ECONOMICS OF MILK PRODUCTION IN VIDARBHA REGION OF MAHARASHTRA

THESIS SUBMITTED TO THE
NATIONAL DAIRY RESEARCH INSTITUTE
(DEEMED UNIVERSITY)
IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE AWARD OF THE DEGREE OF

MASTER OF VETERINARY SCIENCE
IN
DAIRY ECONOMICS

BY

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KARNAL – 132001 (HARYANA) INDIA
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CERTIFICATE

This is to certify that the thesis entitled, **"ECONOMICS OF MILK PRODUCTION IN VIDARBHA REGION OF MAHARASHTRA"** submitted by **BULBUL G. NAGRALE** towards the partial fulfillment of the award of the degree of **MASTER OF VETERINARY SCIENCE IN DAIRY ECONOMICS** of he **NATIONAL DAIRY RESEARCH INSTITUTE (DEEMED UNIVERSITY)**, Karnal, Haryana, India, is a bonafide research work carried out by her under my supervision, and no part of the thesis has been submitted for any other degree or diploma.

Dated: 19.07.11

Kamal Kr Datta

(Dr. K. K. DATTA)
MAJOR ADVISOR &HEAD
(GUIDE)

DEDICATED

TO MY

BROTHER

HITESH

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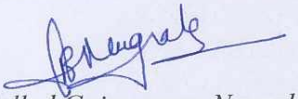

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ABSTRACT

The sustenance of rural livelihoods is currently at stake than ever before, in the face of economic liberalization. Livelihoods options are shrinking in rural areas in general and more so in eco-fragile regions, such as drought, desert prone, hilly areas and rainfed districts. Faced with lower productivity and high uncertainty in crop production rural people in rainfed areas are increasingly dependent on livestock rearing. The present study entitled "**Economics of Milk Production in Vidarbha Region of Maharashtra"** was taken up with the objectives of work out cost of milk production and returns from different species of in milk and milch animals, estimate resource use efficiency in milk production for different species of inmilk animals. It also aimed to identify the major constraints faced by the dairy farmers in the study area. To achieve the above objectives a sample of 120 households were selected randomly from four villages, two villages from each block and one block from each district were selected randomly in Vidarbha region of Maharashtra. Sample households were categorized according to the herd size as marginal, small, medium and large.

The overall average herd size was 2.85 and across the categories for marginal, small, medium and large were 1.5, 3.3, 5.6 and 12.87 respectively. The overall average operational land was 9.47 acres in which 88.2 per cent of land was under rainfed and land holding for marginal, small, medium and large categories was 7.75, 11.6, 10.9, 12.6 acres respectively.

The overall cost per litre for inmilk local cow was worked out to be Rs 21.90 and for marginal, small, medium and large categories was Rs 22.90, Rs 22.43, Rs 20.96, Rs 20.91 respectively. Overall net return was found to be Re. -0.24 and for marginal, small, medium and large categories was Rs -1.60, Re. -0.83, Re. 0.89, Rs 1.59 respectively.

Cost per litre of inmilk crossbred cow was worked out to be Rs.12.26, Rs 11.98, 12.58, Rs 12.79 for marginal, small, medium and large categories respectively with an overall average of Rs. 12.24 per litre.Net return per litre was found to be Rs 4.74, Rs 5.34, Rs 5.48, Rs 5.75 with overall average of Rs 5.10.

In the case of buffalo overall cost per litre of milk was worked out to be 17.42 and for marginal, small, medium and large categories was Rs 17.78, Rs 17.29, Rs 17.08, and Rs17.04 respectively. Overall net returns per litres was found to be Rs 7.71 and for marginal, small, medium and large categories was Rs 7.12, Rs 7.91, Rs 8.25, Rs 8.82 respectively.

The overall cost per litre for milch local cow was worked out to be Rs 26.78 and for marginal, small, medium and large categories was Rs 25.43, Rs 22.13, Rs 26.48, Rs 30.04 respectively. Overall net return was found to be Rs -5.12 and for marginal, small, medium and large categories was Rs -4.13, Re. -0.53, Rs -4.63, Rs -7.54 respectively.

Cost per litre of milch crossbred cow was worked out to be Rs.15.01, Rs 15.39, 17.36, Rs 17.57 for marginal, small, medium and large categories respectively with an overall average of Rs. 15.66 per litre.Net return per litre was found to be Rs 1.99, Rs 1.93, Re. 0.64, Re. 0.97 with overall average of Rs 3.55.

In case of buffalo overall cost per litre of milk was worked out to be 22.37 and for marginal, small, medium and large categories were Rs 22.63, Rs 23.29, Rs 24.69, and Rs23.39 respectively. Overall net returns per litres was found to be Rs 2.99 and for marginal, small, medium and large categories was Rs 2.27, Rs 1.91, Re. 0.76, Rs 2.51 respectively.

The resource use efficiency of green fodder for local cow and crossbred cow was found positive and significant indicating under utilisation of this input while for buffalo it was found positive and non significant indicating its optimal utilisation. Concentrate for buffalo found positive and significant indicating underutilisation. Apart from these miscellaneous expenses found positive and significant for local cow indicating underutilisation of this input.

Major constraints faced by sample household were lack of green fodder availability throughout the year, low availability and high cost of concentrates, lack and high cost of labour, non availability of dry fodder throughout the year, low productivity of animals, etc.

सारांश

आर्थिक उदारीकरण के कारण ग्रामीण आजीविका का निर्वाह वर्तमान में पहले से कहीं ज्यादा दाँव पर है। आजीविका के विकल्प सामान्य रूप से ग्रामीण क्षेत्रों में सिकुड़ रहे है, और सूखा, प्रवण रेगिस्तान, पहाड़ी और वर्षा आधारित जिलों में और इस तरह के पर्यावरण के नाजुक क्षेत्रों में तो और अधिक है। कम उत्पादकता और फसल उत्पादन में उच्च अनिश्चितता वर्षा आधारित क्षेत्रों में ग्रामीण लोगों को तेजी से पशुओं के पालन पर निर्भर कर रहे हैं। वर्तमान अध्ययन "महाराष्ट्र के विदर्भ क्षेत्र में दुग्ध उत्पादन के अर्थशास्त्र" काम के उद्देश्यों के साथ लिया गया है।

विभिन्न दुधारू पशुओं में दूध उत्पादन की लागत और विभिन्नप्रजातियों से शुद्ध लाभ, दुधारू पशुओं की विभिन्न प्रजातियों के लिए दूध उत्पादन में अनुमान संसाधन उपयोग की क्षमता, प्रमुख अध्ययन के क्षेत्र में डेयरी किसानों को पेश आ रही बाधाओं की पहचान करना था। उपर्युक्त उद्देश्यों के लिए 120 घरों का एक नमूना बेतरतीब ढंग से चार गांवों, दो गांवों को प्रत्येक एक ब्लॉक से और एक ब्लॉक को हर जिले से बेतरतीब ढंग से महाराष्ट्र के विदर्भ क्षेत्र में चुना गया। दुग्ध उत्पादन घरों को झुंड के आकार के अनुसार सीमांत, लघु, मध्यम और बड़े रूप में वर्गीकृत किया गया।

झुंड आकार समग्र औसत 2.85 था और के लिए श्रेणियों में सीमांत, लघु, मध्यम और बड़े 1.5, 3.35.6, और 12.87 क्रमशः थे। समग्र औसत परिचालन भूमि 9.47 एकड़, जिसमें 88.2 प्रतिशत भूमि वर्षा आधारित तहत किया गया था और सीमांत, लघु, मध्यम और बड़े श्रेणियों के लिए जोत भूमि 7.75, 11.6, 10.9, 12.6एकड़ क्रमशः था.

स्थानीय दुधना गाय के लिए प्रति लीटर दुध की कुल लागत , रु.21.90 रुपए पाई गई। और सीमांत, लघु, मध्यम और बड़े श्रेणियों के लिए रु. 22.90 , रु.22.43 , रु.20.96 , रु. 20.91 क्रमश पाई गई। कुल मिलाकर शुद्ध लाभ , रु.-0.24 रुपए पाया गया और सीमांत, लघु, मध्यम और बड़े श्रेणियों के लिए - , रु.1.60 रुपये, रु. -0.83 रुपये, , रु. 0.89, , रु.1.59 रुपये क्रमशः पाया गया।

दुधना संकर गाय की प्रति लीटर दुध की कुल लागत रु.12.26 समग्र औसत पाई गई। प्रति लीटर दुध की लागत रु.11.98 ,रु. 12.58, रु.12.79, रु.12.24 सीमांत, लघु, मध्यम और बड़े श्रेणियों के लिए क्रमशः . पाई गई। शुद्ध लाभ प्रति लीटर , रु.5.10 रुपए के समग्र औसत के साथ और , रु.4.74 रुपए,

, रु.5.34 रुपए, , रु.5.48 रुपए, , रु.5.75 रुपए सीमांत, लघु, मध्यम और बड़े श्रेणियों के लिए क्रमशः पाया गया।

दुधना भैंस के दूध के मामले में प्रति लीटर दुध की कुल लागत , रु.17.42 पाई गई औरसीमांत, लघु,मध्यमऔरबड़े श्रेणियोंकेलिए , रु.17.78 रुपए, , रु.17.29 रुपए, , रु.17.08 रुपए, और , रु.Rs17.04 क्रमशः पाई गई। प्रति .लीटर समग्र शुद्ध लाभ , रु.7.71 रुपये थे और सीमांत, लघु, मध्यम और बड़े श्रेणियों के लिए , रु.7.12रुपये, , रु.7.91, , रु. 8.25 रुपये , , रु.8.82 रुपये क्रमशः. पाया गया।

दुधारू गाय के लिए प्रति लीटर दुध कुल लागत 26.78 रुपए पाई गई और सीमांत, लघु,मध्यम और बड़े श्रेणियों के लिए 25.43 रुपए, 22.13 रुपए, 26.48 रुपए, 30.04 रुपएक्रमश पाई गई। कुल मिलाकर शुद्ध लाभ -5.12 रुपये पाया गया और सीमांत, लघु, मध्यम और बड़े श्रेणियों के लिए -4.13 रुपये -0.53 रुपये -4.63 रुपये, -7.54 क्रमशः पाया गया।

दुधारू संकर गाय की प्रति लीटर दुध लागत सीमांत,लघु, मध्यम और बड़े श्रेणियों के लिए रु .15.01 , रु .15.39 , रु .17.36 , रु .17.57 क्रमशः पाई गई और समग्र औसत के साथ 15.66 रुपये पाई गई। प्रतिलीटर शुद्धलाभ .प्रति केलिएरु. 3.55 का कुलऔसत से रु. 1.99 , रु.1.93 , रु.0.64 रु, रु . 0.97 पाया गया।

भैंस के दूध की प्रति लीटर कुल लागत 22.37 पाई गई । सीमांत, लघु, मध्यम और बड़े श्रेणियों केलिए 22.63 रुपए, 23.29 रुपए, 24.69 रुपए, और Rs23.39 क्रमशः थे. प्रति लीटर समग्र शुद्ध लाभ 2.99 रु और सीमांत, लघु, मध्यम और बड़े श्रेणियों के लिए 2.27रुपए, 1.91 रुपए, 0.76 रुपये, 2.51 क्रमशः पाया गया।

स्थानीय गाय और संकर गाय के लिए हरा चारा के संसाधन उपयोग की क्षमता सकारात्मक और इस संसाधन के उपयोग के नीचे का संकेत महत्वपूर्ण पाया गया था. जब कि भैंस के लिए यह

सकारात्मक और इष्टतम उपयोग संकेत पाया है. इन के अलावा विविध खर्च सकारात्मक और स्थानीय इस संसाधन के इष्टतम उपयोग दर्शाते हुए गाय के लिए महत्वपूर्ण पाया.

अधिकतम नमूना घर के साम``ने आने वाली बाधाओं में, हरा चारा उपलब्धता की साल भर में कमी, कम उपलब्धता और ध्यान केंद्रित की उच्च लागत, अभाव और श्रम की उच्च लागत, साल भर सूखे चारे की अनुपलब्धता, आदि पशुओं की कम उत्पादकता के कारण थे.

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CHAPTER – 1

INTRODUCTION

1. INTRODUCTION

Agriculture provides the principal means of livelihood for over 60 per cent of India's population. Despite a steady decline in its share to the gross Domestic Product (GDP) agriculture remains the largest economic sector in the country. Low and volatile growth rates under the sector and the recent escalation of an agrarian crisis in several parts of the country pose a threat not only to national food security but also to the economic well being of the nation as a whole. Small and marginal farmers are the backbone of Indian agriculture as they contribute about 80.4 percent of all farmers household, own 43 percent of land and operate about 46 percent of area, producing half of the output. The total production of food grains (cereals plus pulses) has increased over the last six decades from 51 million tonnes in 1951 to about 234 million tonnes in 2010-11, the area under food grain cultivation has increased from 98 million hectares to only about 125 million hectare, a level which has been stagnating since 1970-71, indicating there is little or no scope for increasing the area under cultivation *(Economic Survey of India, 2010-11)*. Further agriculture development will basically depend on increasing productivity in agriculture which can be possible through extensive use of new and improved technology which is capital intensive. As the majority of farmers in our country are small and marginal with very little marketed surplus and they are unable to afford the capital intensive technologies. More over farmers are not sure about the outcome of crop enterprise as 68 per cent of cultivated area comes under rainfed agro ecosystem.

The rainfed agro ecosystem supports 40 per cent of the human and 65 per cent of the livestock population, provides 44 per cent of food requirement and it has played and continues to play a critical role in Indian agriculture (Singh *et al.*, 2004). In such areas crop production becomes relatively difficult as it mainly depends upon intensity and frequency of rainfall. Mixed crop livestock farming and mixed cropping have been adopted by the farmers in these areas through generation of experience.

In order to avoid risk and uncertainties of crop enterprise and to maximize the outcome under the limited resources, farmers should resort to such enterprise

which can ensure distribution of income throughout the year to maintain the minimum standard of living.

Livestock in India is a major component of agriculture especially in rainfed areas where its contribution is much more than the food. Unlike land, the distribution of livestock is more egalitarian. Small and marginal farmers own 71 per cent cattle, 63 percent buffaloes and 66 percent of small ruminants (NCAP, 2002). The livestock production in rain fed regions is mainly taken up under common property resources based livestock production system, grassland based livestock production system and mixed farming system which are characterized by deficiency of feed and fodder, low animal productivity, subsistence nature of production and low level of production intensification. Livestock plays an important role in the sustainable livelihood of poor people of rain fed agro ecosystem, because of inherent risk involved in the crop farming due to uncertainty of rainfall and occurrence of recurrent drought. In the face of uncertainties in the crop yield, livestock production has been found to provide income and economic stability to farmers. Small ruminant act as cash buffer and large livestock as a capital reserve. In rainfed areas livestock production is less severely affected by drought than crop production and it become the main source of income during years of poor rainfall.

Dairy animals enable poor and landless farmers to earn income using common property resources (World Bank 1999), provide constant flow of income and reduce vulnerability of agriculture production (Holmann *et al.*, 2005). In the vast field of animal husbandry, the contribution of dairying has been most significant in terms of employment generation as well as income generation. According to the NSSO survey (July 2004-June 2005, 61st round) the estimation of employment in animal husbandry sector was 11.44 million in principal status and 11.01 million in secondary status which is 5.50 per cent of the total workforce of the country.

Milk production contributes on an average 27 percent of household income and their contribution varies from about 19 percent in case of large scale farmers to about 53 percent in the landless Category (Shukla & Brahmankar,1999). Women constitute nearly 70 percent of the labour force in livestock farming.

Thus, dairy production has become an important component of rural development programmes in the rainfed areas of India, and is considered as an instrument for socioeconomic change to improve income and quality of life. The improvement of dairy production will be particularly important in coming years in view of the future demand for livestock products, which is expected to double by 2020, while the natural sources that sustain agriculture will become increasingly scarce and degraded (Rangnekar, 2006).

Across the major states of India, Maharashtra has the maximum area under rainfed about 82 percent, which is above than the national average (57 percent). Though the state is dominated by rainfed areas its share in livestock population is 6.8 percent and ranks sixth in India. The share of Animal husbandry in GDSP of agriculture and allied activity sector during 2009-10 was 7.8 per cent. The state is pioneer in the field of dairy development and it is one of the leading states in terms of milk production in the country. During the period between 1985 and 2005, the total milk production in the state registered a much faster growth rate as compared to that for India as a whole. In the year 2009-10, milk production in Maharashtra state was 7.7 million tonnes, per capita availability was 190 gm at state level while the production of milk was 112 MMT and per capita availability 264 gm, (*Economic Survey of Maharashtra, 2010-11*). Out of total milk production from bovines in the state, contribution from indigenous cows is about 14.3 percent; crossbred cows 37.7 percent and buffalo share 44.1 percent. In the state 81.6 percent farmers come under small and marginal category which holds about 53.5 per cent milch bovine population (NSSO Report, 59th Round).

The state is mainly divided into five regions Konkan, Khandesh, Western Maharashtra, Marathwada and Vidarbha (Singh *et al.*, 2004).

Vidarbha region which comprises of eleven districts of Maharashtra is significantly underdeveloped as compared to other regions. The area covered under irrigation is only around 10 percent and about 90 per cent of the crop production depends on rainfall. Failure of crop is almost certain due to irregularity in rainfall leading to heavy unrecoverable losses in agriculture sector. Main crops in this region are Jowar, cotton, rice during kharif season and wheat, bajra, gram during rabi season. Vidarbha region is the home of about 3.2 million cotton farmers. For these categories of farmers cost of production by way of farm inputs

has increased manifold over the years while the productivity of the land remained at the same level and sale price of farm produce has not commensurately increased. These factors have driven farmers to the debt trap and have caused distress leading to suicide. Farmers suicides have been receiving a lot of social, public and political attention, particularly in the Vidarbha region of Maharashtra.In the view of severe crop failure because of short fall of rain more than 20,000 villages have been officially declared drought hit by the state government, including 15,460 villages is in Vidarbha region (Times of India, May 2010). One of the main reasons for most farmers' suicide cases was found that they were not having any other option of livelihood generation besides crop farming (Jadhav, 2008).

Even though Vidarbha region holds highest percentage of livestock population (27 per cent) yet, its contribution to the total milk production is very low (11.9 per cent) to the total state production (ISS Report, 2008-09). In this region emphasis on dairy farming is primarily for draft power, manure and lastly for milk production. So the improvement in livestock production particularly dairy farming is an important pathway for increasing the income of marginal, small and landless laboures given the uncertainties of crop production. This sector needs a focused attention particularly in rainfed regions where there is all the more need to add to the income of the farmers.

In the view of the aforesaid backdrop, there is greater need to undertake comprehensive studies for understanding intricate issues of dairy farming and analyzing major constraints in dairy farming in diverse situations. Keeping all the above facts in view the research topic entitled, 'Economics of Milk Production in Vidarbha region of Maharashtra was taken with following specific objectives:

1. **To work out cost and returns from milk production.**
2. **To estimate the resource use efficiency in milk production.**
3. **To identify the major constraints in practicing dairy farming.**

Limitation of the study

The present study has limitation of the time and other resources available with the student researcher. However, considerable care and thought have been

exercised in making the study as objective and systematic as possible. Further, the expressed opinion of the respondents, in the study, may not be free from personal bias and prejudices. It may however, be recognized that the findings of study may not be generalized beyond the boundaries of the area under investigation and such other areas having similar agro climatic and socio-economic conditions.

Organisation of the thesis

The present thesis is systematically organized into five chapters. The first chapter deals with introduction, statement of the problem, objectives and limitation of the study. The review of the literature has been presented in the second chapter and profile of the study area in the third chapter. The fourth chapter has been devoted to the presentation of research methodology which covers sampling design, selection of variables and their measurement, data collection and statistical tools applied to analyse the data. The findings of the study along with their discussion are presented in chapter fifth. The sixth chapter depicts the summary and conclusions, which have emerged from the results of the study. At the end bibliography and appendices have been given systematically.

CHAPTER – 2

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

In this chapter an attempt is made to critically review the past literature that is relevant to the present study. The reviewed literature would help to keep the research on proper lines and to bring refinement in the study The research work carried out by various researchers related to the problem under study has been reviewed under the following heads.

2.1 COST OF MILK PRODUCTION

Gill and Singh (1986) in their study "An economics analysis of milk production system in different agro- climatic regions of Punjab" observed that per litre cost of milk production of crossbred cows was Rs.2.31, Rs.2.55 and Rs.2.46, respectively in sub-mountainous, central and southern zones of Punjab. The study also reported that cost of milk production for crossbred cows in three zones were Rs.1.62, Rs.1.54 and Rs.1.6 per litres respectively. In all the three zones, the crossbred cows were found to be more profitable than buffaloes.

Acharya *et al*. (1987) studied the comparative advantage of cow and buffalo dairy enterprises in irrigated and unirrigated areas in Ganganagar district of Rajasthan .The study reported that annual maintenance cost of a cow was Rs.2175and Rs. 2132 and that of buffalo was Rs.2662 and Rs 2544 in irrigated and unirrigated areas, respectively. The study also found that gross income from buffalo was twice than that of cow in both areas.

Vashist and Katiha (1988) in their study on comparative economics of milk production from different breeds of dairy animals in Kangra district of Himachal Pradesh reported that the profit margins (Rs. per kg milk) from desi cow, pure bred cows, buffaloes and pure bred buffaloes were Rs. 0.35, Rs.0.45, Rs.0.45 andRs.0.26, respectively on small farms. The corresponding figures for large farms were Rs.0.57, Rs.0.49, Rs.0.48 and Rs.0.80, respectively. They also reported that crossbred cows gave higher returns due to their higher milk yield and feed conversion efficiency.

Devraj and Gupta (1994) in their study on economics of milk production in Churu district of Rajasthan observed that the cost of milk production of lactating buffaloes and local cows were Rs 3.96 and Rs. 4.02 per litre respectively. The

study also revealed that green fodder and concentrate were most significant inputs influencing the milk yield.

Sharma and Singh (1994) conducted a study on economic analysis of milk production by different breeds of milch animals in humid temperate zone of Himachal Pradesh and found that the average cost of maintenance per annum per milch animal for crossbred cows, local cows, graded murrah buffaloes and local buffaloes were Rs. 3624.55, Rs. 1981.95, Rs. 4161 and Rs. 2584.20, respectively.Net return per annum per milch animal was highest for graded murrah buffaloes (Rs.2072.87) followed by crossbred cows (Rs. 1613.64), local buffaloes (Rs. 925.55) and local cows (Rs. 127.62). The study also revealed that the feed cost and labour charges accounted for about 85 percent of the total maintenance cost.

Shah and Sharma (1994) conducted a study and concluded that feed cost formed 55-60 per cent of total cost; concentrate and green fodder had higher share vis-à-vis dry fodder. Wages for human labor and fixed cost shared 20per centeach in total cost. Net return from milk production was positive; least for local cows and 10 times higher in crossbred cows.

Gadre (1995) conducted a study on cost and returns of dairy enterprise as an adjunct to crop husbandry in Vidarbha region of Maharashtra reported that total cost of rearing a crossbred cow and buffalo worked out to Rs. 7,665 and Rs. 9,902, respectively. The higher net returns were obtained by the small farmers by both crossbred and buffalo which worked out to Rs. 3,891 and Rs. 1,053, respectively.

Kalra *et al*. (1995) conducted a study on economic analysis of milk production and disposal in rural areas of Haryana and reported that the maintenance cost of buffaloes, crossbred cows and local cows were Rs.19.11, Rs.20.23 and Rs. 14.22per day per animal, respectively. The cost of milk production was Rs. 4.95, Rs. 3.53and Rs. 6.91 per litre for buffalo, crossbred and local cows, respectively. They also found that the milk production of local cows resulted in a net loss of Rs. 3.82 per day.

Manbhekar *et al.* (1995) in their study on relative economics of milk production from local vis-à-vis crossbred cow in the vicinity of Akola city

(Maharashtra) reported that total maintenance cost of a local cow was Rs. 5,653per year, of which total variable cost formed 84%. Feed cost accounted for 60per centand67per centof total cost for local and crossbred cows, respectively. Cost of milk production for local cows was 80per centhigher than that of crossbred cows. There was a loss of Rs.278 per year from maintaining a local cow.

Baruah *et al*. (1996) studied economics of milk production in Assam and reported that the variable cost accounted for 87.4 percent of total cost, wherein the major component of variable cost was feed. The fixed cost increased as the number of milch animals per household increased. They also found that the overall total fixed investment per milch animal was Rs. 97.59, wherein the investments on cattle sheds, equipments and the animals were 4.7, 2.7 and 92.6 percent of the total investment, respectively.

Gupta and Agarwal (1996) in their study on economics of milk production in Himachal Pradesh observed that the cost of milk production was lowest (Rs. 4.68per litre) for crossbred cows among all types of milch animals. The study also reported that the net income from dairying was quite meagre, although it is an economically viable enterprise in the state. Among different categories of milk producing households, the landless labourers were found to be earning the highest net returns per litre of milk from crossbred cows and the upper medium farmers from buffaloes.

Pundir (1996) studied cost and price determination model in Himachal Pradesh revealed that variable inputs like green fodder, dry fodder, concentrate and labour accounted for 22.5, 26.5, 13.4 and 26.0 percent for buffalo; 18.1, 21.0, 18.6 and 25.2 percent for crossbred cows and 21.3, 24.7, 10.1 and 31.3 percent of total cost of milk production for local cows, respectively. The crossbred cow was found most profitable followed by buffalo during the year.

Chand (1997) in their study on economic analysis of production and marketed surplus of milk in rural farms in Kurukshetra distict of Haryana revealed that the annual cost of maintenance of a buffalo, crossbred cow and local cow was Rs. 12019, Rs. 11535 and Rs. 5811, respectively. The average daily milk yield per milch animal was 4.39, 4.90 and 2.30 litres, respectively. The average

net cost of milk production was Rs. 6.38, Rs. 6.17 and Rs. 6.59 per litre for buffaloes, crossbred and local cows, respectively.

Panghal *et al*. (1997) conducted a study on milk production in different agro climatic region of Haryana and concluded that total milk production was less in dry region as compared to irrigated region. Among cost components, variable cost was found to be 68.70 per cent. The labor cost decreased with the increased in the farm size in all the regions. The study reported that the cost of green and dry fodder was almost equal in irrigated region, which may be due to more availability of green fodder throughout the year.

Sinha (1997) conducted a study on economic analysis of dairy enterprises in Nalanda district of Bihar state and observed that the average net cost of milk production was Rs. 7.19 and Rs. 6.06 per litre from buffaloes and crossbred cows, respectively. The highest cost of milk production in buffalo could be mainly attributed to their lower milk production in comparison to crossbred cow during the year. The study revealed that the feed cost was the major component of production cost, followed by cost of labour in all the categories of households and for different types of milch animals.

Chandra (1998) in a study on economics of milk production in Farrukhabad district of Uttar Pradesh reported that the gross cost per day per milch animal was highest (Rs. 51.10) for large farmers and lowest (Rs. 49.20) for landless labourers in case of crossbred cows. However, the net return was highest (Rs. 12.50) for medium farmers and lowest (Rs. 3.90) for small farmers, whereas it was negative for landless labourers. In case of buffaloes, he reported that the gross cost was highest (Rs. 56.40) for large farmers and lowest (Rs. 47.70) for small farmers.

Dixit (1999) conducted a study on bovine economy in Mandya district of Karnataka state and observed that the net income and family labour income in case of local cows were negative in all categories while in case of buffalo net returns was negative for all categories. He reported positive net return only for crossbred cows, whereas for total bovine, the net income was found to be negative.

Singh (2001) in a study on economic analysis of technological change in milk production in Karnal district of Haryana found that the average per day maintenance cost of crossbred cow was Rs.58.96 and that of local cow it was Rs.37.95. The feed cost was the highest among all cost components having relative share more than 60 percent in both crossbred and local cows. Labor cost stood second next to feed cost in crossbred as well as local cows. The cost of milk production in local cow was Rs.9.80 whereas Rs.7.10 for the crossbred cows. The overall net return in local cows was Rs.0.20 and in crossbred it was Rs.1.62.

Rajadurai (2002) in a study on economics of milk production in Madurai district of Tamil Nadu reported that the total feed cost was more than two third of the gross cost in all the households. He also found that labour cost per day per milch animal was highest for small category of households. The study revealed that the cost of milk production per litre was highest for local cow attributable to its low productivity. He further reported that the net returns per day per animal were highest for crossbred cow.

Mankar (2003) in a study on economics of milk production and disposal pattern in Wardha district of Maharashtra reported that the average maintenance cost per day per animal was Rs.29.53, Rs.38.58 and Rs.37.63 for local cows, crossbred cows and buffaloes, respectively. Total feed cost accounted for about 76.57, 72.11 and 76.53 percent of gross cost for local cows, crossbred cows and buffaloes, respectively, whereas total variable cost accounted for about 93.03, 87.80 and 89.32 percent of gross cost, respectively. Net returns were found to be negative in case of all milch animals. Except for cross bred cows in case of large farmers.

Kumar and Pandian (2003) studied cost of milk production in a milk-shed area of Tamil Nadu during the year 2000. The total maintenance cost per indigenous cow, buffalo and crossbred cow per day was found to be Rs.33.03, Rs. 33.72 and Rs.72.80, respectively. The variable cost accounted for 96.18, 95.33 and 92.31 percent of the total cost respectively. Category wise analysis revealed the total cost decreased with the increase in farm size. It was further reported that the cost of milk production was lower in crossbred cows followed by buffaloes and indigenous cows.

Das (2004) in a study on economics of milk production in Burdwan district of West Bengal reported that per day maintenance cost of buffalo, CB cow and local cow was Rs.35.20, Rs.40.20 and Rs.32.28 respectively. Net return per litre of milk was highest for CB (Rs.1.28). Negative return was incurred in case of local cow.

Desai (2005) made a study on economics of milk production and disposal pattern in Bidar district of Karnataka and reported that the average maintenance cost per day per animal was Rs.28.72, Rs.38.85 and Rs.31.68 for local cows, crossbred cows and buffaloes, respectively. Total feed cost accounted for about 68.76, 82.11 and 70.80 percent of gross cost for local cows, crossbred cows and buffaloes respectively. Net returns were found to be negative in case of all milch animals except for cross bred cows.

Khan (2006) conducted a study on economic analysis of milk production systems in new alluvial zone of West Bengal and reported that per litre cost of milk production was lowest for crossbred cow (Rs.8.78) and highest for local cow(Rs.22.36). Net return per litre of milk was highest for buffalo (Rs.2.88). Negative return was found in case of local cow.

Singh (2006) conducted a study on economics of milk production and marketed surplus in Imphal, West district of Manipur and observed that per day maintenance cost for a milch crossbred cow and a milch local cow was Rs.72.95 and Rs.22.89, respectively. While the net return from local cow in milk was Rs. 4.27and from crossbred cow in milk was Rs. 48.70. Hence, a crossbred milch cow was found more economical.

Sirohi *et al.* (2007) in their study on “Economics of Milk Production: Variations across Productivity Levels” reported that the average daily maintenance cost ranged from about Rs. 62 for crossbred cow of average 7 litres productivity to Rs. 97 for high producing animal, yielding nearly 24 litres per day. The feed cost increased from Rs. 43 to Rs. 48 for increase in average productivity from 7 to12 litres/day and further to Rs. 63 and Rs. 79 for corresponding productivity levels of 17 and 24 litres/day, respectively. The net profit margin per cow was estimated to be 9per centfor milch animals and 35per centfor the lactating animals. In case of buffaloes, the average daily maintenance cost ranged from Rs. 43.50 for a buffalo producing about 3.6 litres of milk, to Rs.

62 for the animal with average daily yield of 11.5 litres. The average daily cost was Rs. 52 over the three productivity ranges and about 7 percent lower (Rs. 48) for milch animals.

Singh (2008) in his study on **"**Economic analysis of milk production in Varanasi District of Uttar Pradesh" reported that overall daily net maintenance cost per milch buffalo was Rs. 47.37, and per milch cow was Rs.35.99.The feed cost constituted about 79 per cent of gross cost. Overall net cost of milk production for milch buffalo was Rs.13.27 per litre and it was Rs.15.78 per litre for milch cows. Net return from milking buffalo was Rs.1.05, which was highest (Rs.9.60) for large and lowest (Rs.0.73) for landless, whereas negative return was incurred in small and medium category. The net returns per milch buffalo were found negative for all the categories except for marginal category. Net return from cow milk production was found negative which may be due to inadequate number of observations.

Ghule (2010) in his study on "Economics of Milk Production and its Disposal Pattern on Commercial Dairy Farms in Ahmednagar District of Maharashtra" found out that the cost of maintenance of milch cattle was Rs. 121.39, Rs. 120.52 and Rs. 108.94 on small, medium and large categories respectively while for milch buffalo was Rs. 99.08 on large buffalo farm. Cost per litre of milk came out as Rs. 12.49, Rs. 12.58 and Rs. 11.48 on small, medium and large farm respectively for milch crossbred cow whereas for milch buffalo was Rs. 26.78 on large farm. Net returns per litre of milk in case milch cattle were Rs. 1.57, Rs. 1.36, Rs. 3.30 on small, marginal and large and for milch buffalo earned Rs. 2.66 on large farms.

FARM INCOME

Sharma *et al.* (1991) In low hills, the farm income accounted for 46per centthe total household income, wherein livestock had nearly one-third share. The off-farm income formed the major source of family income. In the mid hills where farm income contributed nearly 78 per cent to livestock enterprise subscribed about 40 per cent of the farm income. While in high hills, a predominantly fruit based farming, the farm income contributed about 93 per cent and livestock had hardly 10 per cent share.

Parsha (1996) farmers derived 55 per cent of the total income from crop enterprise, 21 per cent from large ruminant, 14 per cent from small ruminant and seven per cent from wage earning. The income from livestock and wage earning accounted for 60 and 30 per cent respectively for resource poor farmers.

Singh and Joshi (2008) studied the economic analysis of crop production and dairy farming in marginal and small farmers in three zones of Punjab were found out that for the marginal farmers contribution of crop to the income highest in zone III (81.2 per cent) lowest in zone I (71 per cent) while dairy farming contributed highest in zone I (28.8 per cent) and lowest in zone II (18.9 per cent). For the small farmers crop contributed highest in zone III (82.3 per cent) and lowest in Zone I (72.7 per cent) while dairy farming contribution highest in zone I (27.2 per cent) and lowest in zone III (17.7 per cent).

Kumar and Kumar (2008) studied effect of contract farming on income and employment generation was found out that crop contributed 91.4 per cent and livestock 8.6 per cent to the gross farm income on contract farms while on non contract farms crop contributed 81.18 per cent and livestock 18.82 per cent to the gross farm income.

Patil *et al.* (2009) studied the livestock contribution to the total farm income of tribal and non tribal areas in Gujarat Livestock contributed 32 per cent to the household income in tribal and 20 per cent in non tribal areas. Crop contributed 52 per cent and 61per cent for tribal and non tribal framers income resp.

Singh and Gangwar (2010) studied the economics of crop and livestock production in U.P found out that contribution of livestock to marginal ,small ,medium and large farmers income was about 76.9 per cent, 55.4 per cent ,75.7 per cent, 29.3 per cent respectively while the contribution of crop was 23 per cent, 44.5 per cent, 24.2 per cent and 70.6 per cent respectively.

2.3 RESOURCE USE EFFICIENCY

Gupta and Kumar (1988) conducted a study on resource use efficiency in milk production in Muzaffarnagar district of Uttar Pradesh and observed that concentrate was the most significant factor affecting the milk yield of buffaloes and cows whereas green fodder, dry fodder and labour influenced the yield

differently in different seasons for various categories of milk producers in the study area.

Lalwani (1990) studied the resource use efficiency and estimated that marginal physical product (MPP) and marginal value product (MVP) of the resources used for milk production for buffalo, crossbred and indigenous cows under various categories of farm size in Karnal district of Haryana. The study revealed that green fodder was used in excess among dairy farmers possessing land but was deficient among landless producer. Concentrates were generally used deficiently by all categories of cattle owners. It was also reported that excess quantity of dry fodder was used in case of indigenous cows but was deficient for buffalo and crossbred cow in landless and the medium farm sizes.

Murthy and Naidu (1992) conducted a study on resource productivity and resource use efficiency of milk production in East Godavari district of Andhra Pradesh and reported that feed and fodder were observed as the important factors for increasing the efficiency of milk production. He also reported that the marginal value productivity of labour was negative for descript and combined farmer. The study suggested that the profit could be increased by using more quantity of dry fodder and concentrate by all the farmers.

Wani *et al*. (1992) studied input output relationship in milk production and estimated the marginal value product of relevant input variables separately for non descript and crossbred cows in the Kashmir Valley. It was reported that marginal value products (MVPs) of feed and human labour inputs for both crossbred and nondescript cows were higher than their respective factor cost. Therefore, increased use of these inputs was suggested in order increase the milk yield.

Rajendran and Prabaharan (1993) conducted a study on resource use efficiency in milk production in Dharampuri district of Tamil Nadu. The study revealed that the Cobb Douglas function fitted for buffalo, crossbred and local cows explained 77, 88 and 86 percent of total variation in the milk production respectively. It was suggested that the productivity of buffaloes and crossbred cows can be increased by optimal utilization of the inputs like concentrate and labour. The study also revealed that the productivity per milch animal increased significantly with increase in the herd size.

Roy (1994) in a study on economic analysis of milk production in Midnapore district of West Bengal reported that the concentrate and green fodder had positive and significant relationship with milk production both for crossbred and local cows. It was concluded that the milk production can be increased to a large extent by increasing quality and quantity of feed and fodders in the study area.

Devraj and Gupta (1994) in a study of resource use efficiency in milk production in Churu district of Rajasthan reported that green fodder and concentrate were the most significant input influencing the milk yield in case of buffaloes as well as local cows. The study also reported that other inputs, viz., dry fodder and labour were not found statistically significant, while in some cases they were found negative.

Agarwal *et al*. (1995) in their study on factors affecting the efficiency of cattle management at NDRI farm, Karnal estimated the milk production function in terms of physical quantities of feed and fodder for different seasons. The study revealed that concentrate contributed significantly to milk production in all the season both in case of cows and buffaloes, whereas green fodder (roughage) had significant effect on milk yield in summer season only for crossbred cows. The estimated linear milk production function showed that the roughage and concentrate together explained 89 to 90 percent of total variation in different season for crossbred cows, 78 percent for Sahiwal cow and 68 percent for buffaloes.

Shiyani and Singh (1996) conducted a study on economic analysis of technical efficiency in milk production on members and non members dairy cooperatives in Junagarh district of Gujarat and observed that regression coefficient of concentrate in all the seasons were positive and highly significant for both the groups which indicated greater bearing of concentrates on buffalo milk production. The regression coefficient of green fodder was found positive and highly significant in winter and summer seasons but non significant in rainy season. Negative sign of regression coefficient for dry fodder in winter and rainy seasons implied its over utilization, whereas concentrate feeding also played a vital role in increasing cow milk production in all the three season. They

concluded that the feed and the fodder had a greater bearing on buffalo as well as cow milk production.

Sinha (1997) in a study on economic analysis of dairy enterprises in Nalanda district of Bihar revealed that green fodder and concentrates were highly significant factors affecting the milk production of different breeds of animals. However, dry fodder was not found to have significant effect on the cow milk production in any season.

Gaddi *et al.* (1997) studied the factors affecting milk production in Dharwad district during 1994-95. The results indicated that feed, the most important variable influencing milk production was highly significant for all the categories of farms studied. The other inputs, i.e., labour; fodder and capital were also significant. The study concluded that expenditure must be diverted from fodder resource to other resource to optimize returns from milk production. Feed, labour and capital input were underutilized.

Chandra (1998) studied economics of milk production in Farukhabad district of Uttar Pradesh and observed that the MVP of the green fodder and concentrate were positive and significantly higher than that acquisition cost both in crossbred cows and buffaloes. The study revealed that there was a further scope of increasing the productivity of cows and buffaloes through feeding higher level of green fodders and concentrates.

Kumar (1997) in their study on resource productivity in dairy farming in Tamilnadu observed that the expenditure on concentrates was found to have positive and significant impact on all species of milch animals. MVP of concentrates was significantly more than unity, signifying under utilization of this input in case of both local cows and buffaloes. In case of crossbred cows, MVPs of green fodder and concentrates were significantly lesser than unity, indicating thereby their over utilization in the milk production process.

Kumar and Pandian (2001) conducted a study to analyze the input output relationship in milk production for indigenous cows, crossbred cows and buffaloes under rural conditions in the Vilupuram and Salem district of Tamil Nadu. The estimated Cobb-Douglas function explained about 85, 74, and 76 percent variation in milk production of indigenous cow, buffaloes and crossbred cows

respectively. The study indicated that milk production would decrease if more dry fodder was fed to the animals. A positive relationship between milk production and the concentrates was observed. It was further observed that labor was under utilized in local cows and buffaloes while it was over utilized in crossbred cows.

Mankar (2003) in a study on economic analysis of milk production and disposal pattern in Wardha district of Maharashtra reported that green fodder and concentrate were found positive and significant for all type of milch animals, whereas dry fodder was found positive and significant in case of buffaloes. The difference between marginal value product and marginal factor cost was observed to be statistically significant in case of green fodder for crossbred cows and buffaloes, whereas concentrates feed was found to be significant in case of crossbred cows only

Das (2004) conducted a study on economic efficiency of milk production and marketed surplus in rural areas of Burdwan district of West Bengal and reported that in milk production function, green fodder and dry fodder were positively significant for all types of milch animals, whereas concentrates was found to be positively significant in case of local cow. The difference between marginal value products and marginal factor costs was statistically significant in case of green fodder and concentrates for buffaloes and crossbred cow, whereas in case of local cows green fodder and concentrates were not significant.

Desai (2005) in a study on economic analysis of milk production and disposal pattern in Bidar district of Karnataka reported that in milk production function, green fodder and concentrate were positively significant for all types of milch animals, whereas dry fodder was found to be positively significant in case of local cows. The difference between marginal values product and marginal factors cost was observed to be statistically significant in case of green fodder for local cows, crossbred cows and buffaloes, whereas concentrates feed was found to be significant in case local cows only.

Khan (2006) conducted a study on economic analysis of milk production systems in new alluvial zone of West Bengal and reported that dry fodder and concentrate were the most significant inputs influencing the milk yield in case of crossbred cows. Concentrate for crossbred and dry fodder for local Cattle were

used optimally. Effective feeding of green fodder, dry fodder and concentrate may increase the productivity of animals for a higher returns.

Kumarvel (2006) in his study on economic analysis of Livestock production systems in tribal areas of Tamilnadu reported that green fodder, dry fodder and concentrate were found positively significant for local cows and concentrate was found non-significant in case of crossbred.

Singh (2006) in a study on economics of milk production in Imphal West district of Manipur reported that green fodder and concentrate inputs were positively significant for crossbred cows. The concentrate was used optimally and efficiently while green fodder was not utilized efficiently or underutilized.

Singh (2008) in his study on economic analysis of Milk Production in Varanasi District of Uttar Pradesh concluded that green fodder, dry fodder and concentrate were underutilized indicating that feeding of more quantity of green fodder, dry fodder and concentrate will further increase the productivity of milch buffaloes in the study area.

Sai Pasad (2010) in his study on Economic analysis of dairy production system in Nanded district of Maharashtra concluded that green fodder and dry fodder were optimally utilised in case of crossbred cows and buffaloes whereas concentrate was under utilised in case of buffaloes and increased feeding of concentrate could increase milk production. Labour was underutilised in case of crossbred cows.

2.4 CONSTRAINTS

Shroti (1989) in an analysis of constraints in Aligarh district of Uttar Pradesh found that the first aid workers were not as qualified and trained as to judge diseases and lack of supply of FMD and HS vaccines even on payment. It was also observed that the vaccination was not done timely and emergency veterinary services were not available at time.

Bairathi (1993) conducted a study of constraints in milk production and procurement in Jaipur. He reported that non availability of green fodder round the year was one of the very serious constraints at producer's level.

Fulzele (1994) reported that poor availability of adequate feeds and lack of quality feeds and also non availability of compound feed and mineral mixture and lack of efficient disease reporting system as the major constrains of dairy farmers.

Singh (1994) studied constraints in milk production faced by milk producers in Meerut district of Uttar Pradesh and reported that high cost of medicine and less qualified staff working at village level were serious constraints perceived by dairy farmers.

Pandey (1996) conducted a comparative study of livestock rearing system in Chotanagpur region of Bihar and reported the major constraints relating to breeding as distantly located AI centres, non availability of staff at centre and preference for natural service.

Balakrishna (1997) studied the dairy production in selected farming systems in Karnataka. He pointed out that the non availability or poor availability of green fodder and high cost of concentrate feeding were major constraints.

Rajendran and Prabaharan (1998) in Dharampuri district of Tamilnadu found that inadequate input supply, the animals frequently falling sick , costly veterinary treatment aid, repeat breeding and that high cost of feed is perceived as main constraints.

Yedukondalu *et al.,* (2000) conducted a study in Andhrapradesh. Non remunerative price of milk, lack of co-operatives for milk marketing, non availability of good dairy animals, high cost of concentrates ,low availability of veterinary facilities and distant location of A.I center were the major constraints perceived by dairy farmers.

Ulmek and Patil (2001) identified the constraints faced by buffalo owners in breeding track of Pandharpuri buffaloes of Maharashtra. The constraints identified were shortage of green fodder, High feeding expenses and non availability of funds and low remunerative price of milk. The resource constraints were more significant in Solapur and Sangli districts of Maharashtra.

Singh (2004) reported that poor quality of bulls at village, problem of heat detection, low rate of conception through A.I. and lack of A.I. & veterinary facilities were common breeding constraints, that inadequate knowledge about

balanced feeding, high cost of feeds and fodder and non-availability of land for fodder cultivation were major constraint in feeding in all agroclimatic zones of Bihar & Jharkhand.

Ansari *et al.* (2004) in their study in Uttar Pradesh observed that due to shrinkage of pasture and grazing land, small and marginal farmers have been facing serious problems in providing balanced diet to improved breeds of cows and buffaloes The major constraints for keeping maximum number of non-descript cows and buffaloes are non availability of feed and fodder ,poor shelter, poverty, frequently occurrence of disease, lack of medical support, non existence of Artificial insemination centres and inadequate number of veterinary hospitals.

Natchimuthu and Ramkumar (2004) studied the constraints in utilization of dairy development programme in Pondicherry. The constraints identified by the farmers were low price of milk, high cost of compounded feed, non availability of land for green fodder cultivation, lack of veterinary facilities, inadequate knowledge about balanced feeding and poor conception rate through artificial insemination.

Awasthi *et.al* (2004) conducted a study in drought prone areas of West Bengal. They observed that framers who have access to external inputs irrespective of breeds have performed far inferior compared to those with high access to external inputs. Resource poor farmers of drought prone area have problems to have continuous flow of milk round the year.

Jangid and Rohilla (2004) conducted a study in arid fringes of Rajasthan. The constraints faced by the sample households are non availability of green fodder throughout the year, high cost of fodder and concentrates, uncertainty of monsoon, lack of Artificial –Insemination facilities and lack of knowledge of improved practices.

Malik *et al*. (2005) in the study on existing dairy farming practices in “Uttar Pradesh” reported that frequent problem experienced by the dairy farmers was non-availability of veterinary and AI facilities in the villages, which was a hindrance to the adoption of improved dairy farming practices.

Kalyankar (2004) reported low productivity of animals, high cost of feed and fodder, Poor quality of bulls at village, problem of heat detection, Lack of AI

and veterinary facilities were major breeding constraints in EVZ and CVZ of Maharashtra.

Kumar (2005) in his study in Tamilnadu observed that low price of milk, high cost of feed and fodder and non availability of green fodder and poor conception rate in crossbred as the major constraints in milk production perceived by farmers.

Bardhan, *et al*. (2005) conducted study in Uttaranchal and identified the major constraints as non remunerative price of milk ,low availability of green fodder,high cost of feeed,poor quality of concentrates ,distant location of A.I centers and reproductive problems.

Pandey *et al.* (2005) studied the trends and constraints in the bovine wealth of Haryana.the major constraints perceived by dairy farmers were carrying capacity of common property resources(CPR's) and shortages of feed and fodder.

Kumarvel (2006) in his study in tribal areas of Tamilnadu found that lack of availability of green fodder round the year, high cost of transport involved in getting feed and fodder from plains and lack of suitable crops for cultivation, lack of proper knowledge for improving upon the existing breeds, untimely visit of Veterinary Assistant Surgeon (VAS) and mobile veterinary unit were the main constraints perceived by the dairy farmers.

Dixit *et al.* (2006) in a study conducted in Karnataka and Kerala, observed that major constraints faced by dairy farmers were lack of green fodder and dry fodder cultivation, high cost of feeds, low price for milk and low productivity of milch animals.

Singh *et al.* (2006) in their study, identified the constraints faced by the dairy farmers in Rajasthan. The constraints faced by dairy farmers were low price of milk, lack of proper veterinary and A.I services facilities ,poor knowledge of scientific feeding, management and health practices ,high cost and poor availability of feed, fodder and mineral mixture and lack of grazing land facilities.

Mahendra and Anil (2006) studied the constraints faced by dairy farms in Rajasthan. The main constraints observed by them were high cost of feeds and fodder, poor availability of fodder and feed, limited financial resources, lack of

facilities for treatment, vaccine and medicines, lack of veterinary dispensaries and poor knowledge of scientific management and animal health care practices.

Mahajan (2010) studied the constraints faced by rural and periurban dairy farms in Ludhiana district of Punjab. The constraints faced by dairy farmers were relatively low rate of conception through AI and repeat breeding in buffaloes and crossbred cattle, high cost of concentrates, low availability and high rates of dry fodder, lack of mobile veterinary services and lack of emergency veterinary services.

CHAPTER – 3

PROFILE OF THE STUDY AREA

3. PROFILE OF THE STUDY AREA

Information regarding the geographical location, demography, land use pattern, financial institutions and other features are highlighted. It provides background for analysis, interpretation and discussion of the results and helps in drawing meaningful conclusion.

3.1 An Overview of Maharashtra State

3.2 An Overview of Vidarbha Region

3.3 An Overview of Chandrapur District

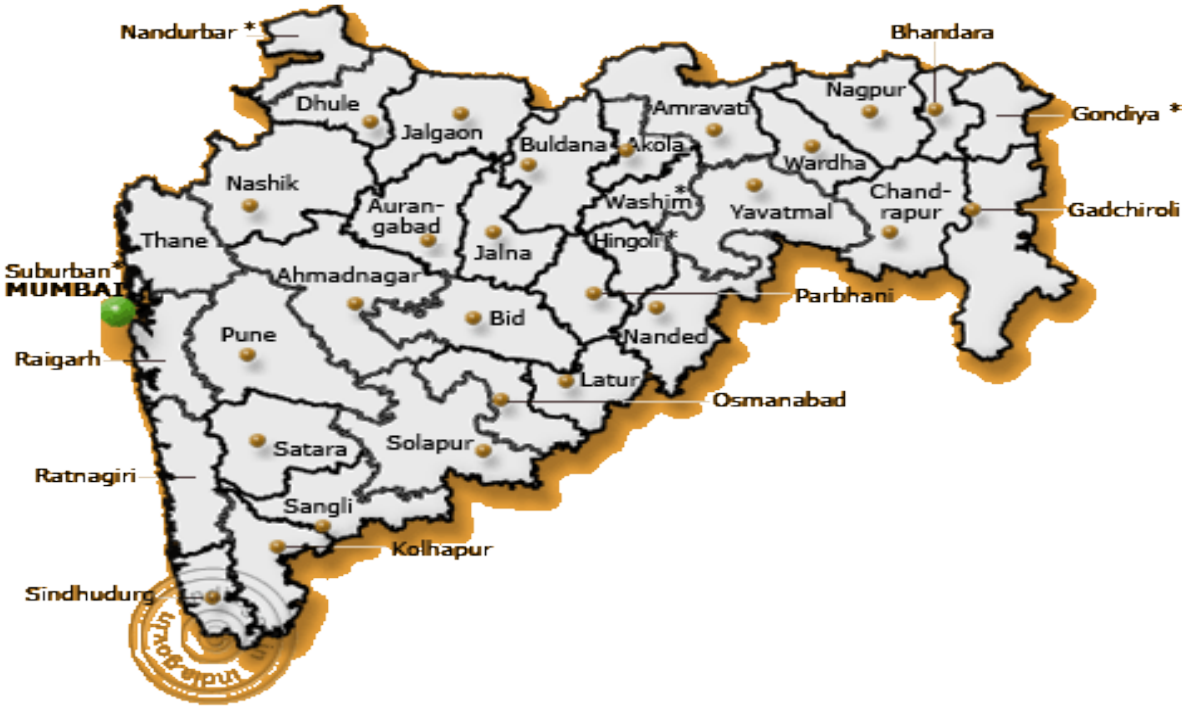
3.4 An Overview of Yavatmal District

3.1 An Overview of Maharashtra State

3.1.1 Introduction and its Location

The Maharashtra state came in the existence in 1960 when Bombay state bifurcated in Gujarat and Maharashtra.

The Maharashtra state occupies the western and central part of the country and has a long coastline stretching nearly 720 kilometers along the Arabian Sea. It is situated on western part of the country between $15^0$54' to $22^0$6'N latitude and $72^0$36' to $80^0$54' E longitude with total area of 307.7 thousand sq.km. Its land frontier is shared by Gujarat in the north-west with the Union territory of Dadar and Nagar Haveli sandwiched in between and Madhya Pradesh in north, Chhattisgarh in east, Andhra Pradesh, Karnataka in south, Goa in southeast and Arabian Sea in the west. Maharashtra's topography is diverse. There are 35 districts in Maharashtra. Geographically, historically and according to political sentiments Maharashtra has five main regions: Vidarbha, Marathwada, Western Maharashtra and Konkan.



MAP OF MAHARASHTRA STATE

3.1.2 Climate

The climate in general is tropical. On the coast the average minimum temperature in January is 16^0 C and the average maximum is 32^0C; in June the average minimum temperature is 26^0C and the average maximum is also 32^0C.

3.1.3 Rainfall

There are large variations in the quantity of rainfall within different parts of the state. Ghat and coastal districts receive an annual rainfall of 2000 mm but most part of the state lies in the rain shadow belt of the ghat with an average of 600 to 700 mm. The annual rainfall ranges from 500 mm to 5000 mm with an average of 1000 mm distributed over 60- 70 days. Maharashtra has a mansoon season that accounts for about 80 percent of its annual rainfall.

3.1.4 Soil

The soils of Maharashtra are residual, derived from the underlying basalts. In the semi-dry plateau, the regur (black-cotton soil) is clayey, rich in iron it is

moisture-retentive. Where redeposit along the river valleys, those kali soils are deeper and heavier, better suited for rabi crops. Farther away, with a better mixture of lime, the morand soils form the ideal Kharif zone. The higher plateau areas have pather soils, which contain more gravel. In the rainy Konkan, and the Sahyadri Range, the same basalts give rise to the brick-red laterites productive under a forest-cover. By and large, soils of Maharashtra are shallow and somewhat poor.

3.1.5 Cropping Pattern

As per the land utilization statistics for 2009-10, out of the total 307.5 lakh ha. geographical area of the State, the gross cropped area was 224.5 lakh ha, net area sown was 174.2 lakh ha. (56.6 per cent), area under forest was 52.1 lakh ha. (16.9 per cent), land not available for cultivation was 31.5 lakh ha. (10.2 per cent), other uncultivated land was 24.1 lakh ha. (7.8 percent) and fallow land was 25.6 lakh ha. (8.3 per cent). The net irrigated area in 2009-10 was 32.55 lakh ha. in the State. Out of the net irrigated area., the area irrigated under well was 21.15 lakh ha. (65 per cent). The gross irrigated area in 2010-11 was 39.7 lakh ha. As per the Agricultural Census 2005-06, the total number of land holdings in the State were 1.37 crore, out of which 102.6 lakh land holdings (74.86 per cent) had area of less than or equal to two hectares with the total operational area of 80.4 lakh ha. (40.2 per cent). Principal crops grown in the State are rice, jowar, bajra, wheat, tur, mung, urad, gram and other pulses.

3.1.6 Livestock Population

Animal husbandry and dairying is one of the important activities in the state supporting rural population in generating income and employment on steady basis. Maharashtra has 161.84 lakh cattle and 60.73 lakh buffaloes (18th Livestock Census, 2007, Govt. of India).

3.1.7 Milk Production

The annual milk production in the state is about 74551.59 lakh kg. The share of different milch bovines in total milk production is about 37.7, 14.3, 44.1 percent for crossbred cow, indigenous cow and buffalo, respectively.

3.1.8 Veterinary Institutes

The state has a network of 32 veterinary policlinics, 1,572 veterinary dispensaries, 2,896 primary veterinary aid centres, 65 mobile veterinary clinics, 27 district artificial insemination centres and 171 taluka veterinary mini-polyclinics as on March, 2010, for rendering veterinary services. For production of frozen semen, there are three laboratories in the State located at Pune, Nagpur and Aurangabad. The artificial insemination (AI) facility is provided at all of these 4763institutes.

3.2 An Overview of Vidarbha Region

3.2.1 Introduction and its location

Vidarbha region is predominantly an agricultural one. Nearly 76 percent of its population lives in villages .As such the economic development of this region and also the prosperity of rural masses is essentially linked with the development of agriculture. Agriculture in this region is still predominantly traditional and has a very low and unstable productivity. The unsatisfactory performance of agriculture is mainly due to the lack of sufficient irrigation facility. Irrigation, which is the key input of intensive cultivation and modern agriculture practices has not yet been satisfactory developed in this region. At present, only about 10 percent of the net cultivated area is irrigated while the remaining continues to be rain fed. It is not therefore surprising that crop frequently suffer from erratic nature of monsoon, resulting in low and unstable productivity.

Vidarbha is the eastern region of Maharashtra state made up of Nagpur Division and Amravati Division. Its ancient name is Berar. It occupies 31.6% of total area and holds 20.4 per cent of total population of Maharashtra. It borders the state of Madhya Pradesh to north, Chhattisgarh to east, Andhra Pradesh to south and Marathwada and Khandesh regions of Maharashtra to west. Situated in central India Vidarbha has its own rich cultural and historical background distinct from rest of Maharashtra. The largest city in Vidarbha is Nagpur, second largest is Amravati followed by Akola, Yavatmal, Chandrapur and Gondia.

MAP OF VIDARBHA REGION

3.2.2 Climate

Climatically there are three season in Vidarbha region : the summer is also called early kharif, the rainy season is called kharif and the winter as rabi or late kharif. The peak summer temperature is as high as 47.8^0C and humidity very low. In Winter though the temperature is low, humidity is not high. It is only in rainy season that humidity is high.

3.2.3 Rainfall

Most of the rain in this region is received through south –west monsoon during the period from June to September. The average rainfall in Buldhana, Amravati and parts of Akola districts ranges between 700 to 900 mm. As one moves eastwards, the rainfall increases gradually ranging 900 to 1250 mm in Yavatmal, Wardha and Western parts of Nagpur district. The precipitation further increases towards east ranging from 1250 to 1700 mm in Bhandara, Chandrapur and eastern part of Nagpur district.

3.2.4 Soils

Most of the region except the eastern part of Vidarbha is underlain by basalt rock or Deccan trap. Cotton is an important crop grown in this soil and hence it is referred to as black cotton soil. Cotton, jowar, pulses, wheat and groundnut are the important crops grown in this region. Maharashtra state accounts for about 30 percent of the area under cotton in the country. Vidarbha is an important cotton growing region and accounts for about 65 percent of the area under cotton in the state.

3.2.5 Milk production

The total milk production in Vidarbha region is about 8884.07 lakh kg. The share of different milch bovines in total milk production is about 26.06, 25.6, and 42.6 per cent for crossbred cow, indigenous cow and buffalo, respectively. Both the indigenous cow and crossbred contributes almost same to the total milk production. The region contributes about 11.9 per cent to the state total milk production.

3.3 An Overview of Chandrapur District

3.3.1 Introduction and its Location

Chandrapur is a well-known district in the state of Maharashtra in India. It is located in the Nagpur division of the state. Chandrapur is one of the largest districts in the state. It was formerly known as, 'Chanda' district and was later renamed as Chandrapur in 1964.

Chandrapur, the easternmost district is located in the eastern edge of Maharashtra in Nagpur division and forms the eastern part of 'Vidarbha' region. It is located between 19.30’ N to 20.45’N Latitude and 78.46’E longitude. The district is bounded by Nagpur, Bhandara and Wardha on the northern side. Yavatmal on the western side. Gadchiroli on the eastern side and Adilibad district of the Andhra Pradesh on the southern side. The district has an area 10,490Sq. km and a population of 2194262 (1.95 percent of the State). The density of population is 191 persons per km^2 with is less than 365 persons per km^2 for the state as whole.

3.3.2 Climate

The climate of the district can be classifies as tropical hot climate with high temperature throughout the year. The two prominent seasons of the district are the hot summer and moderate winter. Winter season is short and mild while the summers are hot and prolonged. After summer, comes the monsoon, which lasts till late September. During the summer season the temperature rises as high as 47.2^0C. While in the winters, daily temperature is about 7.1 degree Celsius. The district receives its rainfall (about 90%) from the south west monsoon from June to September. The average annual rainfall is about 1420 mm.

3.3.3 Soil

The soil of Chandrapur district is of various types. The soils occurring in the Wardha and the Wainganga valleys are generally most fertile. The soil of the district is well defined and conductive for growing crops of various kinds. The most fertile soils are found in the Wardha districts and Waingangā valleys.. These soils locally known as kali soils are very productive and suitable for rabi crops due to high moisture retention capacity. However water logging is very common during monsoon and it is therefore not suitable for kharif crops. Major crops cultivated in kharif season are cotton, pigeon pea, jowar, soyabean, paddy and in rabi season wheat, chana in the district.

3.3.4 Livestock Population

Chandrapur has total 5.7 lakh cattle and 0.8 lakh buffaloes. 1.3 lakh breedable cattle constitute 94.5 per cent indigenous cattle and 5.3 per cent crossbred cattle, 0.4 lakh breedable buffaloes (18^{th} Livestock Census, 2003, Govt. of India).

3.3.5 Milk production

The total milk production in Chandrapur district is about 600.58 lakh kg.The share of different milch bovines in total milk production is about 20.7 per cent, 25.3 per cent, 47 per cent for crossbred cow, indigenous cow and buffalo, respectively. Indicating an importance of buffalo milk in total milk production and dairy farming of the people in the district. The district contributes about 0.8 per cent to the state and 6.7 per cent to the vidarbha region’s total milk production.

3.3.6 Veterinary Institutions

The district has a network of total 154 veterinary institutions includes 1 veterinary polyclinic, 6 taluka mini polyclinics, 23 ZP Grade I veterinary dispensaries, 118 ZP Grade II veterinary dispensaries, 6 mobile veterinary clinics.

3.4 An Overview of Yavatmal District

3.4.1 Introduction and Location

Yavatmal district is located in western India in the state of Maharashtra. The district was given to the East India Company in 1853 along with Berar. Later in 1864 the taluka of Yavatmal were included first into South East Berar district and later Wani district. In 1905 the Yavatmal district was formed.

Yavatmal district lies in the South-Western part of the Wardha Penganga-Waingangā plain. The district lies between 19.26' and 20.42' north latitudes and 77.18' and 79.9' east longitudes. It is surrounded by Amravati and Wardha district to the north. Chandrapur district to the east. Andhra Pradesh State and Nanded district to the south and Parbhani and Akola district.The district has an area of 13582 sq. km (4.41 percent of the state) and a population of 2775457 (2.46 percent of the State). The density of population is 204.34 persons per km^2 with is less than 365 persons per km^2 for the state as whole. Amongst the 35 district in the state, Yavatmal ranks 6^{th} in terms of area and 16^{th} in terms of population. The chief rivers of Yavatmal are the Wardha and the Penganga. Both these rivers flow along the border of the District.

3.4.2 Climate

Yavatmal generally experiences hot and dry summers while moderately cold winters. During the summers daily temperature is about 42^0C While in the winters, daily temperature is about 13^0C. Most of the total annual rainfall is received during the south west Monsoon Season the rainfall is not uniform in all part of the district. The chief rivers of the district are the Wardha and Painganga rivers.

3.4.3 Soil

The soils of the district are generally black and are mostly derived from the Deccan traps with cover most of the district they are of a uniform. Fine texture and vary in colour from black to dark brown they are however slightly inferior in productive capacity to those found in the other district the important cotton growing region in the cotton, pigeon pea, jowar, groundnut, rice are the major kharif crops and wheat, gram, linseed are the major rabi crops in the district.

3.4.4 Livestock population

Yavatmal district has total 7.1 lakhs cattle and 1.3 lakhs buffaloes. 2.1 lakh breedable cattle constitute 95.6 per cent indigenous cattle and 4.3 per cent crossbred cattle, 0.7 lakh breedable buffaloes (18^{th} Livestock Census, 2003, Govt. of India).

3.4.5 Milk production

The total milk production in Yavatmal district is about 1023.73 lakhs kg. The share of different milch bovines in total milk production is about 15, 31, 46.7 percent for crossbred cow, indigenous cow and buffalo, respectively. Indicating an importance of both buffalo and indigenous cow milk in total milk production and dairy farming of the people in the district. The district contributes about 1.3 percent to the state and 11.5 percent to the Vidarbha region's total milk production.

3.4.6 Veterinary Institutions

The district has a network of total 201 veterinary institutions includes 1 veterinary polyclinic, seven taluka mini polyclinics, 46 ZP Grade I veterinary dispensaries, 135 ZP Grade II veterinary dispensaries, 12 mobile veterinary clinics.

CHAPTER – 4

RESEARCH METHODOLOGY

4. RESEARCH METHODOLOGY

This section describes the methodology adopted in conducting the research under the following sub-heads:

4.1 Sampling Design

4.2 Data Collection

4.3 Analytical Framework

4.1 SAMPLING DESIGN

The sampling design adopted for the selection of tehsils, villages and respondents was multistage random sampling procedure.

4.1.1 SELECTION OF THE STATE

The study was proposed to be conducted in the state as across the major states, Maharashtra have maximum area under rainfed about 82 per cent which is above than the national average (57 per cent). Though the state is dominated by rainfed areas its share in livestock population is 6.8 per cent, ranks sixth in India .

The state has the second highest crossbreed cattle and sixth highest buffalo population in the country. The state stands 6th in milk production in the country contributing 7.7 million tonnes to the milk bowl of India. Out of total milk production from bovines for the state, contribution from cows is about 52.0 percent and buffalo class 48.0 percent. Out of the total cow milk production, 61.8 percent is contributed by crossbred cow.

4.1.2 SELECTION OF THE REGION

Vidarbha region was purposively selected for the study as across various regions of the state, vidarbha region holds highest livestock population (27 per cent) but its contribution to the total milk production is very low (11.9 per cent). Region is significantly underdeveloped compared to other regions of the state. Region got the national attention when Prime Minister announced PM Package for the suicidal farmer's families.

4.1.3 SELECTION OF DISTRICTS AND TEHSILS

Two districts i.e. Chandrapur and Yavatmal from the Vidarbha region were randomly selected for the present study. From each district two tehsils i.e. Bhadrawati and Radegao and then from each tehsil two villages. Thus total four villages were randomly selected for the study.

4.1.4 SELECTION OF SAMPLE HOUSEHOLDS

A complete enumeration of milk producer households in each of the selected villages was carried out.

The milk producer household in the present study have therefore been categorized on the basis of number of milch animals for which the standard methodology of cumulative square root frequency method of stratification was used. Various categories of farms obtained through cumulative square root frequency method were as follows:

Marginal:	1-2 animals
Small:	3-4 animals
Medium:	5-6 animals
Large:	7 and more

Finally the 120 sample household were selected on the basis of probability proportionate to the number of households in each category in the present study.

4.2 DATA COLLECTION

The data for the present study were gathered from both primary as well as secondary sources. Primary data were collected by personal interview method. The detailed information required for the study were collected from each of the selected household.

Various published sources of information were used such as Economic Survey of Maharashtra, Integrated sample Survey of Maharashtra and various

reports published by the State Agriculture and Dairy Department for the secondary information like the geographic and demographic particulars, land holding pattern, livestock population, milk production and milk yield of animals, veterinary and milk processing infrastructure etc.

4.3 Analytical Framework

To achieve the objectives of the study, the data collected from 120 households were scrutinised, tabulated and analysed by employing various analytical tools. The techniques so employed are discussed in the present section.

4.3.1Tabular Analysis

The data were subjected to tabular analysis for working out the socioeconomic profile and cost and returns of milking and milch animals of selected sample household.

4.3.1.2 Fixed Cost

Fixed cost is the expenditure, which is incurred whether or not the production is carried out. It includes interest on fixed capital and depreciation. The fixed cost was apportioned on the basis of Standard Animal Units (Patel *et al.* 1983). The conversion coefficients used for apportioning the fixed cost are as follows:

Local cow	= 1.00
Crossbred cow	= 1.40
Buffalo	= 1.30
Crossbred heifer (> 1 yr.)	= 0.75
Crossbred heifer (> 2 yr.)	= 1.00
Buffalo/Local heifer (> 2 yr.)	= 0.75
Buffalo/Local calves (> 1 yr.)	= 0.50
Other calves (< 1 yr.)	= 0.33

The components of fixed cost:

i. Depreciation on Fixed Capital

It is the loss in the value of an asset as a result of its use, wear and tear, accidental damage and time obsolescence. It is worked out separately for milch animals, cattle shed, machinery and equipments keeping in view the present value and useful economic life.

ii. Depreciation on Milch Animals

For calculating depreciation on animals, economic life was considered and taken as:

Crossbred Cows - 8 per cent (productive life 12.5 years),

Local cows -10 per cent (productive life 10 years),

Buffalos - 10 per cent (productive life 10 years)

iii. Depreciation on Cattle Shed and Dairy Equipments

Depreciation on cattle shed, stores and dairy equipments will be calculated by using straight-line method.

Particulars	Appropriate Per cent
Pucca building	2
Semi-pucca building	5
Bullock cart	10
Chaff cutter	10
Milk can	20
Buckets	20

(Rao, 1991).

4.3.1.3 Variable Cost

Variable costs are those costs, which are incurred on the variable factors of production and can be altered in the short run. It includes feed cost, labour cost, veterinary cost and miscellaneous cost.

i. Feed and Fodder Cost

Cost on green fodder, dry fodder and concentrate were worked out by multiplying quantities of feeds and fodders consumed by animals with their respective prevailing prices in the study area.

ii. Labour Cost

It included family as well as paid labour (hired labour). The hired labour was calculated considering type of work allotted and wages paid. In case of family labour, the imputed value obtained depends upon the time spend in dairying and prevailing wage rate of casual labour in the study area.

iii. Veterinary Cost

It included the cost incurred on natural service, Artificial Insemination (A.I.), vaccination, medicines and as fees of veterinary doctor.

iv. Miscellaneous Cost

Miscellaneous costs are the cost of repairs, electricity, water charges, purchase of milk can, bucket, rope, etc. They were calculated on the basis of per milch cows per day for different types of milch cows kept by the sample commercial dairy farms.

4.3.1.4 Gross Cost

It was obtained by adding all the cost components including fixed and variable costs, i.e.

Gross Cost = Total Variable Cost + Total Fixed Cost

4.3.1.5 Net Cost

The net cost was reckoned by deducting the imputed value of dung, from the gross cost, i.e.

Net Cost = Gross Cost- Imputed value of dung

4.3.1.6 Gross Returns

Gross returns were obtained by multiplying milk yield of an individual animal with respective prevailing prices in the study area, i.e.

Gross Returns = Quantity of milk X Market price of milk

4.3.1.7 Net Returns

Net return was calculated by subtracting net cost from gross returns, i.e.

Net Returns = Gross Returns- Net Cost

4.3.1.8 Cost per Litre of Milk Production

In order to estimate the cost per litre of milk, the average net maintenance cost per animal per day was divided by average milk production per animal per day, i.e.

$$\text{Cost Per litre (Rs.)} = \frac{\text{Net cost per animal per day}}{\text{Total milk produced per animal per day}}$$

4.3.2 Functional analysis

Milk production is a complex variable, which is influenced by several explanatory variables. The production function shows the relationship between output (milk yield) and inputs (explanatory variables) used in the production process. In the present study, production function analysis was employed to estimate the resource productivity and resource use efficiency in milk production. The regression equations were fitted for different categories of lactating animals for different seasons separately.

4.3.2.1 Specification of milk production function:

The specification of milk production function used in the present study for functional analysis is as follows:

$$Y = f(X_1, X_2, X_3, X_4, X_5)$$

Where,

Y = Income from milk per animal per day (Rs.)

X_1 = Expenditure on green fodder per animal per day (Rs.)

X_2 = Expenditure on dry fodder per animal per day (Rs.)

X_3 = Expenditure on concentrates per animal per day (Rs.)

X_4 = Value of labour used per animal per day (Rs.)

X_5 = Miscellaneous expenses per animal per day (Rs.)

The choice of a specific functional form was based on statistical criteria, i.e. sign and statistical significance of estimated parameters and co-efficient of multiple determination (R^2). Four types of functions were tried which are as follows:

Linear: $$Y = a + \sum_{i=1}^{n} b_i x_i + u$$

Cobb Douglas $$Y = a + \prod_{i=1}^{n} x_i^{b_i} e^u$$

Semilog $$Y = lna + \sum_{i=1}^{n} b_i lnx_i + u$$

Semilog (Log Lin) $$LnY = a + \sum_{i=1}^{n} b_i x_i + u$$

Where,

Y = Output

X_i = i^{th} input used

a = Constant term

b_i = Partial regression co-efficient of the i^{th} input to be estimated

u = Random error distributed normally with zero mean and constant variance

e = Base of natural log

Ideally, the output (Y) and inputs (X_i) in the above production functions were measured in monetary values rather than their physical quantities; this was done because the quality of feeds and fodders differs from one respondent to the other and can be more appreciably reflected in value terms.

4.3.2.2 Marginal value productivity

Marginal value productivity of inputs were estimated from the fitted production function. The steps involved in the estimation of marginal value product of inputs for different forms of function are given below:

Linear function :

In linear function, the regression coefficients (b_i) of the explanatory variables indicate the MVP.

$$MVP_i = b_i$$

Cobb-Douglas function:

The MVP can be worked out by taking the first order partial derivative of output with respect to the concerned input.

$$MVP_{xi} = b_i \frac{\bar{Y}}{\bar{Xi}}$$

Where,

$\bar{Y}$ = Geometric mean of output Y

$\bar{X}_i$ = Geometric mean of i^{th} input

b_i = Partial regression co-efficient of X_i „s.

4.3.2.3 Resource use efficiency

Resource use efficiency of inputs measures whether or not the inputs are used efficiently. They are used efficiently if the MVP of the input is equal to its unit price, i.e.,

$$MVP_i = P_i$$

Where,

P_i is the unit price of the input.

In order to examine the resource use efficiency, the marginal value productivity of various inputs were worked out for significant regression coefficient in the estimated milk production function. Any deviation of MVP of input from its unit price may be termed as resource use inefficiency. The higher the difference between MVP of an input and its price, the higher is the resource use inefficiency and vice versa.

Further, t-statistic given below was used to test the statistical significance of the difference between the MVP of an input and its unit price.

$$Calculate\ t = \frac{MVP_{xi} - P_{xi}}{S.E\ (MVP_{xi})}$$

$$S.E\ (MVP_{xi}) = S.E\ (b_i)\ \frac{\bar{Y}}{\bar{X}}$$

Where S.E = Standard Error

If the difference between MVP and unit price was statistically not significant, it indicates optimal use of that particular resource.

4.3.3 Constraints faced by dairy farmers

Garrett's ranking technique was followed to analyse the constraints perceived by the dairy farmers. The farmers were asked to rank the factors that were limiting the livestock production. These orders of merit were transformed into units of scores by using the following formula

$$\text{Percent position} = \frac{100\ (R_{ij} - 0.05)}{N_{ij}}$$

Where,

R_{ij} - Rank given for the i^{th} factor by the j^{th} individual.

N_{ij} - Number of factor ranked by the j^{th} individual.

The percent position is converted into scores by referring to the Table given by Garett and Woodworth (1969). Then for each factor the scores of the individual respondents were added together and divided by the total number of respondents for whom scores were added. These mean scores for all the factors were arranged in descending order and the most influencing factors were identified through the ranks assigned.

CHAPTER – 5

RESULTS AND DISCUSSION

5. RESULTS AND DISCUSSION

5.1 Selection of Sample Households

For the selection of sample household, complete enumeration of four randomly selected villages of two districts of the Vidarbha region was done. The sample household were classified into marginal, small, medium and large categories on the basis of herd size using cumulative square root frequency method of stratification. Finally, a sample of 120 households was selected on the basis of probability proportionate to the number of households in each category. The numbers of households in different categories are presented in Table 5.1:

Table 5.1: Distribution of households in four selected villages in Different Herd Size Categories

Herd Size Category	Name of Villages				Total
	Pipri	Nandori	Khairi	Ashtona	
Marginal	89 (17)	83 (16)	167 (33)	107 (18)	446 (84)
Small	24 (4)	38 (8)	23 (4)	13 (4)	98 (20)
Medium	7 (2)	17 (4)	6 (1)	3 (1)	33 (8)
Large	5 (1)	8 (2)	24 (4)	4 (1)	41 (8)
Total	125 (24)	146 (30)	220 (42)	127 (24)	618 (120)

(Figures in parentheses are number of household selected)

5.2 Socio economic profile of the Sample Household

The socio-economic aspects of rural households have an important impact on their decision making process. An attempt is therefore, made in this section to document the important socio-economic characteristics of the sample households.

5.2.1 Family size and Composition

Table 5.2 shows that the average family size in sample households was 6.60 members consisting of 2.14 adult males, 1.22 females.1.43 male children, 1.16

female children. The average number of family members was observed to be maximum on large category (7.1) whereas these figures in case of marginal, small and medium categories was 6.62, 6.22 and 6.25 members, respectively.

Table: 5.2: Category-wise family composition of the sample households

(No.)

Herd size Category	Adult		Children		Average family Size
	Male	Female	Male	Female	
Marginal	2.21	1.85	1.42	1.14	6.62
Small	2.20	1.60	1.50	1.22	6.22
Medium	2.00	1.75	1.50	1.00	6.25
Large	2.38	2.18	1.29	1.25	7.1
Overall	2.14	1.88	1.43	1.16	6.60

5.2.2 Educational Status of Heads of Sample Households

Table 5.3 shows that 13.3 per cent of the head of sample households were illiterate, 28.3 per cent had studied up to primary, 18.3 per cent were educated up to middle, 19.1 per cent educated up to 10^{th} standard, 12.5 have taken formal education up to 12^{th} standard and only 8.3 per cent were found educated up to graduation or above.

Table 5.3: Category wise Education Status of Head Sample Households

Herd Size Category	Education level					
	Illiterate	Primary	Middle	Secondary	Hr. secondary	Graduation and above
Marginal	14(16.6)	27(32.1)	18(21.4)	13(15.4)	9(10.7)	3(3.5)
Small	1(5)	3(15)	4(20)	5(25)	4(20)	3(15)
Medium	1(12.5)	2(25)	0(0)	3(37.5)	1(12.5)	1(12.5)
Large	0(0)	2(25)	0(0)	2(25)	1(12.5)	3(37.5)
Total	16(13.3)	34(28.3)	22(18.3)	23(19.1)	15(12.5)	10(8.3)

(Figures in Parentheses indicate percentage)

Across the category heads of 16.6 per cent of marginal category had no formal education followed by medium (12.5 per cent) and small (5 per cent).The heads of large category were all literates.

5.2.3 Operational Land Holding

It can be seen from the Table 5.4 that average land holding of the sample households were 9.47 acres in which 88.2 per cent of land was under rainfed and only 12.4 per cent under irrigation. The average land holding for marginal, small, medium and large category was found to be 7.75, 11.6, 10.9, 21.6 acres, respectively.

Table 5.4: Average operational Land Holding of Sample Households (*In acres*)

Herd size Category	Irrigated	Rainfed	Total
Marginal	0.87 (11.2)	6.88 (88.7)	7.75 (100)
Small	1.45 (11.8)	10.10 (88.1)	11.60 (100)
Medium	1.30 (23.4)	9.60 (76.5)	10.90 (100)
Large	3.40 (15.8)	18.25 (84.1)	21.60 (100)
Overall	1.17 (12.4)	8.30 (88.2)	9.47 (100)

(Figures in parentheses indicate percentage of total)

Across the categories medium herd size households owned the largest per cent of land under irrigation (23.4 percent) and smallest per cent was owned by marginal category (11.2 per cent).

5.2.3 Composition of Milch Animals

It can be seen from the Table 5.5 that maximum milch buffaloes were held by small category (25.56 per cent) followed by marginal (23.33 percent) while medium and large categories held almost same i.e. 22.22 and 22.89 per cent, respectively. In case of milch crossbred cow, marginal category held 41.07 per cent followed by small category i.e. 35.72 per cent. While in case of milch local cows, maximum percentage was found to be held by marginal category (41.36 per cent) followed by

large category (36.65 per cent) and minimum held by medium category (9.95 per cent). Average herd size in sample household was found to be 2.85.

Table 5.5: Composition and Average Herd Size of Sample Households

Herd Size Category	Buffalo		Crossbred cow		Local cow		Average Herd size
	In-milk	Milch	In-milk	Milch	In-milk	Milch	
Marginal	19 (31.67)	21 (23.33)	20 (48.78)	23 (41.07)	56 (53.33)	79 (41.36)	1.5
Small	14 (23.33)	23 (25.56)	13 (31.71)	20 (35.72)	17 (16.19)	23 (12.04)	3.3
Medium	12 (20)	20 (22.22)	3 (7.32)	6 (10.71)	10 (9.53)	19 (9.95)	5.6
Large	15 (25)	26 (22.89)	5 (12.19)	7 (12.5)	22 (20.95)	70 (36.65)	12.87
Overall	60 (100)	90 (100)	41 (100)	56 (100)	105 (100)	191 (100)	2.85

(Figures in parentheses indicate percentage of total)

5.2.4 Average household income from different sources

Table 5.6 shows the contribution of different sources of income to the total household income. It was found that crop income dominated in all the categories, highest for large category (69.23 per cent) and lowest for medium category (57.54 per cent) as its land holding was low compared to the other category. Followed by the milk income, highest for medium category (35.55 per cent) and lowest for marginal category (17.87 per cent).Income from sale and other livestock contributed about 5.89 per cent to the total household income, highest for marginal category (7.95 per cent) and lowest for large category (2.37 per cent).Income from wages form significant contribution to the household income highest for marginal (6.36 per cent).Other off farm income contributed 8.37 per cent to the household income

highest for marginal category (8.94 per cent) and lowest for small category (4.44 per cent).

Table 5.6: Category wise average household income from different sources

(*In Rs per annum*)

Herd Size Category	Crop Income			Income from milk	Income from wage	Income from sale & other livestock	Other off farm income	Total Income
	Cash	Food	Total					
Marginal	80279 (89.36)	9557 (10.63)	89837 (58.84)	27295 (17.87)	9720 (6.36)	12152 (7.95)	13660 (8.94)	152664 (100)
Small	105121 (83.88)	20198 (16.11)	125319 (63.30)	47950 (24.22)	4580 (2.31)	11300 (5.70)	8800 (4.44)	197949 (100)
Medium	85425 (80.25)	21020 (19.74)	106445 (57.54)	163433 (35.55)	2880 (1.39)	11250 (5.44)	12500 (6.05)	206508 (100)
Large	260700 (84.85)	46519 (15.14)	307219 (69.23)	167495 (21.97)	- (0)	10546 (2.37)	38500 (6.42)	443760 (100)
Overall	96700 (86.92)	14559 (13.07)	111350 (56.73)	49160 (25.04)	7760 (3.95)	11562 (5.89)	16429 (8.37)	196261 (100)

(Figures in parentheses indicate percentage of total income)

5.3 Cost of Milk Production

Analysis of cost of milk production provides clues to the decision making bodies and helps the decision support system to understand whether or not farmers get remunerative prices. Generally, dairy farmers can increase their family income in two ways i.e. by increasing milk production or by reducing cost of milk production. The first alternative is limited as productivity enhancement of the individual milch animal is influenced by certain biological as well as climatic factors such as genetic potential of the animal, climatic parameter like temperature, rainfall, relative humidity, etc. These externalities by no means are subjected to control by the farmer and therefore, an economic sense can only be applied on the latter issue. The second alternative can be achieved through judicious use of various factors of production. Hence analysis of cost of milk production across the milch species forms an important aspect in bovine husbandry.

5.3.1 Cost and Returns of Milk production from In-milk Local Cow on Different Herd Size Categories of Sample Households

Table 5.7 shows that the overall gross maintenance cost of local cow was found to be Rs 44.71 per day which varies from Rs 42.12 per day for marginal farmers to Rs 51.69 per day for large farmer's category.

Table 5.7: Cost and Returns of Milk production from In-milk Local Cow on Different Herd Size Categories of Sample Households (*Rs/animal/day*)

Cost Component	Herd Size Category				
	Marginal	Small	Medium	Large	Overall
Green Fodder	6.10	6.40	7.65	7.70	6.65
Dry Fodder	8.10	8.69	8.74	9.00	8.44
Concentrates	8.85	9.00	13.18	17.60	11.23
Total Feed Cost	23.35 (55.54)	24.40 (55.14)	29.56 (62.25)	34.97 (67.66)	26.33 (58.89)
Labour Cost	13.75 (32.65)	14.69 (33.20)	12.49 (26.31)	9.97 (19.28)	12.92 (28.90)
Misc. Expenses	0.72 (1.71)	0.75 (1.69)	0.81 (1.71)	1.25 (2.42)	0.85 (1.90)
Total Variable Cost	37.82 (88.90)	39.84 (90.03)	42.86 (90.27)	46.19 (89.36)	40.10 (89.69)
Depreciation on Fixed Capital	1.57	1.60	1.75	2.40	1.78
Interest on Fixed Capital	2.72	2.81	2.87	3.10	2.83
Total Fixed Cost	4.30 (10.20)	4.41 (9.97)	4.62 (9.73)	5.50 (10.64)	4.61 (10.31)
Gross Cost	42.12 (100)	44.25 (100)	47.48 (100)	51.69 (100)	44.71 (100)
Value of Dung	3.41	3.62	3.46	3.60	3.48
Net Cost	38.71	40.64	44.02	48.09	41.22
Sale Price of Milk(Rs/litre)	21.30	21.60	21.85	22.50	21.66
Milk Production(litres/day)	1.69	1.81	2.10	2.30	1.88
Gross Return	36.00	39.14	45.89	51.75	40.77
Net Return	-2.71	-1.50	1.86	3.66	-0.45
Cost per Litre(Rs/litre)	22.90	22.43	20.96	20.91	21.90
Net Return per Litre(Rs/litre)	-1.60	-0.83	0.89	1.59	-0.24

(Figures in parentheses indicate percentage in gross cost)

The overall total fixed cost which included depreciation and interest was worked out to be Rs.4.61 per day, and the total variable cost was Rs 40.10 per animal per day. The highest fixed cost was found for large category (Rs 5.50) and lowest for small category (Rs 4.30). The share of total variable cost to the gross cost ranges from 88.90 per cent for marginal category to 89.36 for large category. Feed cost had major share to the total variable cost, overall it was found to be Rs 26.33 per day which varies from Rs 23.34 per day for marginal and Rs 34.97 per day for large category. The labour cost was the next important item in maintenance, which accounted for about 28.90 per cent to the total variable cost. It was found to be Rs13.75 per day for marginal and Rs 9.97 per day for large category. The higher labour component in the rearing of livestock is interesting in the sense that, bovines being rarely maintained as stall fed and normally sent out for grazing, which involve labour. The overall cost per litre was estimated to be Rs. 21.90, highest for marginal (Rs.22.90) and lowest for large category (Rs 20.91).The overall net return per litre was Rs -0.24, except for medium (Rs 0.89) and large category(Rs 1.59) for other two categories net returns per litre was found to be negative.

5.3.2 Cost and Returns of Milk Production from Milch Local Cow on Different Herd Size Categories of Sample Households

The results of the cost of milk production for milch local cow are delineated in Table 5.8 .The overall gross maintenance cost was worked out to be Rs 36.46 per day per animal which varies between Rs 32.65 for marginal to Rs 40.25 for large category. The overall fixed cost was worked out to be Rs 3.99 and total variable cost was Rs 32.47. The overall share of total variable cost to the gross cost was estimated as 88.53 per cent which varies from 84.81 per cent for marginal to 84.95 per cent for large category. In the total variable cost the feed cost shared was work out to be 62.22 per cent varying from 60.69 per cent for marginal to 71.57 per cent for large category. The labour cost again a major component accounted for 20.28 per cent, highest for medium category (Rs11.70) and lowest for large category (Rs 9.47). Overall cost per litre for milch local cow was found to be Rs 26.78, highest for large category (Rs 30.04) and lowest for small category (Rs 22.13). Net returns were found to be negative for all the categories which may be because of large number of dry animals was in the herd.

Table 5.8: Cost and Returns of Milk production of Milch Local Cow on Different Herd Size Categories of Sample Households (Rs/animal/day)

Cost Component	Herd Size Category				
	Marginal	Small	Medium	Large	Overall
Green Fodder	6.50	6.60	8.03	7.92	7.18
Dry Fodder	8.37	8.88	9.03	9.52	8.92
Concentrates	3.64	4.44	6.98	7.89	5.63
Total Feed Cost	18.51 (60.69)	19.92 (69.15)	24.04 (68.49)	25.33 (71.57)	21.73 (62.22)
Labour Cost	9.97 (21.36)	10.20 (17.79)	11.70 (15.38)	9.57 (12.20)	10.02 (20.28)
Misc. Expenses	0.61 (2.76)	0.70 (1.31)	0.70 (1.06)	0.85 (0.98)	0.72 (2.02)
Total Variable Cost	29.09 (84.81)	30.82 (88.24)	36.43 (84.93)	35.75 (84.95)	32.47 (88.53)
Depreciation on Fixed Capital	0.95	1.53	1.65	2.30	1.58
Interest on Fixed Capital	2.62	2.02	2.72	2.20	2.40
Total Fixed Cost	3.57 (15.19)	3.55 (11.76)	4.37 (15.07)	4.50 (15.25)	3.99 (15.46)
Gross Cost	32.65 (100)	34.37 (100)	40.80 (100)	40.25 (100)	36.46 (100)
Value of Dung	3.41	3.62	3.46	3.60	3.51
Net Cost	29.25	30.76	37.34	36.65	32.95
Sale Price of Milk(Rs/litre)	21.30	21.60	21.85	22.50	21.66
Milk Production(litres/day)	1.15	1.39	1.41	1.22	1.23
Gross Return	24.50	30.02	30.81	27.45	26.65
Net Return	-4.75	-0.74	-6.53	-9.20	-6.30
Cost per Litre(Rs/litre)	25.43	22.13	26.48	30.04	26.78
Net Return per Litre(Rs/litre)	-4.13	-0.53	-4.63	-7.54	-5.12

(Figures in parentheses indicate percentage in gross cost)

5.3.3 Cost and Returns of Milk Production from In-milk Crossbred Cow on Different Herd Size Categories of Sample Households

Table 5.9 shows that the overall gross cost of maintenance for in milk crossbred cow was worked out to be Rs 84.63 per day which varies from Rs 83.49 per day for marginal category to Rs 93.59 per day for large category.

Table 5.9: Cost and Returns of Milk Production of In-milk Crossbred Cow on Different Herd Size Categories of Sample Household

(*Rs/animal/day*)

Cost Component	Herd Size Category				
	Marginal	Small	Medium	Large	Overall
Green Fodder	13.94	13.86	15.41	15.49	14.18
Dry Fodder	9.72	9.07	11.02	10.80	9.70
Concentrates	27.55	30.00	35.65	38.40	30.11
Total Feed Cost	51.21 (61.34)	52.93 (64.08)	62.08 (68.54)	64.69 (69.12)	53.99 (63.73)
Labour Cost	19.82 (23.74)	18.01 (21.80)	14.81 (16.35)	14.34 (15.32)	18.24 (21.53)
Misc. Expenses	2.12 (2.54)	2.23 (2.70)	2.36 (2.61)	2.53 (2.70)	2.15 (2.61)
Total Variable Cost	73.15 (87.64)	73.06 (88.57)	78.89 (87.50)	81.56 (87.51)	74.38 (87.89)
Depreciation on Fixed Capital	4.90	4.10	5.20	5.43	4.69
Interest on Fixed Capital	5.43	5.34	6.12	6.60	5.56
Total Fixed Cost	10.33 (12.28)	9.44 (11.43)	11.32 (12.50)	12.03 (12.85)	10.25 (12.10)
Gross Cost	83.49 (100)	82.50 (100)	90.21 (100)	93.59 (100)	84.63 (100)
Value of Dung	3.78	3.89	4.43	4.07	3.90
Net Cost	79.71	78.60	85.78	89.52	80.73
Sale Price of Milk(Rs/litre)	17.00	17.32	18.00	18.54	17.34
Milk Production(litres/day)	6.50	6.56	6.85	7.00	6.60
Gross Return	110.50	113.62	123.30	129.78	114.39
Net Return	30.79	35.02	37.52	40.26	33.66
Cost per Litre(Rs/litre)	12.26	11.98	12.52	12.79	12.24
Net Return per Litre (Rs/litre)	4.74	5.34	5.48	5.75	5.10

(Figures in parentheses indicate percentage in gross cost)

The overall total fixed was worked out to be Rs10.25 and total variable cost was Rs 74.38.The overall share of feed cost to the total variable cost 63.73 varying from 61.34 per cent for marginal category to 69.12 per cent for large category. Labour cost was found to other major component in variable cost its overall cost Rs 18.24 per day, highest for marginal category (Rs 19.82) and lowest for large category (14.34). Overall per litre cost of milk production was found to be Rs 12.24, lowest for small category Rs 11.98 per day and highest for large category Rs12.79 per day.Net return per day was found to be positive for all the categories highest for large category (Rs 5.75) and lowest for marginal category (Rs 4.74).The high level of net returns is attributed to the better productivity of crossbred cows compared to local cow.

5.3.4 Cost and Return of Milk production from milch Crossbred cow on Different Categories of Sample Households

Table 5.10 shows that the per day gross maintenance cost for milch crossbred cow was worked out to be Rs 76.08 which varies from Rs 75.24 for marginal category to Rs 80.52 for large category. . The overall total fixed was worked out to be Rs10.13 and total variable cost was Rs 65.56.The overall share of feed cost to the total variable cost was 64.41 varying from 61.94 per cent for marginal category to 70.12 per cent for large category. Labour cost was found to other major component in variable cost its overall cost Rs 14.68 per day, highest for marginal category (Rs 16.40) and lowest for large category (Rs 9.63).Overall per litre cost of milk production was worked out to be Rs 13.99, lowest for small category Rs 15.01 per day and highest for large category Rs17.57 per day.Net return per day was found to positive for all the categories highest for marginal category (Rs 1.99) and lowest for medium category (Re. 0.64). The low return for large category was due to large number of dry animals.

Table 5.10: Cost and Return of Milk production from Milch Crossbred cow on Different Herd Size Categories of Sample Households

(*Rs/animal/day*)

Cost Component	Herd Size Category				
	Marginal	Small	Medium	Large	Overall
Green Fodder	14.10	14.40	15.73	16.06	14.62
Dry Fodder	10.08	10.40	11.21	12.00	10.55
Concentrates	22.42	22.94	25.00	28.40	23.59
Total Feed Cost	46.60 (61.94)	47.74 (64.26)	51.94 (67.29)	56.46 (70.12)	48.76 (64.41)
Labour Cost	16.40 (21.80)	15.28 (20.57)	11.67 (15.11)	9.63 (11.96)	14.68 (19.39)
Misc. Expenses	2.02 (2.68)	2.15 (2.89)	2.15 (2.79)	2.40 (2.98)	2.13 (2.79)
Total Variable Cost	65.02 (86.42)	65.17 (87.73)	65.76 (85.19)	68.49 (85.06)	65.56 (86.62)
Depreciation on Fixed Capital	4.55	4.37	4.94	5.43	4.62
Interest on Fixed Capital	5.66	5.75	6.49	6.60	5.50
Total Fixed Cost	10.21 (13.58)	10.12 (13.44)	11.43 (14.81)	12.03 (14.94)	10.13 (13.37)
Gross Cost	75.24 (100)	75.29 (100)	77.19 (100)	80.52 (100)	76.08 (100)
Value of Dung	3.78	3.89	3.77	4.07	3.86
Net Cost	71.46	70.39	73.42	76.45	64.51
Sale Price of Milk(Rs/litre)	17.00	17.32	18.00	18.54	17.34
Milk Production (litres/day)	4.76	4.64	4.23	4.35	4.61
Gross Return	80.92	80.36	76.14	80.65	79.95
Net Return	9.46	8.97	2.72	4.20	15.43
Cost per Litre(Rs/litre)	15.01	15.39	17.36	17.57	15.66
Net Return per Litre(Rs/litre)	1.99	1.93	0.64	0.97	3.35

(Figures in parentheses indicate percentage in gross cost)

5.3.5 Cost and Returns of Milk Production from In-milk Buffalo on Different Herd Size Categories of Sample Households

Table 5.11 shows that the overall gross maintenance cost for in milk buffalo was worked out to be Rs 84.03 per day which varies from Rs 84.46 for small category to Rs 89.54 for large category.

Table 5.11: Cost and Returns of Milk Production from In-milk Buffalo on Different Herd Size Categories of Sample Households

(*Rs/animal/day*)

Cost Component	Herd Size Category				
	Marginal	Small	Medium	Large	Overall
Green Fodder	12.98	13.10	16.20	16.60	14.29
Dry Fodder	9.90	10.12	10.22	10.23	10.42
Concentrates	32.25	32.30	35.88	36.55	34.28
Total Feed Cost	55.13 (65.17)	56.52 (66.27)	62.30 (70.52)	63.57 (70.07)	58.97 (67.75)
Labour Cost	18.55 (21.93)	17.90 (20.99)	14.68 (16.62)	14.19 (15.64)	16.55 (19.01)
Misc. Expenses	2.01 (2.38)	1.98 (2.34)	2.15 (2.46)	2.07 (2.31)	2.07 (2.34)
Total Variable Cost	75.69 (89.48)	76.40 (89.59)	79.13 (89.57)	79.83 (87.88)	77.57 (89.12)
Depreciation on Fixed Capital	4.07	4.08	4.90	5.12	4.51
Interest on Fixed Capital	4.83	4.80	4.31	5.78	4.97
Total Fixed Cost	8.90 (10.52)	8.88 (10.41)	9.21 (10.43)	10.90 (12.01)	9.46 (10.87)
Gross Cost	84.46 (100)	85.28 (100)	88.34 (100)	89.46 (100)	84.03 (100)
Value of Dung	4.21	4.08	4.40	4.32	4.29
Net Cost	80.38	80.38	83.00	85.22	81.29
Sale Price of Milk(Rs/litre)	24.90	25.20	25.45	25.86	25.14
Milk Production (litres/day)	4.52	4.65	4.86	5.00	4.67
Gross Return	112.55	117.18	123.69	129.30	117.28
Net Return	32.17	36.80	40.69	44.08	35.98
Cost per Litre(Rs/litre)	17.78	17.29	17.08	17.04	17.42
Net Return per Litre(Rs/litre)	7.12	7.91	8.25	8.82	7.71

(Figures in parentheses indicate percentage in gross cost)

The overall total fixed cost was found Rs 9.46 and variable cost was Rs 77.57 Feed cost forms major share in variable cost varying from 65.17 per cent for marginal category to 70.52 per cent for medium category. Overall labour cost was Rs 16.55 per day it was found that labour cost decline from marginal (Rs18.55) to large category(Rs 14.19).).Overall per litre cost of milk production was worked out to be Rs 17.42 per day. Net return per day was found to be positive for all the categories

highest for large category (Rs 8.82) and lowest for marginal category (Rs 7.12).It was found that though the productivity of buffalo was not very high, it yield high returns .The genuine reason might be due to the fact that buffalo milk fetches a better price due to high fat content as compared to cow milk.

5.3.6 Cost and Return of Milk production from Milch Buffalo on Different Categories of Sample Households

Table 5.12 shows that the overall gross maintenance cost for milch buffalo was worked out to be Rs 79.80 per day which varies from Rs 77.58 for medium category to Rs 83.89 for large category.

Table 5.12: Cost and Return of Milk production from Milch Buffalo on Different Herd Size Categories of Sample Household

(*Rs/animal/day*)

Cost Component	Herd Size Category				
	Marginal	Small	Medium	Large	Overall
Green Fodder	13.20	13.50	15.18	16.80	14.71
Dry Fodder	10.08	10.40	10.64	11.00	10.54
Concentrates	29.26	27.64	28.00	28.50	28.38
Total Feed Cost	52.54 (66.28)	51.54 (66.35)	53.82 (69.37)	56.30 (67.11)	53.62 (67.44)
Labour Cost	15.85 (19.94)	15.27 (19.66)	12.40 (15.98)	14.62 (17.43)	14.62 (18.05)
Misc. Expenses	1.98 (2.50)	1.98 (2.55)	2.15 (2.77)	2.07 (2.47)	2.04 (2.56)
Total Variable Cost	70.37 (88.77)	68.79 (88.57)	68.37 (88.13)	72.99 (87.01)	70.28 (88.07)
Depreciation on Fixed Capital	4.07	4.08	4.90	5.12	4.51
Interest on Fixed Capital	4.83	4.80	4.31	5.78	4.97
Total Fixed Cost	8.90 (11.23)	8.88 (11.43)	9.21 (11.87)	10.90 (12.94)	9.48 (11.92)
Gross Cost	79.27 (100)	77.67 (100)	77.58 (100)	83.89 (100)	79.80 (100)
Value of Dung	4.13	4.08	4.04	4.32	4.15
Net Cost	75.14	73.59	72.54	69.57	72.55
Sale Price of Milk(Rs/litre)	24.90	25.20	25.45	25.86	25.36
Milk Production(litres/day)	3.32	3.16	2.94	2.98	3.24
Gross Return	82.67	79.63	74.77	77.06	82.25
Net Return	7.53	6.05	2.23	7.49	9.69
Cost per Litre(Rs/litre)	22.63	23.29	24.69	23.35	22.37
Net Return per Litre(Rs/litre)	2.27	1.91	0.76	2.51	2.99

(Figures in parentheses indicate percentage in gross cost)

The overall total fixed cost was found Rs 9.48 and total variable cost was Rs 70.28. Feed cost accounted the major share in variable cost varying from 66.28 per cent for marginal category to 69.37 per cent for medium category. Overall labour cost was Rs 14.62 per day it was found that labour cost decline from marginal (Rs15.85) to medium(Rs12.40) and again increase for large category (Rs 14.62).Overall per litre cost of milk production was worked out to be Rs 22.37 per day. Net return per day was found to be positive for all the categories highest for marginal (Rs 2.27) and lowest for medium category (Rs 0.76).

5.4 Resource use efficiency

The mechanism of resource combination in dairy farming can be easily understood if the factor product relationships underlying the milk production process are examined. Milk production is a complex variable which is affected by several explanatory variables such as feed, labour, miscellaneous expenses etc; hence the selection of suitable variables is very essential. The milk production functions have been estimated for local cow, crossbred cow and buffalo using expenditure in feed and fodders, labour cost and miscellaneous expenditure on dairying.

5.4.1 Milk Production Function in milking animals of various species

In order to examine the contribution of different explanatory variables to milk production, the production function analysis was carried out.

Three types of production functions viz. Linear, Cobb-Douglas and Semi-log production were tried. Cobb-Douglas was found to be best fit for all types of milking animals keeping in view the significances and sign of explanatory variables and R^2. The estimated parameters of the production function along with their R^2 value for different species of milking animals are presented in Table 5.13

Table 5.13: Estimated Coefficient of Milk Production Function

Parameters	Species		
	Local Cow	Crossbred cow	Buffalo
No. of Observation	85	39	60
Intercept	2.63 (0.38)	1.74 (0.48)	2.06 (0.84)
Green Fodder	0.66** (0.10)	0.82** (0.09)	0.21* (0.09)
Dry Fodder	-0.07 (0.13)	0.44 (0.13)	-0.26 (0.12)
Concentrates	0.04 (0.02)	0.38** (0.13)	0.74** (0.17)
Labour	0.04 (0.08)	0.07* (0.07)	0.13 (0.09)
Misc.	0.13** (0.03)	-0.02 (0.02)	-0.03 (0.03)
R^2	69.25	79.7	33.3

- **Significant at 5 per cent level of significance**

** **Significant at 1 per cent level of significance**

5.4.2 Resource use efficiency in milk production

In order to examine the resource use efficiency the marginal value product (MVP) of inputs whose regression coefficient were found statistically significant in estimated production function were compared with their respective prices. If the difference between MVP of an input and its unit price is statistically not significant then it indicates that the input is being used efficiently. A significant higher MVP of an input than its price shows that more of the input can be used to increase productivity, while a significant lower MVP of an input than its unit price indicates that the input is used in excess and needs reduction.

The perusal of the Table 5.14 indicated that the regressors explained 69.25, 79.7 and 33.3 per cent variation in the value of milk production for local cow, crossbred cow and buffalo respectively. In case of local cow green fodder and miscellaneous expenses were found positive and statistically significant at 1 per

cent. Green fodder and concentrates were found positive and statistically significant at 1 per cent level of significance and labour positive and statistically significant at 5 per cent level of significance in case of crossbred cow indicating the need of better care and management for further increase in milk production. While for buffalo green fodder was found positive statistically significant at 5 per cent and concentrates positive and statistically significant at 1 per cent level of significance.

Table 5.14: Resource Use Efficiency in Milk Production

Inputs	Species	MVP	Diff	S.E	t- value
Green Fodder	Local Cow	4.463	3.463**	0.680	5.092
	Crossbred cow	15.171	14.171**	1.703	8.319
	Buffalo	4.123	3.123	1.875	1.666
Concentrates	Crossbred cow	2.756	1.756	0.970	1.809
	Buffalo	3.289	2.289*	0.785	2.916
Labour	Crossbred cow	0.558	-0.442	0.523	-0.845
miscellaneous	Local Cow	18.369	17.369*	4.671	3.718

- **Significant at 5 per cent level of significance**

** **Significant at 1 per cent level of significance**

The resource use efficiency of green fodder for local cow and crossbred cow was found positive and significant indicating under utilisation of this input and further increase in milk production can be achieved by increased use of green fodder while for buffalo it was found positive and non significant indicating its optimal utilisation.

The difference between MVP and unit price of concentrate for buffalo found positive and significant indicating underutilisation. Apart from these miscellaneous expenses found positive and significant for local cow indicating underutilisation of this input and increase in this input might be increase further milk production.

5.5 Constraints

An attempt was made to identify the constraints faced by dairy farmers in the study area on the basis of observation and discussion .For the purpose of prioritizing the constraints, Garret ranking has been used. After calculating the percent position of ranks of the already identified constraints, transmutation of orders of merit was done following Garret (1981). The final ranking of the constraints in order to fix their relative priority was done on the basis of their mean scores.

Table 5.15 depicts that lack of availability of green fodder throughout the year was the most important perceived constraint of dairy farmers in the study area followed by high cost, low availability of concentrates and low availability of dry fodder. As the majority of farmers sent their animals for open grazing in common property resources for 5-6 hours and farmer's fallow fields also become another major grazing resource after harvesting of crops. Farmers tend to ration their home grown crop residues and milking animals in addition receive some amount of supplementary feeding home- grown by product such as wheat straw and rice bran and purchased concentrates such as cotton seed cake, soyabean cake, linseed cake .Other significant constraints are lack and high cost of agriculture labour, and low productivity of animals because most of the livestock in study area were non descript. As Low price of milk (as paid by the cooperative societies in their village) and poor quality of bulls at village was also constraints in the area. Repeat breeding in crossbred and lack of A.I and veterinary facilities was also constraints perceived by farmers. Lack of regulated market and milk cooperative and lack of transport were also not available and farmers took milk by bicycle to sell directly to consumers and sweet shops in the cities. Apart from this, milk is collected only in the morning by vendors and sell of evening milk was often a problem.

Major constraints faced by all the categories were lack of availability of green fodder throughout the year and high cost of concentrates. Other major constraints perceived by the marginal category were lack and high cost of agriculture labour in the area, non availability of dry fodder and low productivity of animals as majority of these farmers rear non-descript local cow.

Constraints perceived by small category were low price of milk as most of the farmers sell their milk to the cooperatives, non availability of dry fodder, lack and high cost of agriculture labour, lack of transport facilities it might be the one reason that they sell to the milk cooperative even though they get less price to the milk.

Major constraints faced by medium category were low price to the milk, non availability of land for fodder production, lack and high cost of agriculture labour.

Table5.15: Identification of the Constraints Faced by Different Categories of Dairy Farmers

Sr. No.	Constraints	Mean Score				Overall	
		Marginal	Small	Medium	Large	Mean Score	Rank
1	Lack of availability of green fodder round the year	76.51	78.10	79.50	73.50	76.55	1
2	Low availability and high cost of concentrates	73.30	75.30	70.38	73.50	73.45	2
3	Lack and high cost of agriculture labour	65.02	61.25	62.88	54.38	63.54	3
4	Low availability of dry fodder	64.33	61.80	61.13	57.13	63.22	4
5	Low productivity of animals	63.87	51.05	56.75	55.13	60.68	5
6	Low price of liquid milk	52.44	63.90	69.75	69.88	56.67	6
7	Poor quality of bulls at village	58.23	49.80	52.88	47.38	55.74	7
8	Non-availability of land for fodder cultivation	52.93	52.10	63.00	53.25	53.48	8
9	Repeat breeding in cross-bred cows and buffaloes	52.39	56.35	50.75	48.13	52.66	9
10	Lack of AI and veterinary facilities	53.82	51.65	34.13	61.38	52.65	10
11	Lack of regulated market and milk cooperatives	48.17	58.50	58.25	62.88	51.54	11
12	Lack of transport facilities and all weather road infrastructure	47.74	59.75	57.13	52.13	50.66	12
13	Unavailability of veterinary doctors or attendants	48.80	36.55	28.13	41.88	44.92	13
14	Relatively low conception rate through AI	47.02	37.75	38.25	41.00	44.49	14
15	Unawareness of improve dairy farming practices	41.92	42.90	43.13	41.88	42.16	15
16	Problem of heat detection	39.33	47.70	41.12	43.63	41.13	16
17	Delay in payment by unorganized sector	39.99	44.40	43.88	36.75	40.77	17
18	Incidence of reproductive disorders in the milch animals	41.65	37.70	42.13	30.00	40.25	18
19	Tick/worms infestation	41.17	33.95	39.25	25.13	38.77	19
20	Lack of awareness on animal health care	32.50	34.60	33.50	32.25	32.90	20
21	Inadequate knowledge about balanced feeding	32.99	28.50	31.13	26.38	31.68	21
22	Distantly located milk collection centre	24.39	34.70	39.00	37.75	27.98	22

Other constraints perceived by large category farmers were low price of milk, lack of regulated market and milk cooperatives, lack of AI and veterinary facilities it might be the reasons that most the farmers follow natural breeding by bulls. Distantly location of AI centres from the village prohibits farmers to get their animals inseminated at correct time.

CHAPTER – 6

SUMMARY AND CONCLUSIONS

6. SUMMARY AND CONCLUSIONS

The rainfed agro ecosystem occupies 68 per cent of India's cultivated area and supports 40 per cent of the human and 65 per cent of the livestock population. Irregular crop failure due to uncertain rainfall is common phenomenon in this area. Under such circumstances dairy production is an important component of livelihood and nutrition security in rainfed areas to improve the livelihood of farmers. The study was taken up in Vidarbha region of Maharashtra. Vidarbha region holds highest per cent of livestock population (28 per cent) but contribution to the total milk production of the state (12 per cent) is very low. Keeping this in view, the present study was addressed on Economics of milk production in Vidarbha region of Maharashtra with the following objective:

Objectives:

- ✓ **To work out cost and returns from milk production.**
- ✓ **To estimate the resource use efficiency in milk production.**
- ✓ **To identify the major constraints in practicing dairy farming.**

Among the eleven districts in Vidarbha region two districts Chandrapur and Yavatmal were selected randomly. From each of the selected district one tehsil selected at random. Consequently the one tehsil selected from Chandrapur was Bhadrawati and from Yavatmal Radegao tehsil was each at random. Two villages from each selected tehsils were selected at random, Nandori and Pipri from Bhadrawati tehsil and Khairi and Ashtona from Radegao tehsil. The total milk producing households of the four villages were divided into 4 groups (marginal, small, medium & large) based on herd size categories using 'cumulative square root frequency' method. The sample households from each village for each category were selected by 'probability proportionate method' to each herd size category. A total of 120 sample households were selected from four villages.

The general profile of sample household reveals that the average operational land holding size was 9.47 acres in which 88.2 per cent of land was under rainfed The average land holding for marginal, small, medium and large category was found to be 7.75, 11.6, 10.9, 21.6 acres, respectively. The average family size in sample households was 6.60 members. A total of 13.3 per cent of the head of sample households were found to be illiterate. Illiteracy rate found to be highest in marginal category(16.6 per cent) and lowest in large category (0 per cent) . Maximum milch buffaloes were held by small category (25.56 per cent) followed by marginal category (23.33 per cent). Marginal category held maximum milch crossbred cows (41.07 per cent) followed by small (35.72 per cent). Maximum milch local cows held by marginal category (41.36 per cent) followed by large category (35.65 per cent).Crop income was found to be major source of income, highest for large category (69.23 per cent) and lowest for medium category (57.54 per cent). Followed by the milk income, highest for medium category (35.55 per cent) and lowest for marginal category (17.87 per cent).

The overall cost of milk production per Inmilk local cow per day was Rs.21.66, which was the highest (Rs.22.50) for large category followed by medium (Rs.21.85), small (Rs.21.60) and marginal (Rs.21.30). The overall net return per local cow in-milk per day was Rs.1.88 per day per litre, which was the highest (Rs 2.30) for large category followed by medium (Rs.2.10), small (Rs 1.80) and marginal (Rs 1.69) herd size categories.

The overall gross maintenance cost per milch local cow per day was Rs.36.46, which was the highest (Rs.40.25) for large category followed by medium (Rs.40.80), small (Rs.34.37) and marginal category (Rs.32.65). The overall net return per milch local cow per day was Rs.-5.12, and for all the categories it was found to be negative highest (Re.-0.53) for small and lowest (Rs.-7.54) for large category.

The overall cost of milk production per in-milk crossbred cow per day was Rs.12.24 per litre, which was the highest (Rs.12.79) for large category followed by medium (Rs.12.52), marginal (Rs.12.26) and small (Rs.11.98). However, the overall net return per crossbred cow in-milk was Rs.5.10 per day per litre, which was the highest (Rs.5.75) for large category followed by medium (Rs.5.48), small (Rs.5.34), marginal (Rs.4.74).

The overall gross maintenance cost per milch crossbred cow per day was Rs. 76.08, which was the highest (Rs.80.52) for large category followed by medium (Rs.77.19), small (Rs.75.29) and marginal (Rs.75.24). The overall net return per milch crossbred cow per day was Rs.3.35, which was the highest (Rs.1.99) for marginal category followed by small (Rs.1.93), large (Re.0.97) and medium (Re.0.64).

The overall cost of milk production per in-milk buffalo per day was Rs.17.42 per litre, which was the highest (Rs.17.78) for marginal category followed by small (Rs.17.29), medium (Rs.17.08) and small (Rs.17.04). The overall net return per in-milk buffalo per litre was Rs.7.71, which was the highest (Rs.8.82) for large herd followed by medium (Rs.8.25), small (Rs.7.91) and marginal (Rs.7.12).

The overall gross maintenance cost per milch buffalo per day was Rs.79.80, which was the highest (Rs.83.89) for large category followed by marginal (Rs.79.27) ,small (Rs.77.67) and medium (Rs.77.58). However, the overall net return per milch buffalo per day was Rs.2.99 per day, which was the highest (Rs.2.51) for large category followed by marginal (Rs.2.27), small (Rs.1.91) and medium (Rs.0.76).

Cobb-Douglas function was found to be best fit for all types of milking animals keeping in view the significance and sign of explanatory variables and $R^{2.}$ In case of local cow, green fodder and miscellaneous expenses were found positive and statistically significant at 1 per cent. Green fodder and concentrates were found positive and statistically significant at 1 per cent level of significance and labour positive and statistically significant at 5 per cent level of significance in case of crossbred cow. While for buffalo concentrates positive and statistically significant at 1 per cent level of significance and green fodder was found positive statistically significant at 5 per cent.

It was revealed that resource use efficiency i.e. Difference between MVP and unit price of green fodder for local cow and crossbred cow was found positive and significant indicating under utilisation while for buffalo it was found positive and non significant indicating its optimal utilisation of green fodder. Resource use efficiency of concentrate for buffalo found positive and significant indicating underutilisation. Miscellaneous expenses found positive and significant for local cow indicating underutilisation.

Major constraints faced by sample household were lack of green fodder availability throughout the year, low availability and high cost of concentrates, lack and high cost of labour, non availability of dry fodder throughout the year, low productivity of animals.

Conclusions

On the basis of above discussion, it may be concluded that in the study area, *cotton* and *soyabean* are the major domain of household level income followed by *jowar* and *wheat* whereas livestock plays as a secondary sources of income. While comparing the percentage contribution of different sources of household level income, it was found that the income from cash crop (49.31 per cent) is dominant in the study area followed by the income from cereal crops (7.41 per cent). But interestingly it has been observed that the percentage contribution of (cereal) crop income is lower than the income generated from the livestock sector mainly from dairy sector (25.04 per cent). From this we may infer that though dairy is playing a major role to reduce the risk (1.26) and uncertainty as compared to food crop income (1.62). This variability may be explained that the land holding of selected households is highly unequal as compared to the inmilk animals where the household possess max 1-2 animals. Therefore, it indicate that the livestock sector particularly dairying is helping to secure the rural livelihood in the study area. Therefore major emphasis may be given to the dairy enterprise in order to reduce the risk in such regions.

To improve milk yield, better enabling facilities like better infrastructure facilities in terms of better health care, extension services are warranted. Selection of breeds adaptable to the existing agro climatic conditions that can thrive well on unconventional feed and fodder resources should be given priority in breeding programmes.

As per our study, it was found that local cow in all categories gave the negative returns and its cost of milk production was found very high because we have calculated all the factors of production at market prices. But most of the factors of production are residual or ideal at the household level. They are keeping those animals for draught powers as well as for some other secondary purposes instead of generating income from it.

For crossbred cow, though the cost of milk production was found lower than buffalo but at the same time its returns per litre of milk were also found lower than buffalo. It was mainly because of the low market price of crossbred cow milk due to less fat content. So through the technological advances, cost is to be reduced which is not possible in the study areas the farmers are very poor and cannot afford the cost of technological advances. As suggested by the failure of different central and state schemes concerning livestock in the study area, the crossbred cattle is poorly adaptable to local climatic conditions. The low adaptability of crossbreds is mainly due to higher temperatures, frequent health ailments and higher consumption of fodder. Therefore, concerted efforts will have to be made for green fodder production by introduction of forage crops on fallow lands, community waste land and efficiency of crop residues can be increased through supplementation with urea or urea molasses block. Milk cooperatives and low capacity chilling centres should be established to secure remunerative prices for the milk. Extension services must be strengthened in order to motivate the farmers for dairy farming and to make producer's cooperative society movement a success.

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APPENDICES

APPENDIX- I

ECONOMICS OF MILK PRODUCTION IN VIDARBHA REGION OF MAHARASHTRA

Schedule for complete enumeration of selected villages

District:-..... Tehsils :-..... Village :-.....

Sr No.	Name of the head of Household	Land Holding	Adult milch animals						Young (> 1 yr.)						Calf <1 yr.	Bull	Other	Total
			Buffalo		CB		LC		Buffalo		CB		LC					
			In Milk	Dry	In Milk	Dry	In Milk	Dry	M	F	M	F	M	F				

APPENDIX-II

DIVISION OF DAIRY ECONOMICS, STATISTICS AND MANAGEMENT
NATIONAL DAIRY RESEARCH INSTITUTE
KARNAL (HARYANA)

SCHEDULE

PROJECT TITLE **Date: / /**

Respondent No.....

ECONOMICS OF MILK PRODUCTION IN VIDARBHA REGION OF MAHARASHTRA

General Information about Sampled Household:

Socio-economic profile

a) Name of the head of household: _____.
b) District: _____ Tehsil: _____ Village: _____
c) Education of the Head : Illiterate/Literate _____(mention standard)
d) Family Size:- Male____ Female ____Children (< 18 yrs): M_____ F_____ Total:_____
e) Occupation [main _____, subsidiary _____]
f) Dairy Co-operative Society (DCS):- (Member)_____ (Non-Member):_____

Family particulars

S.no	Name	Age	Relation	M/F	Education	Occupation
			Self			

[@] M – Male, F – Female.

*0- Illiterate, 1- Primary , 2- Middle, 3-High School, 4- higher secondary, 5- Graduation and above.

Land Holding (Acres)

Particulars	Irrigated	Unirrigated	Total	Rent	Source of Irrigation	Annual income from land
Owned						
Leased in						
Leased out						
Operational						

Category : BF /Medium F/ SF / MF / AL (Tick)

Livestock Inventory

S. No.	Types of Animals	Buffalo			CB			LC		
		No.	Value /animal (Rs.)	Total value	No.	Value /animal (Rs.)	Total value	No.	Value /animal (Rs.)	Total value
1	Adult: In milk									
	Dry									
2	Heifer: Pregnant									
	Non - Pregnant									
3	Calves: Male									
	Female									
4	Drought animal									

Others:

Sheep

Goat

Fixed Investment Inventory

Items		No.	Original Value	Year of purchase/ Construction	Present Value (Rs.)	Expected Life	No. of years used	Annual Repairs (Rs.)
Cattle Shed	Kaccha							
	Pacca							
Storage: Feed/fodder								
Chaff cutter Shed	Kaccha							
	Pacca							
Chaff cutter	Power							
	Manual							
Manger								
Water cans								
Milk cans								
Buckets								
Iron chain								
Ropes								
Water Pump								
Bullock cart								
Gunny Bags								
Spade								
Sickel								
Axes								
Others								

Cropping Pattern (including fodder crops)

Sl.No.	Name of the Crop	Kharif		Rabi		Summer	
		Area (acres)	Yield (q /acre)	Area (acres)	Yield (q /acre)	Area (acres)	Yield (q /acre)

Annual recurring expenditure and Farm income

Annual recurring expenditure				Farm income (Annual)			
Particulars	Amount spent on						
	Buffalo	CB	LC	Income from	Unit/qty.	Value (Rs.)	Remark if any
Veterinary charges: Vaccination				Dung			
Medicine				Bullock labour (Hired out)			
Doctor charges				Sale of animal (specify)			
Breeding: Natural				Sale of farm produce			
A.I				Bullock cart			
Dairy equipments repairs				Sale of straw			
Building/shed repairs				Others: 1.			
Water & electricity				2.			
Transport, if any				Horticulture 1.			
Insurance				2.			
Interest on loan							
Annual instalment amount s(Rs.)							
Any other: 1							
2							

Average Stock sales per annum :

	Adult		Young male		Young Female	
	No. (M/F)	Value (Rs.)	No. (M/F)	Value (Rs.)	No. (M/F)	Value (Rs.)
Indigenous						
Crossbred						
Buffalo						
Sheep						
Goat						

Feed and Fodder Consumption per day

Season	Species	Type	No.	GF			DF			CONC.			GRAZING	
				Type (H/P)	Qut (Kg.)	Rate (Rs.)	Type (H/P)	Qut (Kg.)	Rate (Rs.)	Type (H/P)	Qut (Kg.)	Rate (Rs.)	Hr/ day	Charges
Winter	Buffalo	Wet												
		Dry												
	C.B.	Wet												
		Dry												
	L.C.	Wet												
		Dry												
Rainy	Buffalo	Wet												
		Dry												
	C.B.	Wet												
		Dry												
	L.C.	Wet												
		Dry												

Labour used per day (hours per person) for all bovine animals

Type of labour/ Purpose	Family labour			Casual/Hired labour		
	Male	Female	Child	Male	Female	Child
Grazing						
Cutting of Grasses/ Fodder						
Bringing Fodder						
Feeding						
Cleaning shed						
Cleaning/Washing animals						
Milking of Animals						
Selling of milk						
Total hours used per day						
Wage rate (Rs.)						
Crop production						

Average Milk Production Pattern of Milch Animals

Species	SI.No.		Rainy				Winter				
			July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total production
Local Cows	1										
	2										
	3										
	4										
	5										
	Total										
	Cons.										
	Sale	liquid									
		others									

	Rate											
	Whom sold											
Crossbred cow	1	Particulars										
	2	Lack of availability of green fodder round the year										
	3	Low availability and high cost of concentrates										
	4	Inadequate knowledge about balanced feeding										
	5	Problem of heat detection										
	Total	Incidence of reproductive disorders in the milch animals										
	Cont.	Repeat breeding in cross-bred cows and buffaloes										
	Sale	Lack of AI and veterinary facilities										
		Ticks & worms infestation										
	Rate	Lack of awareness on animal health care										
	Whom sold	Lack of regulated market and milk cooperatives										
11	1	Lack of transport facilities and all weather road infrastructure										
12	2	Unawareness of improve dairy farming practices										
13	3	Delay in payment by unorganized sector										
14	4	Malpractice in purchasing methods										
15	5	Distantly located milk collection centre										
16	Total	Low price of liquid milk										
17	Sale	Non-availability of land for fodder cultivation										
18		Low availability of dry fodder										
19	Rate	Poor quality of bulls at village										
20	Whom sold	Relatively low conception rate through AI										

Buffalo

To whom sold (1) Co-operative societies, (2) Milk vendor, (3) Consumer, (4) Tea stall & Halwai, (5) Others

Constraints faced by Dairy farmers

SL. no.	Particulars	Ranks
1	Lack of availability of green fodder round the year	
2	Low availability and high cost of concentrates	
3	Inadequate knowledge about balanced feeding	
4	Problem of heat detection	
5	Incidence of reproductive disorders in the milch animals	
6	Repeat breeding in cross-bred cows and buffaloes	
7	Lack of AI and veterinary facilities	
8	Tick/worms infestation	
9	Lack of awareness on animal health care	
10	Lack of regulated market and milk cooperatives	
11	Lack of transport facilities and all weather road infrastructure	
12	Unawareness of improve dairy farming practices	
13	Delay in payment by unorganized sector	
14	Malpractice in purchasing methods	
15	Distantly located milk collection centre	
16	Low price of liquid milk	
17	Non-availability of land for fodder cultivation	
18	Low availability of dry fodder	
19	Poor quality of bulls at village	
20	Relatively low conception rate through AI	
21	Inefficient veterinary doctor or attendants	

Souce-wise Income details per annum :

a) Livestock

Sale of milk : lit. …… Amount (Rs.)……

Sale of dung : kgs …… Amount (Rs.)……..

Sale of skin/hide : No. …… Amount (Rs.)……..

Sale of others ---------- Amount (Rs.)……..

Drought power No. of days …… Amount (Rs.)……..

Sale of stock as per schedule (Rs.) ……..

Sale of milk products : Products (kg) …….. Amount (Rs.)……..

a. Income from crop producton : Amount (Rs.)……..

b. Income from from wages : Amount (Rs.)……..

d. Other Income : Amount (Rs.)……..

Total annual family Income (a+b+c+d) : Amount (Rs.)……..