CHAPTER – I

INTRODUCTION
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1.1 INTRODUCTION:

India is a developing country where agriculture is the main occupation of the majority of population however, agriculture in India tends to be a gamble with the undependable monsoon. Despite nine five year plans Indian farmer is still not freed from the clutches of monsoon. The Indian farmer is compelled to depend on the most irregular and uncertain and consequently undependable monsoon for decades to come.

The present India's stock of foodgrains will not help in providing food for all people in the country; the marginal farmers, landless labours and the people poverty line have no money to buy relatively expensive food grain. In India 19.3% population living under poverty line [cences 2001] and total population is 102.7 crores [cences 2001] or lakh of irrigation out of them 60% are composed of less than two hectares of land size. These small holders are mainly used for subsistence farming lakh of sufficient fertilizer facilities. The most of the small farmers can hardly produce one crop a year the result of yield is very low.

In India 30% farmer are small holders and nearly 25% of the rural house holders are land less live stock is a sub sector of Indian agriculture. The contribution of this sub sector to the agriculture is nearly 24% and dairy farming is again sub sector of live stock sector. The small and marginal farmers and land less labours is an owner of one or two milch animals The traditional concept of dairy farming in India is totally different from the modern concept of dairy farming in western countries. In India dairy farming is a business mainly of small and marginal farmers. At present Indias dairy farming industry is growing at a fast rate and need a special and temporal analysis.

Agriculture is the backbone of the Indian economy. Agriculture is the source of livelihood for over 70 per cent of population. According to the Indian
census 2001, 69 per cent of Indian population is engaged in agriculture. The agriculture is known as gamble in the monsoon due to inadequate and irregular rainfall. The landless labourers who depend on the seasonal work for living have no money to buy relatively expensive grains. Many millions of small farmers cannot even produce enough on their meager plots of land to provide food for their family.

Indian agriculture is characterised by the ownerships of small land holdings. The small holdings are devoted to the subsistence food crops production and the small farmers inadequately fertilized and without irrigation can produce only one crop a year, which is turn keeps the farmers poor and provides no money to buy the fertilizers and better seeds needed to produce better crops. For half of the population of the nation life is a daily struggle, to find enough food to keep the family alive. For 300 million people in India poverty is a way of live.

Modern agriculture is highly technical and capital oriented. In India, where 80 per cent of the farmers are small holders, agriculture should be supplemented with the subsidiary occupation such as dairying, poultry, sheep rearing, cattle breeding etc. There are enough evidences to show that the ‘Green Revolution’ has benefitted the big land holders who have the irrigation facilities and enough financial resources for the purchase of technical inputs which are the essential ingredients of new technology responsible for the Green Revolution. The recent research studies revealed the fact that dairying can help the country to achieve what had not been possible to do through the spread of the Green Revolution for the small and marginal holders and the land–less labourers. Unlike the cultivation crops, progressive dairying not only places the medium and big farmers into more advantageous position but also increases the income of the small farmers and land–less labourers to a remarkable extent.

1.2 IMPORTANCE OF MILK IN HUMAN DIET:-

Milk is one of the Nature’s most nearly perfect foods. It cantains almost all the material that the human body need and in the most suitable percentages.
Cow’s milk contains on average 87 per cent water and 13 per cent solids consisting of proteins, fats, sugars, a variety of mineral substances and vitamins. All these substances are in such form that they can be easily utilized in building and repairing the body tissues and bones and maintaining health and normal growth.

The Nutritional Expert group of the Indian Council of Medical Research has recommended 300 grams of milk for preschool children in the age group of 7-12 years and boys and girls in the group of 13-18 years and 200 grams for adult men and women and an additional 125 grams for expenditure mothers per day in the case of vegetarians. For meat eating people the recommended requirement ranges from 200 grams for children and 160 grams for adults. While milk is a good food for man it is also an ideal medium for the growth of bacteria. Care should be taken to prevent bacteria from outside entering into it. Even milk that looks clean may contain germs of such throat if drawn from diseased animals if handled by persons carrying the germs of these diseases is washed in polluted water.

1.3 COMPOSITION OF MILK:–
Milk (definition):–

The milk may be defined as the whole, fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy milch animals excluding that obtained within fifteen days before, or five days after calving or such period as may be necessary to render the milk particularly colostrums free containing the minimum prescribed percentage of milk fat, and milk solids not fat (SNF). In India, the term ‘milk’ when unqualified refers to cow or buffalo milk or a combination of two.

Chemically, milk is a complex mixture of fats, proteins, minerals, vitamins and other miscellaneous constitutes dispersed in water. Milk, when freshly obtained is a white opaque fluid when seen in bulk, and has a characteristic faintly–sweetish taste and peculiar odour. The white colour of milk is due to the calcium caseinate it contains, and the opacity is due to the
same substance and to fat. Sometimes, a more or less yellowish tinge is noticeable, that it is due to a lactochrome associated with the fat of milk. The specific density of milk ranges between 1.027 to 1.040, the average being 1.032. Cold milk has greater viscosity and cohesion than warm milk. Viscosity is increased by age, low temperature, products of fermentation and a high solid and fat content. The freezing point of milk is 0.54 to 0.57°C lower than that of water and is generally given as nearly 31°F. When water is added to milk the freezing point rises. Boiled milk has a lower freezing point than raw milk.

### Table No – 1.1
**Composition of Milk**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Constitutes</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Water</td>
<td>86.60</td>
</tr>
<tr>
<td>2</td>
<td>Casein</td>
<td>4.40</td>
</tr>
<tr>
<td>3</td>
<td>Fat</td>
<td>3.25</td>
</tr>
<tr>
<td>4</td>
<td>Milk sugar</td>
<td>4.55</td>
</tr>
<tr>
<td>5</td>
<td>Albumin</td>
<td>0.45</td>
</tr>
<tr>
<td>6</td>
<td>Ash</td>
<td>0.75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: - Milk and milk products by Industrialist.

### Figure No. 1.1
**Composition of Milk**
The table no.1.1 reveals that the content and their per cent in milk. In average milk, about 86 per cent water is observed. This water is not different from ordinary water. Milk fat often called “butter fat” is commercially the most valuable content of milk. This is used to determine the price of milk. There percentage is 3.25 per cent. Lactose is very essential in human diet, particularly important to a baby. It is only one sixth as sweet as sucrose. It has observed 4.55 per cent in milk. The lowest per cent is observed in Albumin and Ash as 0.45 per cent and 0.75 per cent respectively.

1.4 IMPORTANCE OF DAIRYING:-

In the subsidiary occupation for agriculture, dairy is leading activity and plays a vital role in the rural economy. Dairy helps to tackle the serious problem of unemployment. Dairy development is being used as a poverty eradication measures i.e. providing supplementary employment under Integrated Rural Development Programme (I.R.D.P.).

Indian farming is becoming uneconomic due to the heavy pressure of population. Therefore, they cannot get adequate income. Hence, they could not solve their economic problems. Dairy activity brings about significant change in socio – economic structure of rural economy. Dairying provides employment
to the rural landless, small and marginal farmers with supplementary employment and regular source of income and ultimately helps them to increase the standard of living.

India holds a leading position in her cattle population. It is nearly one-fifth of the total cattle population of the world. The cattle play a very important role in development of rural economy, the economic importance of milk and other milk products. However, the role of cattle and dairy farming is an economy is assessed on the basis of contribution of cattle production to total agricultural production. Apart from milk, cow dung and urine are good sources of organic manure, useful for making soil fertile. Generally cows and buffaloes live on plants and vegetable feeds which man cannot eat. They convert their rough feeds to products useful to man like milk and meat.

The dairy sector today provides some 70 million farm families the triple benefits of nutritive food, supplementary income and productive employment for family labour mainly women. Clearly subsidiary occupation for rural people.

1.5 CO-OPERATIVE DAIRYING IN INDIA:-

Indian co-operative movement has not been outcome of a popular demand from the people, it was and still it is an act of the Government, to ameliorate the condition of the economically weaker sections, so that in each state in India, there is a regular Department of co-operation under a minister.

The co-operative societies act was passed in 1912 and the first co-operative dairy was established at Allahabad in 1913.

Co-operative movement is recognized as the most powerful tool for overall socio-economic development of the rural community. As such, milk co-operatives have been in the focus in attracting small and marginal farmers. The Green Revolution, the Government of India has also adopted ‘White Revolution’ through the National Dairy Development Board. Presently, dairy has been properly organized on co-operative basis in Maharashtra and other states of India.
Besides this, ‘Operation Flood Programme’ was introduced in different stages, to promote the dairy development in the country. Technology Mission on Dairy Development (TMDD) was launched by the Government of India in August 1988 to accelerate the pace of dairy development in the country and thereby increase the rural employment and income.

1.6 Operation Flood: Means of White Revolution:

During Fourth Plan, for the dairy development, an important programme known as ‘Operation Flood’ with the aid from ‘World Food Programme’ from July, 1970 was launched with a view to bring about a real breakthrough in milk production.

Table No – 1.2
Role of Operation Flood during 1985 – 1995 in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Primary co-operative societies</th>
<th>Members (In Thousand)</th>
<th>Annual Milk Collection (Lakh tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985 – 86</td>
<td>42692</td>
<td>4484</td>
<td>28762</td>
</tr>
<tr>
<td>1986 – 87</td>
<td>49077</td>
<td>5097</td>
<td>28652</td>
</tr>
<tr>
<td>1987 – 88</td>
<td>54525</td>
<td>5666</td>
<td>28105</td>
</tr>
<tr>
<td>1988 – 89</td>
<td>58883</td>
<td>6250</td>
<td>29090</td>
</tr>
<tr>
<td>1989 – 90</td>
<td>60825</td>
<td>7003</td>
<td>35821</td>
</tr>
<tr>
<td>1990 – 91</td>
<td>63415</td>
<td>7482</td>
<td>35413</td>
</tr>
<tr>
<td>1991 – 92</td>
<td>64057</td>
<td>7945</td>
<td>34280</td>
</tr>
<tr>
<td>1992 – 93</td>
<td>65469</td>
<td>8371</td>
<td>38568</td>
</tr>
<tr>
<td>1993 – 94</td>
<td>67247</td>
<td>8667</td>
<td>40546</td>
</tr>
<tr>
<td>1994 – 95</td>
<td>69600</td>
<td>9000</td>
<td>37230</td>
</tr>
</tbody>
</table>

Source – Compiled from various source. (Reference – Devikar A. A.)

Figure No. 1.2
Role of Operation Flood during 1985 – 1995 in India
The third phase was launched from June 1985. During the II and III phase of Operation Flood per day milk collection increased from 10147 lakh tons to 37230 lakh tons. Thus Operation Flood has successfully developed an institutional framework linking with sixty lakh milk producers in nearly sixty thousand villages with markets in five hundred towns and cities.
1.7 DAIRY FARMING IN MAHARASHTRA:

The co-operative movement in Maharashtra was geared by Dr. Dhananjayrow Gadgil and Mr. Vikhe patil by establishing a sugar co-operative factory. Slowly co-operative movement diffused in the dairying. The main intention of co-operative dairy in Maharashtra was provided and attractive, alternative means of development to vast majority of farmers including large and small farmers as well as the landless. The milk co-operative society in Maharashtra was 450 in 1960-61 which increased to 610 in 1978-79 and in 1990 increased 31294 dairying the same year 36 co-operative milk project in the state. In 2009 total 1012 chilling centers was started. The project of milk operation fluid was carried out in 1971 and second phase in 1978 now 85% of total milk supply is made through co-operative sector in Maharashtra. The milk production in 1975 was 4 lakh litre. While 50 lakh litre in 1980 was in Maharashtra. The milk production approximately 154 lakh litre in 2003. The milk was imported in Maharashtra until 1983 but now it is exported to other state.

The revolution of milk production is yet to come because the average daily milk production is 1.25 Litre while it is 2.20 Litre in India and it is 22.0 Litre. In country like Isriael. The daily availability of milk is 187 gm in Maharashtra while it is 246 in India. According to food Science the standard consumption of milk should be 280 gm/day. There is vast different in consumption of milk in Maharashtra. In Mumbai daily 24 lakh Litre Milk distributed while it is 38 lakh litre in the rest of Maharashtra.

The milk business is in danger many co-operative societies are sick due to competition low production declining quality miss management and growing loss. Now 17 district milk co-operative societies are in loss, generally there is decline in the collection of milk 45 crore rupees were spend in the ninth five year plane on milk development scheme, It was proposed to spend 31 crore rupees on the same in 10th five year plane.

Maharashtra is third largest state in the country occupying nearly 9.36 per cent area possessing about 8.03 per cent of total livestock population in
India. According to the livestock census, of 1997, the state had 396.38 million heads of livestock. Of this, 180.71 million were cattle, 60.73 million buffaloes, 148.02 million sheep and goats and 6.92 million other livestock.

Greater Bombay Milk Scheme meets 55 per cent of demand of milk through its 3914 booths and 1021 institutions like hospitals, canteens and hotels. There are Arey (1951), Worli (1961) and Kurla (1975) dairies. These dairies help to meet the needs of consumption in Bombay and its suburbs ultimately depending upon the milk supply from rural Maharashtra. The key to development of dairying in Maharashtra state is the assurance of market at the doorstep of rural producer and the progress of dairying in co-operative sector.

Table No – 1.2
Institute in Maharashtra

<table>
<thead>
<tr>
<th>Institute</th>
<th>Total</th>
<th>Capacity (Lakh Litre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Co-operatives milk societies</td>
<td>23484</td>
<td>_</td>
</tr>
<tr>
<td>2) Milk cold Storage</td>
<td>125</td>
<td>22.9</td>
</tr>
<tr>
<td>3) Milk training Centers</td>
<td>7.2</td>
<td>77.0</td>
</tr>
<tr>
<td>4) Milk Powder Factory</td>
<td>9</td>
<td>_</td>
</tr>
<tr>
<td>5) Employment</td>
<td>15 lakh</td>
<td>_</td>
</tr>
<tr>
<td>6) Processing capacity</td>
<td></td>
<td>67,30 lakh litre</td>
</tr>
</tbody>
</table>

Sources: Maharashtra state management of live-stock health Report 2009-2010
### Table No – 1.3

**Health Institute of live stock in Maharashtra**

<table>
<thead>
<tr>
<th>Particular</th>
<th>Total strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live-stock multi clinic</td>
<td>32</td>
</tr>
<tr>
<td>Live-stock hospitals</td>
<td>1566</td>
</tr>
<tr>
<td>Primary health Centers</td>
<td>2902</td>
</tr>
<tr>
<td>Mobile stock hospitals</td>
<td>65</td>
</tr>
<tr>
<td>Breeding Centers</td>
<td>27</td>
</tr>
<tr>
<td>Tahsil live-stock clinics</td>
<td>171</td>
</tr>
</tbody>
</table>

Sources- Maharashtra state management of live-stock health Report 2009-2010

This table shows the state management of live-stock health in 2009. The no of live-stock clinic centers 32 and hospitals 1566. The primery live-stock health Centers are 2902 while the no of mobile [Rotating live-stock hospital] is 65. The breeding centers are 27 in Maharashtra 2009-2010.

### 1.8 CHOICE OF THE REGION:

It has been already discussed that the dairy activity plays an important role in the economy of the country. In the present thesis, attempt was made to trace the spatio-temporal variation in dairy development of Sangli district. The reasons for selecting the particular Sangli district are summarized as below.

1. The Sangli district is largely drought-prone areas and has insignificant irrigation facilities except Walwa, Miraj, Shirala and Palus tahsils. There is always shortage of drinking water.
2. The Sangli district has a fertile land.
3. Dairy activity is regarded as an integral part of the agriculture in the region.
4. Development of agro–based industry like sugar industry in the co-operative sector has helped the dairy activity to a greater extent, through availability of capital for progressive investment.
5. There is very limited scope for further increase in the land under cash crops as the eastern and northern part of the region is drought-prone area.

6. Agriculture in the Sangli district depends on monsoon. In such a condition, agriculture is not well developed in this region. So dairy activity is more developed to agriculture sector in subsidiary occupation.

7. Dairy development of this region has not been studied yet by the geographers.

1.9 OBJECTIVES:

The major objective of the present study is to analyse the spatio-temporal variation in dairy development of Sangli district. However, following are the specific objectives of the study:

1. To study the geographical set-up of the Sangli district as a basis for investigation.

2. To study the socio-economic status of the Sangli district.

3. To study the role of co-operative dairy industry and milk production in the Sangli district.

4. To analyse the spatio-temporal variation in dairy development in the Sangli district.

5. The case study of Rajaram Bapu Dudh Sangh.

1.10 DATA BASE AND METHODOLOGY:

A geographical study is based on field work. The present research work is based on both primary and secondary sources of data and information obtained by visiting dudh sangh, milk societies and milk producers through the schedule and interview techniques, methodology is adopted as under:

1. The primary data, pertaining to milk production has been collected through field work by employing questionnaire and interview techniques wherever necessary.
2. Data and information of all dudh sangh and milk societies were collected by interviewing and scheduled the chairman of dudh sangh or societies.


4. The unit of study is tahsil and in the sample studies, village wise study is attempted.

5. Interviews with the individual milk producers and the officials in the co-operative as well as private dairy societies and sanghs.

6. The period 2001-02 to 2008-09 in selected for the study of milk society and dudh sangh; and the period 1985 to 2007 have been considered for the calculation of milch animals.

1.11 METHODS OF ANALYSIS:-

The present study was undertaken from geographical point of view. The data analysis, mostly was done as under-

1. Analysis data and information of milk producers were made on the basis of educational classification, income group, level of milk production, employment opportunities, occupational structure, cattle rearing, structure of settlement, infrastructural facilities.

2. Data and information of milk societies and dudh sanghs were analysed on the basis of spatial distribution, milk production, production of by-products by using Statistical and Cartographic Techniques.

3. Data and information of livestock population particularly cows and she-buffaloes were analysed on the basis of spatial distribution, percentage, growth rate, crossbreed, feed and fodder, economy by using Statistical and Cartographic Techniques.

The appropriate statistical and cartographic methods like growth trend, pie diagram, isohytes, choropleth map, bar graph, line graph etc. were used wherever necessary in the present work.
1.12 LIMITATIONS OF THE STUDY:-

There are certain limitations noticed while collecting data. Some of the major limitations are as follows –
1. Some co-operative as well as private milk societies do not maintain their records properly.
2. Due to lack of education and awareness, milk producers and private milk collectors are not provided proper information to fear of income tax.
3. Chitale Dairy, Bhilwadi in private sector has not provided their dairy plant information.
4. The researcher in such a situation is restricted his enquiry only to the objectives of his study.

1.13 LITERATURE:-

Dairy is one of the important economic activity of the region under study. Therefore, some experts in different disciplines have already selected the theme dairy as their research topic for M.Phil as well as Ph.D. degrees.

S. B. Sarang (1982) has studied dairy farming in Kolhapur district for his Ph.D. degree. He studied spatial distributional patterns, temporal growth, economics and working of milk producers in the Sangli district. Gholap T.N. (1987) has also studied distribution of livestock and fodder supply in Maharashtra for his Ph.D. degree. Khatakale A.B. (1995) has studied dairy farming in Solapur district for his M.Phil degree. He studied pertaining to spatio temporal analysis of milch animals and assesses the fodder and feed resources and their requirements. Devikar A.A. has studied geographical study of dairy enterprise of Baramati taluka for his Ph.D degree.

Being an important economic activity of the region, some scholars from Economics faculty have also studied the dairy activity of this region. Patil M.G. (2002) has studied dairy activity with special reference to pricing of milk products of Government Milk Scheme, Miraj. Koli P.A. (1987) has studied growth and economic significance of milk co-operatives in Kolhapur district.

Glimmer D.A. (1970) studied the spatial distribution of livestock in the Republic of Ireland. He studied the vital importance of livestock in the rural economy and observed regional variations in the concentration of livestock. He employed Weavers modified techniques for studying animal association regions in Ireland and accordingly delineated the livestock regions. Randhwa M.S. (1962) made a detailed study of Indian agriculture an animal husbandry. He observed that dairy was supplementary occupation in the agricultural farming system in India. He studied the regional variation in milk productivity of cow and buffaloes. Gore K. (1969) studied Iresh Agriculture which was mixed in nature and closely associated with livestock. He found that cows were the initial source for milk production, but he observed that there was pronounced regional variations in the pattern of dairy farming. Mishra (1979) studied the development of cattle and dairy. Ghosh (1974) analysed the requirements of feed and fodder to the existing number of cattles in the country. He also calculated the availability of feed and fodder in the country. Khan (1979) made another attempt to supply the dairy development and its contribution to rural prosperity. He has discussed the Operation Flood Scheme-I in detail.

Vishwanathan (1979) studied the role of co-operatives in dairy development in India. He found that per capita availability of milk was less than 110 grams per head per day. Gopalkrishnan C.A. and Lal G.M. (1986)
made an attempt to study livestock and poultry enterprises in relation to rural development. Ramanujan (1992) highlighted the role of dairy farming in rural development, especially dealing with the co–operative dairy in Maharashtra. Chattopadhyay (1993) considered dairy as the second labour source in India. He studied the distribution of milk and the nature of co–operative dairying.

Ahire (1979) has studied the distributional pattern of milk was affected by large size families rather than the small size families in villages around Mahatma Phule Krishi Vidhyapeeth, Rahuri.

Sinha (1991) studied the socio–economic aspects of dairy activity. He observed that majority of the members of dairy co–operative (60%) belonged to medium size families followed by small and large families.

Lohokare (1973) in his work on the pattern of cattle raising and dairy farming in the area of Nagpur Milk Scheme, studied different characteristics of dairy operators.

Jamadar (1973) studied the impact of different factors on milk production in the area of Government Milk Scheme, Chiplun. He also studied the important characteristics of dairy operators related to the dairy activity.

Mane (1977) studied the characteristic of dairy operators. His main aim was to find impact of literacy on dairy development of Kolhapur district. He observed that the percentage of operators completing higher education among the milk producer is very low as compared to those completing primary and secondary education. He also found that 9.7 per cent milk producers have better management. They used to keep good milker cows and buffaloes, use the veterinary facilities and kept the records of different operators.

Saprey (1960) studied different aspects of dairy industry in Poona city. Rao (1985) studied the profitability of dairy activity in different categories of farm size. He compared the income derived from dairy activity and income derived from other agricultural operations.
Godbole (1966) in his study of milk supply in Maharashtra, pointed out that it was possible to increase supply of milk by encouraging milk production in rural areas and marketing it in the cities.


This paper presents the impact of microcredit on return from dairy in Mewat. A sample of 60 members from 30 Self Help Groups and 30 non-members from three blocks of Mewat was drawn for the present study. In order to isolate the impact of credit assistance for dairy, ordinary least squares technique was employed. The average buffalo milk production per household per day and productivity were found to be higher in case of member households than non-member households. The annual gross return from dairy was higher in member households in comparison to non-member households. The coefficient of credit dummy turned out to be positive and highly significant implying positive impact of microcredit on return from dairy.


In order to monitor the changes in heat dissipation through sweating and panting, oxygen consumption, heat production, heat storage, physiological responses (RR, RT and ST) and antioxidant enzymes status, five heifers of Murrah buffaloes were selected from herd and maintained under normal feeding and management followed at the farm. The animals were exposed to four exposure temperatures viz. 32, 35, 40°C with a constant relative humidity of 50% and sham control at 8.00am in a climatic chamber for three hours continuously. The pre exposure heat loss through skin ranged from $5433.49 \pm 371.18$ to $5749.63 \pm 327.53$ KJ/ hr. The heat loss through skin increased with the increase in climatic temperature (40°C). The maximum heat loss ($8584.11 \pm 262.48$ KJ/ hr) was observed at III exposure conditions. The mean values of
pre exposure pulmonary heat loss ranged from 528.26 ± 35.56 to 542.79 ± 14.6 KJ/hr. The percent increase in pulmonary heat loss over pre exposure values were greater at all the exposures compared to heat loss through sweating. The pre exposure oxygen consumption of heifers ranged from 1.38 ± 0.02 to 1.59 ± 0.01 litre/ min. The pre exposure values of oxygen consumption increased after three hours of exposure at all the exposure conditions. The levels of antioxidant enzymes (super oxide dismutase and catalase) showed a linear increasing trend with the increase in the temperature from 32 to 40°C in the climatic chamber. The sweating, panting, oxygen consumption, physiological responses and antioxidant enzymes levels increased significantly (P<0.01) during different exposures, intervals of exposures and their interactions. All the parameters also showed a significant (P<0.01) positive relationship with the temperature humidity index. The results of the study indicated that the heat stress had an adverse impact on physiological status of buffalo heifers. Therefore, buffalo heifers require a protection from heat stress at higher temperature (40°C) exposure for maintaining body temperature.


The study was conducted in four villages of district Karnal namely Budhakheda, Kulwehri, Subhri and Ranwar, selected purposively. From each selected village, 30 respondents having at least one crossbred cow and one buffalo were selected randomly to constitute a total of 120 respondents for the study. Data were collected with the help of a pretested structured interview schedule. Data were then tabulated and put to suitable statistical tests and conclusions were drawn. About 70 percent of respondents having small sized milch herd always vaccinated their animals against Haemorrhagic Septicaemia (HS) whereas 75 percent always vaccinated against Foot and Mouth Disease (FMD). 73.91 percent of respondents having medium sized milch herd always vaccinated their animals against HS, 89.13 percent always vaccinated against
FMD. 72.22 percent out of the respondents having large sized milch herd always vaccinated their animals against HS, 61.11 percent always vaccinated against FMD. Study of the problem of repeat breeding revealed that 6.16 percent of the crossbred cows belonging to respondents having small sized milch herd were repeat breeders and 1.93 percent of the buffaloes were repeat breeders. Out of the crossbred cows and buffaloes belonging to respondents having medium sized milch herd, 7.52 percent and 4.93 percent were repeat breeders, respectively. Whereas, 13.80 percent of the crossbred cows and 10.31 percent buffaloes belonging to respondents having large sized milch herd were repeat breeders. Average age at puberty was higher in small crossbred herd size and the average peak yield increased with increase in crossbred herd size. Average age at puberty, average age at first calving, average service period decreased and the average peak yield increased with increase in buffaloes herd size.


This paper examines the effect of recent economic recession on dairy sector. The changes in dairy production, consumption, trade and prices of milk, feed and value added dairy products have been examined for world as a whole and in the Indian context during 2000-06 (normal situation) and after 2006 (under economic crisis). The Indian dairy sector has witnessed some disquiet trends in terms of slow down in export performance, but, the price trends have not shown volatility similar to the international markets as the sector largely caters to the domestic market where demand is also positively influenced by factors other than income growth. In case of total demand for value added industrial dairy products, that have greater relationship with prevalent economic conditions, the effect of economic turndown is discernible in terms of declining import demand. The decline in exports, possible fall in domestic consumption of processed dairy products and declining trend in production of
important dairy products may have adversely affected the economic performance of organized dairy processing sector in the country. In nutshell, under the existing dairy production system, as the synergy between international price trends and domestic production is somewhat weak, the susceptibility of dairy sector to current economic crisis has not been profound. However, the darker side of this implies that gains to the Indian dairy sector, especially the dairy farmers would be marginal once the world economy follows the recovery path.

1.14 **ORGANIZATION OF WORK:-**

The present research work entitled “Dairy Farming In Sangli District” A Geographical analysis has been divided into seven chapters, each distinctively highlighting various points having bearing on the different aspect of the study.

The first chapter deals with the appraisal of the problem, aims and objectives, sources of data and information and methodology.

The second chapter deals with the Review of literature.

The third chapter deals with the geographical setting of the Sangli district. The chapter presents the location and geology, climate, drainage, soil and all the geographical information about Sangli district and socio–economic status of the Sangli district. It includes the agriculture, cropping pattern, irrigation facilities, population, transportation, banking facilities and socio–economic condition of the milk producers.

Chapter fourth deals with the Spatio Temporal Change in Dairy Farming. It includes the milk collection of co-operative sanghs, distribution of live stock, ice production, fodder availability in the Sangli district.

The fifth chapter describes the Roal of co-operative dairy industries and milk production in Sangli district. It also describe the breeds of milch animals, importance of cows and buffaloes in milk, economy of cows and buffaloes in milk, crossbreeding programme in the region. This chapter tells us to what extent dairy activity is profitable.
Chapter sixth studied the A Case Study of Rajaram Bapu Patil Dudh Sangh Islapur (Walwa)

Chapter seventh deals with the conclusions and suggestions.