CHAPTER 3
REVIEW OF LITERATURE

Researchers in India have completed a number of research studies on various aspects of livestock farming over a period of time. A comprehensive review of literature is an essential part of any scientific investigation. Therefore, an attempt has been made to review the research studies related with milk co-operative societies of India and Gujarat as well as economy of milk production in India and Gujarat. The review of research works have been presented under the three heads viz (1) Feed and fodder for livestock, (2) Animal health, and (3) Extension and exhibition programme for animal husbandry.

Feed and fodder for livestock

The Feed and fodder is a major cost component of milk production of livestock farming. Fodder comprises major protein supplied to milk animals and therefore cultivation of nutritious and high yielding fodder is inevitable. Profitable livestock farming depends mainly on adequate availability of fodder at reasonable prices. Available and selected studies for review in this aspect have been presented here under:

Gangadharan (1980) made a study entitled Feed and economy in milk production: a problem under new dairy FARM technology in Kerala. He found that kerala state is predominantly small farm economy. He noted that there was less costly milk production during rainy season due to availability of feeds as compared to summer season. Besides due to the high demand of land and high pressure on land by human population for various utilization, it is needed to pay special attention for alternative sources of feed such as paddy straw.

Kumar and Sing (1980) studied a Dynamic feed Milk Relationship and Technological change in Milk Production. He reported that a major portion of feed effects in milk production was due to the lactation period. Ignoring this effect leads to serious under estimation of the productivity of feed inputs in the commonly use static milk production models. The cross breeding programme made extremely important contribution in increasing the productivity of milk cattle. Proper feeding management
over the entire cycle of milk production is essential for full exploitation of the genetic potential.

Giri and Banik (1985) has noted that the fodder development is an important component for animal husbandry. The demand of fodder is always increasing with the animal population as well as increase in production of milk.

Sevek (1986) estimated Cost of Milk Production in Gujarat. He examined feeding practices and suggested to suitably rationalize them by reducing the quantity of green and dry fodders and diverting the same amount to raise the quantity of concentrate that would raise the milk yield so as to reduce the cost of milk per liter. He found that milk yield was higher in the intensive irrigation zone followed by moderate irrigation zone and arid & semi-arid zone.

Harold, George and Roger (1987) studied on the “Co-operatives and The Commercialization of Milk Production in India.” They concluded present and foreseeable shortage of feed and fodder in India. It was found that the feed shortage would result from limited supplies of crop residues and fodder shortage and was held responsible to overall low land availability in our country.

Kurup (1987) in his research paper “Perspectives on Animal Breeding and Milk Production” noted that to achieve the desired milk production target by (1) continuing to feed and improve productivity at the present rate and to achieve additional production requirement through increasing the size of cow and buffalo population, and (2) replacing a portion of the local population by an equal number of improved animals-crossbred cows and improved buffaloes-which convert the scarce feeds in to milk with greater efficiency than the local animals, and allowing the remaining existing population to continue to produce whatever milk and draught power they can, at the present rate of production.

Sheth (1987) noted that compounded cattle feed is a vital component of the total package of technical inputs directly related to enhancement of milk production. A multi-ingredient-least cost formula prepared with the aid of computer enable the manufacture of nutritionally balanced, pelleted cattle feed. The manufacture and marketing of 1,55,000 MT of cattle feed in the district during 1985-86 speaks about its acceptance by the Kaira farmers. The milk procurement system of Amul is also the most economical distribution channel for cattle-feed. The feed is sold by almost all the village milk producers’ co-operative societies, the ideal retail outlets. The author noted that cattle feed has a share of more than 75% of the total feeds utilized in the
area. The cattle feed plant has started manufacturing Urea Molasses Blocks developed by the National Dairy Development Board, Anand. This helps to reduce the cost of feeding by better utilization of straws and reduced consumption of concentrate. It provides soluble nitrogen and by-pass protein to the animal.

Chatterjee and Achary (1992) found that chronic shortage of feed and fodder together with poor nutritive values have been the basic reason for lower fertility as well as productive capacity of Indian livestock. They also reported that existing milk production can be increased about ten to fifteen per cent through adequate feeding to present bovine population.

Pandey (1995) found that milk production of bovine population significantly depends upon the good quality of green and dry animal fodders. This kind of feeding to the milky animals noticeable impacting on their milk production. In this connection, it is suggested that to avail of the quality of both types of fodders to the various bovines, improved seed of fodders with restricted doses and pests need be supplied to farmers in irrigated and unirrigated cultivated areas.

Singh, Chakaverty and Das (1995) examined the factors affecting milk production in a district of Orissa. They concluded that at the aggregate level concentrates feed to cows in the herd had a positive significant impact on the milk yield of both cows and buffaloes, while dry and green fodder had a negligible impact on yield level. Similarly, comparison of the estimates made between farm size – classes showed that in the case of marginal and small farmers, the elasticity coefficient associated with dry and green fodder had least impact on milk yield and were negative. Therefore, large scope for enhancing milk yield by feeding more of concentrates to milk animals than feeding dry and green fodder alone.

Bala, Sharma and Kumar (1995) examined milk production trend and Changing Scenario of Bovine Population in Himachal Pradesh. They studied milk production for cattle, buffaloes and goats over a period of 15 years. The contribution of buffalo milk to the total milk production was found the highest. They also observed that the number of improved breeds of bovine population had increased, still more efforts are needed to enhance the replacement of local breeds by improved breeds. For this purpose veterinary services need to be have strengthened in addition to providing regular supply of feed and fodder.
Trivedi (1996) analyzed in his article “Milk co-operative in India- some Major Issues” demand for feed and fodder and its supply. He found demand for green, dry fodder and cakes were 587 million tonne (mt.) and 3,787 mt in the year 1986-87 respectively. These had increased to 772 mt. & 49,793 mt. in the year 1996-97 respectively. Against such observed demand the supply were 226 mt. and 1,315 mt. in year 1986-87 respectively, while these had increased to 309 mt. and 2114 mt. in the year 1996-97, respectively. Thus, he found a big gap between demand and supply of feed and fodder of livestock at point of time as well as over a period of time in the country.

Pradhan (1997) noted that the high milk producing animals consume more feed. An animal is found to produces more milk than cost of additional feed precisely because a portion of the total feed input is required to maintain the cow at constant body weight regardless of its level of production. Therefore, a farmer should ensure that his animals get the proper feed for full exploitation of their production potential otherwise; their milk producing ability of an animal is adversely affected.

Pradhan (1997) examined “Scientific Feeding.” He noted that in India, a large number of feed ingredients of variable chemical composition and digestibility from agriculture, forest, marine and industrial sources is utilized as animal feeds. Good quality forage and concentrates (primarily maize and oilcakes) are not usually available to animal. Thus, scientific and judicious combinations of various available feed ingredients to produce balanced ration for meeting the nutritional requirements for maintenance, growth and milk production have a greater significance.

Tripathi (1997) in his paper “New Concept in Feeding” found that new types of feeds have been developed to improve the nutritive value of traditional cattle diet. Among them, urea molasses blocks (UMB) and bypass protein feed (BPF) are gaining popularity for healthy growth and higher productivity of dairy animals.

Vaidya (1997) in his research project “Ruminant Feeding” observed that both qualitatively and quantitatively a large gap exists in the demand and availability of feed and fodder resources for the livestock. It reflects major constraints in the production as well as feeding itself. There is thus an urgent need to explore new alternate non-conventional feed resources to utilize available feed resources more effectively. With the decreasing availability of conventional and non conventional feed resources, rumen digestion for more effective cattle nutrition is under investigation by scientist. In the new strategy, the focus is on the role of rumen micro
organisms for manipulation of digestion. Rumen is the first and the largest of the four compartments which from the stomach of a cow, buffalo or other ruminants. It contains a large number of organisms which play a vital role in effective utilization of roughage and other fodder/straws to provide nutrition to bovines. The ability to efficiently digest cellulosic and allied plant products and produce milk and meat is unique in nature. However, this is only a partial truth since ruminants cannot be reared profitably only on roughage diets. They also need optimum levels of energy, proteins, minerals, vitamins and clean water to express their full genetic potential. Any deficiency in quality and quantity of required nutrients would adversely affect milk production, weight gain and vital functions.

Singh & Rai (1998) analyzed in their research article namely Economics & production & marketing of buffalo milk in Haryana that the farmers of Haryana state were give high priority of expenditure on fodders for animals in their total household income. Thus, the animal husbandry activates is the significant source of farming family. It also indicates that the fodder expenditure has an important role in milk production.

Dutta and Shantilal (2004) studied on major food grain in Rajasthan and made an estimation of seed, feed and wastage ratios for major food grains. The major objective of the study was to estimate the total quantity of food grains consumed for seed, feed and wastage. The study was confined to two crops i.e., bajra and gram. Jhunjhunu and Sikar districts of the Rajasthan were selected for field survey. Each sample district was further divided into four strata by suitably combining the contiguous blocks. Five villages from each strata based on density of area under selected crops were selected. Thus, the total 40 sample villages and 600 sample farmers consisted for field survey. In Sikar district, 77.68 per cent and in Jhunjhunu district 34.8 percent area was found to be cultivated under Bajra of the GCA, during study period.

They found that, the yield of bajra was 880 kg per hectare on sample farms of Jhunjhunu district while it was 1360 kg per hectare for Sikar district. The yield was higher due to more availability of irrigation in Sikar district. The average value of bajra per hectare was Rs.16, 914 in Jhunjhunu district and Rs.21,783 for Sikar. On an average, bajra fed to farm animals as proportion of net production was 2.63 per cent in Jhunjhunu district and 2.96 per cent in Sikar district. They also noticed that in both the sample districts, small category of farmers fed higher proportion of their net
production of bajra to milch animals as compared to medium and large farmers. It was also reported by sample farmers that they were using bajra as a feed only to in-milk animals.

Patel Arun (2004) in his study, Review of State Agriculture Policy in Gujarat – Part 1 observed that present availability of green and dry fodder concentrates is very low due to some situation like (a) the animal population is about 2 animal per hectare of cultivated land which is varying among the agriculture zone in the state, (b) proportion of rain fed agriculture is relatively high and hence the availability of fodder supply is non-rainy seasons poses a problem. About 70 percent of Gujarat agriculture is rain fed and (c) Gujarat agriculture is dominated by non food grain crops having no fodder value.

Patel Arun (2006) found that there is lack of co-ordination among different programmes initiated so far viz, animal breeding, animal nutrition, animal health and management, organized marketing of milk and milk products. He also examined the problems related with animal husbandry enterprise and noted that this activity is facing shortage of fodder supply and observed that there is noticeable gap between the demand and supply of fodder in Gujarat. He reported that the shortage of dry fodder is about 13.08 per cent, green fodder 32.12 per cent and concentrates (cattle feed) 75 per cent of their respective total requirements which adversely affects the productivity, production and quality of milk of cattle.

Chatterjee, Singh, Shah and Roy (2007) observed that different categories of farmers use ready mix concentrate mixture but it was not common among the landless and marginal farmers. Besides, more than half of the small farmers were able to afford ready mix concentrate mixture for their cattle. Among the concentrate ingredients used, mustard cake and rice grit were most common in the study area. They noted that most of the small farmers and some landless as well as marginal farmers fed local rice bran to their cattle. Only few farmers were found to offer linseed cake along with mustard cake to their animals. Mineral mixture was fed by very few farmers that also when it was available free of cost. Salt is fed by most of the landless farmers and a significant portion of marginal and small farmers.

Cultivated green fodder is fed by none of the landless, very few marginal and a significant portion of small farmers. Though the grazing lands are not in plenty but quite a few numbers of farmers feed their animals through grazing or scavenging during some parts of the day. Use of cut field grasses, though is small in quantity, was
more or less common among the farmers. Feeding of paddy straw is a common practice and almost all the farmers surveyed under this study offer paddy straw to their animals in variable quantity.

Rao, Dang and Singh (2007) have examined in their article Effect of Udder and Teat Characteristics on Milk Composition and Yield of Karan Fries Cows and found out the relationship of udder and teat biometry on milk yield and composition of Karan Fries (KF) cows. The study indicated that proper shape, size and measurements of the mammary gland significantly influence milk yield, fat and protein content.

Sirohi, Joshi, and Kumar (2007) examined the cost of milk production and net profit in their study. The year round data collected from households in villages around Karnal district of Haryana for the study. They found that the maintenance cost of high milking animals increased with the level of milk productivity primarily, because of higher expenses on feed input. The net profit margin varied directly with the productivity of animals. The results indicated that, at the field level, rearing of crossbred cow and buffalo is an economically sustainable proposition only in their average daily productivity during lactation ≥ 9 liters and ≥ 6 liters respectively.

Das, Sahoo and Pathak (2007) examined Intake and Utilization of Nutrients in Growing crossbred Bull calves Fed on cereal Grain Withdrawn Diet With Dry or Green Forage and indicated that complete replacement of cereal grain with wheat brand from the concentrate mixture of growing cross bread bull calves could be done without an adverse effect on nutritional performance on a wheat straw based diet. Furthermore, green maize feeding in place of wheat straw had an added advantage of increasing the nutritive value of the ration and also contributed to judicious use of costly oil cakes for achieving economic feeding.

Singh and Agrawal (2007) examined economics of milk production in Imphal west district of Manipur. They studied costs and returns from milk production. Two blocks viz., Imphal West I and Imphal West II and two villages from each block and a sample of 80 milk producing households of various categories were selected randomly for the study. They observed that two-third of the total milch cows were found in milk. The average fixed investment on dairying per household was highest (Rs.54697) on milch cows. On an average, a crossbred cow in milk was fed 20.8 kg of green fodder, 9.6 kg of dry fodder and 6.2 kg of concentrates while a local cow was fed 4.8 kg of green, 5.9 kg of dry fodder and 1.2 kg of concentrate. The average daily
Milk yields per milch local and crossbred cows were 1.15 liters and 6.45 liters respectively, which increased with increase in herd size category. The daily gross maintain cost per milch for local cow and crossbred cow was Rs.22.89 and Rs.72.95 respectively. The net returns from milk production per local milch cow were negative except for large herd size category. For crossbred cow it was positive and highest for large herd size category followed by medium and small.

Dholakia and Datta (2010) noted in their study entitled “High Growth Trajectory and Structural Changes in Gujarat Agriculture” that shortage of feed and fodder resources is one of the major constraints for low livestock production. Moreover, when feed and fodder account for more than 70 percent of cost of milk production, it is important to put more emphasis on fodder development programme. An increasing pressure of population, industrialization of land and commercialization of agriculture leads to shortage of feeds and fodders. The commercial crops have less crop by-products which can be used as fodder. So in order to increase fodder production, farmers should be encouraged to grow improved varieties of high yielding fodder crops, fodder conservation and its better utilization and improvement of pastureland. Livestock farmers have seen sharply higher feed costs, fueled by competing use demands for maize and soybeans globally, higher exports of oil cakes from India and by higher energy prices. Competing use of land for food feed-fuel-fiber is a cause of concern for livestock sector development and needs to be addressed on priority basis.

At national level, livestock sector has not received as much policy attention as it requires. Although livestock sector occupies an important position and its contribution to the agricultural GDP is the highest, the plan investments made so far do not appear commensurate with its contribution and future potential for growth and development. The allocation to animal husbandry and dairying as percentage of total plan outlay varied from 0.98 percent during the 4th plan to about 0.18 percent during the 9th plan compared to the sector’s contribution to the national GDP of about 5 percent. However, in Gujarat the expenditure on animal husbandry and dairy development has increased from about 20.5 crore in 2004-05 to 95.6 crore in 2008-09, nearly 4.7 times increase. Delivery of livestock services has also improved in the state. There has been a significant increase in number of vaccinations and AIs done in the state. The number of crossbred cows has increased while indigenous cow population has remained stable. Since livestock development is more pro-poor than
other sub-sectors of agriculture due to more egalitarian distribution of livestock resources, there is a need to maintain the momentum in growth of livestock production in the state.

Thanikacchalam and Bal swami (2010) made a study on Milk Production Constraints in Western Ghats of Tamilnadu State. They observed that milk is a popular nutritious food that is used round the year by everyone for different purposes and its modified forms has its own importance. The production of milk is from the cattle population, particularly from the cows and buffaloes which also serves to the weaker section as a subsidiary occupation and also helps to earn additional income. The importance for its increased production has gained momentum now-a-days. The production of milk depends upon various factors like financial assistance, cattle maintenance, health care, price, marketing facility, feeding, fodders etc.

The study revealed that there is an increase in milk yield between 19989-99 to 2008-09 but it remained far below the potential. Hence, scientific and sincere efforts are needed for raising the milk yield further and increasing the profitability of milk producers. The study further illustrated that highest quantity of feed and fodder was fed to in-milk crossbreed cow followed by in-milk buffalo. Dry and unproductive animals were fed relatively very less quantity of feed and fodder. Grain and concentrates feeding was found restricted to lactating high yielding bovine and to bullocks during working period only. The quantity and quality of feed and fodder was found lower when compared with their respective recommended doses by Department of Animal Husbandry. Across season, quantity to feed and fodder fed to animal found varying with lowest in summer and highest in winter.

Raghavendra and Rao (2010) observed that the dairy enterprise provides constant and assured income to the farmers. It is an important supportive occupation to millions of resources poor families in India and prevents migration of rural youth to the cities. With 15% of the world cattle population; India occupies number one position in the world milk production. India became the world leader in milk production in 2001 with milk production of 84 million tones. They also examined that the cost of the production of a liter of milk in India worked out to be lowest in the world.

Shah, Makwana and Sharma (2011) studied Economics of Production, Processing and Marketing of Fodder Crops in Gujarat. They found that there is a large gap between requirement and availability of feed and fodder so the livestock sector is
suffering from problems of underfeeding at a micro level and to some extent overfeeding at micro levels. In case of Gujarat owing to significant increase in livestock numbers and limitation to increase area under fodder crops, the gap between demand and supply of feed and fodder is widening year after year. As a result animals are facing problems of malnutrition, under nutrition or both. This has an ill effect on the productivity of milk animals and growth of livestock sector.

Makwana Ashish (2011) found that the per capita availability of milk increased to 229 gm/day in 2004-05 from 112 gm/day in 1970-71. Estimated 70 million rural milk animal household were engaged in milk production. Allocation by Government to the dairy sector also diminished. The assistance from the central Government to IDDP has gone to nonviable area as there were no feasibility studies. There have been no efforts towards development of value added or innovative milk products. In first four year of the tenth plan milk growth rate was less than 3% per annum. No policy measures were taken to develop and organize the unorganized sector in production of Traditional Indian Dairy Product (TIDP) that have huge potential in domestic as well as export market.

On the whole feed and fodder constitutes 70 percent of the total milk production. It is a general conclusion that there was a large gap between requirement of feed and fodder and its availability in the past which continued to widen over a period of time. Farmers are found to be providing better and greater feed and fodder to milking animals in comparison with dry animals. Similarly framers are also found to be providing greater and better feed and fodder to crossbred cows in comparison with desi cows. The supply of feed and fodder is found to face challenges from (a) commercialization of agriculture, (b) pressures on common grazing land, (c) higher export of oilcakes from our country, (d) an increasing prices of feed and fodder, (e) competing use of land for food-feed-fuel-fiber, etc. There is also an indication of overfeeding so livestock sector in our country is found to be facing a problem of inadequate availability of feed and fodder on one hand and unsatisfactory quality of the available amount of the same.

Animal health

In this part, an attempt has been made to review different studies which have examined any or some aspects of animal health in respect of different parts of the country over a period of time.
Sevak (1986) made a study on Cost of Milk Production in Mehasana district of Gujarat. He concluded the main reasons for deriving higher milk yielding it was a veterinary dispensary in the villages which provide immediate service for maintaining the health of the animal. He reported that this service has an indirect impact on milk yielding rate. He also observed that the sample village that some cattle breeders in the neighboring villages used to give grass after removing mud or dust and after making small pieces to get the best results in milk yielding. They also used to give coconut to the cross-breed cow to get more yield.

Pandey and Mange (1991) studied trends and constraints in Milk Production in Haryana. They observed that the quality of artificial insemination (AI) service in many parts of the country was unsatisfactory. They found that the changes in livestock economy were characterized by negligible increase in veterinary hospitals, livestock supervisory units and AI centres during 1955-56 to 1992-93 in Andhra Pradesh and resultantly about 300 liters loss of milk per animal per location was incurred in the state. The conception rate through AI in buffaloes is observed to be far lower than in cows under field conditions. The number of breedable animals covered under AI during the study period was not more than 10% of the total breedable population in our country.

Bhalla (1997) examined Important Diseases of Dairy Cattle. He maintained that for the successful dairy farming, cattle and buffaloes must be provided assured protection against diseases and pests. Practical steps were outlined for selected diseases. A systematic programme to control cattle diseases of national importance was found to have started. A beginning made with the launching of a national campaign in 1954 for the eradication of render pest was viewed to be now nearing completion.

Jamkhedar (1997) observed that economic losses due to sick animals can be substantial because the death rate of calves is an alarming 50 percent in India. So it can be brought down considerably by proper management and feeding practices and effective ways to keep cattle healthy.

Prasad (2002) examined the variation in milk production on Seasonal Variation in Buffalo Milk Production in Ranga Reddy District of Andhra Pradesh. He reported that farmers with their family members are highly engage in the various crop operations during the various seasons. Consequently they do not extent special attention to maintain milky animals during the Rabi and kharif seasons. Therefore,
their milky animals have not produced expected quantity of milk per day or per time. As a result they found variations in the milk production per animal as well as in seasonal also. Moreover, he also found in his worked that the farms are barren during summer season that is the advantage to the cattle and the farmers are free from the farm activities and they gave attention to their cattle. Besides price of milk is found to be moving up during this season i.e. summer.

Patel (2004) observed that livestock improvement can reduce cost of milk production through scientific breakthrough in disease control, in feeding efficiency, in breeding and in management. He found a tendency to under invest in livestock research and research was found to have been excessively concentrated in disease control and breeding at the expense of nutrition management.

Socio Economics Review of Gujarat (2007-08) revealed that there are 14 policlinics, 522 dispensaries (including branch and mobile dispensaries), 552 first aid veterinary centers, 178 rural primary animal health centers, 2 epidemiological units, 15 disease investigation units and 1 animal vaccine institute at Gandhinagar for the development of animal husbandry activities. The Gujarat state government was found to have started 10 intensive cattle development projects (ICDP). The basic objective of ICDP is to improve the breed of cattle and buffaloes for improving milk production. There were in all 718 centers covered under these projects. The main activities carried out under these projects were AI services, fodder development and other necessary important cattle related activities.

Landage (2010) examined Viability of Primary Dairy Cooperatives Ratnagiri District. He maintained that to increase the milk production in the village cross-breed variety of milk animals need to be supplied. Further Veterinary services and guidance for animal care should be made as much prompt as possible. Training and extension programme for the milk producer, society staff should be conducted according to pre-planned schedules. SHG groups should be linked with dairy development by establishing their primary milk co-operatives, engaging them in preparing / producing food and fodder for milk animals. Credit facilities should be made available to the needy milk producers at the low rate of interest.

Patil (2010) studied challenges before an Improvement of Milk Animals. He found that the co-operatives had worked for an improvement of milk animals by improved breeding, feeding activities and supplying veterinary and extension services. It was found that farmers can save a lot of money through providing
common infrastructure facilities as well as modern technical services. He maintained that the improved animal health care is essential as it can affect the milk production cost. Diseases like Mastitis and Brucellosis can adversely affect the milking animal or calf. To reduce such milk yield losses, proper knowledge base, management, easy access to drugs and services, effective preventive health care and treatment need to be taken care in form of advanced planning. This would avoid the loss of milk production, long calving interval, permanent diseases, infection of disease, etc.

Thanikacchalam & Bal swami (2010) examined Milk Production Constraints in Western Ghats of Tamilnadu State. They found that milk is popular nutritious food used round the year by everyone in the study area. For different purposes in flush and modified forms. The production of milk is from the cattle population, particularly from the cows and buffaloes which also serves to the weaker section a subsidiary occupation and to earn additional income. The importance for its increased production has gained momentum now-a-days. The production of milk depends upon various factors like financial assistance, cattle maintenance, health care, price marketing facility, feeding, fodders etc. The three different areas namely the wet, dry and hilly areas were classified on the basis of their climate and are being assumed to influence the production of milk. Among these selected area further classification was made to in dairy co-operative village and non co-operative village.

Shah, Makwana and Sharma (2011) studied Economics of Production, Processing and Marketing of Fodder Crops in Gujarat. They observed in their study that of the total sample farmers 54.13 per cent cow owners and 39.58 per cent of the buffalo owners experiment good improvement in the milk yield in reference year 2008-09 as compared to the base year 1998-99. The sample farmers opined an improvement in quality of milk animals, better feeding and rearing practices and easy availability of veterinary services over a period of time. They found out that among the various hand and machine operated equipments, chaff cutter for fodder cutting was an important instrument for proper feeding to livestock due to reduction in fodder waste. So an appropriate utilization of feeding by milky animals had resulted in to an increase in the milk productions which to some extent support dairy enterprise.

On the whole, the livestock population of India is found to be suffering from various types of diseases in greater or lower degree for various parts of the country. The poor health status of an animal adversely influences quality as well as quantity of its milk yield. Government of India and various state governments have of course
initiated some efforts to protect animals from different types of diseases through establishment of veterinary services, livestock supervisory units, AI Centres, etc. These efforts have remained successful to some extents and as a result there is some improvement in milk yield in certain regions of the country.

**Extension and Exhibition Programme for Animal Husbandry**

George (1987) made a study on Future Technological Intervention in Animal Feeding Particularly for Dairy Stock in India particularly where feed resources are in short supply and the need for milk is more. He recommended that the scientists working on such area should be given adequate facilities and encouraged in order to stop their overseas assignments. Tendency to copy the exotic models should be avoided and, on the other hand, models which would be suitable in India should be developed, which is not largely practiced in our country.

Sheth (1987) studied Amul’s Programme for Buffalo milk Production Enhancement. The extension unit of Amul adopts various media viz, the Amul News letters, village level meetings, ladies meetings, ladies tour to cattle feed factory, bull station, dairy and bull mother farms, etc. to propagate and popularize animal husbandry activities. Now the television has also been used to contact the farmers to lessen their beliefs in myth, magic and to increase their acceptance of scientific animal husbandry practices. ISRO has obliged us by inviting our experts to assist in preparing a serial ‘Ame Ane Amari Bhuri’ to present the dairy husbandry programmes. Today this programme is very popular among our milk producers. During emergency communication requirements, quickies are prepared and telecast through ISRO.

Agrawal, Singh and Jha (2007) examined Constraints in Adoption of Crossbreeding Technology (CBT) in Different States of India viz. Punjab, Karnataka and West Bengal. The authors have attempted to identify the constraints in adoption of crossbreeding technology. Among breeding and feeding constraints, majority of the adopters of CBT in Punjab reported that lack of progeny tested bulls, low fat content in crossbred cow milk, high mortality in crossbred male calves and repeat breeding as serious constraints. In Karnataka, low fat content in crossbred cow milk was the only serious constraints reported by majority of the adopters of CBT. In West Bengal, all the constraints except for irregular PD and lack of progeny tested bulls were reported as serious constraints. Lack of land for fodder production and lack of availability of
dry fodder in Punjab and lack of milk marketing facilities and lack of availability of dry fodder in Karnataka are the constraints. Among social constraints, inability to take animals to A.I. centre was the only serious constraints in Punjab and West Bengal. However, in Karnataka most of the social constraints were reported as serious for hostile attitude of affluent farmers towards weaker section and inability to take animals to A.I. centers. Among administrative and organizational constraints majority of the adopters of CBT in Punjab reported non-castration of scrub bulls, non availability of HYV seeds of different fodders, lack of basic amenities and allowances to field workers, absence of timely procurement and supply of critical inputs and absence of incentives as serious constraints. However, in Karnataka and West Bengal none of the administrative and organizational constraints were found as serious, for non-availability of HYV seeds of fodders in West Bengal.

Kumar Arun, Lal Darshan, Seth Raman and Sharma Vivek (2007) examined in their research articles Dilatometric Detection of Body Fats, Vegetable Oils and Hydrogenated Fat (Vanaspati) Added Milk Fat that the determination of the solid to liquid fraction from the proportion of solid and liquid fraction of the given fat sample calculated from the thermal expansion curves obtained by plotting the specific volume against temperature, using dilatometric technique, a fairly good idea can be obtained about the authenticity of milk fat.

Savita Kusumkar, and Malik (2007) studied Awareness Among Livestock and Abattoir Workers of Central India About Zoonotic Diseases and Vaccination. They recommended strong support of veterinary extension works and Government assistance of awareness about vaccination and zoontic diseases particularly for workers really engaged in livestock rearing and slaughter of animals or processing and packaging of animal products. A research initiative is needed, preferably in varied geographical, demographical, occupational and recreational situations in order to determine the extent of this problem. To reduce the calf mortality in herd caused by scours, septicemia, and pneumonia, there is a requirement to reduce the level of exposures to infectious organisms during calving and breeding seasons, increase the level of immunity through colostrums, and nurse all calves on first day of birth. Protecting against the fatal calf diseases, the pregnant cow need to be vaccinated late in pregnancy with safe and effective vaccines. Due to high morality in calves, there is an urgent need to establish the priorities to reduce the burden of disease in a herd by
appropriately targeting effective disease prevention and control activities like proper disinfection of sheds, vaccination and efficient management practices.

Singh, Verma, Singh and Mavi (2007) had studied status of Adoption of Artificial Insemination (AI) in Dairy Animals in Different Agro climatic Regions of Punjab. AI is one of the most important biotechnological tools that have been developed to bring genetic improvement of animals. The authors have studied the status of adoption of AI in six different agro climatic region of Punjab and data were collected from 180 dairy farmers from the regions. The conclusion of the study is that the adoption of AI in both cows and buffaloes was 50.56 per cent which was highest in flood plain region (66.67%) and lowest in western region (36.67%). In cows 41.67 percent of the respondents adopted AI, which was highest in flood plain region (60.00%) and lowest in western region (30.00%). However, in buffaloes only 17.78 percent of the respondents adopted AI, which was highest in western plain region (33.33%) and lowest in central plain region (6.67%).

Thirunavukkarasu and Kathiravan (2007) studied Monetary Loses Due to Reproductive Failures in FMD Affected Bovines. Foot and Mouth Disease (FMD) had caused a considerable monetary loss to the livestock farmers by abruptly ending the otherwise successful pregnancy or by extending the calving interval to uneconomic dimensions. In as many as 75 samples, the disease had resulted in an economic loss of Rs. 17.46 lakh to the farmers. Extrapolating this loss to all the 213 outbreaks, one could find that the loss should have been Rs. 49.59 lakh, which is a significant loss for the farm families. While artificial insemination (AI) was planned to upgrade the local cows and buffaloes, the effects of abortion and infertility due to FMD are likely to slow down this key objective. Hence, prevention through regular vaccination against FMD is to be strictly adhered to save the livestock and the farming community from the fearsomely contagious virus, as treating the FMD affected animals could never be economically viable.

Parmar (2009) made a Study of Vishrampura Milk Co-operative Society and covered 25 farmers obtaining high fat content in their animals milks where as 25 farmers were covered obtaining low fat content in milk from their animals. This society also giving assistance of health care service and various vaccine to their members milk animals for improvement and maintained the level of animals health. The milk Society providing various feeds like Amul dan medicated dan, chatan dan, mineral powders to the members to increase the yield of milk as well as for good
health of their animals. The society was also found to arrange different programmes and trainings by the subject experts for the society’s members regarding increasing yield of milk animals with the fat. Moreover, high bonus, provided fund scheme for member, death assistant scheme, women saving scheme etc. for overall development of the society’s members and its livestock. The society is also arranging and managing various activities for the members of milk society through village milk co-operative society. The activities are recommended for loan to purchase animals, celebrate milk day programme, scheme for pakka animal shed with required facility, heavy fodder outer (iron base), electrical chaff cutter scheme, machine for milk collecting animal, visit of animal’s expert or doctors vaccinization distribution of pempelts, animal feeds, certificates distribution scheme, facility of milk storage unit, provision or scheme for transportation etc. for the development of members in respect of milk related activities. He also observed that Gram Panchayat of the village also extended support for the livestock and dairy development activities. The Panchayat is also provided facilities like distributing Panchayat grazing land, enough drinking water to animals, benefit of various Government scheme (moregesing activities) to the village people which has been implemented from time to time.

Reviews regarding Milk Co-operative Society

Koli and Pawar (2010) examined Development of Co-operative Milk Unions in Satara District in the Era of Privatization and reported that the entry of private firms has reduced collection of milk production and profit of co-operative milk unions. The co-operative Unions are not fully utilizing their capacity which was installed at the time of registration. Thus, private sector has become the challenges before the co-operatives. Though, no any type of service is rendered to milk producers; yet the members deliver their milk to private parties. The co-operative unions need to introspect their working, otherwise, the co-operative dairy enterprise will only remain in the history of co-operative movement.

Kamble (2010) examined Dairy co-operatives in India. He observed that dairy industry in general and dairy co-operatives in particular is very much important in the socio-economic development of India in general and rural Indian economy in particular. These cooperatives have to strengthen the level and scope of their role in socio-economic development of the Indian economy, especially in economic reforms
era. He remarked that there is no alternative to the development of dairy co-operatives in overall development, especially rural areas.

Singh Ram Iqbal Prasad and Solanki (1990) studied Economic Performance of ‘Anand Pattern’ Milk Co-operative Societies in Uttar Pradesh. Per household net returns varied from Rs. 871 to Rs. 3406 in different categories of sample households. The higher values on big farms were due to higher milk production which was because of keeping more number of cattle in milk. When the share of income was examined, it was the highest being about 40 percent in the case of landless household followed by 37 percent, 31 percent and 27 percent in the marginal, small and medium/big farm in the societies. Besides this, the members were also paid bonus at the rate of 8 percent according to the quantity of milk supplied by them.

The society’s members reported a number of constraints faced by them. which included lack of linkage between the producer member and district level union, unsatisfactory fat testing procedure, supply of bad quality and high price fodder seeds, irregularity in the supply of inputs including veterinary facilities and in the payments and bonus records etc. In order to make this organization more efficient a proper linkage between society members and district union needs to be established so that problems are solved at the right time. There is also need for a supervisor at the village level during collection of milk, who could ensure that the testing of milk is correct and the entry is correctly recorded in the purchase register and members’ passbooks. Besides, provision of technical inputs to the producer members should also be made available in time.

Sharma Ashwani Kumar (1995) in his study of role of Co-operative Dairying and Its Impact on Resource-Poor Milk Producers in Utter Pradesh. Revealed that the dairy co-operatives need to be organized on proper lines. The resource poor households who are supported under IRDP (Integrated Rural Development Programme), Jawahar Rozgar Yojana and also by dairy co-operatives need to be made operative at an economically viable scale, by involving female labour force. These societies would be assured of the milk supply for their viable working and able to meet out the fairly extensive completion the milk societies have to face with the traditional dudhiyas.