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India's Milk Revolution— Investing in Rural Producer Organizations

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Executive Summary

Over the last 25 years or so, the Indian dairy industry has progressed from a situation of scarcity to that of plenty. Dairy farmers today are better informed about technologies of more efficient milk production and their economics. Even the landless and marginal farmers now own highly productive cows and buffaloes in many areas. Application of modern technology and advanced management systems in milk processing and marketing have brought about a marked change in the market place. Consumers now have a wide range of choice of products and packages. The Operation Flood (OF) programme implemented by National Dairy Development Board (NDDB) played a key role in bringing about this transformation.

The importance of OF programme lies in its focus on small rural producers. Lucrative alternate employment opportunities are often not available in Indian villages making dairying an attractive option for many villagers. Low capital intensity, short operating cycle and steady returns make dairying a preferred activity among the marginal and small farmers (those having less than two hectares of land) and even landless who depend for fodder on common grazing and forest lands. About 57 percent of rural households in India are marginal and small farmers in many milksheds. Nearly 70 million households hold a total of 98 million cows and buffaloes. A majority of milk producers have 1 – 2 milch animals and account for some 70 percent of the milk production. On an average, about 22.5 percent of the income of the rural households is contributed by milk.

The Anand Pattern Cooperative structure comprises village level dairy cooperative societies (DCSs), which promote district level union, which in turn promote state level marketing federation. Starting in 1970, NDDB replicated the Anand Pattern cooperatives through the OF programme all over India. Anand Pattern envisaged:

- Decentralized milk production by small milk producers,
- Milk procurement by primary dairy cooperatives of milk producers,
- Centralized milk processing by union of dairy cooperatives, and
- Marketing of milk and milk products done by federation of unions.

The primary milk producers democratically govern this entire federal cooperative structure to ensure that the higher tier organizations are geared to serve the purpose of the lower levels and the gains at all levels flow ultimately back to the milk producers in a significant measure. The core feature of Anand Pattern model is farmer control on all the three stages, that is, procurement, processing and marketing of milk and milk products. The value addition at procurement and processing stages can be realized by the cooperatives only through control over marketing, thus making control over marketing an essential and critical feature for success. In contrast, many dairy cooperatives worldwide end up as suppliers of raw material to private companies as the private companies own the brands and marketing.

In 2003, dairy cooperatives account for the major share of processed liquid milk marketed in the country. Milk is processed and marketed by 170 Milk Producers' Cooperative Unions, which

federate into 22 State Cooperative Milk Marketing Federations. Over the years, brands created by cooperatives have become synonymous with quality and value. Brands like Amul (Gujarat), Vijaya (Andhra Pradesh), Verka (Punjab), Saras (Rajasthan), Nandini (Karnataka), Milma (Kerala) and Gokul (Kolhapur), etc are among those that have earned customer confidence. The achievements are summarized in Table 1 below.

Table 1: Achievements of Dairy Cooperatives in India

Reach

The Dairy Cooperative Network...

- includes 22 state federations in India
- in 170 milk unions covering over 285 districts
- covers nearly 1,01,000 village level societies
- is owned by nearly 11 million farmer members.

Milk Production

- India's milk production increased from 21.2 million MT in 1968 to 84.6 million MT in 2001-02.
- Per capita availability of milk presently is 226 grams per day, up from 112 grams per day in 1968-69.
- India's 4 percent annual growth of milk production surpasses the 2 per cent growth in population; the net increase in availability is around 2 per cent per year.

Marketing

- In 2001-02, average daily cooperative milk marketing stood at 134.23 lakh litres; annual growth has averaged about 5 per cent compounded over the last five years.
- Dairy Cooperatives now market milk in about 200 class cities including metros and some 550 smaller towns.
- During the last decade, the daily milk supply to each 1,000 urban consumers has increased from 17.5 to 47.3 litres.

Innovation

Bulk-vending - saving money and conserving the environment.

Milk travels as far as 2,200 km to deficit areas, carried by rail and road milk tankers.

95 per cent of dairy equipment is produced in India, saving valuable foreign exchange. Macro Impact

The annual value of India's milk production amounts to about Rs. 850 million.

Dairy cooperatives generate employment opportunities for some 11 million families.

Source: www.nddb.org

CATTLE play a significant role in the economic life of rural India. They have remained as the keystone of Indian farming since time immemorial as draught and milch stock. Their utility for the rural community is so high, that they are considered as embodiment of divinity. “Welfare be to our mother and father; Welfare be to our Cows” so said *Atharva Veda*. They have been contributing to the prosperity of rural India in more than one way. The Royal Commission on Agriculture made the following remark on the contribution made by the cattle (quoted in Khurody, 1974, p.4):

“The cow and the working bullock carry on their patient back the whole structure of Indian Agriculture. In the actual life of the people and in rural economy of the country, the relative importance of bovine animals is indeed much more marked than the figures of the total numbers of cattle suggest.”

The need for promotion of dairying in India arises from two main reasons: (1) supply of adequate quantity of milk at reasonable price to urban consumers, and (2) providing viable subsidiary occupation to unemployed rural poor so as to raise their income earning capacities. Dairy development programme makes these twin objectives coincide.

Although the government policy did not favour any one organizational form, the public and private agencies dominated the dairy industry during pre-independence era (Singh and Singh, 1998) and continued to do so until Operation Flood programme was started in India in 1970. Early efforts for organizing dairying on cooperative lines were made immediately after enactment of Cooperative Societies Act 1912. Government of India took some steps to improve the quality of milch animals and their productivity through Key Village Scheme launched in the First Five Year Plan, and Intensive Cattle Development Plan launched in the Third Five Year plan. However, in the absence of a stable and remunerative market for milk producers, milk production remained more or less stagnant. During the two decades between 1951 and 1970, the growth rate in milk production was barely one percent per annum, while per capita milk availability declined by an equivalent amount. During the 1960s, various state governments tried different strategies to develop dairying, including establishing dairies run by their own departments, setting up cattle colonies in urban areas and organizing milk schemes. Almost invariably, dairy processing plants were built in cities rather than in the milksheds where milk was produced. This urban orientation to milk production led to the establishment of cattle colonies in Bombay, Calcutta and Madras. Their main aim was meeting the demand for milk and milk products in big cities through improvements in milk collection, processing and distribution.

Unfolding the Vision of Sardar

As the government projects did not concentrate on creating an organized system for procurement of milk, the contractors and middlemen were exploiting the milk producers. The establishment of Kaira District Cooperative Milk Producer's Union Ltd., popularly known as AMUL, was in response to this problem.

The Polsons – a private dairy at Anand established in 1929 – procured milk from milk producers through middlemen, processed it and then sent it to Bombay, mainly to the Bombay Milk Supply Scheme. Bombay was a good market for milk and Polsons profited immensely. In the mid-1940s, when the milk producers in Kaira asked for a share of the profits, they were denied even a

modest increase. The milk producers went on strike, refusing to supply milk to Polsons. The Kaira milk cooperatives began as a response to put an end to this exploitation.

The first dairy cooperative in Gujarat was the result of a farmers' meeting in Samarkha village (Kaira district, Gujarat) on 4th January 1946, called by Morarji Desai on the advice of Sardar Vallabhbhai Patel, to fight rapacious milk contractors. It was Sardar's vision to organize farmers, to have them gain control over production, procurement and marketing by entrusting the task of managing these to qualified professionals, thereby eliminating the middle men. Sardar Vallabhbhai Patel assigned Tribhuvandas Patel the task of "making the Kaira farmers happy and organize them into a cooperative unit". The infant cooperative dairy, Kaira District Cooperative Milk Producers' Union Limited (KDCMPUL), -- now famous as AMUL -- was fighting a battle with the Polson Dairy which was privately owned. V. Kurien began working with these farmers in 1949, after returning to India from Michigan State University, where he earned a Master of Science of Mechanical Engineering (with distinction). When Kurien came back to India, he was posted as a Dairy Engineer at the government creamery, Anand, in May 1949. Young Kurien, fed up with being at the government creamery which held no challenge, volunteered to help Shri Tribhuvandas Patel, the Chairman of KDCMPUL, to set up a processing plant. At that time, only two village milk cooperatives were involved, representing only a handful of farmers.

The Kaira Union began with a clear goal, to ensure that its producer members received the highest possible share of the consumers' rupee. This goal itself defined their direction. The focus was on production by the masses, not mass production. By the early 1960s, the modest experiment in Kaira had not only become a success, people began to recognize it as such.

The secret of Amul was its success in combining the native wisdom of our farmers, and the skills and knowledge of professional managers. By forging this partnership, Amul placed the instruments of development into the hands of the people. This partnership implied a relationship of mutual trust, faith and respect: the professional had to recognize that he had the skills and knowledge, but the illiterate farmer had the wisdom passed onto him through generations of tradition. On their part, the farmers had to appreciate that, to survive in local and global market-place surcharged with competition, an economic organization like a cooperative must have committed professionals of the highest quality and integrity.

The basic structure of the Amul model is the milk producers' cooperative society at the village level. Membership in these cooperatives is open to all who need the cooperative's services and who are willing to accept the responsibilities of being a member. Decisions are taken on the basis of one member exercising one vote. No privilege accrues to capital, and the economic returns, whether profit or loss, are divided among the members in proportion to patronage. All the milk cooperatives in a district form a Cooperative Milk Producers' Union that processes the milk into various milk and milk products. The unions in a State are federated in to a Cooperative Milk Marketing Federation, which markets milk products of its member unions. Thus, the core feature of Amul model, which later came to be known as Anand Pattern Dairy Cooperatives, is farmer control on all three stages of procurement, processing and marketing of milk and milk products.

Farmers came from all parts of Gujarat to learn from Amul's success. They went back to their own districts and started their own cooperatives on Anand Pattern such as Mehasana, Surat, Valsad, Bharuch, Sabarkantha, Banaskantha, Baroda, Ahmedabad, Panchamhals, and Rajkot. After years of struggle, the cooperatives began to produce dramatic results. Gujarat Cooperative Milk Marketing Federation (GCMMF) was established in 1973 to jointly market the products produced by the dairy cooperative unions in Gujarat. Today GCMMF sells AMUL brand products not only in India but also overseas. In 2002-03, the GCMMF's turnover was over Rs.2700 crores making it the largest in the food industry. What started as a fledgling cooperative has now become a multi crore dairy industry.

The Genesis of National Dairy Development Board (NDDB)

The struggles and achievements of Anand Pattern dairy cooperatives in Gujarat got the attention of Government of India. In October 1964, on the occasion of the inauguration of Amul's cattle feed plant, the then Prime Minister of India, Lal Bahadur Shastri, spent a night as the guest of a village milk cooperative society near Anand. Impressed by the socio-economic changes brought about by the milk cooperatives, he expressed the desire for a national-level organization to replicate Anand Pattern dairy cooperatives throughout the country. Thus, in 1965, NDDB was registered under the Societies Registration Act, the Charitable Trust Act and the Public Trust Act. Consistent with its model and mandate, NDDB headquarters were established at Anand. The mandate of NDDB is to replicate Anand Pattern Dairy Cooperatives in other parts of the country through its now famous Operation Flood (OF) programme.

Operation Flood Programme

The OF programme is a unique approach to dairy development. During the 1970s, dairy commodity surpluses being built in Europe posed a threat and provided an opportunity to Indian dairy industry. The threat was massive exports of low-cost dairy products to India, which, had it occurred, would have tolled the death-knell for India's staggering dairy industry. The large quantities that India was already importing had eroded domestic markets to the point where dairying was not viable. The opportunity, on the other hand, was the potential of the European surpluses as an investment in the modernization of India's dairy industry. Assistance of the World Food Programme, food aid – in the form of milk powder and butter oil – was obtained from the countries of the European Economic Community (EEC) to finance the programme. It was the first time in the history of economic development that food aid was used as a buffer stock to stabilize market fluctuations as well as to prime the pump of markets that will later be supplied by domestic production. The overriding objective of all aid was the elimination of the need for aid.

During its initial stages, NDDB was assisted financially by the Government of India, the Danish Government and by AMUL. It also received aid from the United Nations Children's Fund (UNICEF) in the form of teaching material and equipment. In 1969, when the Government of India approved the OF programme and its financing through the monetization of World Food Programme-gifted commodities, it was found that the statutes under which NDDB was registered did not provide for handling of government funds. Therefore, in 1970 the government established a public-sector company, the Indian Dairy Corporation (IDC). The IDC was given responsibility for receiving the project's donated commodities; testing their quality; their storage and transfer to user dairies; and

receiving the dairies' payments. Thus, it served as a finance-cum-promotion entity while the entire OF technical support was provided by NDDDB. To avoid any duplication in their activities or overlap of functions, the IDC and NDDDB were eventually merged into a newly constituted NDDDB by an Act of Parliament passed in October 1987. The Act designated the NDDDB as an institution of national importance and accorded it the same autonomy of operation that it had enjoyed and which had been a major factor in its success.

The Three Phases of Operation Flood

The OF programme was implemented in three phases between 1970 and 1996. Working through the State governments, the OF programme created the 3-tier structure of Anand Pattern dairy cooperatives all over India.

Phase-I of OF implemented during 1970-79 was financed by the sale within India of skimmed milk powder and butter oil gifted by the EC countries via the World Food Program. As founder-Chairman of the NDDDB, Dr. Kurien finalized the plans and negotiated the details of EEC assistance. During its first phase, the main thrust was to set up dairy cooperatives in India's 18 best milksheds, linking them with the four main cities of Bombay, Calcutta, Delhi and Madras, in which a commanding share of the milk market was to be captured. It involved organizing dairy cooperatives at the village level; creating the physical and institutional infrastructure for milk procurement, processing, marketing and production enhancement services at the union level; and establishing dairies in India's major metropolitan centres. Thus the first phase of OF programme not only laid the foundation for India's modern dairy industry but also established the possibility of successfully replicating a robust design-concept.

Phase-II, implemented during 1979-85, covered some 136 milksheds linked to over 290 urban markets. The seed capital raised from the sale of WFP/EEC gift products and World Bank loan had created, by end 1985, a self-sustaining system of 43,000 village cooperatives covering 4.25 million milk producers. Milk powder production went up from 22,000 tonnes in the pre project year to 1,40,000 tonnes in 1989, mainly due to dairies set up under OF programme. The EEC gifts thus helped to promote self-reliance.

Phase-III, implemented during 1985-96, ensured that the cooperative institutions become self-sustaining. With an investment of US\$360 million from the World Bank, commodity and cash assistance from the EEC and NDDDB's own internal resources, the programme achieved substantial expansion of the dairy processing and marketing facilities; an extended milk procurement infrastructure; increased outreach of production enhancement activities; and professionalization of management in the dairy institutions. Facilities were created by the cooperatives to provide better veterinary first-aid and health care services, breed improvement technologies like artificial insemination, cattle feed, hygienic milk production techniques and modern animal husbandry management techniques to their producer members.

Impact, Results, Analysis

Over the last 30 years or so, the Indian dairy industry has progressed from a situation of scarcity to that of plenty, making India the largest producer of milk in the world. The credit for this should mainly go to OF programme.

The impact of OF programme can be assessed using various criteria and dimensions. Some of the more salient dimensions are: (i) the achievement of Anand Pattern dairy cooperatives on some important parameters; (ii) women DCSs; (iii) overall increase in milk production, overall per capita milk availability, (iv) product and market leadership of dairy cooperatives, and (v) impact at the micro-level (district union level).

The Overall Impact of Operation Flood Programme

Some select data on the growth of dairy cooperatives during the three OF phases along with the post OF growth is presented in Table 2. It is heartening to note that the momentum of growth is maintained during the post OF period. This indicates the solid foundation laid by the OF programme.

The OF programme was funded by a World Bank loan, EEC food aid and internal resources of NDDDB. The total investments at the end of Phase III of OF programme were estimated at Rs. 15.87 billion. By 1996, the higher growth rate attributed to OF programme was resulting in an extra 43 million metric tons of milk per annum. Since the start of the faster growth trend, and using a 70 percent rate to compound its value to 1996, the total increment was 1,086 million metric tons. Each ton would require about \$310 of imported ingredients if it were to be replaced with recombined milk. If even 2.00 percent of the observed increase in milk production were due to all investments from World Bank, EEC, and NDDDB's own resources, it would return an economic rate of return (ERR) of 10 percent. The returns are phenomenal if most of the increased growth is attributed to OF programme. Partly this is due to congenial environment created by OF for members to invest in biological assets - milch animals - that periodically reproduced themselves without major reinvestment and continue to yield regular benefits utilizing crop residues that otherwise do not have much economic value.

Table 2: Salient Features of Operation Flood and Achievements, 1970-96

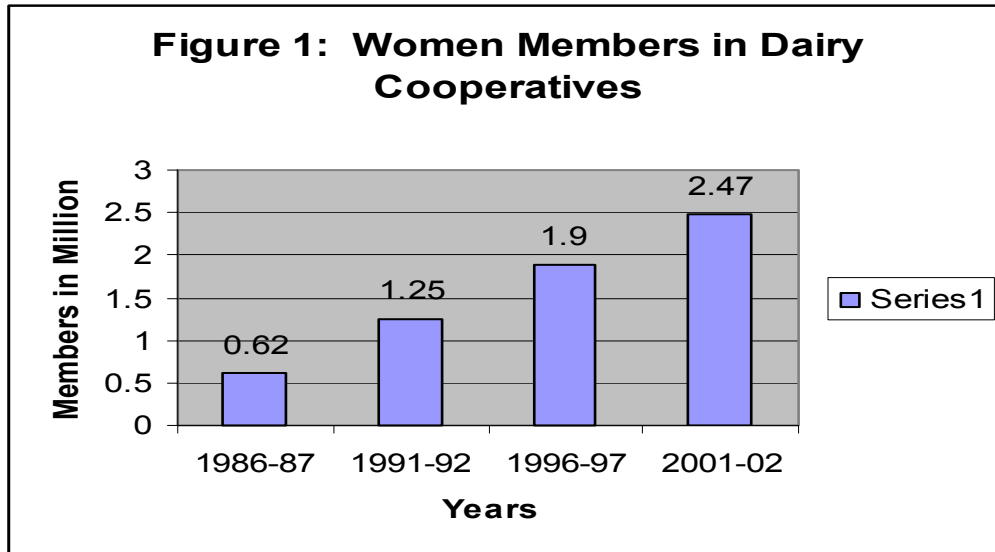
Features	OF Phases			Post OF Phase
	OF - I	OF - II	OF - III	
Date When Started	July 1970	October 1979	April 1985	April 1996
Date When Concluded	March 1981	March 1985	March 1996	March 2002
Investments (Rs. crore)	116.5	277.2	1303.1	
No. of Federations/Apex Milk Unions set up	10	18	22	22
No. of Milksheds covered	39	136	170	170
No. of DCSs set up ('000)	13.3	34.5	72.5	74.3
No. of Members (lakh)	17.5	36.3	92.63	110.6
Average Milk Procurement (mkgpd)	2.56	5.78	10.99	17.60
Liquid Milk Marketing (llpd)	27.9	50.1	100.2	126.72
Processing Capacity:				
Rural Dairies (llpd)	35.9	87.8	180.9	264.7*
Metro Dairies (llpd)	29.0	35.0	38.8	NA
Milk Drying Capacity (MTPD)	261.0	507.5	842.0	990.0*
Technical Inputs:				
No. of AI centres ('000)	4.9	7.5	16.8	22.0
No. of AIs done (lakh/year)	8.2	13.3	39.4	~60.0
Cattle feed capacity ('000 MTPD)	1.7	3.3	4.9	5.2*

Note: mkgpd: million kg per day; llpd: lakh litre per day; MTPD: metric tonne per day; *Figures pertain to 1997-98.

Sources: (1) Dairy India 1997; (2) Quarterly & Monthly Progress Reports on Operation Flood, NDDDB, Anand, 1996 as quoted in Singh (1999b:205); NDDDB annual Report 2001-02, NDDDB

Women Dairy Cooperatives

The milch cattle in India are mainly tended by women. Amul has realized this and built women empowerment activities as an important component of dairy development programme. In the early phases of OF, the strategy was to train women in the modern animal husbandry practices. A large number of training programmes were specifically organized for them. Special incentives were given to all women DCSs to encourage participation of women in governance of dairy cooperatives. More recently, NDDDB launched Women Dairy Cooperative Leadership (WDCL) programme to further strengthen women empowerment efforts. The main objective is to train and position local women as resource person in the village. According to NDDDB's Annual Report 2001-02, the number of district unions covered under WDCL increased to 50 in 2002, cooperatives to 2062, and participants to 90,000. The number of women members in dairy cooperatives is much more impressive. It increased from 0.67 million in 1986-87 to 2.47 million in 2001-02 (see Figure 1).

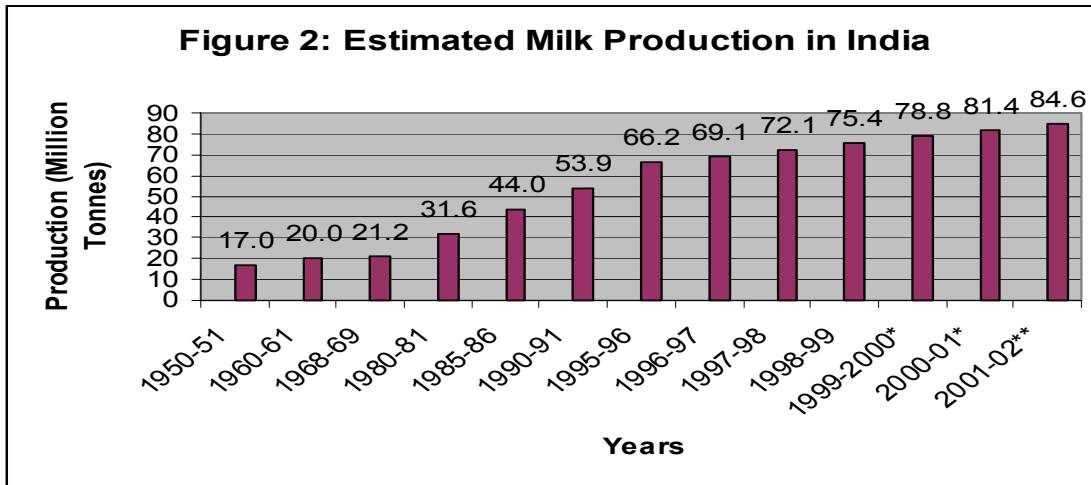


Source: NDDDB Annual Report 2001-2002

Positive Impact on Milk Production

The milk production 1968-69, just before the launching of Operation Flood was only 21.2 million metric tones. It has increased to 30.4 million metric tones by 1979-80, 51.4 million metric tones by 1989-90, and 84.6 million metric tones by 2001-02. The progressive growth in milk production in India is shown in Figure 2.

The increase in milk production is slow to start with. It increased from 21.2 million tones at the beginning of Operation Flood programme in 1968-69 to 31.6 million tones when the first phase of the Operation Flood was concluded with a simple annual growth rate of 4.08 per cent. The annual growth rate was much higher (7.85 per cent) during the Operation Flood second phase, and continued to grow at 5.05 per cent per annum during the third phase of Operation Flood (1985-86 to 1995-96).

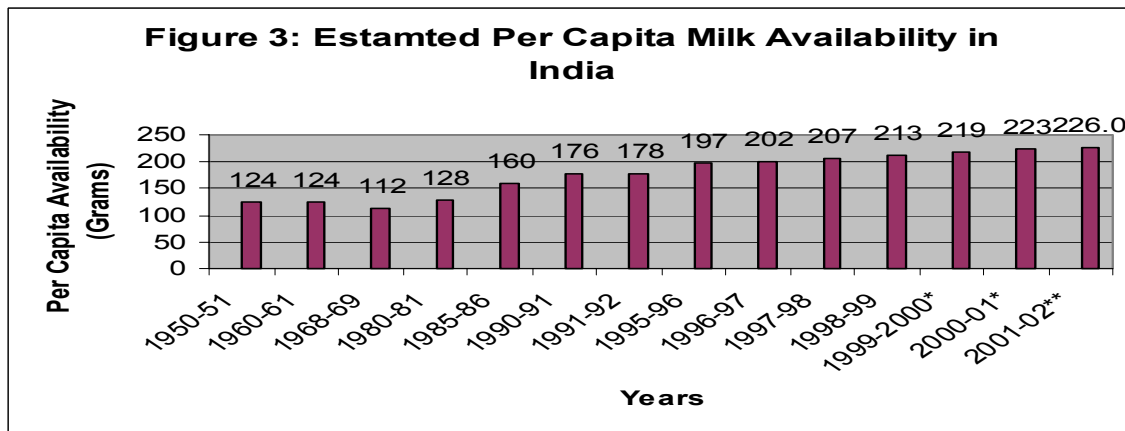


Note: *Provisional; ** Anticipated Achievement

Source: Basic Animal Husbandry Statistics 2002

Positive Impact on Per Capita Milk Availability

As a result of substantial increase in milk production, milk consumption in India has risen from a low of 107 grams per day in 1970 to over 226 grams per day in 2002. The details of the growth in per capita milk availability are given in Figure 3.



Note: *Provisional; ** Anticipated Achievement

Source: Basic Animal Husbandry Statistics 2002

Substantial increase in milk production and milk availability have resulted in stabilization of milk prices in the country; India's towns and cities receive an adequate supply of hygienic milk; and the small farmers and landless laborers who comprise the majority of dairy cooperative membership now have a regular source of income

Product and Market Leadership of Dairy Cooperatives

Milk is processed and marketed by 170 Milk Producers' Cooperative Unions, which federate into 22 State Cooperative Milk Marketing Federations. Over the years, brands created by cooperatives have become synonymous with quality and value. Brands like Amul (Gujarat), Vijaya (Andhra Pradesh), Verka (Punjab), Saras (Rajasthan), Nandini (Karnataka), Milma (Kerala) and Gokul (Kolhapur), Sudha (Bihar) are among those that have earned customer confidence, and have become a market leader in the concerned State besides having significant presence in other States of India. The largest food company in India, as mentioned earlier, is cooperative milk marketing federations, the GCMMF. The market share of some of the products of GCMMF is given in Table 3. The success of GCMMF proves that cooperatives can successfully compete with multi national companies.

Table 3: Market Share of Some Select Products of GCMMF in 2002-03

Sl. No.	Category	Brand Name	Market Share percent	Industry Rank	Competitor
1	Infant Milk food	AMULSPRAY	65	#1	Nestle
2	Dairy Whitener	AMULYA	60	#1	Nestle, Britannia
3	Whole Milk Powder	AMUL WMP	80	#1	Nestle
4	Skim Milk Powder	SAGAR SMP	50	#1	Anik
5	Butter	AMUL BUTTER	80	#1	Nestle, Britannia
6	Breadspread	AMUL LITE	80	#1	Nutralite
7	Cheese	AMUL CHEESE	60	#1	Britannia
8	Cheese Spread	AMUL CH SP	80	#1	Britannia
9	Mozarella Cheese	PIZZA CH	70	#1	Britannia
10	Emmental Cheese	EMMENTAL	80	#1	Imported
11	Fresh Milk	AMUL (A'bad)	60	#1	Britannia
12	UHT Milk	AMUL TAAZA	60	#1	Nestle
13	Fresh Curd	MASTI DAHI	75	#1	Nestle
14	Pure Ghee	AMUL GHEE	25	#1	Nestle
15	Ice Cream	ICECREAM	40	#1	Hindustan Lever, Vadilal
16	Condensed Milk	MITHAI MATE	55	#1	Nestle
17	Ethnic Sweets	SHRIKHAND	50	#1	Warana

Source: Personal Communication from BM Vyas, 2003.

The Impact of Milk Co-operatives at Micro Level

A number of scholars have recently attempted to study the impact of milk co-operatives on milk production, milk price, income, and employment, and have compared milk co-operatives with private traders/dairies. Impact evaluation has been mostly done using the “with and without” approach and the impact was found to be positive in almost all the cases studied (Singh and Singh 1998). For example, Singh and Das (1984), in their study of “Impact of Operation Flood I at the Village Level”

in three selected milksheds in India, namely, Bikaner in Rajasthan, Sabarkantha in Gujarat, and Periyar in Tamil Nadu, observed that the average milk yield per milch animal, the average milk production per household, the average price received by milk producers, the level of employment in dairying, and the average per capita daily intake of calories and protein from milk and milk products were all substantially higher in the co-operative villages than in the control villages (Table 4).

Table 4: Village Level Impact of OF- I in Bikaner, Periyar and Sabarkantha Milksheds, 1980

Sl. No	Particular	Bikaner		Periyar		Banaskantha	
		Co-op Villages	Control Villages	Co-op Villages	Control Villages	Co-op Villages	Control Villages
1	Average milk production(l/hh)	190.96	134.17	121.36	90.89	89.63	43.14
2	Average milk production (l/hh/per milch animal in milk) last month	109.02	69.21	69.74	62.24	79.31	53.25
3	Average price realised(Rs/l)	1.36	*1.14	2.02	1.52	1.76	1.96
4	Gross revenue from milk and milk products (Rs/hh)	142.99	14.24	220.77	84.80	102.16	29.54
5	Gross revenue per milch animal in milk (Rs/hh)	81.71	7.34	126.87	58.08	90.40	36.47
6	Average annual income from milk (Rs/hh):	428.78	938.40		49.40	557.79	370.75
	a) Landless households	** (3.43)	(2.47)	32.41 (2.38)	(6.43)	(11.51)	(11.72)
	b) Landed households	1672.61 (96.57)	1596.59 (97.53)	543.37 (97.62)	253.51 (93.57)	1619.97 (88.48)	788.74(88.28)
7	Employment in days from dairying (hh/annum):	76.84	190.10	79.28	40.04	66.54	
	a) Landless households	(67.57)	(53.28)	(11.38)	(5.03)	(14.62)	38.97 (19.91)
	b) Landed households	169.84 (32.47)	100.60 (26.06)	180.36 (35.32)	155.91 (32.13)	169.21 (38.26)	156.20(36.40)
8	Calorie intake from milk and milk products (K calorie/ capita/day)	460.0	255.0	107.0	94.0	154.0	97.0
9	Protein intake from milk and milk products (gm/capita/day)	9.0	6.0	4.0	4.0	5.0	4.0

* Implicit value of milk in terms of ghee price. ** Figures in parentheses represent percentage of the aggregate income, in case of employment these are percentage of total employment in all activities.

Source: Katar Singh and V. Mukunda Das, Impact of Operation Flood I at Village Level, Research Report I, IRMA, 1984.

The landless households in the co-operative villages were found to be better off than their counterparts in the control villages in terms of most of these criteria. The vulnerable section of the rural populace, i.e., children below six years, and expectant and nursing mothers in the co-operative villages had, by and large, better nutritional status than their counterparts in the control villages.

Similarly, Parthasarathy (1991) cites a number of reasons why the white revolution was thought to be more equitable than the green revolution. He notes that as a resource the distribution of milch cattle is more equitable than land; higher income elasticity of demand for milk in comparison to cereals provides more opportunities for the employment of landless in dairying industry; it is easier to provide poor with cattle resource which biologically multiply than providing them with land by redistribution; and there is greater scope for the employment of women in the dairy industry with favourable consequences for family healthy and nutrition.

Arora and Bhogal (1996) found the performance of the Meerut Milk Union to be highly satisfactory with about 50 per cent of the milk markets in rural areas captured by dairy co-operatives. The prices paid by milk co-operatives were higher than those paid by private vendors. However, the authors emphasize the need for more proactive role on the part of dairy co-operatives in order to meet the stiff competition from private milk vendors. Singh and Chattaraj (1996) found that the average number of cross-bred cows per household and the average family labour income per milch animal per annum were both higher in the villages having milk co-operatives as compared to the villages without milk co-operatives. The authors conclude that the dairy co-operatives had a positive impact on income of the members. Koli (1996) in a similar study of Gokul Co-operative Dairy in Kohlapur district of Maharashtra found that the co-operative had played an important role in securing fair price to milk producers, in providing various inputs and services to them and in increasing employment opportunities.

Empowerment Elements

Empowerment is a multi-dimensional construct. We have used the framework suggested by World Bank for assessing the OF programme on the following empowerment dimensions.

- Social empowerment
- Economic empowerment, and
- Political empowerment.

Social Empowerment

Social environment deals with the issues of exclusion and inclusion. The issues of inclusion and exclusion become important in a multi-religious, multi-cultural and highly stratified society like India.

The National Commission on Agriculture observed in its 1976 report on Rural Employment, “Next to crops, animal husbandry programmes have got the largest employment potential. The most important feature of these programmes are that they provide subsidiary occupation, offer gainful

employment at the location itself and make better utilization of female and child labour..... Most of these programmes are particularly suitable for weaker sections of the rural community and have redistributive effect on rural income in favour of them” (Quoted in Mascarenhas 1988, p. 47).

Baviskar explains that OF was considered a means of overcoming the barriers of caste, class and power, something earlier rural development programs had been unable to do (Baviskar 1988, p. 346). He notes, “Since milk production does not require much land, but 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 the Hindu religious ideology, people belonging to any caste, even the lowest, can and do participate in producing milkalso cooperatives which organize only milk producers can successfully bypass the constraint of village power structure.”

Furthermore, although, OF was not designed to eradicate the problems of poverty and unemployment, it is true that millions of landless households, and marginal and small farmers who were engaged in milk production and were all poor who benefited a lot from increased income and employment opportunities generated by OF. Of the farm families covered under OF, 21 percent had no land, and another 66 percent were marginal and small farmers owning less than four hectares of land. Over 70 percent of the participating households had one or two milch animals (NDDDB 1987:7). Thus, OF turned out in practice to be a pro-poor programme and improved the distribution of incremental income from milk among rural milk producing households more equitably.

As far as empowerment of women is concerned, it was mainly through Women Dairy Co-operative Societies (WDCs) seriously being promoted during third phase of OF and post OF period. In the WDC’s women find themselves empowered, as they are authorised to make their own decisions by way of holding meetings outside the home. Income from WDCs enables the women to make most household expenditure without being dependent on their husbands. Regarding employment generation for women, OF has played an important role. With 3.5 million milk suppliers, “it is reasonable to assume that 5 percent represented women who were able to stay at home rather than go out for work. This withdrawal of women from the labour force will have created an additional 175,000 labouring jobs, predominantly for the very poor” (Candler, Kumar 1998 p 50-51).

The village dairy cooperative also empowers people at another level. The village cooperative is a clean well lit and orderly place. The villages have gone through a similar transformation ever since the cooperatives began to operate. When the people of a village see cleanliness, sanitation, hard work and discipline in the cooperative, when they know that the cooperative serves them well, it probably inspires them to bring more of these qualities into their own lives.

The women members of dairy cooperatives visit dairy cooperative unions. They are shown the mysteries of artificial insemination under a microscope. Does not their knowledge of conception in animals help them to better understand their own lives and to begin to control what was simply assumed as a matter of fate?

When our villages’ people see a veterinarian cure an animal that would have otherwise died, they learn about the efficacy of the modern medicine. When they see their income from milk increase as their animals improve; produces better milk better housing, feed and care, they become hopeful of

their future. And they learn that it is not fate that determines their future, but they can take control of their own destinies.

Economic Empowerment

The economic empowerment deals with connecting people and their institutions with the markets. Efficiency and effectiveness of operations is an essential pre-requisite for economic empowerment.

In the words of Peter Drucker (1977:33), “Efficiency is concerned with doing things right. Effectiveness is doing the right things”. In the pre-OF era, milk price was not used as an instrument of dairy development. No effort was made by any government to ensure remunerative price to the producer but consumer price of milk supplied from government-run city milk schemes was invariably subsidised. This had two adverse effects on dairy development. First, in the absence of year-round remunerative price for his milk, the producer did not have any incentive to increase milk production by better breeding, feeding, and management of animals. Therefore, milk production stagnated and increased at a miserably low rate of one per cent per annum in the pre-OF era. Secondly, due to lower sale price of milk (than its cost as well as open market price), city milk schemes incurred huge losses year after year and, thus, were not able to save and plough back any money in modernising and expanding their activities. Thus, the milk pricing policy followed before 1970 was anti-producer and anti-dairy development.

For the first time, OF accorded the highest priority to ensuring year-round and dependable market at remunerative price for rurally produced milk. As a matter of fact, OF was originally conceived as a marketing project. Producer price of milk in most OF areas is determined by the State governments concerned and is set at levels which are considered remunerative to milk producers, although cost of milk production is not explicitly considered in fixing the producer price. Despite the fact that the cost of milk production is not explicitly considered by Co-operative Dairy Federations and Unions in fixing the producer price of milk in OF milksheds, there is some evidence available to show that the terms of trade over the last one decade or so have been favourable to milk producers. The time series data on producer price of milk and the wholesale price index of oilcakes which account for nearly three-fourths of total cost of milk production confirm this. The compound annual rate of growth over the period, 1987-88 to 1995-96 in the producer price of milk was 10.9 percent as compared to 5.8 percent in the wholesale price index of oil cakes (Singh and Singh 1998:21-22).

The core of the Anand Pattern, which was the conceptual foundation of the first Operation Flood, contained an elegant theory explaining why early dairy unions in Gujarat -- such as Kaira, Mehsana, Sabarkantha, Banaskantha, and others -- came up as an outcome of autonomous group action, and rapidly consolidated to emerge as mammoth and extremely successful farmer organizations with hundreds of thousands of members dominating the economies of their domains. The strategy evolved by early dairy cooperatives in Gujarat were decidedly superior to alternative ones being tested in the 1960s such as the Key Village Scheme or government-owned milk plants collecting and processing milk collected by contractors; the Anand Pattern -- in which accent was on keeping cattle in the hinterland and transporting milk to cities by farmer cooperatives rather than transporting cattle as well as fodder to cities -- had strong comparative advantage (Shah, 1996).

Political Empowerment

The political empowerment deals with connecting poor with the government. OF programme not only was able connect the grass root level dairy cooperatives with the State and Central governments but also with the international agencies.

“Cooperative enterprises provide the organizational means whereby a significant proportion of humanity is able to take into its own hands the tasks of creating productive employment, overcoming poverty and achieving social integration. They constitute a model for a people-centred and sustainable form of societal organization, based on equity, justice and solidarity” observed Secretary-General Boutros Boutros-Ghali in his message on the occasion of the first International Day of Cooperatives (1 July 1995). As "schools of democracy", cooperative enterprises also contribute to the promotion of social stability. For it is clear that governments, although they may create an enabling environment, cannot achieve or maintain sustainable development without an interactive social partnership, actively involving all of civil society in an empowered, democratic manner. Thus, with their globe-spanning dimensions and diversity, their mutual insistence on social partnership, participatory democracy, empowerment and "people-centred sustainable development", the cooperative movement reflects a strong, deep current of humanism that forms the bedrock of social development.

In a country like India, democracy rests on a fragile foundation. One must underpin that democracy with a plurality of rural institutions that involves direct control of individuals over matters that have immediate effect on their own lives. The Anand Pattern dairy cooperatives of India are such institutions.

Implementation Factors

The success of a mammoth programme like OF require meticulous planning and implementation process. Some of the principles and factors that guided the implementation process of OF are discussed in this section.

Political Economy of Change – Leadership and Politics of Change

"Operation Flood's cooperatives have created a grassroots foundation underpinning India's democracy," said Lalit Mansingh, Charge D'affaires for the Embassy of India in the U.S., upon learning of Kurien's selection as the 1989 World Food Prize laureate. Doornbos and Nair (1990, p.15) were of the opinion that advocates of the Anand Pattern of organizational set-up consider it superior over other forms as it combines procurement, processing and marketing all within one structure.

The Anand model has evolved under socio-economic and agro-ecological factors which are confined to the Anand region. Since these factors are likely to vary from one region to another, doubts are expressed regarding the relevance of replicating this model in other regions. This opinion has been negated by the fact that genuine Anand Pattern co-operatives succeeded in all socio-economic and agro-climatic environments in India when they had honest and enlightened elected leadership and committed professional managers. Further, the increased income from milk under OF initiated a

process of change in other activities of the milk-producing households and contributed to their socio-economic development.

However Dr Kurien in 1987 emphasised the limited poverty removal capacity of the program in the following words: “Operation Flood is not an all purpose poverty removal program. It can not 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. (Similarly, OF) is not an all purpose development program, aimed at removing economic and social inequalities existing in rural India for centuries at one stroke’ (Quoted in Verhagen 1990, 253).

Putting Instruments of Development in People’s Hands – Secret of Anand

While explaining the secret of success of Amul to Lal Bhadur Shastri, the then Prime Minister of India in 1964, Kurien said, "Sir, this is a dairy owned by farmers. It is managed by an elected board of farmers. They, in their wisdom, have appointed me as a professional manager, to manage it for them even as I remain subordinate to them. I am not sent by the government; I am an employee of this co-operative. They can hire me, they can fire me. So when you have this combination, that is, the power of its people with professional managers like me, many good things can happen".

Institutional Scaling-up Process – Innovation and Implementation

The OF programme sought to establish milk producers' cooperatives in the villages and made modern technology available to them. The broad objectives are to increase milk production ("a flood of milk"), augment rural incomes and transfer to milk producers the profits of milk marketing which are hitherto enjoyed by well-to-do middlemen.

Korten (1980) explained the Learning Process that was involved in OF as follows: “Along with the farmers, Kurien learned how the problems of milk production and marketing within a village co-operative framework could be overcome. As they learned, other co-operatives were formed and brought within the organizational umbrella. Gradually methods were refined, and the organization that was eventually to become the NDDDB grew – from the bottom up – adding new layers and branches as it grew, always under the sustained leadership of Kurien. Appropriate management systems to meet the demands of the program were worked out through experience. The values of integrity, service, and commitment to the poorest member producers were deeply imbedded in its emerging structures. Management staff was hired fresh from school, trained through experience on the job, indoctrinated in the values of the program, and advanced rapidly as the program grew”.

In each instance of replication effort, the overall process can be broken down into three stages, each with its own unique learning requirement. The three stages as represented here are a simplified abstraction of what in reality may be a very disorderly and largely intuitive process. Yet the abstraction helps to explicate an alternative to the blueprint approach to programming. The elements of each stage can be described roughly as follows:

Stage 1: Learning to be effective: One or more spear head teams (SHTs) of highly qualified personnel are sent to one or more villages which constitute their learning laboratory or pilot site. Here

they develop a familiarity with the problem in question from the beneficiary's perspective and try out some promising approaches to addressing jointly identified needs. They may be supported by a variety of external resource persons with expertise in the social, managerial, and related technical sciences. Errors will be common and the resource inputs required will be high relative to results. It is assumed that rapid adaptive action will be taken as errors in initial assumptions are identified.

Stage 2: Learning to be efficient: As insights are gained into what to do, attention is redirected to learning how to do it more efficiently, eliminating activities which are relatively non-productive and working out simplified problem solving routines for handling critical activities within the grasp of less skilled persons. Identifying local teams (leaders as well as professionals) who could take over and run the organizations once established and providing training and education to them is inbuilt into OF. New learning laboratory sites may be selectively established to test and further refine such methods – simultaneously giving additional personnel experience in their application.

Though, official statistics on milk production shows a substantial increase in milk production beginning with the 1970s under OF programme over the levels in previous two decades, the accuracy of the statistics has been challenged by several scholars. Mergos and Alderman (1987) assessed the impact of Operation Flood (OF) in two World Bank- funded dairy development projects, one each in Madhya Pradesh and Karnataka. They found that milk production had increased at the average incremental rate of about 7 per cent per annum in the Project areas under OF vis-à-vis non-OF areas. In a recent study based on the available theoretical and empirical evidences, Mergos (1997) examined the ground reality of increase in milk production and direct impact of OF on milk production. The study admitted that the direct impact of OF on milk production growth had been modest and indicated that 25 per cent to 50 per cent of increase in procurement by OF 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.

Nalini Kumar (1997:34) while reviewing the literature on OF, particularly in the post- 1987 period, observed that OF had generated a voluminous and controversial literature. He noted that a lot of evidence on OF was either anecdotal or was based on area specific case studies. Lack of empirical data and scientific rigor continue to be a serious limitation of the available evidence on OF programme effects. Critics have even doubted the accuracy of official estimates of milk production. But there is sufficient evidence to show that there has been substantial growth in the dairy sector. Tremendous change in the dairy economy, wide marketing network and increased per capita availability of milk despite the high increase in population are sufficient pointers of the growth.

Stage 3: Learning to expand: Then attention is again redirected, this time to the phased development of a network of supporting organizations – each with a significant and specialized function that could substantially and synergistically contribute to the over all purpose and geared to the requirements of carrying out the prescribed activities on a larger scale. It requires building into the organization the supporting skills, management systems, structures, and values.

Strategy of Spearhead Teams to organize milk producers and assist in building institutions they own and control and strategy to withdraw after hand holding for a while worked out very well and contributed to successful scaling up of the programme.

Issues and Lessons

The core of the Anand Pattern—the engine-assembly—containing the theory of why the spontaneous replication of Amul clicked repeatedly found cogent exposition in the early impromptu discussions which Kurien had with groups of new recruits being inducted to the NDDB's officer cadre. These discussions were, in point of fact, the conceptual foundation of the proposal for the first Operation Flood programme. He called them the principles of Operation Flood; but in fact they contained an elegant and testable theory of how best to build strong agricultural marketing co-operatives. In these informal talks, Kurien explained why, by following the experience of Amul, the dairy co-operatives in Mehsana, Sabarkantha and elsewhere had succeeded with such leadership and managerial inputs as were available locally. In recounting the reasons, he never suggested that these unions had succeeded because of their bye-laws or because of their particular type of federal structure or because they were district unions rather than sub-district ones or because they had followed the international co-operative principles. Instead, he enunciated six propositions which together explained why a farmers' co-operative which adhered to the spirit of these propositions had distinctly higher chances of success than one that did not. These six propositions embodied the core of the design-concept underlying the Anand Pattern whose violation in spirit could explain numerous failures not only in attempted replication of the Anand Pattern hardware but throughout the arena of development experimentation (Shah, 1996).

Market Access—Pre-Condition for Post-Subsistence Production¹

In a subsistence production system, in order to raise production and productivity, we must first stimulate and expand the market to which subsistence producers have easy, low-cost access. This access will help the producers use up the slack available in their production system to take benefits. Then only production enhancement programmes make sense to them.

“In order to create an Anand (milk production system) it is important to first find a Bombay (milk demand system).”

Marketing—First Step to Cooperative Organization

It is best to begin by studying the demand system rather than the production system; to first mount successful marketing strategy rather than to organize the producers. Where marketing is under-emphasized or mishandled, dairy and other cooperatives failed.

“Production enhancement programmes must follow and not precede the commissioning of the procurement, processing and marketing system.” Many efforts to do the other way have often failed, for example, many income generation activities promoted by cooperatives and NGOs fail for want of access to a remunerative market rather than limitations in production of goods and services.

¹ All quotes in Section 5 are by Dr. V Kurien

Anand Pattern—A Superior Design Concept

A superior design concept is required to avoid mis-match between demand and supply variations and also free the cooperative from cut-throat competition with small-time players.

“An Anand can capture and retain a Bombay’s market and yet provide its farmer members a stable remunerative market for milk only if it has effective procurement (logistics involved in collecting small marketable surpluses from many members and efficient processing facilities.”

The Principle of Pump Priming

The best way to organize a producers’ cooperative is to start with marketing. However, unless producers’ cooperatives are organized, they have nothing to market; and unless cooperatives know how to dispose of the produce, they cannot start the procurement process. NDDDB found pump-priming the best answer to this 'launch' problem that all new co-operatives face. The pump-priming principle was central to the design of the OF programme. NDDDB often stressed that the distinctive aspect of OF was that instead of using foreign aid as an external resource inflow, it used donated dairy commodities - for priming the pump - as an integral part of the strategy which led to the success of the project. If used instead as external resource flows, the donated powder and butter oil could have destroyed the domestic milk production base by making prices of the perishable milk and milk products further unremunerative and increased dependence on imports.

“External resource support is required for priming the pump and must be used to enable and enhance domestic production rather than to promote disabling dependence.”

The SNF Surplus – Distinctive Competitive Advantage

Notwithstanding the received wisdom from Northern experts, successful leap-forward development of technology to produce milk powder from buffalo milk provided the Indian dairy cooperatives to benefit from SNF surplus that made it possible to offer much higher prices than traditional operators to the members. In addition, this made entirely uneconomical for members either to make ghee at home or sell milk to other traditional competitors.

“The SNF surplus was created by the powder plant and was a source of powerful competitive advantage vis-à-vis the traditional competitors.”

Member Control and Professional Management

In the absence of professional expertise, it would be difficult to quickly gain a market foothold on the scale needed and exploit the full advantage offered by technology and market. Whose interests a successful business enterprise serves will depend upon whom professionals are accountable to, in principle and practice.

“If development of producers is the goal behind building the business, then this goal could be best achieved by ensuring that the business is managed by professionals and technocrats who are and “feel” accountable to producers through their elected board.”

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