CHAPTER - II

REVIEW OF LITERATURE

This chapter is devoted to the review of literature relevant to the topic of the study. Some of the similar studies which have direct relevance to the problem under investigation have been traced out. The information available about the impact of Mini-Dairies on income and employment generation in rural areas is scanty. However, some studies have been conducted to evaluate the components of dairy development in rural areas. An endeavour has been made to present here a review of such studies or pertinent literature which is likely to have direct bearing on this study. Keeping in view the objectives of the study the review has been categorized under the following heads:

1. Infra-Structural Studies.
2. Studies relating to production and cost functions.
3. Dairying as an Instrument of Economic upliftment.
5. Operation Flood Programme and Other Studies.
2.1 **Infra-Structural Studies:**

For successful dairying, the infra-structure based on scientific lines relating to the improvement in breeding, feeding, marketing, veterinary care, training, proper monitoring, dairy extension service, and credit facilities etc. is essential. The following studies have tried to examine the role of infra-structural facilities and the extent of their availability in various parts of India.

Tyagi (1975)\(^1\) in his study of factors influencing the adoption of dairy innovations by farmers of Intensive Cattle Development Project, Karnal in Haryana reported that the adoption of breeding, feeding, disease control and management practices were influenced by the herd size, knowledge, family education, farm size, sale of milk and occupation of the farmers.

Dubey and Singh (1975-76)\(^2\) while studying the knowledge level of cross-bred cattle owners observed that most of the rural cross-bred cattle owners were not aware of the scientific dairying

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1. Tyagi, K.C. 1975. 'Factors influencing the adoption of dairy innovations by farmers of ICDP, Karnal', paper presented at *Summer Institute* on 'Modernisation of Dairy Farming' held at NDRI, Karnal.
management practices like breeding, feeding and health care. They indicated that 93 percent of them were not aware of heat cycle and 71 percent did not know the right time of artificial insemination. Similarly, majority of them did not have knowledge of the time of feeding of colostrum to calves and feeding mineral mixture and common salt. They also observed that 74 percent of the cattle owners could not name the diseases even for which vaccination was carried out under the Intensive Cattle Development Project.

Rath (1977)\textsuperscript{3} investigated into the improved dairy practices viz., breeding, feeding, disease prevention, cattle management and marketing in the village of Cuttak (Orissa). He found that dairy farmers who had higher knowledge of breeding practices, had more cross-bred cattle. He also reported that farmers did not adopt artificial insemination due to the notion that cross-bred male calves would be useless for working purposes.

V.B. Sharma (1979)\textsuperscript{4} made a survey in villages and cattle fairs of Hissar and Rohtak districts.

in Haryana. He observed that the village animals grow at a much slower rate due to underfeeding of growing stock below 2 years of age. He also found that the farmers took progressively great interest in heifer-feeding as she got mature.

Kaur and Sharma (1985)\(^5\) investigated the role of rural women in Animal Husbandry in Haryana and found that in majority of the cases 66.10 percent females alone were responsible for care of animals. While assessing the contribution of women in the care of animals in different management practices, it was reported that the animal care was more or less a female domain.

Singh (1986)\(^6\) studied some villages of Hissar district and reported that people paid more attention towards feeding and management of lactating animals than those of pregnant and growing ones. All farmers having irrigated land preferred first to have green fodder for their live-stock than for cereals. Singh also observed that the people preferred cross-breeding and artificial insemination


more for cows and less for buffaloes. The villagers got discouraged from adopting cross-breeding and artificial insemination as 75 percent of Calves born were male who did not have high economic value and secondly, failure in conception was high and cows and buffaloes needed artificial insemination twice or thrice. Farmers generally considered cross-bred males as poor draught animals and unsuitable to the hot climate, hence they tried to sell their calves after lactation at low prices and it made them further reluctant to go for cross-breeding and artificial insemination.

Mishra (1986) highlighted the characteristic pattern of sectoral relations between live-stock, agriculture and industry at inter-regional as well as intra-regional levels. He suggested a clustered village approach with a co-operative structure and considered that the state should play a catalytic role in providing appropriate infra-structure to co-operatives for making an effective use of new or upgraded technology.

Damodaran (1987) examined the structural dimensions of the fodder crisis in his study of

a village of Karnataka. He revealed that introduction of cross-bred cows amongst the small and marginal farmers and the landless labourers had to be complemented by schemes for better distribution of land resources in the village. In the absence of adequate land with the beneficiary groups, stall-feeding of the cross-breds with quality fodder would become impossible. This might force their poor owners to either sell off these animals or lower the genetic potential of the calves. Hence, the schemes for fodder development in village commons should be implemented and the benefits of fodder resources created thus should accrue to the needy.

Sharma and Bhatele (1988)\(^9\) recognised the need for the implementation of various dairy development programmes for increasing milk production. They further suggested that by developing additional infrastructure i.e. improving the indigenous stock of both cows and buffaloes, technically trained personnel with proper attitude and behaviour, proper communication link and unstinted support of producers to the co-operatives could help the dairy sector to become more meaningful and lucrative.

Rao (1991) in his study of Socio-economic analysis of milk production observed that socio-economic factors, education, size of land holding and herd size etc. were significantly responsible in enhancing milk production.

Wadia (1991) in his study of Dairy Development through co-operative milk producers societies narrated the background and progress started with the registration of the Kaira district co-operative milk producers union Ltd. Anand (Gujarat) from 1946 to March 1990. He credited National Dairy Development Board for the spread of dairy development through milk producers co-operatives in the country and to other states. He reported that by March 1990, there were over 60 thousand co-operative milk producers societies with 7 million farmer-members supplying milk to the urban areas.

Saini et al (1992) in a case study of Himachal pradesh while working on production


and Marketing of milk in hilly areas suggested some ways and means of dairy development through milk producer's societies.

Lenka (1992)\(^{13}\) while working on Self-sufficiency in Fodder Production, observed the fodder shortage of 339 million tonnes of dry and 682 million tonnes of green fodder in India than its requirements and stated the efforts taken by the Government to overcome this shortage of fodder through various techniques of non-conventional feed resources and better utilisation of available fodder. The steps which would be undertaken by the Government, through maintaining proper co-ordination among various agencies involved in the planning and implementation of fodder development activities during Eighth Five Year Plan, were also proposed.

The findings of the above studies can be summarised as follows: The knowledge level of the cross-bred cattle owners regarding the scientific dairying management practices like breeding, feeding, health care was found to be low. Higher knowledge of the above practices had favourable impact on the production and productivity of cross-bred cattle.

The feeding of Urea molases, preference of green

fodder over cereals, preference for cross-breeding and artificial insemination more for cows and less for buffaloes, disliking the cross-breeding or artificial insemination due to certain inhibitions were emphasized. A clustered village approach with a co-operative structure, the need of co-operatives for making use of upgraded technology and the positive role of the State was appreciated. Despite this, cross-bred cows had to be complemented by schemes for better distribution of land resources and schemes for fodder development in village commons. A need of improving the indigenous stock of both cows and buffaloes, technically trained personnel with proper attitude and behaviour, proper communication link and unstinted support of producers to the co-operatives were some of the requirements considered appropriate to improve the dairy development programmes.

2.2 Studies relating to production and cost functions

It is pertinent to know the important factors influencing milk production and its cost structure. One of the factors which affects both milk production and cost, is the availability of nutritious feeds and fodder. Some studies have been conducted in different parts of the country over different periods of time to estimate the cost of milk production
and provide input-output information in milk production enterprises. The following few studies have tried to examine this aspect of dairy farming.

Bakshi (1970)\(^{14}\) studied the impact of Government Milk Supply Schemes, Jabalpur (M.P.) on the dairy farmers and found that socio-economic factors like size of family, size of landholding and number of animals owned had significantly favourable influence on daily milk production. He also reported that adoption of improved breeding, feeding, disease control and management practices had favourable effects on 52 to 82 percent adopters.

I.J. Singh, A.C. Gangwar and I.R. Chakravarty (1979)\(^{15}\) studied the seasonal variations in cost of milk production in case of milch animals in Haryana and reported that the cost of milk production from cows was the lowest in summer and the highest in winter. In case of buffaloes, it was the highest in summer and the lowest in rainy season.

Huria and Achaya (1980)\(^{16}\) stated that expansion of dairying was limited to the agricultural, economic,


technological and social constraints. They found that the limit to the degree of dairy development depends on the low cost of animal feeding and the animal feeding system should be so designed that animals compete minimally with man for foods that both can consume. They also underlined that the present western model of dairying, based on too much concentrates as it is expected for cross-bred cows, is not suitable in its entirety for developing countries.

Patel et. al. (1982) while studying the utilisation pattern of milk in project villages around Karnal in Haryana, observed that on an average, about 52 percent of the total milk produced was retained in the household for consumption and the remaining 48 percent was disposed off to various market outlets. It was also observed that out of total milk kept in the household for consumption 46 percent was utilised as fluid milk and about 54 percent was consumed in the form of milk-products. It was also reported that the per capita consumption of milk and milk products was higher in medium and large farm house-holds as compared to small land holders and landless dairy farmers.

17. Patel et.al. 'Milk Production and its utilisation around Karnal (Haryana)', paper presented at the Conference held at Punjab Agriculture University; 1982.
Gill and Patel (1984)\textsuperscript{18} studied milk production and disposal pattern in rural Punjab. They reported that dairy herdsize (Buffaloes, local cows and Cross-bred cows) and milk production per farm were positively co-related with farm area. They also observed that the marketed surplus of milk was greater on small holdings in comparison to medium and large farms and it was higher by 11.05 to 31.17 percent of the total production of milk.

Acharya, Varghese and Singh (1986)\textsuperscript{19} examined the dairy development of Ganganagar district in Rajasthan and observed that irrigated areas had absolute advantage in milk production vis-a-vis unirrigated areas. They found that expansion in irrigation and rapid technological change in crop farming had accelerated the growth of dairy enterprise in general and buffaloes in particular. They further reported that buffaloes had clear income advantage over cows in both irrigated and unirrigated areas.

Juneja (1987)\textsuperscript{20} suggested that it would be


\textsuperscript{20} Juneja, I.J. 'A study on the influences of certain factors relevant to herd management on the performance of Holstein Friesian and Jersey Cattle' at Hissar, 1987.
better to produce Jersey and Holstein-Friesian Stock locally rather than importing heifers or cows. He also mentioned that the cost involved in excess feeding could be avoided either by increasing the herd size or by reducing the feed and fodder procurement.

Doornbos and Nair (1987)\textsuperscript{21} emphasized that in place of introduction of foreign technology of artificial insemination of cows, upgrading of buffaloes should be considered as an alternative way of raising the productivity of milch-animals. In their view spread of concentrated feeds to the present stock of milch-cows would lead to a sizeable increase of the productive capacity and thus of the milk yield.

Dutt (1990)\textsuperscript{22} suggested Cross-breeding as a policy to overcome low productivity of our milch-cattle. He also favoured Operation Flood II Programme for effective utilisation of animal wealth and man power.


\textsuperscript{22} Dutt, S. 'Dairy as an instrument of development' \textit{Yojana}, May 16-31, 1990, pp. 18-20.
Education, size of family, size of land holding, number of milch animals and management practices have favourably affected the daily milk production but marketed surplus of milk was greater in the case of small holdings. A study on seasonal variations in cost of milk production in Haryana revealed that the cost of milk production from cows was the lowest in summer and the highest in winter. In case of buffaloes it was the highest in summer and lowest in rainy season. The limit to the extent of dairy development depended on the low cost of animal feeding. High cost of animal feeding based on large amount of concentrates was not suitable for developing countries as it competed with man for food. Irrigated area and buffaloes had clear income advantage over un-irrigated areas and cows respectively. In some studies cross-breeding policy was also suggested to overcome low productivity of milch cattle.

2.3. Dairying as an Instrument of Economic Upliftment

As stated before, the number of operational holdings in India is on the increase and the average size of holdings (1.68 hectare) is going down. Out of 97.73 million holdings, there are about 56.75 million holdings which were upto 1 hectare of land holding. With this subsistence level of agriculture
rural poor are mostly live in deprivation. They do not have assets, are not organised and do not have sufficient skills. Therefore, dairying can become a poor man's bread and may be proved as an instrument of economic upliftment of this section of the society. The following studies trace out some ways and means of economic upliftment through dairying.

Khan and Rao-Jude (1974) on the basis of their study in a few selected villages in Allahabad (U.P.) advocated that dairying could be instrumental in bringing about socio-economic changes amongst rural milk-producers in India, as well as other developing countries by improving the income of the weaker sections through co-operatives.

Patel, Thakur and Pandey (1977) while studying the impact of milk co-operatives in Kaira, Mehsana and Banaskantha districts of Gujarat observed that among milk suppliers to milk-co-operatives, 57.33 percent belonged to weaker sections who produced about half of the total milk production. They also

confirmed the earlier observations that marketed surplus of milk per household was comparatively higher with the weaker sections. They also found that contribution of dairy income to the total income was 65 percent for the landless, 27 percent for the small farmers, 24 percent for the medium and only 19 percent for the big farmers. They concluded that the milk co-operatives are of considerable benefit to the weaker sections.

Serka (1984)\(^\text{25}\) while studying the impact of Operation Flood I and II and covering dairy farmers whose holdings were less than 5 acres, more than 5 acres and landless persons indicated that most of the milk procured, was through small land-holders and landless labourers. He favoured milk-co-operatives as they significantly contributed towards the alleviation of poverty among rural milk producers.

Dhiman and Khirwar (1986)\(^\text{26}\) suggested measures for enhancing the income of rural women through dairy activities. They also advocated for fixing remunerative prices of milk, formation of women dairy co-operatives and their active participation in the process of modernisation of dairying.


Bowonder, Dasgupta, S. Gupta and Prasad (1987) suggested some steps which they considered necessary for improving food security and nutrition in rural areas. They also observed that the landless and marginal farmers could be more benefited and could have a continuous source of income with the dairy developmental activities in summer when agricultural employment remained low.

F. Doornbos (1991) while studying Dairy aid and development in respect of India's Operation Flood emphasized the need of introduction of foreign technology of artificial insemination of cows and upgrading of Buffaloes. It was also expected that Anand Model Co-operatives, could act as agents of social transformation.

It is significant to note that one of the above studies found that contribution of dairy income to the total incomes was 65 percent for the landless and 27 percent for the small farmers which was higher than the dairy incomes of the medium and big farmers. Milk co-operatives were of considerable benefit towards the alleviation of poverty as they procured most of the milk from small land-holders and landless


labourers. By involving women in dairy activities, fixing remunerative prices of milk, formation of dairy co-operatives and improving food security and nutrition, a continuous source of income could be provided to the landless and marginal farmers through dairy developmental activities in summer when agricultural employment remained low.

2.4. **Impact Studies**

In the past, a few researchers have also addressed themselves to examine the impact of organised milk marketing especially of the milk co-operatives on Anand Pattern and other dairy development programmes. Their findings bring out the impact of these programmes as follows:

Dahiya (1982) investigated, while studying comparison of specialised dairy farming, mixed farming and arable farming at Haryana Agricultural University, Hissar, that specialised dairy farming when compared to mixed and arable farming provided significantly higher milk returns.

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Sharma (1986)\textsuperscript{30} while studying the implementation of the Intensive Cattle Development Programme in the Gurgaon district of Haryana, found that the performance of the Programme was very unsatisfactory. The main focus of the study was on the delineation of the constraints which were identified from the viewpoint of farmers and field functionaries. He further pointed out that majority of the cattle keepers were seen as low adopters of improved breeding, proper feeding, management, nutrition, disease control and marketing practices. He also suggested a new management strategy and a proper communication system to make the Programme a success. An efficient management system would accelerate the adoption of improved dairy farming practices and promote infrastructural efficiency of the I.C.D.P. Organisation and a proper communication behaviour would create awareness and understanding among the dairy farmers about the modern dairy husbandry innovations.

Chauhan and Sengar (1988)\textsuperscript{31} in their study of a Mini-Dairy unit of 5 cross-bred cows managed on scientific lines, maintained that such a Mini-Dairy unit was a profitable enterprise and could provide

\begin{itemize}
\item \textsuperscript{31} Chauhan, B.R.S. and Sengar, M.S. 'Generating Employment Through Mini-Dairy,' Yojna, October 16-31, 1988, pp. 25, 26, 34.
\end{itemize}
full employment to at least one person regularly. As per their estimates, with an initial investment of just Rs. 43700, one could get a return of Rs. 20000 per annum after five years.

Mascarenhas (1988) worked on dairy co-operatives in Karnataka. He favoured the Cross-breeding or embryo technology for enhancing milk production. In his opinion Operation Flood Programme made a considerable impact on changing the attitudes of the people, moving towards commercialisation, enlarging employment and contributing village amenities.

Paul Seabright (1989) while studying two villages in Tamil Nadu, cautioned dairy farmers that Live-stock investments under Integrated Rural Development Programme was not a profitable or viable mode of production. He opined that the benefits from the livestock owned through I.R.D.P. loans were significantly low in comparison with those who were managing livestock with their own resources. He warned against subsidies and identified problems of such Livestock investments.

Jaya Chander (1990) suggested in his study of dairy development of Drought Prone of Chittor in Andhra Pradesh, that in order to increase per animal net returns and per farm human labour employment, a provision of availability of fodder and better marketing system for milk and milk products would have to be worked out.

Lalwani (1990) studied human labour absorption in Dairying in Haryana and suggested decomposition analysis for identifying the determinants that raised labour absorption when dairy farmers shifted in favour of cross-bred cattle. He recommended that the new technology of cross-bred cattle would succeed only if such animals lactated at higher levels than buffaloes and indigenous cows. But for this, he considered, availability of concentrates and other nutrients at reasonable prices, a bare pre-requisite throughout the year. Further, he raised many issues viz. could India's poor dairy farmers, being landless and having marginal farm sizes, afford to meet such bovine requirements? If not, the success of cross breeding of cattle with exotic dairy strains in providing gainful employment would remain open to question.

Parthasarathy (1991) in his study of White Revolution, Dairy Co-operatives and Weaker Sections, found a significant increase of milk production, though the claim of white revolution was exaggerated. He also observed that milch cattle were more equitably distributed than cropland and supplementary income from milk tended to reduce the overall inequities. In his observation landless labourers were not found to have benefited from dairy development and the policy of integration of marketing, input and veterinary services, was well conceived with some adjustment to agro-economic situations. He also reported adoption of the cross-bred varieties to the local conditions and advocated its further encouragement.

Smith and Sareen (1992) described in their study some constraints faced by women dairy farmers in India and proposed some concrete suggestions to overcome them.

Specialised dairy farming when compared to mixed and arable farming provided higher milk returns. The performance of I.C.D.P. in the Gurgaon district of Haryana was observed to be very unsatisfactory as cattle keepers were found to be low adopters of


improved breeding, proper feeding, management, nutrition, disease control and marketing practices. An efficient management and communication system was suggested to make the programme a success. A Mini-dairy unit of 5 cross-bred cows managed on scientific lines, was considered a profitable enterprise. Cross-breeding or embryo technology was also appreciated in one of the studies. Livestock investments under I.R.D.P. was depreciated as lower benefits were observed from the livestock owned through this programme in comparison to those who were managing livestock with their own resources.

2.5. Operation Flood Programme and Other Studies

Operation Flood is major plank of the current dairy policy in India, which seeks to promote the dairy farming on Anand pattern in all parts of the country. Operation Flood I was launched in July 1970 with the objective of laying the foundation for a modern dairy industry in India which would meet the country's need for milk and milk products. Operation Flood II was launched in October 1979 and it was intended to extend the foundations laid by Operation Flood I. Operation Flood III has been in operation since October 1987.
Nair and Jackson (1981) described the salient features of the Operation Flood II strategy, its weaknesses and more effective alternative strategy. They considered basic change in the village power structure a pre-requisite to the effective functioning of co-operatives and accepted the Anand Type Co-operatives as a viable model of village organisation to manage common resources and activities in their alternative strategy. The alternative strategy emphasised the more equitable and at the same time more productive use of scarce concentrate feed resources with 'desi' cattle and buffaloes rather than cross-bred animals. In their opinion cross-breeding technology was not suitable for India as it strengthened existing patterns of economic exploitation of the many rural poor by the few rural and urban rich and which might actually reduce nation's milk production.

George (1985) while critically evaluating Operation Flood Programme, described that for the restructuring India's dairy economy it was undoubtedly the most imaginative and innovative dairy programme. In his opinion, the basic structure of the project was defective as it was based on Anand Centrism.

reliant on foreign consultants and dependent on foreign funding. He brought out that it was capital intensive, inimical to the small milk producers and favourable to the large operators. It badly affected the potential of native cattle and did not cover the buffalo which was India's premier milch-animal. Hence, he concluded that western technology of milk production based on cross-breeding, was both economically and climatically inappropriate to India.

Surender Singh (1986) explored some important implications of the Operation Flood II Programme. He also drew almost similar conclusions to Shanti George by explaining that Operation Flood II did not seem to be a safe device to save the peasantry. In his attempt, he suggested to change the present policy and approach adopted in India under Five Year Plans. He indicated that the magnitude of shortages of live-stock feeds and fodder would increase with the increase in the number of cross-bred milch-cattle. This would also adversely affect the genetic potential of cross-bred cattle and hit hardest the small and marginal farmers and landless cattle keepers. Hence, mere introduction of cross-bred animals would not increase milk production in the country.

Achaya and Huria (1986)\textsuperscript{41} studied Operation Flood and considered it as a means of alleviation of rural poverty. In his opinion with better co-operative system this programme of dairy development could provide the hope for the fulfilment of a dream of rural poor.

Ratnam (1986)\textsuperscript{42} while examining demand and supply of milk products and their nutritional aspects, observed that land-linked dairying at local levels, would ensure proper dairy development if it was accompanied by latest technology (Cross-breeding), better marketing facilities and adequate transport facilities. In his study, he also analysed the role of all India and State-based undertakings which emerged after independence and the backsliding of the old tradition of Goushalas.

Baviskar and George (1986)\textsuperscript{43} distinguished the decentralised small scale production of milk

\begin{itemize}
\item \textsuperscript{41} Achaya, K.T. and Huria, V.K. 'Rural Poverty and Operation Flood', Economic and Political Weekly, XXI, No. 37, September 1986, pp. 1551-1556.
\item \textsuperscript{42} Ratnam, C. Dairy Development, Demand and Supply Aspects, Chugh Publications, Allahabad, 1986.
\end{itemize}
in India and the centralised large scale Operation Flood strategies and stated that the latter did not seem congruent with the existing situation.

Bedi (1987)\textsuperscript{44} studied the impact of the total dairy development programme in the Hoshiarpur and Sangrur districts in Punjab both at the level of beneficiaries and at the programme level. His observation was that the dairy practices, including maintenance of milch animals, their holding pattern, milk yield per animal, etc. remained almost constant during the pre-loan and post-loan periods. He also felt that the assumptions guiding the programme and the expectations of the respondents were also found to be mutually incompatible and thus failed to make any break-through in the prevailing dairy situation in the area. He concluded that dairy development programme with sufficient planning and control and better marketing oriented efforts might achieve the established objectives or reducing income disparities and desired profitability.

Randeria (1987)\textsuperscript{45} examined the findings made by the Joint Review Mission of the European Economic


Community and the World Bank on Operation Flood II. The Mission was of the opinion that "Operation Flood II was too ambitious" and that "the scope of the Project remained quite unrealistic." It concluded that "the quality of achievement was quite uneven across India and the States, ranging from very satisfactory to disappointing."

Naik and Singh (1988)\(^46\) in their study, criticised the adoption of cross-breeding in India and warned that switching cattle over to milk production might not be at the cost of draught power. They also stressed on the weaknesses of our cattle development schemes which aimed at exploiting the animals only for a single purpose i.e. for milk production. They also suggested that cattle development strategy might be such that animal's dual character was maintained and for this in the absence of adequate fodder resources, the cross-breeding policy would be a mistake. They further cautioned by saying that if land was spared for the production of fodder and/or if a portion of food grains was spared for animals, it would mean that animals might be in direct competition with men.

Shankari (1989) while studying the dairy development in Chittor district in Andhra Pradesh, found a mixed opinion on Operation Flood Programme. She maintained that cross-bred cow was a superior milch-animal to the local breed cow in the quantity of milk production if they were fed with green fodder and concentrates but the bullocks might not be dispensed with as they were not useful for working purposes in hot climate. In her view, this loss from bullocks would be compensated with the gains from the cross-bred cows. On the other hand she observed that the local bred cow even if it meant decreased incomes but investments and risks involved were smaller for landless labourers. She further explained that no wonder the farmers had a positive attitude to the programme in which the little income they derived from dairying went a long way in meeting their survival needs.

Sharma and Vanjani (1989) on the basis of a field study regarding women co-operatives of Shankpur in Rajasthan examined the class and gender biases in the present dairy policy. Women Milk Co-operatives under the Operation Flood Programme aimed

at providing employment, income and increased status for rural women but their observation was that these milk co-operatives appeared doomed to the same fate as the sugar co-operatives (Matson, 1984). They could not avoid concluding, along with critics of dairy development policies in India, that success would remain ephemeral for this island of development surrounded by a sea of inequality in landholdings, hierarchical gender roles and massive ecological crises.

Shah (1992) while analysing Dairy Development as a means of improving the nutritional status of rural poor, found that the Operation Flood project upgraded the overall standard of living of the poor milk producers. But simultaneously the role of the state as well as voluntary agencies in raising this, must be recognised. He also reported that as the problems of poverty and nutrition being deeply interrelated and very complex from the angles of the socio-economic inequality prevailing in rural India, a replication of Anand Model would perhaps be regarded incomplete without the replication of other rural development projects viz. nutrition, education, food fortification, price intervention through public distribution systems, integrated family planning and Balwadis etc.

Patel (1993)\textsuperscript{50} while addressing in the 52nd Annual Conference of the Indian Society of Agricultural Economics on the Present Status and Promise of Dairying in India emphasized comprehensively covering various aspects of dairying in India. He examined the role of dairying in sustainable Crop Farming in the context of Indian economy. He also suggested some changes in the present breeding, feeding and pricing policies in order to overcome or reduce the intensity of constraints of dairy development. In his opinion, the increasing economic demand for milk could be achieved if a small portion of the indigenous herd was replaced by high yielding animals in cattle by cross-breeding the non-descript cows with exotic breeds and in buffaloes through grading up of the non-descript buffaloes with improved breeds like Murrah. He also suggested some concerted efforts for increasing green fodder production through enhancing the productivity of fodder per unit area and introduction of forage crops on fallow lands, community waste lands, grazing lands, Government land on both sides of roads and rail etc. The bio-conversion efficiency of crop residues could be increased through supplementation with Urea molasses block, green fodder, by-pass protein feeds, etc. The crop residues could also be nutritionally improved through treatment of straws.

Sharma and Singh (1993) while examining Resource Productivity and Allocation Efficiency in Milk Production in Himachal Pradesh opined that there was a great variation in the relative economic efficiency of different breeds of milch animals reared in different resource situations due to variations in genetic characters, feeding and management practices. They further indicated that the optimisation of resources with the existing capital indicated the possibility of increasing the milk output in cross-bred cows and buffaloes by diverting a part of funds from green fodder, dry fodder and labour to concentrates. They considered concentrates as the most important input affecting milk production and suggested readjustment of feed inputs for raising milk production in all the seasons on both the beneficiary and non-beneficiary households.

In some studies an alternative strategy was suggested in which Anand Type Co-operatives with basic change in the village power structure were appreciated to manage common resources. The strategy emphasized the more equitable and more productive use of scarce concentrate feed resources with desi-cattle and buffaloes rather than cross-bred animals. To them, cross-

breeding technology was not suitable for India as it strengthened existing patterns of economic exploitation of the rural poor by a few rural and urban rich and that might reduce nation's milk production. Cross-breeding policy was not a safe device if it was not accompanied by land-linked dairying, better marketing facilities, adequate transport facilities and sufficient planning and control. Our Cattle Development Strategy would be appropriate so that animal's dual character was maintained i.e. milk production and draught power. In any case, it might not be such that animals would compete with men in matters of food resources.

Another group of proponents of Operation Flood Programme viewed that it reduced rural poverty and inequalities, increased milk production and nutritional status of the poor. To them, Anand Model Cooperatives could act as agents of social transformation. Dilip Shah viewed that a replication of Anand Model would be regarded incomplete without the replication of other rural development projects. R.K. Patel suggested some changes in breeding, feeding and pricing policies. He partly favoured cross-breeding to meet out increasing economic demand for milk by replacing a small portion of the indigenous herd by high yielding animals. After analysing the above studies it seems
that mixed policy as suggested by Shah might fulfil the dream of rural poor and would prove very useful in meeting the increasing demand of the urban consumers as well.

The above review shows that most of the studies have been undertaken especially in Gujarat, Karnataka, Punjab, Madhya Pradesh and Kerala. Some of the studies have been undertaken by some research institutions in the areas covered by cattle development projects and scientific dairying management practices and additional infrastructure in Haryana, Kerala and Karnataka. Some have emphasized on the need of Operation Flood and Milk-Producers Co-operative societies and some have rejected it under Indian conditions. Chauhan and Sengar have tried to analyse the mini-dairy unit of cross-bred cows run by the milk producer's own resources. Little efforts have yet been made to determine the income and employment capacity of the mini-dairy enterprise.