Economics of buffalo milk production in Mhow tehsil of Indore district

THESIS

Submitted to the

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya Gwalior

(M.P.)

In partial fulfilment of the requirements for

the Degree of

MASTER OF VETERINARY SCIENCE AND ANIMAL HUSBANDRY

In

Livestock Production and Management

By

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2010

CERTIFICATE – I

This is to certify that the thesis entitled "***ECONOMICS OF BUFFALO MILK PRODUCTION IN MHOW TEHSIL OF DISTRICT INDORE***" submitted in partial fulfilment of the requirement for the degree of "***MASTER OF VETERINARY SCIENCE AND ANIMAL HUSBANDARY***" *in* ***LIVESTOCK PRODUCTION AND MANAGEMENT,*** Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya Gwalior (M.P.) is a record of bonafide research work carried out by ***Mr. PARMJEET SINGH*** under my guidance and supervision. The subject of the thesis has been approved by the student's Advisory Committee and the Director of Instructions.

No part of the thesis has been submitted for any other degree or diploma (certificate awarded etc) or has been published/ published parts have been fully acknowledged. He has duly acknowledged all the assistance and help received during the course of investigation.

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CERTIFICATE – II

This is to certify that the thesis entitled "***ECONOMICS OF BUFFALO MILK PRODUCTION IN MHOW TEHSIL OF DISTRICT INDORE"*** submitted by **Mr. *PARMJEET SINGH*** to the, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya Gwalior (M.P.) in partial fulfilment of the requirement for the degree of **"*Master of Veterinary Science & Animal Husbandry*"** in the Department of Livestock Production & Management, has after evaluation, been approved by the external examiner and by the student's advisory committee after an oral examination on the same.

Place: Mhow (M.P.)

Date: 27/11/2015

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ACKNOWLEDGEMENT

I take this privilege to express my esteem and profound sense of gratitude to my guide and chairman of advisory committee ***Dr. Sandeep Nanavati,*** *Associate Professor Department of Livestock Production and Management College of Veterinary Science and Animal Husbandry, Mhow (M.P.) for his learned counsel, valuable guidance, concrete suggestion and constant encouragement during the entire course of the study and for help in preparing the manuscript of the thesis.*

I owe my wholehearted gratitude to the members of advisory committee ***Dr.N.K.Nayak,*** *Assitant professor, Deptt of Livestock Production and Management,* ***Dr.S.K.Joshi,*** *Associate Professor, Department of Animal Breeding and Genetics,* ***Dr.A.R.Verma,*** *Associate. Professor, Department of Livestock Production & Management, College of Vety. Sci. & A.H., Mhow for the suggestions and altruistic help that has given accelerated move to the work.*

I would have never been the one I am without the constant inspiration and support rendered by my junior ***Rajnikanta.*** *I thank to her for all that she has been to me.*

Indeed, the words at my command are inadequate either in form or spirit to convey the depth of my feeling of gratitude and expressing my salutes to my friends and seniors ***Dr. Chabil Singh, Dr. Harish Sharma, Dr. Gaurav Chowdhary, Dr. N.S. Rawat, Dr. N. Kurechea and Dr. Lekha Panwel*** for their unselfness support and help at all time during the experimental work, without whom this present experiment work was not possible.

I express my deep sense of gratitude, which is solely reserved for my father ***Dr. D.S. Chowdhary*** *and beloved mother for their blessings, love, sacrifice, patience, inspiration and appreciation during the course of study, which was very much necessary to me to materialize this study.*

I Convey my gratefulness to my dear sister ***Assist. Commandant Dr. S.S Chowdhary*** *for the moral support and felicitation that has kept me sprightly and vibrant during the execution of this work.*

Last, but not the least, I am grateful to my near and dear who helped me every time.

In the end my prayer to God Almighty is to bless me and all who have helped me and reduce our burden in life.

Place: - MHOW (M.P.)
Date: - 27-11-10

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CHAPTER – I

INTRODUCTION

Livestock keeping is a centuries old tradition for millions of Indian rural households and domesticated animals have been an integral part of the farming systems from time immemorial. Although the organization of livestock production in small units persists, household production systems are increasingly becoming integrated into input as well as out put markets. As a result of gradual transition from subsistence to market system, the economic dimensions of livestock keeping have assumed increasing significance in household behavior. Thus, in understanding its true significance, the livestock sector in India needs to be viewed as a sector linked with the livelihood of millions of rural households, over 70% of all rural households, who depend on livestock farming for supplementary incomes.

India is, predominantly, an agricultural country with more than 75 percent of the population in villages, depending on agriculture, animal husbandry and allied activities for their livelihood. Among many livestock enterprises, dairying is the most ancient occupation established in the rural setting of our country. Dairy sector contributes significantly in generating employment opportunities and supplementing the income of small and marginal farmers and landless laborers of rural India, besides, providing food security. The demand of livestock products is also increasing at the rate of more than 4 percent per annum.

Livestock Sector is a prominent sector among agriculture and allied activities in India. In 1997-98, livestock alone contributed to 25 per cent of the total value of agriculture GD which has now increased upto 30% in the year 2007-2008. This has gradually increased from 14 per cent in 1980-81. On the other hand, the contribution of the agricultural sector to gross domestic product (GDP) decreased from 26 per cent in 1997-98 to 17.1 percent in 2008-09. In 2008-09 the contribution of livestock to total GDP was 5.21% according to Government of India report 2008-09. Dairy sector ranks first among the individual agriculture commodities in terms of total value of production. The value of milk output and its products is 70000 crore rupees and that of dairy industry as a whole is 105000 crore rupees.

India, the current leader in the dairy world, ranks first in milk production with a production level of 106.1 million tonnes of milk (FAO - 2008) growing steadily at a compound annual growth rate of 7- 8 percent. India is the world's single largest milk producing country with a share of about 14 per cent in world milk production. Milk has achieved a unique status in terms of its output value and contribution to the national economy, with output value exceeding Rs.100000 crores and has made rapid strides both in terms of number of milk producers and quantity of milk produced. The White Revolution has demonstrated that the power of scale can be effectively acquired by milk producers if they work in cooperative manner. The per capita availability of milk is estimated to have increased to 252 grams per day during 2008 from 226 grams per day during 2001.

Buffaloes dominated the milk production scene contributing about 54 percent of the total, followed by cows (about 45%) and goats (about 3%). India has over 98 million buffaloes and accounts 57% of world's buffalo population. Buffalo population increased from 43.4 million recording a growth rate of 1.59% on an average per annum during 1951-97 ranging from 1.12 to 1.87% in different decades. In contrast, buffalo population almost doubled over the same period, growing much faster (almost 2% per annum between 1987 and 1992). The positive and impressive growth rates in Indian buffalo population can mainly be assigned to the increasing demand for milk and milk products. In addition buffalo is a triple purpose animal for milch, meat and draught, it also provides better economic returns to the farmer.

But over the time, the growth in production as well as in productivity has accelerated but, productivity has increased faster than the production indicating that milk production growth is gradually becoming productivity centered.

Livestock production plays a pivotal role in the rural economy of the developing countries like India. Marketing channel is a path traced in the direct or indirect transfer of product, as it moves from a producer to ultimate consumer. Market channel is the structure of agent and dealers, wholesalers and retailers through which the commodity product or service is marketed. The production of milk is essentially a market-oriented enterprise. Appropriate market availability prompts smallholders to produce more milk primarily for sale and earn cash income so as to meet for their petty needs. This trend, however, leads to the

reduction in the milk to be retained at home for consumption by the household members. An increase in milk production will not only contribute to more cash income, but also ensure more amount of milk available for family consumption.

Also there are various problems being faced by our farmers. The major constraints are high cost of feed and fodder and poor resources for raising fodder crops. Other constraints are under feeding of animals high cost of compound feeds, mineral mixtures and fodder seeds, ill equipped veterinary hospitals, lack of vaccines and medicines, high cost of treatment, poor knowledge of scientific management and animal health care practices. However the level of problems varies from area to area.

Animal Husbandry and dairy farming are vital sectors of rural economy. Dairying on scientific lines offers great opportunities for increasing farm income and employment, particularly for weaker section of the rural community. However, to obtain profit from a dairy unit, the cost structures and economic size of the unit are very important. On the other hand, the traditional cattle keepers of Indore district are very poor, illiterate and not well aware of economic aspect of milk production. Hence, an effort has been made in this study to work out the economics of milk production in different dairy unit sizes. With this view the cost of milk production of buffaloes has been worked out.

Keeping these factors in views, the present investigation on the economics of buffalo milk production in Mhow tehsil district Indore of Madhya Pradesh was studied.

The specific objectives of the studies were:

1. To work out the cost of maintenance per milch buffalo per year on different herd size groups.
2. To work out the cost of milk production per litre for milch buffalo on different herd size groups.
3. To study the pattern of marketing of milk, marketing channels, price spread and marketing efficiency of milk.
4. To identified the constraints of commercial buffalo entrepreneurs.

CHAPTER – II

REVIEW OF LITERATURE

The researcher would be able to make an improvement over the existing studies an also expand the horizons of investigation on the subject matter. The review could also help in refracting the concept and statement, which were made in the earlier studies as well as for supporting the findings of the present study. The attempt of new research worker is to study the literature related to the problem undertaken. Therefore, it forms an integral part of any systematic research work. Hence an effort has been made in this chapter to review the selected reference in three section by keeping in view of objectives of the study as under:

2.1 Economics of milk production.

2.2 Marketing of milk under various marketing channels.

2.3 Constraints and suggestions of dairy owners.

2.1 Economics of milk production

Reddy (1980) analyzed labour employment in dairy enterprise in Bangalore district of Karnataka State. The study revealed that the labour employment in the maintenance of a cross-bred cow during a lactation was 106, 111 and 92 days on small, medium and large farms, respectively. The corresponding figures for a local buffalo were 81, 72 and 74 man days and for a local cow 56, 54 and 45 man days, respectively. The potential of labour employment in dairying increased with the introduction of new technology.

Gupta (1986) studied the cost of milk production of crossbred cows Jersey, Holstein-Friesian and Brown-Swiss along with the cost of milk production of desi cow and murrah buffaloes has been worked out in this study for the selected tract of Punjab state. In this tract the milk production cost was minimum in rainy season followed by winter and summer seasons in case of murrah buffaloes while for Jersey, Brown-Swiss and desi cows the cost was minimum in rainy season

followed by summer and winter seasons. However, the production cost in the tract for Holstein-Friesian cow was minimum in summer season followed by rainy and winter seasons. Keeping crossbred Holstein-Friesian cow is most profitable in all the seasons of the year.

Kumar and Gupta (1988) studied the cost of milk production of different categories of milk producers for buffalo, local cow and crossbred cow in different seasons in Muzaffar Nagar District of Uttar Pradesh. The study revealed that the per litre cost of milk production from buffalo, local cow and cross-bred cow worked out to Rs.2.34, Rs.1.89 and Rs.1.83, respectively. Thus the per litre cost of milk production was the lowest in the case of cross-bred cow on account of its highest milk yield among the three species of milch animals which proves its economic superiority over the others.

Singh *et al.* (1990) conducted a study at Haryana Agricultural University, Hisar to compare the economics of keeping buffaloes versus crossbred cows under mixed farming conditions. For the units with three cows and three buffaloes, the mean annual expenditure was Rs.26692/- and Rs.27800/- respectively. Income from sale of milk was Rs.34897/- and Rs.24578/-, while net income was Rs.18433/- and Rs.9315/- for a unit of three cows and three buffaloes, respectively. The annual income per 100 rupees invested was Rs.69.05 and Rs.33.50 for cow and buffalo respectively indicating crossbred cow keeping was more profitable.

Grover *et al.* (1992) conducted a study in Bhatinda district of Punjab. The average annual net maintenance cost of a buffalo and a cow for the triennium ending 1989-90 worked out at Rs.5,651 and Rs.4,852, respectively. The average cost of milk production per litre in the case of buffalo based on different cost concepts, i.e. Cost A, Cost B and cost C was estimated at Rs.3.66, Rs.4.19 and Rs.4.53, respectively. The corresponding figures for cows were Rs.4.40, Rs.4.97 and Rs.5.36. The bulk-line cost of production per litre of buffalo's milk covering 85 per cent of milk produced of holdings were Rs.6.32, Rs.8.73 and Rs.6.80, respectively. The corresponding figures in case of cow were Rs.7.60, Rs.9.08 and Rs.9.18 per litre, respectively.

Grover *et al.* (1992) revealed that the farmers of Bhatinda district of Punjab were maintaining on an average three milch cattle worth of Rs.10,489. The average annual net maintenance costs of a buffalo and a cow worked at Rs.5,271 and Rs.4,681. Green fodders, roughages and concentrates taken together accounted for 68.42 and 73 per cent of the total expenditure on a buffalo and a cow respectively. The average annual yields of milk per buffalo and per cow were 1,216 and 926 litres. The average total cost of production per litre of milk for buffaloes and cows came at Rs.4.34, and Rs.5.05, respectively

Autkar *et al.* (1995) studied the components of livestock structure and its milk production in the Vidarbha region of Maharashtra. The maintenance cost per milch animal in small, medium and large size groups was about Rs.1,669, Rs.2,028 and Rs.2,178, respectively and the overall cost being Rs.1,914. The major items of maintenance cost were feed, human labour and interest on working capital. At the overall level, feed cost contributed about 65 per cent of the total cost. The net return per milch animal per annum was Rs.521, Rs.409 and Rs.264 in small, medium and large size groups, respectively. The input-output ratio in milk production worked out at to 1.31, 1.20 and 1.12 in these three size groups, respectively, with overall average being 1.22.

Gadre (1995) examined that the cost and return from milch animals and contribution of dairy and crop enterprises to the total farm income of different size groups of farms in Vidarbha region of Maharashtra. The total cost of rearing a crossbred cow and buffalo worked out to Rs.7,665 and Rs.9,902 respectively, whereas the gross returns were Rs.10,496 and Rs.10,269, respectively. Further, it was observed that the highest net returns were obtained by the small farmers from both a crossbred cow and a buffalo which worked out to Rs.3,891 and Rs.1,053; giving an input-output ratio of 1: 1.41 and 1: 1.08, respectively.

Gouraha (1995) studied the cost structure, pattern of disposal and relative economics of milk production of the urban and rural dairies, in Raipur district of Madhya Pradesh. The study brought out that average daily expenditure incurred on a milch animal was higher in the urban area than in rural area due to higher proportion of concentrate and green fodder fed to animal and higher cost of feed and fodder which accounted for nearly 68 per cent of the total cost. The average cost of production of per litre of milk for crossbred cow came to Rs.5.44 and

Rs.5.16 in the urban and rural dairies, respectively, while the corresponding figures for a buffalo marked out to Rs.6.32 and Rs.6.33, although not much difference in the cost of production of milk in both the areas was observed. The net returns were Rs.3.84 and Rs.4.68 per litre in the case of crossbred cow and buffalo milk respectively in the urban area. These were, however, Rs.2.55 and Rs.3.67 per litre crossbred cow and buffalo milk in the rural area. A loss of Rs.2.13 per litre was reported in the case of local cow milk in the rural dairies. The negative returns per litre of milk for local cow were due to lower milk yield. The per day per animal yield of milk was higher in crossbred cow than in buffalo in both the areas.

Diwakar *et al.* (1995) revealed that the cost of production of cow milk on cost A basis worked out to Rs.3.87, Rs.5.20 and Rs.3.24 per litre, respectively in size – class I, size – class II and size – class III (more than 10 cow house holds). Further, the total cost of production per litre of milk in the corresponding three size classes of dairy farms were Rs.6.39, Rs.7.87 and Rs.5.67.

Khatkar *et al.* (1995) studied in dairy enterprises in different size groups of farm in Hissar district of Haryana. The net return per milch animal from dairy enterprise were found to be the highest on large farms (Rs.6,414) owing to higher productivity and economics of scale enjoyed by them, followed by medium farms (Rs.5,315), small farms (Rs.5,054) and marginal farms (Rs.4,988). More than 75 per cent of the total cost was incurred on feed and fodder in all size categories of farms.

Baruah *et al.* (1996) studied on economics of milk production in Assam. The study revealed that milch animals accounted for a major share followed by cattle sheds and equipments, irrespective of dairy unit size. The fixed costs varied from 10.75 to 13.71 per cent of total cost. Interest on fixed capital emerged as the major components of the fixed cost in all the unit sizes while the feed cost constituted the major item of the variable cost. The total return per milch animal was found to be more in 4-6 animals unit size in comparison to other unit sizes considered in the study. The cost of productions per litre of milk were observed to be Rs.8.47, Rs.8.23, Rs.8.28, Rs.8.38, and Rs.8.08 in less than 4, 4-6, 7-9, 10-12 and more than 12 animal unit sizes, respectively.

Atkare *et al.* (1998) examined the details of all costs recorded in 1994 and 1995 on a crossbred herd maintained at the livestock instructional farm at Akola, Maharashtra. The average gross cost of milk production, on a herd basis, ranged from Rs. 7.52 to 7.9 per litre. Production costs were slightly lower in the summer season, but similar in the winter and rainy seasons. Feed was the major item of expenditure (74%) followed by labour and supervision, replacement costs, and health cover (veterinary charges).

Kumar *et al.* (1998) investigated the average daily milk yield of cows and buffaloes for different herd size categories of households. Based on the results it can be concluded that there are good chances of increasing milk production at constant rate in cows as well as buffaloes through simultaneous increase in the use of all outputs. Concentrates and green fodder were the most significant variables influencing milk production in cows and buffaloes.

Chand *et al.* (1999) studied the major determinants of milk production in the Jaipur district of Rajasthan. The study observed that dry fodder had no significant effect on milk yield of indigenous cows, Friesian and Jersey crossbred and buffaloes in villages. Green fodder and concentrates were the important inputs, which determined milk yield in the villages. It is concluded that it would be possible to increase the yield by feeding more green fodder and concentrates to the animals.

Chand *et al.* (2000) in the Kurukshetra district of Haryana state revealed that cross-bred cows and buffaloes found to be the profitable dairy animals. Break even analysis of output further endorsed this finding. Green fodder, concentrate and labour demonstrated their positive influence on milk production whereas dry fodder and stage of lactation exhibited their negative effect. The study indicated the scope for enhancing milk production through increased use of concentrate feed and green fodder.

Chandra and Agrawal (2000) studied was conducted in Farrukhabad district of U.P. The households were classified in to four categories viz., landless milk producer, small farmer (0.1 – 2.0 ha), medium (2.1 – 4.0 ha) and large (above 4.0 ha) farmers. The total gross cost per milch animal per day worked out to be Rs.48.39 and Rs.50.95 in crossbred cows and buffaloes, respectively. Feed cost

constituted 2/3rd of total gross cost both in cows and buffaloes. The overall net return per day per milch animal was found to be Rs.6.83 and Rs.9.34 for crossbred cow and buffaloes, respectively. The gross cost and net returns per milking animal per day were found almost of the same order both for crossbred cows and buffaloes.net cost per litre of milk from crossbred cow was found to be Rs.5.30 and that of from buffaloes it was Rs.7.58. Net cost per litre of milk was higher in buffaloes as compared to crossbred cows for all the categories except for landless milk producers where it was higher for crossbred cows as compared to buffaloes. It was observed that for medium farmers, crossbred cows are more suitable and for large farmers, buffaloes are more suitable.

Kumar and Kumar (2001) the decomposition analysis of output change under new production technology in dairy farming in Meerut district of Western Uttar Pradesh. Study revealed that the effect of green fodder was positively and negatively significant for crossbred and local cows, respectively. The total estimated change in milk output 156.8% between crossbred and local cows (Group 1) and 33.13% between crossbred cows and buffaloes (Group 2). The contribution of technical change was 47.65 and 8.21% in group 1 and 2, respectively. Estimates of geometric means of different inputs revealed mean differences in the mean level of inputs for buffaloes and local cows in relation to crossbred cows. The geometric mean of value of milk output was also higher in crossbred cows. Decomposition analysis revealed the overall difference in the value of milk output per milch animal between cross-bred and local cows was 156.80% with 15% higher overall returns from crossbred than local cows. A technology output difference of 47.56% was observed between crossbred and local cows. Input contribution was as high as 109.15% with the highest contribution from concentrates (93.41%), labour (6.25%), green fodder (5.92%) and miscellaneous costs (3.37%). The overall difference in gross income per milch animal was only 33.13% between crossbred cows and buffaloes. Decomposition of the total change in milk yield gave an 8.2% neutral and non-neutral technological change contribution while a 24.92% difference in the value of milk output was found between crossbred cows and buffaloes. Concentrates (18.48%) had the highest contribution followed by labour input (3.43%), miscellaneous costs (2.87%) and

green fodder (0.61%). It is concluded that crossbred cows were better allocates of all the inputs compared to local cows and buffaloes as milk producers.

Kumar and Pandian (2001) conducted a study to analyse the input output relationship in milk production for indigenous cows. Crossbred cows and buffaloes in the Villupuram and Salem district of Tamil Nadu. The study revealed that the input data relating to milk production and the output data were collected from selected households. The Cobb-dougles function explained about 85, 74 and 93% of variation in milk yield of indigenous cows, buffaloes and crossbred cows, respectively. The analysis indicated that milk production would be reduced if more dry fodder was fed to the animals. There was a positive relationship between milk yield and the concentrates fed.

Atkare *et al.* (2002) studied on factors affecting the cost of milk production. Such as the cost of feeds, labour, supervision and health coverage, were studied. Data on 30 crossbred cows (Gir x Jersey, Sahiwial x Jersey and Sahiwal x Holstein – Friesian), Maintained at a farm in Maharashtra, India. Covering the period 1998-99, were used. On wet basis, the average gross cost of milk production per litre were Rs.7.08 and Rs.8.07; 6.85 and 8.13; and 6.73 and 7.83, respectively, during the rainy, winter and summer seasons for the year 1998 and 1999. The corresponding values for net cost were Rs.6.86 and 7.83; 6.63 and 7.89; and 6.53 and 6.62, respectively. The average gross cost of milk production on held basis was Rs.9.07 and 9.08; 9.05; 9.37; and 9.24 and 8.89, respectively during the rainy, winter and summer season of the years 1998 and 1999.

Kumar *et al.* (2002) studied the cost and return in milk production in Virudhunagar district of Tamil Nadu. The local cows, crossbred cows and buffaloes for various categories of dairy farms. The collected primary data on various aspects of bovine rearing pertained to the agricultural year 1997-98 feed cost constituted the major component (65-73%) in the gross cost, irrespective of size categories and type of milch bovines. The share of labour cost in the gross cost formed the next largest for all the three species of bovines and for all the categories of bovine keepers (14-30%), the fixed cost shared (9-15%) of the gross cost. The study also revealed that the cost of production was the lowest for crossbred cow followed by buffaloe and local cow.

Kumar and Pandian (2003) the cost of milk production in the milk shed area of Tamil Nadu. Studied the total cost per indigenous cow per day was Rs.33.03. the total fixed cost and total variable cost accounted for 3.01 and 96.18% of the total cost respectively. A category wise analysis of farmers revealed that the total cost decreased with the increase in farm size. The total cost per buffalo per day was Rs.53.72. The total fixed cost and total variable cost accounted for 4.67 and 95.33%, respectively. The total cost per crossbred cow per day was Rs.72.80. The total fixed cost and total variable cost accounted for 7.69 and 92.31% of the total cost, respectively. No specific trend was observed as far as the relationship between the total cost and category of farmers concerned for both buffaloes and crossbred cows. The cost of milk production was lower in crossbred followed by buffaloes and indigenous cows.

Dwaipayan *et al.* (2004) conducted in Udham Singh Nagar district in Uttaranchal to analyse the cost and returns in milk production from indigenous cattle in different seasons for different categories of farmers. Net returns over total cost on an average basis were found to be negative for all the three seasons.

Raju *et al.* (2005) conducted a study in Bangalore district at different levels of production. The average total cost of milk production of cross bred cow per day was Rs 71.76, fixed cost and variable cost accounting for 6.49 and 93.51% of total cost respectively. Feed and labour cost accounted for more than 90% at all levels of production. The average cost per litre of milk at below 6 litre level of production worked out to Rs 9.51, leaving a small margin of profit. It was apparent that the returns over cost at below 6 litres milk yield level is an uneconomic proposition at the current prices offered by the dairy co-operative society.

Dwaipayan *et al.* (2005) conducted a study in the Tarai area of the newly created state of Uttaranchal, India , to analyze the economics of buffalo milk production for diffirent categories of farmers in different seasons [date not given].Larger farmers incurred the highest expenditures (Rs. 21054) in maintenance of their animals. The lowest expenditures were made by the marginal category of farmers (Rs. 17071). Net returns over total cost were negative for all the categories of the farmers, except marginal farmers. Average net loss in the study area was Rs 795. However, family labour income was positive for all categories of farmers. These findings indicate that rearing of buffaloes for milk

purpose is non- remunerative and unprofitable proposition in the study area. Some policies suggestions were made to overcome some of the constraints towards profitable milk production.

Bharadwaj *et al.* (2006) conducted study in four villages of Hissar district of Haryana state and 200 respondents constituted the study sample. The breakeven output milk production was worked out to be 5.00, 5.56 and 5.56 litres per day on small, medium and large categories of respondents, respectively. The breakeven output was achieved much earlier on small herd size as compared to medium and large herd size farms.

Sharma *et al.* (2006) investigated the different feeding patterns in buffalo. Lactating buffaloes (35) were randomly selected to receive enhanced level of oil cakes (ES) in the concentrate (Parts/100: soyabean meal/ mustard cake 20/30, wheat bran 80/70). Fifteen buffaloes were given concentrate mixture usually formulated by the farmer (Parts / 100: mustard cake 8 : wheat bran 92) and designated as control. The basal diet of cereal (wheat/paddy) straws was offered *ad libitum* while the amount of supplements were adjusted in consultation with the farmers during 10 months of feeding trial. In the opinion of the participating farmers ,though enhancement of cake in the concentrate brings overall improvement in the milk yield, body condition of animals and level of cash benefits, requirements of assured cash out lays may be a possible constraints in adoption of this strategy.

Sirohi *et al.* (2007) analyzed the year round data collected from households in villages around Karnal district of Haryana. The cost of milk production and net profit margins was worked out for cross bred cows and buffaloes. The increase in cost was less than proportional to increase in production hence, the net profit margin varied directly with the productivity of animals. The results indicated that, at the field level, rearing of cross bred cow and buffalo is an economically sustainable proposition only if their average daily productivity during lactation is $\geq$ 9 litres and $\geq$ 6 litres respectively.

Singh and Agarwal (2007) conducted study in Imphal West district of Manipur state with objective to work out costs and returns from milk production. Total 80 households were selected consisting of 42 small, 31 medium and 7 large farmers. The net returns from milk production per local milch cow were negative

except for large herd size category. For crossbred cow it was positive and highest for large herd size category followed by medium and small.

Kumar and Singh (2008) conducted study to analyze the economics of milk production in Andaman and Nicobar Islands from local cows, crossbred cows and buffaloes maintainted by different categories of farmers. Negative relationship was observed between the total cost and cost of milk production and the farm size in all the species.

Sekhon *et al.* (2008) conducted study in Punjab, which was divided into three zones. Total sample comprised 100 small, 100 marginal and100 other categories of farmers. It was concluded that green fodder and concentrates constituted 85% of the total cost among the marginal and small farmers in region I; Whereas it was 62% for other categories. In region II and III these items constituted 50% and 35% and 60% and 38% of the total cost respectively, varying inversely with the farm size. Hired labour constituted around 1% among marginal and small farmers; 19-24% for other categories for different regions.

Wani *et al.* (2009) conducted survey in Jammu & Kashmir to examine livestock practices adopted in various agro- climatic zones of the state.150 households were selected from four zones and the study revealed that feed and fodder constitutes the major expenditure in milk production and varies from 50 to 75 percent of the total cost.

2.2 Marketing of milk

Naidu and Babu (1992) attempted to study the impact of dairy cooperative in income and employment of marginal and small farmers, at Parmeswaramanglam. From the analysis it was observed that the increase income from dairying was Rs.830 (25.5%), in case of marginal farmers and Rs.1480 (22.5%), in case of small farmer per annum.

Singh and Singh (1994) studied the production, consumption and disposal of milk on average farm in urban and rural area of Ludhiana district in Punjab. It would be seen that the average production of milk per farm was 6587.75 litre in urban and 4933.94 litre in rural area. Direct consumption of milk was 20.77% in urban and 30.80% in rural area. The quantity of milk converted in to other products

was 16.19 per cent in urban and 29.48% in rural area. They studied different marketing channels in urban and rural areas. The maximum proportions of farmer were found to disposing milk through milk vendor (46%) and milk fed (34%) and halwai (12.5%). The proportion of milk sold through these agencies was found to be the highest for channels producer – milk vendor – consumer in urban area and producer – milk fed – consumer in rural areas.

Raut and Tripathi (1995) studied the marketing cost, margins and price spread in marketing of milk among different size classes of milkmen in Kharda district of Orissa. A large number of intermediaries were involved in the process of milk marketing as observed through the investigation and they form a long chain of market channel. The price received by the producer cover the variable cost but it does not cover the total cost of production. In marketing channels having one middleman, the producer recovered the variable cost but could not recover the total cost of production. In marketing channel of two middlemen, the producer's received a marginal return over the variable cost, which varies from Rs.0.89 to 0.99 per litre. In marketing channel having three middlemen, the price received by the producer was to the extent of 50% of the price paid by the consumers. But the producers fail to get profit over total cost of production per litre.

Singh and Rai (1998) studied economics of production and marketing of milk in Haryana. The study concluded that feed and fodder cost was more important item of the total maintenance cost accounting for 58 to 68 per cent of the total cost. They also studied different marketing channels of milk. The study further showed that the milk vendor being an important intermediary in the milk marketing was taking large profit by adopting various type of malpractices. The net gain was higher to the producer selling milk through milk cooperative society. However, the producer's share in consumers rupee was higher for those selling of milk through private milk vendor. Thus the indicates of marketing efficiency confirmed that channel producer – milk vendor – consumer was most efficient channel in milk marketing in study area.

Baruah and Sarkar (2000) studied the prevailing marketing channel and pricing of liquid milk in Kamrup district, Assam. 10 societies out of the 24 functional societies under West Assam Milk Producer's Cooperative Union Ltd. were selected and studied.

Their different marketing channels were identified in the study areas:

- Producer – MPCS – Milk Union – Urban Consumer
- Producer–Middlemen–Urban Consumer
- Producer – Consumer

The first channel was considered as the superior channel as it guarded the interest of both the producers and the consumer equally.

Babita Bohra *et al.* (2004) studied that production of milk is essentially a market-oriented dairy. Ready market availability prompts smallholders to produce more milk primarily for sale and earn cash income so crucial for their petty needs. This trend, however, leads to the reduction in the milk to be retained at home for consumption by the household members. An increase in milk production will not only contribute to more cash income, but also ensure more amount of milk available for family consumption.

Yadav (2004) conducted study on different marketing channels in Indore district of Madhya Pradesh and concluded that the marketing efficiency was in inverse relation with the total costs and margins. Comparison of Shepherd's indicated that channel-I (99.00) was most efficient followed by channel-II (7.33), channel-IV (4.40) and channel-III (3.87). Marketing efficiency of other channels was low as compared to channel-I due to high marketing cost and presence of intermediaries in the channel.

Vedamurthy and Chouhan (2005) studied the different marketing channels of milk in Shimoga district of Karnataka. When the marketing efficiency was compared between different channels i.e Producer- consumer (channel-1), producer-vendor-consumer (channel-2) and producer- vendor-processor-consumer (channel-3), it was found that the price spread was lower in channel -2. But if we rely on Shepherd's formula, it shows that channel-3 is more efficient than channel-1. This may be true because in the channel-3, where milk vendor processor was intermediary, he was obtaining milk from interior villages and was selling the milk in city in packed form. His product satisfied the consumer and revealed the preference of packed milk from vender processor to that of milk of Karnataka Milk Federation and vendors. Hence the high marketing efficiency channel-3 is in line with the ground realities.

Thirunavukkarasu and Sudeepkumar (2005) investigated the three marketing option were available for the dairy farmers; unorganized vendors, formal / organized dairy cooperatives and integrated contract system. After the weakening of vendor – farmer relationship and initiation of Milk Producer Cooperatives at the village level, there has been a shift from vendor to cooperatives system. When the dairy sector opened for private investment coupled with poor performance of cooperatives, farmers shifted towards new marketing option the 'integrated contract system'. Irregularity in payment, distant location of collection centre and inability to milk the animals were reasons for shifting back to vendor from other marketing options. Promt payments, sustainability of marketing systems in business were major factors responsible for retaining members and attracting new dairy farmers.

Sangu *et al.* (2006) conducted study in western U.P. Moradabad district to know the impact of being the suppliers of dairy cooperatives society and the size of land holdings, on milch herd composition and disposal pattern. For this 120 non-suppliers and 120 suppliers of dairy co-operatives were interviewed . The milch stock size, productivity of animals, milk production, milk flow towards milk vendors, total consumption and conversion of retained milk into products were positively associated with land holding size while the share of milk used in fluid form was negatively associated with land holding size. Landless labourers, marginal farmers and large farmers have been adopting commercialization of dairying in the region while small and medium farmers were keeping milch animals for the domestic use.

Singh *et al.* (2007) conducted study in Imphal west district of Manipur state with objective to work out costs and returns from milk production and disposal of milk. Of the total milk produced, marketed surplus accounted for 96% and the rest 4% was consumed at home.

Yogi *et al.* (2008) conducted study in Jaipur district of Rajasthan. The analysis of primary data collected from 80 milk producers, 8 milk vendors, 5 halwais, 3 contractors and 10 consumers revealed that unorganized sector was dominating in procurement of milk with the share of about 80%. The producers share in consumer's rupee were highest and price spread was observed lowest in channel II. The study further showed that the efficiency of that channel was low in which number of intermediaries were more.

Agarwal *et al.* (2009) conducted study in different agro climatic zones of Gujarat and Maharashtra states to estimate productivity, consumption and marketed surplus of milk. A sample of 150 households from each zone was selected in both the states using multi stage random sampling. The percentage of households selling milk were higher in all the zones of Maharashtra as compared to Gujarat. Most of the households supplied and preferred to sell milk to vendors and consumers in all the zones of two states.

2.3 Constraints and suggestions on dairy owners

Dube *et al.* (1987) observed various problems in adoption in animal husbandry practices. The important constraints were low price of milk and milk product, lack of veterinary hospital in villages and high cost of concentrates.

Chauhan *et al.* (1994) studied losses due to diseases and constraints for dairy development in Kangra district of Himachal Pradesh in 1990-1991. Data colleted from (100) dairy farmer (61 small, 25 medium and 14 large) through personal interview method were analysed. High cost of fodder and concentrates, scarcity of fodder, poor quality of agricultural land, illiteracy, scattered holding, lack of grazing land and infestation of weed were reported to be major problem of dairy development.

Thorat and Kulkarni (1994) studied constraints faced by dairy farmer in Shirpur Tehsil of Pune district. It revealed that the high cost of feed and fodder (87%) non-availability of loan for purchase of animal (7%), inadequate money for the purchase of animal (69%) and inadequate money for construction of byre (59%) were the major economic constraints. Low rate of milk (29%), unsuitable time of milk production (26%) and payment of milk not in time were the other constraints faced by the farmers. It revealed that majority of farmers (85%) were unaware about the preparation of silage in scientific manner and lack of knowledge about the feeding of animal.

Yadav *et al.* (1995) studied the constraints of dairy enterprise in Submontane zone of Maharashtra. The result of the study indicated that the weak financial status, cost factor and management difficulties were the main constraints in not maintaining good quality animals of the farms. The respondent farm families

strongly expressed the need for finance for the purchase of milch animals and also for feed and fodder. They opinioned that good quality feed and fodder should be made available to them at reasonable rates andt they need to be assured reasonable and stable prices for milk throughout the year to make the dairy enterprise as a supplementary and paying proportion.

Rajendran and Prabhakaran (1998) studied the constraints in milk production in rural areas of Dharanpuri district of TamilNadu. The major constraints in milk production were high feed cost, high investment, low price of milk, inadequate infrastructure facilities for milk marketing, low milk yield, inadequate input supply, high cost of veterinary treatment, disease and repeat breeding. It is concluded that adopting improved feeding and breeding management practices can increase milk production.

Keshava and Mandape (2001) studied the problems encountered \and prospects of dairy farming in Muzaffarpur district of North Bihar. Study reveled that inadequate herd size, low milk productivity and poor feeding practices were major problems characterized dairy farming in the area. The other major problems encountered included disease susceptibility of the animals, costly cattle feeds and unavailability of veterinary facilities and regular milk markets.

Natchimuthu and Ramkumar (2004) studied the constraints perceived by 210 dairy farmers selected from six villages in Pondicherry region. Economic constraints especially low price for milk and high cost of feed were emanated from the study as the most serious constraints.

Dwaipayan *et al.* (2004) conducted in Udham Singh Nagar district in Uttaranchal to analyse the cost and returns and constraints in milk production from indigenous cattle in different seasons for different categories of farmers. Net returns over total cost on an average basis were found to be negative for all the three seasons. The major factors, which contributed to unprofitable milk production were high cost of feed and fodder and non-remunerative prices of milk paid by the dairy co-operatives.

Dwaipayan *et al.* (2005) carried out the study in five randomly selected villages of Rudrapur block of district Udham Singh Nagar; Uttaranchal, to study the major constraints perceived by dairy farmers. A total of 72 farmers were selected

as sample for the study, having representations from landless, marginal, small, medium and large farmers. The study established non- remunerative price of milk, testing of milk only on the basis of fat percentage, reproductive problems, distant location of A.I centres and high cost of feeds to be the major constraints faced by the dairy farmers of the region.

Singh and Chouhan (2006) studied the constraints faced by dairy owners in Jhunjhunu district of Rajasthan state. The data were collected through interview schedule from 720 dairy owners of 40 villages. The major constraints were high cost of feed and fodder and poor resources for raising fodder crops. Other constraints were under feeding of animals high cost of compound feeds, mineral mixtures and fodder seeds, ill equipped veterinary hospitals, lack of vaccines and medicines, high cost of treatment, poor knowledge of scientific management and animal health care practices.

Agarwal *et al.* (2007) studied feeding and breeding constraints in Punjab, Karnataka and West Bengal. High cost of feed and fodder, Lack of marketing facilities, non availability of dry fodder, high cost of veterinary treatment were the major hurdles in profitable milk production in the study area.

Rangasamy and Dhaka (2007) identified the major constraints faced by the dairy plants in Tamil Nadu including procurements, processing, manufacturing and distribution of dairy products; the number of respondents were selected based on probability proportion to sample size method. Some members of co-operative society selling milk to vendors and some of the collection centres collecting the inadequate quantity of milk were the very serious problems faced by co-operative and private dairy plants respectively.

Sekhon *et al.* (2008) conducted study in Punjab regarding constraints related to marketing, institutional and production. The major constraints in milk production were high feed cost, high investment, low price of milk, inadequate infrastructure facilities for milk marketing, low milk yield, inadequate input supply, high cost of veterinary treatment, disease and repeat breeding.

Shashi et al. (2009) studied the constraints perceived by the dairy farmers in rearing buffaloes in and around Patna. The study was conducted on 60 randomly selected dairy units. Farmers recorded eleven constraints, of which high cost of

buffalo ranked first followed by lack of proper housing due to high cost of land, non availability of green fodders and feed supplements, high cost of veterinary medicines, poor results of A.I., lack of finance, uneconomical male calves and non remunerative price of milk which require proper attention on priority basis

CHAPTER – III

METHODOLOGY

This chapter deals with the research methodology adopted in the selection of blocks, villages, farmers and markets for the present study, under the following sub-heads:

3.1 Sampling technique

3.2 Collection of data and method of enquiry

3.3 Analytical tools and concepts

3.1 Sampling technique

Multistage stratified random sampling design was used for the selection of ultimate unit of sample. The study was carried out in Mhow tehsil of Indore district (M.P.). For the selection of the sample, two stage stratified random sampling technique was adopted with villages at first stage and respondents within the village as the final stage sampling unit. Five villages of Mhow tehsil of the Indore district were selected for the study. A list of households having buffaloes in each selected village was prepared and arranged in the ascending order of the herd size and stratified into three different herd groups having unit size i.e. small (farmers having less than 5 milch animals), medium (farmers having 5-10 milch animals) and large (farmers having more than 10 milch animals) based on simple cumulative method. A total of 10 milk producers households were selected randomly for all the 3 herd size groups in each of the selected village ensuring equal proportion. A total of 50 milk producer households were selected randomly comprising 25 small, 15 medium and 10 large from all the 5 selected villages.

3.2 Selection of villages

The design of the study for the selection of sample adopted was two stage stratified random sampling with village as a primary unit and milk producer household as a secondary unit.

At the first stage five village producing milk were selected randomly. The selected villages are as under:

1. Umaria 2. Panda 3. Harsola

4. Pigdamber 5. Kauti

3.3 Concepts and definitions used

A. Variable costs

(i) **Feed cost:** The value of purchased feeds was recorded as reported by the respondents whereas owned farm produced feeds were evaluated at the market prevailing prices of the selected villages.

(ii) **Labour cost:** The value of hired labour was recorded as reported by the respondents while the family labour value was imputed at the prevailing wage rate of casual labour in the selected villages.

(iii) **Veterinary and miscellaneous cost:** These included the expenses like veterinary, water and electricity charges and were valued at the actual expenses incurred.

B. Fixed cost

(i) **Depreciation on milch cattle:** Depreciation on milch animals were calculated @ 10 per cent per annum from 5^{th} lactation onwards. Depreciation computed by the straight line method. No depreciation was allowed after 13 years.

(ii) **Depreciation on the value of cattle shed:** The depreciation on cattle shed was charged fixed at the rate of 5 per cent per annum for pucca and 10 per cent per annum for kuchcha sheds.

(iii) **Interest on the fixed capital:** The interest on the owned fixed capital comprising of the value of cattle sheds and milch buffaloes was worked out at fixed rate of 12 per cent per annum, while the interest on the capital borrowed for the purchase of fixed assets was taken as the actual payment made by the respondents.

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

C. Total cost

It included all the working as well as fixed expenses viz., feed, labour, depreciation, interest, veterinary and miscellaneous expenses.

D. Net cost

The net cost was worked out by deducting from the total cost the value of manure produced and value of young stock.

E. Cost and income bases

Cost A = cost of green fodders, roughages and concentrates (farm produced as well as purchased), value of hired upkeep labour, depreciation on the value of milch buffalo and their sheds and miscellaneous expenses.

Cost B	=	Cost A + interest on the value of milch buffalo and their sheds
Cost C	=	Cost B + imputed value of family upkeep labour
Gross income	=	Value of milk and dung produced
Net income	=	Gross income – cost C
Family labour income	=	Net income + imputed value of family labour
Farm business income	=	Gross income – cost

Analytical frame work

Apart from the cost of maintenance, various marketing expenses have also been estimated. The marketing costs included various expenses such as cost of transportation, loading and unloading, commission and fee and certain other marketing expenses.

Multiple regression was selected to establish the input-output relations per buffalo for different herd size groups as dependent variables and four inputs viz., green fodder, dry fodder, concentrates and human labour expenditure as independent variables. The general form of the function fitted was specified as follows:

$Y = ax_1^{b1} x_2^{b2} x_3^{b3} x_4 b^4$

Y = Gross returns of cow milk in rupees.

Where,

A = Constant

X_1 = Value of green fodder in rupees

X_2 = Value of dry fodder in rupees

X_3 = Value of concentrates in rupees

X_4 = Value of human labour in rupees

bi = The regression coefficient of the i^{th} independent variable (i = 1)

Marketing channel

Marketing channel is a path traced in the direct or indirect transfer of title to a product, as it moves from a producer to ultimate consumer. Market channel is the structure of intra agents and dealers, wholesalers and retailers through which the commodity product or service is marketed.

Marketing cost

Marketing cost is the actual expenses incurred in brining the goods and services from the producer to the consumer. Marketing cost included handling charges at local point, assembling charges, transport, handling by wholesalers and retailing charges to customers. These costs are paid by the producer, marketing agencies, purchasers at different stages.

Market margins

Market margins refer to the total expenses and profits of the marketing functionaries.

Price spread

Price spread refers to the difference between price paid by the consumer and price received by the producer.

Producer share in the consumer's rupee

Producers share in consumer's rupee has been calculated by using following formula:

$$P = (C - M)/C \times 100$$

Where,

P = Producer share in consumers rupee

C = Consumer rupee

M = Marketing costs

OR

Producer's share (PS) in the consumer's rupee and marketing efficiency were measured by using following formula:

$$\text{Producer's share (PS)} \quad \frac{\text{Price received by producer}}{\text{Price paid by the consumer}} \times 100$$

Marketing efficiency (ME) was analyzed through the Shepherd's formula as:

Marketing efficiency (ME) = V/I – 1

V = Value of goods sold (consumer's price)

I = Total marketing costs

The higher the ratio, the more the marketing efficiency and vice-versa.

CHAPTER – IV

RESULTS

Milk enterprises

This chapter deals with analysis and interpretation of basic data collected for the present investigation.

4.1 Estimation of cost of maintenance and returns per milch buffalo per year on different herd size groups

The buffaloes were the main milch animals maintained by the farmers in the study area. It provided milk and milk products to the farmer's family and manure to be utilized for crop production. A portion of dung is utilized as fuel. The milch animals maintained on the sample farms are generally of poor breed and are not fed properly which resulted into their low productivity and returns.

Table 4.1: The Cost of maintenance and returns from milk production per buffalo per annum on different farm size groups: (in rupees)

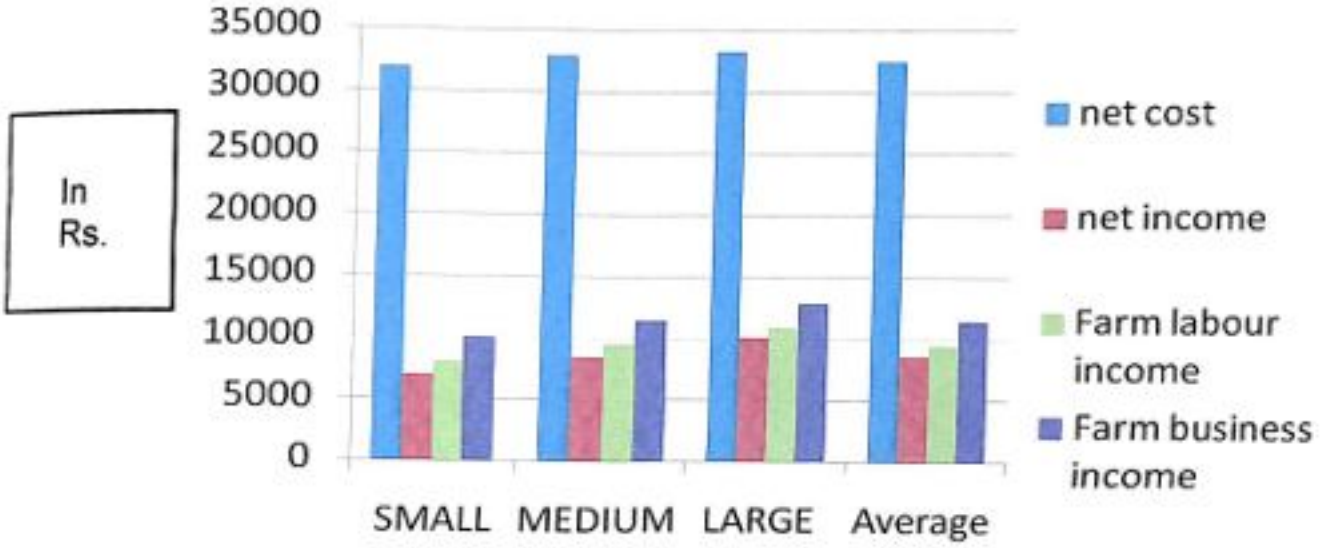
Particulars	Small	Medium	Large	Average
Green fodder	6249.6 (17.8)	6504 (18.05)	6120 (16.8)	6300 (17.72)
Dry fodder	10240.80 (29.30)	10120 (28.09)	11017 (30.29)	10359.80 (29.13)
Concentrates	11260 (32.20)	11278.66 (31.31)	11990 (32.96)	11411.60 (32.09)
Labour charges	1066.80 (3.05)	1984 (5.5)	2041 (5.6)	1536.80 (4.3)
Veterinary charges	853.60 (2.4)	794 (2.2)	849 (2.3)	834.8 (2.3)
Miscellaneous charges	770 (2.2)	753.33 (2.09)	766 (2.1)	764 (2.14)
Depreciation on fixed assets	1522.04 (4.3)	1571.7 (4.36)	1639.15 (4.5)	1560.36 (4.3)

Cost A	31962.84 (91.4)	33005.70 (91.6)	34422.15 (94.6)	32767.56 (92.16)
Interest on fixed capital	1917.76 (5.4)	1957.19 (5.4)	2030.60 (5.5)	1952.16 (5.4)
Cost B	33880.60 (96.9)	34962.89 (97)	35628.72 (97.97)	34554.91 (97.19)
Imputed value of family labour	1066.8 (3.05)	1055.33 (2.9)	744 (3.04)	998.80 (2.
Cost C or total cost of maintenance	34947.39 (100)	36018.22 (100)	36366.72 (100)	35552.50 (100)
Income from dung	1754	1778.66	1783	1767.20
Income from young stock	1352	1353.33	1335	1349
Net cost of maintenance	31841.5	32886.22	33248.72	32436.31

Output				
(i) Milk yield (litres)	1762.4	1877	1968.5	1838
(ii) Price per litre	22	22	22	22
(iii) Value of milk	38772.8	41294	43307	40436
Net income	6931.40	8407.77	10058.27	8465.79
Family labour income	7998.2	9463.1	10802.27	9421.19
Farm business income	9915.96	11407.64	12832.88	11385.49
Input-output ratio	1:1.21	1:1.25	1:1.29	1:1.24
Cost of milk production per litre	18.06	17.51	16.77	17.66

Note: Figures in parentheses show the percentage to total cost.

Fig. 4.1 Cost of maintenance and economics of milk production (per buffalo per annum)



4.2 Comparative economic analysis of net cost of maintenance & economics of milk production per buffalo per annum.

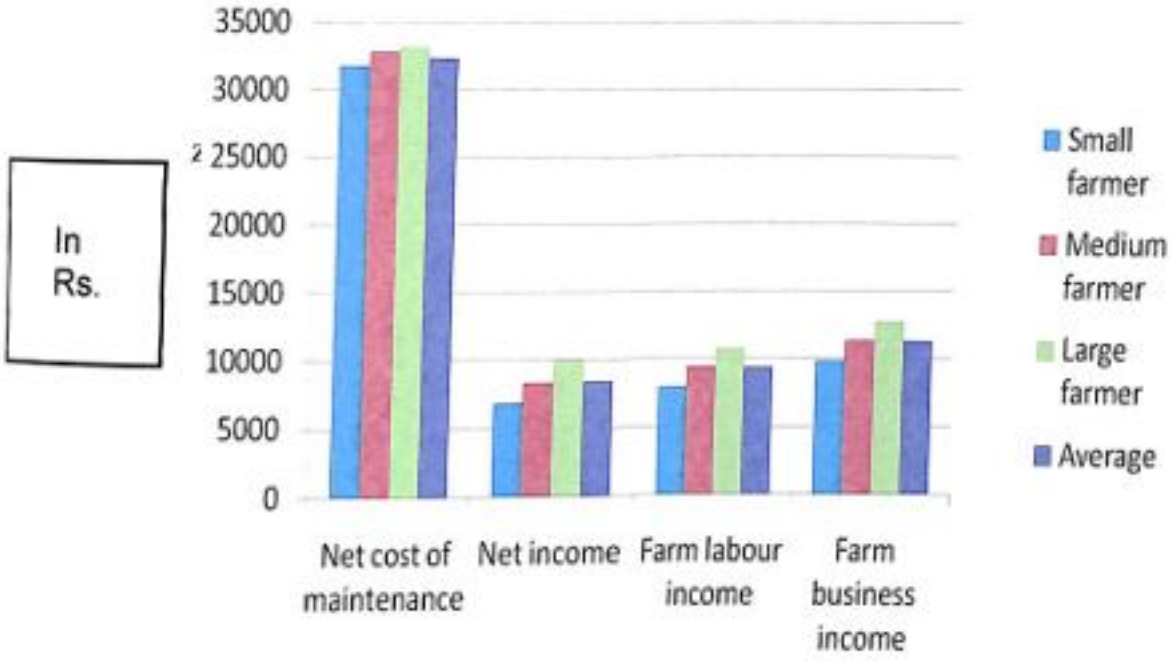


Table 4.1, reveals that, on an average, the total cost of maintenance of a buffalo per annum was worked out to be Rs.35552.50. After deducting the income received from manure and sale of young stock, the average net cost of maintenance came to Rs.32436.31 per buffalo. On an average, the cost of concentrates accounted for the highest percentage being 32.09 to the total cost of maintenance followed by fodder 29.13 per cent, veterinary charges 2.3 per cent, labour charges 4.3 per cent and miscellaneous charges 2.14 per cent. The average per buffalo milk yields came to 1838 litres per annum, which was valued at Rs.40436. On an average, net income per annum was Rs.8465.79. On an average family labour income and farm business income were worked out to Rs.9421.19 and Rs.11385.49, respectively. An increasing trend was observed in the milk yields and net income on large farmers. Better feeding and breeding on large farms resulted into higher milk yields and returns per buffalo on these farms. The cost of milk production per litre per buffalo, on an average, was worked out to Rs.17.66 which was slightly higher on small sized farms due to lower milk yields per buffalo. The average benefit-cost ratio was calculated at 1: 1.24, yields per buffalo.

4.1.1 Production function analysis:

Production function analysis was carried out to examine the productivity and efficiency of different sources of the sample herds. Multiple regression analysis was done to examine the input-output relationship and productivity of herds on milch buffalo.

Production function analysis of milch buffalo

The four regression equations fitted to the data, log-linear regression was found to be best fit on the basis of R^2 value and standard error of regression coefficients. The regression coefficients of different inputs used in the production functions were estimated for buffaloes separately for all selected farms in Mhow tehsil of Indore district.

Functional analysis

The technique of functional analysis was employed for evaluating the resource productivities and resource-use efficiency. The Cobb-Douglas production function which gave the best fit was selected to establish the input-output relations

with returns per buffalo as dependent variables and four inputs viz., green fodder, dry fodder, concentrates and human labour expenditure as independent variables. The regression coefficients of different inputs used in the production functions were estimated for per buffalo separately for all farms sizes.

The general form of the function fitted was specified as follows:

$$Y = a X_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4}$$

Y_1 = Gross returns of cow milk in rupees

Where,

a = Constant

X_1 = Value of green fodder in rupees

X_2 = Value of dry fodder in rupees

X_3 = Value of concentrates in rupees

X_4 = Value of human labour in rupees

bi =The regression coefficient of the i^{th} independent variable (i = 1 to 4)

Table 4.2 Regression coefficient of production functions of buffaloes for different farms.

Particulars	Small	Medium	Large
Constant	3.332	5.499	-26.445
Concentrates	0.0003 (0.0001)	0.00015 (0.00008)	0.0033 (0.0007)
Dry fodder	0.00047 (0.0001)	0.00039 (0.0001)	0.00021 (0.00009)
Green fodder	0.00059 (0.00002)	0.00055 (0.00004)	0.00019 (0.00004)
Human labour	0.0017 (0.00001)	0.0013 (0.00001)	- 0.00040 (0.00003)
Coefficient of determination (R^2)	0.951	0.731	0.558
F- Value	96.70**	6.79**	1.57ns
Returns to scale (bi)	3.06	2.39	3.3
Number of observations (N)	25	15	10

** = $P \leq 0.01$

Note: Figures in parentheses are the standard errors of the regression coefficients.

Table 4.2, reveals that the milch buffalo, for small farmers included in the analysis explained 95.1 per cent of the variation in gross returns by the coefficient of multiple determinations (R2). The elasticity of production with respect to small farmers for green fodder, concentrate and dry fodder were 0.00059, 0.003 and 0.00047, respectively positive and significant at 1 per cent level. This implied that 1 per cent increase in green fodder, concentrate and dry fodder would increase in gross returns by 0.00059, 0.003 and 0.00047 per cent evaluated at the geometric mean level. The regression coefficient of human labour was 0.0017 positive. The sum of elasticities was 0.1211. The results revealed that the farmers could

increase the gross return in milch buffalo by applying more green fodder, concentrates and dry fodder.

Similarly in case of medium farmers, the four variables included in the analysis explained 73.1% of the variation in gross returns by the coefficients of multiple determination. The elasticity of production with respect to the concentrate, dry fodder and green fodder were 0.00015, 0.00039 and 0.00055. The regression coefficient of human labour was 0.0013. Therefore an increase in human labour by 1 percent evaluated at geometric mean would increase the gross returns by 0.0013. The results revealed that the farmers could increase the gross return in milch buffalo by applying more green fodder, concentrates and dry fodder.

In case of large farmers, the four variables included in the analysis explained 55.8 percent of the variation in gross returns by the coefficient of multiple determination The elasticity of production with respect to the concentrate, dry fodder and green fodder were 0.0033, 0.00021 and 0.00019, respectively positive. This implied that 1% increase in concentrate, dry fodder and green fodder would increase the returns by 0.0033, 0.00021 and 0.00019 percent evaluated at geometric mean level. The regression coefficient of human labour was -0.00040. However the results were non significant in case of large farmers.

4.2 Pattern of marketing of milk including different marketing channels

4.2.1 Marketing of milk

The producer has a choice in the selection of distributive channels for his marketing strategy. The following marketing channels were identified for marketing of milk in the study area. Among them, the first channel is a direct channel and the remaining three are indirect channels.

Channel-I: Producer-Local Consumer

Channel-II: Producer-Milk Vendor (A)-Urban Consumer

Channel-III: Producer-Milk Vendor (B)-Halwai-Urban Consumer

Channel-IV: Producer-Private dairy-Distributor-Private milk booth-Urban Consumer

Marketing Costs in Milk Marketing

Average marketing costs incurred by different intermediaries in milk marketing have been worked out in table 4.3.

Table 4.3 Marketing costs incurred by different intermediaries in milk marketing

Item	Channel-II	Channel-III	Channel-IV
Costs incurred by milk vendor (A)			
Transportation	1.10 (44)	-	-
Labour costs	1.40 (56)	-	-
Sub total	2.5 (100)	-	-
Costs incurred by milk vendor (B)			
Transportation	-	1.10 (22.91)	-
Labour costs	-	1.40 (29.16)	-
Sub total	-	2.5 (52.08)	-
Costs incurred by halwai			
Transportation	-	0.20 (4.1)	-
Labour costs	-	0.70 (14.58)	-
Processing	-	0.60 (12.5)	-
Packaging	-	0.20 (4.1)	-
Depreciation on equipment and interest on fixed capital	-	0.60 (12.5)	-
Sub total	-	2.3 (47.91)	-
Costs incurred by private dairy			
Transportation	-	-	0.45 (11.25)
Procurement, input and overheads	-	-	0.45 (11.25)
Processing	-	-	0.56 (14)
Milk Chilling	-	-	0.30 (7.5)
Packaging	-	-	0.22 (5.5)
Marketing overheads	-	-	0.50 (12.5)

Depreciation on equipment and interest on fixed capital	-	-	0.57 (14.25)
Handling losses	-	-	0.10 (3.03)
Sub total	-	-	3.15 (78.75)
Costs incurred by distributor			
Transportation	-	-	0.45 (11.25)
Labour costs	-	-	0.24 (6.00)
Sub total	-	-	0.69 (17.25)
Costs incurred by milk private milk booth			
Transportation	-	-	0.08 (2.00)
Labour costs	-	-	0.08 (2.00)
Sub total	-	-	0.16 (4.00)
Total Marketing Cost	2.5 (100.00)	4.80 (100.00)	4.00 (100)

Note: Figures in parentheses are the percentage of the total marketing costs.

The marketing costs incurred by different marketing functionaries in different channels adopted for sale of milk in the study area. Among the various marketing channels, the cost of marketing (per litre of milk) was the least in channel-II followed by channel-IV, and channel-III. The total marketing costs per litre of milk in the above channels has been worked out to Rs.2.5, Rs.4.80 and Rs.4.00 respectively. Channel-I is not presented in table as the sales were direct and hence marketing cost has not been incurred. In channel-II, entire marketing costs were incurred by the lone market intermediary i. e., milk vendor. An amount of Re.1.10 (44 per cent) was incurred on transportation of milk from village to the town and remaining cost was the cost of labour Rs.1.40 rendered by the milk vendor in supplying milk to the consumers which accounted for a major portion of marketing costs viz. of 56 per cent.

In channel-III, the milk vendor (B) incurred Rs.1.10 (22.91 per cent) towards transportation and Rs.1.40 (29.16 per cent) labour cost while halwai incurred an amount of Rs.2.3 on various items such as labour cost Rs.0.70 (14.58 per cent), processing Rs.0.60 (12.5 per cent), packaging Rs.0.20 (4.1 per cent) and depreciation on equipment and interest on fixed capital Rs.0.60 (12.5 per cent).

Of the total costs per litre of milk incurred in channel-IV, private dairy had ion's share with 78.75 percent followed by the distributor 17.25 per cent and the rivate milk booth 4 percent. The expenditure incurred by the above intermediaries stood at Rs.3.15, Rs.0.69 and Rs.0.16 per litre of milk. Among the various costs incurred by the private dairy, processing and depreciation was the major cost which accounted for 14 percent and 14.25 of total marketing costs. In this channel, overhead costs 12.5 per cent, transportation 11.25 per cent and procurement and marketing overhead 11.25 per cent. The actual amounts incurred on the above items were Rs 0.56, Rs.0.57, Rs 0.50, Rs.0.45 and Rs.0.45, respectively. The remaining costs like chilling, packaging and handling losses accounted for 16.03 per cent. Distributor has spent Rs.0.45 (11.25 per cent) per litre of milk on transportation. His labour charges were Rs.0.24 (6 per cent). The private milk booth incurred an amount of Rs.0.08 (2 per cent) on transportation and labour costs were Rs.0.08 (2 per cent). It is observed that on transportation of one litre of milk in channel-IV accounted for 24.5 per cent of the total cost.

Fig.4.3 Total marketing cost in different channels (per litre)

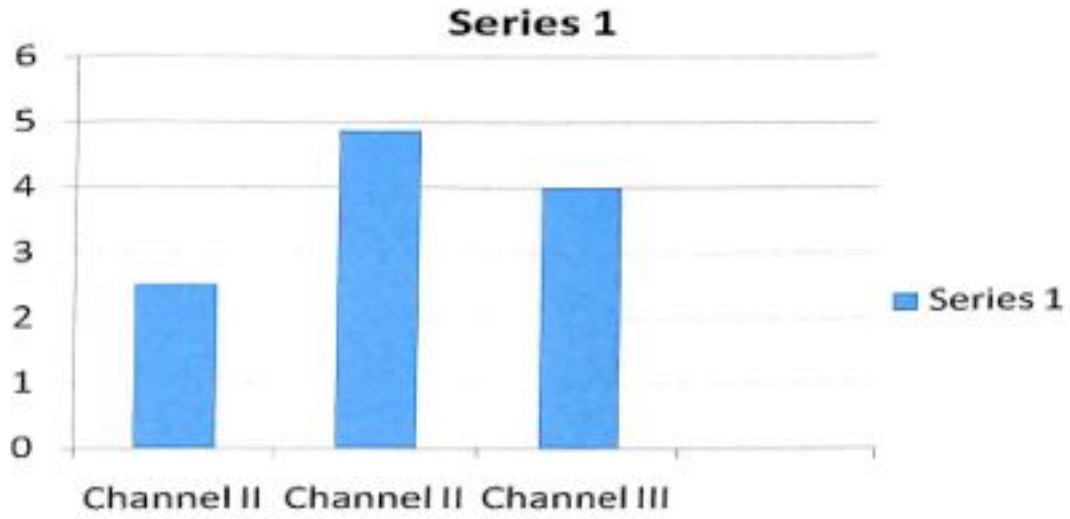
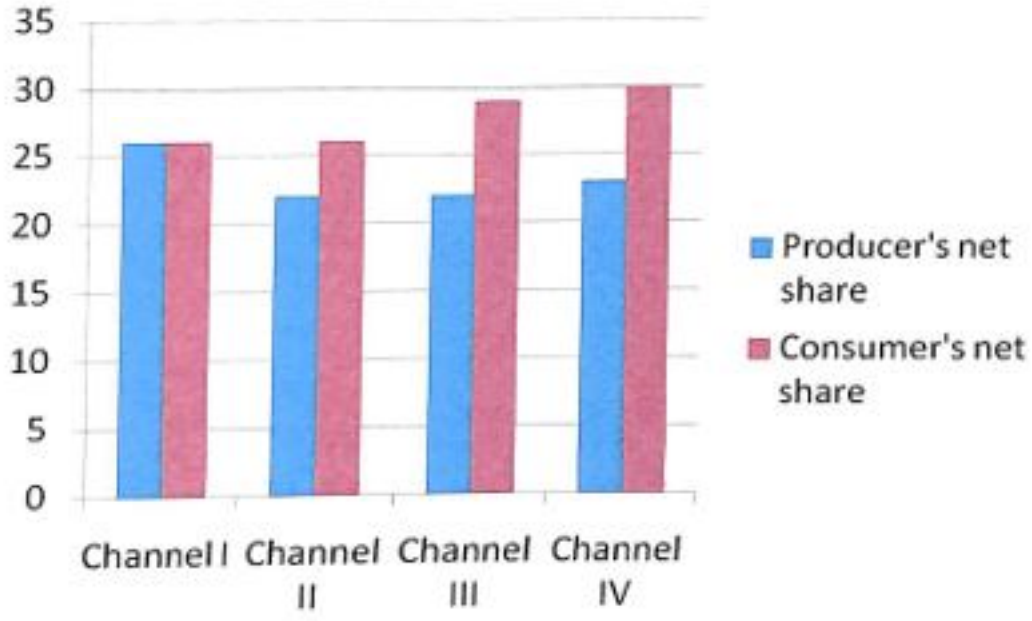


Fig. 4.4 Producer's net share and Consumer's price for different marketing channels



4.3 Estimation of price spread and marketing efficiency of milk

4.3.1 Price- Spread in Marketing of Milk

Price spread refers to the difference between the two prices i.e. the price paid by the consumer and price received by the producer. A study of the prices spread involves not only the ascertainment of the actual prices at various stages of the marketing channel, but the cost incurred in the process of the movement of the produce from the farm to the consumer and the margin of various intermediaries.

The price spread, marketing costs and margins were estimated per litre of milk for sack of convenience. The marketing costs, profit margins of producer-seller as well as market functionaries were worked out and the details about the price spread for per litre of milk marketed through different channels are presented in table 4.4.

Table 4.4 Price-Spread in Marketing of Milk through Different Marketing Channels

Market Functionaries	Channel I	Channel II	Channel III	Channel IV
Producer's net share	26	22 (84.61)	22(75.8)	23(76.6)
Costs incurred by milk vendor (A)	-	2.5 (9.61)	-	-
Milk Vender (A)'s margin	-	1.5(5.7)	-	-
Milk Vendor (A)'s sale price	-	26	-	-
Costs incurred by milk vendor (B)	-	-	2.00(6.8)	-
Milk Vendor (B)'s margin	-	-	1.00 (3.5)	-
Milk Vendor (B)'s sale price	-	-	25	-
Costs incurred by halwai	-	-	2.3 (7.9)	-
Halwai's margin	-	-	1.5 (5.17)	-
Halwai's sale price	-	-	29	-
Costs incurred by private dairy	-	-	-	3.15 (10.5)
Private dairy's margin	-	-	-	1.00 (3.3)
Private dairy sale price				26.15

Costs incurred by distributor	-	-	-	0.70 (2.3)
Distributor's margin	-	-	-	0.60 (2)
Distributor's sale price	-	-	-	28.45
Costs incurred by private milk booth	-	-	-	0.16 (0.5)
Private milk booth's margin	-	-	-	1.00 (3.3)
Private milk booth's sale price	-	-	-	30.00
Consumer's price	26(100.00)	26(100.00)	29(100.00)	30.00(100)

Note: Figures in parentheses are the percentage of the consumer's price

Milk producer received a maximum price i.e. Rs.26.00 per litre of milk in channel I followed by channel IV with Rs.23, channel II and channel III with Rs.22.00. Maximum price of Rs.26.00 per litre of milk in channel I is obviously due to the absence of any intermediary between producer and the consumer. In channel IV in which private dairies existed for purchase of milk was found to be offering only Rs.23 per litre which was lower than price offered by direct consumer. A Rs.26.00 in channel II and milk vendors B Rs.25.00 in channel III.

Leaving the channel I which is a direct channel, producer's share in consumer's rupee was 84.61 percent in channel II, 75.8 per cent in channel III and was only 76.6 percent in channel IV.

In channel II, marketing costs formed 9.61 per cent of the consumer's rupee. The margin of the vendor was found to be 5.7 per cent of the consumer's rupee.

In channel III out of the two intermediaries i.e. the milk vendors and halwai, it was the later, which incurred relatively more cost Rs.2.3 (7.9 per cent) against the former Rs.2 (6.8per cent). This is evidently due to the capital establishment cost which the halwai possess compared to the milk vendor. Coming to the margins once again, it was the halwai which get a margin of Rs.1.5 (5.17 per cent) as against Rs.1.00 (3.5 per cent) with regard to milk vendor (B).

In channel IV, maximum costs were incurred by the private dairy Rs.3.15 (10.5 per cent) followed by the distributor with Rs.0.70 (2.3 per cent) and private milk booth with Rs.0.16 (0.5 per cent). The high costs by private dairy could be attributed to various functions performed by them in the process of marketing. The margin of private dairy was found to be maximum with Rs.1.00 (3.3 per cent) followed by distributor with Rs.0.60(2 per cent) and private milk booth with Rs.1.00 (3.3 per cent) per litre of the consumer's price.

The comparison of margins in absolute terms, it was found that maximum margin of Rs.1.5 (5.17 per cent) was taken by the halwai in channel III. It is observed that halwai as retailers have high capital establishment cost and also relatively large turn over. Hence they have the associated risks, which compel them to take more margins out of consumer's price. Coming to the private dairies, the margin stood at Rs.1.00 (3.3 per cent), which apparently seems to be on the lower side. But the observation was that the milk which the private dairies purchased used to be sold as standardized in the form of removal of fat content. The fat so separated is converted into various milk products and this go as unnoticed in the price-spread analysis. The revenue obtained from the sale proceeds of these products is a direct income to dairy

4.3.2 Marketing Efficiency of Milk

Marketing efficiency indicates to what extent the marketing agencies are able to move the goods from producer at the minimum cost, extending maximum service from producer to final consumer. The efficiency of the different marketing channels for per litre of milk was analysed by estimating the Shepherd's formula.

Table 4.5 Marketing efficiency of milk in different channels

Channel	Value of milk sold (consumer price) Rs. per litre (V)	Total marketing cost Rs. per litre of milk (I)	Marketing efficiency (m)
Channel- I	26.00	-	99.00
Channel –II	22.00	2.5	7.8
Channel-III	22	4.80	3.5
Channel-IV	23	4.00	4.7

Table 4.5, reveals that marketing efficiency was in inverse relation with the total costs and margins. Comparison of Shepherd's indicated that channel-I (99.00) was most efficient followed by channel-II (7.8), channel-IV (4.7) and channel-III (3.5). It was low in other channels as compared to channel-I due to high marketing cost and presence of intermediaries in the channel

4.4 Constraints of Dairy Entrepreneurs

4.4.1 Constraints faced by the dairy entrepreneurs in production of buffalo milk

The selected buffalo milk producers were contacted through opinion surveys for analysis of the major problems in production as well as in the marketing of buffalo milk. They expressed number of problems, which are listed in table 4.6.

Table 4.6 Constraints faced by the dairy entrepreneurs in production of buffalo milk

S.N.	Constraints relating	Per cent
1.	High price of feed, fodder & veterinary aids (P1)	87.00
2.	Ignorance of severe infestation of disease control of buffaloes (P2)	57.00
3.	Non-availability of good quality buffalo breeds (P3)	76.00
4.	Lack of credit facilities (P4)	60.00
5.	Non-availability of good quality feed and fodder for the animals (P5)	63.00
6.	Inadequate veterinary aid facilities (P6)	56.00
7.	Inadequate extension facilities (P7)	53.00
8.	Insufficient labour availability	48.00

Table 4.6 shows that the response of the selected buffalo milk producers as the acquisition of capital and high price of feed, fodder and veterinary aid were the main problems expressed by 87.00 percent of the producers followed by non-availability of good quality of buffalo breeds 70 percent which results in low milk production. Ignorance of severe infestation of disease control 57.00. Nearly 63.00 per cent of the milk producers complained that non availability of good quality feed and fodder is a big hurdle in efficient milk production. Inadequate veterinary aid and inadequate extension facilities accounted for 56 percent and 53 percent

Fig. 4.5 Constraints faced by milk producers in production of buffalo milk

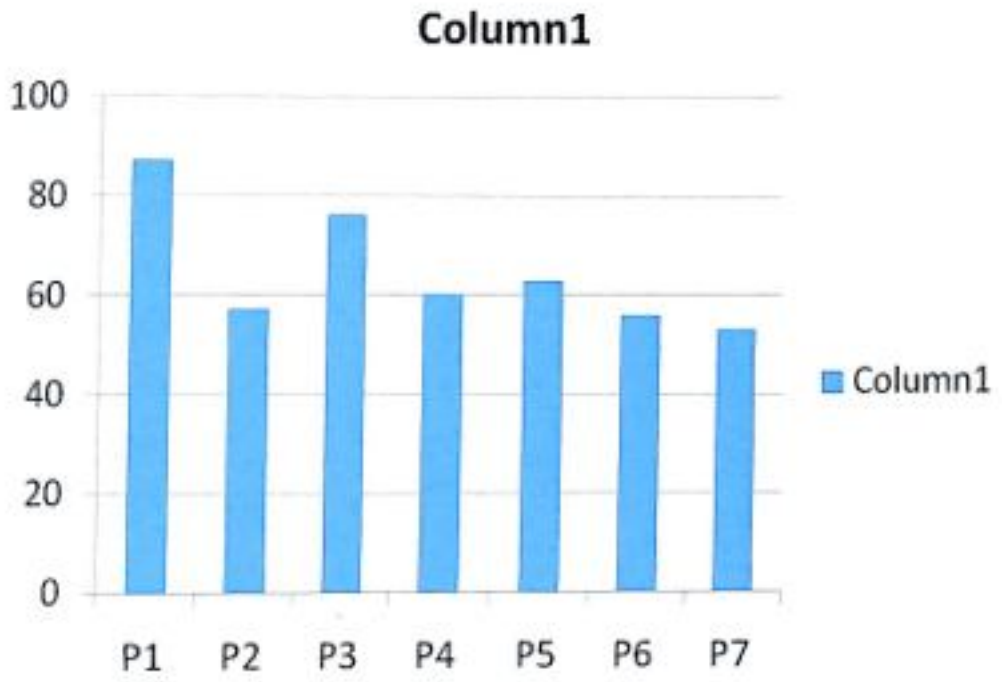
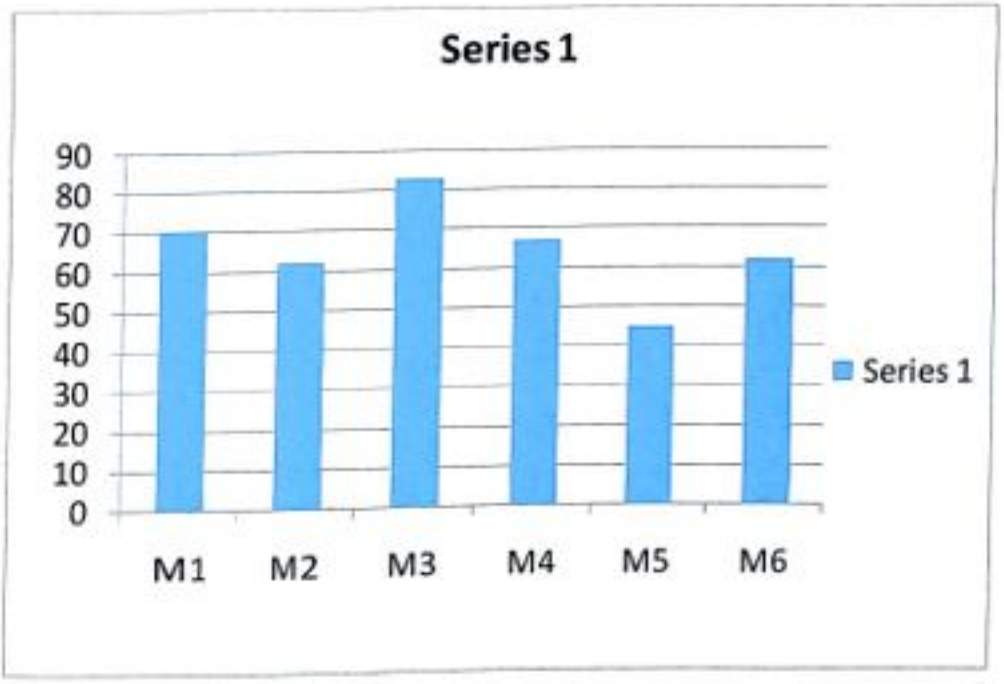


Fig. 4.6 Constraints faced by milk producers in marketing of buffalo milk



respectively. Lack of credit facilities and insufficient labour were reported by 60 percent and 48 percent of the milk producers.

4.4.2 Constraints faced by the dairy entrepreneurs in marketing of buffalo milk

Table 4.7 Constraints faced by the dairy entrepreneurs in marketing of buffalo milk

S.N.	Marketing Constraints	Percent
1.	Inadequate storage facilities for milk and milk products (M1)	70.00
2.	Lack of dairy processing unit (M2)	62.00
3.	Non-remunerative prices for milk and milk products(M3)	83.00
4.	Delay payment for milk and milk products (M4)	67.00
5.	In sufficient market (M5)	45.00
6.	Lack of transportation facilities (M6)	62.00

Milk and milk products fall under highly perishable group of commodities and have to be stored under controlled conditions of temperature and humidity in cold storage and deep freezers. The problems of dairy processing unit were reported by 62.00 percent and Inadequate storage facilities for milk and milk products accounted for higher percentage which was 70 percent. Insufficient market of buffalo milk were reported by 45.00 per cent. Lack of transportation facilities accounted for 60 percent of the total farmers. The respondent's of buffalo milk producers families strongly expressed the dire need of finance for the purchase of good quality buffalo breeds, feed and veterinary aid. About 83.00 per cent of the producers complained that they did not get remunerative prices for their milk and milk products and 67.00 percent complained for delayed payment for milk and milk products. The problem of marketing of milk and milk products was of prime concern to the producers. An un-remunerative price of the milk and milk products was the top most marketing constraints Payments made in fractions were the major factors which lead the imperfect market situations and lower income to producers in the region. The marketing constraints affect the profits to entrepreneurs adversely. Removal of marketing bottlenecks would go a long way in improving the cost of dairy entrepreneurs.

The farmers opinioned that good quality of cheap feed, veterinary aid and good breeds should be made available to them at reasonable rates and they need to be assured reasonable and stable prices for milk and milk products.

CHAPTER- V

DISCUSSION

This chapter deals with the discussion regarding the results obtained through the research problem. It mainly focuses on the current status of the economics of production and marketing of buffalo milk in tehsil Mhow district Indore of Madhya Pradesh. The chapter discusses the findings on the following topics:

5.1 Estimation of cost of maintenance and returns per milch buffalo per year on different farm size groups.

5.2 Pattern of marketing of milk including different markrting channels.

5.3 Estimation of price spread through different marketing channels and marketing efficiency of milk

5.4 Identification of production and marketing constraints faced by the milk producers of the study area

5.1 Estimation of cost of maintenance and returns per milch buffalo per year on different farm size groups

The study revealed that, on an average, the total cost of maintenance of a buffalo per annum was worked out to be Rs.35552.50. After deducting the income received from manure and sale of young stock, the average net cost of maintenance was found to be Rs.32436.31 per buffalo. The farmers of all herd size groups had incurred almost equal expenditure on the maintenance of a buffalo as they made higher investment on fodder and concentrates for maintaining them. The cost incurred on green fodder by the small, medium and large farmer was Rs.6249.6, 6504 and 6120, respectively and the average was Rs.6300. The cost incurred on dry fodder by the small, medium and large farmer was Rs.10240.80, 10120 and 11017, respectively and the average was Rs.10359.8.The studies were in accordance to Sekhon *et al.* (2008). He concluded that fodder and concentrate constituted 62 to 85 percent of the total cost. The study was also in accordance with Grover *et al.* (1992) who concluded that green fodder, roughage and concentrate taken together accounted for 68.42 percent of the total cost. On an

average, the cost of concentrates accounted for the highest percentage being 32.09 to the total cost of maintenance followed by fodder 29.13 per cent, veterinary charges 2.3 per cent, labour charges 4.3 per cent and miscellaneous charges 2.14 per cent. The veterinary charges were highest in case of small farmers and average was Rs.834.8. Labour charges were highest in case of large farmers and the average was Rs.1536.80. The net cost of maintenance was found to be highest in case of large farmers which amounted to Rs.33248.72 and the result was in accordance with Dwaipayan (2005) who concluded that large farmers incurred highest expenditure in maintenance of animals. The average milk yield per buffalo was 1838 litres per annum, which was valued at Rs.40436. The net income was highest in case of large farmers because of high milk yield and the average was Rs. 8465.79. On an average family labour income and farm business income were worked out to Rs.9421.19 and Rs.11385.49, respectively. An increasing trend was observed in the milk yields and net income on large farmers. Better feeding and breeding on large farms resulted into higher milk yields and returns per buffalo on these farms.

The cost of milk production per litre per buffalo for small, medium and large farmers was worked out to Rs.18.06,17.51 and 16.77, respectively which was slightly higher on small sized farms due to lower milk yields per buffalo. The benefit-cost ratio was calculated and it was highest in case of large farmers (1:1.29) because of relatively higher milk yields per buffalo and the average was at 1: 1.24.

For small farmers included in the analysis explained 95.1 per cent of the variation in gross returns by the coefficient of multiple determinations (R). The elasticity of production with respect to small farmers for green fodder, concentrate and dry fodder were 0.00059, 0.003 and 0.00047, respectively which were positive and significant at 1 per cent level. This implied that 1 per cent increase in green fodder, concentrate and dry fodder would increase in gross returns by 0.00059, 0.003 and 0.00047 per cent evaluated at the geometric mean level. The regression coefficients of human labour was 0.0017 positive. The sum of elasticities was 0.1211. The results revealed that the farmers could increase the gross return in milch buffalo by applying more green fodder, concentrates and dry fodder.

Similar findings were reported by Kumar and Pandian (2001) to analyze the input-output relationship in milk production and the function explained 85, 74 and 93 percent of variation in milk yield.

Similarly in case of medium farmers, the four variables included in the analysis explained 73.1% of the variation in gross returns by the coefficients of multiple determination. The elasticity of production with respect to the concentrate, dry fodder and green fodder were 0.00015, 0.00039 and 0.00055. The regression coefficient of human labour was 0.0013. Therefore an increase in human labour by 1 percent evaluated at geometric mean would increase the gross returns by 0.0013. The results revealed that the farmers could increase the gross return in milch buffalo by applying more green fodder, concentrates and dry fodder.

In case of large farmers, the four variables included in the analysis explained 55.8 percent of the variation in gross returns by the coefficient of multiple determination. The elasticity of production with respect to the concentrate, dry fodder and green fodder were 0.0033, 0.00021 and 0.00019, respectively positive. This implied that 1% increase in concentrate, dry fodder and green fodder would increase the returns by 0.0033, 0.00021 and 0.00019 percent evaluated at geometric mean level. The regression coefficient of human labour was -0.00040. However the results were non significant in case of large farmers.

5.2 Pattern of marketing of milk including different marketing channels

Marketing of milk

The producer has a choice in the selection of distributive channels for his marketing strategy. The following marketing channels were identified for marketing of milk in the study area. Among them, the first channel is a direct channel and the remaining three are indirect channels.

Channel-I: Producer-Local Consumer

Channel-II: Producer - Milk Vendor (A) - Urban Consumer

Channel-III: Producer - Milk Vendor (B) - Halwai - Urban Consumer

Channel-IV: Producer - Private dairy-Distributor - Private milk booth-Urban Consumer

The marketing costs incurred by different marketing functionaries in different channels adopted for sale of milk in the study area. Among the various marketing channels, the cost of marketing (per litre of milk) was the least in channel-II followed by channel-IV, and channel-III. The total marketing costs per litre of milk in the above channels has been worked out to Rs.2.5, Rs.4.80 and Rs.4.00 respectively. Channel-I is most efficient on account of absence of any intermediary and the findings were in accordance with Baruah and Sarkar (2000). In channel-II, entire marketing costs were incurred by the lone market intermediary i.e., milk vendor. An amount of Rs.1.10 (44 per cent) was incurred on transportation of milk from village to the town and remaining cost was the cost of labour Rs.1.40 (56 percent) rendered by the milk vendor in supplying milk to the consumers which accounted for a major portion of marketing costs viz. of 56 per cent.

In channel-III, the milk vendor (B) incurred Rs.1.10 (22.91 per cent) towards transportation and Rs.1.40 (29.16 per cent) labour cost while halwai incurred an amount of Rs.2.3 (47.91) on various items such as labour cost Rs.0.70 (14.58 per cent), processing Rs.0.60 (12.5 per cent), packaging Rs.0.20 (4.1 per cent) and depreciation on equipment and interest on fixed capital Rs.0.60 (12.5 per cent). In this study channel I was found to be the most efficient which is in strong contradiction with the findings of Vedmurthy and Chouhan (2005) who found that channel III as most efficient of all.

Of the total costs per litre of milk incurred in channel-IV, private dairy had lion's share with 78.75 percent followed by the distributor 17.25 per cent and the private milk booth 4 percent. The expenditure incurred by the above intermediaries stood at Rs.3.15, Rs.0.69 and Rs.0.16 per litre of milk. Among the various costs incurred by the private dairy, processing and depreciation was the major cost which accounted for 14 percent and 14.25 of total marketing costs. In this channel, overhead costs 12.5 per cent, transportation 11.25 per cent and procurement and marketing overhead 11.25 per cent. The actual amounts incurred on the above items were Rs.0.56, Rs.0.57, Rs.0.50, Rs.0.45 and Rs.0.45, respectively.

The findings were in accordance with Yogi *et al.* (2008) in which it was concluded that efficiency of that channel was lowest where number of intermediaries were more

The remaining costs like chilling, packaging and handling losses accounted for 16.03 per cent. Distributor has spent Rs.0.45 (11.25 per cent) per litre of milk on transportation. His labour charges were Rs.0.24 (6 per cent). The private milk booth incurred an amount of Rs.0.08 (2 per cent) on transportation and labour costs were Rs.0.08 (2 per cent). It was observed that on transportation of one litre of milk in channel-IV accounted for 24.5 per cent of the total cost.

5.3 Estimation of price spread through different marketing channels and marketing efficiency of milk

Price spread refers to the difference between the two prices i.e. the price paid by the consumer and price received by the producer. The milk producer received a maximum price i.e. Rs.26.00 per litre of milk in channel I followed by channel IV with Rs.23, channel II and channel III with Rs.22.00 each. Maximum price of Rs.26.00 per litre of milk in channel I is obviously due to the absence of any intermediary between producer and the consumer. In channel IV in which private dairies existed for purchase of milk was found to be offering only Rs.23 per litre which was lower than price offered by direct consumer. A Rs.26.00 in channel II and milk vendors B Rs.25.00 in channel III. The price spread was found to be the lowest in channel II which is in accordance with the results obtained by Vedmurthy and Chouhan (2005) in Shimoga district of Karnataka.

Leaving the channel I which is a direct channel, producer's share in consumer's rupee was 84.61 percent in channel II, 75.8 per cent in channel IV and was only 76.6 percent in channel III.

In channel II, marketing costs formed 9.61 per cent of the consumer's rupee. The margin of the vendor was found to be 5.7 per cent of the consumer's rupee. Similar results were obtained by Singh and Rai (1998), confirming that marketing efficiency of channel II was the most efficient.

In channel III out of the two intermediaries i.e. the milk vendors and halwai, it was the later, which incurred relatively more cost Rs.2.3 (7.9 per cent) against the former Rs.2 (6.8 per cent). This is evidently due to the capital establishment cost which the halwai possess compared to the milk vendor. Coming to the margins once again, it was the halwai which get a margin of Rs.1.5 (5.17 per cent) as against Rs.1.00 (3.5 per cent) with regard to milk vendor (B).

In channel IV, maximum costs were incurred by the private dairy Rs.3.15 (10.5 per cent) followed by the distributor with Rs.0.70 (2.3 per cent) and private milk booth with Rs.0.16 (0.5 per cent). The high costs by private dairy could be attributed to various functions performed by them in the process of marketing. The margin of private dairy was found to be maximum with Rs.1.00 (3.3 per cent) followed by distributor with Rs.0.60 (2.00 per cent) and private milk booth with Rs.1.00 (3.3 per cent) per litre of the consumer's price.

The comparison of margins in absolute terms, found that maximum margin of Rs.1.5 (5.17 per cent) was taken by the halwai in channel III. The findings were also in accordance with.Yogi *et al.,* (2008) who also reported the significant share obtained by the halwai in channel II. It is observed that halwai as retailers have high capital establishment cost and also relatively large turn over. Hence they have the associated risks, which compel them to take more margins out of consumer's price. Coming to the private dairies, the margin stood at Rs.1.00 (3.3 per cent), which apparently seems to be on the lower side. But the observation was that the milk which the private dairies purchased to be sold as standardized in the form of removal of fat content. The fat so separated is converted into various milk products and this go as unnoticed in the price-spread analysis. The revenue obtained from the sale proceeds of these products were a direct income to dairy.

The study reveals that marketing efficiency was in inverse relation with the total costs and margins. Comparison of Shepherd's indicated that channel-I (99.00) was most efficient followed by channel-II (7.8), channel-IV (4.7) and channel-III (3.5). It was low as compared to channel-I due to high marketing cost and presence of intermediaries in the channel. The findings of the present study were totally in accordance with the findings of Yadav (2004), who also found the inverse relation between marketing efficiency and total costs and margins

5.4 Identification of production and marketing constraints faced by the milk producers of the study area

5.4.1 : Production Constraints

The study revealed that the selected buffalo milk producers faced problems related to the acquisition of capital and high price of feed, fodder and veterinary aid expressed by 87.00 percent of the producers followed by non-availability of good

quality of buffalo breeds 70 percent which results in low milk production. Ignorance of severe infestation of diseases control was a serious problem an was reported by 57.00 percent of the producers. Nearly 63.00 per cent of the milk producers complained that non availability of good quality feed and fodder is a big hurdle in efficient milk production. Inadequate veterinary aid and inadequate extension facilities accounted for 56 percent and 53 percent respectively. Lack of credit facilities were reported by 60 percent of the milk producers. Insufficient labour is one of the serious problem faced by the milk producers in the study area and has been reported by 48 percent of the respondents.

The findings are in agreement with Agarwal *et al.* (2007) who reported, feeding and breeding as major constraints in a study carried out in Punjab, Karnataka and West Bengal.

5.4.2: Marketing Constraints:

Milk and milk products fall under highly perishable group of commodities and have to be stored under controlled conditions of temperature and humidity in cold storage and deep freezers. The first and foremost constraint reported by dairy entrepreneurs was non-remunerative prices for their milk and milk products(83 percent) which clearly indicate the farmer is unable to fetch optimum price of their produce inspite of substantial increase in the price of all the components (Feed, cost of animal, housing etc.) Similar findings have been reported by Shashi *et al.* (2009) in Patna district.

The problems of dairy processing unit were reported by 62.00 percent and inadequate storage facilities for milk and milk products accounted for higher percentage which was 70 percent. Insufficient market of buffalo milk was reported by 45.00 per cent. Lack of transportation facilities accounted for 60 percent of the total farmers. The respondent's of buffalo milk producers families strongly expressed the dire need of finance for the purchase of good quality buffalo breeds, feed and veterinary aid. 67.00 percent complained for delay payment for milk and milk products. The problem of marketing of milk and milk products was of prime concern to the producers. A un-remunerative price of the milk and milk products was the top most marketing constraints. Payments made in fractions were the major factors which lead the imperfect market situations and lower income to producers in the region. The marketing constraints affect the profits to entrepreneurs adversely. Removal of marketing bottlenecks would go a long way in improving the cost of dairy entrepreneurs.

Most of the farmers opinioned that good quality of cheap feed, veterinary aid and cow breeds should be made available to them at reasonable rates and they need to be assured reasonable and stable prices for milk and milk products throughout the year to make the cow enterprise as a supplementary and paying proposition.

CHAPTER- IV

6 SUMMARY, CONCLUSION AND SUGGESTIONS FOR FURTHER WORK

6.1 SUMMARY

Livestock production plays a pivotal role in the rural economy of the developing countries like India. Animal Husbandry and dairy farming are vital sectors of rural economy. Dairying on scientific lines offers great opportunities for increasing farm income and employment, particularly for weaker section of the rural community. However, to obtain profit from a dairy unit, the cost structures and economic size of the unit are very important. On the other hand, the traditional cattle keepers of Indore district are very poor, illiterate and not well aware of economic aspect of milk production. Hence, an effort has been made in this study to work out the economics of milk production in different dairy unit sizes. With this view the cost of milk production of buffaloes has been worked out.

Keeping these factors in views, the present investigation on the economics of buffalo milk production in Mhow tehsil district Indore of Madhya Pradesh has been taken up with following objectives:-

The specific objectives of the study were:

1. To work out the cost of maintenance per milch buffalo per year on different herd size groups.
2. To work out the cost of milk production per litre for milch buffalo on different herd size groups.
3. To study the pattern of marketing of milk, marketing channels, price spread and marketing efficiency of milk.
4. To identify the constraints of commercial buffalo entrepreneurs.

Multistage stratified random sampling design was used for the selection of the ultimate unit of the sample. The study was carried out in Mhow tehsil of Indore district (M.P.). For the selection of the sample, two stage stratified random sampling technique was adopted with villages at first stage and respondents

within the village as the final stage sampling unit. Five villages of Mhow tehsil of the Indore district were selected for the study. A list of households having buffaloes in each selected village was prepared and arranged in the ascending order of the herd size and stratified into three different herd groups having unit size i.e. small (farmers having less than 5 milch animals), medium (farmers having 5-10 milch animals) and large (farmers having more than 10 milch animals) based on simple cumulative method. A total of 10 milk producers households were selected randomly for all the 3 herd size groups in each of the selected village ensuring equal proportion. A total of 50 milk producer households were selected randomly comprising 25 small, 15 medium and 10 large farmers from all the 5 selected villages. The primary data were collected by personal interview method.

On an average, the total cost of maintenance of a buffalo per annum was worked out to be Rs.35552.50 and net income per annum was Rs.8465.79. An increasing trend was observed in the milk yields and net income on large farmers. Better feeding and breeding on large farms resulted into higher milk yields and returns per buffalo on these farms. The cost of milk production per litre per buffalo, on an average, was worked out to Rs.17.66 which was slightly higher on small sized farms due to lower milk yields per buffalo. The average benefit-cost ratio was calculated at 1: 1.24, yield per buffalo which was higher on large farms because of relatively higher milk yields per buffalo.

The calculations related to the regression coefficient implied that the small farmers could increase the gross returns in milch buffalo by applying more green fodder, concentrates and dry fodder. Similarly in case of medium farms the results revealed that the farmers could increase the gross returns in milch buffalo by applying more green fodder, concentrates and human labour. In case of large farmers the results revealed that the farmers could increase the gross returns in milch buffalo by applying more green fodder, concentrates and dry fodder. The analysis showed that human labour was being excessively used in case of large farms so there is need to reduce its application.

The producer has a choice in the selection of distributive channels for his marketing strategy. The milk producer received a maximum price i.e. Rs.26.00 per litre of milk in channel I followed by channel IV with Rs.23, channel II and channel III with Rs.22.00 each. Maximum price of Rs.26.00 per litre of milk in channel I is obviously due to the absence of any intermediary between producer and the

consumer. In channel IV in which private dairies existed for purchase of milk was found to be offering only Rs.23 per litre which was lower than price offered by direct consumer. A sum of Rs.26.00 in channel II and milk vendors B Rs.25.00 in channel III, leaving the channel I which is a direct channel, producer's share in consumer's rupee was 84.61 percent in channel II, 75.8 per cent in channel III and was only 76.6 percent in channel IV.

The comparison of margins in absolute terms it was found that maximum margin of Rs.1.5 (5.17 per cent) was taken by the halwai in channel III. It is observed that halwai as retailers have high capital establishment cost and also relatively large turn over. Hence they have the associated risks, which compel them to take more margins out of consumer's price. Coming to the private dairies, the margin stood at Rs.1.00 (3.3 per cent), which apparently seems to be on the lower side. But the observation was that the milk which the private dairies purchased to be sold as standardized in the form of removal of fat content. The fat so separated is converted into various milk products and this go as unnoticed in the price-spread analysis. The revenue obtained from the sale proceeds of these products were a direct income to dairy.

Marketing efficiency is essentially the degree of market performance. The relation of marketing efficiency was inverse with the total costs and margins. Comparison of Shepherd's indicated that channel-I (99.00) was most efficient followed by channel-II (7.8), channel-IV (4.7) and channel-III (3.5). It was low as compared to channel-I due to high marketing cost and presence of intermediaries in the channel.

The selected buffalo milk producers faced problems related to the acquisition of capital and high price of feed, fodder and veterinary aid followed by non-availability of good quality of buffalo breeds which results in low milk production. Ignorance of severe infestation results in low yield thereby reducing the milk production. Non availability of good quality feed and fodder was a big hurdle in efficient milk production. Inadequate veterinary aid and inadequate extension facilities, lack of credit facilities and labour were also reported. Another serious problem of respondents is insufficient labour which effects the buffalo enterprise.

Milk and milk products fall under highly perishable group of commodities and have to be stored under controlled conditions of temperature and humidity in

cold storage and deep freezers.The problem of marketing of milk and milk products was of prime concern to the producers. An un-remunerative price of the milk and milk products was the top most marketing constraints followed by delayed payment for the milk and milk products during the year. Payments made in fractions were the major factors which lead the imperfect market situations and lower income to producers in the region. The marketing constraints affect the profits to entrepreneurs adversely.

The buffalo enterprise would respond better if organized as an independent enterprise on commercial basis by providing capital and credit subsidized rates, insurance and encouraging the establishment of more cooperatives and marketing services to the dairy farms in rural areas of Madhya Pradesh.

6.2 CONCLUSION

1. The total cost of maintenance per buffalo per annum was highest in case of small farmers followed by medium and large farmers.

2. The average cost benefit ratio was highest in case of large farmers, which was because of relatively higher milk yields per buffalo.

3. The calculations related to regression coefficient implied that the farmers particularly small farmers can increase the gross returns in milch buffalo by applying more green fodder, concentrate, and dry fodder as the analysis explained 95.1% of the variation in gross returns by the coefficient of determination.

4. In marketing the producer received a maximum price in channel I and it was because of the absence of any intermediary between producer and the consumer followed by channel IV, channel II and channel III.

5. By comparison of margins in absolute terms it was found that maximum margin was taken by the halwai in channel II.

6. Generally most of the private dairy owners adopt the practice of selling milk after cream separation. The cream so removed is converted into various milk products and this goes unnoticed in price spread analysis.

7. The dairy entrepreneurs faced many problems and among them, the most common was high price of feed and fodder, non availability of good buffalo breeds, non availability of good quality feed and fodder.

8. The prominent problems related to marketing were non remunerative price of milk, lack of storage facilities and delayed payment.

6.3 SUGGESTIONS FOR FURTHER WORK

I. Similar research work can be carried out for other areas as well.

II. A study can be conducted by compairing the economics of production and marketing in two different areas.

III. The study and analysis can be repeated for larger samples using a large population of cattle and buffalo both.

IV. A similar study may be planned with different sampling procedure.

V. The study can be expanded by including the cost incurred on preparation of milk by products.

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