.04
2	Annual fixed cost of milk processing unit (₹ Lakh)	621.15
3	Annual total variable cost of milk processing unit (₹ Lakh)	35489.23
4	Annual gross returns from milk processing unit (₹ Lakh)	39744.84
5	Estimated break-even quantity of processed milk (lakh litre)	796.40
6	Actual quantity of processed milk (lakh litre)	851.88

Table 5.41 Actual and break-even quantities of milk products of Yashoda dairy

(2015-16)

Sr. No.	Particulers	Qty
1	Actual output(lakh litre)	369.78
2	Annual fixed cost of milk processing unit (₹ Lakh)	947.03
3	Annual total variable cost of milk processing unit (₹ Lakh)	18463.37
4	Annual gross returns from milk processing unit (₹ Lakh)	22181.01
5	Estimated break-even quantity of processed milk (lakh litre)	313.55
6	Actual quantity of processed milk (lakh litre)	407.61

actual quantity should be increased up to 313.5 lakh litres in order to cover the cost of production.

5.15 Economic evaluation of individual dairy units

The study of costs and returns of individual dairy units an important base on determining their profitability. Also, the study of costs and returns is an important economic criterion for reorganizing the business.

5.15.1 Land use pattern of individual dairy units

The information of land use pattern of individual dairy unit is given in Table 5.4. It is observed that, the total land holding of cow herd and buffalo herd were 3.20 ha and 5.20 ha respectively. Out of this 0.08 ha and 0.20 ha land of cow herd and buffalo herd respectively was permanent fallow. The cropping intensity of cow herd and buffalo herd was 200 per cent.

Table 5.42 Land use pattern of individual dairy unit

(ha)

Sr. No.	Particulars	Cow herd	Buffalo herd
1	Total land	3.20	5.20
2	Irrigated land	3.20	5.20
3	Permanent fallow	0.08	0.20
4	Area under cultivation	3.12	5.00
	Gross cropped area	6.24	10.00
	Cropping intensity	200	200

5.15.2 Livestock composition of individual dairy units

The Table 5.42 indicates the livestock composition of individual dairy unit.

It is seen from Table 5.42 that, total livestock population of cow herd and buffalo herd was 54 and 96 respectively. Out of total livestock population in milk cows and buffaloes contributes major share i.e. 68.52 and 64.60 per cent. The share of dry animals was 16.67 and 13.54 per cent in cow herd and buffalo herd respectively. There is no breeding bull in cow herd and 5 breeding buffalo in buffalo herd.

Table 5.43 Livestock composition of individual dairy units

(N)

Sr. No.	Particulars	Cow herd	Buffalo herd
1	In- milk animal	37.00 (68.52)	62.00 (64.60)
2	Dry animal	9.00 (16.67)	13.00 (13.54)
3	Calves	8.00 (14.81)	16.00 (16.66)
4	Breeding bull	0.00	5.00 (5.20)
	Total livestock	**54.00 (100)**	**96.00 (100)**

(Figures in parentheses are percentages to total number)

5.15.3 Capital assets of individual dairy units

Land, labour and capital are the most important factors of milk production activity. The information on value of

capital assets of the individual dairy unit s presented in Table 5.43 and Fig.5.4 and 5.5.

It can be observed from the Table 5.43, the total value of assets inclusive of land was ₹ 194.25 and ₹ 548.82 lakhs of cow herd and buffalo herd respectively. The share of land value in total value of assets was 64.16 and 69.14 per cent in cow herd and buffalo herd, respectively. Thereby, indicate that land as major item of farm assets. The share of livestock in total value of capital assets was 10.28 per cent in cow herd and 42.81 per cent in buffalo herd.

Table 5.44 Capital assets of individual dairy units

(₹ In lakh)

Sr. No.	Particulars	Cow herd	Buffalo herd
1	Land	144.00 (74.14)	300.00 (54.70)
2	Farm building	25.50 (13.12)	9.00 (1.63)
3	Byre	3.00 (1.55)	2.00 (0.36)
4	Irrigation structure	0.50 (0.25)	0.45 (0.08)
5	Livestock	19.95 (10.28)	235.03 (42.81)
6	Machinery and tools	0.86 (0.44)	1.82 (0.33)
7	Dairy equipments	0.44 (0.22)	0.52 (0.09)
	Total assets	**194.25 (100)**	**548.82 (100)**
	Value of capital assets excluding land	50.25	248.82

(Figures in parentheses are percentages to total cost)

5.15.4 Cost of milk production of individual dairy units

The details of cost of milk production of dairy unit was shown in Table 5.44.

Table 5.45 Cost of milk production of individual dairy units

(₹ in lakh)

Sr. No.	Particulars	Cow herd	Buffalo herd
1	No. of milch animals	54	96
2	Feeding cost	49.36 (64.16)	67.02 (69.14)
3	Labour cost	12.64 (16.44)	11.99 (12.38)
4	Veterinary and Misc. charges	1.46 (1.90)	2.30 (2.38)
5	Working of accessories and vehicles	0.79 (1.03)	0.91 (0.94)
	Working cost (2+5)	**64.25 (83.53)**	**82.23 (84.84)**
6	Herd replacement cost	4.97 (6.47)	6.66 (6.88)
7	Interest on value of animals and fixed assets	4.07 (5.30)	5.04 (5.20)
8	Depreciation on fixed investment and accessories	3.61 (4.7)	2.98 (3.08)
	Fixed cost (6+8	**12.67 (16.47)**	**14.70 (15.16)**
	Total cost (Working + fixed cost)	**79.63 (100)**	**96.93 (100)**
	Per animal cost (₹)	14246	10096
	Per litre cost (₹)	27.67	38.06

(Figures in parentheses are percentages to total cost)

It is observed from the Table 5.44 that, total cost of milk production of cow herd was ₹ 76.63 lakhs. The share of working cost was 83.53 per cent, while share of fixed cost was 16.47 per cent in total cost of cow herd. Out of total cost of cow herd 64.16 per cent was feeding cost. The estimated per animal per annum cost of cow herd was ₹ 14246 and per litre cost was ₹ 27.67.

Total cost of milk production of buffalo herd was ₹ 96.93 lakhs. The share of working cost was 84.84 per cent, while share of fixed cost was 15.16 per cent in total cost of buffalo herd. Out of total cost of buffalo herd 69.14 per cent was feeding cost. The estimated per animal per annum cost of buffalo herd was ₹ 10096 and per litre cost was ₹ 38.06.

5.15.5 Cost and returns of individual dairy units

The cost and returns structure of individual dairy unit was shown in Table 5.45. The total cost of milk production activity was ₹ 76.90 lakhs for cow herd and ₹ 96.93 lakh for buffalo herd. The per litre cost of milk production was ₹ 27.67 for cow herd and ₹ 38.06 for buffalo herd. Per litre price received for cow milk was ₹ 32 and for buf

falo milk was ₹ 42.

The production activity yields the gross return 88.88 lakh for cow herd and ₹ 106.32 lakh for buffalo herd. The net return over total cost was ₹ 11.98 lakh for cow herd and ₹ 9.36 lakhs for buffalo herd. The estimated B:C ratio was 1:15 for cow herd and 1:09 for buffalo herd. From the above discussion it can be

concluded that, the cow herd was more benefited than buffalo herd.

Table 5.46 Actual costs and returns from milk production of individual dairy units

(Lakh ₹/ milch herd)

Sr. No.	Particulars	Cow herd	Buffalo herd
1	No. of milch animals	54	96
2	Working cost	64.25	82.23
3	Fixed cost	12.65	14.70
	Total cost (Working + Fixed cost)	76.90	96.93
4	Milk production(Lakh litre)	2.73	2.46
5	Per litre price realized	32	42
6	Per litre cost	27.67	38.06
7	a) Milk value b) Value of dung Total returns	87.36 1.52 88.88	103.32 3.00 106.32
8	Net returns over working cost	24.63	24.09
	Net returns over total cost	11.98	9.36
	B:C ratio	**1.15**	**1.09**

5.15.6 Annual income of individual dairy units

The total annual income of individual dairy unit was ₹ 90.08 lakh for cow herd and ₹ 106.84 lakhs. The share of milk activity in annual income of individual dairy unit was 98.36 percent in cow herd and 99.51 per cent in buffalo herd. The remaining 1.34 per cent in cow herd and 0.49 per cent in buffalo herd was from other sources.

Table 5.47 Annual income of individual dairy unit.

(₹ In lakh)

Sr. No.	Particulars	Cow herd	Buffalo herd
1	Milk production activity	88.88 (98366)	106.63 (99.51)
2	Other sources	1.20 (1.34)	0.53 (0.49)
	Total income	**90.08 (100)**	**106.84 (100)**

(Figures in parentheses are percentages to total income)

5.16 Problem Faced by dairy units

5.16.1 Problems faced by co-operative and private dairy unit.

a) Collection of milk

1. Spoilage of milk
2. Heavy competition to co-operative dairy from private dairy

3. Low quality milk and adulteration
4. Losses of milk in handling
5. Low milk collection increases cost of production

b) Processing of milk

1. Irregularity in electricity supply
2. Increased price of raw materials and chemicals
3. Older machinery use3
4. High repair and maintenance cost
5. Lack of research and development facilities
6. Lack of skilled labour

c) Marketing of milk and milk products

1. Highly competitive market condition
2. High cost of packing material
3. Distant markets
4. Higher commission to commission agent
5. Spoilage of milk and milk product due to poor keeping quality
6. Private dairy captured maximum market

d) Manufacturing of milk products

1. Quality of milk products is not of high standard

e) Financial and administrative constraints

1. High production cost for co-operative dairy unit
2. Political interference in co-operative dairy unit
3. Curtailed Govt. grants.

5.16.2 Problems faced by individual dairy units

a) Purchase on milch animals

1. Difficulty in getting loans
2. Non availability of pure breed in local market

b) Sell of milch animal

1. Malpractices followed by agent in local market
2. Distantly situated regulated market

c) Maintenance of milch animals

1. Shortage of man power
2. Higher wage rates for labour
3. High cost of fodder and concentrates
4. Lack of knowledge about scientific feeding approach

d) Marketing of milk

1. Rate of milk is not proper
2. Lack of knowledge about value added product making
3. Distant markets

5.19 SWOT analysis

a) Strengths

1. Jalgaon ranks 7th in milk production and 1st Powder plan in Maharashtra
2. Variety of climate suitable for different animal breed.
3. Mumbai, Aurangabad and Nasik are the biggest market available.
4. Traditional emphasis on consumption

b) Weaknesses

1. Traditional method of animal rearing
2. Lack of mechanization
3. Dairy is the subsidiary business but not prime business

4. Poor quality of milk production
5. Lack of management and feeding practices

c) Opportunities

1. Demand for milk increased day by day.
2. Increased investment in milk industry through private sectors.
3. Growing focus on health and nutrients in urban market.
4. Per capita consumption of milk is increased

d) Threats

1. Low price of milk in international and local markets affects on milk industry.
2. Lack of skill labour
3. Difference in milk procurement during lean and flush season.
4. Higher cost of Animal feed and milk production.
5. High competition due to new emerging brand.

6. SUMMARY AND CONCLUSIONS

The wet dairy is zooming an international dairy pattern, following GATT and emergence of WTO. Indian dairy industry has an opportunity to augment its exports. The increasing globalization of food distribution and the necessity of having a strong position in order to take an advantage of the increasing world-wide demand will lead to continue restructuring of the Indian dairy industry over the next few years. The major emphasis is being laid on quality of raw milk, increasing processing efficiencies and development of new value added products.

In India, there is a wide scope for increasing the per capita consumption of milk to meet the nutritional requirements. In view if increasing demand for milk in the urban as well as rural areas, many private, co-operative and government dairy units have entered into dairy business.

In Jalgaon district, different forms of dairy units are managed under government, co-operative and private sectors which are competition with each other. The Jalgaon Zilha Sahakari Dudh Utpadak Sangh, Jalgaon and Yashoda dairy, Chalisgaon are popular milk processing units in Jalgaon district. This dairy units has entered to business of manufacturing and marketing of milk products. It was decided to choose this unit for its economic and management study. Considering these facts, the research topic *viz.,* " An Economic Appraisal of Dairy Industry in Jalgaon district of Maharashtra" is undertaken with the following specific objectives.

1. To evaluate the performance of selected private, co-operative and individual dairy units in Jalgaon district of Maharashtra.
2. To estimate costs and returns of selected dairy units.
3. To study the problems of dairy industries and suggest measures to overcome.

The present study is based upon the relevant data obtained from annual reports of the dairy units and personal interviews of the officials of the units for the year 2015-16. The analysis of data was mostly concerned with the management aspects in procurement, processing and distribution to study the per litre cost of procurement, processing and distribution of the dairy units, to examine economic performance of dairy units and break even analysis of dairy units. The results so obtained are briefly summarised as under.

6.1 Findings

1. Total bovine population of the Jalgaon and Maharashtra decreased from 1086 to 809 thousand and 24624 to 21078 thousand, respectively during the period from 1997 to 2012.
2. The rate of growth of milk production of Maharashtra and India increased by 4.18 per cent and 4.54 per cent respectively during the period from 2006-07 to 2015-16. The annual milk production of Jalgaon decreased by -2.65 per cent during the period from 2006-07 to 2015-16.
3. Total capital raised by JZSDUS was ₹ 9024.21 lakhs. The maximum share of capital was authorized capital

(22.16 per cent), while the share of revised funds and surplus was 5.49 per cent.

4 The annual milk procurement, milk sale and members societies of JZSDUS increased by 4.29, 2.80 and 1.29 per cent during the period from 2006-07 to 2015-16. While annual members decreased by -2.74 per cent during period from 2006-07 to 2015-16. The annual share capital and turnover of Jalgaon Dudh Sangh increased by 8.64 an 13.26 per cent during the period from 2006-07 to 2015-16.

5. The annual milk procurement and milk sale of Yashoda dairy increased by 2.99 and 3.74 per cent during the period from 2011-12 to 2015-16.

6. Total quantity of milk procured by JZSDUS was 855 lakh litres with an average daily procurement of 2.34 lakh litres.

7 Total quantity of milk procured by Yashoda dairy was 409.04 lakh litres with an average daily procurement of 1.12 lakh litres.

8. The price paid to the milk producers by JZSDUS varied across the different seasons. The per litre average price paid to the milk producers during flush season was ₹ 25.11 and it was ₹ 29.82 during lean season. The average price paid to the producers by JZSDUS was ₹ 27.60 and total quantity of milk purchased was 855 lakh litres

9. The price paid to the milk producers by Yashoda dairy varied across the different seasons. The per litre average

price paid to the milk producers during flush season was ₹ 27.20 and it was ₹ 30.20 during lean season. The average price paid to the producers by Yashoda dairy was ₹ 28.1 and total quantity of milk purchased was 409.04 lakh litres.

10. Total procurement cost of milk worked out to ₹ 1535.68 lakhs during the year 2015-16 for JZSDUS. In the total procurement cost, the share of fixed cost was hardly 2.49 per cent and that of variable costs was to the tune of 97.51 per cent.
11. The total procurement cost of milk worked out to ₹ 674.91 lakhs during the year 2015-16 for Yashoda dairy. In the total procurement cost, the share of fixed cost was hardly 6.61 per cent and that of variable costs was to the tune of 93.39 per cent.
12. The total processing cost of milk of JZSDUS was worked out to ₹ 1927.89 lakhs. In the total cost, per cent share of fixed and variable cost was 13.93 and 86.07 percent, respectively.
13. The total processing cost of milk of Yashoda dairy was worked out to ₹ 867.16 lakhs. In the total cost, per cent share of fixed and variable cost was 46.92 and 53.08 per cent, respectively.
14. The total distribution cost of milk of JZSDUS was ₹ 1396.31 lakhs. In the total costs, share of fixed and variable cost was 9.05 and 90.95 per cent, respectively.

15. The total distribution cost of milk of Yashoda dairy was ₹ 634 lakhs. In the total costs, share of fixed and variable cost was 17.96 and 82.04 per cent, respectively.
16. The total management cost of milk of JZSDUS was worked out to ₹ 1638.52 lakhs, during the year 2015-16. In total management cost, the share of fixed and variable cost were came to 10.42 and 89.57 per cent respectively.
17. The total management cost of milk of Yashoda dairy was worked out to ₹ 703.55 lakhs, during the year 2015-16. In total management cost, the share of fixed and variable cost were came to 47.52 and 52.48 per cent respectively.
18. The total conversion cost of milk products of JZSDUS was estimated to ₹ 43.06 lakhs. Out of the total conversion cost, the per cent share of fixed cost was 17.34 per cent, while that of variable cost was 82.66 per cent. The conversion costs of the products, such as milk powder, SMP, butter and ghee were estimated ₹ 0.93, 0.53, 1.96 and 2.55 lakhs, respectively.
19. The total conversion cost of milk products of Yashoda dairy was estimated to ₹ 48.77 lakhs. Out of the total conversion cost, the per cent share of fixed cost was 22.57 per cent, while that of variable cost was 77.43 per cent. The conversion costs of the products, such as ghee, SMP, cheese and gulab jamon were estimated ₹ 32.15, ₹ 7.66, ₹ 6.61 and ₹ 2.34 lakhs, respectively.

20. The average per kg manufacturing costs of milk products of JZSDUS such as milk powder, SMP, butter and ghee came to ₹ 140.93, ₹ 90.47, ₹ 251.93 and ₹ 257.40, respectively.
21. The average per kg manufacturing costs of milk products of Yashoda dairy such as ghee, SMP, cheese and gulab jamon came to ₹ 259.84, ₹ 96.94, ₹ 219.92 and ₹ 72.94, respectively.
22. The total marketing cost of milk products of JZSDUS was ₹ 52.05 lakhs in which the share of fixed cost was 2.39 per cent , while that of variable cost was 97.61 per cent. Advertisements, transports charges, materials and supplies were the major items of cost sharing 42.10 per cent to total marketing cost.
23. The total marketing cost of milk products of Yashoda Dairy was ₹ 153.57 lakhs in which the share of fixed cost was 6.51 per cent , while that of variable cost was 93.36 per cent. Advertisements, transports charges, materials and supplies were the major items of cost sharing 90.86 per cent to total marketing cost.
24. The total management cost of milk products of JZSDUS was ₹ 81.36 lakhs, in which share of fixed cost was 10.53 per cent, while that of variable cost was 89.47 per cent.
25. The total management cost of milk products of Yashoda dairy was ₹ 50 lakhs, in which share of fixed cost was 52.68 per cent, while that of variable cost was 47.32 per cent.

26. The total cost of JZSDUS amounted to ₹ 36110.48 lakhs per annum. Out of total cost the share of fixed cost was 1.73 per cent, while that of variable cost was 98.27 per cent.
27. The total cost of Yashoda dairy amounted to ₹ 19410.40 lakhs per annum. Out of total cost the share of fixed cost was 4.84 per cent, while that of variable cost was 95.16 per cent.
28. The annual gross returns of JZSDUS amounted to ₹ 3974.84 lakhs. The profitability worked out over fixed costs was ₹ 39123.69 lakhs and total returns over variable cost was 4255.51 lakhs. The B:C ratio worked out to 1:10.
29. The annual gross returns of Yashoda dairy amounted to ₹ 22181.01 lakhs. The profitability worked out over fixed costs was ₹ 21223.98 lakhs and total returns over variable cost was 3717.64 lakhs. The B:C ratio worked out to 1:14.
30. The estimated break-even quantity of processed milk of JZSDUS was 796.40 lakh litre and actual quantity of milk was 851.88 lakh litres. It is clearly indicate that, actual quantity should be increased up to 796.4 lakh litres in order to cover the cost of production.
31. The estimated break-even quantity of processed milk of Yashoda dairy was 313.55 lakh litre and actual quantity of milk was 407.61 lakh litres. It is clearly indicate that, actual quantity should be increased up to 313.55 lakh litres in order to cover the cost of production.

32. The total land holding of cow herd and buffalo herd were 3.20 ha and 5.20 ha, respectively. Out of this 0.08 ha and 0.20 ha land of cow herd and buffalo herd, respectively was permanent fallow. The cropping intensity of cow herd and buffalo herd was 200 per cent.
33. Total livestock population of cow herd and buffalo herd was 54 and 96, respectively. Out of total livestock population in milk cows and buffaloes contributes major share i.e. 68.52 and 64.60 per cent. The share of dry animals was 16.67 and 13.54 per cent in cow herd and buffalo herd. respectively.
34. The total value of assets inclusive of land was ₹ 194.25 and ₹ 548.82 lakhs of cow herd and buffalo herd, respectively. The share of land value in total value of assets was 64.16 and 69.14 per cent in cow herd and buffalo herd, respectively.
35. Total cost of milk production of cow herd was ₹ 76.63 lakhs. The share of working cost was 83.53 per cent, while share of fixed cost was 16.47 per cent in total cost of cow herd. Out of total cost of cow herd 64.16 per cent was feeding cost. The estimated per animal per annum cost of cow herd was ₹ 14246 and per litre cost was ₹ 27.67.
36. Total cost of milk production of buffalo herd was ₹ 96.93 lakhs. The share of working cost was 84.84 per cent, while share of fixed cost was 15.16 per cent in total cost of buffalo herd. Out of total cost of buffalo herd

69.14 per cent was feeding cost. The estimated per animal per annum cost of buffalo herd was ₹ 10096 and per litre cost was ₹ 38.06.

37. The production activity yields the gross return ₹ 88.88 lakh for cow herd and ₹ 106.32 lakh for buffalo herd. The net return over total cost was ₹ 11.98 lakh for cow herd and ₹ 9.36 lakhs for buffalo herd. The estimated B:C ratio was 1:15 for cow herd and 1:09 for buffalo herd.
38. The share of milk activity in annual income of individual dairy unit was 98.36 per cent in cow herd and 99.51 per cent in buffalo herd.
39. Adulteration in raw milk and high transport cost was the problems faced by dairy units.

6.2 Conclusion

1. The population of less productive bovines has declined whereas that of productive animals like cross-bread cows has increased
2. The total milk production showed an decreasing trend in Jalgaon district.
3. The livestock population of the Maharashtra and Jalgaon was decrease except total cattle crossbred due to increase in females population of cattle crossbred.
4. The members of co-operative dairy unit was decreased but the number of primary milk co-operative societies increased.
5. The co-operative unit in Jalgaon have made progress in share capital and turnover over the period of time.

6. The purchase price of milk varied according to different season. In lean season, purchase price of milk was little bit higher than flush season. The per litre purchase price of Yashoda dairy was greater than JZSDUS.
7. The quantity used for manufacturing milk products, was less than the quantity of milk used for liquid milk distribution during the year 2015-16.
8. The average per litre procurement, processing, distribution and management cost of milk of JZSDUS was higher than Yashoda dairy.
9. The per kg conversion and marketing cost of SMP and ghee of JZSDUS was less than Yashoda dairy.
10. The average per kg manufacturing cost of ghee and SMP of Yashoda dairy was higher than JZSDUS because of high conversion and marketing cost.
11. The per kg management cost milk product of JZSDUS was higher than Yashoda dairy.
12. The estimated break-even quantity of processed milk of JZSDUS, was 996.9 lakh liter and actual quantity of milk was 851.88 lakh liters. It is clearly indicate that, the actual quantity should be increased up to 996.9 lakh litres in order to cover the cost of production.
13. The estimated break-even quantity of processed milk of Yashoda dairy was 941.9 lakh litre and actual quantity of milk was 407.61 lakh litres. It is clearly indicate that, actual quantity should be increased up to 941.9 lakh litres in order to cover the cost of production.

14. The B:C ratio of JZSDUS was less than Yashoda dairy. Therefore Yashoda dairy have more benefit than JZSDUS.
15. The milk production and gross returns showed positive relationship with the number of milch animals. The returns increased with the herd size .
16. The activity of maintaining cross-bread cows of milk production was profitable than of maintaining buffaloes.
17. The dairy units faced several problems in their business activity *viz.,* problems in collection of milk, processing of milk, marketing of milk and milk products, manufacturing of milk products, financial and administrative constraints
18. The problem faced by milk producers *viz.*, problems in purchase on milch animals, sell of milch animal, maintenance of milch animals, marketing of milk.

6.3 Suggestions

1. To improve economic efficiency of a business activity to a higher level, the dairy unit should try to increas the utilization of install capacity and profitability in business.
2. It is advisable to the dairy unit to increas the procurement price of milk to attract the milk producer.
3. The expenditure on feed, fodder and concentrates could be reduced by adopting high yielding varieties of grasses, legumes and fodder crops on farmers fields. The Government should provide the necessary input supplies at subsidized rates to the dairy farmers.

4. The milk producers should be trained for dairy management practices viz., feeding practices, maintaining optimal herd size, balanced feeding, artificial insemination and new technologies in dairying in order to achieve the maximum milk production thereby realizing more profit and would generate employment and income.

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