ECONOMICS OF PRODUCTION AND DISPOSAL OF MILK IN SINDHUDURG DISTRICT

A thesis submitted to the

DR. BALASAHEB SAWANT KONKAN KRISHI VIDYAPEETH, DAPOLI
(Agricultural University)
Dist. - Ratnagiri (Maharashtra State), India

In partial fulfilment of the requirements for the degree of

MASTER OF SCIENCE (AGRICULTURE)

In

AGRICULTURAL ECONOMICS

By

DEVAKATE BALVANT KUNDALIK

B.Sc. (Agri.)

DEPARTMENT OF AGRICULTURAL ECONOMICS,
FACULTY OF AGRICULTURE,
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DAPOLI- 415 712, DIST. - RATNAGIRI (M.S.)

MAY, 2016

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CERTIFICATE

This is to certify that the thesis entitled **'ECONOMICS OF PRODUCTION AND DISPOSAL OF MILK IN SINDHUDURG DISTRICT'** submitted to the Faculty of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri (Maharashtra State) in the partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (AGRICULTURE)** in **AGRICULTURAL ECONOMICS**, embodies the results of a piece of *bonafied* research carried out by **MR. BALVANT KUNDALIK DEVAKATE (Regd. No. 2374)** under my guidance and supervision and that no part of this thesis has been submitted for any other degree or diploma or published in other form. All the assistance and help received during this course of investigation and the sources of literature has been duly acknowledged by him.

Place: Dapoli
Date: / / 2016

(S.S. Wadkar)
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Affectionately dedicated
To my
Beloved Grand Parents
Late .Nivrutee Tukaram Devakate
And
Sau.Putalabai Nivrutee Devakate

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In everyone's life, the day arises when one has to mould their feelings into words. Sometimes the words become unable to express the feelings of the mind; because the feelings of the heart are beyond the reach of the words when I approach the completion of this manuscript, nostalgia takes over and so many memories which are full of gratitude of those who encouraged and helped me at various stages of this research work and also throughout my life suddenly brim my heart. It gives me immense pleasure to express my feelings over here.

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Place:Dapoli

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DEPARTMENT OF AGRICULTURAL ECONOMICS

COLLEGE OF AGRICULTURE, DAPOLI

Title of Thesis	**:**	Economics of production and disposal of milk in Sindhudurg district.
Name of the Student	**:**	Devakate B. K.
Regd. No.	**:**	2374
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THESIS ABSTRACT

An attempt has been made in present research to know the cost of production of milk on farmer's field in Sindhudurg district. A sample of 120 dairy farmers was drawn from Kankavali, Kudal and Vaibhavadi talukas of Sindhudurg district randomly. Information on selected parameters was collected for the year 2015-16. The selected dairy farmers were grouped into three categories as marginal (less than-1ha), small (1.00-2.00 ha) and medium (2.01- and above)

It was observed from the study that an average age of milch animals was 5.00, 4.66 and 5.33 years with average number of completed lactations was 2.66, 2.66 and 3.33. There was no much variation among economic traits of dairy farmer. Average milk yield of local cows, crossbred cows and buffaloes was 745.57, 1307.03 and 1365.29 litres. Average intercalving period was 526.66 days, 410.66 days and 459.66 days in case of local cows, crossbred cows and buffaloes, respectively.

Regarding per day feeding of milch animals, it was noticed that in all the seasons' quantity of paddy straw fed more or less same during days in milk and dry period. However, a daily quantity of

green fodder fed to crossbred cows was more as compared to local cows and buffaloes. Daily quantity of concentrate fed was also more in respect of crossbred cows compared to local cows and buffaloes. As a result, per day milk production of milch animals was different from group to group. At the overall level, the per milch animal cost of production during intercalving period was worked out to Rs. 23973.28, Rs. 27652.69 and Rs. 31049.52 regarding local cows, crossbred cows and buffaloes of a which, share of labour cost was 58.09 per cent, 57.41 per cent and 46.90 per cent in case of local cows, crossbred cows and buffaloes, respectively. Average gross returns worked out to Rs. 29815.93 for local cows, Rs. 32379.64 in crossbred cows and Rs. 45704.66 in buffaloes. Thus, net profit was calculated to Rs. 6683.22 for local cows, Rs. 4726.95 for crossbred cows and Rs. 14655.14 for buffaloes, respectively.

The per litre cost of milk production at the overall level for local cows, crossbred cows and buffaloes was Rs. 25.38, Rs. 21.15 and Rs. 22.74, respectively. The C.D. function in simple linear form was applied used to estimate the resource use efficiency in milk production. The results of the analysis indicated that herd size, human labour, and paddy straw and concentrates veterinary Expenses had significant influence on milk production. The total variation explained by all explanatory variables included in the function was 88.60 per cent, 45.00 per cent and 39.50 per cent in respect of local cows, crossbred cows and buffaloes, respectively. At the overall level, MVP of paddy straw (X_3) were more than their factor cost, indicating underutilization of these resources. However, MVP of human labour (X_8) was less than its factor cost, indicating excess utilization of human labour. The C.D. function in log linear form was used to estimate resource use efficiency in milk production. The results of the production function reveal that herd size, paddy straw and concentrates veterinary Expenses had significant influence on milk production. The total variation explained by all explanatory variables included in the function was 93.60 per cent, 63.00 per cent and 21.10 per cent correspondingly in case of local cows, crossbred cows and buffaloes, respectively. At the overall level, MVP of paddy straw (X_3) were more than their factor cost, indicating underutilization of these resources. However, MVP of herd size (x_1) was less than its factor cost, indicating excess utilization. The disposal of milk production is more in respect of

crossbred cow then buffalo followed by local cow. Major constraints in milk production were high cost of crossbreds (94.16%), non availability land for fodder cultivation and non availability of green fodder. On the whole, the study reveals that performing dairy activity is profitable business and provides gainful employment to family members.

CHAPTER-I
INTRODUCTION

Milk forms an important constituent of human diet, so the importance of milk in human diet cannot be over emphasized in India. Milk is only source of animal protein, calcium and riboflavin, as getting an adequate quantity of animal protein, calcium and riboflavin is difficult solely from plant foods. Hence, it is necessary to include milk in any balanced diet particularly in vegetarian diet.

India continued to be the largest milk producing nation with milk production of 146.30 was recorded million tonnes in 2014-15. An increase of 6.20 per cent over the previous year was recorded. The estimated per capita availability of milk was 322 grams per day, which is more than the world average of 294 grams per day. Per capita availability of milk in developed countries is at 831 grams per day and in Asia the same is estimated at 186 grams per day. The dairy co-operatives procured about 13.90 million tonnes of milk as compared to 12.50 million tones of it in the previous year, registering a growth of 11.10 per cent. Liquid milk marketing by the co-operatives stood at 11.70 million tonnes as compared to 11.00 million tonnes in the previous year. An increase of about 6.10 per cent. Was noted FAO reported 3.10 per cent increase in world milk production from 765 million tonnes in 2013 to 789 million tonnes in 2014 (NDDB, Annual Report 2014-15).

The use of milk and ghee has been mentioned in ancient Hindu scriptures such as Vedas, Ramayana and Mahabharata, etc. Utilization of milk for conversion into various products viz., like Makhan, Channa, Dahi, Khoa, etc. is prevalent throughout the country for scores of centuries past till date. 'Lord Krishna' himself was from the milk producing communities and is well known as

'Makhan Chor'. In fact, no ceremony in India is complete without milk or its products

Milk production in India is predominantly the domain of small holders in mixed farming system. Indian dairying has made rapid strides but animal productivity remained low. Average dairying assumes great significance in providing employment to rural peoples as well as stable source of income to augment their earning from main enterprise. Such as crop husbandry. Dairy enterprise plays very important role in the rural economy of India.

It provides income and employment not only to the worker section of the society but also to the farming community of the country in general. The returns from small holding can be maximized by the proper combination of dairy enterprise with crop production.

The three concepts – costs, returns and profitability needs to be analyzed while assessing the economics of any production activity. In this perspective, the dairy sub-sector occupies a very important productive activity in agricultural economy of India as milk is the second largest agricultural commodity contributing to GNP, next only to rice. It is said that the crop husbandry is a land resource based enterprise and provides almost seasonal income and employment to the farmers, where as dairy provides not only employment to the farmer family during off season but also a regular flow of income all the year round. So, dairy development recognized as an important activity suitable for employment generation and value addition in agricultural sector of Indian economy in general and of rural families especially small and marginal farmers and landless agricultural labours in particular.

The intensive Dairy Development Programme, Strengthening Infrastructure for Quality and Clean Dairy Entrepreneurship

Development Scheme are some of the government important schemes/programmes for meeting the growing demand for milk. The National Project for Cattle and Buffalo Breeding has been under implementation since 2000. A new scheme called the National Dairy Plan Phase-I has been launched in March, 2012 with the objectives of improving productivity of milch animals, strengthening and expanding village level infrastructure for milk procurement and providing producers greater access to the market in the dairy sector.

The dairy industry in India is going through major changes with liberalization policies of Government. Indian dairy industry is heading towards an accelerated and positive momentum with unprecedented growth in milk production during last 30 years. India has emerged as the largest producer of milk in the world. It has brought greater participation of the private sector. This also consistent with global trends, which could hopefully lead to greater integration of Indian dairying with the world market for milk and milk products.

Under the diary enterprise, feed is an important aspect of dairy sector. Fodder accounts to 45 per cent of the total cost of milk production. If it's profit is more because of low cost of production, They may earn good profit and may sell their produce at lower price to catch more market. Therefore, the study of economics of milk production is of practical interest to milk producers point of view. They quotated the directions to bring down the cost of production of milk, thus, ensuring good margin of returns to producer and their price to the consumer, indirectly governing the supply and demand position of milk.

Therefore, the estimation of cost, return and profitability of milk production is essential for the dairy farmers for introducing desirable changes in the production, productivity and value addition

in its operation at the micro level and policy makers in formulating plans for improvement in dairy cattle productivity and value addition based on sound economic principle at the macro level. The present study is an attempt in this direction in micro perspective in the area of Konkan region.

Dairy Development in Maharashtra

The Government of Maharashtra has taken positive steps in initiating the dairy development programme in the state. The milk collection, processing and distribution scheme was first started at Pune in 1950. Thereafter, the activity of procurement of milk from producers in rural areas had been extended to 20 centres. Since farmers are spread out in the villages, the Government has made agreement for collection and purchase of milk produced by farmers and undertaking further steps in processing till it is sold to consumer in the important cities of the state and provided an assured market capable of giving reasonable returns to the milk producers.

Maharashtra ranks sixth in India's total milk production during the year 2013-2014. The milk production of Maharashtra was 7.67 million tonnes, while the per capita availability of milk in Maharashtra was 190gm/day during the year 2013-2014. During the year 2013-2014, there were 74 milk processing plants and 129 government/co-operative milk chilling centres with capacity of 80.50 lakh litres per day and 22.50 lakh litres per day, respectively. The average daily collection of milk by the government and co-operative dairies taken together (excluding Greater Mumbai) was 34.74 lakh litres during 2013-14 and 34.09 lakh litres during 2013-14 (upto October, 2014). (Anonymous, 2014).

Maharashtra state has achieved a spectacular success in dairy development activity through the establishment of government milk

scheme and co-operative milk collecting societies. Moreover, dairying as a subsidiary occupation has become a important business activity and additional source of employment and income in rural areas of the state.

The Anand pattern of dairy co-operative has a three-tier organizational structure, consisting of milk producer's co-operative society at the village level, co-operative milk producers union at the district level and co-operative milk producers federation at the state level. This structure has been observed as the most successful one in realizing the economies of scale in all the dairy development activities in the state through the use of modern technology.

Livestock makes substantial contribution to the economy by providing subsidiary occupation and income to the rural population, food to human population and employment to small farmers and landless labours. According to 19th livestock population census, total cattle population in Sindhudurg was 752379. In which Bovine were 333097 constituting 44.27 per cent of the total cattle population. cattle population was 228271 (30.33%)and buffalo population was 104826 (10.93%), respectively of the total livestock population. (Socio-Economic Review and District Statistical Abstract of Sindhudurg district 2013-2014).

This situation led to undertake a detailed study of milk federation particularly from management point of view. Considering the above fact, the study entitled 'Economics of production and disposal of milk in Sindhudurg district is undertaken with following specific objectives.

Objectives

1. To estimate cost, returns and profitability in milk production.
2. To assess resource use efficiency in milk production.
3. To study disposal pattern of milk production.

4. To study constraints faced by dairy farmers

Scope of the study

Today there is an increased demand for milk all over the country due to increased population and as one of the vital ingredients of human diet. The government is trying to encourage milk production so as to provide milk for its growing population at least to fulfill the minimum requirement of milk. The main emphasis today is to increase milk production in rural areas through milk producer's co-operative society by encouraging marginal farmers and landless labourers to undertake dairy as a subsidiary occupation and generate income. The efforts are being made to develop dairy enterprise in rural areas on scientific base so as to increase the productivity of indigenous dairy animals by proper feeding, breeding and management to ensure reasonable returns to milk producers.

This necessitates study in cost of milk production to decide the economic levels of milk production and profitability of milch animals considering resources supplied by farm family. It is also important to study the resource use efficiency at producer's level in rural setting in Sindhudurg district of Maharashtra state.

Findings of this study will be useful to the government for fixing prices of milk in the light of changing prices of feed and fodder. The results will also be useful to individual farmers to improve their decision making ability so as to attain optimum level of milk production which will give maximum profit and minimum per litre cost by selecting suitable breed and improving feeding and management practices.

CHAPTER-II

REVIEW OF LITERATURE

Review of literature forms an integral part of a research work. Review of literature published elsewhere related to the subject under study is always useful to the researcher to outline the constraints of research, formulate objectives, strong methodology and avoid unnecessary duplication of efforts. It also provides general orientation about the topic of investigation for creating an insight and sense of integration about the object as a whole. An attempt is made in this chapter to review the literature on the problem. The review of literature is grouped under following heads.

5. Costs returns and profitability in milk production.
6. Resource use efficiency in milk production.
7. Disposal pattern of milk production.
8. Constraints faced by dairy farmers.

2.1 Costs returns and profitability in milk production

Mule (1976) studied the economics of milk production in Ratnagiri district (M.S.). He observed that total cost of production of cow milk was Rs. 1518.02 during inetrcalving period. Out of total cost, 65.64 per cent was feed cost. He also observed that the total cost was highest on landless households and lowest on medium holding Rs. 1814.13, Rs. 1315.15 respectively. Overall per day and per liter cost of milk production worked out Rs. 2.58 and Rs. 1.87 respectively. The overall total cost of buffalo milk production was Rs. 3232.22 during intercalving period out of the total cost. Feed cost accounted for 67.26 per cent. Overall per day and per liter cost of milk production was Rs. 6.09 and Rs. 1.79, respectively.

Acharya and Pawar (1980) conducted a study on economics of milk production at dairy farms of Mahatma Phule Agricultural University, Rahuri for different categories of livestock. The study revealed that average daily and total milk production per lactation of crossbred cow was 8.48 litres and 2609 litres, respectively. The figures for buffalo and local cow were 4.13 and 1359 litres and 2.26 and 6.04 litres, respectively. Crossbred cow gave a profit of Rs. 1528/- per lactation and Rs. 0.59 paise per litre milk production as against Rs. 400/- and Rs. 0.29 paise for buffalo While in case of local cow, there was loss of Rs. 162 and 27 paise, respectively mainly due to low productivity and prolonged dry period.

Saha and Gupta (2000) studied the economics of milk production in Murshirabad district of West Bengal. The study revealed that the average maintenance cost of crossbred cow, local cow and buffalo was Rs. 36, Rs. 25 and Rs. 37 per day, respectively. Thus they concluded that milk production from local cow and buffalo was not economically viable due to low milk yield which was attribute to inadequate feeding and low genetic material.

Kamble (2001) examined economics of crop and dairy enterprise combination in Chiplun block of Ratnagiri district. The analysis showed that cost of maintenance of local cow and local buffalo exceeded than return, indicating net loss of Rs. 2,663.64 in case of local cow and Rs. 2,834.18 in local buffalo. Overall cost of maintenance for crossbred cow was Rs. 16,382.24 which gave a net profit of Rs. 3,092.43. The cost of maintenance of crossbred cow was Rs. 16,330.92, Rs. 16,385.94 and Rs. 16,477.22, on small, medium and large farms respectively with respective figures of net profit were Rs. 2,732.43, Rs. 3,556.82 and Rs. 2,908.60 regarding small, medium and large farms.

Khem Chand *et al.* (2002) studied economic analysis of commercial dairy herds in arid region of Rajasthan. The study revealed that milk production on commercial dairy herds was an economically viable and profitable enterprise in Bikaner city.

Hemalatha *et al.* (2003) conducted a study on economics of milk production of different breeds of bovines in Ahmednagar district of Maharashtra state. The study revealed that the net cost of maintenance of animal per day varied from Rs. 24.30 in case of non-descriptive cattle, Rs. 48.28 regarding graded buffaloes, Rs. 49.61 in respect of jersey crossbred cows to Rs. 52.40 for Holstein freisian breed cows. The average profit per animal was maximum (99.53 %) in case of jersey crossbred cows, which were small and compact, compared to Holstein fresian crossbreds those were bulky animals but very close to Jersey crossbred in profits. Even buffaloes were found to be more profitable (95.22 %).

Ganesh Kumar and Pandian (2003) carried out a study on cost of milk production in the milkshed area of Tamilnadu during 2000. Total cost per indigenous cow per day was Rs. 33.03, total fixed cost and total variable cost accounting for 3.81 to 96.18 per cent of the total cost, respectively. A category wise analysis of farmers revealed that the total cost decreased with increase in farm size. The total cost per buffalo per day was Rs. 53.72 and total fixed cost and total variable cost accounted for 4.07 and 95.33 per cent, respectively The total cost per crossbred cow per day was Rs. 72.86, total fixed cost and total variable cost constituted for 7.69 and 92.31 per cent of total cost respectively. The cost of milk production was lower in crossbred cows followed by buffaloes and indigenous cows.

Hymajyothi *et al.* (2003) undertaken an investigation in small (1-2 she buffaloes), medium (3-4 she buffaloes) and large herd size (5 and above she buffaloes) milk producers in west Godavari district

of Andhra Pradesh, to examine economics of buffalo milk production. Expenditure on fodder and concentrates formed the major share in the total cost of milk production in all the categories of milk producers. The average cost of buffalo milk production was Rs.7.95 per litre for small herd size milk producers, whereas it was Rs.7.92 per litre for medium herd size milk producers and Rs.7.86 for large herd size milk producer. However, the net returns per litre of buffalo milk were found to be highest in small herd size milk producers followed by medium and large herd size milk producers.

Neeraj Rao *et al* (2004) examined the economics of milk production in Kanpur (dehat) district of Uttar Pradesh.Two blocks from the selected district and five villages from each selected blocks were selected randomly in proportion to the number of farmers categorized under three size groups of 0-1,1-2 and above two hectares. The study revealed that the total maintenance cost of a milch animal per lactation has increased as farm size increased. The average maintenance cost of milch animal during a lactation period was worked out to Rs 10278. Amongst all size groups, the labour charges accounted the highest share (Rs. 7450) followed by fodder and concentrates. The gross income from milk production was higher (Rs. 49873) on large farm. Input output ratio was the highest on small farms and it was 1:1.31.

Shiyani and Singh (2004) evaluated Sustaining Livestock-Crop Production System in Gujarat` with an aim to identify and estimate the profitability of major livestock crop production systems in Gujarat. A cluster of three villages from each agro-climatic zone was selected and a complete enumeration of 25 villages was done. Total samples of 2,793 households were enumerated. In all, 49 livestock-crop production systems were identified from the entire state. On the basis of probability proportion, a total of 150 respondents from

each Agroclimatic zone were finally selected and made the total sample size of 1200 respondents. The study revealed that the buffalo + paddy + fallow + summer paddy + sugarcane based production systems gave the maximum annual net profit of Rs. 26,904 over cost C-2 in North Saurashtra (Zone-I), where as buffalo + crossbred cows + sugarcane emerged as the most profitable system not only in South Saurashtra (Zone-II) (Rs. 64,298) but among all the systems of Gujarat state. In general, the buffalo + groundnut + fallow + fallow system and buffalo + groundnut + wheat + fallow system were found to be most profitable in North Saurashtra (Zone-I) and South Saurashtra (Zone-II)zones, respectively.

Singh and Dayal (2004) studied the economics of production and marketing of milk in the state of Uttar Pradesh. The results of the study reavealed that the feed and fodder cost was the most important item of the total maintenance cost accounted for 55 to 65 per cent of the total cost in Agro-climatic zone-I and 51 to 66 per cent in Agro-climatic zone-II. The net profit per day of a milch buffalo was very low due to the high maintenance cost and low milk yield of each herd size group in each zone of the state. The net profit of milk production per buffalo per day was observed to be higher (Rs. 48451.80) in the case of small herd size group due to higher per day milk yield of milch buffaloes as compared to medium and large herd size groups in both of the zones.

Bharadwaj *et al.* (2006) assessed economics of buffalo milk production in Hisar district. The study was conducted in four adopted villages by Central Institute for research on Buffalo and 200 respondents constituted the study. The milk producing households were divided into 3 categories on the basis of number of milch buffaloes maintained by them. The average number of milch

buffaloes under small, medium and large units were 1.38, ± 0.05, 3.18 ± 0.06 and 5.36 ± 0.19, respectively. The average daily milk production was 5.88, 6.01 and 6.20 liters/ buffalo/day. The average sale price of the milk received by different categories of respondents was Rs. 11.65, Rs. 11.70 and Rs. 11.80, respectively. The corresponding figures of net maintenance cost, gross return and net profit per day per buffalo was Rs. 57.00, Rs. 63.80, Rs. 64.30 and Rs. 65.80, Rs. 71.20, Rs. 73.16 and Rs.11.50, Rs. 7.22 and Rs. 8.66, respectively.

Parmar *et al.* (2010) studied the comparative economics of milk production of buffalo, indigenous cow and crossbred cow in Vadodara district of Gujarat. The data were collected from 144 milk producing farmers spread over 12 villages in three talukas of Vadodara district. The average maintenance cost for buffalo (n=325), indigenous cow (n=52) and crossbred cow (n= 10) per year was about Rs 23527, Rs 12793 and Rs 25207, respectively. The major cost components were cost of fodder, concentrate and human labour which constituted about 76 to 77 per cent of total cost of maintenance of milch animal. The net profit per year per animal was maximum in respect of crossbred cows (Rs. 3472) followed by buffalo (Rs. 2076) and indigenous cow (Rs. -2433). The total cost of milk production (cost-C_2) per litre of buffalo, indigenous and crossbred cow milk was Rs 13.45, Rs 11.34 and Rs 7.77, respectively.

Tulika P. *et al* (2010) in their study entitled economics of production and marketing of buffalo milk in Indore district of Madhya Pradesh observed an increased trend in milk yield and net income from small to large producers. Better feeding and better breeding on large farms resulted into higher milk yields. The average cost of milk production per litre of buffalo was worked out to Rs.

10.46, which was slightly higher on small farms due to lower milk yields per buffalo. The average benefit:cost ratio was calculated at 1:1.52 which was little higher on large farms because of relatively higher milk yield per buffalo.

Inderpreet *et al.* (2011) studied economic analysis of milk production in peri-urban dairy farms of Punjab. The study was conducted in Ludhiana, Sangrur and Jalandhar districts of central Punjab to examine the production, marketing and consumption pattern of milk in peri-urban areas. The result of the study revealed that the proportion of high yielding cows was more (57 per cent) as compared with low yielding buffaloes (43 per cent) on selected farms. The average animal milk production per animal worked out to 2462.6 tonnes of buffalo milk and 3827.3 tonnes of cow milk annually. The net profit per animal per day was marginally higher ((Rs. 52.70) in case of cows as compared to buffaloes (Rs. 50.30).

Singh *et al.* (2012) made a comparison of cost of milk production among beneficiaries and non-beneficiaries of dairy co-operatives in Meghalaya. The data was collected from 100 dairy co-operative society beneficiaries and 100 non-beneficiaries selected from four districts, viz. East Khasi, Ri-Bhoi, Jaintia and West Garo hills. The households were classified into small, medium and large categories based on the number of milch animals. The study revealed that milk production and productivity of beneficiary households was significantly higher than non-beneficiaries. The average cost per litre of milk production of crossbred cow was worked out to significantly higher the non-beneficiaries (Rs. 15.40) than for beneficiaries (Rs. 12.67) group. Consequently, beneficiaries got about 19 per cent more returns compared to non-beneficiaries. In case of beneficiaries the cost per litre milk production decreases with increase in herd-size while in case of non-beneficiaries,

maximum cost was incurred by small herd-size owners and lowest by medium herd-size owners.

2.2 Resource use efficiency in milk production:

Mattigatti *et al.* (1993) made an attempt to study the resource productivity in cow milk production - an impact of operation flood programme in Dharwad district of Karnataka state. Data were collected from 65 members of programme co-operatives and 65 non-members. A production function was then estimated using ordinary least square (OLS) for both the groups, respectively. The results indicated that introduction of co-operatives has increased resource use efficiency as well as herd size and crossbreeding of cows.

Kumar and Agarwal (1994) conducted a study on 'Resource use efficiency in milk production in Mathura district of U.P.' Multiple linear regression analysis was carried out and Marginal value product (MVPs) of various resources, to examine resource use efficiency. The results of the study revealed that, the green fodder and concentrate contributed positively and significantly to the milk yield of both cows and buffaloes, while negative and significant impact of order of lactation was observed in case of buffaloes. The production elasticities of feed and fodder were positive for all categories of milk producing households, indicating the scope for increasing the productivity of bovine. In case of cows, MVPs of concentrate were positive and significantly greater than unity for all categories and MVPs of green fodder and dry fodder were positive but less than unity showing excessive use. Similar trend noticed for buffalo also.

Shiyani and Singh (1996) in their study on 'An economic analysis of technical efficiency in milk production in Junagadh district of Gujarat state' observed that, the feed, fodder and labour had greater bearing on milk production. Ample scope for increasing milk production existed even with the existing availability of resources. The output efficiency of milk was high during winter as compared with other seasons. They further suggested that strengthening of existing extension services to address the problem of resource use conservation.

Ganeshkumar *et al.* (2000) carried out a study on resource productivity in dairy farming in Virudnagar district of Tamil Nadu. The production function analysis was used to find out the input-output relationship. The estimated Cobb-Douglas function explained about 83 per cent, 80 per cent and 59 per cent of variation in returns from milk yield of local cow, cross-bred cow and buffaloes respectively. Expenditure on concentrates was found to have positive and significant impact on all species of milch animals.

Sinha and Singh (2000) examined the efficiency of resource used for milk production in Central Bihar during agricultural year 1996-97. They fitted Cobb-Douglas production function to explain the variation in milk production. The function explained the variation in milk production by about 68.53 per cent in buffaloes. The variation observed in crossbred cow was 73.00 per cent, 56.00 per cent, 62.00 per cent for rainy, winter and summer season, respectively. The expenditure on green fodder and concentrates had positive and significant influence on seasonal milk production, while dry fodder was over utilized. The MVP of concentrates and green fodder showed potential to exploit production in all cases, while MVP of dry fodder warranted reduction in its use. Finally they

concluded that much scope was available for the allocation of available resources to optimize their utilization in the study area.

Kamble (2001) in his study on economics of crop and dairy enterprise combination in Chiplun block of Ratnagiri district observed that in case of local cow, number of animals and human labour had significant effect on milk production. While, in case of crossbred cow, impact of number of animals and miscellaneous expenses was significant. In local buffaloes only number of animals showed significant effect on milk production. The analysis also revealed that about 27 per cent, 35 per cent and 48 per cent variation in milk production of local cow, crossbred cow and local buffalo respectively was explained by various resources.

Khemchand *et al.* (2002) studied economic analysis of commercial dairy herds in arid region of Rajasthan. The income on a dairy herd depends primarily on the quantities of various factors of production used in the production process and output (level of milk production). The pattern of use of major factors of production are floor space availability labour utilization pattern, dairy management practices etc.

Singh *et al.* (2007) assessed resource use efficiency in milk production and disposal of milk in Imphal West district of Manipur. Linear and Cobb-Douglas forms of production functions were fitted to assess the resource use efficiency. The regression coefficients of expenditure on green fodder and concentrate were found positive and significant for crossbred cows. Concentrate was used optimally and efficiently, while green fodder was not used efficiently in the study area. Of the total milk produced, marketed surplus accounted for 96% and the remaining 4% was consumed at home.

Pandian *et al. (*2013) studied Efficiency of Resources Use in Urban Milk Production in the State of Tamil Nadu, India. The Study was under taken to analyze the productivity of resource in milk. production in urban areas of Tamil Nadu. A total sample size of 90 dairy farmers was selected from three urban milk shed areas of Tamil Nadu namely Chennai (Tambaram), Erode and Vellore for the present Study. To estimate the productivity of resources in milk production, Cobb Douglas Production Function was used. The co-efficient of multiple determinations (adjusted R2) was 0.912, indicating that the five variables selected for the analysis had explained 91.2 percent variation in total milk production. The Results of Cobb- Douglas Production Function revealed that concentrate, green fodder and labour had Positive and highly significant (P<0.01) influence on Milk Production. The result of allocative efficiency of resources in milk production revealed that concentrates, labour and veterinary charges were underutilized, whereas green fodder and dry fodder were over utilized.

Tanwar *et al. (*2015) studied production function and resource use efficiency of milk in different categories of member and non-member families of dairy co-operatives in Jaipur (Rajasthan). Linear and Cobb-Douglas production functions were applied. The linear function was found best fit keeping in view significance of regression co-efficient and value of R^2. Results of multiple linear equation (MLE) revealed that concentrate and green fodder across all categories in member families and concentrate in all categories and green fodder in landless and marginal households in non-member families were the main significant variables which were affecting the returns from milk.

Vishnoi *et al.* (2015) examined milk production function and resource use efficiency in Jaipur district of Rajasthan. The results of

Cobb-Douglas production function revealed that an expenditure on dry fodder and green fodder for small category of herd size were found to be positive and significant. The results for medium category of herd size explained that partial regression coefficients for expenditure on green fodder and miscellaneous expenditure were found positive and significant. The results for large category of herd size showed that the partial regression coefficient for expenditure on concentrate and miscellaneous expenditure were found positive and significant.

2.3 Disposal pattern of milk production

Balisther and Chauhan (1983) conducted a study in Bichpuri block of Agra district. The data on milk production from different categories of farms *viz.,* small, medium and large are collected for the year 1978-79 for the disposal of milk from producer to consumer in study areas were identified.

Biradar (1986) carried out research on disposal of milk in Udgir talukas of Latur district of Maharashtra. He found that 45 per cent of the households were supplying 60 per cent of milk to the private vendors Whereas, 55 per cent of households were supplying 40 per cent of the milk to the milk co-operatives society and average milk cost per litre was found to be Rs. 2.73.

Kaur and G. S. Gill, (1989) conducted a study on data obtained from 28 small, 14 medium and 8 large farms (avarege size of 8.07, 12.64 and 17.50 acres respectively.) in rural areas of Ludhiana district (India) on all sizes of farm, the number of milking animals was in the order buffaloes > crossbred cows > local cows and about 75, 73 and 50 per cent respectively. were lactating. The mean daily milk production on small, medium and large farms respectively. was 8.80, 16.43 and 31.50 (overall mean 14.57) litres,

corresponding mean on farm consumption was 3.10, 4.68 and 6.62 (mean 4.11) litres, per capita on farm consumption was 0.62, 0.994 and 1.128 (mean 0.914) litres, and marketed surplus was 64.71, 71.52 and 78.97% (mean 71.79%) of production.

Tripathi and Kunzru (1994) carried out study on milk production, consumption and disposal behaviour of rural dairy animal owners of Bareilly district of U.P. The member co-operative villages were six, selling milk to dairy co-operatives. whereas most of non-members were selling liquid milk to middlemen and products directly to the consumer in town market.

Shah and Sharma, (1994) taken up study on production, consumption and disposal of milk and milk products in Bulandshahar district (U.P.). The percentage of milk consumed as fluid milk decreased from summer to rainy and from rainy to winter seasons. The quality of milk retained at home has increased from summer to rainy and from rainy to winter seasons. The proportion of milk converted into curd has decreased as the herd size increased (40, 27 and 18 percent of milk retained by small, medium and large producers, respectively. Whereas, the proportion of milk converted to ghee increased (60, 73 and 82%, respectively). Milk production, marketed surplus quantity and percentage of milk converted into curd was higher in villages, which had an adequate market infrastructure than in those which did not. The consumption of fluid milk, curd and ghee/capita was also higher in villages which had an adequate market infrastructure than in those which did not. The daily consumption of fluid milk and ghee/capita was highest in winter, whereas the daily curd consumption was highest in the rainy season for all categories in the study area.

Gupta and Dev Raj (1995) conducted study on consumption and disposal of milk in Churu district (Rajasthan). Mean daily milk

production/household, percent consumed by households and percent marketed as liquid milk and as ghee respectively was as follows: (i) 4.52, litres, 96.24, 3.76 -% (ii) 7.69 litres, 71.39, 10.66 and 17.95%; (iii) 7.94 litres, 71.03, 16.12 and 12.85% (iv) 11.88 litres, 66.83, 19.19 and 13.98% and overall, 8.01 litres, 73.03, 14.23 and 12.74%. A mean of 54.02 percent of the milk retained by households was consumed as such, 22.90 percent as ghee, 6.84percent as curd and 16.24 percent was taken in tea. Seasonal production and consumption figures showed that in all groups, milk production was highest in winter and percentage retained for household consumption was highest in summer.

Sangu (1997) carried out the study to reveal the price spread of milk among various functionaries engaged in milk marketing in western U.P. during the year 1993. The study revealed that relative share of milk producer in consumer price fluctuation from 70.78 to 90.28 per cent in various channels of milk marketing. The producers share in consumer price was at the highest (90.28 %) when they sold their milk to consumers directly. Among the remaining channels the producers got maximum share in consumer's price (81.04 %) when they sold their milk to cooperative societies. The most efficient channel for marketing was to sell milk directly to consumers, the milk sale through co-operative society happen to be the best channel.

Koshta and Chandrakar (1999)) conducted a study on economics of production and disposal of fluid milk in members and non-members of milk co-operative societies. The study was conducted in Raipur district, Chhattisgarh state India (n=100, date not given). Non-members had higher operational costs per cow/day and lower cow productivity than members of milk co-operative societies. Returns are higher for non-members as they obtain higher

prices than members. Cost-benefit ratio higher for buffaloes than cows due to the low operational cost of milk production.

Devaraj (2001) taken up a comparative study on the costs and price spread in milk marketing in co-operative and private sectors of Karnataka state during 1998-99. Data were obtained from market intermediaries operating around 5 milk plants (3 and 2 plants) three in co-operative sector and two in private sector). The price spreads in 6 identified marketing channels were discussed. It was concluded that producers can increase their profit margins if they venture in processing.

Sangu *et al.* (2006) conducted research on milk disposal and consumption pattern by milk producers in western Uttar Pradesh. Milk consumption varied from 222 gms per capita among landless category of non-suppliers in summer to 721 gms per capita in winter, among large farmer category of suppliers. Hence, milch stock size, productivity of animals, milk production, milk flow towards milk vendors, total consumption and conversion of retained milk into products was positively associated with land holding size, while the share of milk used in fluid form was negatively associated with landholding size. Landless labourers, marginal farmers and large farmers have been adopting commercialization of dairying, in the region, while small and medium farmers had been keeping milch animals mainly for their domestic use.

Ghule *et al.* (2014) analysed of marketed surplus and disposal pattern of milk on commercial dairy farms in Maharashtra. The study revealed that the marketed surplus as percentage of milk production was 94.48, 94.81 and 96.96 per cent for small, medium and large commercial farms, respectively. The contribution of small, medium and large category of farms to the total marketed surplus was 38.69, 20.68 and 40.63 per cent, respectively. The commercial

dairy farms in the study area had preference for organised agencies to dispose of their produce. Out of total quantity of milk marketed per day by the sample farms, 33.16 percent of marketed to co-operative dairy, 55.65 per cent to private dairy and the rest 11.19 percent was sold to the vendor.

Wani *et al.* (2015) evaluated the performance of dairy co-operative societies and milk disposal pattern of member farmers in Jammu and Kashmir. The study further showed that average herd size of milch animals and average household milk production in Jammu was higher as compared to Kashmir region. A considerable proportion of member farmers were disposing milk to other agencies besides dairy co-operatives in both of the regions of J&K. The price offered for milk by different stakeholders varied significantly and thus influenced the members to adopt other agencies for sale of their marketed surplus besides being co-operative society member.

2.4 Constraints faced by dairy farmers

Bhavsar (1981) stated that major problem in maintaining the dairy animals were poor quality concentrates. The lack of good network of veterinary aid center was another problem faced by the sample respondents.

Gaikwad (1984) found that the major problems in maintaining dairy animals were low milk rate offered by the dairy co-operatives, non-availability of green fodder throughout the year, high prices of feed and medicines and lack of financial help.

Gupta and De (1989) reported a major constraints perceived by adoptors and non-adoptors in rearing of crossbred cows. Adoptors expressed that crossbred cows could not tolerate high temperature during summer, crossbred cows were not easily available, cost of crossbred cows was very high and crossbred male

calves could not sent for slaughter purposes. Whereas, non-adoptors expressed that crossbred cows requires more care in rearing, sweet sellers were reluctant to purchase cow milk and they were not aware of the profitability of crossbred cows.

Raj *et al.* (1993) conducted a study on constraints in the adoption of crossbred cows in Krishna district of Andrha Pradesh. The study revealed that lack of knowledge (60 %), non-remunerative price for the milk (90 %), non-availability of veterinary services (50 %) green fodder (40 %), labour (27.50 %) concentrate measures (60 %) distant location of A.I. centres (42.50 %) reluctance of people to consume cows milk (25 %) etc. were the major constraints faced by the dairy farmers.

Chaudary and Intodia (2000) carrid out a study on constraints perceived by cattle owners in adoption of modern cattle management practices. A study was taken in Barmer district of Rajasthan state. Where, efforts had been made to identify certain constraints in adoption of modern management practices. The results of study depicted that poor irrigation facilities for growing green fodder (48.18%), high cost of concentrate (42.50%), cost of feed and fodder (36.20%) and non-availability of improved fodder seeds (22.20%) were most serious constraints faced by livestock owners.

Keshava and Mandape (2001) analysed problems and prospects of dairy farming in Muzaffapur district of North Bihar. Farmers belonging to different land holding categories and rearing at least one milch animal were randomly selected as respondents. The result of the study revealed that dairy farming in the area was characterized by inadequate herd size, low milk productivity and poor feeding practices. The major problems faced by farmers in dairy farming were proneness of animal to diseases, costly cattle

feeds and unavailability of veterinary facilities and regular milk market.

Monalisa Maity *et al.* (2002) conducted research by personnal interview with 120 dairy farm women from 12 randomly selected villages of South 24 Paragana district of West Bengal. The constraints faced by respondents in adopting clean milk production practices were studied. It was found that lack of willingness on the part of clientele, lack of knowledge about milking method and cleanliness of cows and milkers were the very serious problems hindering adoption.

Shashi Paul *et al.* (2003) carried out a study in southern part of Rajasthan. The study showed that the constraints faced by the tribals were low grazing capacity of crossbred cow, low fat content in the crossbred cattle, lack of vaccination facilities, low market price of milk of crossbred cow in local market and less adaptability of crossbred cow to the tropical environment.

Kumar and Kumar (2003) studied the constraints faced by small and marginal farmers in dairy farming as a subsidiary occupation – A case study in Kolar district of Karnataka state. The findings of the study revealed that both small and marginal farmers have expressed low price for milk, high cost of feeds and fodder and non-availability of land for fodder cultivation as major constraints.

Choudhari (2004) studied an economics, marketing and constraints of milk production in progressive dairy farms. The necessary infrastructure facilities viz., transportation and veterinary facilities were major constraints and need to be developed for the dairy unit in own managed or co-operative basis.

Kavathalkar *et al.* (2007) studied constraints in adoption of scientific recommendation in feeding of dairy animals in Nagpur

district and found that adoption of various scientific recommendations of feeding of dairy animals were meager in Nagpur district, financial constraints involving high cost of concentrate, high cost of green fodder (79.25 per cent), non-remunerative price for milk (83.70 per cent), high cost of labour (72.59 per cent), high cost of mineral mixture (54.81 per cent), and poor economic condition (54.07 per cent) were the major constraints.

Manhas and Sharma (2008) studied constraints in dairy farming in Jammu district of Jammu and Kashmir with 200 dairy farmers and revealed that 50 per cent of the dairy farmers have faced medium level of constraints, while 32.50 and 17.50 per cent respondents have encounted high and low level of constraints, respectively. The respondents have expressed infrastructural constraints as the most severe impediments, whereas technical constraints were hampering the dairying to the least extent. There was a significant difference between different groups of respondents with respect to constraints encountered by them.

Rathore *et al.* (2009) examined constraints perceived by the cattle keepers in adoption of recommended breeding, feeding and housing management practices in Churu district of Rajasthan. The study showed that lack of AI centres, distant location of veterinary hospitals, poor conception coupled with repeat breeding, lack of pregnancy diagnosis (P.D.) facilities and costly treatment were important constraints in adoption of recommended breeding practices. Lack of awareness about hay and silage preparation and treatment of poor quality roughages, high cost of fodder and concentrate, lack of knowledge about balance feeding and scarcity of green fodder were the main constraints in balance feeding of cattle. High cost of investment in construction of scientific cattle shed, inadequate credit facilities, lack of knowledge about cheap and

scientific housing and high cost of raw material were the major constraints in housing management practices.

Meghanathan *et al.* (2010) identified the constraints in tribal livestock farming by collecting data from 900 tribal farmers in six hilly areas of Tamil Nadu. The data were analyzed by Garett`s ranking technique and revealed that lack of sufficient pasture land, lack of marketing facility, lack of adequate credit facilities, unremunerative price for the livestock products and lack of scientific knowledge on livestock farming were observed to be major constraints perceived by the tribal farmer.

Pandian *et al* (2010) studied prioritizing the constraints in milk production in Tamil Nadu and analyzed the socio-economic factors associated with the intensity of these constraints. The results explained that lower price for milk was the fore most constraint in milk production. Farmers rearing cross-bred cow perceived that higher feed cost was the second important constraint followed by high investment requirement as their third constraint. Farmers rearing local cow and buffalo perceived low productivity as their second and fourth important constraint, respectively.

Sarkar and Ghosh (2010) studied constraints in milk production faced by co-operative and non-co-operative dairy farms in West Bengal. The study showed that non-co-operative farms faced major constraints and high severity compared with co-operative farms in expanding milk production and severe or more severe constraint was lack of infrastructure facilities.

Duguma *et al.* (2011) carried out constraint analysis faced by urban dairy farmers and gender responsibility in animal management in Jimma Town, Oromia Region, Ethiopia. Data were analyzed using descriptive statistics. Lack of land (50%), shortage of

feed (38.90%), lack of improved animals (5.60%) and lack of access to artificial insemination (3.70%) were constraints limiting dairy production in the study area. Other constraints included lack of extension services, diseases, lack of credit service and marketing problem.

Inderpreet *et al.* (2011) studied economic analysis of milk production in peri-urban dairy farms of Punjab. The study revealed that the major constraints farced by farmers in the buffalo and cow enterprise were breeding, high cost of feed and fodder, non availability of land for fodder cultivation, problem of disposal off male calves and lack of organized markets.

Kumar *et al.* (2011) studied constraints faced by dairy farmers in adopting improved dairy farming practices in Bettiah district of Bihar. It is evident from the study that ill equipped A.I. centre (83.33 %), problem of breeding (79.16 %), poor knowledge and appreciation for A.I. services (72.50%), lack of availability of good breed able bull for natural services (69.16 %) under breeding were the main factors. The preference of growing cash crops (sugarcane) instead of fodder crops (84.16 %), poor knowledge about improved feeding of dairy animals (80.83 %) unavailability of feed and fodder particularly in floods (78.33 %) under feeding practices. In addition to this, lacking facility for treatment of diseases /vaccine/medicine etc. (83.33 %), distantly located veterinary hospital (81.66 %), poor awareness and knowledge about importance of vaccination (80.00 %) were they are main hurdle under the management and health care practices. However, lack of dairy co-operative societies (83.33 %) and wastage of milk due to poor availability of cold chain (82.50 %) were perceived as other important constraints in adopting (IDFP) by majority of dairy farmers in the study area.

CHAPTER-III

SOCIO-ECONOMIC BACKGROUND OF STUDY AREA

This chapter is devoted to explain the socio-economic background information about the area under study. The study of background information is necessary to understand the economic implications of the physical conditions under which production is carried out. The various factors such as topography, location, climate, rainfall, soil, irrigation, marketing and communication facilities decide the stability of particular enterprise in the area. Therefore a brief account of socio-economic conditions prevailing in the selected area (Sindhudurg district) is given so as to have better understanding of the region and the interpretation and implications of findings of the study.

3.1 Location

The Sindhudurg district lies in between $15^{0}37'$ to $16^{0}40'$ South and $73^{0}19'$ and $74^{0}18'$ East West longitudes. The total area of Sindhudurg district is 5207 sq. km., which accounts for 1.70 per cent of the total area of Maharashtra.

3.2 Boundaries

Sindhudurg is bordered on the North by Ratnagiri district, on the South by the state of Goa, on the West by the Arabian Sea and to the east across the crest of the western Ghats or Sahyadris is Kolhapur district. Sindhudurg is a part of Konkan (coastal) region, a narrow coastal plain in Western Maharashtra which lies between the Western ghats and the Arabian sea.

3.3 Topography

The zone has an undulating topography with hills and rocky plains alternating. The whole of eastern and northern parts of the zone are covered with hills, which are continuation of the main Sahyadri ranges. About 85 per cent of the land surfaces in the zone are hilly. The important parent rock information of the districts is deccan trap, granites and laterites. The laterites have the largest extent in zone. South Konkan can be divided into three parts on the basis of physical features *viz*; a) hilly area of Sahyadri and its offshoots, b) the plateau surface on which cereal crops such as Rice and Nagli are grown and c) coastal plains where coconut and arecanut gardens and fishing are the main sources of earning livelihood. The rivers of South Konkan; *viz* Savitri, Vashisthi, Shastri, Tillari and Terekhol flow from East – West and join Arabian Sea.

3.4 Soil

Lateritic soil is the predominant type of soil in this zone. Along the seacoast in a narrow belt coastal saline and coastal alluvial soil occur. The pH of the soil ranges from 5.5 to 6.5, calcium carbonate is completely absent and the soil is poor in phosphorus content. The lateritic soil is rich in organic matter and consequently in nitrogen content. However, the peculiar climate in the region and acidity of soil lower down the mineralization rate of nitrogen from the organic

matter. As a result, these soils found to be responsive to the application of nitrogenous fertilizers. The soils are fairly supplied with potassium.

In the immediate vicinity of the coast or creeks, the soils are highly saline and do not supports any crop except the halophytic bush type vegetation. The coastal saline soils have more than 3 per cent of total soluble salt and pH of 7.5 to 8.0. The coastal alluvial soils are clay loamy in texture having pH of 7.0 to 7.5 and total soluble salt 0.1 to 0.2 per cent. They have good fertility and support garden crops viz,. coconut, arecanut banana, etc. The hilly high lying terrain has '*varkas*' type soil which is suitable for cultivation of millets such as Ragi, *Vari* and Oilseed crop say niger and sesamum. The soils are found in several grades *viz*; a) soil useful for rice cultivation b) *varkas* soils useful for cashewnut, mango and nagli and c) coastal alluvial soils useful for coconut and arecanut gardens and d) salty land locally known as *Khar* or *Khajan* land.

3.5 Climate

Since the pattern of agricultural development is determined by the combined effect of rainfall, temperature and humidity, the characteristics in this respect should be analysed in detail. The zone has three seasons *viz*; i) Summer from March to May, ii) Rainy seasons from June to October, iii) Winter season from November to February.

3.6 Rainfall

Rainfall in the zone is mainly due to south-west monsoon. Winter rains from north-east monsoon are negligible or rare. Although rainfall is spread over from middle or last week of May to November, the important months of rainfall are only four i.e. June, July, August and September and 97 per cent of the rainfall receives

during these months. The maximum rainfall (33.37%) and intensity (49.4 mm/hr) are noticed in the month of July. The variability of the south-west monsoon is 25 per cent. The total rainfall ranges from 2500 mm to 5000mm distributed in 90 to 120 days in different parts. The maximum dry spells are observed in the month of September followed by June.

3.7 Temperature

Warm and humid climate is characteristic feature of the coastal belt. The mean daily temperature is above 20^0C throughout the year. May, generally the hottest month with mean maximum temperature around 22^0C. High humidity in association with warm temperature from April to October renders the weather uncomfortable in the absence of wind. Temperature after May till August is about 4 to 5^0C the diurnal range in temperature is small during April to October being less than 7^0C due to maritime influence. It however, increases by 10 to 11^0C during November to March under the influence of northerly dry winds of land origin. The mean annual range of temperature i.e. variation in mean daily temperature throughout the year is only 5^0C.

3.8 Humidity

During rainy season, the humidity is as high as 90-98 per cent. It is least during winter afternoon when it comes down to 60 per cent

3.9 Area and population

The total geographical area of the Sindhudurg district 5207 sq. kms. This is about1.70 per cent of the total area of Maharashtra state. According to 2011 Population Census the total population of Sindhudurg district is 84, 96, 91 and density of population per sq. km is 163. In the total population, the proportion of female was

higher of 432319 numbers (50.87%) than male of 417332 numbers (49.13%). The sex ratio of the region (female per 1000 male) was 1036. In the area, high literacy percentage was observed. It was 85.60 per cent in Sindhudurg district.

From Table 3.1, it can be concluded that there is a good scope for increasing area under cultivation by bringing the cultivable waste and other fallow land under cultivation. Particularly, on this area, Mango and Cashewnut cultivation should be taken up with the help of Employment Guarantee Scheme under Horticultural Development programme. The proportion of area under forest is also very low 0.77 per cent which need to be increased. As a result, high proportion of cultivable waste land as well as barren and uncultivable land and fallow land the proportion of net area sown to total geographical area was very low (26.81%).

3.10 Land utilization

The land use pattern of Sindhudurg district is given in the Table 3.1.

Table 3.1: Land utilization of Sindhudurg district.

Sr. No.	Land use category	Area in (ha)	% Area
1	Total geographical area	5040	(100.00)
2	Area under forest	39	(0.77)
3	Land put to non agricultural uses	122	(2.42)
4	Barren land and land unsuitable for cultivation	210	(4.17)
5	Permanent pastures and other grazing land	100	(2.00)

6	Land under miscellaneous tree crop and grooves	352	(6.98)
7	Cultivable waste land	1000	(19.84)
8	Current fallows	203	(4.02)
9	Other fallows	656	(13.02)
10	Net area sown	1351	(26.81)
11	Area sown more than once	420	(8.33)
12	Gross cropped area	1771	(35.14)

(Figures in parentheses indicate percentages to total geographical area.)

Source: Socio-Economic Review and District Statistical Abstract of Sindhudurg districts (2013-14).

3.11 Cropping pattern

The area under different crops in Sindhudurg is given in Table 3.2. It is seen from Table 3.2 that cereal crops dominate the cropping pattern of Sindhudurg. Among the cereal crops, rice is a predominating crop during kharif accounting for 799 ha. (59.14%) on a limited area, where water is available, the rice is grown in rabi-hot weather season, usually the mono cropping of rice is practiced. The proportion of pulses in the total area is only 1.41 per cent. The spices and condiments are grown on 9 ha. (0.70), fruits and vegetables occupied 365ha. (27.02%). Fruit crops mainly consisted of mango and cashew.

Looking to the cropping pattern, it was observed that cropping pattern of South Konkan region was directed towards cash crops such as mango, cashewnut, coconut, spices and condiments, which results into the higher returns per hectare to the cultivators of this region.

Table 3.2: Cropping pattern of Sindhudurg district

Sr. No.	Crop	Area in ha. (00')	% Area
1	Rice	799	(59.14)
2	Other cereals	900	(66.62)
3	Total cereals	1699	(125.75)
4	Total pulses	19	(1.41)
5	Total foodgrains (cereals + pulses)	918	(67.95)
6	Fruits and vegetables	365	(27.02)
7	Species and condiments	9	(0.70)
8	Total food crop	1292	(95.63)
9	Total oil seed crops	126	(9.33)
10	Total non-food crops	204	(15.09)
11	Area cropped more than once	420	(31.08)
12	Gross cropped area	1351	(100.00)

(Figures in parentheses indicate percentages to total gross cropped area.)

Source : Socio-Economic Review and District Statistical Abstract of Sindhudurg Districts (2013-14).

3.13 Horticulture

Development of horticulture is the hope of this region. The agro-climatic conditions of this region are favourable for cultivation of mango, cashew, coconut, and arecanut and also spices. In fact, some farmers have made the good beginning by taking large-scale plantation of mango and cashew. From the year 1990-91, the Government of Maharashtra has undertaken massive programme of plantation of horticulture crops under Employment Guarantee Scheme Since then, large area of this region has been covered under

horticultural plantations. out which otherwise being unutilized up to the year 2009-10. About 2.80 lakh hectares area was brought came under horticultural plantation out of which 1,07,000 ha. under mango, 1,43,000 ha. under cashewnut and about 21,000 ha under coconut. Considering the export potential of alphonso mango, recently government has declared this region as Agri-Export Zone for alphonso mango.

3.14 Agro-industries

The main agricultural products in Sindhudurg district are paddy, nagli mango, cashewnut, kokum, jackfruit and arecanut. These products are of great economic importance. In addition to these major forest products like bamboo, timber wood, catechu (katha), grass and some plants of medicinal value are found in the region.

The South Konkan region is famous for production of best quality alphonso mango and also for cashew, coconut and arecanut. Alphonso mango and cashew gives seasonal employment to local peoples for operations such as harvesting, grading, assembling and distribution of mangoes, drying of cashew nut, separation of apples and nuts, preparation of wooden boxes for mango packaging, marketing and transportation, cashew processing, etc. Cashew processing units not only help in employment generation i this region but also help in dispersal of units in the rural areas to prevent the migration of rural masses to urban areas. There are nine cashew processing factories and 78 household level cashew processing units in this region. Cashewnut from these districts fetches a substantial foreign exchange. Kokum fruit are also collected in the season, processed and sold in the form of *kokum syrup* and amsul, *kokum oil* is also extracted from seeds. This has good demand in cosmetics industry. Paddy straw is useful for

manufacturing paper and paperboard, there are some units operating in the region.

3.15 Livestock

Livestock makes substantial contribution to the economy by providing subsidiary occupation and income to the rural population, food to human population and employment to small farmers and landless labour.

The livestock population in South Konkan region as per livestock census 2010-11 is given in Table 3.4. It can be seen from Table 3.4 that total cattle population in Sindhudurg was 752379. Of which 44.27 per cent was bovine population, cattle and buffalo population was 30.33 per cent, and 10.93 per cent respectively of the total livestock population.

The conditions in the zone are ideally suited for grassland development and cattle production. As per the report of nutrition expert's per capita consumption of milk was meagre in the zone, this needs boosting. The increase in the milk production can be achieved through increase in number of productive animals, growing of grasses on waste lands, setting up of veterinary aid centres and encourage The unproductive animals and menaces as stray cattle for which grampanchayat act needs to be enforced vigorously.

Table 3.4: Livestock population of Sindhudurg district.

(Figures in Numbers)

Sr. No.	Category	Numbers	Per cent
1	Cattle	228271	(30.33)
2	Buffalo	104826	(10.93)

3	Total Bovine	333097	(44.27)
4	Sheep	214	(0.02)
5	Goat	36291	(4.82)
6	Poultry	46932	(6.23)
7	Other livestock	2748	(0.36)
	Total livestock	**752379**	**(100.00)**

(Figures in parenthesis indicate percentages to total reported area.)

Source: Socio-Economic Review and District Statistical Abstract of Sindhudurg districts (2013-14).

3.16 Transport and communication.

The National Highway (NH-17) namely Mumbai to Goa, running from North to South is the major source of road transport. All the tahsil places and big villages in the region are well connected to this highway to facilitate smooth transport service. The total road length of district is 10541 kms. Of which length of National Highway is 385 kms. The region is having only one railway route (Konkan Railway) running from north to south with total length of 297.47 km. with to this transport facility, the region is now well connected with Southern and Northern part of the country. At present, transporting of agricultural goods, truck/tempo services are being used because of their easy access. The rail transport is presently used only for journey purpose. However in coming future, the Konkan railway will definitely provide better transport facility for valuable agricultural commodities of this region in distant markets of the country.

In order to have better and early transmission of messages, the region is having 654 posts 371 post offices and 24326 telephone

connections in Sindhudurg district. Recently, the mobile facility is made available at many places to facilitate quick communication.

3.17 Marketing of Agricultural Produce

There are number of functioning co-operative societies in this region which cater the needs of market. However, long distanced from major market such as Mumbai, Pune and other big cities hilly undulating terrain hamper the transportation of goods produced in the region. Inadequate transport facilities and lack of ready market are the major bottlenecks in production of certain commodities. Most of the mangoes sent to Mumbai market and some quantities are marketed in Pune, Nagpur, Kolhapur and other cities in the state. Sometimes, mangoes are also sent to Ahmedabad, Indore, Rajkot, New Delhi, but the quantity is very meagre.

There is no surplus food grain production in the region and hence, marketing of food grain is not developed. Area under groundnut is increasing where the irrigation facilities are available and therefore, few oil mills/ghanis are in operation.

3.18 Co-operative and banking sector

Co-operative and banking sector covers various aspects of agricultural needs such as extension of agricultural credit and supply of agricultural inputs through co-operative societies. Upto the end of March 2010, there were 829 co-operative societies in Sindhudurg district. Of which, 607 (25.36%) were Primary Agricultural Co-operative Credit Societies. In addition to this various commercial, schedule and co-operative banks branches were in operation in this region and the total number of branches was 298. As compared to Maharashtra, the percentage share of PACS's in the region was only 1.50 and the proportionate credit disbursement was hardly 0.80 per cent (up to 2009-10). This showed that co-operative

institutes and banking sector are not well developed in a study area as compared to rest of Maharashtra.

Source: Socio-Economic Review and District Statistical Abstract of Sindhudurg district (2013-2014).

CHAPTER-IV

METHODOLOGY

The specific research required to adopt an appropriate method and procedure for conducting investigation, analysis and interpretation. The economic investigation includes selection of study area, villages and farmers, collection of data and finally methods and techniques of analysis used to arrive at the conclusions related to the objectives specified. The methodology adopted for the present study is outlined in this chapter. For present study, a multistage sampling technique was followed for selection of the district, tahsils, villages and ultimate selection of dairy farmer.

4.1 Selection of district

At first stage, the Sindhudurg district was purposively selected because study in this district is not carried out so far.

4.2 Selection of tahsils

At the second stage, three tahsils namely Kudal, Kankavali and Vaibhavwadi from Sindhudurg district were selected on basis of maximum cattle population in these tahsils in Sindhudurg district.

4.3 Selection of villages

It is obvious that the population of dairy farmer is concentrated in villages, where there are milk collection centres. A list of such villages in collecting centres or selected talukas was obtained from appropriate government agencies. From this list, three villages from each taluka were selected randomly. Selection of talukas and villages is given in the Table 4.1.

Table 4.1: Selection of tahsils and villages

Sr. No.	Tahsils	Village	No.of (dairy farmer)
1.	Kudal	1. Pinguli	10
		2. Bibvane	10
		3. Ranbambuli	10
		4.Oras	10
2.	Kankavali	1. Nandgaon	10
		2. Tondawali	10
		3. Talere	10
		4. Kasarde	10
3.	Vaibhavwadi	1. Vaibhavwadi	10
		2. Adegov	10
		3. Kokisare	10 10

		4. Sangulwadi	
4.	**Total**		120

4.4 Selection of dairy farmer

Form each village 10 dairy farmers were selected randomly. A sample of 120 dairy farmers was drown from 12 villages of 3 tahsils in Sindhudurg district

4.5 Collection of data

The data were collected from selected dairy farmers by personal interview method. For this purpose, special pre-tested schedule was developed. The detailed information on feeding, housing, healthcare management and cost incurred on different milch animals were collected with the help of this specially designed schedule.

4.6 Reference period

The data for the present study is pertained to the year 2014-15 and collected in the month of January 2016.

4.7 Analysis of data

The analysis of collected data was carried out by using different statistical tools such as percentages, ratios, averages, mean, frequency distribution etc. In order to working out cost of milk production, the standard cost concepts of farm management were used. In addition to this with a view to study resource use efficiency, the Cobb-Douglas type production function was applied.

The selected milk producers were grouped into three different categories as small, medium and large according to land holding of milk producers. The information of the same is presented in Table 4.2.

Table 4.2: Size group wise distribution of selected dairy farmer

Sr. No.	Size group	No. of milk producers	Land holding(ha)
1.	Marginal	51	Less than 1
2.	Small	36	1.01 – 2.00
3.	Medium	33	2.01 and above

4.8 Procedure for estimation of costs

The cost incurred on maintenance of different milch animals including cost of veterinary charges, medicines, feeds and fodders, wages of labour, etc. was considered.

4.8.1 Feed cost

The actual paid out cost plus transport charges was considered as a cost of purchase of feed and fodder. Whereas, in case of home produced feed and fodder, prevailing market rates were treated as imputation cost.

4.8.2 Labour cost

In case of labour actual wages paid was considered as labour cost whereas in case of family labour the cost was imputed on the basis of prevailing wage rate for hired labour in the study area.

4.8.3 Medicine cost

Actual expenditure incurred on medicines and veterinary aids inclusive of service charges were considered.

4.7.4 Other miscellaneous charges

The expenditure on ropes and chains, minor repairs to byres etc. were considered as miscellaneous expenditure and it was apportioned to dairy farmer.

4.7.5 Interest on capital

a. Fixed capital

Interest on fixed capital i.e. investment on different milch animals, tools, equipments and machinery was taken as 10 per cent per annum for intercalving period.

b. Working capital

Interest on working capital (paid out cost) was calculated at the rate of 13 per cent for three months period.

4.7.6 Depreciation

a. Milch animal

Depreciation on milch animals was calculated by straight line method by using following formula.

$$\text{Annual depreciation per milch animal} = \frac{\text{Purchase price - culled value}}{\text{Productive life in years}}$$

The productive life of a cow was considered as 10 years and the value of hide and skin (scrape value) was considered as a Rs. 300 per cow.

b. On cattle byre

Depreciation on cattle byre is calculated by using following formula.

$$\text{Annual depreciation of cattle byre} = \frac{\text{Construction cost - Junk value}}{\text{Expected life of byre}}$$

Where,

Expected life of byre was considered as 10 years.

c. On dairy utensils

$$\text{Annual depreciation on dairy utensil} = \frac{\text{Purchase Price - Junk value}}{\text{Expected life of dairy utensil}}$$

Where,

Expected life of dairy utensils was considered as 5 years.

4.7 Cost concepts used in the study

Following cost concepts were used for estimation of maintenance cost of different milch animals.

A) Variable costs

1) Cost of feeds

The feed cost was worked out by taking into consideration of the quantity of different ingredient to the animal and their respective prices. The transportation charges of bringing feed from market to farm was taken in to an account.

2) Cost of labour

The labour engaged for carrying out different operations in dairy farms such as transportation of feeds, cleaning, feeding, watering and miscellaneous works were considered. Human labour was measured in man days. Labour cost was imputed by considering actual wages paid to them.

3) Veterinary expenditure:

The actual cost of medicines and veterinary aids paid on livestock was treated as veterinary expenditure.

4) Interest on working capital:

The prevailing rate of interest per annum on long term (or rate of interest at which investment was made done by owner) was considered on working capital as 12 per cent per annum.

6) Miscellaneous charges

Actual expenditure incurred towards the electricity charges, sanitations and minor repairing was supposed to be as miscellaneous costs.

B) Fixed costs

1) Depreciation

Depreciation is the reduction in the value of equipment's or assets as time passes. Depreciation on buildings, fencing, shed facilities as well as on equipments and appliances was worked out at the rate of 10 per cent per annum on total value.

2) Interest on fixed capital

On value of all fixed assets utilized in milk production i. e. cattle shed, milk canes and other utensils, etc. the interest was worked out at the rate of 10 per cent per annum.

4.8 Cost of milk production

Per litre cost of milk production is worked out by using following formula.

$$\text{Cost of milk production per litre (Rs.)} = \frac{\text{Net maintainance cost (Rs.)}}{\text{Total milk yield in intercalving period (litre)}}$$

4.9 Resource use efficiency in milk production

The resource use efficiency in milk production of farmers was estimated by fitting Cobb-Douglas type of production function to per cow input-output data.

Functional form

$Y = A\ Xij^{bi}\ e$

Where,

Y = Milk yield per milch animal per day

bj = Elasticity of coefficient of respective variables

e = Error term

Xj = Explanatory variables

X_1 = Herd size (No. of animals)

X_2 = Green fodder (kg)

X_3 = Paddy straw (kg)

X_4 = Concentrates (kg)

X_5 = Lactation period (days)

X_6 = No. of lactations

X_7 = Veterinary expenses (Rs.)

X_8 = Human labour (days)

4.10 Estimation of marginal physical productivity

The MPP of different inputs was estimated by taking first order partial derivative of output (Y) with respect to concerned input appearing in estimated production function.

$$Y = aX_2^{b_2} X_3^{b_3} X_4^{b_4} X_8^{b_8} e^u$$

$$\text{MPP of } X_2 \quad \frac{dy}{dx_2} = ab_2 X_2^{b_2} X_3^{b_3} X_4^{b_4} X_8^{b_8} e^u$$

$$\therefore \frac{dy}{dx} = b_2 \times \frac{\bar{y}}{\bar{X}_2}$$

Where,

$\frac{dy}{dx_2}$ = MPP of X_2 input

b_2 = Production elasticity of X_2 input

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

$\bar{X}_2$ = Geometric mean of X_2 input

Likewise MPPs of i^{th} inputs were estimated

4.11 Estimation of marginal value product (MVP)

The MVP value productivity of i^{th} input is calculated by multiplying unit price of output to MPP of respective i^{th} input.

MVP of Xi = (MPP of Xi) × (Price per litre of milk)

4.12 Judging of resource use efficiency

With a view to judge the resource use efficiency, the ratio of MVP to its respective factor price (Px) is calculated separately each input.

$$\frac{\text{MVP}}{\text{Factor price}} = 1, \text{ Optimum use of resources}$$

$$\frac{\text{MVP}}{\text{Factor price}} < 1, \text{ Excess use of resources}$$

$$\frac{\text{MVP}}{\text{Factor price}} > 1, \text{ Under utilization of resources}$$

CHAPTER-V

RESULTS AND DISCUSSION

The data collected from the sample farmers were analyzed as per the methodology specified in Chapter-IV and the results are presented and discussed in this chapter. The results are grouped under following heads.

1. General information of the dairy farmer.
2. Cost of production and profitability of milk.
3. Resource use efficiency in milk production.
4. Disposal of milk production.
5. Constraints in production of milk.

5.1 GENERAL INFORMATION OF THE DAIRY FARMER

The general information of the selected dairy farmers regarding age, education, size of family and occupation is presented in Table 5.1.

5.1.1 Age

Age is one of the important factor influencing enterprise attitude in various ways, which ultimately affects managerial ability, skill and judgment in dairy business. It is seen from Table 5.1 that the average age of selected dairy farmer varied from 45 years under marginal size group to 43 years in small group and 48 years under medium size group with an average age of around 44 years. This indicated that they had good experience and were looking after the dairy enterprise in study area.

5.1.2 Education

Education is another important factor influencing managerial and technical ability in dairy enterprise. The educational status is

evaluated by giving zero point to illiterate milk producer and one point for every standard of education attained by him. It is evident from Table 5.1 that there was not much difference between educational score in all the three groups. The average educational score was only 4.35 indicating that the sample dairy farmers had better education level. For dairy enterprise, this status of education may be considered as sufficient.

Table 5.1: General information of selected dairy farmers

Sr. No.	Particulars	Size Groups			Overall
		Marginal (N=51)	Small (N=36)	Medium (N=33)	(N=120)
1.	Age (years)	45	43	48	44
2.	Educational score	3.78	5.22	5.30	4.35
3.	Family size				
	(i.) Male	4.21 (53.76)	4.88 (55.51)	5.81 (54.55)	4.85 (55.11)
	(ii.) Female	3.62 (46.24)	3.91 (44.49)	4.84 (45.45)	3.95 (44.89)
	Total (i+ii)	7.83 (100)	8.79 (100)	10.65 (100)	8.8 (100)
4.	Occupation				
	(a.) Main Agriculture	51	36	33	120
	(b.) Subsidiary 1.Dairy	51	36	33	120

(Figures in parentheses are percentages to respective to totals)

5.1.3 Size of the family

Size of family is the another factor affecting production and consumption of milk. It also contributes towards supply of family labour to the enterprise. It is of observed from Table 5.1 that the overall average family size was 8.8 persons. There was no much

difference in family size among different size groups. The average family size varied from 7.83 persons in marginal group to 10.65 persons under medium group.

5.1.5 Occupation

The due importance is given to the dairy enterprise in farming. It is seen that all the dairy farmers undertaking dairy as subsidiary occupation. It could be noticed that all the dairy farmer were having agriculture as their main occupation.

5.2 LAND HOLDING

The information about land holding of sample dairy farmers is presented in Table 5.2.

Table 5.2: Per farm land holding

(Area in ha.)

Sr. No.	Particulars	Size Groups			Overall
		Marginal	Small	Medium	
I.	Cultivated land				
	i. Irrigated land	0.16 (57.14)	0.49 (35.50)	0.65 (26.53)	0.41 (25.46)
	ii. Unirrigated land	0.05 (17.85)	0.10 (7.24)	0.21 (8.57)	0.11 (6.83)
	Subtotal (i+ii)	0.21 (75.00)	0.59 (42.75)	0.86 (35.10)	0.52 (32.29)
II	Fallow land	0.02 (7.14)	0.18 (13.04)	0.25 (10.20)	0.19 (11.80)
III	Grazing land	0.01 (3.57)	0.20 (14.49)	0.30 (12.24)	0.24 (14.90)
IV	Unsuitable for cultivation	0.04	0.41	1.04	0.66

		(14.28)	(29.71)	(42.44)	(40.99)
	Grand total	0.28 (100.0)	1.38 (100.0)	2.45 (100.0)	1.61 (100.0)

(Figures in parentheses are percentages to respective totals)

It is observed from the Table 5.2 that at the overall level, the average size of land holding was of 1.61 ha. The average land holding under marginal, small and medium size group was worked out to 0.28 ha, 1.38 ha and 2.45 ha, respectively. Out of total cultivated land, the 0.41ha was under irrigation. The proportion of irrigated land was maximum in case of marginal size group (57.14%) followed by small group (35.50%) and medium group (26.53%).

5.3 CROPPING PATTERN

The cropping pattern is the important factor, which determines magnitude of employment potential on farm as different crops require varying quantities of labour units. Table 5.3 gives an idea about the area allocated under different crops in different seasons.

Table 5.3: Per farm cropping pattern

(Area in ha.)

Sr. No.	Particulars	Groups			Overall
		Marginal	Small	Medium	
I.	***Kharif* season**				
	a. Paddy	0.14 (50.00)	0.38 (50.66)	0.53 (50.96)	0.36 (54.45)
	b. Nagali	0.01 (3.57)	0.02 (2.66)	0.05 (4.80)	0.02 (3.03)
	Kharif crops (a+b)	0.15 (53.57)	0.4 (53.33)	0.58 (55.76)	0.38 (57.57)

II.	***Rabi/ summer* season**				
	a. Vegetable	0.01 (3.57)	0.02 (2.66)	0.03 (2.88)	0.02 (3.03)
	b. Other	0.03 (10.71)	0.08 (10.66)	0.06 (5.76)	0.05 (7.57)
	c.Fodder crop	0.03 (10.71)	0.06 (8.00)	0.09 (8.65)	0.06 (9.09)
	Rabi crops (a+b+c)	0.07 (25.00)	0.16 (21.33)	0.18 (17.30)	0.13 (19.69)
III.	**Perennials**				
	a. Coconut	0.02 (7.14)	0.005 (0.66)	0.02 (1.92)	0.015 (0.22)
	b. Cashew	0.01 (3.57)	0.05 (6.66)	0.07 (6.73)	0.03 (4.54)
	c.Mango	0.03 (10.71)	0.14 (18.66)	0.19 (18.26)	0.12 (18.18)
	Perennials (a+b+c)	0.06 (21.14)	0.19 (25.33)	0.28 (26.92)	0.16 (22.72)
	Total cropped area	0.28 (100.0)	0.75 (100.0)	1.04 (100.0)	0.67 (100)
	Net cultivated aera	0.21	0.59	0.86	0.54
	Cropping intensity (%)	133.33	127.11	120.93	124.07

(Figures in parentheses are percentages to respective totals)

It is seen from the Table 5.3 that the cropping pattern of sample was dominated by *Kharif* crops. Total area under *kharif* crops is of 0.38 (57.57%). The total area under *rabi* crops 0.13 ha (19.69%). The area under perennial crops like coconut and arecanut was 0.16 (22.72) ha at the overall level. Thus, the total cropped area

with marginal small, and medium farm was 0.28 ha, 0.75 ha and 1.04 ha with overall average cropped area of 0.67 ha. The cropping intensity for sample dairy farmer being 124.o7 per cent.

Cropping intensity of marginal dairy farmer small dairy farmer, and medium dairy farmer and was 133.33 per cent, 127.11 per cent and 120.93 per cent.

5.4 LIVESTOCK

The composition of livestock of sample farmers is presented in Table 5.4.

Table 5.4: Per farm herd size (Fig in Numbers)

Sr. No.	Category of livestock	Size Groups			Overall
		Marginal	Small	Medium	
I.	**Local cattle**				
	a. Cows	1.37	1.61	1.69	1.53
	b. Bullocks	0.37	0.55	0.33	0.41
	c. Heifers/Calves	1.06	1.19	1.45	1.24
	Sub-total	2.8 (43.75)	3.35 (41.56)	3.47 (37.11)	3.18 (40.56)
II.	**Crossbred cattle**				
	a. Cows	0.60	0.86	1.18	0.88
	c. Heifers/Calves	0.43	0.61	0.96	0.63
	Sub-total	1.03 (16.09)	1.47 (18.23)	2.14 (22.88)	1.51 (19.26)
III.	**Buffalo**				
	a. She-buffaloes	1.23	1.58	1.93	1.58
	b. He-buffaloes	0.31	0.36	0.15	0.28
	c. Heifer/Calves	1.03	1.30	1.66	1.29
	Sub-total	2.57 (40.15)	3.24 (40.19)	3.74 (40.00)	3.15 (40.17)
	Grand total	6.4	8.06	9.35	7.84
	Total value of livestock asset (Rs.)	17911	20580	29579	22690

It is seen from Table 5.4 that at the overall level, the per farm livestock population observed to be 7.84 bovine animals. It was further seen that out of total bovine population, the 0.88 were crossbred cows, 1.53 were local cows and 1.58were local buffaloes.

The average number of bovines maintained by marginal, small, and medium farmers was 6.40, 8.06 and 9.35, respectively. In all

the categories of farms, the number of buffaloes was more than local cattle's and crossbred. However, on marginal farms the number of local cows and buffaloes more than crossbred cattle's. This showed that dairy farmers under medium size group relied more on local milch animals than crossbred cows but this was not the case in other two groups of farms. The per farm value of livestock at overall level was Rs.22690 and per farm value of livestock was found Rs. 17,911, Rs. 20,580 and Rs. 29,579 in case of marginal, small and medium farmers group, respectively.

5.5 INVESTMENT IN DAIRY ENTERPRISE

Investment in dairy enterprise comprised of investment in milch animals, cattle shed and dairy equipments. The investment in livestock and other assets per holding and per milch animals varies according to the resources of different categories of milk producers.

Table 5.5: Per farm investment in dairy enterprise

(Fig in Rs.)

Sr. No.	Particulars	Size Groups			Overall
		Marginal	Small	Medium	
1.	Milch animals	17911 (79.48)	20580 (69.69)	29579 (66.22)	22690 (70.57)
2.	Cattle shed	2793 (10.93)	5843 (17.75)	9718 (21.22)	6118 (17.61)
3.	Dairy utensil	2446 (9.57)	4127 (12.54)	5742 (12.54)	4105 (11.81)
	Total	23150 (100)	30901 (100)	45039.9 (100)	32913 (100)

(Figures in parentheses are percentages to respective totals)

Per farm investment at the overall level was Rs. 32913. The total investment was maximum in respect of medium farms followed by small and marginal farms. The investment on cattle shed and

milch animal at the overall was found17.61per cent and 70.57 per cent, while very small amount was invested on dairy utensils in all the size group of dairy farmers.

5.6 INFORMATION OF HERD SIZE

The detail information on milch animals in dairy unit of sample farmers is given in Table 5.6.

It is noticed from the Table 5.6 that at the overall level, per farm number of local cows, crossbred cows and buffaloes maintained was 1.27, 0.73 and 1.28, respectively. Average age of local cow was 5 years, crossbred cows 4.66 years of and buffaloes that was of 5.33 years. Age at first calving of local cows, crossbred cows and buffaloes was 3.5, 2.7 and 4.0 years, respectively. The present order of calving was 2.66, under local cows, 2.66 in crossbred cows and 3.33 in respectively buffaloes. The intercalving period was 526.66, 410.66 and 459.66 days in case of local cows, crossbred cows and buffaloes, respectively. The average milk yield was more regarding of crossbred cows followed by buffaloes and local cows While the per day milk yield was also in the same order.

5.7 FEEDING SCHEDULE

Feeding is the most important factor But in Sindhudurg district no availability of green fodder mostly animal are grazing in gairan or forest area, which directly affects the milk production. There were wide variations in the quantity of feeds and fodders fed to milch animals from season to season and from individual animal to animal in the same season.

The average daily quantities of feeds and fodders fed to local cows, crossbred cow and buffaloes in different seasons during the intercalving period are given in Table 5.7.

Table 5.6: Per farm details of herd size

(Fig. in numbers)

Sr. No.	Particulars	Marginal			Small			Medium			Overall		
		Local cow	Cross bred	Buffalo	Local cow	Cross bred	Buffalo	Local cow	Cross bred	Buffalo	Local cow	Cross bred	Buffalo
1.	No. of milch animals per farm	1.03	0.54	1.01	1.33	0.63	1.19	1.45	1.03	1.66	1.27	0.73	1.28
2.	Age (years)	5	5	6	6	4	5	4	5	5	5	4.66	5.33
3.	Age at first calving	2.5	3	3.5	3.5	2	4.5	3.5	3.0	4.0	3.5	2.7	4.0
4.	Present order of calving	3	2.5	3	2	2.5	3	3	3	4	2.66	2.66	3.33
5.	Inter calving period(days)												
	a. Lactation	240	290	260	250	286	270	275	296	270	255	290.66	266.66
	b. Dry	290	115	197	280	120	197	240	125	185	271.66	120	193

	Total days	535	405	457	530	406	467	515	421	455	526.66	410.66	459.66
6.	Milk yield (lit.)												
	a. In lactation	678.8	861.3	919.1	997.5	1081.08	1285.2	1196.25	2134.16	2016.9	944.40	1307.03	1365.29
	b. Per day	2.75	5.5	3.5	3.0	6.0	4	3.0	7.0	4.5	2.91	6.16	4

Table 5.7.Seasonwise daily feeding schedule of milch animal

(Kg/day/animal)

Class of animals	Season	In milk				Dry period			
		Green fodder/grass	Paddy straw	Concentrate	Total value (Rs.)	Green fodder/grass	Paddy straw	Concentrate	Total value (Rs.)
Local cow	Rainy	-	3.5 (7.00)	0.5 (3.75)	10.75	-	3.5 (7.00)	-	7.00
	Winter	-	7.5 (15.00)	0.5 (3.75)	18.75	-	7.00 (14.00)	-	14.00
	Summer	-	3.5 (7.00)	0.5 (3.75)	10.75	-	2.5 (5.00)	-	5.00
Crossbred	Rainy	3.5 (14.00)	7.5 (15.00)	1.0 (7.5)	36.5	2.5 (9.00)	5.5 (11.00)	-	19.00
	Winter	3.5 (14.50)	10 (20.00)	1.5 (11.25)	45.75	2 (8.00)	7.5 (15.00)	-	23.00
	Summer	3.5 (14.00)	7.5 (15.00)	1.0 (7.5)	36.5	-	7.5 (15.00)	-	15.00

Local buffalo	Rainy	-	4.5 (9.00)	1.0 (7.5)	16.5	–	4.5 (9.00)	-	9.00
	Winter	-	7.5 (15.00)	1.0 (7.5)	22.5	-	7.5 (15.00)	-	15.00
	Summer	-	3.5 (7.00)	0.5 (3.75)	10.75	–	4.5 (9.00)	-	9.00

Green fodder (kg) Rs. 4, Paddy straw (kg) Rs. 2 and Concentrates (kg) Rs. 7.5

(Figures in parentheses are monetary values of feed)

5.7.1 Feed quantity

It is evident from Table 5.7 that various types of roughages were fed in different quantities in different seasons. There was a definite pattern of feeding practice in the year throughout the region based on feeds available locally. Paddy straw was fed in early start of rainy season (June-July), green fodder was fed in forest area throughout the year especially later spell of rainy season (Aug.-Sept.) and concentrates were fed throughout the year for milch animals. On an average the local cows in milk was fed with 3.5 kg of paddy straw and 0.50 kg of concentrates in rainy season While during other two seasons namely winter and summer, only paddy straw of 7.50 kg and 0.50 kg concentrates was fed to local cows. In dry period fed with 3.50 kg, 7.00 kg and 2.50 kg paddy straw in rainy, winter and summer seasons respectively. No concentrates were given to local cow in dry period.

Daily quantities of paddy straw fed to crossbred cows in milk were 7.50 kg and 3.50 kg green fodder in rainy and 3.50 kg and 3.5 kg paddy straw in winter and summer seasons, respectively. The per day concentrates given in rainy, winter and summer seasons were 1.00 kg, 1.50 kg, 1.00 kg, respectively. The crossbred cow in dry period fed with 5.50kg of paddy straw in rainy season and 7.50 kg and 7.50kg paddy straw in winter and summer seasons respectively. Concentrates were not given to crossbred cows in dry period. Daily quantities of paddy straw fed to buffaloes in milk were 4.50 kg straw and its 7.50 kg and 3.50 kg in winter and summer seasons respectively. The concentrates given in rainy, winter seasons were 1.00 kg, 1.00 kg, respectively. Buffaloes in dry period were fed with 4.50 kg, 7.50 kg and 4.50 kg paddy straw in rainy, winter and summer seasons respectively. No concentrates were given to buffaloes in dry period.

5.7.2 Feeding cost

The minimum feeding cost was incurred in summer and maximum in rainy season in respect of crossbred cows either in milk or dry. This was mainly because of costly paddy straw fed in early spell of rainy season and the cost of concentrates was also high, as no other fodders were available during this period. In summer season only dry grass of inadequate quantity was fed.

5.7.2.1 Milk period

The per day feeding cost of local cow, crossbred cow and buffalo during days in milk in rainy, winter and summer seasons were Rs. 10.75, Rs. 18.75 and Rs. 10.75 and Rs. 36.5, Rs. 45.75 and Rs. 36.5 and Rs. 16.5, Rs. 22.5 and Rs. 10.75, respectively.

5.7.2.2 Dry period

The per day feeding cost of local cow, crossbred cow and buffalo during dry period in rainy, winter and summer seasons were Rs. 7.00, Rs.14.00 and Rs. 5 and Rs. 19.00, Rs. 23.00 and Rs. 15.00 and Rs. 9.00, Rs. 15.00 and Rs. 9.00 respectively.

5.8 OPERATIONWISE LABOUR UTILIZATION

There are various operations in dairy enterprise for which either family labour were performing various operations like feeding, cleaning, grazing, milking and delivery of milk, etc. In order to know the labour utilization pattern for maintenance of local cows, crossbred cows and buffaloes, per day per animal, labour utilization was worked out and information is in given Table 5.8.

It is revealed from Table 5.8 that at the overall level, 140 minutes of labour (family) was utilized per day to look after the local cow, crossbred cow and buffalo. Out of this maximum time (60 minutes) were spent for grazing of animals followed by cleaning (20 minutes), feeding (10 minutes) and milking (10 minutes) delivery of milk (5 minutes). Of the total labour employed per day for maintaining milch animal, about 1.75 hours (105 minutes) were of male hardly 0.58(35 minutes) was of family labour. There were no use of hired labour in the study area.

Table 5.8: Per farm operation wise labour utilization

(Minutes/day)

Type	Class of labour	Feeding	Cleaning	Grazing	Milking	Delivery of milk	Total hours)
Male	Family	10	20	60	10	5	105 (1.75)
	Total	10	10	60	10	5	105 (1.75)
Female	Family	5	5	20	5	-	35 (0.58)
	Total	5	5	20	5	-	35 (0.58)
Total		15	15	80	15	5	140 (2.08)

(Figures in parentheses are percentages to the totals)

5.9 Other expenses on milch animals

Other expenses for milching animals included veterinary charges, expenditure on ropes, chains etc. The annual amount of other expenses incurred per milching animal for different breeds of animals is shown in Table 5.9.

It is observed from the Table 5.10 that annual expenditure towards medicines and veterinary aids were highest for crossbred cows in medium group (Rs.442.4) followed by small groups (Rs. 265.5.2) and under marginal group (Rs. 181.3). In case of local cow it was (Rs. 186.8) (Rs.254.1), and (Rs.277.2) in marginal small, and medium farmers, respectively. In respect of buffaloes, it was (Rs.293.1), (Rs.301.3) and (Rs.351.5) in under marginal, small and medium groups, respectively. This indicates that the extra care of crossbred cows and local cows taken by farmers for medication and health. However, the miscellaneous charges were highest for crossbred cows followed by buffaloes and local cow.

5.10 Per farm cost of milk production in intercalving period

5.10 Local cows

Table 5.10 shows the cost of milk production per farm for local cows on different categories of sample farms. Total fixed cost included interest on fixed capital and depreciation on fixed assets. Total variable cost included cost of feeds and fodder comprising of costs on green fodder, paddy straw and concentrates Wages of human labour consisting of costs on hired male labour in case of on large farms and prevailing wage rates for small and medium farms, veterinary expenses and miscellaneous expenses

Table 5.9: Other expenses on milch animals

(Fig in Rs.)

Sr. No.	Particulars	Marginal			Small			Medium			Overall		
		Local cow	Cross bred	Buffalo	Local cow	Cross bred	Buffalo	Local cow	Cross bred	Buffalo	Local cow	Cross bred	Buffalo
1.	Veterinary charges	186.8	181.3	293.1	254.1	265.5	301.3	277.2	442.4	351.5	239.3	296.4	315.3
2.	Miscellaneous charges	205.6	179.4	278.4	270.8	319.4	355.8	281.8	503	492.4	252.7	333.9	375.53

Table 5.10: Per farm cost of milk production in intercalving period of Local Cow

(Rs/farm)

Sr. No.	Particulars	Marginal	Small	Medium	Overall
A.	**Variable Cost**				
	Feed and fodder	2966.4 (14.81)	4327.5 (18.24)	5007.75 (1.77)	4100.51 (17.10)
	Wages of human labour	13108.8 (65.45)	13655 (57.57)	14951.75 (52.94)	13928.1 (58.09)
	Veterinary expenses	186.8 (0.93)	254.1 (1.07)	277.2 (0.98)	239.3 (0.99)
	Miscellaneous expenses	205.6 (1.02)	270.8 (1.14)	281.8 (0.99)	252.73 (1.05)
	variable cost	**16467.6 (82.22)**	**18507.4 (78.03)**	**20518.5 (84.63)**	**18520.64 (77.25)**
	Interest on working capital@13%	294.03 (1.46)	311.60 (1.31)	342.37 (1.21)	316.00 (1.31)
	Total variable cost	**16761.63 (83.69)**	**18819 (79.35)**	**20860.87 (73.86)**	**18836.64 (78.57)**
B.	**Fixed cost**				
	Interest on fixed capital@10%	1522.19 (9.50)	2116.50 (10.0)	3393.34 (12.01)	2299.45 (9.66)
	Depreciation on fixed assets	1742.83 (13.68)	2780.42 (15.44)	3988.33 (14.12)	2837.19 (11.83)
	Total fixed cost	**3265.02 (16.30)**	**4896.92 (20.64)**	**7381.67 (26.13)**	**5136.64 (21.42)**
	Total cost	**20026.65 (100.0)**	**23715.92 (100.0)**	**28242.54 (100.0)**	**23973.28 (100.0)**
	Gross returns	22274.3	30760.6	36413.1	29815.93
	Milk yield (lit.)	678.8	997.5	1196.25	944.56
	Value of dung produced	785.5	825.6	910.6	840.5
	Per litre cost of production of milk	29.50	23.77	23.60	25.38

	Net profit	2247.65	7044.68	8170.56	6683.22
	Benefit cost ratio	1.11	1.29	1.28	1.27

(Figures in parentheses are percentages to respective totals)

Total cost of milk production/farm intercalving period of which animal was (Rs.23973) in which proportion of variable cost and fixed cost was (77.25) per cent and (21.42) per cent, respectively. Size groupwise analysis of farm revealed that total cost increased with increase in farm size. It was highest for medium farms (Rs.28242) followed by small farms (Rs. 23715) and marginal farm (Rs.20026). Major constituent of variable cost was wages of labour, which accounted for (58.09) per cent of the total cost followed by feed cost (17.10) per cent, veterinary expenses (0.99) per cent and miscellaneous express (1.05) per cent. On an average, the cost of milk production per litre was worked out to (Rs.25).Gross returns per cow were maximum in case of marginal farms (Rs.22274) followed by small farms (Rs.30760), large farms (Rs.36413). On an average, the gross returns were (Rs.29815) and net profit was of (Rs.6683).

Total cost of milk production/animal in intercalving period was Rs. 18876.59 of which proportion of variable cost and fixed cost was 78.57 per cent and 21.42 per cent, respectively. Size group wise analysis of farms revealed that total cost increased with increase in farm size. It was highest in respect of medium farm (Rs. 19477.61) followed by marginal farms (Rs. 19477.61) and farm (Rs.17831.51). Major constituent of variable cost was wages of labour, which accounted for 58.01 per cent of the total cost followed by feed cost 17.10 per cent, veterinary expenses 0.99 per cent and miscellaneous express 1.05 per cent. On an average, the cost of milk production per litre was worked out to Rs. 25.38. Gross return per cow were maximum on medium farms (Rs. 25112.48) followed by small farm (Rs. 23128.27) and marginal farms (Rs. 21625.53). On

an average, the gross returns were Rs. 25477.11 and net profit was of Rs. 5262.37.

Table 5.11: Per animal cost of milk production in intercalving period of Local Cow

(Rs/Animal)

Sr. No.	Particulars	Marginal	Small	Medium	Overall
A.	**Variable Cost**				
	Feed and fodder	2880 (14.81)	3253.75 (18.24)	3453.62 (1.77)	3228.74 (17.10)
	Wages of human labour	12726.99 (65.45)	10266.91 (57.57)	10311.55 (52.94)	10967.00 (58.09)
	Veterinary expenses	181.35 (0.93)	191.05 (1.07)	191.17 (0.98)	188.42 (0.99)
	Miscellaneous expenses	199.61 (1.02)	203.60 (1.14)	194.34 (0.99)	199 (1.05)
	variable cost	**15996.69 (82.22)**	**13915.33 (78.03)**	**14150.68 (84.63)**	**14583.18 (77.25)**
	Interest on working capital@13%	285.46 (1.46)	234.28 (1.31)	236.11 (1.21)	248.81 (1.31)
	Total variable cost	**16273.42 (83.69)**	**14149.62 (79.35)**	**14386.80 (73.86)**	**14832 (78.57)**
B.	**Fixed cost**				
	Interest on fixed capital@10%	1477.85 (9.50)	1591.35 (10.0)	2340.23 (12.01)	1810.59 (9.66)
	Depreciation on fixed assets	1692.06 (13.68)	2090.54 (15.44)	2750.72 (14.12)	2234 (11.83)
	Total fixed cost	**3169.92 (16.30)**	**3681.89 (20.64)**	**5090.80 (26.13)**	**4044.59 (21.42)**
	Total cost	**19443.34 (100.0)**	**17831.51 (100.0)**	**19477.61 (100.0)**	**18876.59 (100.0)**
	Gross returns	21625.53	23128.27	25112.48	23477.11
	Milk yield (lit.)	659	750	825	743.74
	Value of dung produced	785.5	825.6	910.6	840.6

	Per litre cost of production of milk	29.50	23.77	23.60	25.38
	Net profit	2182.18	5296.75	5634.86	5262.37
	Benefit cost ratio	1.11	1.29	1.28	1.24

(Figures in parentheses are percentages to respective totals)

5.12Crossbred cows

The cost of milk production of crossbred cows under different categories of sample farms is given in Table 5.12. The total cost of milk production per cow was (Rs.27652) and total fixed cost and total variable cost accounted for (23.82) per cent and (76.17) per cent of the total cost and the category of sample farms was concerned. It

Table 5.12: Per farm cost of milk production in intercalving period of Crossbred cow

(Rs/farm)

Sr. No.	Particulars	Marginal	Small	Medium	Overall
A.	**Variable Cost**				
	Feed and fodder	5808.7 (21.69)	4801.7 (20.68)	12155.56 (31.54)	3955.32 (14.30)
	Wages of human labour	15839.8 (59.15)	15621.32 (67.30)	16167.52 (41.95)	15875.8 (57.41)
	Veterinary expenses	181.3 (0.67)	265.5 (1.14)	442.4 (1.14)	296.4 (1.07)
	Miscellaneous expenses	179.4 (0.66)	319.4 (1.37)	503 (1.30)	333.9 (1.20)
	variable cost	22009.2 (82.19)	21007.92 (90.50)	28870.48 (74.92)	20461.42 (73.99)

	Interest on working capital@13%	597.33 (2.23)	584.79 (2.51)	627.65 (1.62)	603.25 (2.18)
	Total variable cost	**22606.53 (84.42)**	**21556.71 (92.87)**	**29498.13 (76.55)**	**21064.67 (76.17)**
B.	**Fixed cost**				
	Interest on fixed capital@10%	1839.31 (6.86)	2421.28 (10.43)	3652.47 (9.47)	2621.01 (9.47)
	Depreciation on fixed assets	2332.04 (8.70)	3233.3 (13.92)	5380.57 (13.96)	3967.01 (14.34)
	Total fixed cost	**4171.35 (15.57)**	**5654.58 (24.36)**	**9033.04 (23.44)**	**6588.02 (23.82)**
	Total cost	**26777.88 (100.0)**	**23211.29 (100.0)**	**38531.17 (100.0)**	**27652.69 (100.0)**
	Gross returns	20020.65	24998.34	48392.43	32379.64
	Milk yield (lit.)	861.3	1081.08	2134.16	1307.03
	Value of dung produced	1072.05	1214.58	1440.91	1242.51
	Per liter cost of production of milk	31.09	21.47	18.05	21.15
	Net profit	-6757.23	1787.05	9861.26	4726.95
	Benefit cost ratio	0.74	1.07	1.25	1.17

(Figures in parentheses are percentages to the respective totals)

Was highest for medium farms (Rs.38531) followed by small farms (Rs.23211) and marginal farm (Rs.26777). Major constituent of variable cost was labour cost accounting for (57.41) per cent of the total cost followed by those on feed (14.30%), veterinary expenses (1.07%) and miscellaneous expenses (1.20%). Similar was the trend about all categories of sample farms. A category wise examination revealed that labour cost increased with increase in farm size. In

contrast, the feed cost increases with increase in farm size, while no specific trend was observed with regard to the relationship of veterinary expenses and miscellaneous expenses with the farm size. On an average, the cost of milk production per litre was estimated to (Rs.2115). Due to high cost of fodders with increase in farm size, the per litre cost of production of milkh has inverse relationship with farm size. This might be due to better economic position of small and medium farmers. On an average, the gross return from crossbred cows was (Rs.32379). It was maximum in case of medium farms (Rs.48392) followed by small farms (Rs.24998) and marginal farm (Rs.20020). The overall net profit from crossbred cow was (Rs.4726).

5.13 Crossbred cows

The cost of milk production/animal for crossbred cows in respect of on different categories of sample farms is given in Table 5.13. The total cost of milk production per cow was Rs. 37880.39 and total fixed cost and total variable cost constituted for 23.82 per cent and 76.17 per cent the of total cost and the category of sample farms was concerned. It was highest for medium farms (Rs. 49588.66) followed by small farms (Rs.37408.90) and marginal farm (Rs. 36843.31). Major constituent of variable cost was labour cost accounting for 57.41 per cent of the total cost, followed by those on feed (14.30%), veterinary expenses (1.07%) regarding and miscellaneous expenses (1.99%). Similar was the trend on all categories of sample farms. On an average, the cost of milk production per litre was estimated to be Rs. 21.15 Due to high cost of fodders with increase in farm size, the per litre cost of production of milk.

Table 5.13: Per animal cost of milk production in intercalving period of Crossbred cow

(Rs/Animal)

Sr. No.	Particulars	Marginal	Small	Medium	Overall
A.	**Variable Cost**				
	Feed and fodder	10756.85 (21.69)	7621.74 (20.68)	11801.51 (31.54)	5418.24 (14.30)
	Wages of human labour	29332.96 (59.15)	24795.74 (67.30)	15696.02 (41.95)	21747.67 (57.41)
	Veterinary expenses	335.74 (0.67)	421.42 (1.14)	305.10 (1.14)	406.02 (1.07)
	Miscellaneous expenses	332.22 (0.66)	506.98 (1.37)	488.34 (1.30)	457.39 (1.20)
	variable cost	40757.77 (82.19)	33345.90 (90.50)	28029.59 (74.92)	28029.34 (73.99)
	Interest on working capital@13%	1106.16 (2.23)	928.23 (2.51)	609.36 (1.62)	826.36 (2.18)
	Total variable cost	**41863.94 (84.42)**	**34217 (92.87)**	**28638.96 (76.55)**	**28855.71 (76.17)**
B.	**Fixed cost**				
	Interest on fixed capital@10%	3406.12 (6.86)	3843.30 (10.43)	3546.08 (9.47)	2063.78 (9.47)
	Depreciation on fixed assets	4318.59 (8.70)	5132.22 (13.92)	5223.85 (13.96)	5434.26 (14.34)
	Total fixed cost	**7724.72 (15.57)**	**8975.52 (24.36)**	**8769.94 (23.44)**	**9024.68 (23.82)**
	Total cost	**49588.66 (100.0)**	**36843.31 (100.0)**	**37408.90 (100.0)**	**37880.39 (100.0)**
	Gross returns	37075.52	39679.90	46982.94	44355.67
	Milk yield (lit.)	1595	1716	2072	1790.45

	Value of dung produced	1072.05	1214.58	1440.91	1242.51
	Per liter cost of production of milk	31.09	21.47	18.05	21.15
	Net profit	-12512.96	2836.58	9574.03	6475.27
	Benefit cost ratio	0.74	1.07	1.25	1.17

(Figures in parentheses are percentages to respective totals)

Has inverse relationship with farm size. This might be due to better economic position of small and medium farmers. On an average, the gross returns from crossbred cows was (Rs.44355.67). It was maximum in respect of medium farms (Rs.46982.94), followed by small farms (Rs.39679.90) and marginal farms (Rs.37075.52). The overall net profit from crossbred cows was (Rs.6475.27).

5.14Buffaloes:

The cost of milk production in intercalving period of buffaloes under for different categories of sample farms is given in Table 5.14. The total cost per farm a day was (Rs.31049) and total fixed cost and total variable cost were (21.45) per cent and (78.54) per cent respectively. Total cost was highest in respect of medium farms (Rs.41127), small farms (Rs. 28598) and marginal farms (Rs.24432). Major constituent of the variable cost was labour cost accounting for (46.90) per cent of the total cost followed by feed cost (28.12%), veterinary expenses (1.01%), miscellaneous expenses (1.20%). Similar trend was observed in all categories of farms. A categorywise examination showed that the labour cost increased with increas in farm size, while there was no specific trend with decrease in farm size, while there was specific trend with regard to the relationship of feed cost, veterinary expenses, miscellaneous expenses with farm size as in case of crossbred cows. The average cost of production per

litre of milk was Rs.22.74. Cost of production was found higher in respect of small farms followed by medium farm. On an average, gross returns from buffaloes were Rs.45704, maximum in case of medium farms then small farms and marginal farms. The overall net profit from buffaloes was Rs.14655.

Table 5.14; Per farm cost of milk production in intercalving period of Buffaloes

(Rs/farm)

Sr. No.	Particulars	Marginal	Small	Medium	Overall
A.	**Variable Cost**				
	Feed and fodder	4556.11 (18.64)	6329.61 (22.13)	15310.51 (37.22)	8732.07 (28.12)
	Wages of human labour	14201.2 (58.12)	14747.4 (51.56)	14747.4 (35.85)	14564.9 (46.90)
	Veterinary expenses	293.1 (1.19)	301.3 (1.05)	351.5 (0.85)	315.3 (1.01)
	Miscellaneous expenses	278.4 (1.13)	355.8 (1.24)	492.4 (1.19)	375.5 (1.20)
	variable cost	19328.81 (79.11)	21734.11 (75.99)	30901.81 (75.13)	23987.77 (77.25)
	Interest on working capital	379.20 (1.55)	390.18 (1.36)	426.96 (1.03)	398.78 (1.28)
	Total variable cost	**19708.01 (80.66)**	**22124.29 (77.36)**	**31328.77 (76.17)**	**24386.55 (78.54)**
B.	**Fixed cost**				
	Interest on fixed capital	1649.04 (6.74)	2285.82 (7.99)	3331.65 (8.10)	2404.59 (7.74)
	Depreciation on fixed assets	3075.18 (12.58)	4188.44 (14.64)	6466.66 (15.72)	4258.38 (13.71)
	Total fixed cost	**4724.22 (19.33)**	**6474.26 (22.63)**	**9798.31 (23.82)**	**6662.97 (21.45)**
	Total cost	**24432.23 (100.0)**	**28598.55 (100.0)**	**41127.08 (100.0)**	**31049.52 (100.0)**

	Gross returns	32275.3	43296.8	64243.8	45704.66
	Milk yield (lit.)	919.1	1285.2	2016.9	1365.29
	Value of dung produced	820.5	860.8	1020.6	900.6
	Per litre cost of production of milk	26.58	22.25	20.39	22.74
	Net profit	7843.07	14698.25	23116.72	14655.14
	Benefit cost ratio	1.32	1.51	1.56	1.47

(Figures in parentheses are percentages to respective totals)

The per litre cost of milk production for local cows, crossbred cows and buffaloes were Rs.25, Rs.21 and Rs.22 respectively. It was lower in crossbred cows followed by buffaloes and local cows. Rajendran and Prabharan (1993), Kalra *et al*. (1995) and Bada and Dhoka (1998) observed similar findings.

Table 5.15; Per animal cost of milk production in intercalving period of Buffalo (Rs/Animal)

Sr. No.	Particulars	Marginal	Small	Medium	Overall
A.	**Variable Cost**				
	Feed and fodder	4511 (18.64)	5319 (22.13)	9223.19 (37.22)	6821.92 (28.12)
	Wages of human labour	14060.59 (58.12)	12392.77 (51.56)	8883.97 (35.85)	11378.82 (46.90)
	Veterinary expenses	290.19 (1.19)	253.19 (1.05)	211.74 (0.85)	246.32 (1.01)
	Miscellaneous expenses	275.64 (1.13)	298.99 (1.24)	296.62 (1.19)	293.35 (1.20)
	variable cost	19137.42	18263.95	18615.50	1888.00

		(79.11)	(75.99)	(75.13)	(77.25)
	Interest on working capital	375.44 (1.55)	327.88 (1.36)	257.20 (1.03)	311.54 (1.28)
	Total variable cost	**19512.88 (80.66)**	**18591.84 (77.36)**	**18872.75 (76.17)**	**19051.99 (78.54)**
B.	**Fixed cost**				
	Interest on fixed capital	1632.71 (6.74)	1920.85 (7.99)	2007.01 (8.10)	1878.58 (7.74)
	Depreciation on fixed assets	3044.73 (12.58)	3519.69 (14.64)	3895.57 (15.72)	3326.85 (13.71)
	Total fixed cost	**4677.44 (19.33)**	**5440.55 (22.63)**	**5902.59 (23.82)**	**5205.44 (21.45)**
	Total cost	**24190.32 (100.0)**	**24032.39 (100.0)**	**24775.34 (100.0)**	**24257.43 (100.0)**
	Gross returns	31955.74	36383.86	38701.08	35706.76
	Milk yield (lit.)	910	1080	1215	1066.63
	Value of dung produced	820.5	860.8	1020.6	900.6
	Per litre cost of production of milk	26.58	22.25	20.39	22.74
	Net profit	7765.41	12351.47	13925.73	11449.32
	Benefit cost ratio	1.32	1.51	1.56	1.47

(Figures in parentheses are percentages to respective totals)

Buffaloes

The cost of milk production/animal for buffaloes in intercalving period for different categories of sample farms is given in Table 5.15. The total cost per farm a day was Rs.24257.43 and total fixed cost and total variable cost were 21.45 per cent and 78.54 per cent respectively. Total cost was highest for medium farm Rs.24775.34, followed by marginal farm Rs. 24190.32 and small farm Rs.24032.39. Major Constituent of the variable cost was labour cost constitued 46.90 per cent of the total cost, followed by feed cost (28.12%), veterinary expenses (1.01%), and miscellaneous expenses (1.20%). The average cost of production per litre of milk was Rs.22.74. Cost of production was found higher in case of small farms followed by medium farms. On an average, gross returns from buffaloes were Rs.35706.76, maximum in case of medium farms then small farms and marginal farms. The overall net profit from buffaloes was Rs.11449.32.

The per litre cost of milk production for local cows, crossbred cows and buffaloes were (Rs.25.38), (Rs.21.15) and (Rs.22.74) respectively. Hence, it was lower in crossbred cows, followed by buffaloes and local cows. Rajendran and Prabharan (1993), Kalra*et al*. (1995) and Bada and Dhoka (1998) observed similar findings

Table No. 16. Profitability in milk production of milch animal at overall level

The information on profitability milk production of milch animals is represented in the Table. No.16. Table 5.16 reveals that the profitability in case of different size groups of milch animal such as local cows, cross breed cows and buffalo. The profitability at variable cost was increased with increase in size of holding It was Rs. 21064 in case of Rs 24386.55 while Rs. 27652. And local cow Rs.23973 .respectively. The return over variable cost was highest in buffalos Rs.21318. Followed by cross breed Rs.11394. And local

cows Rs.10979. Respectively. The return over total cost was highest in buffalos Rs.14655 followed by local cows Rs.5842 and cross breed (Rs.4726) respectively.

Table No. 16: Profitability in milk production of milch animal at overall level

Sr.no.	Different cost	Local cow	Crossbreed cow	Buffalo
1.	Fixed cost	5136.64	6588.02	6662.97
2.	Variable cost	18836.64	21064.67	24386.55
3.	Total cost	23973.28	27652.69	31049.52
4.	Gross return	29815.93	32379.64	45704.66
	Net return over			
1.	Fixed cost	24678.64	25791.62	39041.69
2.	Variable cost	10979.29	11314.97	21318.11
3.	Total cost	5842.65	4726.95	14655.14
	B.C. ratio at			
1.	Fixed cost	1.20	1.25	1.17
2.	Variable cost	1.58	1.53	1.87
3.	Total cost	1.24	1.17	1.47

The Benefit: Cost ratio at variable cost was observed highest in of respect buffaloes (1.87) followed by local cows (1.58) and crossbred maximum (1.53), respectively. The Benefit: Cost ratio at total cost was in case of cross cows (1.17) followed by buffaloes (1.47) and local cows (1.24) and net returns profitability at fixed cost was found increased with increase in size of holding in respect of all animal categories of milch animals.

5.17 Resource use efficiency in milk production

With a view to know the contribution of resources and their use efficiency, Cobb-Douglas production function in simple linear form was used, the selected explanatory variables were herd size, green fodder, paddy straw, concentrates, lactation days, number of

lactation, veterinary expenses and human labour and their standard errors are presented in Table 5.17 The group wise estimates of Cobb-Douglas production function are given in

5.17.1. Local cows

It can be seen from the Table 5.17 that the variables say herd size(X_1) and human labour (X_8) were positive and statistically significant either for milk production. The regression coefficients No of variation in milk production explained by all the independent variables included in the function was 88.6 per cent. The sum of production elasticities was estimated more than one (2.4397) which indicated increasing returns to scale in milk production of local cows.

Table 5.17: Stepwise method use regression coefficients of simple linear function

Variable	Parameters	Local cow	Crossbreed cow	Buffalo
Intercept	----	1.4915	7.111	2.39
Herd size (No. of animal)	X_1	0.0001*	-	-
Green fodder (Kg)	X_2	-	-	-
Paddy straw (Kg)	X_3	-	0.0001*	0.0001*
Concentrates (Kg)	X_4	-	-	0.043*
Lactation days (Days)	X_5	-	-	-
No. of lactation	X_6	-	-	-
Veterinary expenses (Rs)	X_7	-	-	0.086**
Human labour (Days)	X_8	0.0615**	-	-
R^2	------	0.8866	0.4507	0.3935
Returns to scale	-----	2.4397	7.5618	2.9126

(*Significant at 5 % Level, **Significant at 10 % Level)

5.17.2. Crossbred cows

It is observed from the table 5.17 that the regression coefficients
for of paddy straw (X_3) were statistically significant for milk production. The variation caused in milk production by all the independent variables included in the function was 45 per cent. The sum of production elasticities indicating increasing returns (7.5618) to scale in milk production of crossbred cows.

5.17.3. Buffaloes

It is noticed from the table 5.17 that the regression coefficients for number of paddy straw (X_3), concentrates (X_4) and No. of veterinary expenses (X_7) were statistically significant. The variation caused in milk production by all the independent variables included in the function was 39.35 per cent. The sum of production elasticity indicated increasing returns (2.9126) to scale in milk production of buffaloes.

Table 5.18: Simple Resource use efficiency in milk production of different milch animals.

Resources	MPP	MVP	Factor price (Px)	MVP/Px ratio	Level of resource use
Local Cow					
Herd size (X_1)	2.8950	96.49	5008	0.0192	Excess use
Human labour (X_8)	0.09582	3.1938	54.62	0.05847	Excess use
Crossbred cow					
Paddy straw (X_3)	0.5983	13.16	2.0	6.58	Under use
Buffalo					
Vet .expenses (X_7)	3.038	0.0010	293.3	3.729	Under use

Paddy straw (X_3)	0.2519	9.068	2.0	4.5343	Under use
Concentrates (X_4)	(-1.6487)	(-59.35)	7.5	(-7.9138)	Excess use

5.18 Marginal value productivity and simple resource use efficiency in milk production

It is observed from the Table 5.18 that in case of local cows MVP of herd size (X_1), human labour (X_8) was less than their factor price indicating excess use of these resources. Whereas, crossbred cows, MVP of paddy straw (X_2) was observed more than the factor price showing under use of resources. In case of buffalo also the MVP of Veterinary expenses (X_7), paddy straw (X_3) was less than their factor price, indicating under use of resources. Whereas, MVP of concentrates (X_4) less than their factor price indicating excess use of resources in buffaloes. Therefore, the excess use of these resources needs to be curtailed for increasing the milk production.

5.18.1. Local cows

It is evident from the Table 5.19 that the variables viz., herd size(X_1), that number were positive and statistically significant on milk production. The regression coefficients No of variation in milk production explained by all the independent variables included in the function was 93.6 per cent. The sum of production elasticities was more than one which indicated increasing returns to scale (1.6486) in milk production of local cows.

Table No.5.19: Stepwise method use Regression coefficients of log linear function

Variable	Parameters	Local cow	Crossbreed cow	Buffalo
Intercept	-------	0.7179	0.7471	1.3093
Herd size (No. of animal)	X_1	0.0001*	0.0935**	0.0001*

Green fodder (Kg)	X_2	-	-	-
Paddy straw (Kg)	X_3	-	0.0001*	0.0572**
Concentrates (Kg)	X_4	-	-	0.1204**
Lactation days (Days)	X_5	-	-	-
No. of lactation	X_6	-	-	-
Veterinary expenses (Rs)	X_7	-	-	0.0083**
Human labour (Days)	X_8	-	-	-
R^2	-------	0.9306	0.6305	0.2110
Returns to scale	-------	1.6486	1.4712	1.7063

(*Significant at 5 % Level, **Significant at 10 % Level)

5.18.2. Crossbred cows

It is noticed from the table 5.19 that the regression coefficients for number of herd size (x_1), paddy straw (X_3) were statistically significant for milk production. The variation caused in milk production by all the independent variables included in the function was 63 per cent. The sum of production elasticities indicating increasing returns to scale (1.4712) in milk production of crossbred cows.

5.18.3. Buffaloes

It is seen from the table 5.19 that the regression coefficients for number of herd size (x_1), paddy straw (X_3), concentrates (X_4) and Number of veterinary (X_7) were statistically significant. The variation in milk production explained by all the independent variables included in the function was 21.10 per cent. The sum of production elasticities indicated increasing return to scale (1.7063) in milk production of buffaloes.

Table 5.20: Log resource use efficiency in milk production of different milch animals

Resources	MPP	MVP	Factor price	MVP/ Px	Level of resource

			(Px)	ratio	use
Local Cow					
Herd size (X_1)	1.7262	57.53	5008	0.01148	Excess use
Crossbred cow					
Herd size (X_1)	2.459	54.10	6819	0.0079	Excess use
Paddy straw (X_3)	0.5138	11.30	2	5.6519	Under use
Buffalo					
Herd size (X_1)	1.2519	45.0714	10801	0.004172	Excess use
Paddy straw (X_3)	0.08788	3.163	2.0	1.581	Under use
Concentrates (X_4)	(-0.5685)	(-20.46)	7.5	(-2.7288)	Excess use
Vet .expenses (X_7)	0.0030	0.1083	315.3	0.00034	Excess use

5.20 Marginal value productivity and simple resource use efficiency in milk production

It is observed from the Table 5.20 that in case of local cows, MVP of herd size (X_1) was less than their factor price indicating excess use of these resources. Whereas, in case of crossbred cows, MVP herd size (X_1), paddy straw (X_3) less than the factor price indicating excess and under use of resources. In case of buffalo also the MVP of herd size (X_1), paddy straw (X_3) concentrates (X_4) Veterinary expenses (X_7) was less than their factor price indicating excess use of resources. Therefore, the excess use of these resources needs to be curtailed for increasing the milk production.

5.21. Per farm disposal of milk

5.21.1. Local cows

It is seen from the Table 5.21 that the total milk production in intercalving period of local cows was highest in case of medium farms (1196.25 litre) followed by small farms (997.5 litre) and

marginal (678.8 litre), size of farm respectively. In case of cow the milk directly sold to the consumer was highest regarding medium farms (137.5 litres) followed by small farms (125 litre) and marginal farms (120 litre) respectively. Highest to milk was sold by medium farms and lowest by marginal farms to milk hotel owner and co-operative society respectively.

5.21.2: Crossbred cows

The crossbred highest in medium (2134.16 litre) small (1081.08 litre) and marginal (861.3 litre), size of farm respectively. as regard to crossbreed cows the milk was directly sold to milk co-operative societies in highest quantity in case of medium farms (2134.16 litre) followed by small farms (1081.08 litre) and marginal farms (861.3 litre), respectively.

Table 5.21: Per farm disposal of milk in (Litres)

Sr. No.	Particulars	Local cow			Crossbreed			Local buffalo		
		Marginal	Small	Medium	Marginal	Small	Medium	Marginal	Small	Medium
1	Quantity Retained for consumption	-	-	-	-	-	-	130 (14.14)	135 (10.50)	135 (6.69)
2	Consumer	120 (17.67)	125 (12.53)	137.5 11.49)	-	-	-	260 (28.28)	337.5 (26.26)	337.5 (16.73)
3	Hotel owner	240 (35.35)	250 (25.03)	275 (22.98)	-	-	-	130 (14.14)	135 10.50)	135 (6.69)
4	Milk co-op .Society	318.8 (46.96)	622.5 (62.40)	783.75 (65.51)	861.3 (100)	1081.08 (100)	2134.16 (100)	399.1 (43.42)	667 (51.89)	1409.4 (69.87)
5	Total Quantity of milk produced	678.8	997.5	1196.25	861.3	1081.08	2134.16	919.1	1285.2	2016.9
6.	Marketed surplus	678.8	997.5	1196.25	861.3	1081.08	2134.16	789.1	1150.2	1881.9

5.21.3. Buffaloes

In case of buffalo which was highest under medium farms (2016.9 litre) small farms (1285.2 litre) and marginal (919.1 litre) respectively. The milk consumption was observed highest regarding medium and small farms (135 liter) followed by marginal farms (130 litre) the milk was highest sold by medium farms and lowest by marginal farms to hotel owner and co-operative society respectively.

5.22: Constraints faced by the dairy farmer in milk production and disposal

Livestock keeping in old days aimed at to obtain draught power for farming, Milk production was not given due importance by them. In recent years the changing structure of economy and increased demand for milk given momentum for dairy farming. However, there appeared to be many constraints in milk production and its disposal. The same has studied and presented in Table 5.22.

Table 5.22: Constraints in production and disposal of milk

Sr. No.	Particulars	(N =120)	Percentage
1.	High cost of crossbreed cow	113	94.16
2.	Non availability land for fodder cultivation	110	91.66
3.	Non-availability of green fodder	107	89.16
4.	Lack of organized markets	106	88.33
5.	Improper housing facility	105	87.50
6.	Inadequate knowledge about balanced feeding and management practices	103	85.83
7.	Lack of irrigation in summer season	102	85.00

8.	Lack of cold storage facilities	100	83.33
9.	High cost of concentrates	100	83.33
10.	Delay in receipt from cooperative society	89	74.14
11.	Low productivity of animal	99	82.50

Problems of the sample dairy farmer which examined cows indicated that the 94.13 per cent of the farmer high cost of crossbred cows and 91.66 per cent of them pointed out non availability of land for fodder cultivation. Other problems reported were non-availability of green fodder (89.16%), lack of organized markets (88.33%), improper housing facility (87.50%) and inadequate knowledge about balanced feeding (85.83%).

Almost all sample household (100%) disposed of their milk through milk co-operatives.

CHAPTER-VI

SUMMARY AND CONCLUSIONS

The main purpose of this chapter is to summarize the results of present research work and to draw meaningful conclusions on the basis of the results.

The study on "Economics of production and disposal of milk in Sindhudurg district of Maharashtra state" was undertaken with the following objectives to know the scientific information on cost of production of milk for different milch animals and disposal at farm level.

1. To work out the cost of production and profitability of milk.
2. To estimate resource use efficiency in milk production.
3. To study disposal pattern of milk production.
4. To document the constraints in production and disposal of milk.

For this study, a sample of 120 dairy farmers from Vaibhavadi, Kankavali and Kudal tahsils of Sindhudurg district were selected randomly. The selected dairy farmers were interviewed in the month of March, 2016 and the information on all aspects of production and disposal of milk was recorded for the year 2015-16.

The detail analysis for the selected dairy farmers was carried out by distributing samples into three groups as marginal (less than 1.00 ha), small (1.01 – 2 ha) and medium (2.01 – and above ha) and accordingly group wise distribution of samples was as such that 51 farmers were laid under marginal group, 36 in small group and 33 in medium group, respectively.

The results of the present investigation are summarized as under.

The selected dairy farmers had an average age of 44.00 years, educational score 4.35 and having average family size of 8.8 members; of which, 3.95 were female members. The average size of land holding ranged from 0.28 ha in marginal group to 1.38 ha in small group with an overall average of 0.41 ha. The proportion of cultivated land was 25.46 per cent at the overall level.

The cropping pattern of selected dairy farmers was dominated by Kharif crops (57.57 per cent) of the gross cropped area followed by *Rabi* crops (19.69 per cent) and the perennial crops (22.72 per cent).

On an average, sample dairy farmer had 6.4 bovine animals, of which, 1.53 were local cows, 0.88 were crossbred cows and 1.58 were buffaloes. This proportion was directly related to size group of farms.

The per farm capital investment on livestock activity was to the tune of Rs. 32913 at the overall level. This investment ranged from Rs. 23,150 in marginal group to Rs. 45,039 of medium group.

At the overall level, the average age of milch animals was 5.00, 4.66 and 5.33 years with average number of completed lactations was 2.66, 2.66 and 3.33. The intercalving period for local cows, crossbred cows and buffaloes was 526.66, 410.66 and 459.66 days with lactation period of 255, 290.66 and 266.66 days, respectively. The average milk yield was 745.57, 1307.03 and 459.66 litres in local cows, crossbred cows and buffaloes, respectively. Among different groups, there were no much differences regarding age, calving order, lactation days and intercalving period of milch animals.

On an average, the local cows in milk was fed with 3.5 kg of paddy straw, with 0.50 kg of concentrates in rainy season. While during other two seasons namely winter and summer, only paddy straw of 7.5 kg and 0.50 kg of concentrates fed in both seasons. Local cow in dry period fed with 3.50 kg, 7 kg, and 2.50 kg paddy straw in rainy, winter, and summer seasons respectively. No concentrates were given to local cow in dry period.

Daily quantities of paddy straw and green fodder fed to crossbred cows in milk were 7.5 kg and 3.5 kg in rainy and 10 kg and 7.50kg of paddy straw was fed in winter and summer seasons, respectively. The concentrates given in rainy, winter and summer seasons were 1 kg, 1.50 kg and 1 kg, respectively. The crossbred cow in dry period fed with 5.50 kg paddy straw and in rainy season with 2.50kg green fodder while 7.50 kg and 7.50 kg paddy straw was given in winter and summer seasons, respectively. Concentrates were not given to crossbred cows in dry period. Daily quantities of paddy straw in fed to buffaloes in milk were 4.50 kg paddy straw rainy season, and 7.50 kg and 3.50 kg in winter and summer seasons respectively. The concentrates given in rainy and winter seasons were 1.0 kg, 0.50 kg, respectively. Buffaloes in dry periods were fed with 4.50 kg, 7.50 kg and 4.50 kg paddy straw in rainy, winter and summer seasons respectively. No concentrates were given to buffaloes in dry period.

The per day feeding cost of local cows, crossbred cows and buffaloes in milk during rainy, winter and summer seasons was Rs. 10.75, Rs. 18.75 Rs. 10.75 and Rs. 36.5, Rs. 45.75, Rs. 36.5 and Rs. 16.5, Rs. 22.5, Rs. 10.75, respectively.

The per day feeding cost of local cows, crossbred cows and buffaloes dry period during rainy, winter and summer seasons was

Rs. 7.00, Rs. 14, Rs. 5.00 Rs. 19.00, Rs. 23.00, Rs. 15.00 and Rs. 9.00, Rs. 15.00, and Rs. 9.00, respectively.

Per milch animal total labour utilization for maintenance was observed to 140 minutes per day at the overall level. Out of which, 105 minutes work done by male family labour and 35 minutes work done by female family labour per day respectively.

The cost of production of milk in intercalving period for local cows was worked out to Rs. 23973.28 at the overall level. Of wich a share of labour cost was 58.09 per cent. The total cost was Rs. 20026.65, Rs. 23715.92 and Rs. 28242.54 for marginal, small and medium farms respectively. The gross returns of Rs. 29973.28 and net profit of Rs.6683.22.were recorded per litre cost of production for local cows was Rs. 25.38 at the overall level.

The cost of production of milk in intercalving period for crossbred cows was estimate out to Rs. 27652.69 at the overall level. Of this total cost a share of labour cost was 57.41 per cent. The group wise total cost of production was worked out to Rs. 26777.88, Rs. 23211.29 and Rs. 38531.17 in marginal, small and medium group respectively. The total gross returns at overall level were worked out to Rs. 32379.64 The gross returns received by marginal, small and medium farmers were Rs. 20020.65, Rs. 24998.34 and Rs. 38531.17, respectively. Per litre cost of production of milk at the overall level was Rs. 21.15. Per crossbred cow net profit received was Rs. 4726.95. This profit was maximum in case of medium farmer (Rs.9861.26) followed by small farmer (Rs.1787.05) and marginal group (Rs.-6757.23).

The cost of milk production in intercalving period for buffaloes was computed to Rs. 31049.52 at the overall level. Of this total cost, a share of labour cost was 46.90 %. The total cost of

production worked out to Rs. 24432.23 in case of marginal farmer, Rs. 28598.55 for small farmers and Rs. 41127.08 in respect of medium farmers. The total gross returns at the overall level was worked out to Rs. 45704.66 and net profit of Rs. 14655.14 the per litre cost of production was Rs. 22.74.

The analysis of resource use efficiency indicated that the herd size (X_1) and paddy straw (X_3) had significant impact on milk production. The analysis also revealed that 0.88 per cent, 0.45 per cent and 0.39 per cent variation in milk production of local cows, crossbred cows and buffaloes was explained by identified variables.

In case of local cows, MVP of human labour (X_1) was less than its factor price, indicating excess use of these resources. Whereas, MVP of human labour was (X_1) less than the factor price, indicating excess use of resources. In case of crossbred cow the MVP of paddy straw (X_2) was more than its factor price, indicating under utilization of resources. Whereas MVP of concentrates (x_4) was less than the factor price showing excess use of resources and veterinary. Expenses (x_7) paddy straw (x_3) was more than the factor price indicating under use of resources both in buffalo. Therefore, the excess use of these resources needs to be curtailed for increasing the milk production.

Disposal of milk at overall level was made through in milk co-operative society followed by hotel owner and consumer respectively.

Important constraints as reported by sample farmers in production and disposal of milk were high cost of crossbred cows (94.16%), non-availability of land for fodder cultivation (91.66%) non-availability of green fodder (89.16%) and improper housing facility (87.50%), etc.

Conclusions

The following conclusions are drawn from present study.

1. The average herd size comprising of local cows, crossbred cows and buffaloes in case of marginal, small and medium farms correspondingly was of 1.03, 0.54, 1.01 and 1.33, 0.63, 1.19 and 1.45, 1.03, 1.66 animals, respectively.

2. The dairy farmers in the study area had been maintaining local cows, crossbred cows and buffaloes for milk production. However, the proportion of buffaloes was more in medium farms. There were no wide variations in the economic traits of dairy farmers.

3. On an average the local cows in milk was fed with 3.50 kg of paddy straw and 0.50 kg of concentrates in rainy season While during other two seasons namely winter and summer, only paddy straw of 7.50 kg and 0.50 kg of concentrates in the both seasons was given. Local cows in dry was period fed with 3.50 kg paddy straw in rainy season and 7 kg and 2.50 kg of paddy straw in winter and summer seasons was supplied respectively. No concentrates were given to local cows in dry period.Daily quantities of paddy straw and green fodder fed to crossbred cows in milk were 7.50 kg and 3.50 kg in rainy and 10 kg and 7.50 kg of only paddy straw in winter and summer seasons, respectively. The concentrates given in rainy, winter and summer seasons were 1.0 kg, 1.5 kg, 1.0 kg, respectively. The crossbred cow in dry period fed with 5.50 kg and 2.50 kg paddy straw and green fodder in rainy season and 7.5 kg and 7.5 kg paddy straw in winter and summer seasons, respectively. Concentrates were not given to crossbred cows in dry period.

4. Daily quantities of paddy straw fed to buffaloes in milk were 4.50 kg in rainy season and its 7.50 kg and 3.50 kg in winter and summer seasons respectively. The concentrates given in rainy, winter seasons were 1.0 kg, 0.50 kg, respectively. Buffaloes in dry period were fed with season and its 7.50 kg and 4.50 kg in winter and summer seasons, respectively. No concentrates were supplied to buffaloes in dry period.

5. Per cow cost of production during intercalving period for local cows was worked out Rs. 23973.28 at the overall level. Of this total cost the share of feed cost and labour cost was 70 per cent. This indicated that feeds and fodders were the prime factors in production of milk.

6. The cost of production of milk during intercalving period of crossbred cows was worked out to Rs. 27652.69 at the overall level. Of which the maximum share was of labour cost (57.41%) and feed cost (14.30%). This shows that feeds and fodders were the important factors in milk production.

7. The cost of production of milk in intercalving period in case of buffaloes was estimated to Rs. 31049.52 at the overall level. Of this total cost, a share of labour cost was (46.90%) and feed cost contributed to 28.12 per cent.

8. The study revealed that the yielding capacity of crossbred cows was 6.16 litres per day. The productivity of local cows and buffaloes was very low i. e. 2.91 and 4 litres. Per day Due to this reason, farmers were diverting towards maintaining only buffaloes for economic advantages.

9. Cent per cent crossbreed maintaining of the dairy farmers supply their milk to co-operative society located in the village.

10. The major constraints in production of milk were high cost of crossbred, non-availability of grazing land and non-availability of green fodder.
11. The major constraints in disposal of milk were lack of cold storage facilities, delay in receipts from co-operative society.

Policy implication

Based on the results of present study and general observations of the investigator during data collection, following suggestions made are most useful for planning, execution and improvement of dairy development of the study area.

1. Most of the cow owners were not aware of the improved feeding and management practices and technical know-how. The development departments and co-operative milk society in particular should provide sufficient infrastructure and training for educating farmers and motivating farmers for increasing milk production and encouraging farmers to adopt standard feeding schedules according to seasons and intercalving period.
2. Government policy or directives must be in favour of dairy farmers through remunerative prices.
3. Farmers be encouraged to adopt dairy enterprise as a commercial venture.

APPENDIX II

SCHEDULE FOR DATA COLLECTION

(Agriculture Year : 2015-2016)

1. General information about the dairy farmer

i. Name

a. Age : …… b. Education : …….

c. Village : …… d. Taluka : ……

ii. (a) Occupation

a. Main : …… b. Subsidiary : ……..

(b) Experience in dairy farming (years) : ……..

(c) Distance of milk collection centre : ……..

iii. Family members : Male Female Total

Upto 3 years

3-12 years

Above 12 years

iv. Category of household : L.L./S.F./M.F./L.F.

v. Land holding : MF

SF

LF

vi. Land utilization :

i. Cultivated land (acres) a. Irrigated :

b. Unirrigated :

Total :

ii. Fallow land a. Current fallow (acres) :

b. Permanent (acres) :

iii. Unsuitable for cultivation (acres)

2. Cropping pattern

Sr. No.	*Kharif*		*Rabi*		Summer		Perennial	
	Crop variety	Area (ha)	Crop variety	Area (ha)	Crop variety	Area (ha)	Crop variety	Area (ha)

3. Livestock

Sr. No.	Kind	Number	Present value
1.	Bullocks		
2.	He-buffaloes		
3.	Cows		
4.	Buffaloes		
5.	Heifers		
	i. Cow		
	ii. Buffalo		
6.	Sheep		
7.	Goat		
9.	Others		

4. Assets involved in dairy enterprise

Sr. No.	Item	Year of asset formation	Replacement value (Rs.)	Per cent value (Rs.)
1.	Cattle shed			
	i. Kaccha			
	ii. Pucca			
2.	Store			
3.	Machinery and equipments			
4.	Milk cans			
5.	Buckets			
6.	Iron chains			
7.	Iron baskets			
8.	Other land tools			
9.	Bicycle			
10.	Bullock cart			

5. Information of livestock

Name	Breed	Number	Home-breed	Purchased	Present age	Present value (Rs.)
I. Cattle						
1) Milking cows						
2) Pregnant cows						
3) Dry cows						

4) Heifer (1 to 3 years)						
5. Calves						
6. Bulls						
II. Buffalo						
1. Milking buffalo						
2. Pregnant buffalo						
3. Dry buffalo						
4. Heifer						
5. Calves						
6. He-buffalo						
7. Bull						
III. Goat						
IV. Sheep						
V. Others						
VI. Poultry birds						

6. Detailed information of milking animals

Breed and name of the animal or identification mark	Age at first calving (years or months)	Order of present calving	Information of last calving			Dry days	Information of present calving		
			Days in milk	Average milk yield/ day (lit.)	Total milk yield (lit.)		Date of calving	Stage of lactation upto date of visit (days)	Average daily milk yield (lit.)
1) Cow									
i. Local cow (N.D.)									
a) _____									
b) _____									
ii. Purebred (specify)									
a) _____									
b) _____									
iii. Cross-bred									
a) _____									

b) _____									
2) Buffalo									
i. Local (N.D.)									
a) _____									
b) _____									
ii. Purebred (specify)									
a) _____									
b) _____									

7. Feeding (season wise daily quantity of feeds and fodder fed to individual animal) in kilograms

Season and class	Feeding												
	During days in milk					During dry days					Grazing	Remarks	
	Green fodder or green grass	Dry fodder or Dry grass	Paddy straw	Concentrate		Green fodder or green grass	Dry fodder or Dry grass	Paddy straw	Concentrate		No. of days cows/ day	Type of feed/ fodder	Price Rs./qtl.
				Home made	Ready made				Home made	Ready made			
Rainy												1) Green fodder	
A. Cow												2) Green grass	
1. Local												3) Dry grass	
2. Purebreed												4) Dry fodder	
3. Crossbred												5) Concentrate	
b. Buffalo												6) Home made	
1. Local												7) Ready made	
2. Purebreed													
Winter													
A. Cow													
1. Local													

2. Purebreed													
3. Crossbred													
b. Buffalo													
1. Local													
2. Purebreed													
Summer													
A. Cow													
1. Local													
2. Purebreed													
3. Crossbred													
b. Buffalo													
1. Local													
2. Purebreed													

8. Labour required (daily labour required in minutes)]

Sr. No.	Particulars of work	Family labour (minutes)			Hired labour (minutes)			Charges of hired labour				Remarks
		M	F	C	M	F	C	M	F	C	Total	
1.	Feeding of animals (No. and time of feeding)											
2.	Cleaning of byre											
3.	Milking											
	a. Morning											
	b. Evening											
4.	Grazing of animals (Daily grazing hours and month of grazing)											
5.	Delivering of milk											
	a. Collection centers											

	b. Door delivery											
6.	Cleaning of animals and watering											
7.	Any other work (Veterinary aid and care at the time of calving)											

9. Other expenses for milch animals

Sr. No.	Particulars	Local cow (Rs.)	Purebred cow (Rs.)	Crossbred cow (Rs.)	Buffalo (Rs.)		Total (Rs.)
					Local	Purebred	
1)	Veterinary charges						
	a. Medicines						
	b. Veterinary charges						
2)	Service charges						
	a. Natural						
	b. Artificial insemination						
3)	Electricity charges						
4)	Ropes/chains						
5)	Others						

10. Production and disposal of milk

Category of animal	Milk production (lit.)	Milk fed to calf (lit.)	Total milk produced (lit.)	Milk retained for household consumption				Total milk sold (lit.)		Sale price		Losses
				Fluid milk (lit.)	Converted into products			Society	Outside	Society	Outside	
					Name of product	Lits. of milk used	Quantity of product (kg/lit.)					
A) Cow												
i) Local												
ii) Pure breed												
iii) Crossbred												
B) Buffalo												
i) Local												
ii) Pure breed												

11. Details of fodder produced and purchased

Sr. No.	Particulars	Rate/ Unit	Quantity produced		Quantity purchased	
			Quantity	Value	Quantity	Value
1.	Green fodder					
2.	Dry fodder					
3.	Paddy straw					

12. Total milk handled in a year by milk producer (litres) 2015-2016

Month	Dairy co-operative		Govt. milk scheme		Milk supplied to				
	Qty.	Value	Qty.	Value	Whole-saler	Retailer	Vendor	Consumer	Total

13. Sale of milk

Agency (Monthwise)	Quantity (lits.)	Rate (Rs./lit.)	Value

14. What are the difficulties in selling of milk

a. Absence of milk collection centre Yes/No

b. Lack of transport facility Yes/No

c. Prices for milk Average/High/Low

15. Why you are selling milk to co-operative dairy society?

a. Milk collection centre is located in a village Yes/No

b. Immediate disposal Yes/No

c. Value realization quickly Yes/No

d. Others Yes/No

16. Mode of transportation for delivery of milk

Delivery to agency	**Mode of delivery**				
	Head load	**Bullock cart**	**Bicycle**	**Motor cycle**	**Other specify**
1. Co-operative dairy					
2. Consumer					
3. Wholesaler					
4. Retailer					
5. Vendor					

17. Do you face difficulties in transportation of milk? Yes/No

If yes, what are the difficulties?

a. Temporary or seasonal roads Yes/No
b. Inadequate and slow transport facility Yes/No
c. Insufficient utensils Yes/No
d. Others ……. Yes/No

18. Constraints in production and disposal of milk

Sr. No.	Particulars
1	High cost of crossbreed cow
2	Non availability land for fodder cultivation
3	Non-availability of green fodder
4	Lack of organized markets
5	Improper housing facility
6	Inadequate knowledge about balanced feeding and management practices
7	Lack of irrigation in summer season
8	Lack of cold storage facilities
9	High cost of concentrates
10	Delay in receipt from cooperative society
11	Low productivity of animal

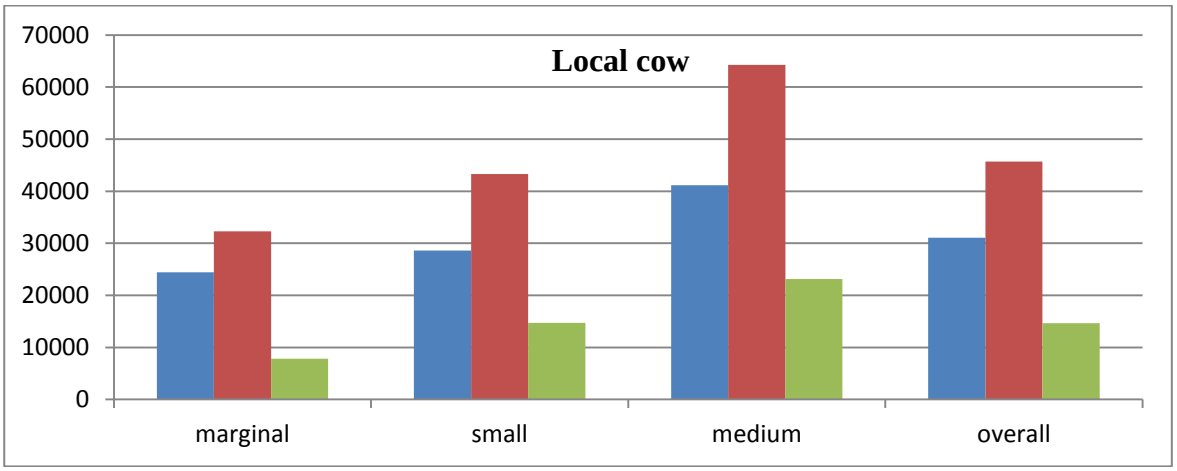
APPENDIX I

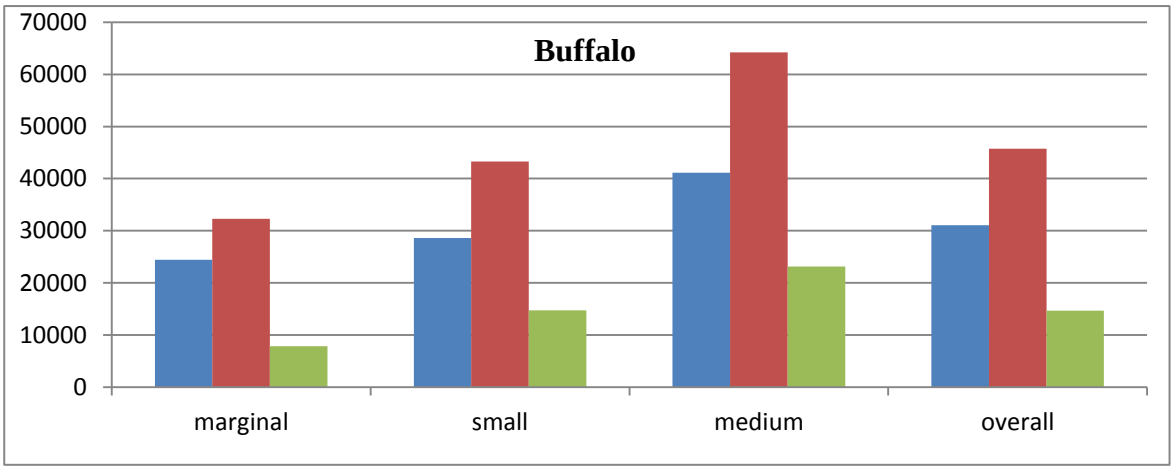
Table Value of milk (Rs/liter)

Sr. No.	Milk sold to	Local cow			Crossbreed			Local buffalo		
		Marginal	Small	Medium	Marginal	Small	Medium	Marginal	Small	Medium
1	Quantity Retained for consumption (liter)	-	-	-	-	-	-	130	135	135
	Rate/liter	-	-	-	-	-	-	40	40	40
	Total	0	0	0	0	0	0	5200	5400	5400
2	Consumer	120	125	137.5	-	-	-	260	337.5	337.5
	Rate/liter	38	38	38	-	-	-	40	40	40
	Total	4560	4750	5225	-	-	-	10400	13500	13500
3	Hotel owner	240	250	275	-	-	-	130	135	135
	Rate/liter	36	36	36	-	-	-	36	36	36
	Total	8640	9000	9900	-	-	-	4680	4860	4860
4	Milk co-op.Soci	318.8	622.5	783.75	861.3	1081.08	2134.16	399.1	667	1409.4

	ety									
	Rate/liter	26	26	26	22	22	22	28	28	28
	Total	8288.8	16185	20377.5	18948.6	23783.76	46951.52	11174.8	18676	39463.2
	Grand total	21488.8	29935	35502.5	18948.6	23783.76	46951.52	31454.8	42436	63223.2

Fig. 3. Per farm Total cost, Gross return and Net profit of different milch animals





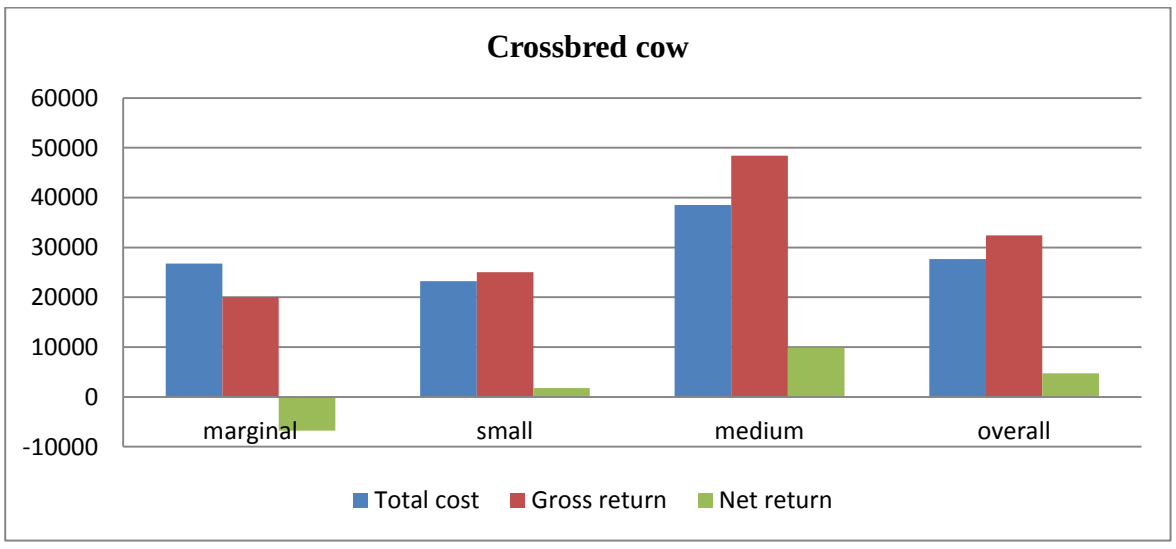
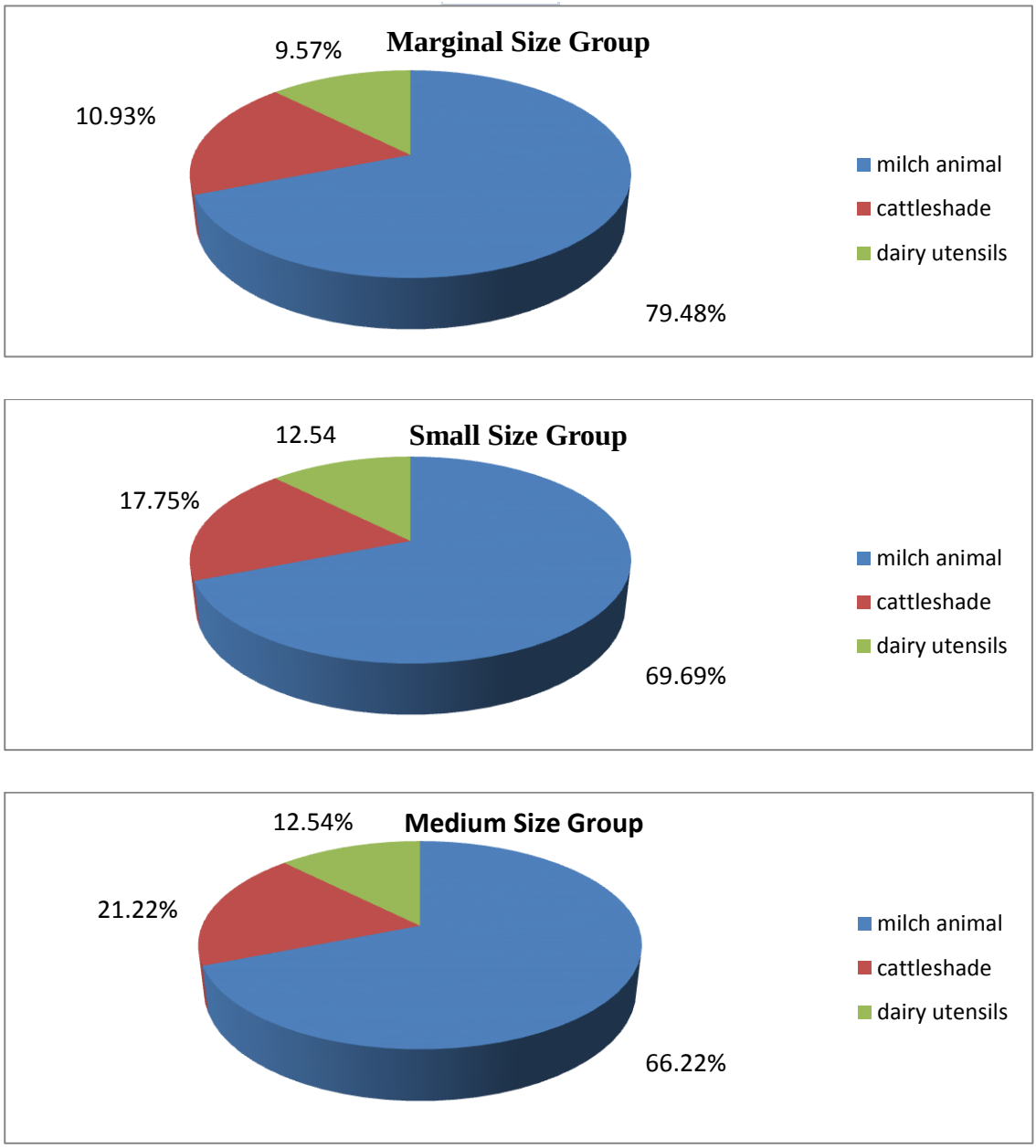
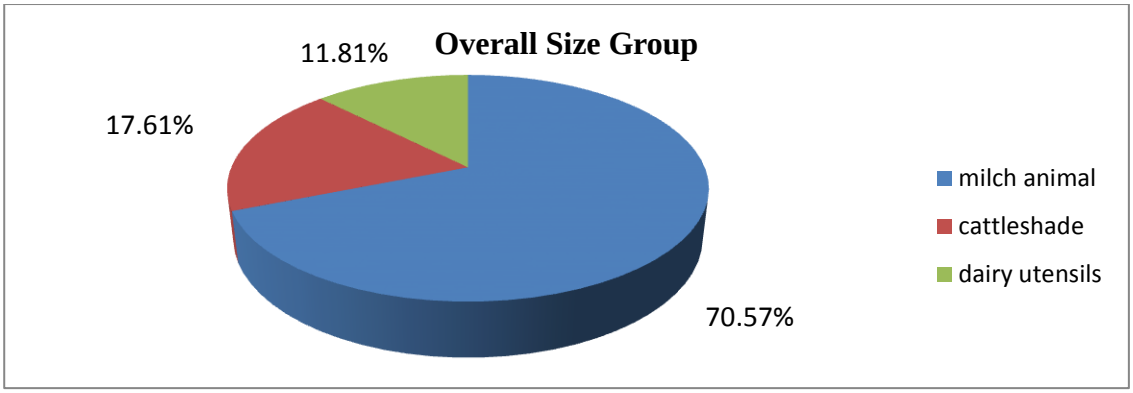


Fig 2. Investment in dairy enterprise





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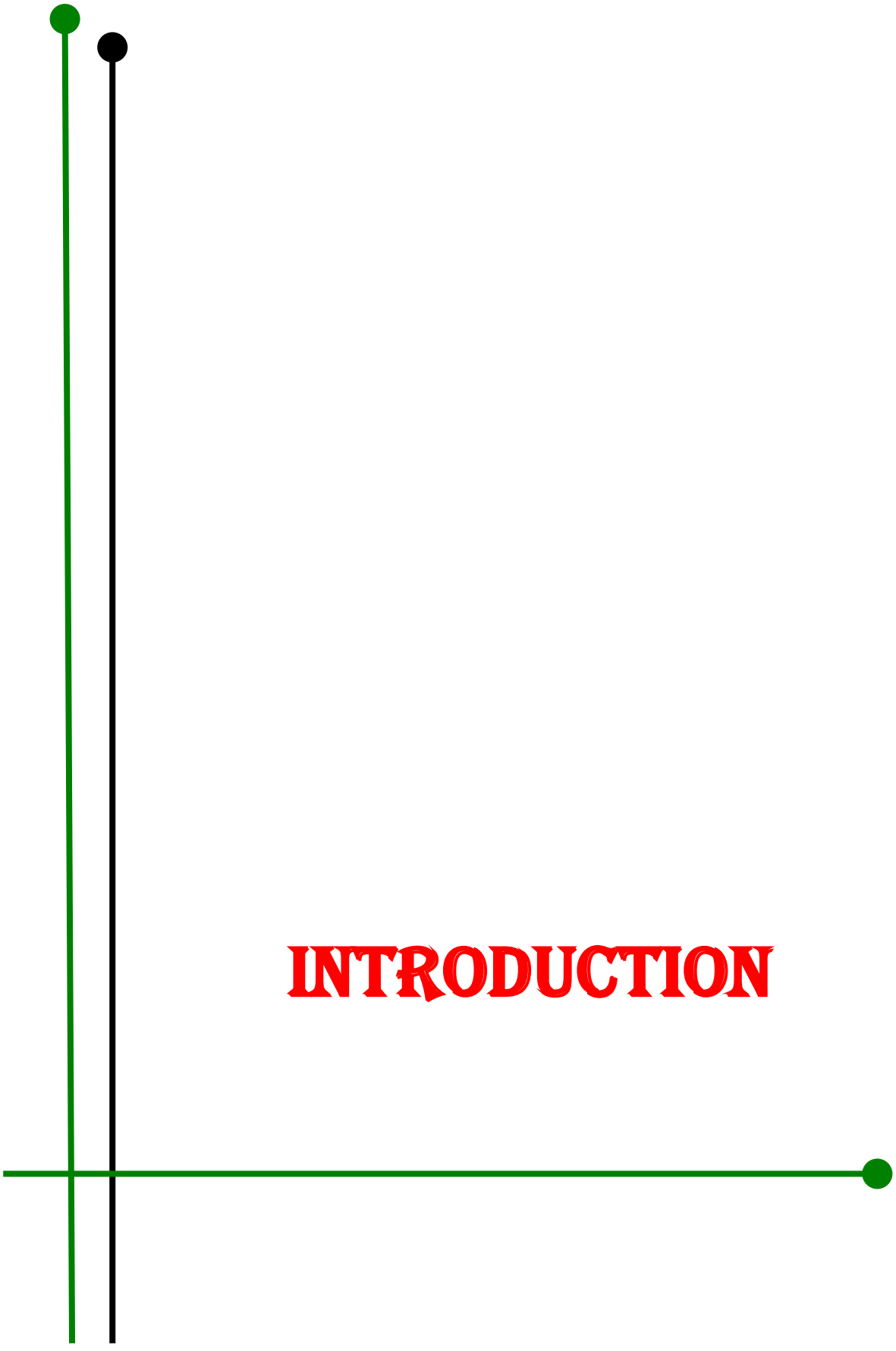
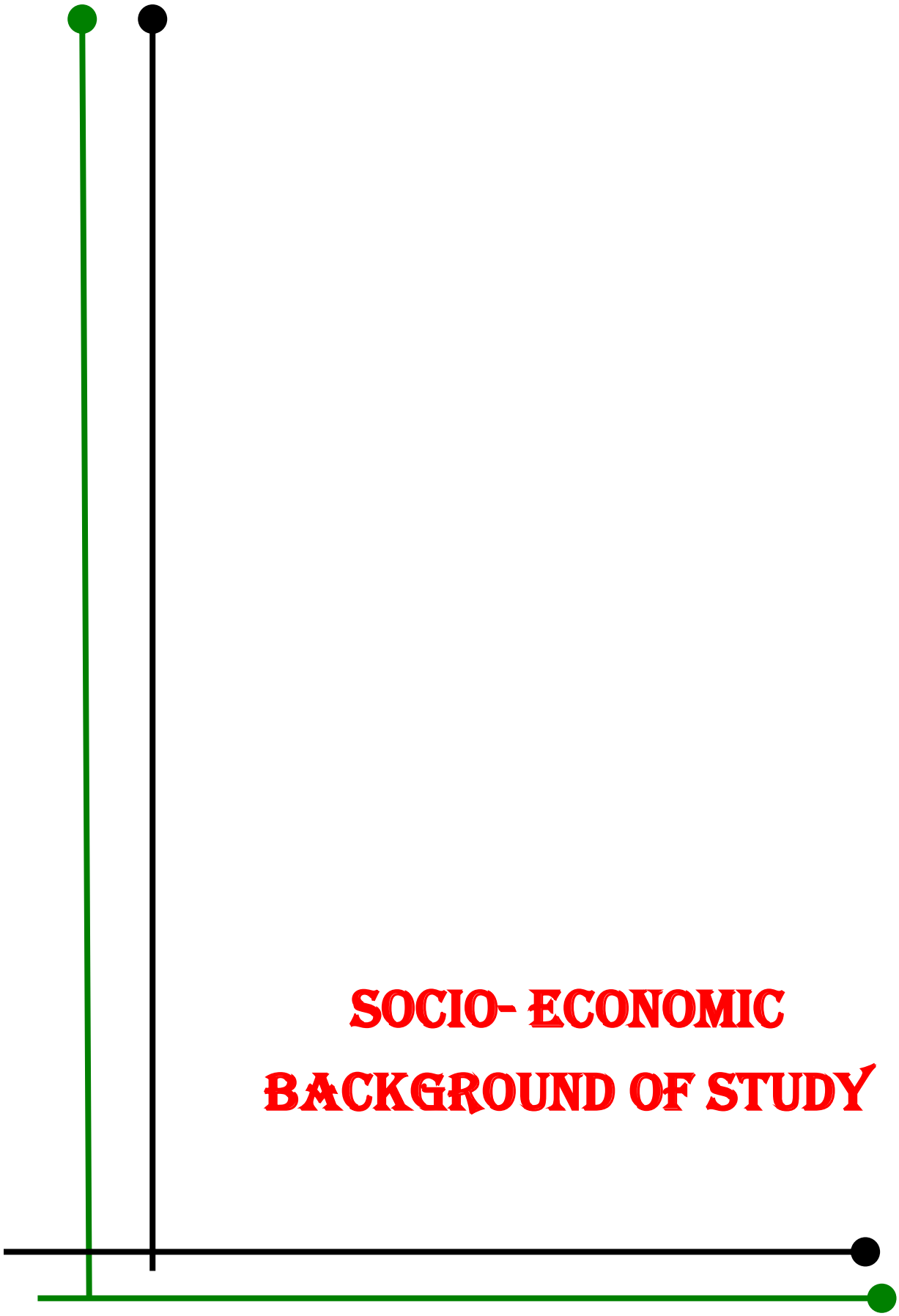
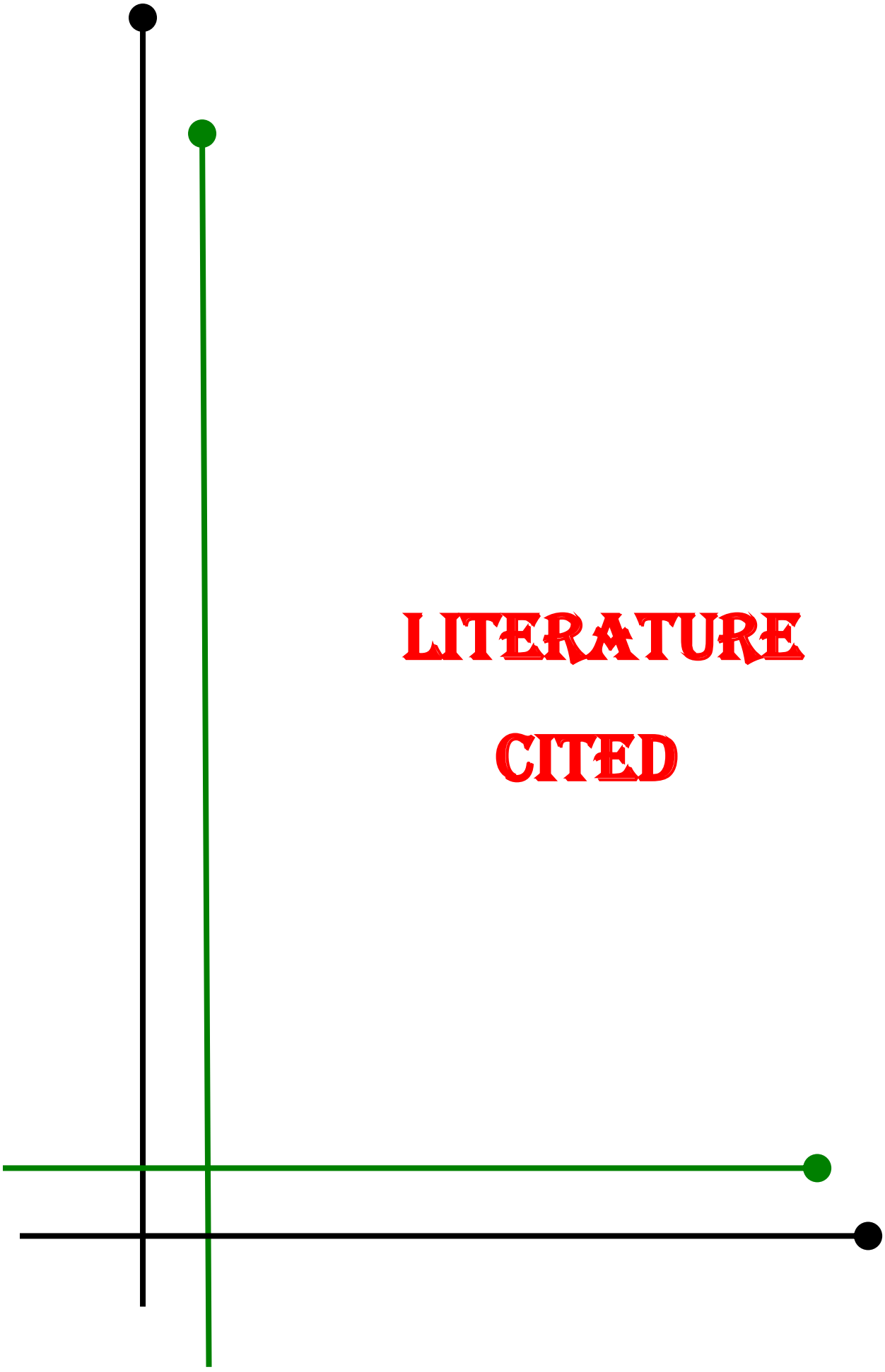


INTRODUCTION

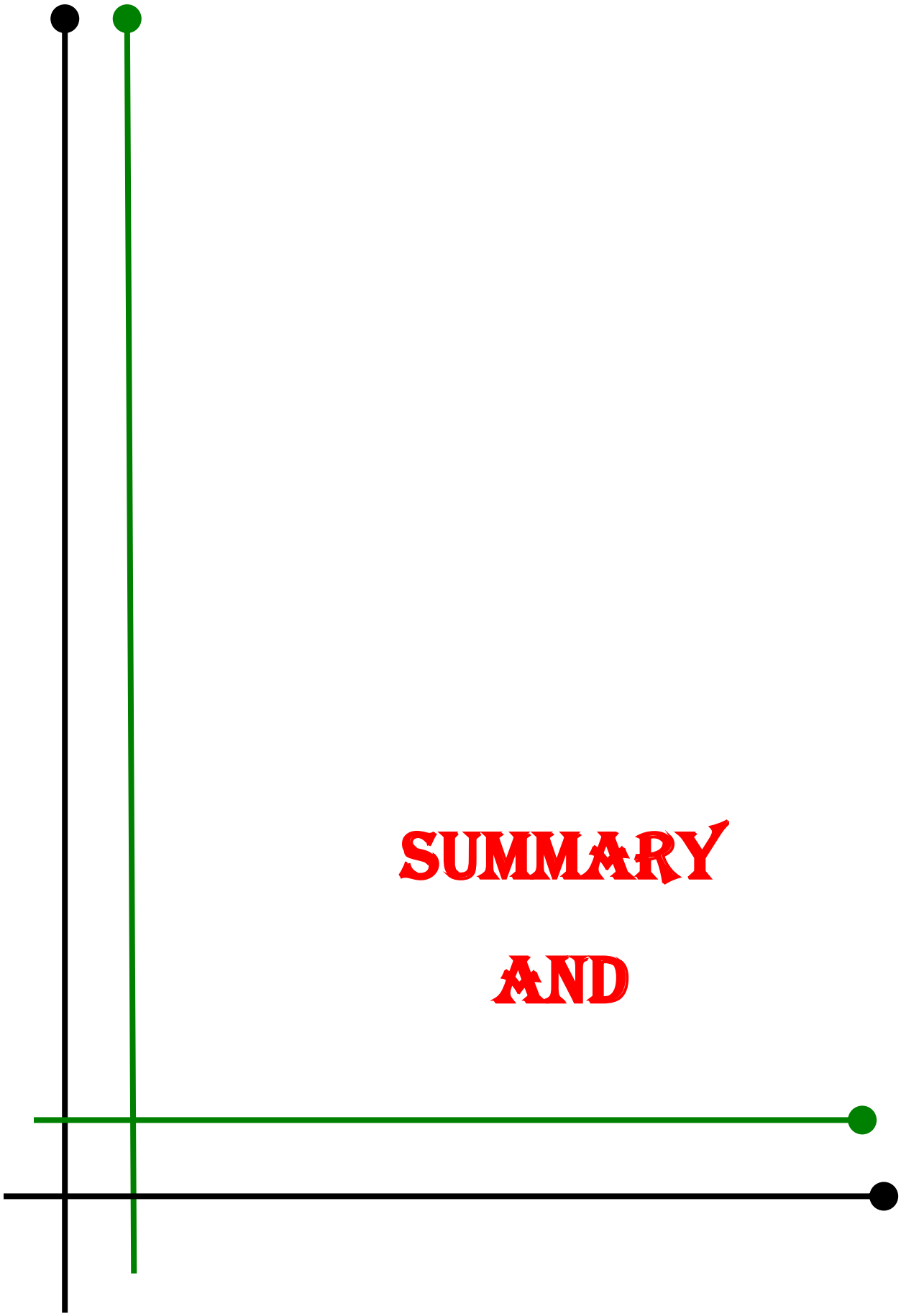


SOCIO- ECONOMIC BACKGROUND OF STUDY

APPENDICES

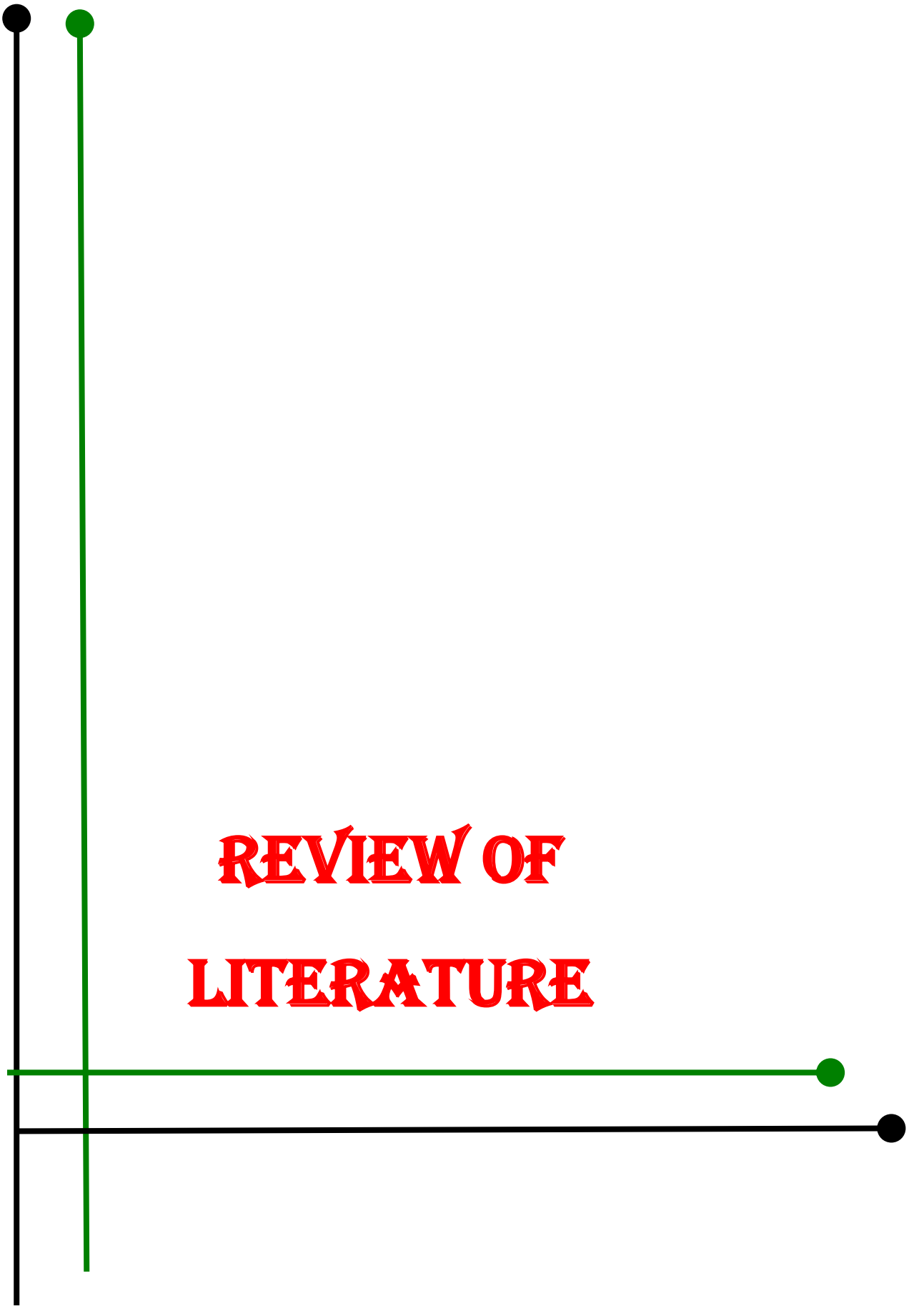


LITERATURE CITED

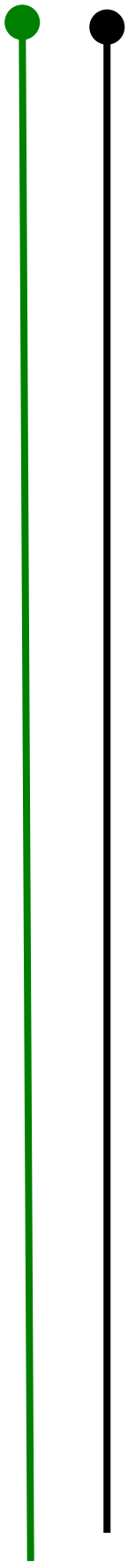


SUMMARY

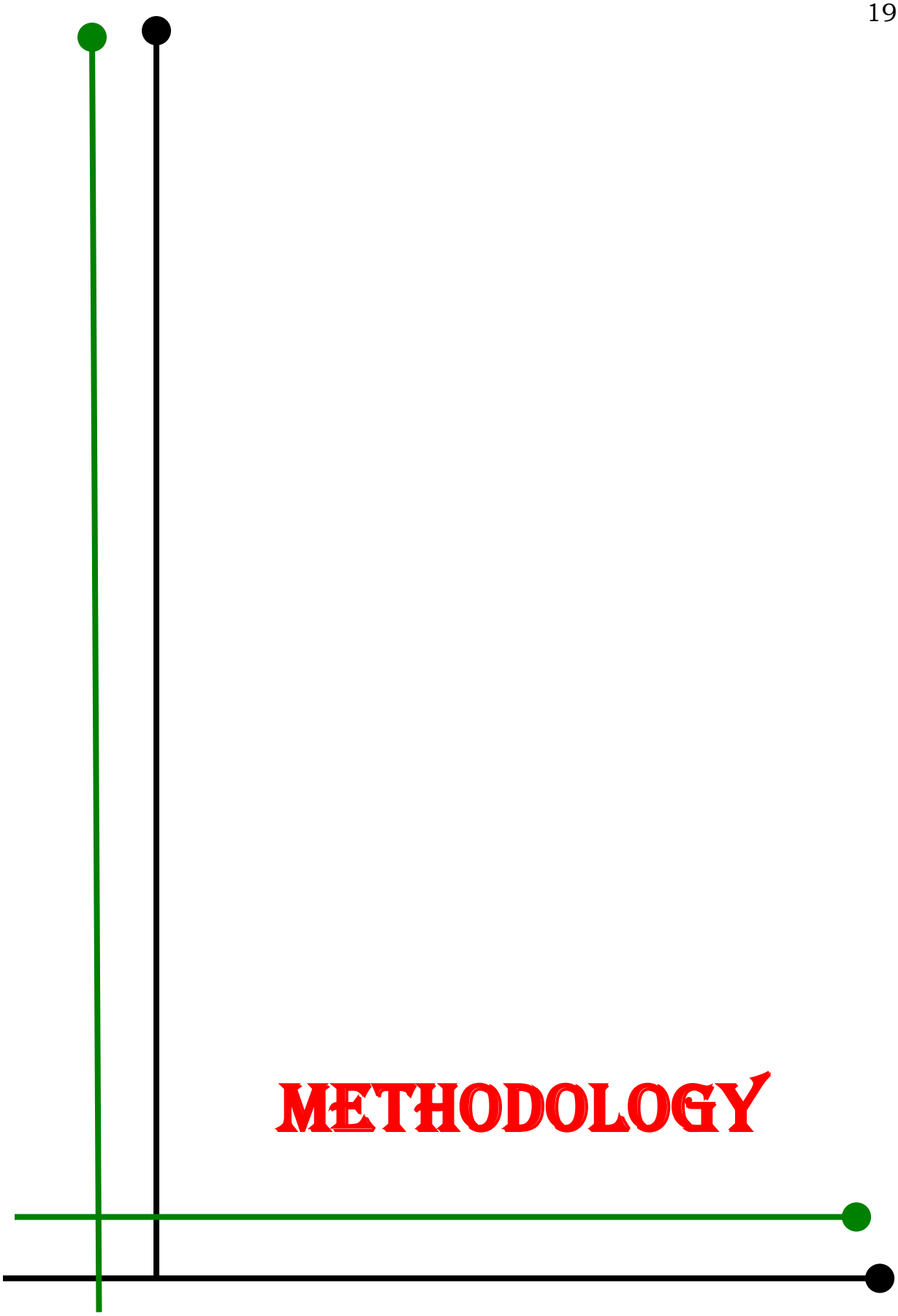
AND



REVIEW OF LITERATURE



RESULTS AND DISCUSSION



METHODOLOGY

Fig. 1 Map of study area: Sindhudurg District