Chapter 2

REVIEW OF LITERATURE

The Indian dairy industry has changed radically in the last three decades. Milk production, which was stagnant between 1950 and 1970, has tripled since the early 1970’s. Despite the tremendous growth in population, per capita availability of milk has increased from 132gms per day in 1951 to 250 gms in 2006. Operation Flood (OF) launched in 1970 has played an important role in this transformation. Operation Flood has generated a large and controversial literature. Moreover, a lot of evidence on Operation Flood in the literature is anecdotal. In addition, it is clearly evident that over time, because of its enormous physical and financial size, expectations from Operation Flood have grown. The program was, and is a dairy production program with beneficial aspects. Much of the critical literature ascribes miscellaneous objectives to Operation Flood and then criticizes it for not meeting them.

2.1 Key Players in the Field

The most active group has been the Indo-Dutch Scholars. These Scholars maintain that their empirical findings do not confirm the "grand claims made for the Operation Flood Programme as a success story of global significance" (Doornbos, Stuijvenberg and Terhal 1987). Their work
is a collaborative effort jointly administered by the Indian Council of Social Science Research (ICSSR), New Delhi and the Institute of Social Science Research in Developing countries (IMWOO), The Hague. They argue that Operation Flood's contribution to increased milk production in the country has been negligible and its impact on poverty limited. They are also concerned about the practicality of replicating the Anand Pattern in widely differing regions of the country.

Doornbos and others (1990)\(^2\) prescribe four alternatives to Operation Flood: i) a rural milk production system based on goat and sheep rearing (to better meet the needs of the poorest) and on buffaloes, ii) a locally based system that would encourage rural milk consumption and local processing and marketing, iii) a network for marketing milk in urban areas that would build up trade between urban centers and adjacent villages; and iv) a "multimodel" approach that would replace the single Anand model.

Shanti George (1987)\(^3\) has provided an example of what she considers an alternative model for the dairy sector in India called "Operation Counter Flood". This model while emphasizing phasing out of dairy imports and maintaining the complementarity between agriculture and dairying has several of the ingredients which Doornbos and his colleagues have outlined above.

Franco and Chand (1991)\(^4\) evaluate dairy co-operatives affiliated with Surat District Co-operatives Milk Producer's Union (SUMUL) in the tribal belt of South Gujarat. They conclude that though the co-operatives
have benefited the tribal community as a whole, they have some very significant limitations. The authors argue that though the potential of Operation Flood is large it has not been able to benefit the poorest to the extent possible primarily because of its inability to reach the landless labourers and marginal farmers.

Somjee and Somjee (1989), in a longitudinal field research study spanning two decades, examine the performance of four milk co-operatives in Western India (Amul, Dudhsagar, Sumul and Sabar). The authors concentrate on the social and economic constraints affecting the poor and the largely successful efforts of socially concerned individuals from the dairies to reach them.

Mascarenhas (1988) examines the process of replication of the Anand model under Operation Flood-1 and 2. The author evaluates the Operation Flood Programme for its socioeconomic impact and development role, using Karnataka for an in-depth study.

The research studies of Mergos George and Roger Slade (1987) and of Alderman(1987) throw substantial light on Operation Flood. The former uses farm household data from 12 villages in Madhya Pradesh to test the hypotheses related to the production and distribution effects of the project. The latter uses multi-variate regression analysis on household level data from 42 villages to test the hypotheses on production and income effects of dairy co-operatives in Karnataka.
2.2 Production Impact of Operation Flood

Efforts to improve dairy production in India began under the First Five Year Plan (1951-56). More than half of the expenditures on dairy development under the First and Second plans were on cross breeding and artificial insemination. Government Programs such as the Key Village Scheme (KVS) and the Intensive Cattle Development Programs (ICDP) emphasized use of improved breeds of cattle to enhance milk production.

Mergos and Alderman (1987)\(^8\) furnished reliable estimates of the impact of Operation Flood on milk production on the basis of data collected in two World Bank-sponsored and funded research studies in Madhya Pradesh and Karnataka. The researchers used the technique of multiple regression with dummy variables to isolate and measure the impact of Operation Flood on milk output. They estimated that in Madhya Pradesh, milk output had increased by about 20% over a period of five years and, in Karnataka by about 50%. In other words, the average incremental rate growth in milk production in the Operation Flood areas vis-a-vis Non-Operation Flood areas was about 7% per annum. This seems to be a significant achievement of Operation Flood.

Kumar and Singh (1993)\(^9\) assessed the impact of Operation Flood on production of milk in Rajasthan and analyzed a data set of 90 households of two districts. The authors pointed out that total production of milk per household per day in the villages covered under Operation Flood was almost one and halftimes (6.92 litres) that in the Non-Operation Flood villages (4.93 litres).
Mattigatti et.al. (1993)\textsuperscript{10} evaluated the impact of Operation Flood on cow milk production in Dharwad district of Karnataka state, and concluded that the introduction of dairy co-operatives helped farmers to boost the production.

Gulati et.al. (1996)\textsuperscript{11} conducted a World Bank-sponsored study on the Indian Dairy Policy and Protection. The study revealed that the productivity of milk animals increased due to cross-breeding of the non-descript Indian cows with the high yielding exogenous cattle breeds. There are indications based on the data from various Livestock Census Statistics that the number of milk animals was increasing faster than the number of total bovine stock. In other words, relative to draft power, milk production has been a more important reason for maintaining the bovines and the share of cross-bred cows in the stock of cows has also increased due to the substantial rise in the number of Artificial Inseminations done in the 1980's.

In a recent study based on the available theoretical and empirical evidences, Mergos (1997)\textsuperscript{12} examined the ground reality of increase in milk production and direct impact of Operation Flood on milk production. The study admitted that the direct impact of Operation Flood on milk production growth had been modest and indicated that 25% to 50% of increase in procurement by Operation Flood was likely due to switching. It also advocated that milk production increase in the country was real and no evidence was available to show otherwise.
Kumar and Singh (1993)\textsuperscript{13} assess the impact of milk co-operatives in Rajasthan on the rural economy, analyzing data on 90 households in two districts. The author point out, “Total production of milk per household per day in the villages covered by the co-operative societies was almost one and a half times that in the control villages.”

Mattigatti and others (1993)\textsuperscript{14} evaluate the impact of Operation Flood on cow milk production in Dharwad district in Karnataka state, concluding that the introduction of dairy co-operatives helped to boost farmer's production of cow's milk.

Mishra and Sharma (1990)\textsuperscript{15} calculates a "feasible milk yield growth rate" from available information on growth rates for feed and fodder. The authors stress that a "warranted or required growth" of milk yield is associated with a given growth rate of milk production. Comparing the feasible growth rate with the warranted growth rate, they conclude that the actual rate of growth of milk production before 1970 was higher than official estimates. But from 1971-72 to 1985-86, it was lower. When recalculated to allow for an increasing proportion of cross-bred cows their recalculated "feasible milk yield growth rate" drops to a level compatible with reported statistics.

The debate in the post 1987 literature is mainly on how much credit for growth in milk production should Operation Flood receive. Program supporters would like to give Operation Flood most of the credit. Others argue that a combination of factors, in addition to Operation Flood, brought about the dramatic increase in milk production. They argue that assured
procurement prices for producers, technological progress and the increased availability of fodder were crucial.

Aneja (1994)\textsuperscript{16} maintains that an assured market and fair prices now available to Indian milk producers, even during the flush season played a major role in increasing milk production. He points out that milk producers receive approximately two-thirds of the consumer price.

Nair (1985)\textsuperscript{17} has identified an increase in the availability of feed for farm animals as a possible cause of increased milk production. Others refer to the positive impact of technological progress in the livestock sector. A 1996 World Bank document describes the research and training activities of the Indian Council of Agricultural Research and its subsidiary institutions, State Agricultural Universities, and private institutions and NGOs like the Bhartiya Agro Industries Foundation (BAIF). Describing the BAIF's crossbreed dairy programme, Satish and Farrington (1990)\textsuperscript{18} note that NGOs, which began experimenting with Semen-Freezing technology in 1975, now produce nearly 10% of the national crossbred dairy herd and operate approximately 500 cattle development centre's covering 1.5 million families in 6 states.

Munshi and Parikh (1994)\textsuperscript{19} attempt to decompose the growth of milk production on the basis of aggregate milk supply model. Their model considers the number of co-operative societies to be a measure of technological progress which they conclude was largely responsible for this growth in milk production. The author's note that, “the co-operative
net-work provides a natural channel for the dissemination of information as well as an infrastructure base for the adoption of new technology."

T. Shah (1987) asserts that Operation Flood addressed the key problem that had maintained the dairy industry at a "low level equilibrium". Most of the earlier cross-breeding and related programs to increase milk production did not achieve significant results because scant attention was paid to farmer's need for extension, veterinary health services, improved fodder, and access to markets. By providing for procurement, processing and marketing of member's milk, Shah argues, the co-operative system "attacked the crucial link between traditional dairying and its demand system." He observes:

"A good deal of research into the economic impact of dairy co-operatives has shown that the creation of a better marketing infrastructure itself is enough to bring about a major increase in a village's milk production. Most such research has viewed the output increasing effect of dairy co-operatives as a one shot threshold effect. Recent research conducted by the Institute of Rural Management, Anand (IRMA), however, indicates that the establishment and maturing of dairy co-operative institutions sets into motion a gradual and long drawn out process of modernization and growth based mainly on achieving fuller utilization of the 'slack' built into the traditional system".

Singh and Acharya's (1986) impact study covering three milk sheds in Madhya Pradesh supports the above viewpoint. Their analysis was based on a randomly selected sample of 604 households in 9 DCS
villages and 265 households in 3 control villages. The authors noted that in villages exposed to co-operatives, the average increase in the quantity of milk sold per household was greater than the average increase in the production.

Kumar and Singh (1993)\textsuperscript{22} also argue that higher production in villages with co-operatives can be attributed to the relatively well developed marketing infrastructures these villages enjoy.

Parthasarthy (1991)\textsuperscript{23} says, "The association of higher rates of growth of milk production with Operation Flood-1, which began in 1970, may give a false impression that it is the cause, and the improvement in the rate of growth, the effect". He reproduces data from Government documents to show that most states with high growth rates for milk production were not covered by dairy co-operatives at the close of Operation Flood-1. He states firmly, "There is only a weak causal relationship between dairy co-operatives and the higher rate of growth". He argues that the quantum jump in milk production in the 1970's was mainly due to the "shift from low yield cows to high yield buffaloes". Parthasarthy provides data which shows that while there was an approximately 11\% increase in the number of milk cows between 1961 and 1982, the she buffalo population in milk increased by nearly 40\% over the same period.

2.3 Socio-Economic Impact of Operation Flood

The 1987 literature review stresses the importance of drawing a distinction between absolute and relative changes in income. "Although
the projects may have a positive effect on average incomes and on the incomes of the poor, these income changes may not be equally distributed". After more than a quarter century of its existence, there appears to be a consensus on the program’s positive impact on incomes. But critics argue that Operation Flood has had a limited impact on the status of the poorest sections of Indian Society (the landless).

Franco and Chand (1991)\textsuperscript{24} who studied dairy co-operatives in the tribal belt of South Gujarat, state that in the Zankhvav taluka, average annual net income per co-operative member increased from Rs.2180 to Rs.3020 in three years. The author’s also add that "To say that the landless labourers and marginal farmers are relatively outside the co-operatives is to state a true fact".

While studying the impact of milk co-operatives in Mehsana, and Banaskanda districts of Gujarat, S.M. Patel, D.S Thakur and M.K. Pandey (1977)\textsuperscript{25} have observed that among milk suppliers to milk co-operatives, 57.33% belongs to the weaker sections, who produce about half of the total milk production. They confirmed that marketable surplus of milk is comparatively higher with the weaker sections. They further observed that income from dairying is much more significant for the medium and big farmers.

R.K. Shrivastava (1970)\textsuperscript{26} observed that milk co-operatives have given incentive to the milk producers in the form of assured and remunerative market for all their surplus milk and also provided them
facilities to adopt scientific husbandry and to integrate crop production and increase their net returns.

A study conducted by Katar Singh and Mukund Das (1982)\textsuperscript{27} indicated that in the well established milk-shed of Sabarkanta, the village with milk co-operatives stood in sharp contrast with those having none. Productivity of animals in the co-operative village was 1.5 times to that in the control villages, higher percentage of producers sold milk in the co-operative villages resulting in a 3.5 times higher dairy income among households there in consequently contribution per animal was 1.5 times to that prevailed in the control villages.

B.S. Bhaviskar (1990)\textsuperscript{28} analysed the impact of the dairy co-operative in the Sanjaya Gujarat. The dairy co-operative and AMUL have brought many benefits to the milk producer's in the village. They provide an assured market for milk at a reasonable price, and provide regular and efficient veterinary and extension services at the village itself. It is not easy to assess the contribution of dairy co-operative to reducing economic inequality. About 90% of the landless labourers are unable to take advantage of the co-operative. Thus the effectiveness of dairy development programmes as reducing poverty is severely limited even in ideal village such as Sanjaya. The author addresses to the replication of the Anand Pattern of dairy development in other parts of the country. In this regard, one cannot overlook the long tradition of milk production, the fertile and irrigated land to provide fodder, the proximity of a large market in Bombay, the business orientation of Gujarati Milk Producer's, the skilled
political leadership of the patidars, the creation of an efficient managerial cadre, the consistent support from the state and central Governments, and the generous aid provided by the various international agencies - the specially favorable conditions which enabled the evolution of the Anand Pattern, and which cannot be easily recreated elsewhere.

Parthasarthy (1991)\textsuperscript{29} has done an interesting analysis to see whether participation of the land poor in milk production is higher in a state where co-operatives are significant in comparison to the all India level. Comparing the state of Gujarat with the all India average, he finds a much better participation of the land poor households in Gujarat. However, Punjab which benefited immensely from the Green Revolution and also progressed in establishing dairy co-operatives records even better levels of participation. Parthasarthy finds that in Punjab, for every 100 small farmer household there were 126 bovine in milk as against 52 in Gujarat and 48 for all India. Parthasarthy argues that performance of the land poor is better when there is growth in dairy co-operatives along with high rate of growth of agriculture. He however found low participation rates among the landless in both the states: 9 out of 100 in Punjab and 17 out of 100 in Gujarat. He concludes that the large majority of landless households could not participate in dairying even in a state which records high rates of agricultural growth and substantial progress in building co-operatives.

Singh and Acharya (1986)\textsuperscript{30} reach a very different conclusion on the basis of their Madhya Pradesh study, which covers 12 villages in three milk sheds. Of these villages 9 had a DCS and the other three villages
were used as control villages. The analysis is based on a randomly selected sample of 604 and 265 households in the DCS and control villages respectively. The author's conclude that in villages exposed to Operation Flood the landless and poorer households had "Markedly higher milk production per household than their counterparts in the control villages". They add that "The lower caste and SC/ST households had higher milk production per household than the upper caste household".

Fulton and Bhargava (1994)\textsuperscript{31} also note that "A key characteristic of the individual producers is their small scale of operation with an average daily collection per member of 1.4 liters. Thirty five percent of the milk producers were landless while another 28% were marginal landholders".

Baviskar (1988)\textsuperscript{32} explains that Operation Flood was considered a means of overcoming the barriers of caste, class and power, something earlier rural development programmes had been unable to do. He notes, "Since milk production does not require much land, but mainly family labour which the poor have amply, the landless poor can easily and profitably participate in the white Revolution, deriving employment and additional income from it. Since milk is not a polluting substance in Hindu religious ideology, people belonging to any caste, even the lowest, can and do participate in producing milk ....... also co-operatives which organize only milk producer's can successfully bypass the constraints of village power structure".

Parthasarathy (1991)\textsuperscript{33} cites a number of reasons why the 'White' Revolution was thought to be more equitable than the 'Green' one. He
notes: as a resource the distribution of milk cattle is less inequitable than land, higher income elasticity of demand for milk in comparison to cereals, provides more opportunities for the employment of the landless in a growing dairy industry; it is easier to provide the poor with cattle resources than providing them with land; there is greater scope for the employment of women in dairy industry with favorable consequences for family health and nutrition. Hence, when the poorest did not benefit to the extent visualized, Operation Flood was criticized for being overly ambitious. Critics derived satisfaction in building strawmen and then reducing the achievements of the programme to naught. However, debate on the issue seems to have subsided since Dr. Kurien emphasized the limited poverty removal capacity of the program in the following words:

"Operation Flood is not an all-purpose poverty removal programme. It cannot be, because it focuses clearly on a single productive activity, dairying, while the ranks of the rural poor include many different categories of the disenfranchised: the old, the infirm, the tribals, the landless, the small farmers, the artisans, and so forth. Operation Flood is not an all-purpose development programme, aimed at removing economic and social inequalities existing in rural India for centuries at one stroke".

Somjee and Somjee conclude, "The phenomenon of rural poverty and the attempts to reach out to the rural poor with the help of post-independent India's most efficient agency of rural development, that is, milk co-operatives- when sought to be understood in any specific area, with in the framework of its broader social contexts, ... turns out to be far
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more varied and complex than our social sciences theories would have us believe. This is because its roots stretch out into cultural, political and human sources besides the economic”.

2.4 Constraints Faced by the Landless

The literature discusses the constraints which hinder the active participation of the landless in dairying. Though Baviskar (1988) identifies four major constraints on the ability of households to undertake milk production - the money to buy a buffalo; availability of fodder; space to house a buffalo; someone to look after the buffalo - he considers fodder to be the most serious. The landless lack the resources to buy, and the land to grow it.

Joshi (1990) observes that in Saurashtra, “the landless have to depend on village pastures for feeding their animals. Although pastures are available in large parts of Saurashtra, they are overgrazed. Therefore, the animals remain underfed. Moreover, the landless cannot always afford to buy fodder from the open market nor do they have access to the pastures owned by the landed classes”.

Somjee and Somjee (1989) who have landed the success of the SUMUL dairy which gets 70% of the milk supply from tribal villages, admit that in converting, “the milk less adivasis into milk producers.” SUMUL did not face a fodder constraint as the Adivasi Villages were located either on the edge of forests or had easy access to them. Describing the development of dairy industry in Karnataka, Mascarenhas mentions that
even large farmers find it difficult to set apart a certain amount of land for fodder cultivation as it means taking way scarce land from crop production.

Mergos and Slade (1987)\textsuperscript{37} while studying the distribution effects of milk production in an Operation Flood Project area in Madhya Pradesh find the capital and feed constraint to be ‘critical’ for households. They note that since the dairy project does not meet the credit constraint, participating households have to fend for themselves.

Verghan (1990)\textsuperscript{38} considers the fodder barrier to be stronger than the ‘credit’ barrier. He says that “the information of village co-operatives, the setting up of modern dairying infrastructure, together with the extension of various inputs such as veterinary care, artificial insemination and balanced cattle feed are expected to improve the economics of milk production…however, they are unlikely to improve the resource position of the poor, especially of the landless labourers in terms of fodder.”

Narendra Singh (1979)\textsuperscript{39} finds that programmes like ‘Operation Flood’ are intended to mitigate the crises in the economics of European countries and to gain control over the market and material resources of manpower in the third world. The programme will result in decreasing consumption of milk with in traditional milk production community, growing infiltration of foreign capital and the increasing technological dependence on the European countries.

Though Government poverty alleviation programs like the Integrated Rural Development Progamme (IRDP) provide subsidized loans
for the purchase of dairy cattle, critics argue that their impact is limited because of their inability to overcome fodder barrier.

J. George (1988)\textsuperscript{40} argues that though the objective of programmes like Integrated Rural Development Programme is to provide income earning opportunities for the poorest through provision of assets like milk cattle, they are unlikely to be successful merely by distributing animals in the absence of attention to marketing facilities and fodder requirement.

Chen and Athreya (1986)\textsuperscript{41} notice that though several NGOs provide loans to the poor for cattle, few simultaneously meet their fodder needs. The authors argue that “subsistence dairying by landless or land poor households is based on access to common grazing grounds and to sources of green fodder (wild grasses, field wastes). The fodder crisis in India is as great if not greater than the much talked–about fuel wood crisis. In many communities, the poor are being denied access to common grazing lands or to field wastes, which have acquired a commercial value as the demand for agricultural wastes both for fodder and industrial purposes has increased”.

\section*{2.5 Women and Operation Flood}

Gender issues have received considerable attention in the literature on dairying. Many critics think this to be a favourable development since women’s contribution to dairying was given little attention in the past. Shanti George notes (1991)\textsuperscript{42}, “The subordinate gender’s contribution to a subordinate activity (dairying) has for long been almost unacknowledged in the literature on rural development”.
2.5.1 Women in the Dairy Sector

Women’s important contribution to the dairy sector is now well recognized. Sen and Rani (1990)\textsuperscript{43} note that women constitute 93\% of the workers in dairying and animal husbandry, though their level of involvement varies from state to state.

Jamal (1994)\textsuperscript{44} quoting a study by Agarwal for Uttar Pradesh, notes that on an average, farm women spend approximately 3 hours per day on animal husbandry related activities. Women perform a wide array of tasks in the dairy sector. They process the milk, clean, feed, milk and tend the animal, collect the fodder, collect and process the cattle dung for fuel.

Critics argue that adequate representation is not given to women in dairy co-operatives and unions. Fulton and Bhargava (1994)\textsuperscript{45} note that in 1990-91 women made up only 15.5\% percent of the 7.40 million members in the co-operatives.

Bennet (1993)\textsuperscript{46} notes, “The membership in most of India’s 58, 885 village level dairy co-operative societies (DCS), is heavily dominated by men, even though female members do most of the dairy production work. Although there are now, 1086 all women DCSs in India, gender disaggregated data on membership for the remaining 57,799 are not available. Women constitute less than 3\% of total DCS board members.”

Rangnekar and others (1994)\textsuperscript{47} observe that many women are not even aware that their work of tending cows and buffalos is an important economic activity. Analysts argue that this merely shows that though
women are the actual managers of the milk economy, when it comes to participating in village or district level organizations, they get pushed aside and men take over. This practice is so deep rooted that women rarely complain.

The literature draws attention to the conscious efforts being undertaken by Government agencies, local communities non-Government organizations (NGOs) and women ‘activists’ to increase the participation of women in modern dairying. Manoshi Mitra (1986) mentions that though the Anand Pattern normally allows for the setting up of one co-operative per village an exception is made if the demand is for the setting up of a women’s only co-operative. Such efforts have sometimes produced spectacular results.

Somjee and Somjee (1989) describe the efforts of the rural community of Khadgodhara, (a part of Amul dairy) to bring their women, who are the actual managers of milk economy, to the forefront. In this effort, the women themselves played a major role. Through their untiring effort, determination and enthusiasm they were successful in running a women’s only milk co-operative. Though the Amul officials were initially reluctant to allow for the opening of a milk co-operative in Khadgodhara, as there was one in an adjoining village, they agreed when the demand was for a women’s only co-operative for the community. The authors note that since the women of the village knew that their performance was being judged by the men, they felt challenged and were determined to succeed against all odds.
Azad (1985)\textsuperscript{50} states that often “Government planning and policy making bodies that endeavor to integrate rural women in the development process, meet with little success due to lack of vision, poor and inaccurate data base as well as lack of consciousness at the implementation level”.

Manoshi Mitra’s (1986)\textsuperscript{51} example of a women’s co-operative in Kheda district brings to light the problems that emerge in women’s co-operatives despite the efforts undertaken by organizations like the NDDB. The women’s co-operative, which did very well for sometime, became dependent on male secretaries and teachers as technical skills and leadership qualities were lacking in the women. Mitra mentions that problems also arise when a co-operative is made into a women’s co-operative in name only as in the case of a village in Vaishali District in Bihar. In this situation, women are manipulated by men, and the class and caste biases of the original co-operative continue to influence the female members. Mitra stresses that to ensure that benefits reach poor women, conscious efforts need to be made to promote leadership and technical skill amongst them at the pre-co-operative stage.

Marty Chen and Anila Dholakia (1986)\textsuperscript{52} provide a case study of the role played by the Self Employed Women’s Association (SEWA) in collaboration with NDDB in promoting women’s involvement in livestock maintenance and milk production in a dry zone of Dholka block in the Ahmedabad district in Gujarat. The study illustrates the various obstacles in organizing poor women and offers valuable lessons for Government and NGOs with similar aims.
2.5.2 Impact of Modern Dairying on Women

Two radically different viewpoints are found in the literature about the impact of commercialization and modernization in the dairy sector on women. Critics argue that these processes have generated hidden costs and increase the work load of women who provide most of the labour. They argue that modern dairying reduces women from ‘doers and deciders’ to ‘doers only’. Advocates on the other hand argue that Operation Flood provides an opportunity for women to improve their economic and social status.

Dilip Shah (1992)\textsuperscript{53} who studied the impact of co-operatives in the Surat District of Gujarat observes that co-operativisation led to a rise in workload for women involved in dairying.

Sharma and Vanjani (1993)\textsuperscript{54} carried out an assessment of the impact of Operation Flood on the lives of women in a village in Alwar District of Rajasthan. Looking at women’s participation in dairying in Shankpur village, the authors argue that formation of women’s co-operatives creates more unpaid work for them and increases their stress. The authors add that women did not benefit in terms of nutrition either. “Women are the last to benefit from any increase in family consumption. Improvement of their health and nutritional status will require a restructuring of the family power structure and associated gender roles”.

Meera Chatterjee’s observation (1990)\textsuperscript{55} supports this viewpoint: “Gender is a significant determinant of nutritional levels, accounting for lower caloric intake and consequent poorer nutritional status among
females. Among the poor, resources such as food are limited, and females receive a smaller share than males. But as women have a relatively high economic value, they may be maintained above the survival line”.

The Indo Dutch critics also do not hesitate in admitting, “An improvement in the food situation of households in general does not guarantee that the nutritional status of vulnerable groups, young children and lactating and pigment mothers had become satisfactory”. Doornbos and others (1990)$^{56}$ argue however that it is important to distinguish between those women who substitute dairying for agricultural labour and those who take up dairying as an additional activity besides wage labour. They argue that where dairying substitutes for agricultural labour an improvement in the position of women producers can be expected.

Singh and Acharya (1986)$^{57}$ in their impact study at Madhya Pradesh Dairy Development Project tested whether the project led to an increase of female labour in milk production. They conclude that for all landholding classes total employment of male and female labour in milk production was greater in Dairy Co-operative Societies Villages in comparison to control villages. They further show that the project did not have a significant impact on female household labour used in milk production. They conclude that female labour employment in milk production was inversely related to the size of land holding (though relationship was weak).
Advocates provide examples to show the positive impact of ‘modern’ dairying on the status of women. Somjee and Somjee (1989) describe the achievements of one of the largest milk co-operatives in India. The authors remark, “Dudhsagar is perhaps the only co-operative which has made an official policy, and not merely a strategy to involve more and more women in its village level operations. “Consequently, there is increasing presence of women in diary related matters in the village where there was none earlier and women’s views, though to a large extent still expressed through their men folk, are no longer ignored in the community.”

Linda Mayoux (1995) drawing attention to the viewpoints of Dixon and Sunder in her work says “producer co-operatives, where women work together in a co-operative workshed outside the home, have been seen as having particular benefits because they challenge the norms of female seclusion and the unequal household division of labour.” The author elaborates that women empowerment could be an important objective for the co-operatives. So large is the benefit which women are perceived to receive from participation in producer co-operatives that Marty Chen and others (1986) recommend that as a matter of policy, 10 percent of all new dairy co-operatives should be women’s producer co-operatives. They also recommend that at least one-third of total members in existing primary co-operatives should be women and wherever possible there should be a sustained policy of transferring membership of co-operatives from men to women.
2.5.3 Constraints Faced by Women

The literature also draws attention to the social and cultural constraints which hinder active participation by women in modern dairying. Bennett (1993)\textsuperscript{61} notes, “Evidence is overwhelming that access- who gets what- is closely related to gender in Indian Society”. The inside/outside dichotomy” constraints their economic productivity while simultaneously limiting their access to education, health and other services like extension and training. The patrilineal transmission of land limits their access to financial services as land is the main form of collateral. “Though the intensity of the inside-outside dichotomy varies, on the whole, barriers to women’s access to resources and markets are greater in the northern part of India than in the south.”

Mitra (1986)\textsuperscript{62} argues that ‘Extension Services provided by the dairy do not often reach the women due to sociological constraints and a lack of focus on women’s activities”.

Many of the problems which poor women face with respect to their involvement in dairying activities are not very different from those faced by marginal and landless farmers in general. These are constraints with respect to access to land, fodder and credi. These constraints may be more severe in the case of women because of the other gender related constraints they face.
2.6 Implementation of the Anand model

The National Dairy Development Board’s (NDDB) relationship with the States and central Government, and the nature of the co-operative organization it has helped to build have been debated extensively in the literature. Critics argue that NDDB enjoys too much autonomy in carrying out its operations and follows a “top down strategy” which is not in keeping with the spirit of the Anand Pattern. Advocates on the other hand consider its mode of operation to be highly successful pointing out that the Government looks favourably on the organization and has placed more primary commodities like edible oils, fruits and vegetables under its umbrella. Supporters also consider programmes similar to Operation Flood, appropriate for dairy development in other Asian and African Countries, where prevailing conditions in dairying today are comparable to those that were once found in India.

2.6.1 The Institutions

The National Dairy Development Board (NDDB) and the Indian Dairy Corporations (IDC), created in 1965 and 1970 respectively, have the major responsibility for implementing Operation Flood. National Dairy Development Board was created as a registered society and enjoys a parastatal status. Indian Dairy Corporation was set-up under the Indian companies act 1956 to handle the financial aspects of Operation Flood. Both the institutions are managed by technocrats and are under the final authority of the Central Government’s Ministry of Agriculture. Following
the Jha Committee’s recommendations, the two were merged in August 1987 under the general umbrella of National Dairy Development Board.

Though dairy development is a state subject under the constitution, the centre and States exercise joint jurisdiction, with the Central Government laying down general guidelines within which the individual States design their dairy development policies. A significant shift in policy took place when the National Dairy Development Board was established in 1965. Initially the organization functioned mainly as an advisory body, but it soon acquired the main responsibility for dairy development in the country. Critics argue that the Operation Flood programme which involved the transfer of enormous amounts of dairy aid from EEC, was responsible for this change. The Indo Dutch Scholars argue “An Institution (NDDB) introduced as an annex to Central Government dairy development agencies evolved into being an usurper of those agencies”

Mascarenhas (1988)\textsuperscript{63} notes that since the State Governments have the responsibility of actually implementing Operation Flood, NDDB promotes its dairy development policies through a process which involves considerable networking with the states. He describes, “By adopting a strategy of persuasion, negotiation and bargaining with the implementing states, NDDB has adopted a collaborative rather than a controlling role. Such collaboration takes several forms (and) is supported, by a system of incentives to encourage state agencies to adopt new types of programmes.”

S. George (1990)\textsuperscript{64} notes that the state Governments are reluctant to surrender authority in dairy development matters to the National Dairy
Development Board. She adds that the NDDB’s negotiation strategy involves temptations, bargains, compromises and provides the “National Dairy Development Board (NDDB) with something of a tactical advantage, for delays and failures in the Operation Flood Programme can always be attributed to the dilatoriness or incompetence or hostility of various State Governments. “George adds that NDDB’s relationship with all states is not the same. In Gujarat National Dairy Development Board enjoys a sympathetic “insider” position, whereas in Maharashtra Operation Flood’s strategy of dairy development has been challenged by officials.

Doornbos and Gertsch (1994) note that the National Dairy Development Board enjoys considerable autonomy, because of the intermediary position between the donor agencies and Indian State Governments in addition to influencing dairy policy at the center.

Gertsch (1995) observes that though the main task of National Dairy Development Board was to replicate the Anand Pattern, through providing relevant advice and technical guidance to the states, Operation Flood (OF) gave it an opportunity to become a corporatist partner of the state. “In the planning, policy making and programme implementation, the National Dairy Development Board often claims to perform these functions in the interests of the farmers and at times on behalf of State Dairy Federations and Unions...."
2.6.2. Replication of the Model

The National Dairy Development Board has been criticized for failing to successfully replicate the Anand Pattern. Initially replication was to take place in Gujarat but when a large dairy surplus became available from the World Food Programme (WFP) and the European Community, expansion took off on a national scale. More than 70,000 Anand Pattern Co-operatives have been established since the National Dairy Development Board came into being in 1965. The 1987 literature review refers to the problems inherent in attempts at replication. The Review of International Co-operation noted in 1992:

“While there have been many outstanding success, there were also some symptoms that caused concern. In analyzing these, a common theme emerged: member participation and control was often less than necessary to ensure success. It was recognized that less than 20 percent of India’s co-operatives follow the Anand Pattern. The co-operative environment is dominated by the other 80 percent co-operatives that often do not share a commitment to the fundamental principles and values of co-operation”.

Some critics argue that the original Anand model and the model which was sought to be replicated throughout the country were so different in origin, technology, and mode of operation that replication would not be achieved. George has distinguished between two kinds of Anand Patterns: one which was found in the Anand milk tract of western India, the “real” Anand, and the other a “notional” Anand, and she attempts to bring out the
claimed divergence between the two patterns by testing some basic assumptions about the real Anand against evidence from the literature. On the basis of her analysis she states that “If the original appearance of the Union in Kaira had been the result of official planning or deliberate intervention by public or private development agencies, the question of replication would be simpler as situational factors and catalytic inputs might be more easily identified. The spontaneous, non-governmental emergence of this dairy co-operative, however, makes the issue more complex and analysis more difficult”.

The earlier literature review (Alderman, Mergos and Slade) made numerous references to authors who argue that replication of the Anand Pattern was not possible because of the special features associated with its origin and leadership. Patel (1990) highlights a number of factors specific to the original model, which were responsible for its success. In particular, she refers to the solidarity, skill and entrepreneurial capability of the land holding Patidar caste, the political influence they exercised, the large agricultural surplus they put into dairying as a subsidiary activity, the support of the national movement for the co-operative ideology, the proximity of the Bombay Market to the region, the age old dairy culture of the charotar tract, and the significant donations of foreign aid to the Kaira Union and Amul in the period prior to the inauguration of Operation Flood. Patel argues that these factors are not replicable. Patel concludes, “The National Dairy Development Board technocrats, in order to sell their product, the Operation Flood Scheme, marketed the myth of the Anand
Pattern as an organisational structure which, once put into operation, would be able to flood India with rivers of milk”.

Other critics question the idea of centralization inherent in the concept of replication. They argue that the approach of replicating the Anand pattern does not take into account the diverse features present in different parts of the country. Hence, the form of co-operation which emerges in various regions (because it is shaped by the local political, social and cultural background) is different.

Mitra (1990)\(^{68}\) observes that while in Kheda district in Anand, the milk producers came together spontaneously, in Bihar, because replication involved state initiative and supervision, caste and class relations had a profound effect on the nature of co-operation that emerged and largely succeeded in keeping the landless and the Harijans out of most of the co-operatives. Dairy co-operatives in the state at least in the short run added to the “process of polarization between different classes and caste groups”.

Critics have stressed decentralized approaches to dairy development as an alternative policy. As an example, Savara shows how the SUMUL dairy, because of the persistent development policy, was able to create a milk production culture in a tribal population totally inexperienced in dairying. Savara notes that the tribal co-operatives deviated “substantially” in their functioning from the Anand Pattern.

Gertsch (1990)\(^{69}\) argues that National Dairy Development Board’s (NDDB) top down strategy eliminates the role of self motivation which was
the driving spirit behind the ‘original’ Anand Model. The National Dairy Development Board’s method is to enter into negotiations with the State government which leads to the formation of a State Dairy Development Corporation which propagates the co-operative structure to the district and Village level.

Programme advocates do not consider replication to be an impossible task. They argue that it can be brought about if an attempt is made to adapt programme “essentials” to suit diverse conditions in different parts of the country. Mascarenhas (1988) argues for a heuristic approach which would not be replication, but a “prototype being improved by local people, with the help of professionals, who share the value of the farmers.” Mascarenhas gives another reason why replication may not occur successfully. He draws attention to indigenous forms of co-operation, like the ‘Jajmani’ System of reciprocity, that have operated for centuries in the Indian Society. He adds that building a successful dairy co-operative structure on the old existing indigenous one, basically involves the blending of the institutional (dairy co-operative) and indigenous form of co-operation. He quotes John Bennett: “If we view indigenous co-operation as the soil in which formal, institutional co-operative organization must be planted, we shall find that the indigenous forms may either assist or obstruct the task. Indigenous co-operation may bring disparate groups together, thus helping to implement egalitarian co-operation, or it may divide groups and reinforce barriers between them, in
which case it will impede the establishment of institutional co-operatives.” (quoted in Mascarenhas).

National Dairy Development Board (NDDB) was entrusted the task of creating ownership, participation and representation in States which have a vastly different socio cultural pattern in comparison to Gujarat. As Gertsch (1990) Notes, “The NDDB utilized various agents in implementing its programmes that includes Government officials, (political leaders and bureaucrats), public institutions, international aid agencies, farmers’ co-operatives at various levels, spearhead teams to mobilize co-operative organization at the grassroots level along with their counter part teams who sustain the impetus after the initial effort……….."Co-ordinating all these diverse actors to create the typical Anand Pattern is not an easy task. The National Dairy Development Board is aware that its efforts do not always result in the creation of a representative structure. It was set as a co-operative development group to increase member participation and control. The management of National Dairy Development Board is one with the critics on the issue that a fully effective operation depends vitally on farmer control at all three levels, lack of political / bureaucratic interference and employment of professional managers serving at the pleasure of the farmer controlled board of Directors. However, they are faced with the operational question of how to persuade politicians and bureaucrats to relinquish control to farmers, especially, where the state has historically invested substantially in milk processing factories and other infrastructure.
2.7 Sustainability

Operation Flood sought to lay the foundation of a modern dairy industry in India. The programme became possible when large amounts of dairy aid become available from a variety of International agencies, namely the World Food Programme (WFP) of the United Nation’s Food and Agricultural Organisation (FAO) and the European Economic Community (EEC). In addition, Operation Flood received bilateral assistance through the Government of India from several countries. Five loans from the World Bank provided additional funding.

Programme funds were generated by selling donated commodities and were utilized for enhancing milk production, and building an infrastructure for milk processing and marketing.

Doornbos and Gertsch (1994) discuss the reason why donors and recipients are interested in foreign aid. They observe that donors consider aid to be either an investment, a means of disposing off their surplus, or an instrument of development. They explain that the European Community, initially, thought of Operation Flood as a means of depositing its surplus and promoting its exports. In 1980s the EEC came to look upon aid as an instrument of development. India saw aid as a means of strengthening and achieving self sufficiency for its dairy sector and improving its balance of payments situation.

S. Patel (1990) comments that the “International linkages of Amul were forged only after it had succeeded in making milk production into a successful venture and had organized milk co-operatives around its
production base. International aid was invited only for the processing of surplus milk and not, it is important to emphasize, for the organization of milk production itself.”

2.7.1 The Dependency Debate

A key issue which has been the subject of much debate in the literature is whether Operation Flood has built dependency into the system. Dr. Kurian (1992) argues that operation flood is an example of successful utilization of food aid as an investment. He observes, “the overriding objective of all aid should be to eliminate the need for aid, and that the use of food aid as an investment would be seen to be the most likely way to achieve that objective.”

Banerjee.A (1994) adds, “The successful Indian dairy development programme Operation Flood has shown how food aid can be used as an investment in building the type of institutional infrastructure that can bring about national dairy development. Programmes like Operation Flood, with similar policy orientations, may prove to be appropriate to dairy development in other Asian as well as African Countries……..”

Critics argue that the programme is unstainable as large quantities of commodity aid and grants from a variety of international agencies made it possible. Doornbos and others (1990) explain that aid served to establish the National Milk Grid System (NMGS) which provides facilities for transport of milk over long distances. They argue: “The strong regional and seasonal variations in procurement combined with the high rate of milk utilization for manufacturing products in surplus areas would lead to
unacceptably low level of milk availability, especially in the urban and metropolitan areas outside the western region, if no foreign commodities were available to bridge the gap."

Doornbos and Gertsch (1994)\textsuperscript{77} note that even though National Dairy Development Board (NDDB) has made self-financing a statutory requirement, there is no strict adherence to this principle and subsidized capital is constantly used for capital investment and operating capital investment and operating capital loans. "The constant need for fresh money constitutes one of the most pressing reasons for continuation of aid."

Doornbos and others (1990)\textsuperscript{78} refer to two kinds of subsidization: Input subsidization and Investment subsidization. They argue that withdrawal of these subsidies would put the sustainability of the whole infrastructure in the doldrums.

J. George (1988)\textsuperscript{79} notes that though milk processing capacity in the country increased phenomenally under Operation Flood, procurement did not correspondingly increase. George explains, "As most of the capacity expansion programmes have been on account of aid induced investment, an unused capacity is evidence of the aid’s inefficiency."

Shanti George (1987)\textsuperscript{80} argues that the very policy decision which made Operation Flood depended for funds on the sale of imported dairy commodities was faulty because such funding by its very nature creates a "dangerous substratum of subsidies". George has provided an example of what she considers an alternative model for the dairy sector in India called
“Operation Counter Flood.” This model emphasizes phasing out of dairy imports.

Critics admit that the issue of how for National Dairy Development Board’s (NDDB) policy influence has led to a sectoral dependency by incorporating India’s dairy sector into the world market for dairy products needs further careful examination.

Gertsch (1990) argues that the depending argument with respect to foreign aid arises because of the pricing policy of milk. Gertsch notes that National Dairy Development Board (NDDB) sells the dairy commodity aid that it receives from the European Economic Community (EEC) to various dairies at a ‘transfer price’ lower than the indigenous cost of production of dairy commodities. Since this subsidy is then passed down, the real cost of dairy production for the whole sector gets obscured. Doornbos and others support this argument when they say “Over the period 1970-1985 a continuous stream of aid commodities has lended to blur the effective cost of such supply, partly as a result of the price policy which has been followed for many years.”

Dilip Shah (1993) argues that there is little truth in the dependency argument since over time, as a result of Operation Flood, India has developed skilled manpower, dairy technology and the capacity to manufacture dairy equipment and produce a diverse range of milk products.

Chatterjee and Acharya (1992) provide statistics to show that there has been a dramatic decline in dependence on imported skimmed
milk powder and butter oil. They show that imported skimmed milk powder and butter oil utilized as a percentage of total milk throughput in the organized sector was 54 percent in 1961, 17 percent in 1971 and has dropped to 2 percent in 1989.

Mascarenhas (1983) notes that even prior to Operation Flood, donated commodities and commercial imports of milk were coming into India and he argues that “By adopting the strategy aid for development Operation Flood I and II converted such commodities into funds which were then invested in developing the infrastructure for dairy development.”

Advocates point to the large physical capacity that has been built in the dairy sector as a result of aid. Sahni (1993) claims that the “world’s largest infrastructure for procurement, processing and marketing of rurally produced milk has been established in the country.”

Khanna (1994) refers to the tremendous capacity which has been built in the dairy equipment manufacture industry when he states that in 1970 almost 90 percent of the equipment and instruments for the dairy industry were imported where as now 90 percent is manufactured in the country.

Aneja (1994) describes how under Operation Flood – I “Skimmed milk powder and butter oil were made available to the metro cities at prices equivalent to producer prices for milk in India. The programme generated over 1000 million rupees which financed the setting up of additional milk marketing dairies in the metro cities and setting up of eighteen Anand Pattern district dairy co-operatives which were linked through a network of
rail/road milk transportation system ..........Imported milk powder was thus used to set-up milk powder plants in India eliminating the need to import."

2.8 Latest Reviews

R.V.Singh (2006) evaluated the Tribal Dairy Co-operatives in Madhya Pradesh with the main objective of assessing the impact of integrated Tribal Dairy Development Programme on the socio-cultural and socio-economic life of tribal dairy farmers. This study evolved a strategy for strengthening dairy development programmes in tribal areas which was also given to include educating farmers, building strong co-operative institutions, reasonable milk prices, providing veterinary services, cattle breed improvement, fodder banks and a special package deal for tribal people. In addition, this study also emphasizes the efficient running of dairy co-operatives.

Ronald E. Deiter, Roger A. Dahlgran and David M. Passe (2007) says that member awareness and member evaluation of dairy cooperative services in the North Central Region. Members seem well informed about services provided by only a few cooperatives. Years of cooperative membership, size of a producer's operation, awareness of the service by other members of the cooperative, and member's attitude about the importance of services are found to have a significant effect on a member's awareness. Contrary to recent allegations, members of larger cooperatives are most aware of services. Cooperative service policies seem consistent with member control. Finally it is demonstrated that
selective member education programs that generate an increase in member awareness may not necessarily enhance member support.

Kuntoro Boga Andri (2006) attempts to analyze the characteristic of Indonesia's dairy co-operative and its performance. The study revealed that, all dairy cooperatives sampled, facilitates and gives opportunities to farmers to carry on their small business unit and to improve. They attempt to develop the smallholding dairy farms into economically successful enterprises. It was found that the source of the increase in co-operative's capital and the total milk produced in this study, is neither the farmer's larger productivity nor cooperative operational unit working efficiently, other than due to the influence of increasing the number of farmer and the dairy cattle. Theoretically, the success of the increasing of capital for the productive investment will afford an upcoming, advantageous for the members in the form of better supports and services. However, this study has not yet found a significant correlation between the success in performance of the cooperative and the improvement of farmer's dairy enterprises.

Bir Bahadur Karki (2005) says that dairy cooperatives are found everywhere in both developed and developing countries. In developing countries, it is one of the income sources of their rural economy whereas in developed countries it takes the form of a sustainable business. These countries face different types of problems. Developing countries focus on increase in production volume of milk and milk product, and developed countries do on enhancement of milk product, brand, and merger of dairy
co-operatives. Dairy cooperatives have been getting various opportunities as well as facing different challenges. They are going to formulate different types of strategic planning to cope with these challenges and to get success. Strategic plans of dairy cooperatives in developing countries are, generally to increase production volume of buffalo milk, bring about the internal improvement in cooperative societies, reduce cost of production, provide quality service to consumer through skill, trained and educated manpower, and e-commerce. Strategic plan of developed countries is quite different from that of developing countries. Their strategic plans are to merge different dairy cooperative societies / institutions into a dairy cooperative, and compete in the global market with quality of products.

Pratyusha Basu Jayajit Chakraborty (2008)⁹² says in an article that livestock-based livelihoods are currently being promoted by international development agencies as part of global efforts to combat poverty. India's dairy development program, organized around village cooperatives, has become an important model for such efforts. The article aims to identify household characteristics that influence membership in India's rural dairy cooperatives by comparing two villages representing different degrees of success. Utilizing logistic regression methods, data collected through a comprehensive survey of all households in the two villages are analyzed to examine (1) how variables describing animal ownership, agricultural attributes, and household labor availability contribute to explaining membership in the dairy cooperative; and (2) whether factors influencing membership differ across the two villages. Our results indicate that
although agricultural property ownership influences cooperative membership in both villages, the kind of dairy animal used and labor utilized for dairying work also have a significant and context-specific effect on household participation.

2.9 Conclusion

Operation Flood has generated a large and controversial literature. This literature review, dealing primarily with literature in the post 1987 period, has attempted to highlight the main arguments of the key players in the field on production, socio-economic and gender impact of Operation Flood. The controversy regarding Operation Flood implementation and sustainability has also been visited. Lack of empirical data and scientific rigor continues to be a serious limitation of the available evidence on programme effect. A lot of evidence on Operation Flood is either anecdotal or is based on area specific case studies.

Absence of longitudinal studies makes it difficult to assess the precise production impact of Operation Flood. But sufficient evidence exists to show that there has been substantial growth in the dairy sector. The tremendous change in the dairy economy, the immense marketing network, the increased per capita availability of milk despite the tremendous increase in population are sufficient pointers of this growth. Directly or indirectly, Operation Flood has played a major role in this growth. A programme as large as Operation Flood is bound to be criticized. Though some critics have totally repudiated the usefulness of Operation Flood, they
have been noticeably silent on a plausible alternative for dairy policy in India. Their few suggestions are modest and not very convincing.

Evidence exists to show that Operation Flood has had a positive impact on income levels in rural India. Critics claim that Operation Flood has not benefited the poorest, but available evidence gives a mixed picture. Advocates argue that where the fodder and credit constraints have been tackled, the poorest have benefited tremendously. Numerous NGOs and socially concerned individuals have been undertaking active steps to integrate the poorest in the dairy development efforts of the community. There is need for more information and rigorous study to determine if better policies could overcome the fundamental fodder constraints faced by the landless, thereby extending the developmental impact of Operation Flood.

Advocates claim that Operation Flood is a boon for Indian rural women. They feel it provides them an opportunity to improve their social and economic status. Critics however point to an increased work burden for women. Whilst some women have certainly benefited, further empirical research is needed to conclude whether women on the whole have gained or lost.

The Anand Pattern has not been replicated uniformly. What has emerged all over the country are adaptations and variations on the Anand Pattern. This fact is well recognized even by programme administrators who, given the political and administrative set-up in the country, find it difficult to ensure farmer control and adherence to co-operative principles.
At the time of this writing, farmer control is still the subject of a nationwide political struggle, though more intense in some places than others. The serious contention by critics that Operation Flood has made India’s dairy sector vulnerable to external pressures, does not seem to have an empirical basis.

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