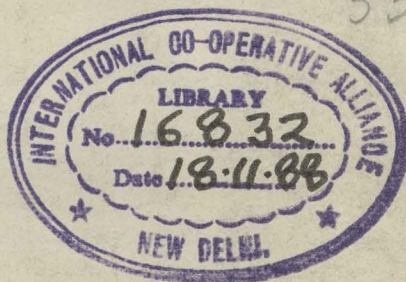


REGIONAL TRAINING COURSE
ON
COOPERATIVE DAIRY DEVELOPMENT
FOR
SOUTH - EAST ASIA

December 6th-19th 1987

Background Papers



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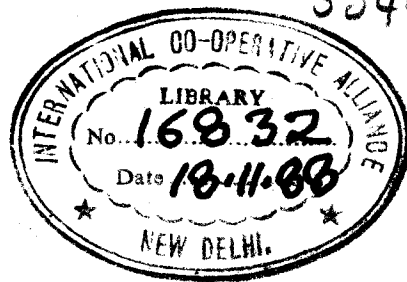
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Operation Flood 1970-75 - a study

Section 1:



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Operation Flood 1970-75 - a studyIntroduction

This study attempts, within a limit of some 151 pages, to provide an over-view of India's dairy-development programme popularly known as "Operation Flood" its history, its structure, its progress and its future. In the study, Section 1 summarises developments in India's agriculture and dairying until 1970, along with case studies illustrating the kinds of situations which, in the 1960's, confronted decision-makers responsible for India's dairying; Section 2 recounts the events in the 1960's which briefly led to the formulation of Operation Flood and which influenced its structure; Section 3 briefly describes the implementation of Operation Flood, from its inception in 1970, until the end of 1975; Section 4 starts with a summary of India's food-and-agriculture situation at the end of 1975 and, in this context, discusses the 1975-85 perspective of dairying in India - this summary is presented as background material for the four case studies which follow it, illustrating some examples of decisions which faced policy - and decision-makers responsible for different parts of Operation Flood at the end of 1975.

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Section 1: India's agriculture and dairying
until 1970

1.1 : Natural resources, agriculture and
planned development until 1970

The Indian sub-continent has one of the world's longest unbroken histories of continuous cultivation by man --and not by man alone. Even 3-4000 years ago, in parts of the sub-continent, man tilled the land using bullocks for draught-power. Thus, if agriculture is viewed as man's unending endeavour to adapt his ecology to his needs for food and fibre, the early appearance of the domesticated bovine as man's partner in this endeavour evidently enabled an early agrarian society to evolve peacefully on the Indian sub-continent. Instead of relying on human labour alone - which sometimes took the form of slave labour --man relied instead on the cow, as the nurturer of males for draught and of females for milk, as well as the producer of fuel and manure in the form of dung.

In the face of early invaders from the north--and subsequently fleeing from or following a series of warring rulers who sought to dominate the sub-continent--the cultivating communities established themselves where the land was most supportive to man. They paid whatever tribute each successive local victor might exact -- in the forms of grain, labour and taxes -- and they evolved village-based societies which had sufficient resilience to survive both the demands of kings and the hazards of a capricious climate.

For, in such a monsoon climate, agriculture is often dominated not simply by insufficient rainfall. On the contrary, annual rainfall averages as much as 200 inches (508 cm.) in some of India's coastal regions and at least 50-60 inches (127 cm - 152 cm.) in many other parts of the country. But what most of India's cultivators have to gamble with is the monsoon's uncertain timing; seed must be sown as soon as the pre-monsoon showers fall after the long hot summer -- but if the main monsoon rains do not start within 7-10 days of the first showers, the seedlings wither and the crop is lost.

This is particularly true in India's cereal production, which accounts for 60-70 % of cultivated land in most areas. To reduce the risks created by uncertain rainfall, traditional varieties of the main crops (especially cereals) which evolved were those with drought-resistant characteristics under semi-arid conditions: characteristics which were at least as important as the ability to produce high yields under conditions of optimal humidity. In other words, stability of production was as important as periodic plenitude to the traditional society, whose numbers in any case increased only slowly.

In the British era, however, the numbers dependent on the land increased ominously - and the ability of India's cultivators to produce essential foods, despite the often unfavourable monsoon rains, convinced the administrators that the country was really self-sufficient in food production. Until the 1940's periodic (and increasingly frequent) famines were believed to demonstrate only imperfections in the country's storage, transport and marketing systems. Investments in these parts of the country's food-agriculture infrastructure proceeded apace, particularly as they complemented the rapid development of such industrial crops as cotton and jute, along with plantation production of spices, tea etc. All this time, however, little attention was paid to modernising the production of such basic foods as cereals and pulses, until a series of disasters, culminating in the 1943 Bengal Famine, forced the administration to modify its reliance on laissez faire as a food-production policy.

After the Bengal Famine, "Grow more food" campaign heralded the first official effort to apply to the problems of food production the unusually comprehensive administrative structure, which had been erected mainly to maintain law, order and revenue collection. The campaign itself did little to modernise the country's neglected cereal and pulse systems but it did mean that the time of India's independence in -- 1947, many administrators had already started to confront the problems involved in systematic modernisation of the basic food systems.

To this extent, the ground was laid for independent India to initiate formalised planning of national development, with mounting emphasis on the food-agriculture sector -- and, when the country's first Five-year plan was launched in 1950, it placed considerable emphasis on agricultural production. During the 1950's and 1960's, plan allocations rose by 50% in "real" terms, representing some 6.7% of gross national product by 1966-69 -- while outlays for agriculture and minor irrigation rose to 17.5% of all plan outlays (see Exhibit 1.1.1, page 6).

These outlays contributed to significant increases in yields and in multiple cropping. The major break-through, of course, was achieved in cereal yields by development of high-yielding varieties, particularly of rice and wheat.... Lately, it has become fashionable to criticise this "green revolution" on the grounds that its energy intensive nature limits its scope in energy-poor countries -- and confines its benefits, even in those countries, to the richer farmers, who command the inputs on which the high-yielding agricultural technology is based, such as fertiliser and irrigation water. Nevertheless, the new production technology did serve to reduce the vulnerability of the country's cereal system to drought -- and it helped to turn the areas of highest agricultural productivity into net "exporters" of cereals (despite these areas' dense human populations), thereby enabling the Government to erect a vast public procurement and marketing system. By 1970, this system had proven itself capable of handling at least 10% of available cereals: enough to enable the system to protect the majority of

the most vulnerable people in drought-hit areas from extreme deprivation.

The initial advantage of the new technology was its relatively short gestation period as soon as the seed could be produced, gains in actual production could be achieved within one season. In the mid-1960s, some 5% of the Districts of India were selected (on the basis of assured rainfall, availability of irrigation water etc.) for initiation of the new technology in wheat and rice. By 1970-71, these Districts were producing 3.15% of all cereal on 1.62% of the land used for cereal production -- and the technology had spread spontaneously among farmers in many more Districts.

This gain in production (see Exhibit 1.1.2, page 7) provided time for the build-up of area-specific programmes with longer gestation periods: the planning and implementation of command area development programmes in areas covered by canal irrigation systems -- as well as the evolution and application of new production technologies in drought-prone and dry-land farming areas. While these slower-yielding programmes were yet to bear fruit, the availability of caloric foods had broken through the "scarcity barrier" (see Exhibit 1.1.3, page 8). In the period of 1950-51 to 1970-71, despite a population increase of slightly more than 50%, the amount of cereals available per capita rose by almost 25%.

Policy-makers, Administrators and farmers alike derived from this achievement a new optimism -- tempered by their recognition that the quality of the national diet was still poor. The availability per capita of major protective foods had fallen, especially of pulses (an important protein source for the poor majority) and of milk (the country's major source of animal protein and an important source of fat, also). By that time, the fashion in professional nutritionism had become statements along the lines of "Calories and protein are in general equally scarce; all that is required, therefore, is a general increase in the foods that people now eat." This "all" that was required, however, had actually proven to be the problem itself - because equivalents to the new technology, which had worked so well for cereal production, had not been found for application to the production of protective foods, including milk, which is the subject of the next section of this note.

Exhibit 1.1.1: Plan allocations and expenditures for agriculture and irrigation : 1950-70

	<u>1st FYP</u> <u>1951-56</u>	<u>2nd FYP</u> <u>1956-61</u>	<u>3rd FYP</u> <u>1961-66</u>	<u>Annual P.</u> <u>1966-69</u>
Total Plan allocations: in Rs. crores*	2,356	4,800	7,500	6,665
Total Plan expenditures in Rs. crores ^{2/}	1,960	4,672	8,577	6,756.5
At constant prices	100.0	150.2	248.5	156.1
Ave. as % of end-year gnp		6.7	7.8	6.7
Agriculture and Irrigation: ^{3/} Allocations; in Rs. crores	741	949	1,089	1,166 ^{4/}
Expenditures: in Rs. crores ^{2/}	724	901	1,672	1,581
At constant prices ^{2/}	100.0	94.1	127.4	96.6
Animal Husbandry:				
Allocations in Rs. crores	22	56	43	34
Expenditures in Rs. crores	8	21.4	43.4	34
At constant prices ^{2/}	100.0	207.0	308.1	192.5
Dairying:				
Allocations in Rs. crores	-	-	34	26
Expenditures in Rs. crores	7.8	12	33.6	25.7
At constant prices ^{2/}	100.0	118.9	308.1	192.5

^{1/} During 1966-69, three separate Annual Plans were implemented.

^{2/} Taking 1951/56 figures as 100, deflating subsequent figures by the All-India Consumers Price Index 1949 = 100 at the end-year level.

^{3/} Agriculture totals include those shown below for Animal Husbandry and Dairying.

^{4/} These figures do not include outlays for major irrigation.

* One crore = ten million

Sources:

"Records and Statistics, "Vol. 26, No.4, August, 1975;

"India 1974 : A reference annual, " Publications Division, Government of India, March, 1974:

"Economic Survey, 1975-76," Government of India, New Delhi, March, 1976;

"Third Fifth Five Year Plan, "Planning Commission, Government of India, 1961;

"Fourth Five Year Plan, "Planning Commission, Government of India, New Delhi, July, 1970.

Exhibit 1.1.2: Cropping patterns, yields and irrigation: 1950-51 to 1970-71

	<u>1950-51</u>	<u>1960-61</u>	<u>1970-71</u>
Cereals : area in lakhs* of hectares	806	919	1,014
average production: kgs./hect.	587	757	949
Pulses : area	206	237	231
average	482	538	524
Vegetables, fruits & nuts:			
area	22	27	27
Five major oilseeds:			
area	110	128	147
average	654	826	604
Cotton & Jute:			
area	63	82	84
Sugarcane:			
area	17	24	26
est. extraction : kg/hect.	3,342	4,613	4,963
Total cropped area, in lakhs of hectares	1,319	1,528	1,651
Area sown more than once, in lakhs of hectares	131	196	247

* ten lakhs = one million

Sources : Derived from : "Indian Agriculture in Brief", 14th edition, and "India: pocket book of economic information, 1973 & 1974", Government of India, New Delhi, 1975.

Exhibit 1.1.3: Population and per capita availabilities of major foods : 1950-51 to 1970-71

	<u>1950-51</u>	<u>1960-61</u>	<u>1970-71</u>
Availability in grammes per capita daily:			
Cereals (1950/61/71)	337	400	418
Pulses (1950/61/71)	57	69	51
Vegetables & fruits (50/62) ^{1/}	87	116 ^{2/}	n.a.
Sugar, gur and like products	42	55	56
Vegetable oil, unprocessed	7	9	9
Vegetable oil, hydrogenated	-	2	3
Meat, fish & eggs (50/62) ^{1/}	23	21	n.a.
Milk & Milk products, milk equt.	139	121	110
Population in millions	361	439	548

^{1/} Derived from "India's natural resources and agriculture, " Indian Institute of Management, Ahmedabad, India, 1963.

^{2/} Estimated on the basis of Dr. Ram Das's paper "Problems and Prospects of Ensuring Food for Children in India" Published in "National Food Congress", May, 1970.

Sources : Except where otherwise stated: "Indian Agriculture in brief, " and "India: pocket book of economic information, 1973 & 1974, " Government of India, New Delhi, 1975.

1.2: Dairying as a part of agriculture:
planned development until 1970

India had been a land of mixed farming since long before its written history began -- and it remains so to this day. Cereal production accounts for 70% of land use; but cereal production is particularly sensitive to fluctuations in the timing of the monsoon rains -- so the cultivator's safest course is to possess his own bullocks; this alone gives him absolute assurance that, as soon as the pre-monsoon showers fall, he can immediately complete his tillage and sowing operations.

Therefore, every farmer who can afford it has always owned a pair of bullocks -- and those subsistence farmers who cannot afford it share a pair. The increasing numbers dependent on the land (and the consequent fragmentation of holdings) has meant that draught-animals have tended to be distributed in proportion to rural population -- and in 1950-1970, for every seven draught males, there were five cows to ensure the replacement of draught stock.

The place of the cow, as a key element in the agricultural production system, was recognised by the honour which society accorded to the cow and protected by vegetarian dietary practice, reinforced by taboo against slaughter. Prehistoric selection evidently emphasised draught characteristics more than milk-production characteristics -- while the absence of culling ultimately made purposive selection impossible. Thus, although a number of pure breeds of cattle have existed for many centuries in India, most of the country's cows have for long been non-descript, drought-resistant seasonal calvers, capable of producing serviceable males for draught, but seldom producing more than 1.1/2 litres of milk daily (the estimated annual average yield per milch cow was 180 litres in the 1960's.)

Taboo against slaughter had not applied to the buffalo, which had also not proven so well suited to draught-work, except in paddy areas with long rainy seasons. Therefore, in many areas suited to mixed farming with milk production, some selection took place in buffalo herds; yields varying from 3-8 litres of milk were not uncommon (with an estimated 0.01 - 0.10 % exceeding 20 liters daily) - and the national average annual milk yield of the buffalo was estimated at 500 litres in the 1960's.

Thus, as milksheds and milk trading evolved, most of the milk traded was buffalo milk, containing some 7.5% fat (vs 4.5% in Indian cows' milk) plus 9.0% solids not-fat (vs 8.6% in cows' milk). The dependence of the entire system on the monsoon rains (and the severity of the long, dry, hot summer in most parts of India) meant that fodder was in short supply each summer and calving was highly seasonal (most concentrated in the post-monsoon months). Milk production in the summer "lean season" typically fell to an estimated one-third of winter "flush season" levels while consumption and demand remained steady throughout the year. The seasonal imbalances between supply and demand were

over-laid periodically by regional droughts of 1-3 years duration. In the face of these seasonal and regional imbalances between supply and demand, the traditional milk trade had evolved a technology and product-mix which enabled it to prolong the life of some milk solids: milk fat was made into ghee (fermented, clarified butter), with some six months' shelf-life, and milk solids not-fat were condensed in various forms which could, with difficulty, be stored for 3-4 months -- some 50% of all milk traded was believed to be converted into such production during the 1950's.

By this time, the traditional milk trade had become quite complex. It consisted mainly of village milk-and ghee-buyers, milk-product makers, urban-oriented middle-man cum money lenders (to whom, in the lean season, poor milk producers would mortgage their next year's milk production at distress prices in exchange for a loan, often at an extortionate rate of interest). The working of this system caused mounting dissatisfaction among rural milk producers -- while urban consumers increasingly objected to the fact that the milk-men could dilute their product with impunity. In the larger cities, to ensure supplies of fresh milk, the traditional trade had taken to the practice of keeping milch animals in the city itself, importing the feedstuffs required, as well as freshened animals, from the hinterland milksheds. This did nothing to deter milkmen from dilution - on the contrary, as a high-cost production system, it encouraged dilution - and, of course, it added to urban pollution.

In the mid-1940's the then colonial government attempted to ameliorate the milk supply situation in Bombay city by contracting with a private dairy company in Kaira District (266 miles north of Bombay) for daily supply of chilled, pasteurised milk, to be shipped overnight by truck to the city - and for some time this milk was rationed out to mothers and infants in the city. But the project proved costly, by 1947, it became almost unmanageable -- and it was wound up.

But the lesson was not wasted on independent India's government. In 1946, while the project was still alive, the milk producers of Kaira District had protested against the exploitive prices which they were being paid by the private firm with the contract to supply milk to the Bombay City project. They had, in fact, gone on strike and refused to supply their milk to the project -- and on the advice of Sardar Vallabhbhai Patel, a leader of the independence movement, they started to form their own primary co-operatives, so that they could manage their milk business on their own behalf.

When Independence came, the government inaugurated a new "Bombay Milk Scheme" which was to have two parts: a dairy with bottling facilities in Bombay city - and a dairy with pasteurising facilities in Kaira District, which would belong to the Kaira District Co-operative Milk Producers' Union - and which would ship milk in bulk by rail-tanker to the Bombay Milk Scheme's dairy, so that it could be bottled and sold in the city. A major

advantage of the system was, of course, its directness: the producers' milk was purchased, tested, paid for and bulked by each Kaira village co-operative milk society. The Union of these societies organised collection of their milk in cans and trucks brought the milk quickly to the union's dairy at Anand. The dairy pasteurised and chilled the milk, then shipped it by overnight train to the Bombay dairy. The absence of middlemen - and also the fact that the union was staffed by professional managers and technicians (who were private employees of the union, not government servants) -- helped to make the system efficient and responsive to the producers' needs.

In 1950, as the Anand Union continued to grow, the Government of India adopted the procedure of promoting the country's development on the basis of five-year plans. For subjects such as "agriculture," which are categorised by the Constitution as "State subjects," the Government of each of the States comprising the Union of India (numbering 22, at the time of writing) devised its own five-yearly plan in discussion with the Central Government, which sometimes also contributed additional funds for investment in the subject under the "Central Plan." This was the pattern followed for dairying (as a part of agriculture) - and, although it formally entered the planning process, with a separate sub-head allocation, only in 1960-61 under the 3rd Five-year Plan, plan investments in dairy development grew rapidly, initially as a part of the Plan for Animal Husbandry (see Exhibit 1.1.1, page 6).

During the 1950's, most State Governments set up special Departments or "Cells" to administer their dairy development programmes. By the 1960's, some State Governments had several Departments which were concerned with dairying, such as Veterinary/Animal Husbandry/Milk/Dairy Development Departments - and, for co-operative dairies, the co-operative department. There was some controversy as to whether it was helpful for dairying to come under a special department - some of the technical specialists concerned felt that this equated "dairying" with "the dairy plant," that it led to an undue emphasis on urban dairy construction and/or that it divorced dairy processing from milk production and marketing....

An exception to the official administrative structure developed in Gujarat State, where the Anand Co-operative had continued to grow. Observing its success, milk producers in other parts of the State had decided to organise their dairying on the Anand Pattern during 1950's and 1960's - and the Anand Co-operative had helped the new co-operative unions to organise themselves, to get their dairy plants built etc. They had also found, in the 1950's, that the Anand Pattern provided a useful structure not only for marketing the producer-members' milk, but also to help them increase their milk production. By the 1960's the Anand Pattern Co-op's were organising their own mobile veterinary clinics, which visited the villages once weekly, they were also compounding their own cattle-feed and marketing it through their own village co-operatives, as well as providing greenfodder seeds

to producers. The State Government promoted and guided the development of these co-operatives (and also conducted a continuous and concurrent audit of their operations, for which the co-operatives paid the Government) - but no officials were employed in the co-operatives' structure, nor had the State a special Department for dairying.

In other states, the concerned Departments played a more direct role and dairy development evolved differently. Some dairies were operated as parts of a government department; some dairies were co-operatively owned but largely staffed by officials on deputation - and some dairies were privately owned and operated these largely concentrated on production of consumer products, such as baby food, malted milk foods etc). In many States, planned dairy development started with small local breeding programmes, under a "Key Villages Scheme". In the 1960's, the Government of India launched a large programme to increase milk production, known as the "Intensive Cattle Development Programme," covering first 16 and ultimately some 60 Districts, with provision of integrated services to producers for milch-animal breeding, feeding and management. Each project was designed to be co-ordinated with improved systems for milk procurement, processing and marketing - although many of the people concerned felt that the co-ordination of such programmes was complicated by the number of Departments involved.

Nevertheless, the modernising dairy sub-sector as a whole continued to grow. By the early 1970's, the country had some 69 urban milk plants, 31 pilot milk schemes, three rural creameries and seven milk-product plants. It was estimated that this modern dairy system was handling some 3.5% of the country's milk production.

Despite these efforts, milk production per capita had fallen (see Exhibit 1.1.3, page 8), even though the bovine population had continued to rise, albeit more slowly than in the 1950's (see Exhibit 1.2.1, page 13). Moreover, despite the fact that cows that bred for milk production were believed to be more efficient converters than buffaloes, the trends in the number of females kept for milk production -- and in the number of young stock being reared -- indicated that the country's stock of buffaloes was increasing faster than its stock of cows.

It was in this context--of rising numbers and falling milk production per capita--that the Government of India launched Operation Flood, which was designed to create a "flood" of rurally produced milk. Before turning to Operation Flood itself, however, this Section concludes with case studies, written in 1960-68, at the Indian Institute of Management, Ahmedabad, illustrating the kinds of situations which confronted many decision-makers and executives involved in the country's dairy development, at various levels, towards the end of the 1960's.

Exhibit 1.2.1: India's bovine population, 1950-51 to 1970-71

	<u>In lakhs*</u> <u>1950-51</u>	<u>1960-61</u>	<u>1970-71</u>
<u>Cattle</u>			
Females over 3 years kept for milch	460	510	540
Males over 3 years kept for draught	590	690	710
Others over 3 years	60	70	70
Young stock under 3 years	440	490	470
Sub-total	1550	1760	1790
<u>Buffaloes</u>			
Females over 3 years kept for milk	210	240	290
Males over 3 years kept for draught	60	70	70
Others over 3 years	10	20	20
Young stock under 3 years	150	190	200
Sub-total	1980	2270	2370

* 10 lakhs = one million

Sources : "Indian Live Stock Census, 1956, '61, '72 the Government of India, New Delhi.

1.3 Case study

The Greater Bombay Milk Scheme

In 1945, the Bombay Government inaugurated the first Bombay Municipal Milk Supply Scheme. It bought 7%-fat milk for 75 np per seer (.91 Ltr. equivalent) and sold it at half that rate for consumption by children and expectant mothers. By 1947, the scheme had cost the Government Rs.30 million. Yet there were many complaints of inequitable distribution and unsatisfactory quality.

In 1947, the first post-independence government of what was then Bombay State re-organised the Bombay Municipal Milk Scheme and put it directly under the State Government's control. The employees of the original municipal scheme were returned to serve with the municipality, and the distribution centres (on municipal property) were closed. The government announced that it would pay 12 1/2 np per seer for milk purchased, and that this price would also be charged to consumers - the Government would pay the handling costs, etc. A new set of local suppliers were placed under contract, with very severe penalties for adulteration. In the longer run, the Government planned to buy milk from villages around Bombay, where the price would be lower, and to use the margin thus earned to cover the expenses of the Scheme.

Accordingly, milk was purchased from a private company which collected milk in Kaira District, 266 miles from Bombay. Also Shri. Tribhuvandas Patel was encouraged to organise the Kaira District Co-operative Milk Producers' Union ("Amul Dairy")

By 1947, one insulated truckload of milk was being shipped daily from Amul's centre at Anand, Kaira District, to Bombay. Meanwhile, the scheme had also started to distribute "toned milk" (a blend of fresh milk, skim milk powder and water). Distribution booths were opened on public property, and consumer co-operatives were encouraged to distribute milk by being paid 50 np per 37 litres handled.

After Independence, however, Bombay's population had expanded rapidly - and this human increase attracted a growing number of privately owned buffaloes into the city. To remove this health hazard, the Government opened a "milk colony" at Aarey, on the city's boundary, to house the buffalo previously kept within the city limits. Although initially unpopular with buffalo keepers, Aarey, milk colony grew. In 1950, a dairy plant was opened at Aarey, with a daily capacity of some 185,000 litres. Even this capacity became insufficient during the 1950's. Bombay's 1947 population of under two million had grown to some four million.

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The Government therefore accepted a grant of Rs.8,000,000 from Unicef for a plant at Worli with a daily capacity of about 740,000 litres. In anticipation of this increased capacity, the Government began to organise village co-operatives("Mofussil Scheme")outside Bombay in 1960 (as well as continuing to buy milk from Amul)/By 1963/some 10% of the Scheme's 200,000 litres daily supply came from the Mofussil Scheme, 40% from Amul and 50% from Aarey Milk Colony. In late 1963, the Scheme distributed daily some 350,000 litres of full-fat and toned milk to 2 1/2 million people. Executives in the Scheme estimated that this was 60% of the city's current milk consumption.

When the case-writer contacted the Greater Bombay Milk Scheme, in October, 1963, he was first invited to talk with the Commissioner, Mr.Majumdar, the Director, Mr.Salpekar, and then with Mr.Dave, the Genereal Manager. After a discussion of the history and policies of the scheme, Mr.Dandekar, Controller of Milk Procurement and Distribution, took the case-writer to his office. (After explaining that GBMS delivered milk to its retail outlets at 5.30-7.00 am. and at 1.30-2.30 pm) Mr. Dandekar went on to explain that, altogether, the scheme distributed through 1296 of its own centres, 123 private centres, 3 of its own whole-day centres, 17 private whole-day centres, and 470 hospitals, factories and other institutions. There were 143 additional centres for distributing double toned milk for very poor people each afternoon. During a visit to one of the scheme's own centres, in an exclusive Bombay suburb, at 6 a.m, Mr. Dandekar remarked, "We have chosen this site with care. You see how quiet it is here now. In such areas, we have to place our booths so that the noise would not wake people. After all, this centre starts at 5.30 a.m. Each has a manager who gets Rs.30/- per month. Here, the morning manager is a clerk. You can see from his looks and his dress what a respectable fellow he is. We choose our staff very carefully. The assistant is an office boy, who gets Rs.20/-per month. These jobs give them some extra money."

Through the thin dawn light, servants came with bags and baskets to purchase their household's milk. Often the basket would have the householder's "card" attached to it. The card is a stamped metal plate, showing the maximum amount of milk that the householder may normally have, unless his centre has a surplus.

"In the area, of course, they take full-cream milk; it is Rs.1.04 per litre. Most households take 2 or 3 litres". Mr.Dandekar added, "Milk is not a rationed item. If the householder wants a larger quota, he applies for another card. If he wants more than 20 litres, for a special occasion, we ask him to apply 2 days in advance. Now let us move on"

A mile or so away, at 6.30 a.m., a middle-class area's distribution centre was very different sight. It had two booths next to each other. "If the demand in an area grows a lot, we simply put in another booth." Mr.Dandekar said.

The street was moderately busy with bicycles and cars. Householders themselves, men and women, were collecting their milk. "I work in a factory office," one customer explained, "I have bought milk here ever since they opened this centre: must be seven years ago. I have two children. I usually take two litres of milk each morning... We do not take any in the afternoons. It is not convenient for my wife."

"You take it from a dudh-wallah (private milk vendor) in the afternoons," laughed Mr. Dandekar.

"Only if we need extra," the man smiled: "It is more convenient, and he delivers to our house... I must go, I have to get breakfast and to work."

--- A little later, in the small courtyard of a community hall, there was a double private centre. A man and an assistant were selling milk on one side of the varandah; a woman and an assistant were doing the same thing on the other side of the varandah. "This is a consumer co-operative," Mr. Dandekar explained: "They do a fine job. We give them a rebate of 50 np on 40 litres and we deliver the milk. That's all we have to do. For our own centres, we have to invest Rs. 1,200 in the booth, we have to put it up, maintain it, as well as selecting, supervising, and paying staff. Here we've none of this trouble. Quite a few customers here take toned milk. Three percent fat is quite adequate: at 54 np per litre, it's good value. You may not realise it but these people are lucky to be able to afford it ---Next we we will see the people who cannot afford it."

-- "Now you see the real Bombay," Mr. Dandekar announced a little grimly. It was 7.00 a.m. There was the milk booth to one side of a broad street which was flanked by four-story "apartment house". The street was filled with bicycles. A few of the many pavement sleepers were still curled up on their cots, or on their blankets spread directly onto the paving stones... (A customer who had just bought a half litre of milk invited Mr. Dandekar and the case-writer into his family's room in an apartment house.) It was about 10 ft. by 12 ft. and lined with cupboards, clothes hangers, a few chairs, and a pot. A burner, for cooking, was close by the window. The customer explained that he was lucky, he earned Rs. 250 per month as a mechanic, and his old father earned Rs. 90/- as a night watchman. This enabled him to support his family of seven people, all of whom lived in this room.

"We take this milk for the children," he explained - and a bonnie little girl was drinking some of it by this time - "I think I am the only one of this floor that can afford the Scheme's milk though," he quickly tucked in his shirt: "I shall not be able to afford it if I am late for work". Please excuse me."

...As we picked our way along the corridors and down the stairs, Mr. Dandekar hazarded a guess that 8 or 10 people lived in each of the one-room apartments. "They may buy one-fifteenth of

a litre of diluted milk each day. Just enough for tea - it probably costs them 5-7 np,"he added as we moved through a little group which had surrounded our jeep.....

Just a hundred feet up the road was a tiny store, a hole in the wall. Inside, one man sat surprisingly beside two refrigerated milk containers. His price was 50 np per litre, and his buffalo milk a little blue in colour....

By 8.30 a.m., the labour pool from Bombay's suburbs was rushing into the city. At the station, the whole-day milk distribution centre was already sold out of toned milk, which sold at 18 np per 1/5 litre (and) whole milk at 27 np per 1/5 litre. The centre consisted of a 20 ft. counter, behind which stood two men, some chilling equipment and a coffee urn. The only other item sold was iced coffee at 25 np per glass.

Over the station, however, the restaurant was doing a more varied business. It seated about 75 people, and was filled with commuters taking a breakfast of coffee with traditional puri and bread-type foodsThe coffee was 25 np per cup. Total spendings per customer appeared to be about 50 np....

Mr. Dandekar and the case-writer then visited a double-toned milk centre in a very poor quarter of town. As the group got out of the jeep and walked toward the booth, a young women approached and shouted a loud, long protest.

"She is saying that she queued a long time to get this double-toned milk this morning; then they told her they had none. Now, she says, if she joins this queue, the milk will obviously have run out before she gets any ...Unfortunately, no one had explained to her this double-toned milk is distributed only in the afternoons. It is sold at 26 np per litre and has 1.5%-fat content. We subsidise it at 8 np per litre, as our way to repaying the foreign aid we have received. Over five years, we have to distribute from milk worth 150% of the aid which we received. We feel that this double-toned milk is the best way of fulfilling this obligation. During school session, most of it goes to school children. During school holiday, we open up some centres on a special afternoon shift and sell up to one litre per head on a 'first come,first served' basis. Of course, it is not hygienic -- but bottling costs 4 np per bottle, and these people cannot afford it.

Old men, young children, and a few women, jostled with suppressed anxiety in the queue, waiting their turn to thrust an empty can or mug under the distributor's milk dipper. As the dipper went deeper into the can, the queue became more uneasy. The young women who had protested so hard watched this evidence that the milk was almost finished with scornful resignation. Soon, she went muttering away.

(Mr. Dandekar and the case-writer visited one of Bombay's three private wholesale milk markets. It handled some 37,000 litres daily. The going rate at the time of their visit was 64 np/ltr. but it rose to Rs.2.00 per litre in the summer. They also visited a private milk bar which sold GBMS milk and a factory where the workers were given GBMS milk during each shift. Mr. Dandekar said to the case-writer:) "Of course, I only started in this particular job a few months ago - although I have been with the Scheme for some time... We really have about 80,000 litres daily of surplus milk at the moment. Of course, the Worli Dairy has just opened. While Aarey Dairy is being reconditioned, we are doing almost all our processing at Worli. But when Aarey is back in operation, we shall probably be issuing some 100,000 new cards. There are several factors to be considered here.

Should we intensify distribution in our present areas(see table on page no.19) or extend our benefits to the expanding suburbs? You see, Aarey(our smaller plant) is in the north and Worli is in the South. But the North is expanding faster it will one day have to be served largely from Worli. So we must consider transportation cost when we decide where to expand our distribution.

"Then we must also choose how to distribute our expanded capacity. I am very much in favour of consumer co-operators doing it themselves. Also, I am very interested in permanent whole-day centres operated by our organisation. We shall shortly open four of these, on a pilot basis. (Subsequent enquiry - indicated that GBMS retail-point costs were consumer co-operatives, 1.25 p /ltr; GBMS part-time booths, 0.80 p/ltr., GBMS whole-day booths, 0.81 p/ltr -- or 0.93 p/ltr including depreciation of donated refrigeration equipment.) They will have refrigerated storage for 400 litres. We expect them to handle the business of 4-6 of our part-time centres. But of course, this will require some changes in the consumer's habits. We shall have to see how interested she is in buying milk at any time of day.

"In this direction, I am very interested also in mobile sales units. For example, in many places here, house-wives go to the bazars between five and six p.m to buy vegetables. A little later, people go to Marine Drive for a walk. Many be a mobile sales unit could take milk to consumers at both places at the appropriate time. I should like to test this.

"Then, also we should encourage the growth of clean milk bars, such as the one you saw..."

Mr Dave, General Manager of Aarey and Worli dairies, first worked in food distribution in 1942, as a Member of the Civil Supplies Department of Bombay States Government. The Department was responsible for distribution of essential foods during and after the Second World War. In 1948, Mr. Dave joined the Greater Bombay Milk Scheme, became Controller of Distribution and Procurement, and was promoted to General Manager in early 1963.

Distribution of GBMS milk, population and incomes, by ward, in Bombay

1/
GBMS milk distributed daily:

	Whole milk	Toned milk	Double toned	All GBMS milks: ave. per cap. daily:			Human population	Average income per cap. daily	
				Nutrients	Expenditures				
Fat % :	7.0	3.0	1.5						
Snf % :	9.5	9.5	10.5						
	(in 1000's of litres)			Fat	Snf	Total	(in np)	(in 1000's)	(in Rs.)
				(in gms)					
Wards :									
A	11.0	5.5	0.3	6	8	14	9	196	1.53
B	4.4	5.1	2.1	4	7	11	6	125	1.90
C	10.5	7.5	2.1	4	5	9	5	339	2.26
D	22.1	12.1	2.0	7	9	16	10	354	2.67
E	9.9	13.9	4.3	2	2	4	3	499	1.58
F	23.6	18.1	3.9	5	4	9	7	549	2.21
G	19.1	18.3	2.9	3	3	6	5	660	1.97
BN	12.1	7.4	2.1	5	5	10	7	303	2.03
SK-KU	8.5	7.5	1.5	3	3	6	5	290	
PA	8.5	5.6	1.0	5	5	10	7	192	
GH	4.9	8.7	0.8	2	2	4	3	253	
GOR-MLD-KND	7.4	4.9	2.0	5	5	10	8	168	
VIK-MUL	4.9	2.7	0.3	2	2	4	4	244	
HOSP & INST	5.6	6.9	-	-	-	-	-	-	
TOTAL	152.0	120.5	25.3	4	4	8	5	4,252	2.24

Sources: - 1/ Figures on GBMS milk distribution refer to week ending 21.10.63, daily average.

GBMS records: Bombay Municipal Census, 1961; "Economic Survey of Bombay," by Prof. M. Lakdawala, Bombay University, 1961 (income figures adjusted for time change by case-writer).

He explained that the Aarey Dairy had been shut down for complete overhaul when Worli Dairy was opened in mid-1963. By December, 1963, Aarey was back again into full production. Together, two dairies could handle 600,000 litres daily, and 675,000 litres "if pushed," Mr. Dave calculated, the latter figure being his estimate of Bombay city's present daily milk consumption.

As he viewed his relatively new position of General Manager in December, 1963, Mr. Dave saw that a large part of his task lay in moving the Scheme towards an early fulfilment of its mandate to supply Bombay's entire milk demand. To this end, the Scheme would add 100,000 litres to its daily distribution in January, 1964, Mr. Dave said, achieving its 1964 target of 450,000 litres daily without delay. "The 1965 target is 600,000 litres," Mr. Dave added matter-of-factly, "and we shall achieve on time also" He went on to discuss with deliberation the matter supply, adding that it seemed reasonable to expect Amul's current daily delivery of 110,000 litres to raise to 185,000 litres by 1965 - "Assuming that the correct price is negotiable, etc."

Mr. Dave pointed out that one major change in distribution was expected to take place as the Scheme moved toward its 1965 target: full-time distribution centres would be opened, offering increased convenience to house-wives and the elimination of queuing for milk. The Scheme's planned target of one hundred full-time centres, all catering solely to the domestic demand for liquid milk, would be accompanied by the opening of twenty milk bars, catering to the public's needs for cheap, nutritious snacks and refreshments. "After all," Mr. Dave added, "one-fifth of a litre of toned milk costing, say, 15 np appeals to a worker more than a cup of tea, is clearly better for him and it is cheaper."

"In fact, of course, one great strength of our's is that we offer a nutritious healthy milk at a price which almost everyone can afford. Toned milk contains 3% fat--which is certainly as good as most of the milk sold by private vendors (better, probably):and, while they simply add dubious water to dirty milk, we add powder to pasteurised milk, so that toned milk actually has more valuable protein and minerals than fresh milk...At 54 np per litre, this milk is very good value for money. At present, the private vendors' milk which is so often unhygienic and adulterated, costs up to Rs.1.25 np per litre... Obviously, this matter of price is very important in our plan to satisfy Bombay's milk demand. We have to hold our price line. But, at present, I see no special reason why this cannot be done. The present factors in milk production costs should remain quite stable-- and no doubt the Government would take any step which might become necessary in order to keep costs stable. Of course, some flexibility is necessary--and for example, I would expect us to be able to continue to sell toned milk if the price were to rise to, say, 60 or 65 np. In fact, one reason why we stick to imported milk powder for our toned milk is that foreign powder is cheap...However, even if enough were available, it is hard to see how we could afford Indian Powder, when even a favourably

priced brand costs Rs.3.25 per kilo, as opposed to the imported powder's price of about Rs.1/- per kg."

(The case-writer asked Mr.Dave:) "How would you feel about working in the Scheme if it were to be turned into a private company?"

"I don't believe it could work," Mr.Dave replied: "we have 8,000 employees altogether. Like any population, these people have varying standards and motives. With the authority of government behind it, the Scheme can compel the maintenance of standards at higher levels than a private company could. Also, quite naturally, the General Manager of a private company would be judged by the profit he made. Now, the opportunities for profit are quite limited here. Beyond a certain point, where could he turn for increased profit other than to adulteration? Furthermore, we are in a position to negotiate our price to producers. We can therefore look after the interests of both producers and consumers. But a private man would be at the mercy of producers. Once he had a plant to keep running, he would simply have to bid for the milk. He would have to pay whatever was asked. This would lead to higher prices.

"Not that there are no alternatives. In London, for example, two private dairies have supplied most of the city's milk for some time. But that is under a Milk Marketing Board...It is quite possible, anywhere, to have some kind of Federation of milk handling organisations which compels adherence to agreed quality standards, and which arbitrates on prices between producers and handlers,etc. If such a board exists, it is quite feasible to have private dairies, and so on. However, I believe that our own form of organisation is very well suited to looking after the needs of producers and consumers."

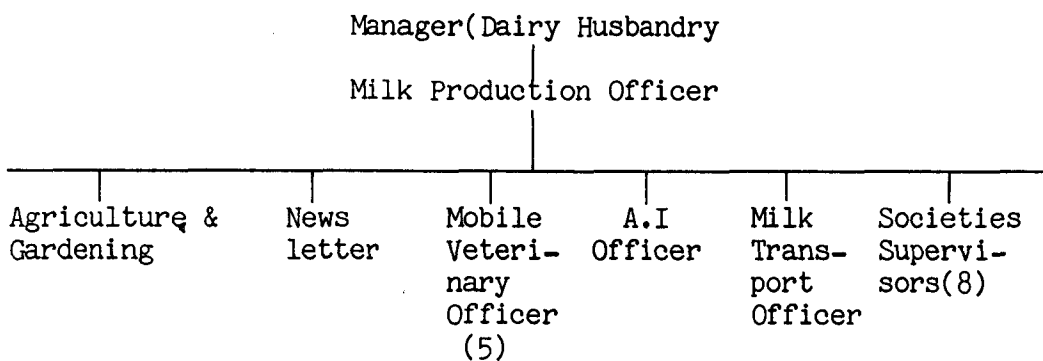
(The remainder of this text discussed the Aarey milk colony, which then housed 21,000 buffaloes and Bombay city-stables which were believed to have altogether some 45,000 buffaloes.)

1.4 Case study

Kaira District Co-operative Milk Producers' Union Ltd.

The Kaira District Co-operative Milk Producers' Union was organised in the year 1946. Its milkshed, Kaira District, contained 1,663,000 cultivated acres (900 vilages, with 80% of its estimated 250,000 rural families dependent on agriculture.) The Union comprised 540 milk producers' co-operative societies at village level by 1966. (In addition to shipping some 100,000 litre of liquid milk daily to Bombay, 266 miles to the South, the Union had developed a wide line of dairy products which were very successfully marketed under the brand-name, "Amul".) Amul's work on increasing milk production and been a part of its operations since its inception; the programme was considered to be urgent and its tempo had accelerated rapidly since 1962, when the organisation of the responsible Division was as follows:

Dairy Husbandry Division - 1962



In April 1962, the organisation decided to launch a seven-year plan to increase milk production. (It had been devised by Dr.Rao, Manager (Dairy Husbandry) who had joined the Organisation in 1957.) The programme included better breeding, veterinary aid, extension, management and animal nutrition -- altogether, these activities were to achieve the total target of 100% increase in milk production under the seven-year plan. As targeted, above 40 to 45% of the increase in milk production was based on the development of animal nutrition alone, much of which was dependent on the fodder development programme.

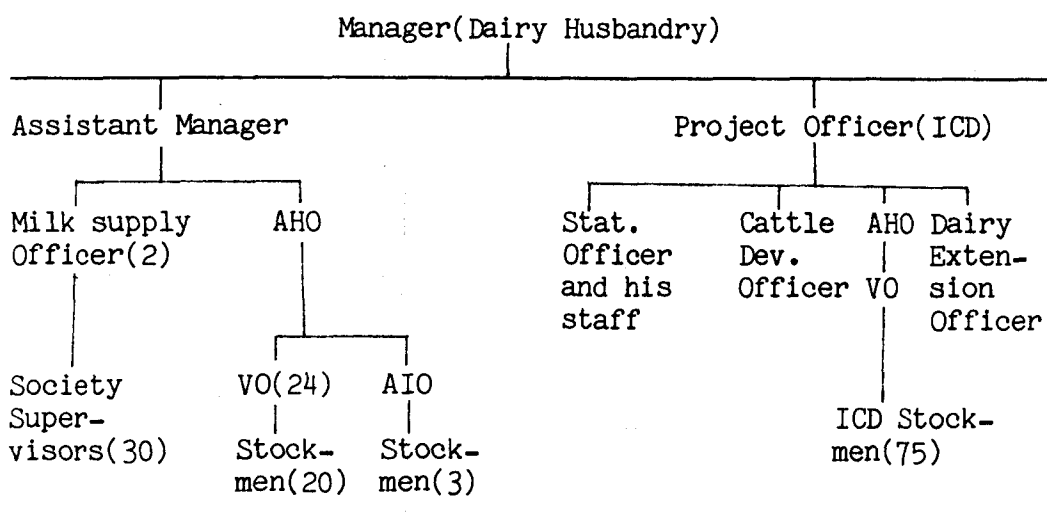
By mid-1965, the following steps had been achieved: First-Aid available in 268 villages; Lay Artificial Inseminators in 138 villages; 40 breeding bulls available for A.I. Semen; 35 co-operative supervisors employed by Amul to help village co-operatives to run on business-like lines; 1,435 acres of lucerne sown by Amul's member-farmers; 15 mobile veterinary Officer-teams established and approximately 31,000 buffaloes eartagged (histories recorded of 5,700).

In the 1960's the concept of "intensive agricultural district programmes" -- whereby all complementary resources were applied simultaneously in areas believed to offer opportunities for optimal returns -- became one of the major instruments of the Government of India for increasing food grain production. In 1964, Government proposed that suitable areas be chosen for "intensive cattle development". It was proposed that whole districts be given generous allotments of Central and State funds for intensive cattle development.

The Government of Gujarat State believed that Kaira (Amul's area of operation) and Baroda District was one of the most promising areas for cattle development. By August 1965, after completion of all formalities and producers Kaira and Baroda were declared as one of the "intensive cattle development blocks" in the State. It was agreed that Amul would be the executive agency for this programme.

Dr. Rao was entrusted with the task of integrating the work of cattle development which originally grew through the two different schemes, Amul's 7-year plan and the new ICD programme. In little less than a year, Dr. Rao found himself sitting over an expanded organisation to work for cattle development. There was a number of people with different skills and experience. The following illustration describes the Dairy Husbandry Division as the ICD Programme got under way in 1965:

Organisation of Dairy Husbandry Division as it started expanding in terms of scope and personnel



Looking at the organisation chart, Dr.Rao said, "Of course, it is very important that we organise our division in the most practical manner. And as you know, at Amul all the management discusses the question very thoroughly before such new programmes are undertaken. In general, we have the people who are hired under the ICD more-or-less on a level with our own staff with regard to pay, authority and responsibility.

"We have now nearly 250 people working for the Dairy Husbandry Division, having different backgrounds and experience.

"My problem today is to work out various ways of reorganising the Dairy Husbandry Division to accomplish the objectives of cattle development."

Dr.Rao in consultation with his colleagues decided to work out various changes in work relationships of his men responsible for cattle development and milk procurement in Amul. He had two immediate objectives before him. They were: 1. to develop effective task groups with "different levels of leadership" in the group hierarchy within the existing organisational structure, and -- 2. to undertake two campaigns, through newly formed task groups, for growing more fodder and accelerating the programme for artificial insemination in the region.

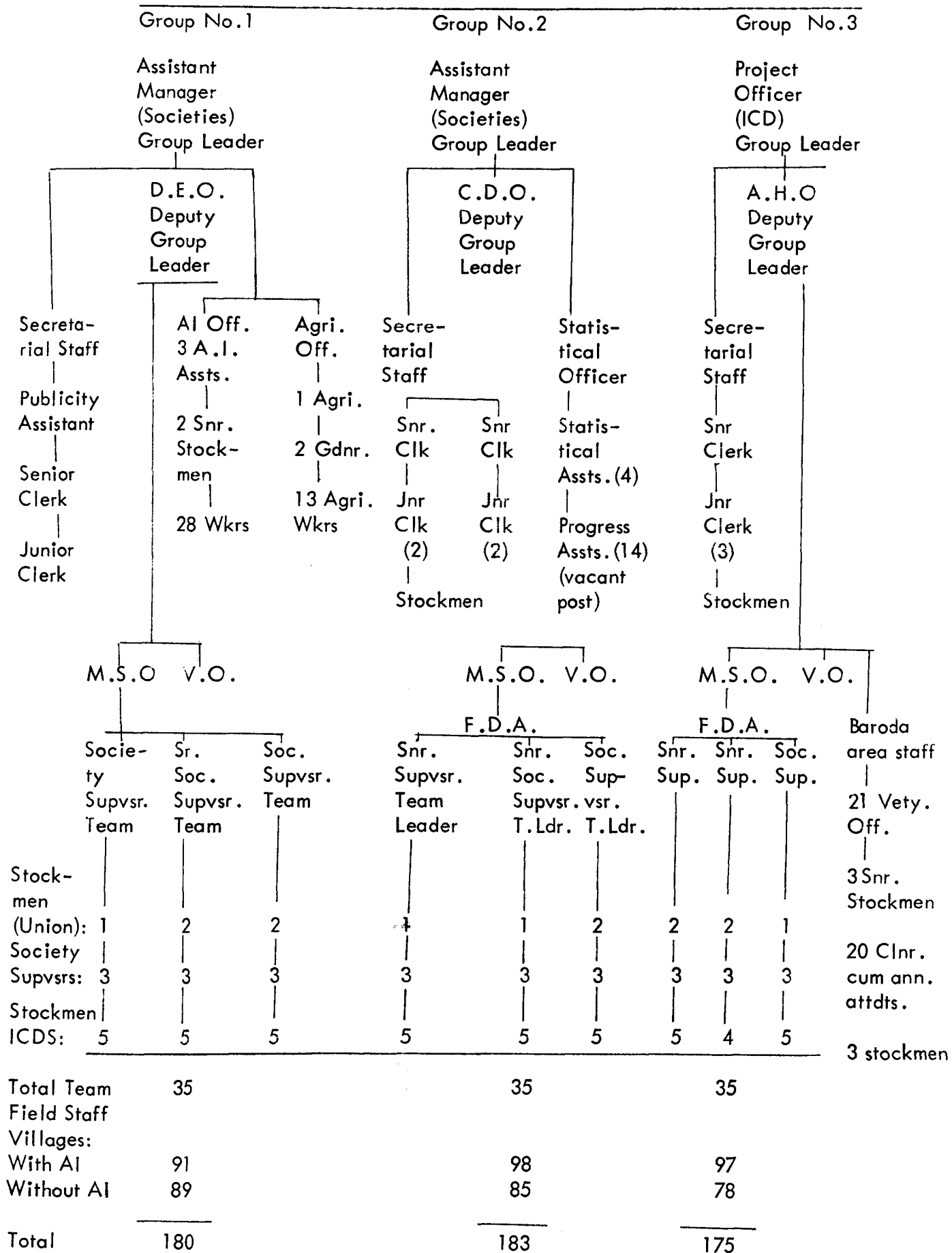
His first look at the prevailing organisational structure gave him the idea of having three task groups, led by the Assistant Managers (Societies) and the Project Officer (ICD) respectively. The idea of having three task groups raised the question of membership for each group. The membership distribution among groups was directly linked to the tasks to be performed by each. The main tasks involved were: 1. bringing more land under lucerne cultivation and acceptance of seed for it during the month of August 1966, and -- 2. implementation of a programme of increase the take-up of artificial insemination during the month of September, 1966.

Since the tasks of all groups were same, it was anticipated that the three groups might in the process of their work, develop a competitive element to accomplish better results. The task groups were formally designated Group-1, Group-2 and Group-3, having leaders and deputy leaders at three levels in the group organisational hierarchy and all three groups had men with general and specialist backgrounds, with the skills required to perform the tasks involved in lucerne and AI campaigns. In a formal way, the manner in which the three groups were formed is described by the chart on page 25. In the chart, the following abbreviations have been used:

D.E.O	=	Dairy Extension Officer
C.D.O	=	Cattle Development Officer
V.O	=	Veterinary Officer
A.H.O	=	Animal Husbandry Officer
M.S.O	=	Milk Supply Officer
F.D.A	=	Fodder Development Assistant

Chart of Dairy Husbandry
Division Staff

Manager Dairy Husbandry



All three groups and the sub teams within each group were assured complete freedom in their operational programmes during the anticipated campaigns. The commonality of the job to be done made it essential that each group be made responsible for a comparable area. The area for each group was approximately 180 villages, including 80 with AI Centres. Each group's area was further divided among three teams, each with three sub-teams, responsible for 60 and 20 villages respectively. For effective implementation, all groups required certain common services such as transport, storage, semen collection cans, publicity material and budget control. These services were designated Central Services and were separately assigned to each group.

(Looking back on the experience in October, 1966, Dr.Rao said:) "I also introduced an element of competition among the groups by declaring that at the end of the lucerne and A.I.Campaigns - on the basis of performance - the groups will be judged as 'first,'second and third'. But, at the same time, I did make it sure that adequate consultations take place among the group leaders about various things of mutual interest. Whenever the group leaders came with any problem before me, I told them that it would be much better to have consultation among themselves and then suggest to me what to do. And, it has worked so well that few problems now come to me -- and whatever does come to me comes also with a suggested solution. You know, I used to sit here in the office for hours together and still have a lot of work pending. But, right now, I hardly have that kind of work for three-to-four hours and I can spend a lot of time in planning and thinking. I am also reading a very interesting book on 'Human Organisation' which really tells me many things about the ways in which people behave in different situations..."

"Let's first talk--about the 'lucerne campaign' during the month of July. "You know, we have six jeeps in all and each group has two jeeps for the campaign activities for one month. But we have only one driver for one group.

Among group members at least two officers were knowing driving village for a day and divide themselves in sub-groups to take care of equal members of farmer-families. We used to inform the village society and our field staff a day earlier to assemble in the village along with the members of the Managing Committee. Here we used to contact all farmers to contact every farmer in the village. Because lucerne needs irrigation facilities. So, our latter approach was to have an advance party of field staff go to the village and prepare a little of pump owners and farmers using such irrigational facilities. That really reduced a lot of unnecessary contacts. In the village, we arranged a meeting with the ladies and talked about the need for growing lucerne. The whole group made it a point to meet in the village during lunch time. All members of the group were asked to bring lunch-packets from their homes and the lunch we used for exchanging notes about things done or to be undertaken. Later, in the afternoon, the group along with the members of the Managing Committee used to

contact each Individual farmer and obtain advance commitment from the farmers to grow more lucerne and the amount of seed he would accept. The commitment was obtained in writing. We were also to convince the pump-owners to give irrigation water at concessional rate for lucerne cultivation and this was done without much difficulty. They also helped in persuading farmers to grow more lucerne and accept seed for it...Out of 30 days, we spent 22-26 days in the field. The group members used to start early in the morning from Anand for the selected village and return to Anand at about 7 or 8 p.m. But, you see, nobody was complaining about these hectic activities. They were trying to do their best. At the same time, they also kept watch on the activities of other groups and how they were doing. Our Statistical Unit was prompt in providing me all necessary information and data on performance. Well, in case of lucerne, the position is like this:

<u>Years</u>	<u>Lucerne seed</u>
1962-63	300 kg
1963-64	1,114 kg
1964-65	6,119 kg
1965-66	10,987 kg
1966-67	79,867 kg

You can see the tremendous quantity of lucerne seed demand we could obtain through our groups. The group-wise performance was

Group I	26,860	500 kgs
Group II	27,861	100 kgs
Group III	25,325	750 kgs

It was a very close competition among groups. But, at any rate, group II was declared as 'first'...."

"during AI campaigns, our approach was more-or-less similar...In addition to this, before launching AI campaigns, we did organise some regular study lectures and group discussions to prepare all members for the kind of the job they had to do in the field. We also conducted an examination for all the people... Those who had a general background were asked to take an examination in animal husbandry and those who had a technical background were asked to take an examination in Audit and Administration of Co-operative Societies. This was done to ensure that all members of the three groups acquired adequate knowledge and skills to undertake AI work as well as to understand the working of Society, Audit and Administration. This has really very good effect. This also facilitated communication between people with technical and general background."

1.5 Case study

The Sarangapur Intensive Cattle Development Project

In an effort to raise milk production and productivity in the country, the Government of India, in 1963-64, developed an Intensive Cattle Development ("ICD") Scheme, to be conducted in areas where the natural potential for milk development was considered good and where milk supply schemes were operating. The central idea of ICD was that optimal returns could be obtained only when there was simultaneous intensive application of animal husbandry inputs at the farm level, coupled with adequate organization for input and output handling. The scheme also envisaged that farmers should be able to realise its benefits quickly: within a plan period, it should lead to at least 30% increase in milk production and 60% coverage by artificial insemination. Keeping these figures in view, the Central Government had also suggested to the different States a model pattern for ICD organisation and facilities...

According to this pattern, each ICD project would cover 100,000 milch animals of breedable age, to be divided into four regions, each with 25,000 animals. At this level of coverage, the funds and facilities depicted in the chart on the next page were to be provided.

Each of the four regional units was to have 25 sub-units, each covering 1,000 animals. Thus, a project as a whole would cover about 5-600 villages (5 or 6 Development Blocks -- about 3,50,000 human population). Regional and sub-unit facilities were to be mainly concerned with artificial insemination (breed improvement), disease control, development of suitable feeds and fodder recording of date, keeping of the central herd book, and veterinary care.

A Northern State Government selected Sarangapur District for an Intensive Cattle Development Project. This was one of the most advanced Districts in the Western Region of the State. The District's human population included some 360,000 farm families. They lived in 1,500 villages, organised in 26 Development Blocks. Farmers were said to be progressive and the milk herd traditionally superior. Since the District was in the milk-shed area of Eldhi Milk Supply Scheme (EMS), a substantial channel for organised milk marketing already existed. The District supplied about 15,000 litres of milk daily to EMS through co-operatives alone.

Organisation and facilities for ICD projects: suggested Government of India pattern

Project Leader(Deputy
Director, Animal Husbandry
Cattle Development Officer
Class II)

1 Jeep

"Assisted by"

Officer I/C Central Semen Bank	4 Regional AI Centres: @ each:	Asst. Regis- trar co-ops. 1 Jeep	Dairy Ext' Officer 1 Jeep	Fodder Develop- ment Off. 1 Jeep	Statis- tical Officer 1 Stat. Supvr.
12 bulls 1 Jeep	1 Reg. Vet. Officer 8 bulls Milk recor- ding staff 1 jeep Medicines, glassware etc. :Rs.1500 yearly 1 Mobile Van in each region 25 stockman centres: each with: 1 stockman 1 Bull Attendant Contingencies medicines Rs.750 yearly		Asst. DEO 15 dairy Assts. 5 field Assts. 15 Cycles	Tech.Super- vision 3 Fodder Development Assts. 6 Block Development Officers 20 Village level workers	1 Econ. Supvr. 1 Field Supvr. 14 Progress Assts. 2 Senior Comp.
Total no. of milch animals to be covered			1,00,000	Total no. of AI sub-centres	100
Total no. of bulls for AI			244	Total no. of vets.	16

Sarangpur's breedable age milch animals numbered 2,58,000. Buffaloes, the common milch animals, were estimated as yielding around 7 litres when in milk. Some 80% of the District's geographical area was cultivated, with 136% had intensity of cropping. Of the net sown area, 160% had irrigation facilities, in addition to an average annual rainfall of 36". The average net area sown per worker in the rural areas was about 2.90 acres. It was said that, 25 years ago, the ratio between the cows and buffaloes was 2.5:1. Now it was just the opposite....

Long before ICD, Sarangpur had supplied its surplus milk to the nearby metropolitan city of Eldhi, (outside the state of which Sarangpur District was a part). In December 1960, when the Eldhi Milk Scheme (EMS) installed its large-scale dairy, the calculations were that the EMS would procure much of its milk from the rural areas of Sarangpur and Dasher Districts. Both of which were surplus districts. At the same time, EMS's remunerative market for the milk producers would foster greater production of milk. However, EMS's procurement remained inadequate. Therefore, the Sarangpur ICD project was started with the specific objective of increasing milk productivity and production, as well as EMS procurement.

Planned development of cattle in this area had been started with the advent of five-year plans and the National Extension Service. Before that, there existed only 7 District Board Hospitals. These veterinary hospitals also maintained pedigree bulls for breeding by natural service. Each hospital's activities had mainly covered the adjacent 5-6 villages only.

In 1952, Sarangpur District's five tehsils had been reorganised into 26 Blocks for development purposes. Initial cattle development work was chiefly focussed on establishing veterinary hospitals in 25 Blocks. In the Second Five-year Plan, the 'Key Village Scheme' came into operation. Five Key Village Blocks with 6 units each manned by stockmen were opened. These Key Village provided artificial insemination ("AI") in their headquarters and natural service in their field units. Side by side, the Animal Husbandry Department also opened stockmen dispensaries in the villages to cater to the need of 506 villages in the neighbourhood. These stockmen dispensaries were later gradually equipped with AI and other facilities, after stockmen had been trained. By 1965, there were in all 32 veterinary doctors with their hospitals and 85 stockmen -- 36 working in their own dispensary units and 30 working on Key Villages Units, out of which 19 units were covered by dispensaries and AI, and 19 working with hospitals. There were in all 51 centres with AI--three were attached to hospitals, while the rest were Stockmen Centres. The Key Villages Blocks and 7 hospitals has their own bulls for semen collection. They supplied semen to a few other units. The units not so covered obtained semen from the centralised Semen Bank....

The District Livestock Officer had been in charge at the District Level and Veterinary Surgeons were responsible for Block Level work. The Key Village Block with Veterinary Officers controlled the Key Village Stockmen units. The other Stockmen were answerable to the Block Veterinary Surgeon. Administratively, the Veterinary Surgeon and the Stockmen were responsible to the Block Development Officer at the Block Level. The major activities covered were:(1) veterinary care (chief emphasis);(2) AI; (3) castrations; (4) inoculations.

When the ICD scheme was introduced in Sarangpur in 1965, the activities, funds and personnel were pooled into one organisation, with the ICD Project Officer at the top. A new post of Cattle Development Officer was created. Also, to tackle fodder development, posts for one Senior Inspector and three Inspectors were created.

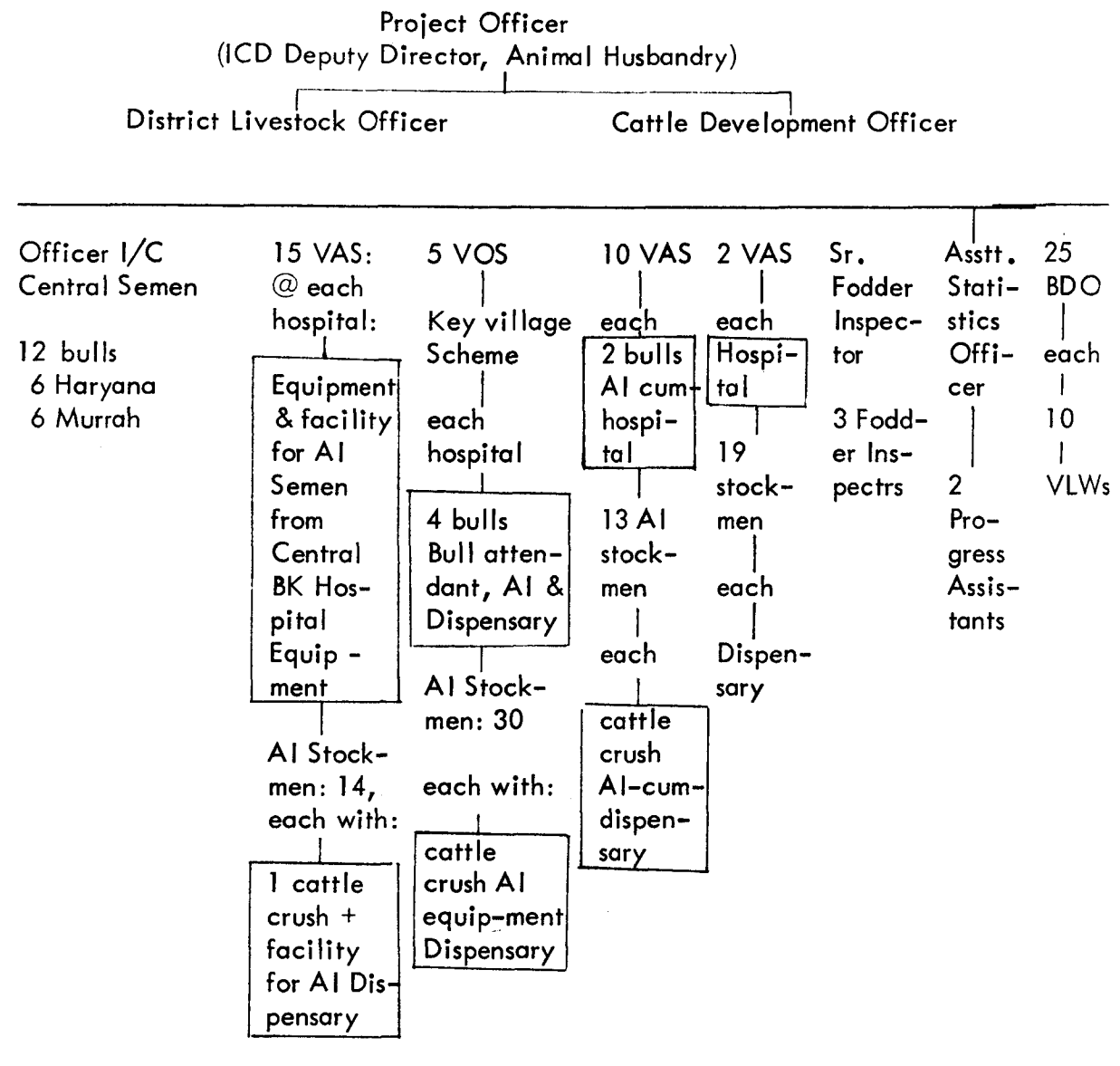
The ICD scheme had worked for about a year now. Progress under ICD had been made as shown below:

<u>ICD Progress, Sarangpur</u>	
<u>Activities</u>	<u>1965-66</u>
Treatments	85,650
Castrations	10,060
Vaccination (H&RP*)	253,534
Inseminations : Cows	12,703
Buff.	21,632
Supply of fodder seed during:	
Kharif (quintals)	423
Rabi(quintals)	336
Fodder Demonstrations during:	
Kharif	87
Rabi	313

*R.P vaccination during 1966-67 had been comparatively restricted by shortage of vaccine.

The PO wondered whether results were commensurate with the increase in financial input.

Unofficial organizational facilities chart



Total no. of hospitals	-	32	Total no. of bulls per AI	-	52
Total no. of hospitals with AI facilities	-	30	Total no. of Vets & Vos	-	32
Total no. of sub-centres	-	76	Total no. of villages	-	1,500
Total no. of sub-centres with AI facilities	-	57			
Total no. of milk animals	-	2,90,000			

The resources of the ICD consisted of Rs.1.3 million for the year (Rs.840,000 from regular and plan schemes and Rs.460,000 additional budget). He felt that these resources were much less as compared to the original ICD Scheme(not fully accepted by his State), where the non recurring and subsidy budget alone worked out to Rs.2 million per district. However, his present budget was more than previous budgets.

The PO also felt that the existing set-up of the units was quite inadequate for the District. Looking to the fodder situation, they had not been able to give a seed subsidy to many farmers, because the budget was available only for 5,000 acres of fodder and the whole stock of seed was lifted in a month or so. On the whole, the PO felt that all the areas of the District, though covered by ICD, were not getting all facilities because of limited supply of inputs for development. The outlay of Rs. 1.3 million per annum for ICD work excluded expenditures of the Dairy Development Wing, which was responsible for the organised milk collection and sales to EMS. The modus operandi of the Dairy Wing was (a) to organise milk producers' co-operative societies for milk collection;(b) to establish Milk Unions of the co-operatives, in order to efficiently assemble and market milk to EMS -- and (c) to provide technical assistance to Unions and their member-societies. Fifteen farmers, each buying a minimum of one share for Rs.10, could combine to form a co-operative society. Such primary Societies then formed a Union. Members were expected to sell milk to their co-operative society. The Unions assembled the milk thus collected and supplied it to the EMS. Prior to ICD the EMS had collected milk solely through private contractors distributed all over the territory. After the co-operative started, the EMS as a matter of policy extended full patronage to the Co-op's.

The Co-op's mixed and sold cattle feed, distributed cattle loans and provided testing and chilling facilities. However, it was not obligatory on the part of the members to sell the whole of their milk to the co-operatives only.

Amongst the private merchants some called "contractors" had contracts with EMS, while others supplied to retailers at Eldhi. Most of the milk thus marketed was buffalo milk. The EMS collected milk by bulk tankers from collection points equipped with chilling facilities. These were manned by the Co-op's Unions in some cases and by private contractors in others. Prices paid by EMS varied seasonally...In the milk shed area, EMS prices, which has been worked out after careful study, provided a good guideline to their competitors --the private merchants -- who offered a premium over and above the EMS price, especially in lean season, to divert supplies to their market channel. After the ICD had worked for a year or so, the EMS was blamed for its failure to support the ICD programme. Estimated production in the area was 760,000 kgs. buffalo milk, and 140,000 kgs cow milk. EMS appeared to procure only 1/5, whereas the merchants took nearly 1/2 of the total production of milk:

Sarangpur milk trade, 1962-68

	<u>At the time of introduction of co-op's in 1962</u>	<u>At present (in 1966)</u>
Private milk traders :		
EMS Contractors	70 to 80	108
Non-EMS Contractors	150	200 (Approx.)
Co-operative societies :		
Primaries	60	325
Milk Unions	6	7
Membership of societies:		
Individuals in Primary Societies	1,561	14,274
Primaries in Unions	60	235
Total milk handled per year, in 1000's litres :		
by co-op's Unions (supply to EMS)	1,712	2,620
by EMS private contractors (Supply to EMS)	11,300	23,200
non-EMS contractors (supply to city retailers)	52,200	45,001
Milk collection points :		
EMS contractors	70 to 80	103
Co-op's	6	10
Non-EMS contractors	(collected individually from villages)	

---"Strictly speaking, the ICD was not in reality applied to Sarangpur District," observed the Project Officer, Shri Chadda, "The original pattern provided 100 stockmen centres for each lakh of breedable population, but whereas our District has three lakh breedable population, but only 87 centres (which may be raised to 100). But otherwise all the activities are the same. Just as the Package programme is for agricultural production, ICD is for cattle development and milk production.

"The functions here in ICD are: (1) treatment and (sale of) medicines carried out by Doctors at hospitals and stockmen at the village dispensaries; (2) AI and castration -- done at hospitals and stockmen centres, -- (3) fodder development and demonstration done through stockmen. At the District level, we have two officers under me involved in parallel function as supervisors of the units. There are 32 hospitals, each Block having one and some more than one, and 87 centres -- again spread over 24 blocks."

At the project level, the three officers were:(1) Project Officer and under him (2) the District Livestock Officer, and (3) the Cattle Development Officer. The District Livestock Officer above him and the CDO parallel to him were added after the ICD scheme started. Their main tasks were: (i) Project Officer, decisions about future plans and budget, fixing targets for centres, supervising the working; (ii) District Livestock Officer, disbursing and drawing, work supervision -- and (iii) Cattle Development Officer, mainly work supervision.

Supervision of cattle-development work had to cover the following:(1) Treatment and special treatment campus; (2) Hospital Inspections;(3) Stockmen Centre inspections; (4) Checking AI; (5) Checking pregnancy diagnosis; (6) Checking castration; (7) Mass inoculation and castration campaigns; (8) Attending village meetings -- and (9) Checking seed subsidy, seed demonstration work etc. Therefore, in the geographical area of 1,480,000 acres, these three officers were to go about visiting 87 centres and 32 hospitals and 26 blocks for the purpose of work inspection.

The Project Officer, talking about the supervision activities, stated, "I have to compulsorily make 22 days' field tours with 12 night halts. For this I have two jeeps at my disposal. But you see the work of correspondence and routine administration keeps me quite busy at least for part of the day at headquarters. But I always move in the afternoons and manage to make my night halts also." He described his modus operandi as follows: Whenever I go on supervision and inspection I go uninformed. I reach the villages and trace the animal which has been reported as treated or inseminated etc. and check it there. This I consider very effective. Moreover, personally I do not consider my present position as a rise in my level... After all what results can I show with an under-budgeted scheme...?

1.6 Case study

Manipur village

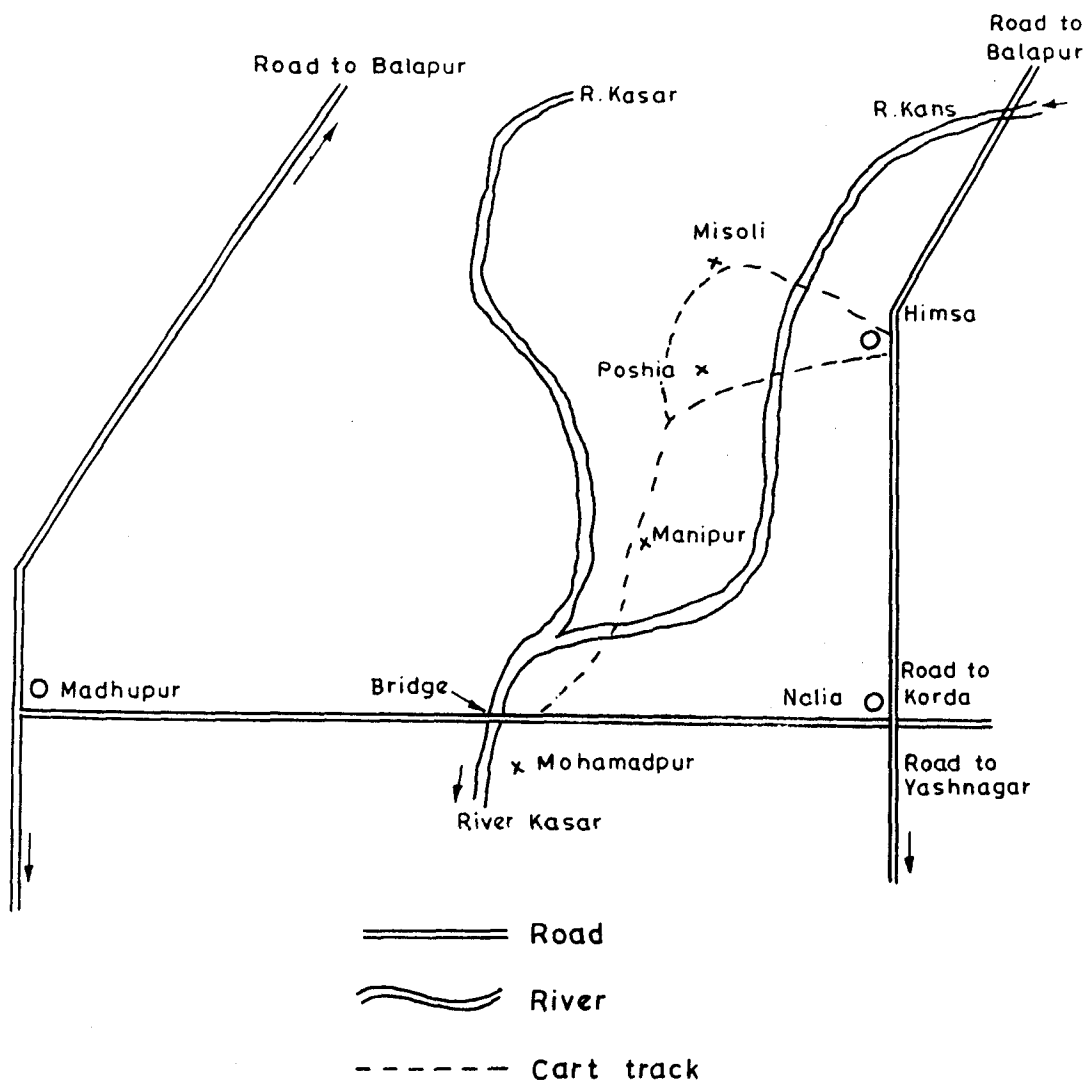
Shri Shankarbhai Patel, a leading farmer and member of the Panchayat of village Manipur was disappointed when he knew that the name of his village was not included in the list of villages where new milk co-operative societies were to be started by the Yashnagar District Milk Producers' Union Ltd., ("YDMPU") in April 1966. He had been trying to have a milk producers' co-operative society in Manipur for the last three years but had not been successful. He knew that the main factor causing this failure was the topography around his village. Manipur was unfortunately situated on a traffic island made by the river Kesar on the West side and another small river, the Kans, on the South and East side. The only approach was from the North, whereas all the truckable roads were located on the other sides, across the river.

The rivers were not so big, but they had eroded the land in such a way that the village was encircled with gulleys and hence the approachable roads were cut off. If one wanted to go to the nearby villages, situated in the South, East or West he had to go on foot through the short cuts. The only approachable side with a cart, truck or bus was from North: i.e through the village Misoli (see sketch next page)

The inhabitants of Manipur had trade links with nearby villages (Nalia, Himsa and Madhupur) which were on truckable roads. The only truckable road from Madhupur to Manipur was through Mohamadpur, Nalia, Himsa and Misoli. In fact, Mohamadpur (on the Madhupur-Korda road) was hardly 2 1/2 miles from Manipur but, as there was no direct approach road or cart track crossing the Kans river on that side, trucks had to travel on a semi-circular route to Misoli, plying for 10 miles, instead of 2 1/2 miles, in order to enter Manipur. Because of its bad location from the transport point of view, some people named the village as "Kala Dwip," which means "unapproachable village."

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Sketch showing position of Manipur with reference to other villages



Except for the transport difficulties, the village was happy in other respects. Some of the farmers were progressive and they had adopted improved seeds like NP-324 wheat, hybrid bajri, Punjab 121, groundnut, etc. They had also installed pumps and oil engines on ten out of the twenty wells in the village, creating an irrigation potential for about 250 acres in the Rabi season and 150 acres in hot-weather season. The main crops in different seasons were as follows: Kharif: Bajri, Groundnut, Inferior Millets, Paddy & Cotton; Rabi: Wheat, Cumin, Vegetables and Lucerne - and hot weather: Bajri, Sundhia Jowar and Vegetables.

The farmers had also kept buffaloes for milk production, which added to their income. They had relatives in nearby villages with co-operative milk societies and had realised the advantages of having such co-operatives. (A few farmers had adopted the feeding of Vijay Dan -- a concentrate distributed by the YDMPU) They prepared ghee out of surplus milk, for sale to the local business-men. A Mavawala had opened his centre in one of the satellites of Manipur. (Mava is prepared by evaporating a portion of the water from milk. Four litres of good quality milk (with 9% SNF and 7-8 fat) would yield about 1 kg of mava) He purchased milk from about 50 suppliers at varying prices, ranging from 15-60 paise per litre, and prepared about 20 kgs of mava per day in summer and about 30 kg of mava per day in the flush season. He despatched the mava to Bombay every day. (The milk co-operative societies affiliated to YDMPU dairy had paid on average about 70 paise per litre of good quality milk.)

Mr. Shankarbhai Patel did not belong to the majority caste (Kshatriya) but had a good command over the village. He was a member of the village Panchayat, where he played a dominant role in the Panchayat affairs. He spoke of his idea of having a milk society in the village and all members of the Panchayat was asked to contact every household to collect the data on production and consumption of milk. His findings were as follows:

Total population	Male	1063
	Female	1024
	Total	2087
Number of houses		492
Buffaloes, in milk		144 (in April 1966)
Buffaloes, dry		155 (in April 1966)

Daily milk production	280 litres (in April 1966)	
Daily home consumption of milk	80 litres	"
Daily purchase of milk by non-producers.	50 litres	"
Daily surplus milk used for ghee or sold to <u>mavawala</u>	150 litres	"

It was estimated that the proposed milk co-operative would be able to collect about 150 litres of milk per day in summer and about 250 litres of milk per day in the flush season. This would increase in the near future by about 50- 100 litres per day, as the producers in neighbouring villages would also bring their surplus milk to the proposed milk co-operative.

As transport of milk cans was the major bottleneck, Mr.Shankarbai Patel tried to find a possible solution. He thought of the following three alternatives:

1. The milk cans, containing upto 30 litres each, could be sent by head-load to Nalia, about 2 1/2 miles away, where the truck from the dairy came to fetch the milk at about 7.30 am. in morning and 7.30 p.m in evening. The persons carrying milk would take about one hour to deliver the cans at Nalia. The milk producers would have to bring their milk by about 5.30 in the morning and 5.30 in the evening. Usually, they milked their buffaloes by about 6.30 a.m. and 6.30 p.m. So they would have to adjust their milking time, which would be rather difficult for them in the initial stage.
2. The route of the milk-truck could be extended by about 2 1/2 miles from Himsa to Manipur village. If the route of the truck coming from Nalia to Himsa was extended to Manipur, it would take an additional half-hour for such a trip and its delivery time at the Dairy would be delayed by at least by 1/2 hour. Such a delay would not be easily acceptable to YDMPU.
3. The last alternative was to cut out a road through Kans river between Mohamadpur and Manipur. Actually cart trucks existed upto the banks of the Kans river on both of its sides. Such cart tracks had to be widened a little to make them approachable to trucks. Such a truck route, with a pass through Kans river, would cost at least Rs.2,000/-. If such a short cut was prepared, the milk truck from Mohamadpur to Himsa via Nalia could be diverted through Manipur as well as another village, Poshia, from which milk could be collected through new co-operative societies. In following such a diversion, the total distance covered by the truck would be slightly reduced as follows:

<u>Route</u>	<u>Via</u>	<u>Total distance</u>
Mohamadpur to Himsa	Nalia	3 + 3 = 6 miles
Mohamadpur to Himsa	Manipur	2 1/2 + 2 1/2 = 5 "

In getting the desired cart track widened, Mr. Patel saw one difficulty. The portion of the cart track on Manipur side of Kans river was under the control of Manipur Panchayat, but the other portion fell in the jurisdiction of Mohamadpur Panchayat. Widening of that part would be objected to by the farmers holding adjoining fields. Such farmers could be made to agree to widening the cart track by the special efforts of the village Panchayat/Taluka Panchayat/Milk Supply Officer of the YDMPU.

Mr. Patel thought it advisable to discuss the matter with the Milk Supply Officer of YDMPU so as to arrive at a possible solution.

1.7 Case study

Ekaj Jatni Praja

The Amroli Milk Producers' Co-operative Society (AMPS) was confronted with a problem of maintaining regular milk supply of quality to the dairy plant. In the year 1964-65, the AMPS had sustained a loss of Rs.1500/- on account of supply of sour milk. During February 1965 to June 1965 about 900 kgs fat worth milk was graded as sour (i.e second grade) and hence dairy plant management had deducted Rs.1.60 per kg fat from the monthly bill of the AMPS. The AMPS also had to face local competition of three private dealers in the area. The total milk procured by AMPS and the three private dealers in the area were as follows: AMPS : 320 litres; private dealers: 180 + 180+ 90 = 450 litres.

The private dealers bought milk without any testing, paying arbitrary prices to each individual milk producer of the village. These dealers also advanced money as loans to a few selected producers. The favoured treatment and better price was given to the leading influential village milk producers from the dominant caste group of Barayas.

The supervisor thought there were three major reasons for irregular supply of milk: (i) The three competitors offer attractive price and terms to some village milk producers belonging to the Baraya caste group; (ii) In recent months there is considerable low feeding capacity in the area due to famine conditions -- and (iii) The dominant caste group in village comes from Barayas, who are socially and economically most influential in the community affairs.

The supervisor came to AMPS to help them in regularising a milk supply of required quality.

On the first day, the supervisor rejected milk of five producers which had low fat content. These five producers went to private dealers and sold their milk to them. It became the talk of the village that the Union's supervisor had come to check the milk. Some of the milk producers were seen rushing back with their milk when the supervisor was found standing near the collection booth. These were the people who used to bring low quality milk and still managed to get a better price. The supervisor's presence diverted them to sell their low quality milk to private dealers.

In 3-4 days, producers bringing good quality milk found it advantageous to sell milk to AMPS's. The quality of milk procured improved while the quantity did not reduce.

Talking to the Chairman of the AMPS, the Writer asked him his assessment of the problem and the way in which he would like to tackle it.

Writer: Mr. Shah, do you think you will be able to procure good quality milk regularly in future.

Chairman: well! I would try. Now on, I am proposing to sit here for half an hour every day and check milk collected by the society. But I don't know whether or not I will be able to do it. As you know, all the producers and employees of the society are of the same caste (Ekaj Jatni Praja).

Composition of the village

Population	4200
Baraya	600 families
Harijan	25 "
Muslim	6 "
Patel	4 "
Bania	2 "
Carpenter	2 "
Potter	1 "
Total	700 (settled within one mile:radius)

Composition of the AMPS

Caste-group	Membership	Members deliver- ing milk (in March 1966)	Milk procured (in litres)
Baraya	440	140	250
Muslim	30	21	50
Patel	5	2	3
Harijan	5	3	7
Bania	8	-	-
Total	490	172	325

Organisation of the AMPS

Chairman	Shah(Bania)			
Managing Committee nine members)	All Baraya			
Secretary	Baraya			
Milk collector	Tester	Recorder	Clerk	all Baraya

1.8 Case study

Using a cover on the Pavali

The Chairman of the Milk Producers' Cooperative Society along with other members of the Managing Committee decided informally that they must convince people to put cover on the milk vessels while they bring it from home to the booth. The bacterial contamination and consequent souring of the milk could be reduced, if people would accept the practice of covering the vessel.

At present the members of the society were bringing their milk produce in a brass cylinder (locally known as "Pavali") or in some cases an aluminium vessel(harni).The majority of people used uncovered Pavali which might be tinned from inside. The Pavali capacity ranged from one to five litres milk and its cost varied from Rupees five to twenty.

While talking to the Chairman, the writer asked him how he proposed to get this practice accepted by his people.

Chairman: Before we started collecting milk in the village, people were habituated use earthen pots. But, then there was not much movement of milk either. Now, as they have to bring milk here in the society more-or-less every day, they use a brass vessel(Pavali). In most cases the work connected with cattle and milk is done by female members of the family.

Writer: Mr. Chairman, do you think your members understand the implications of not covering the milk pots?

Chairman: I do not think so . But we have to educate them by saying that dust and insects falling in an open vessel may spoil all our collected milk and bring loss to the society. Our problem is not very great because of short distances between home and the collection booth. However, these people use a cover on the Pavali in the rainy season, as they know that added rain-water will reduce the fat content.

Writer: But, as you have informally decided to convince people to use a cover over their Pavalis, what do you propose to do now?

Chairman: We cannot do this by sending a circular. We have to make people understand the implications of not using the cover. First, we may ask members to cover their Pavali by lids. They might do it. There is another problem if they put a cover over the Pavali. The shape of Pavali is such that it becomes difficult to carry if you put a cover on it. The male always keep Pavali on the shoulders, while the female put it on their head while carrying. In such a case, it is inconvenient to put a cover and carry. We have another disadvantage in using the open Pavali. In village streets you may frequently find a dog chasing or cattle fight, resulting in spilling over the milk from the Pavali.

Writer: What about using other convenient vessels?

Chairman: We are thinking of this. But we must find a really improved vessel with a cover for the use. The Pavali is not used for milk alone. The family use it for heating water, bringing oil from the shop, keeping ghee and buttermilk etc. and it is also very easy to clean it. I think the best thing is to find out an exclusive vessel with a cover for milking as well as bringing milk to the booth.

1.9 Case study

Bijapur MPCS

The Chairman of the Bijapur Milk Producers' Co-operative Society was worried over the housing problem of the society. The Bijapur Milk Producers' Cooperative Society (BMPCS) had been started in 1960 to collect milk from the milk producers in Bijapur vilage. They had collected about 150 litres of milk per day in the beginning and slowly and steadily increased the collection to 1000 litres per day in 1965/6. Since its inception, the Society had been housed in a rented building belonging to Shri Daduram, the Sarpanch of Bijapur village Panchayat. Shri Daduram had constructed a house with four rooms of 12' x 12' size with a common verandah of 6' width. The Society had rented one of the rooms at Rs.15/- per month. Daduram had allowed the Society to use the whole of the verandah during the time of collection of milk in the morning and the evening (say, about two hours per day) The verandah was facing the village road and it was about 3' above ground level. The situation of the room rented to the Society was very good as it was in the centre of the village and was accessible by truck. In fact, the Society wanted a house with a high platform from which the milk cans could be delivered directly into the truck. The truck would stand in front of the verandah for about 5 to 10 minutes in the morning and in the evening, at about 7.45 a.m and p.m., while the Society's milk was loaded into it.

As the Society developed in the course of time, its activities also increased. Besides collection of milk, it entered into the business of cattle feed, which was sold to the milk producers from 8 am to 10 am. The Chairman and the executive staff of the society felt that the premises were too small for housing their equipment as well as the office. The Chairman approached Shri Ram Singh with an instruction to rent another room besides the one already rented. Shri Daduram had felt that he had fixed a low rent and wanted to increase the rent. He demanded Rs. 50/- per month for two rooms as well as the verandah attached to the rooms. Shri Ram Singh could not agree to such offer as he thought that the rent was on a very high side.

He approached another businessmen in the village, Shri Ganpat Lal, who had constructed a house on the outskirts of the village. The house was in the form of a spacious hall of 12' x 25', but it did not have an adequate verandah, as it was hardly 3 feet wide. The verandah was facing the village road, which was of about 10 feet width.

As the contract period for Daduram's room was to be over by 30.6.64, Shri Ram Singh preferred to enter into the contract with Shri Ganpat Lal, whose house was to be rented at Rs.25/- p.m. Shri Ram Singh called a meeting of the Managing Committee and placed his proposal for renting shri Ganpatlal's house at Rs. 25/- per month for a minimum period of 4 years. The members of

the Committee agreed to his proposal and empowered him to enter into a contract with Ganpat Lal. Accordingly, Shri Ram Singh made a contract with Ganpat Lal to rent his house and shifted the society to the new building from 1.7.1964.

Shri Daduram did not like the action taken by Shri Ram Singh, but he was helpless as he had no command over the members of the managing committee. Later on, Shri Ram Singh found that the building was inconvenient for loading the cans into the trucks as there was no platform. He asked for permission for construction of a katcha (temporary) platform of 6' width covering 3' of the village road and, in anticipation of sanction, he constructed the katcha platform. Shri Daduram did not like the action taken by Shri Ram Singh in construction of the platform in front of the new building rented by the Society, as it encroached upon the village road and caused some inconveniences to the village traffic. Most of the members of the village panchayat were shareholders of the milk society and hence he did not dare to reject the application for getting permission to construct the platform. However, he informed Shri Ram Singh orally that the platform was illegal and had to be removed. Shri Ram Singh knew it well that Shri Daduram was right from the legal point of view, but he did not agree with Shri Daduram's view that the platform caused inconvenience to the village traffic as the truck occupied that place hardly for 10 minutes in the morning and 10 minutes in the evening-- and there was no traffic on that road during such time. He suspected that Shri Daduram would not allow the construction of the platform because the Society had left the rented room belonging to Shri Daduram.

Operation Flood 1970-75 a study

Section 2: Events leading to the start-up
of Operation Flood.

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Section 2:Events leading to the start-up of Operation Flood2.1 The then Prime Minister's visit to a village

In October, 1964, the then Prime Minister of India, Shri Lalbahadur Shastri, expressed a desire to get away, for at least a full day and a night, from the trappings and formality of his office - and to spend the time in a village. Those responsible for his health and welfare understandably demurred; but, as the PM grew more insistent, they felt obliged to enable him to fulfill his wish "to get back to my roots, back to the true India, which is in our villages."

Shri Shastri had agreed to inaugurate a new cattle-feed plant, which had been set up by the Kaira District Co-operative Milk Producers' Union near the Union's headquarters at Anand ... that afternoon, as the PM's "convoy" approached Anand, it made an unscheduled stop on a quiet road - and the next thing anyone knew was that an unmarked car was trundling its way down a narrow side lane to the village of Ajarpura. There, a tobacco processing building had been converted for simple human habitation (for some foreigners, so the village had been told).

Shri Shastri's car stopped in front of this building at about 9 p.m. and his village hosts showed him his temporary quarters. After quietly asking that the carpet be removed -- "I have never used one in my life" - and after having the metal cot exchanged for a "charpoy" (the traditional Indian bed, with a wooden frame and a net-work of jute webbing to lie on), Shri Shastri expressed satisfaction with his village home. He bathed and joined 15-20 farmers at their customary vegetarian dinner.

From Shri Shastri's questions about the vegetables served, the conversation moved on to his hosts' crops and milch animals -- and, of course, their milk co-op'. By one a.m., their enthusiastic guest was eagerly making plans to rise at five, in order to see the village co-op's milk collection at six. Brushing aside the protest of a doctor who was present, Shri Shastri confirmed his morning appointment - and, indeed, just before six a.m., he was seen walking to the co-op', pausing only briefly on his way (without comment) to look at a small group of landless people's hut-like homes.

He watched the milk producers bring their milk for sale to the co-op' (1/2 - 3 litres each, usually), saw now each producer's milk was fat-tested, watched them being paid for the milk brought to the co-op' the previous evening -- and listened carefully to their accounts of how the co-op. union provided an artificial insemination service, to help them up-grade their milch buffaloes, a mobile veterinary service which visited the village each week - and green fodder seeds for the producers to test on their land.

Now came the traditional token of respect: the farmers placed garlands of flowers over Shri Shastri's head. But Shri Shastri only removed the garlands and, looking around him, beckoned the two oldest men in the audience. When they stepped forward, he garlanded them, asking each in turn, "How are you?"-- "Everything is well," each replied.

Shri Shastri turned back to the co-op and studied the graphs on the walls of the Managing Committee's meeting room. He noted the rising production and sale of milk...then, reluctantly taking his leave, he again took up his official schedule.

Inaugurating the cattle-feed plant before 40,000 milk producers, he told them how happy and privileged he was to have spent a night among them -- and how he had seen the working of their milk co-operatives: "This is good work", he said, "It should be done everywhere. We will think now how it can be done".

2.2 Cleaning up the Delhi Milk Scheme

In mid 1964, the then Minister for Food, Agriculture, Community Development and Co-operation (abbreviated to Ministry of Agriculture" in this text) in the Government of India requested Shri V. Kurien, General Manager of Kaira District Co-operative Milk Producers' Union, Anand (referred to henceforth in this text as the "Anand Co-operative") to visit him in Delhi. The capital city's large, modern dairy, which was operated by civil servants as part of the Department of Agriculture in his Ministry, was officially titled "The Delhi Milk Scheme" (in brief, "the DMS"). The Minister explained that the DMS seemed to have become unmanageable. He requested Shri Kurien to come and work in Delhi as long as would be necessary in order for him to "clean up the DMS". Shri Kurien expressed his view that the task was beyond any one man's capability -- and, besides, he had a full-time job already. However, it became clear that the Minister would not take 'No' for an answer. So, ultimately, Shri Kurien obtained the Minister's permission to put together a team which would work for six weeks on the DMS: The Team included Shri H.M. Dalaya, Deputy General Manager of the Anand Co-operative, to head the Team on the spot and thereby to enable Shri Kurien to commute between Delhi and Anand, his place of work; the rest of the Team consisted of the Anand Co-operative's Manager, Production & Planning (who would be responsible in the Team for engineering); the Director of the National Dairy Research Institute (quality control); the Secretary of the Federation of Dairy Co-operatives, Uttar Pradesh (who would be responsible in the Team for milk production and procurement); the General Manager of the Greater Bombay Milk Scheme (who would be responsible in the Team for milk distribution)-- and a non-Indian visiting faculty member of the Indian Institute of Management, Ahmedabad, working on management in the food-agriculture sector (who would be responsible in the Team for accounting, personnel, economics and general management). Shortly after this multi-disciplinary Team's composition was agreed, the chief executive of the DMS, resigned and, next day Shri Kurien in effect took charge of the DMS, armed with the authority of the Minister for Agriculture and backed up by the authority of the Finance Minister in the Government of India.

After a week of intensive observation and interviewing, the Team submitted its first report (of some 10 pages) to the Minister for Agriculture. After summarising the Team's main findings -- near break-down of most equipment, lack of quality control, dis-functional accounting, chaotic purchasing and inventory controls, demoralised staff, defective pricing -- the report recommended a drastic, urgent overhaul of the entire dairy and its administrative procedures, as well as the replacement of five of its senior managers.

These recommendations were accepted. The Team spent the next six weeks implementing them -- and, on the eve of its demittal, presented the Minister with a final report (of some 150 pages), recommending the actions needed to ensure that the DMS would in

future be properly managed and would grow to serve all the needs of Delhi's milk consumers (vs. 30% of the city's milk market, which it then served). In accepting the report, the Minister instructed his officers not to "tinker" with the Team's technical recommendations, but rather to concentrate on deciding how, within the Government's administrative rules etc., the DMS's management could be put (and maintained) on a sound footing. The Minister went on to say that Shri Lal Bahadur Shastri, the then Prime Minister of India, had expressed the wish that there should be a central institution which would help milk producers all over India to organise their own dairy co-operatives on the pattern of the Anand Co-operative, which had contributed so much to the effectiveness of the DMS teams work. The Minister went onto point out that the DMS team had demonstrated the value of such a multi-disciplinary set of dairy practitioners -- and suggested that the country's dairies needed to have such expertise available on a permanent, rather than on an adhoc basis. He asked his officers and Shri Kurien to recommend to him the form that such a central institution should take.

2.3: The National Dairy Development Board 1965-1970

The Minister for Agriculture had asked Shri Kurien to recommend the form that a central dairy development institution should take; its main objectives, the Minister said, should be replication of the Anand Pattern of dairy co-operative and making multi-disciplinary, professional dairy expertise available to dairies in the public, co-operative and private sectors. Shri Kurien discussed the matter at length with his immediate colleagues and with many others in the dairy industry, as well as with officials in the Ministry of Agriculture, who had of course also been asked by the Minister to advise him on this question. They subsequently showed Shri Kurien their recommendations: in brief, they recommended a Dairy Development Council, the composition of which would reflect the fact that, as agricultural (including dairying) was a State subject under India's Constitution, agricultural policy and official investment in agriculture was a subject of each State Government in the then 19 states of India. To reflect this fact, the Ministry proposed that the Dairy Development Council should be composed mainly of officers in the Central and State Governments who were involved in dairy development. The proposed Council was to meet periodically, so that its members could jointly decide on aspects of the nation's dairying which were of common interest. Members would also benefit by exchange of experience etc.

Shri Kurien did not believe that such a Council would achieve much. He had a study made of existing central commodity-oriented institutions (the Tea Board, the Coffee Board etc.), of corporations wholly owned by the Central Government (the Food Corporation of India etc), -- and of other countries' dairy structures (Poland's Co-operatives, the Milk Marketing Board of England and Wales etc.).

Finally, he recommended to the Minister that a National Dairy Development Board be set up, under the aegis of the Government of India, to be registered as a Charitable Trust (i.e. non-profit making). He recommended that the Board should have seven Members: mainly professional, practicing dairymen, with a Chairman to be appointed by the Government of India in consultation with the Chairman. In accord with the provisions of the law on charitable trusts, the Secretary of the Society would also be its chief executive officer, responsible for carrying out the policies and programmes determined by the Board, while also observing the Rules of the Society in pursuance of its objectives (for every such Society, a statement of its objectives and Rules had to be approved by the Commissioner responsible for Charitable Trusts, before the Society could be registered).

The main objective recommended for the Board was that it should carry out feasibility studies, engineering design, erection, commissioning of plants, manpower development services, bulk procurement services, original design and manufacturing follow-through, trouble-shooting on complex equipment, consultancy on planning, control, organisation and marketing, as well as

international liaison with bodies outside India concerned with dairying.

In essence, these recommendations were accepted. The National Dairy Development Board (which soon became known as the "NDDB") was registered under the Charitable Trust Act and the Public Trust Act in 1965, with its Head Quarters at Anand(it was the first such central body to have its HQ outside the country's capital city.) The Government of India appointed Shri Kurien as the NDDB's first Chairman plus seven members: the three senior, central government officials concerned with dairy development and related research, one State Government officer responsible for his State's dairy development, the Assistant General Manager and the Manager, Production & Planning, of the Anand Co-operative -- and one academic who specialised in management in the agriculture and foodsector.

For more than twelve months, the NDDB deliberated and consulted with others in the dairy industry, to decide how it should actually operate. At first, it received financial assistance from the Central Government:Rs.30,000 (then equal to US \$4,000) in 1965-66 and Rs.20,000 in 1966-67. However, the NDDB found that burdensome administrative procedures were involved in receiving such financial assistance; moreover,the Board decided that, if the NDDB was to offer comprehensive dairy development services-- without becoming bureaucratic, top heavy, or academical -- it should charge fees which would cover the cost of providing each service. This would enable the NDDB to remain technically and financially viable, while also ensuring that any uneconomic or unhelpful services would wither away for lack of paying users. By following this policy, the NDDB was able to dispense with Government assistance from 1967 onwards.

In 1965-66, however, this happy state of affairs had seemed far off to Members of the NDDB. Each of them, including the Chairman, had a full-time job. It was seldom practical for the Board to meet, with all Members present, more often than once in three months -- and they felt that this frequency should be sufficient for the purpose of setting policies, monitoring progress and fulfilling their responsibilities vis a vis the funds of the NDDB (which were, in effect, in their hands as a Trust).

To provide dairy development services, however, the NDDB clearly needed full-time professional staff with relevant experience. The most suitable source of men for many such services was the Anand Co-operative and, especially, its Planning & Production Division, whose Manager was a member of the NDDB. This Division of the Anand Co-op' had already helped several neighbouring milk producers co-operatives by designing, erecting and commissioning dairy plants for them. In fact, the first such project executed by the NDDB was one which had been started by the Planning & Production Division of the Anand Co-op' -- and much of the work involved in completing it was also done by staff members of Anand Co-op's Production & Planning Division.

Slowly, however, the NDDB built up its own staff and service. By 1968 (still with significant help from the Anand Co-op'), the NDDB's services included: design, turn-key erection and commissioning of dairy and cattle-feed compounding plants; manpower development programmes; feasibility studies; market surveys; bulk purchases of dairy equipment for its clients -- and, under government license, bulk import of milk powder. The value of goods and projects handled by the NDDB reached Rs.8 crores (Rs. 80 million) that year.

In the process of gearing itself up to provide these services, the NDDB had of course developed its own staff and modus operandi. To begin with, it operated largely on time donated by the Board's Chairman and Members plus professional services "borrowed" from the Anand Co-op' (including an Honorary Secretary and Treasurer). For day-to-day decision-making, the Chairman consulted with a compact executive Committee of the Board -- and with Advisors, whom he had designated from among the Board's Members: the Anand Co-op's Manager, Planning & Production, who was designated "Adviser, Engineering" within the NDDB's organisation -- and the academic specialist in management in the agriculture and food sector, who was designated "Adviser, Management and Manpower Development" within the NDDB's organisation. The latter commuted to Anand once or twice weekly from Ahmedabad, 56 miles away, where he worked; then, in early 1968, his Ahmedabad assignment ended and he came to Anand to work full-time on the NDDB (as a non-Indian, he was in fact recruited by the Food & Agriculture Organisation of the UN, at the request of the Government of India, and assigned to work with the NDDB full-time).

By mid-1968, the NDDB had some eight professional staff members plus a small complement of draughtsmen and office staff. A full-time Secretary and a full-time Treasurer were appointed in 1968 -- and, later in the year, the NDDB was organised into two functional Divisions: the Engineering Division, which carried out dairy design, erection, installation and commissioning, plus original equipment design and manufacturing follow-through -- and the Management & Manpower Division, which (although very much smaller than the Engineering Division) conducted feasibility studies, marketing studies, techno-economic analysis and manpower development programme. Originally, these Divisions were led by the Adviser, Engineering, and the Adviser, Management & Manpower Development, until, in 1969, full-time professional office rs were appointed to lead each of the two Divisions. These men reported to the Secretary (the NDDB's chief executive), while the two Advisers were retained in a "staff" relationship to the Chairman and Secretary. During this period, the Treasurer built up the NDDB's Accounts Section, of which he had administrative charge.

During 1969, the NDDB's workload continued to grow and its staff increased accordingly. By March, 1970, the Engineering Division had twelve professional staff plus three graduate apprentice Engineers; the Management and Manpower Development Division had

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seven professional staff plus four graduate apprentice executives.

Until 1968, the NDDB's premises had been a small, privately rented house close to Anand Co-op's campus. Then the Anand Co-op' built a new 5-storey administrative building, of which it rented first one floor, then two floors, to the NDDB. Meanwhile, the milk-producer members of the Anand Co-op' had voted to give NDDB Rs. 650,000 (US \$ 80,000). Understandably impressed, the Royal Danish Government (which had long assisted India's dairy development) gave the NDDB altogether Rs.13 lakhs (Rs.1.3 million)-and (in early 1970's) further capital assistance -- at the formal request of the Government of India. The NDDB had added some funds to these gifts -- plus Rs.130,000 for equipment etc. -- from its earnings during 1966-70. Thus, the NDDB acquired its Rs. 20 lakhs (Rs. 2 million) campus on 15 acres of ground (donated by the Government of Gujarat State) -- and, in early 1970, the NDDB was able to move into its own premises, the first phase of which provided approximately 1,200 sq.m of office space, hostel accommodation for 20 and housing for thirty staff members.

The NDDB felt that it had timed this build-up of its facilities rather neatly, even though there had been some scepticism when it had initiated its building programme. For, although the demand for the NDDB's services had been increasing during 1967-68, nevertheless, the Board itself had often been despondent. Old dairy hands in India foresaw the day when the NDDB would lose its youthful initiative and slide into the morass of bureaucratised inertia, poor standards of performance, and indifference to the interests of producers and consumers alike, which characterised so many dairy organisations.

In general, many Board Members felt that NDDB's services, although providing marginal savings in costs etc., were really being used by the Dairy establishment to prop up the old, rather than to ring in the new. In particular, the NDDB found that it could make no headway in persuading or helping State Governments to enable their milk producers to set up co-operatives on the Anand Pattern. Such co-operatives continued to be confined to the milksheds of Gujarat State, where the Anand Cooperatives had initiated the Anand Pattern so much earlier.

The economic strength of the Anand Pattern co-operatives rested considerably on the conservation and marketing of members' flush-season milk as skim milk powder, baby food and pasteurised, refrigerated butter. During the 1960's, these indigenous manufactured dairy products had achieved a high level of acceptance in the country's urban demand centres.

Meanwhile, however, the EEC had built up its "Butter Mountain" and its "Milk Powder Mountain" (as the popular press referred to the huge surpluses of butter and milk powder, accumulated at that time by the European Economic Community). Soon, there were unofficial reports that 20,000 tonnes of table butter were to be

presented, free, to India -- enough to wreck the Anand Pattern co-operatives' market for some years to come ... But, in the event, the EEC proved receptive to an idea for putting some of its butter and some of its milk powder to a much more constructive use -- and that idea was to become an important part of Operation Flood.

2.4: The creation of Operation Flood and the Indian Dairy Corporation

If only surplus dairy commodities from abroad could be donated to the country -- and then turned back into liquid milk, to be sold into India's cities at reasonable price, the NDDB reasoned, then these commodities could do great good. This was the reasoning which led the NDDB to formulate the urban marketing strategies used in the programme which came to be known as "Operation Flood" (because it was designed to help create a flood of rurally produced milk in India's natural milksheds).

By late 1968, the NDDB had invested an estimated Rs.500,000 in formulating Operation Flood, which it then submitted as a proposal to the Government of India. By late 1969, the Government of India had proposed the Project to the Food and Agriculture Organisation of the UN's World Food Programme (through which it proposed to obtain EEC donated butter and milk powder for the project). In early 1970, the proposal was accepted by the World Food Programme - and, four months after the NDDB moved into its own premises, Operation Flood was launched.

The Project involved investments in India's dairying of Rs. 95.4 crores (US \$ 127 millions). Thus, with a professional staff of 27 -- and unlimited enthusiasm -- the NDDB entered the 1970's as the main-spring of the largest dairy development programme ever undertaken anywhere in the world.

But this had not been an easy achievement. By mid-1968, often with the help of the Anand Co-op's experienced personnel, the NDDB had provided a limited amount, at least, of the following services: design and turn-key erection of rural dairy plants; feasibility studies of projects aimed at setting up rural dairy co-operatives on the Anand Pattern; bulk procurement of dairy equipment, aggregating a number of client-organisations' orders in order to obtain a more favourable price -- including the writing of specifications and inspection of finished goods prior to their acceptance; design and manufacturing follow-through of dairy and cattle-feed compounding equipment not previously manufactured in India; negotiation of prices for milk powder imported under Government license for a number of dairies; manpower development programme--and urban milk market studies.

On the basis of this experience, most Board Members (including all the professional dairymen on the Board) had concluded that India's modernising dairy sub-sector faced seven major problems. (1) The publicly owned urban dairies had become "addicted" to the use of imported Skim Milk Powder (subsidised by all exporting countries except New Zealand and available at 1/5 - 1/3 of Indian prices) to extend their meagre supplies of fresh milk; this use of imported powder also enabled them to sell liquid milk which seemed "cheap" to those urban consumers who could obtain a Milk Card, which entitled a household to the Dairy's milk; this hidden subsidy also enabled the Dairy to hire large numbers of

inefficient and/or unnecessary personnel -- and it enabled the Dairy to get by without erecting systems to procure milk directly from rural areas. Instead, most publicly-owned Dairies bought milk through middlemen, who were often influential, as well as being part of a traditional structure which tied milk producers to distress-price selling by giving them loans at extortionate rates during the Summer lean-season. (2) Another related part of this traditional system was the city-cattle keeping community, which brought higher-yielding milch animals into the cities, fed these animals of concentrates and forage imported into the city -- and therefore produced expensive milk. City milk producers could sell this milk, often in diluted form, because most consumers had no choice but to buy it, as no publicly-owned modern urban dairy could satisfy more than 30% of its market. (3) Thus, the traditional milk supply system could dilute its product at will and could manipulate prices, forcing low prices on rural milk producers and forcing high prices on urban consumers, especially in the lean, summer season. (4) The publicly-owned urban dairies could not raise their retail prices in summer, because consumers would blame any price increase on "the Government": so administrators hesitated to offer a higher price to rural producers in the lean season, for fear of increasing their Dairy's unprofitability -- and it was well known that some traditional middlemen sold their milk to the Dairy in Winter (when the Dairy's price offer was relatively high) and then switched their milk to their own retail channels in summer (when the Dairy's price offer was relatively low). (5) Because of these kinds of margin-taking opportunities, the traditional system could usually outbid organisations like co-operatives, if they started effectively to buy milk directly from rural milk producers. (6) In any case, implementation of projects for integrated production, procurement, processing and marketing of milk through Anand Pattern co-operatives in rural milk-sheds, was very difficult: usually, up to four Government Departments were involved (Milk/Animal Husbandry/Veterinary/Co-operative etc.); moreover the Anand Pattern Co-operatives were autonomous and hired their own professional staff, whereas departmentally-run dairy projects were staffed by personnel from the concerned Departments.... (7) Another set of problems centred on the fact that India's dairy processing was based on Western, temperate-climate technology; dairy equipment had to be made from stainless steel, which was scarce, costly and usually imported; the dairy-equipment industry was dominated by three companies which did not depend on sales of dairy equipment for their viability; even if it negotiated with these companies from a relatively strong position (on bulk-procurement order, for example), the NDDB found it hard to obtain significant price reductions, despite the fact that, on the rare occasions when it could get equipment made by other (usually smaller) indigenous fabricators, this equipment was usually much lower priced than similar equipment obtained from India's Big Three dairy-equipment manufacturers.

Although the publicly-owned dairies' dependence on "cheap" imported milk powder had helped to suppress indigenous milk prices and production, the limited availability of foreign

exchange (needed to pay for such imports) at least placed a limit on the amount of Powder imported. Moreover, the Anand Pattern co-operatives had generally negotiated annual contracts to supply Bombay City's dairies with a more-or-less fixed quantity of milk daily at a constant year-round price. Most excess milk which these co-operatives procured (usually in the cool, flush season) was conserved in the form of butter, milk powder and baby-food - and these lines had so far won remunerative markets (in fact, the Anand Co-operative's brand name for its dairy products, "Amul", was probably the best-known brand name in India).

By 1968, however, the NDDB believed that the "mountains" of surplus dairy commodities, which the European Economic Community had accumulated, constituted a threat to the domestic markets of the Anand Pattern co-operatives. Already, for example, there had been unofficial mentions of a gift of 20,000 tonnes of butter from the EEC to India. The Anand Pattern co-operatives were at that time selling less than 10,000 tonnes of their pasteurised table butter yearly.

The NDDB felt that it could hardly recommend poor rural milk producers to invest in costly dairy plants etc. in the face of such market uncertainties. Offers of donated powder and butter would no doubt help to suppress urban prices (as donated imported wheat was believed to have done in the past). As long as such supplies lasted, they would inevitably be tempting to both politicians and administrators, especially in a country as poor as India...

In the face of these problems, the NDDB determined to pursue an "all or nothing" solution. It drew up the project which became popularly known as "Operation Flood"

This proposal was based on five major principles. (1) To "prime the pump" for the publicly-owned urban dairies, donor countries would convert some of their accumulated stocks of butter into butter oil, which could be recombined with skim milk powder into liquid milk, and these commodities would be donated through the UN-FAO World Food Programme to the Project; the commodities would, however, be priced into the Dairies at Prices high enough to avoid their acting as a suppressant on indigenous milk production. (The funds generated by this "sale" of milk recombined from donated commodities would be used to support all the investments envisaged under the Project, thereby insulating it from periodic shortages of funds for official investment. Urban demand for milk was believed to be increasing by 6% yearly; the Project would use some of the funds generated by the "sale" of recombined milk to increase the capacities of the publicly-owned dairies in the major cities, so that their capacities would at least equal effective 1970 demand by the end of the Project (equal to about 75% of projected demand after five years, when the project was due to be completed). (3) As the publicly-owned urban dairies obtained commanding shares of their markets (partly by selling liquid milk recombined from donated commodities),

city-based and peri-urban milk production would be forced back into the rural hinterland milksheds, where milk production was more economic; in these milksheds, the Project would use some of the funds generated through recombined milk to finance the establishment of Anand Pattern milk producers' co-operatives, these co-operatives would procure and process each milkshed's enhanced supplies of milk -- and market much of this milk directly to the cities' public dairies; thus, by the end of the project, the cities' dairies would be able to replace milk recombined from donated commodities with fresh milk produced in their economic, hinterland milksheds. (4) As city-based milk production was ended, the higher-yielding animals would no longer be drawn from the milksheds into the cities where their calves were not reared and where 50% of their mothers were believed to be slaughtered prematurely because it was uneconomic to re-freshen them in the city ;so it would be easier for the small, rural milk producers to build up their holdings of better milch animals-- and significant shares of the funds to be generated by the project were ear-marked for rearing pure-bred bulls, for setting up artificial insemination systems to help rural producers up grade their milch animals -- and for helping the Anand Pattern co-operatives in the milksheds to supply their members with complementary technical inputs, to enable them to increase their milk production, so that the co-operatives would thereafter be able to "keep up with" projected increases in the cities'demands for milk products. (5) In any region of the country, however, milk production would, even at the end of the Project, be vulnerable to the fallibility of the monsoon rains -- in any 5-7 years, any region could (and sometimes did) suffer 1-3 years of very poor monsoon rains, which could occur consecutively; but it was extremely rare for all regions of the country to suffer this way during the same years; therefore, some generated funds were reserved for investment in road and rail-tankers, for long-distance transportation of liquid milk, as well as to create warehousing for milk products(frozen cream, milk powder etc.), which the new Anand Pattern co-operatives would be conserving from their members' flush-season milk; these products would act as a "reserve", because they could be shipped to regions where milk shortages developed, to be recombined there into liquid milk; thus it was planned that a "National Milk Grid" would be established by the end of the Project, which would use medium-term storage and long-distance transportation to evenout seasonal and regional imbalances between supply and demand.

These five basic principles of Operation Flood were evolved by the NDDB during 1967 and 1968. It had taken many hours of discussion. Much midnight oil had been burned in the process of collecting the limited data available, analysing it -- and trying to put figures on the quantities and values involved..... During this process, the NDDB had identified not only the main principles of Operation Flood, but also the yardsticks which it would use in order to finalise the project.

Fortunately, the NDDB was in a position to evolve these yardsticks from the practical experience accumulated in the Anand

Co-operative and the NDDB itself. For example, when the urban dairy in Baroda City (a city of some 350,000 people, 25 miles from Anand) had been started, in the early 1960's, it had been the first co-operatively owned and run dairy of its kind -- and the Baroda District Co-operative Milk Producers' Union (whose dairy it was) had determined that it should capture a commanding share of Baroda City's liquid milk market. At first, however although the dairy had a capacity of 50,000 litres daily, it could collect only some 12,000 litres of milk daily from its village milk societies in the surrounding milkshed area of Baroda District, which was the Co-op's area of operations. The ability of the traditional milk traders to dilute milk and to make higher margins on milk products etc. enabled them to outbid the co-op's for milk in the villages. So the Anand Co-operative had agreed to supply the Baroda Co-op' with 25,000 litres of milk daily at a fair price -- and, within six months, the Baroda Co-op's procurement had risen to 40,000 litres of milk daily....

Of course, this strategy had worked because the Anand Co-operative had been in a position initially to supply Baroda with 25,000 litres of milk daily -- but no rural dairy organisation had the ten or twenty lakh (one or two million) litres of milk daily to spare, which would have been needed to do that same job in India's major cities -- hence the evolution of the basic marketing strategy of Operation Flood: namely, the use of liquid milk recombined from donated commodities, to "prime the pump" for the major cities' urban dairies and thus to enable them to capture commanding shares of their markets. However, because of the scale involved and the complex relationships between the major cities' demands for and their milksheds' supplies of liquid milk, the NDDB had decided to allow as a yard-stick, a period of about three years between the time when Operation Flood would start to pump recombined milk into the cities and the time when that recombined milk would be replaced by indigenous milk procurement from the major cities' rural hinterland milksheds.

On a different plane, financial yardsticks for each action item could be determined from the experience accumulated at Anand in doing the job which each action item in Operation Flood required. For example, the NDDB had re-balanced the processing equipment of old dairies, in order to make them more efficient, and it had built new dairies, of course... Thus, the yardsticks evolved by the NDDB covered the average projected cost of creating 100,000 litres daily of additional milk processing capacity in the cities, the estimated cost of bringing one milch animal into an Anand Pattern milk co-operative's network etc. Applying these yardsticks to "balanced" investments in urban processing capacities, rural processing capacities, Anand Pattern co-operative etc., the NDDB calculated that just under Rs. 7 crores (Rs. 70 million), plus a little less than 10,000 tonnes of commodities (to be recombined during a period of five years), would be required for each additional ten lakh (one million) of urban population to be covered by the major cities' modern dairies. These estimates included the investments required in building up milk supplies from Anand Pattern co-operatives in the

rural milk sheds, ensuring that the initial technical inputs needs to increase milk production could be marketed by the Anand Pattern Co-operatives, as well as related investments in long-distance transport facilities, manpower development etc.

At the time, India's urban population was estimated to be 12 crores (120 million). However, there were only seven cities with populations of more than one million. The total populations of these cities were estimated to be some 2.5 crores (twenty-five million) and the existing modern dairies in these cities were believed to be supplying not more 30% of their markets' effective demand for liquid milk. Thus, it would have required Rs. 120 crores (Rs. 1,200 million) to build up the modern dairy systems in all seven cities to the level of effective 1970-demand for liquid milk.

This figure raised two questions: what level of investment in balanced dairy development could be managed efficiently during 1970-75 -- and what projected total of investment would be accepted as credible by the policy-and decision-makers involved (both within India and in international bodies)?

After much deliberation, the NDDB decided to set itself a "ceiling" of Rs.100 crores (Rs.1000 million) of investment for Operation Flood -- and that 1970-75 would be considered to be only Operation Flood's first phase, on the assumption that further phases would follow later.

Ranking India's major cities in descending order of size, the NDDB calculated that the project could cover Calcutta, Bombay, Delhi and Madras at a cost of Rs.95.4 crores (Rs.954 million) and that the addition of any other major city would require a total of more than Rs.100 crores (Rs. 1000 million). It was therefore decided that the project proposal should cover only the four major cities, where estimated demand for liquid milk was 27.5 lakh litres (2.75 million litres) daily, the existing modern dairies had only 10 lakh litres (1 million litres) daily capacity, which could be re-balanced to a maximum of 13.5 lakh litres (1.35 million litres) daily. Thus, for the entire Project, the following schedule of investments in eleven "Action Items" was worked out in detail:

	<u>Rs. Lakhs*</u>
Action Item 1: Increasing capacity of existing dairies in the 4 major cities from 10 lakh to 13.5 lakh litres of milk daily	191
Action Item 2: New dairies in the four major cities with a total capacity of 1,400,000 litres of milk daily	1400
Action Item 3: Storage and long distance transportation	317
Action Item 4&5: Rural milk collection & chilling centres, feeder/balancing dairies with total estimated capacity of 27 lakh litres of milk daily (these two action items were originally stated separately and later amalgamated)	2098
Action Item 6: Resettlement of 100,000 city-kept cattle	1540
Action Item 7: Technical inputs for increasing milk production (1,875,000 milch animals to be covered)	2850
Action item 8: Development of improved milch animals (one unit for rearing bulls etc. in each of the ten participating States)	400
Action Item 9: Organisation of rural milk procurement (18 Anand Pattern milk producers' co-operatives) with an average of 500 village societies by the end of the project	180
Action Item 10: Project planning, implementation and manpower development	358
Action Item 11: Miscellaneous (including unloading, storing and transporting donated commodities within India)	206
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It was calculated that, to "prime the pump" for the city dairies, 126,000 tonnes of skim milk powder ("SMP") and 42,000 tonnes of butter oil ("BO") would be utilised. It was believed that milk solids other than fat had a market value in India equal to 45% of the value of milk fat, while buffalo milk (with a content of 9% solids not-fat and 6% fat), delivered at the dock of a city dairy, had a value of at least Rs. 1.00 per litre. Therefore, it was decided that the donated commodities would be priced into the dairies at Rs. 4.35 per kg. of skim milk powder and Rs. 9.67 per kg. of butter oil, which was equivalent to a raw material cost of Rs. 100 per litre of milk with 9% solids not-fat and 6% fat. At these values, donated commodities would generate Rs. 95.4 crores (Rs. 954 million). It was anticipated that these commodities would be recombined in the form of milk with 9% solids not fat and 3% fat (the composition of milk, usually

extended by use of imported milk powder, often marketed by the cities' dairies as "toned milk") recombined in this form, the donated commodities would "make" 1,400,000,000 litres of milk -- which, to maintain good palatability, the NDDB believed could be mixed with an equal quantity of fresh milk (i.e. recombined fat should not exceed 50% of the total fat content in the final product.)

Dr. Kurien and Members of the NDDB had informally discussed this proposal with the Government of India and with FAO-WFP of the UN. By the end of October, 1968, a cautiously optimistic (but informal) "go-ahead" had been received from UN officials and the project had been formally proposed to the Government of India, for forwarding to the FAO-WFP. EEC stocks of dairy commodities were reportedly mounting and it was considered that the Project could well be approved at the meeting of Inter-governmental Committee (the Governing Council of Member Countries) of the World Food Programme of the FAO-UN, which was to be held in November, 1968.

Nothing further happened at that time, however.

In subsequent months, as the EEC worked at decreasing its stocks of dairy commodities, reports filtered through of opposition to the Project. How much of this was unfounded gossip, no one could say. For example, senior officials in the Government of India were said to have scoffed at the idea of either generating or investing as much as Rs.95.4 crores (Rs.954 million) for dairy development in five years -- one such unbeliever reportedly dubbed the proposal "Kurien's circus". Other interested groups in India (such as city milk producers, traditional milk traders and dairy equipment manufacturers) were believed to have expressed dismay at the "power" which the Project could put into the hands of official and co-operative parts of the dairy sub-sector. According to an entirely different school of reporters, some UN officials had privately expressed doubts about the wisdom of putting such values as those proposed for the Project into the hand of an implementing agency which no UN body could "control". Some major exporters of dairy commodities were believed to fear that India would use donated commodities to "replace" its commercial imports of SMP (which had recently averaged 20,000 tonnes annually), even though countries receiving such commodity assistance from the WFP always had to agree that donated commodities would not be used to replace commercial imports.

Finally, in mid-1969, it appeared that, at very high levels in the Government of India, there was dissatisfaction that the proposal seemed to have stalled. Dr. Kurien was invited to a series of informal meetings, held over a period of 3 days, attended by altogether five Secretaries (each the Head of an important Department of the Government of India which had some interest in the Project) -- and the Project was duly forwarded by the Government of India to the FAO-WFP.

Meanwhile, it had been decided that, as a Charitable Trust, the NDDB could not receive and "sell" the Project's donated commodities. Therefore, the Government of India established a new company of its own, the Indian Dairy Corporation, which (on behalf of the Government of India) would be responsible for receiving the Project's donated commodities, testing their quality, storing them as might be necessary, transferring them to user-dairies--and receiving the dairies' payments. Described as a "finance-cum-promotion" house for the country's dairy development, the new Corporation would be responsible for seeing that the generated funds (projected at Rs.95.4 crores) were invested as laid down in the project proposal. The Memorandum of Association for the new Corporation specifically mentioned the NDDB as its source of technical expertise.

There was a minor flurry of travail when in accord with regular UN procedures, a WFP/FAO Inter-Agency Team was sent to India to review the Project Proposal in August, 1969. On its arrival in Delhi, word reached the NDDB at Anand that the Team required data on milk production and consumption in the milksheds and the major cities. One of the difficulties in formulating the proposal had been the dearth of reliable data. Nevertheless, within three days, NDDB staff completed and mimeographed forty foolscap pages of tables, presenting data on most of the details raised. The NDDB staff also compiled and mimeographed another volume ("Volume-I) presenting 156 pages of NDDB reports, research studies etc., on which the Project proposal had already largely been based --"The questions the Team ought to have asked", as one of the compilers said.

In October, 1969, the Inter-governmental Committee of the UN-FAO World Food Programme unanimously approved the Project. On March 4th, 1970, the Government of India and the WFP duly signed a "Plan of Operations" for the project. Although its format had changed, this ultimate document still contained all the basic values, action items etc. as had been contained in the NDDB's original proposal of October, 1968. The Indian Dairy Corporation was registered in early 1970, with Dr. Kurien as its Chairman and with a Board of Directors which included senior officials responsible for dairying from the State Government of Gujarat, Andhra Pradesh, Bihar and Uttar Pradesh (four of the seven "milkshed States" participating in the Project), as well as from the State Government of Maharashtra, West Bengal and Tamil Nadu (the three "Major city-cum-milkshed States" participating in the Project plus the Chairman (Chief Executive) of the Delhi Milk Scheme (the Government of India's own dairy in the capital city), as well as the senior official in the Government of India responsible for dairy development -- and three technical Members plus the Secretary of the NDDB - thirteen Directors in all.

The first shipments of donated commodities were landed in India and received by the Indian Dairy Corporation before the end of June, 1970. On July 1st, Operation Flood was officially launched.

Operation Flood 1970-75 - a study

Section 3: The development of Operation Flood
1970-75

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The development of Operation
Flood: 1970-75

3.1: The start-up of operations and the Project's
use of donated commodities

The plan of Operations, signed by the Government of India and the UN FAO World Food Programme in March, 1970, summarised: (1) The assistance to be given through the WFP in the form of donated skim milk powder (126,000 metric tonnes) and butter oil (42,000 metric tonnes) during the five years, 1970-71 to 1974-75; (2) The funds to be generated Rs.95.4 crores (Rs. 954 million) by pricing these commodities (at Rs.4.35 kg/SMP and Rs. 9.67 kg/BO) into the modern dairies in India's four major cities -- Bombay, Calcutta, Delhi and Madras; (3) The yearly increases projected in procurement of indigenously produced milk by the four cities' dairies and the build-up and phase-out of milk recombined from donated commodities (see Exhibit 3.1.1 page 69) -- and the year-by-year projected investment of generated funds in eleven Action Items (see Exhibit 3.1.2, page 70). In addition, the Plan of Operations specified that the SMP and BO to be provided by the WFP would be "fit for recombination into milk for human consumption". Also, the two signatories (the Government of India and the World Food Programme, FAO-UN) agreed, in the Plan of Operations, that there should be two UN Inter-Agency Reviews of the Project: one at the end of its first phase, which was to be of 12-18 months duration - and other at the end of its second phase, which was to be completed by the end of the 36th month.

The Government of India had designated the Indian Dairy Corporation (the "IDC", which it owned wholly) as its agency, which was responsible to it for implementing the Project. The National Dairy Development Board (the "NDDB", an autonomous, non-profit making service organisation) was designated as the IDC's main source of technical expertise in the IDC's Memorandum of Association. The Government of India had appointed Dr.V.Kurien, the Chairman of the NDDB, as Chairman of the IDC also, when the Corporation was registered in February, 1970. In fact, the NDDB and the IDC soon came to be referred to jointly as "the Project Authority" responsible for Operation Flood (a practice which is followed in this text also).

Five major (and very different) tasks confronted the Project Authority early in 1970 (operations officially started on July 1st, 1970); (1) The IDC and the NDDB had to evolve a way of working together jointly on the Project; (2) The handling of donated skim milk Powder ("SMP") and butter oil ("BO") had to be organised; (3) Work on the eleven Action Items had to be planned and organised; (4) Working relationships had to be established with the Central and State Governments, as well as with their dairy organisations which were involved in the Project -- and (5) Procedures had to be established for planning and controlling the Project's flows of donated commodities and generated funds.

Exhibit 3.1.1: Four major cities' modern dairies : projected throughputs of liquid milk 1970-71 to 1974-75

	Donated commodities used yearly 1000's M.T		Funds generated yearly Rs. (rounded) * crores	Throughputs of liquid milk: daily average, in 1000's litres				
	<u>SMP</u>	<u>BO</u>		<u>Bombay</u>	<u>Calcutta</u>	<u>Delhi</u>	<u>Madras</u>	<u>Total</u>
<u>1970-71</u>								
Indigenous Procurement				515	165	310	60	1,050
Recombination	10.5	3.5	8.0	90	100	70	40	300
Total				605	265	380	100	1,350
<u>1971-72</u>								
Indigenous Procurement				530	175	325	70	1,100
Recombination	30.0	10.0	22.0	240	300	190	120	850
Total				770	475	515	190	1,950
<u>1972-73</u>								
Indigenous procurement				630	250	425	120	1,425
Recombination	39.0	13.0	29.5	290	400	240	170	1,100
Total				920	650	665	290	2,750
<u>1973-74</u>								
Indigenous Procurement				775	410	500	190	1,875
Recombination	30.6	10.2	23.2	225	340	200	110	875
Total				1,000	750	700	300	2,750
<u>1974-75</u>								
Indigenous Procurement				875	560	600	240	2,275
Recombination	15.9	5.3	12.0	125	190	100	60	475
Total				1,000	750	700	300	2,750
Grand total:	126.0	42.0	95.4					

* One crore = ten million

Source: Derived from: "Plan of Operations", India-WFP Project 618, March, 1970.

Exhibit 3.1.2 Projected expenditure of generated funds, year-wise, on eleven Action Items, during five years

<u>Year of operation</u>	In lakhs of Rs.					Total
	1.	2.	3.	4.	5.	
<u>Action items</u>						
1. Expansion of the four cities' existing capacity to obtain a rapid increase in their distribution of liquid milk	166	25	-	-	-	191
2. Expansion of handling capacity by additions to existing handling facilities and erection of new urban liquid milk plants	175	525	525	175	-	1,400
3. Storage and long distance milk transport facilities	-	-	105	105	107	317
4. Milk collection and chilling centres	34	109	220	218	47	628
5. Feeder/balancing milk plants	83	222	537	588	40	1,470
6. Resettlement of city-kept cattle and buffaloes	140	350	350	350	350	1,540
7. Increasing milk production by provision of technical inputs which will include production of ready mixed concentrates and green fodder, artificial insemination, veterinary services and medicines and calf rearing assistance	105	643	697	697	708	2,850
8. Development of improved milch animals -	-	-	99	147	154	400
9. Organisation of rural procurement of milk	16	39	47	48	30	180
10. Project planning, implementation and manpower development	17	62	108	121	50	358
11. Miscellaneous including unloading, storing and inland transportation of WFP food	45	95	20	20	26	206
	<u>781</u>	<u>2070</u>	<u>2708</u>	<u>2469</u>	<u>1512</u>	<u>9540</u>

* 10 lakhs = one million

Source : Adapted from: "Plan of Operations", India-WFP Project 618, March 1970.

During the first year of operations, the IDC and the NDDB developed a way of working together. According to its statutory obligations, the IDC organised and audited the handling and use of donated commodities. It acted as the financier and promoter of the dairies, milk producers' organisations etc. which were to comprise the Project -- but, instead of duplicating the NDDB's technical-services staff, it engaged the NDDB as its consultant for evaluation of proposals (to start new dairies etc.) and as its agent for carrying out those parts of the project for which the IDC was directly responsible (helping to start new milk producers' organisations etc.). Because agriculture (including dairy development) is a State subject under the Indian Constitution, the ten State Governments involved in the Project were responsible for the implementation of new dairies, technical input programmes etc.-- but they could also engage the NDDB either to do the job on a "turn-key" basis, or as their Consultant, to help them carry out the task themselves: the NDDB had already carried out such tasks on both a turn-key and a consultant basis. In work connected with Operation Flood, of course the NDDB adopted the practice of referring to the IDC before it made proposals to -- or accepted assignments from -- the State Governments, because the project was being funded by the IDC.

Donated commodities started to arrive in June, 1970. The IDC funded a short training programme, organised by the NDDB, in testing and quality control for SMP and BO. The IDC also set up procedures for customs clearance and storage of WFP-donated commodities, as well as their movement to the city dairies. Soon, however, a difficulty developed: some of the commodities were not of the standard required for recombination into milk for human consumption. This complicated the process of clearance; it required the WFP and IDC to develop special procedures for agreeing on which bags of SMP and which tins of BO should be rejected (shipments were not identified by batches or lots) -- it also led the city dairies to distrust the concept of recombination: there were complaints from consumers about "smelly milk". In the first year of operations, more than 23% of SMP and almost 25% of BO received by the IDC had to be rejected as unfit for recombination.

There were also technical problems involved in recombination of these commodities into liquid milk. In Action item 1, it was of course envisaged that much work would have to be done to increase the city dairies' capacities to a total of 13.5 lakh (1.35 million) litres daily (including provision for recombination of commodities into half that amount of milk) -- but the existing equipment was found to be more limited than originally expected. In July-August, 1970, recombination in all four cities' dairies combined averaged 256,000 litres daily -- and, therefore, it dropped appreciably as the usual seasonal rise in indigenous milk production and procurement took place. Also, the city dairies had some commercially imported milk powder available to them at about half the price of IDC's SMP. Thus, only 50% of the first

year's targets were achieved for recombination and generation of funds(See Exhibit 3.1.3,next page).

A further complication for the Project Authority had arisen out of a decision made during the visit to India of the UN Pre-feasibility Mission on the Project, which had reviewed the Project's prospects in February, 1970. This Mission had recommended that the Madras City Dairy should be included in the Project only after it had been extensively overhauled. The NDDB had to deploy ten of its technical staff-- and to pull together a team of some 70 engineers and technicians from dairy equipment manufacturing firms etc. -- in order to enable the dairy to participate in the Project. This work was completed only in August, 1970. However, this did have the advantage of completing the work required by Action Item 1 in the Madras Dairy quickly -- whereas, in Bombay, Calcutta and Delhi, it was only by late 1972 that most of the work on expanding the existing dairies' capacities, to a targeted total of 13.5 lakh litres (1.35 million litres) daily, could be completed.

At that juncture, the Project received a double blow: poor monsoon rains caused India's milk production to fall, so that the four major city dairies could procure much less than the targeted supplies of indigenously produced milk -- and, at the same time, world production of milk powder and butter declined steeply, so that the WFP was unable to supply the amounts of commodities which the IDC required for the Project. These adverse conditions persisted until September, 1974, when the Project was officially extended for two years. By the end of 1974, however, except in Calcutta, indigenous milk production and procurement had risen, while the managements of the city dairies had acquired more confidence and experience in handling increased throughputs of milk... Finally, by January, 1976, the combined throughputs of the four major cities' dairies had risen to the target-level of Action Item 1, 13.5 lakh litres (1.35 million litres) daily.....

Meanwhile, however, the setbacks experienced in supplies and recommendation on commodities had inevitably limited the funds available to the Project Authority for investment in the Project's eleven Action Items. Almost Rs. 45.9 crores (Rs. 459 million) had been generated -- and the IDC found an additional Rs. 8.5 lakhs (Rs. 85 million) from various sources - but, even so, the total funds available to the Project Authority had barely exceeded 50% of the targeted total and the IDC's overall investment strategy had to be modified accordingly. Nevertheless, the basic physical plant and human organisations, envisaged as arising out of the Project, did indeed arise in the four major cities and their hinterland milksheds (see Exhibits 3.1.4 and map on page no. 74 and 75) The progress made in 1970-75 is summarised in the next three sections of this text: 3.2, 3.3 and 3.4.

Exhibit 3.1.3 The Four major cities' dairies; procurement, recombination and throughputs of milk; 1970 75

	Commodities shipped:in 1000 M.T.		Funds ^{2/} generated: in Rs. crores *	Daily average, in 1000's litres ^{1/}				
	SMP	BO		Bombay	Calcutta	Delhi	Madras	Total
<u>1970-71</u>								
Indigenous procurement				342	176	75	33	626
Recombination	4.9	1.3		39	94	5	15	153
Total ^{2/}	6.0	1.6	4.16	382	270	80	47	778
<u>1971-72</u>								
Indigenous procurement				377	54	162	38	635
Recombination	7.9	2.4		67	58	79	27	231
Total	7.9	2.4	5.76	491	276	140	57	963
<u>1972 - 73</u>								
Indigenous procurement				379	57	144	46	625
Recombination	10.0	3.3		990	61	144	39	303
Total	11.3	3.5	8.3	545	170	274	84	1073
<u>1973 74</u>								
Indigenous procurement				249	59	74	57	443
Recombination	11.7	4.4		90	84	133	49	356
Total	11.7	4.6	9.54	420	292	182	99	993
<u>1974-75</u>								
Indigenous procurement				415	44	178	57	694
Recombination	10.1	2.5		31	121	98	60	310
Total	10.1	2.6	6.91	533	187	323	110	1152
<u>July-Dec. 75</u>								
Indigenous procurement				533	66	200	65	863
Recombination	5.8	0.8	3.3	623	248	64	41	176
Total	5.8	0.8	3.3	644	200	349	137	1330
Grand total	52.8	15.5	37.97 ^{3/}					

1/ - 3/on on page 76

* One crore = 10 million

Exhibit 3.1.4: Eleven Action Items, expenditures of generated funds, 1970-75 - and end-1975 revised estimates

Action Items Abbreviated descriptions	In lakhs of Rs.					Ap.1 Dec. 31,75	Total 70.75	Revised estimate
	(Year ending March 31st.)							
	<u>70-71</u>	<u>71-72</u>	<u>72-73</u>	<u>73-74</u>	<u>74-75</u>			
1. Expansion of existing city dairies	18	94	32	26	7	4	181	291
Cum.		112	144	170	177			
2. New city dairies	11	17	119	376	359	217	1098	2362
Cum.		27	146	522	881			
3. Grid inspt & storage	-	-	-	69	37	7	39	377
Cum.		-	-	69	32			
4&5. Milk collection & chilling; rural feeder -balancing dairies	38	269	311	983	188	369	2178	3638
Cum.		307	618	1601	1789			
6. City cattle re- settlement	-	-	8	-	1	-	9	875
Cum.		-	-	8	9			
7. Technical inputs for inc'd m. production	15	25	65	79	223	205	612	2691
Cum.	-	40	105	184	407			
8. Development of improved m. animals	5	13	53	65	16	17	169	400
Cum.		18	71	136	152			
9. Organisation of rural m. procurement	-	2	6	11	29	33	81	260
Cum.		2	8	19	48			
10. Planning, implemen- tation, manpower dev.	11	28	9	18	31	19	115	358
Cum.		38	47	65	96			
11. Misc. (inc. handling WFP commodities)	16	40	33	26	39	68	222	388
Cum.		56	89	115	154			
Total	114	488	636	1653	856	939	4704	11644

* 10 lakhs = one million

MAP OF INDIA

PROPOSED PROJECT TO IMPROVE MILK MARKETING AND PRODUCTION IN THE FOUR MAJOR CITIES AND THEIR MILK-SHED AREAS

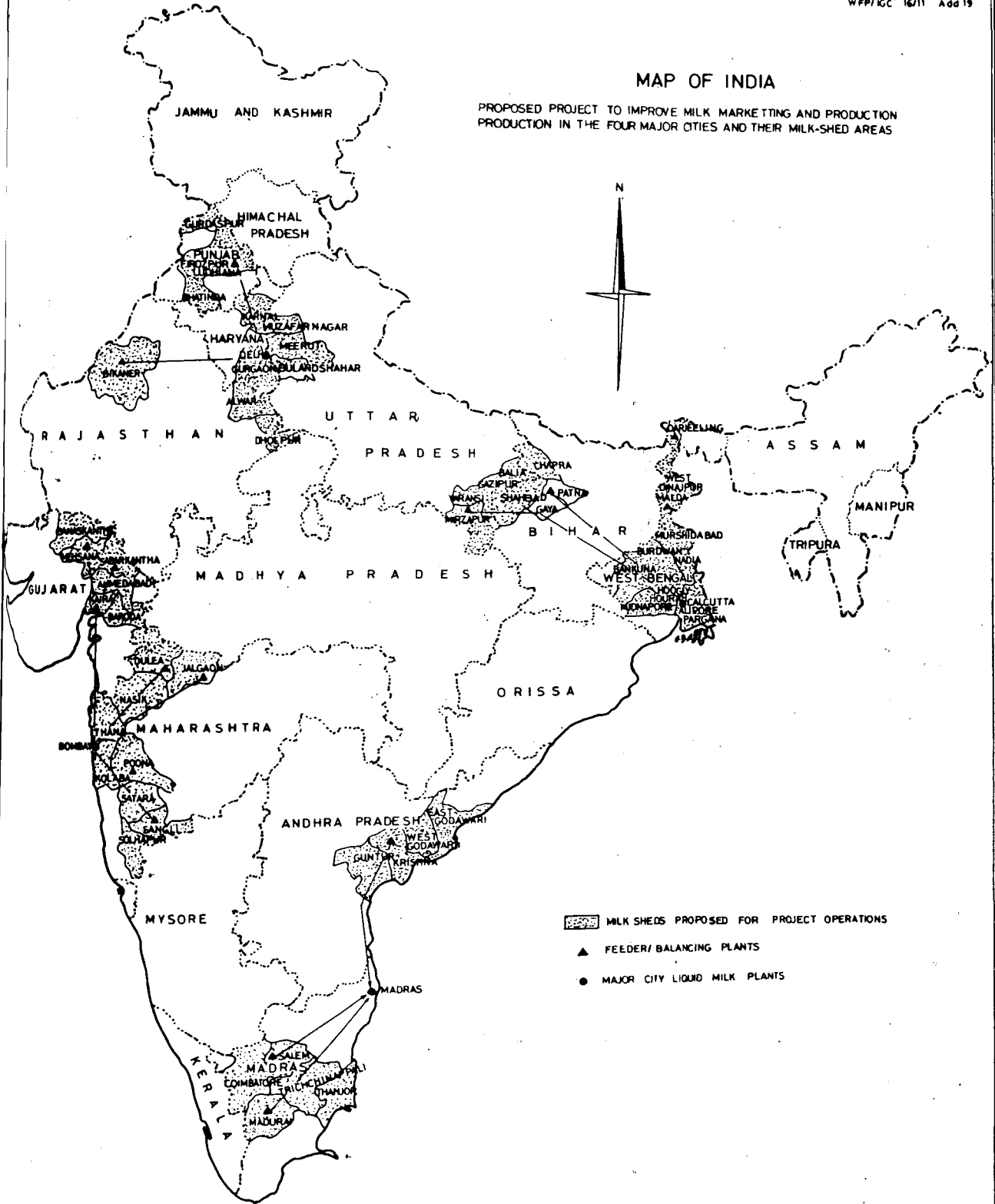


Exhibit 3.1.3: Footnotes

1/ Calculated from quarterly averages.

2/ Totals for SMP & BO include any utilisation by feeder-balancing dairies. "Funds generated" reflects transfer value of SMP & BO utilised - the amounts realised yearly by the IDC differed from these amounts, according to lags and leads in shipments to and payments by the city dairies etc. Totals shown for daily throughputs of milk include any milk reconstituted from commercial imports etc., in addition to indigenous procurement and recombination.

3/ The IDC had actually realised a total of almost Rs.45.9 crores (Rs. 459 million) by December 31st, 1975, because transfer value were raised from Rs.4.35 to Rs. 6.5 for 1 kg of SMP and from Rs.9.67 to Rs. 10.0 for 1 kg of BO in early 1974; some additional funds had been realised by sale of rejected commodities.

3.2: New and expanded dairy processing facilities and cattle-feed compounding plants

By mid 1970, the NDDB's Engineering Division had grown to include some seven engineers (drawn mainly from the Anand Co-operative's Production & Planning Division) plus a number of draughtsmen, estimators etc. The Division was directed by the NDDB's Member Adviser, Engineering, who was also the Manager, Production & Planning, in the Anand Co-operative. In its work with the Anand Co-op'the NDDB's engineering group had handled jobs ranging from a co-operative dairy plant to two small urban dairies and three cattle feed compounding plants. These jobs had provided experience in design, preparation of estimates and tender documents, supervision of erection and installation-work (most of the actual on-site work being done by civil contractors, equipment manufacturers' installation staff etc.), as well as accustoming the group to the tasks of commissioning, running in and handing over the finished plants..."Then," as the Adviser, Engineering, once remarked, "Operation Flood descended on us".

With the onset of Operation Flood, the Engineering Division became the IDC's major instrument for getting much of the physical plans which the Project involved completed. Action Item 1 consisted of expanding the capacities of the existing city dairy plants from an estimated ten lakh litres (one million litres) of milk (mostly bottled) daily to 13.5 lakh litres (1.35 million litres) in the first phase of the Project. Action Item 2 consisted of putting one new, large dairy plant in each of the four major cities. These plants, also were to handle liquid milk -- but it was anticipated that they would not involve bottling, which hitherto had been the conventional method of packaging milk in India. Action Item 3 involved medium-term storage facilities for milk powder, butter oil, frozen cream etc. which could be moved to wherever demand called for their recombination into liquid milk, plus road - and rail-milk tankers for moving the enhanced milk supplies which the Project was designed to create. Action Item 4 and 5 included all the Project's rural milk processing facilities which were to be of three types: (1) Chilling centres in the more distant parts of the Project's selected milksheds: (2) "Feeder dairies," which would simply receive milk from Anand Pattern village milk co-operative, pasteurise it - and ship it in bulk to other dairy plants for further processing or for distribution in urban areas -- and (3) "Feeder-balancing dairies," which would also receive milk from Anand Pattern village milk co-operatives, but which would be equipped both for "feeding" liquid milk in bulk to the cities, as well as also being capable of conserving a large proportion of the milk handled in the form of milk powder and butter or frozen cream (thereby "balancing flush-and lean-season milk supplies). In addition, under Action Item 7, "Technical inputs for milk production," the Division was responsible for getting the cattle-feed compounding plants put up, which the project was to provide for the Anand Pattern dairy co-operatives in the milksheds selected for the Project's coverage.

A five-pronged strategy was evolved to cope with the Division's new workload: (1) Priority was to be given to expansion of the existing city dairies' capacities (including recombination capacities), to provide more liquid milk for consumers while also generating funds for the Project; (2) Innovative design, especially in the Project's early phase, was to be minimised, in order best to capitalise on the experience already accumulated with designs prevalent in India by the NDDB's engineering group, as well as by civil contractors, dairy-equipment manufacturers in India etc.; (3) New dairies were, as far as possible to be standardise (to avoid the extra work involved in designing custom-made plants) and the designs evolved were to be modular (to ensure that it would be relatively simple to expand their capacities as the need arose); (4) Architectural and civil-construction design were largely made the responsibility of outside experts, who did this work acting on a detailed brief from the Division - and (5) The majority of the dairy-processing equipment required would be procured in bulk by the NDDB (under contract to the IDC) in order to create a "central pool" of equipment for the Project as a whole, which could be drawn on as and when the erection work on each new dairy progressed to the point of being ready for equipment installation.

Steps were taken to increase the Division's strength. Twelve young engineers were recruited as Graduate Apprentice Engineers. A UN-FAO group of eight advisers, which had been provided for when the Plan of Operation was drawn up, also joined the Project, providing additional men with experience in dairy design and dairy erection engineering.

An immediate task facing the Division was a survey of the four major cities' existing dairies, to decide how to increase their capacities most economically from an estimated ten lakh litres (one million litres) daily to 13.5 lakh litres (1.35 million litres) daily. Actually, more work was involved than this description implies. Some dairies' capacities for reception, refrigeration, pasteurisation or storage were not balanced. These imbalances had to be corrected to maximise on the total investment. Some of the dairies' equipment -- which had been relied on for recombining SMP and BO -- was found to comprise less capacity than expected. In particular, some of the dairies' homogenisers were giving trouble -- and homogenisers were neither made in India nor quickly available from abroad.

In the case of Madras City, the complete overhaul which the dairy required put unexpected pressure on the NDDB's engineering manpower. In other cases, the governmental authorities involved were not geared to the quick decision-making which the situation required. Also, the world's largest stainless steel manufacturers reported long order books and the industry appeared to be likely to be able to promise only distant delivery dates (and rising prices) -- while India's indigenous production of stainless steel was limited in quantity and in sheet-sizes, thicknesses etc.

Despite these problems, in addition to overhauling the Madras City dairy, the NDDB acted as consultants to the authorities in Bombay, Delhi and Calcutta helping them to draw up design plans for increasing their dairies' capacities, under Action Item 1, to 13.5 lakh (1.35 million) litres daily, including 675,000 litres daily of recombining capacity. Agreements were finalised with the authorities, setting out how the work would be done; most of the authorities wanted to contribute as much as possible out of their own manpower and skills; in general, therefore, the agreements stipulated that the concerned Government's Public Work Department would execute the construction work involved, while the NDDB would be responsible for equipment installation etc.

Meanwhile, to help overcome the problem of stainless steel supplies, some Rs. 1.83 crores equivalent (US \$ 2.44 million) of assistance was accepted from UNICEF, to be used for supplies of imported dairy equipment, components -- and stainless steel sheets for fabrication of equipment within India. This assistance brought and added "bonus" to the project, in as much as UNICEF-funded imports were exempt from customs duty. It was also thought that UNICEF's procurement procedures were fast-moving and that this factor would help to speed up the expansion of the city dairies' capacities.

In the Plan of Operation, the Government of India had agreed to make available to the Project up to \$2 crores - (\$20 million) - equivalent in foreign exchange, which was the estimated value of imported equipment etc. required for the Project. Accordingly, the Government of India allocated credit and loan funds from altogether five countries totalling some Rs.3.7 crore (Rs.37 million)-equivalent (two-thirds of it, Swedish credit) for the purchase of imported equipment etc. Only the Swedish credit was "untied:" all other credit had to be spent on equipment from the country supplying the credit. This meant that equipment schedules for the Project's dairy expansions, new dairies etc. had to be compiled with one eye on the technical requirements of the plants and the other eye on the equipment available from the countries involved. Nevertheless, specifications were drawn up, tenders were floated and -- after many hard bargaining sessions -- Rs. 1.5 crores (Rs.15 million) of commitments were entered into during the first year of operations. Almost all remaining equipment orders were finalised during the second year.

By March, 1972, most of the work on expanding the four cities' dairies had been completed, but there had been some serious delays in construction work -- and provision of some vital-Unicef funded recombination equipment had been delayed by a human error. It also turned out that some imported valves used could not function as expected--and this caused practical operating problems when the expanded capacities of the four city dairies were commissioned. Thus, the enhanced milk processing recombining capacities, created under Action Item 1, became usable only by fits and starts during 1972 (in the main) -- and, in one city dairy, the work was yet to be formally accepted by the competent authority at the end of 1975.

However, as it turned out, supplies of indigenous milk and WFP-donated commodities were not as plentiful as expected in 1972-73. By the time there was a need for them, the expanded capacities were, in practice, ready. Moreover, many of the technical staff concerned believed that, if the expanded capacities of the four cities' dairies were run flat out, they could well put out 17.5 lakh (1.75 million) litres of milk daily.

From the start of the Project, however, the Project Authority had apprehended that supplies of fresh milk to the four cities would be limited by the capacities of the dairies in the cities' hinterland milksheds, until the rural feeder-balancing dairies for the Project could be completed (Action Item 5). Even in the first year, therefore, in Gujarat State (where the Government co-operative way of working made implementation easier), work quickly started on expanding the capacities of the existing feeder-balancing dairies owned and operated by the Anand Co-operative and one of its sister co-op's in Mehsana, by a total of 700,000 litres daily. Work also started quickly on the design and erection of feeder-balancing dairy plants for two new Anand Pattern milk co-operatives quite near to Anand. In addition, work started on construction of one new rural dairy plant in Maharashtra state and on expansion of an existing dairy in the state of Andhra Pradesh. The capacities thus to be created were to total about ten lakh (one million) litres daily.

As this new rural processing capacity became available, increased long-distance transportation facilities (planned under Action Item 3) would be needed. Road-and-rail-tankers made in India until that time had been small by international standards. However, the Project Authority did not want to import tankers, partly because non-Indian designs were not always well suited to Indian conditions and partly because the Project's use of foreign exchange was being minimised as a matter of policy. In the first year of the Project, therefore, the NDDB evolved new designs for road-tankers, most of them with 13,000 litres capacity, and rail-tankers of 20 and 40,000 litres capacity. Then orders were placed for road-tankers with capacities totalling 760,000 litres.

Because of the amount of work which the Division had found to be involved in making a new design for each new dairy plant which the Division undertook, it evolved standardised, modular designs for the urban and for the rural dairy plants envisaged under Operation Flood. Also, a decision was made to minimise the use of rural milk-chilling centres and to depend instead on rapid and efficient transport systems to move fresh milk directly from the villages to their feeder-balancing plant, rather than via an interposed chilling centre. This, it was believed, would decrease both capital costs and processing costs while also avoiding the problems encountered in managing and supervising far-flung rural chilling centres. Thus Action Item 4 (chilling centres) was amalgamated with Action Item 3 (Rural feeder-balancing dairies).

For these dairies, the NDDB's Engineering Division evolved a design which could start in the form of a small chilling centre (thereby permitting some of the milkshed's milk to be conserved and marketed); this small installation could then be incorporated as a part of the final dairy plant, with reception, pasteurising and chilling capacities to handle 60,000 litres a day (for onward bulk shipment to an urban dairy--in other words, it would at that stage be a "feeder dairy"); the same unit could then be expanded to handle 100,000 litres of milk a day -- and, ultimately, it could be built up to 150,000 litres daily capacity, including equipment and storage for conserving up to 100,000 litres of milk daily as milk powder and butter (which would enable the dairy to "balance" higher flush-season milk procurement with lower lean-season milk procurement -- thus, it would become a "balancing plant").

As the work developed in the cities and their hinterland milksheds, the NDDB decentralised its operations. Major design-work and production of layout drawings etc. remained the responsibility of the Engineering Division at the NDDB's head quarters in Anand. The NDDB also established Regional Offices in the four major cities (usually sharing office facilities with the IDC's office in each city). Each time the Engineering Division completed its part of the work required on a dairy plant (or a cattle-feed plant), the job was "handed over" to the concerned Regional Office for implementation and one of the Division's Site Engineers was posted to work on the site itself.

The head of each of the NDDB's Regional Offices was administratively responsible for all the NDDB's work under way in his Region and personnel such as Site Engineers in his Region were under his administrative control. There was a small staff in each Regional Office to complete the detailed drawings for each construction job. For most of the time one Erection Engineering Adviser from the FAO Team, which had been assigned to the Project under UNDP funding, was assigned to work with each Regional Office, with the idea that he would be deployed by the Head of the Regional Office to assist with any job in the Region as and when required.

The head of the Engineering Division at Anand retained technical control of each such job, of course, but Regional Offices were expected to refer back to the NDDB's HQ only if a question arose involving a major design-revision -- and, in fact, each Site Engineer was encouraged to take as many decisions as he could on details of his project on the spot.

Despite the clear-cut nature of this division of responsibilities, there were from time to time the usual "head-office/branch-office" arguments as to whether a Regional Office had exceeded its authority or the HQ was maintaining too much centralised control...Nevertheless, the pace of implementation grew quite rapidly.

By 1972, the Engineering Division had evolved designs for the large urban dairies to be set up (under Action Item) in Bombay, Calcutta and Delhi (each of 400,000 litres daily capacity), as well as in Madras (of 200,000 litres daily capacity). India's urban dairies had always depended on bottling for packaging and distribution of milk; but this involved heavy investment in plant area and equipment; it required the return and washing of bottles, which was costly and an administrative head-ache; bottled milk heated up quickly in India's hot summers, thereby limiting its life. Also, the Project Authority doubted whether the bottle manufacturers would be able to cope with a sudden upsurge in the country's bottling capacity of 14 lakh litres (1.4 million litres) daily (breakages alone would account for some 100-150,000 1/2-litre bottles daily).

At this point, Unicef brought to the Project Authority's attention a bulk-milk vending system which was being used in Mexico City. By this system, liquid milk was pasteurised, chilled almost to freezing point and distributed by large, insulated road-tankers to bulk milk retail points (each of which could keep 1-2000 litres of milk refrigerated) where the consumer could take her own empty vessel, place it under a faucet, insert a previously purchased token in a slot -- and thereby energise the system so that the faucet would deliver a 1/2 litre of fresh, cold milk into the waiting vessel. The NDDB had sent a team of experts to Mexico to evaluate the system -- and, on the basis of this team's report, it was decided that the Mexico bulk-milk vending system could, with some adaptations, be used for the new dairies in Bombay, Delhi and Madras (but not in Calcutta, where crowded conditions would make it difficult to locate and supply the retail outlets).. Lengthy negotiations to import at least the first batch of 1-200 bulk vending units from the U.S.A. then ensued, but each time agreement was almost reached, another round of inflation caused a rise in the price per unit. In early 1973, the NDDB decided to design its own bulk-vending system and to have the units manufactured indigenously. A special off-shoot of the Engineering Division was established in Bombay, where it was believed that the required components etc. could best be obtained. Two NDDB engineers plus a member of the FAO Team assigned to the IDC-NDDB formed the nucleus of the new Design Group.

A design had already been evolved (in early 1972) for the four cities' large dairy plants (these, because each would feed a host of mini-retail, bulk-milk vending dairies, came to be referred to as "Mother Dairies"). Based on systems for bulk-handling of milk through out the plant -- and equipped with out-door storage silos of 100,000 litres capacity (to be fabricated and erected in India for the first time), the Mother Dairies were considered to be an advance in urban-dairy design, offering savings in capital and running costs plus a higher degree of engineered control over each stage of the process than had been available in the urban dairies so far built in India.

Even so, the design was slow to gain the acceptance of the authorities responsible for the four major cities dairies. Finally, in late 1973, the Government of India approved the design for Delhi's new dairy and the job of getting this dairy built, commissioned and run in was entrusted by the IDC to the NDDB on a turn-key basis. The dairy was actually erected and commissioned in ten months (vs. two years, which is customary in India), in time to be a "show piece" during the XIX International Dairy Congress, which was held in Delhi in December, 1974.

The NDDB's own retail bulk-milk vending system was of course adopted as the distribution system for the Delhi Mother Dairy. It worked well and consumers seemed to like it. The manufacture of new units was slower than the NDDB had originally hoped -- and there were some difficulties in finding locations for vending points, especially in the more crowded parts of the city. Nonetheless, by January, 1976, sixty-three units were operating, each with the capacity to refrigerate and store for vending 1000 litres of milk; some units were being filled by bulk tanker twice daily and were vending as much as 2000 litres daily. There were to be 200 units in Delhi by the end of 1976.

The Madras Mother Dairy was commissioned in mid-1975; the Bombay Mother Dairy followed in late-1975. Work on the Calcutta Mother Dairy had been delayed and the dairy was expected to be commissioned only in late 1976. At the end of 1975, however, the distribution systems to be used for these three Mother Dairies were yet to be finalised. The Madras authorities had agreed to test two bulk-vending units -- and it was hoped that the Bombay authorities would shortly do the same -- but both authorities appeared to favour a system which would pack milk for distribution in 1/2 litre plastic bags, because they felt that this system was simpler to operate than the bulk-milk vending system. The project Authority, however, felt that the bulk-milk vending system involved lower processing and marketing costs, it also kept milk refrigerated until it reached the consumer -- and, in any case, the bulk-milk system was consistent with the Government of India's policy of minimising the use of petro-chemical products for purposes such as packaging.

As this debate continued, the Engineering Division carried on with its other tasks: non-Operation Flood dairies grew apace; more rural feeder-balancing plants were completed; cattle-feed compounding plants were erected and commissioned (the aim was to put up one for every Anand Pattern co-operative milk union which was being started under Operation Flood); altogether, at any one time during 1973-5, the NDDB was handling 70-80 discrete design/erection/installation/fabrication projects on either a turn-key or a consultancy basis.

By the end of 1975, however, the Project Authority felt that "Engineering" had survived the "Flood" very creditably (see Exhibit 3.2.1 next page). It had built-up a formidable group of

Exhibit 3.2.1: Major processing capacities created by Operation Flood 1970-75

The four major cities' regions and their hinterland rural milksheds		Capacities created, in 1000 litres daily and their status/target completion date:	
		<u>Raw milk</u>	<u>Conservation 1/</u>
<u>North</u>			
<u>Urban:</u>	Delhi: <u>2/</u>		
	Existing dairy	100 complete	
	New Dairy	400 complete	
<u>Rural:</u>	Rohtak	100 complete	60 early 76
	Ludhiana <u>2/</u>	50 complete	60 complete
	Bhatinda <u>2/</u>	40 complete	60 complete
	Bikaner	100 mid-76	60 end 76
	Meerut	100 early-76	100 mid-76
<u>South</u>			
<u>Urban:</u>	Madras		
	Existing dairy <u>2/</u>	50 complete	
	New Dairy	200 complete	
<u>Rural:</u>	Sangamjagarlamudi	150 mid-76	150 end 76
	Vijayawada <u>2/</u>	100 complete	
	Madurai <u>2/</u>	100 complete	100 complete
	Coimbatore	20 complete	
	Erode/Coimbatore <u>3/</u>	60 --	60 --
<u>East</u>			
<u>Urban:</u>	Calcutta		
	Existing dairy	150 complete	
	New Dairy	400 mid-76	
<u>Rural:</u>	Patna	100 early 76	60 mid-76
	Matigara	100 complete	60 complete
	Murshidabad <u>3/</u>	100 --	60 --
	Varanasi	100 early 76	60 mid-76
<u>West</u>			
<u>Urban:</u>	Bombay		
	Existing dairies	250 complete	
	New Dairy	400 complete	
<u>Rural:</u>	Jalgaon	100 complete	60 early 76
	Dhulia	80 early 77	60 early 77
	Anand <u>2/</u>	400 complete	300 complete
	Mehsana <u>2/</u>	300 complete	375 complete
	Sabarkantha	175 complete	75 complete
	Banaskantha	150 complete	60 complete

- 1/ Approximate throughputs vary with product-mix.
2/ Expansions of dairy plants existing before 1970
3/ At planning stage by end-75.

young engineers, who had proven their practical ability and their technical integrity. The big up-surge in engineering work created by Operation Flood was over -- and, on the basis of the experience thus gained, many opportunities for innovation had been identified. There was wide-spread belief that new milk-handling systems, better suited than the existing systems to India's semi-tropical conditions should be devised -- and that these should emphasise the conservation of energy. The IDC was planning to put up a subsidiary unit which would manufacture dairy equipment. The NDDB was drawing up a proposal to set up, within the NDDB, an innovatory Design and Development Unit which would work closely with the NDDB's computerised systems staff on the design and development of new, producer-to-consumer milk handling systems, as well as on designs for individual pieces of dairy-processing equipment, on new approaches to processes-flow management etc.

3.3 Milch animals, technical inputs for milk production -- and milk producers' organisation

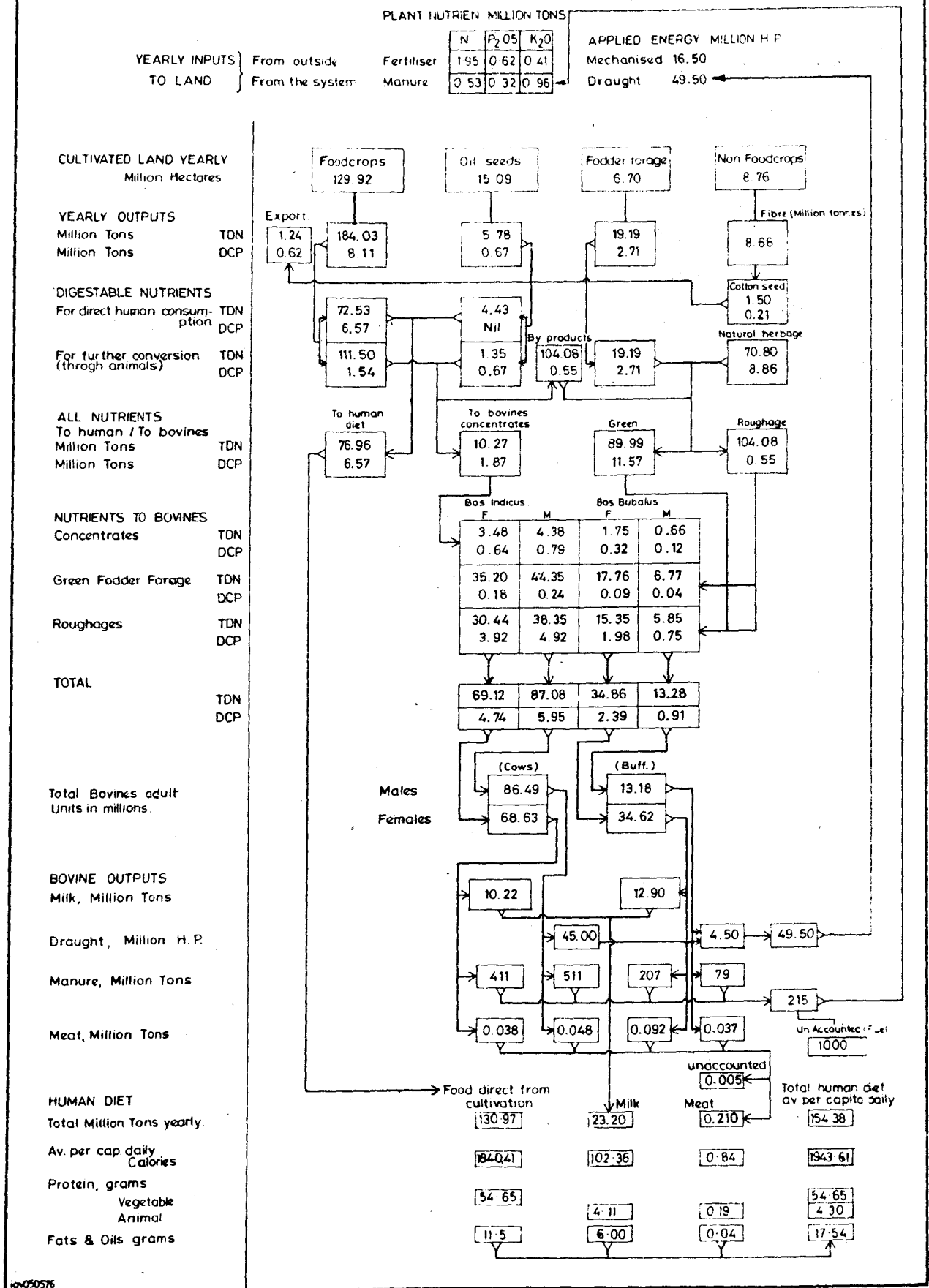
The NDDB had recruited a "Project Executive and Adviser, Animal Husbandry; in mid-1969 to work in its Management and Manpower Development Division. This Officer had built up a small group of animal husbandrymen and veterinary doctors, with practical experience in milch-animal breeding, feeding and management. This was to become, in effect, the IDC's right arm in getting four of Operation Flood's Action Items implemented: No.6, resettlement of city-kept cattle; No.7, provision of technical inputs for milk production; No.8, development of improved milch animals -- and No.9, rural milk producers' organisation. Action Items 8 and 9 were to be implemented directly by the IDC (although this was officially confirmed only in 1972), while Action Items 6 and 7 were to be implemented through each concerned State Government's designated agency.

The Project Authority believed that the structure of the Project placed several constraints on the order and speed with which these Action Items could be implemented. For example, the major cities depended on city-kept milch animals for much of their milk supplies; until the modern dairies could replace these supplies, city-kept cattle could not very well be removed. Actions such as 'milch animal improvement' and 'provision of technical inputs for milk production' would require an organisational infrastructure capable of reaching out directly to the 18.75 lakh (1.875 million) milch animals which the Operation was supposed to cover in the hinterland milksheds. No such structure existed yet in most of these milksheds -- hence, the separate provision (under Action Item 9) to enable the Project Authority directly to assist each milkshed's producers in setting up their own Anand Pattern Co-operative milk union. Here again, however, there was a problem: a milk co-op' could not process and market its members' milk until it had a dairy plant to prolong the life of the milk, so that it could be sold in an urban demand centre as fresh, pasteurised milk, or as conserved milk products -- and the rural feeder-balancing plants were bound to take some time to come up.

Nevertheless, there were some actions which could be initiated. These mainly concerned pure-bred milch stock and cattle-feed compounding.

Next to the NDDB's head-quarters at Anand, there was one of India's longest-established institutes for agricultural research. In 1970, the institute had asked the IDC-NDDB for assistance in establishing a pure-bred Jersey herd on its campus. The Project Authority believed that such an experience would be instructive, so it associated some of its animal husbandrymen with the work of establishing the new Jersey herd...and, as turned out, much was learned from this effort. On the one hand, the Jerseys (96 pregnant cows and heifers plus four bulls, all pure-bred, which were flown in from abroad) were found to adapt well to the climate within a year, despite Anand's rather high summer

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temperatures which peak at 118 degree F (47.7 degree C). On the other hand, in general, the herd (which had been donated as a friendly country's "aid" gesture) was found not to be of the genetic quality originally hoped for. On the basis of this experience, the Project Authority subsequently obtained, from the Government of India, release of foreign exchange for the purchase of pure-bred Jersey and Holstein-Freisian stock. Rs. 41.8 lakhs (Rs. 4.18 million) - equivalent of free foreign exchange was used to purchase some 285 pregnant cows and 149 bulls, which provided the nucleus herds for fourteen "milch animal improvement centres" under Action Item 8. One or two of these centres were established in each of the ten participating states during 1973 and were estimated as being capable of producing the pure-bred bulls which would be needed to produce semen for the artificial insemination systems which were to be set up in the twenty Anand Pattern milksheds. Each unit was also projected as becoming financially viable in its second or third year via sales of milk, animals and manure (sales of milk alone were projected as covering two-thirds of annual operating costs).

From the start of the Project in 1970, it had been planned that under Action Item 7, the Anand Pattern milk producers' co-operative unions would market technical inputs to help their members increase their milk production. So this Action Item had to wait until the Anand Pattern Unions were formed. However, it was known that each union was to be helped to market cattle-feed concentrate to its members -- and that the compounding plants (designed by the NDDB of almost 100% indigenous manufacture) took 1-2 years to fabricate and erect. Three of these, therefore, were started in 1970 -- although, as it turned out, their locations were outside (but adjacent to) the selected milksheds. Two of the Gujarat Unions already had such plants. By the end of 1975, eight more were under construction or completed and seven more were at the planning stage.

This still left untouched the essential task of establishing the new Anand Pattern milk producers' co-op's in the milksheds selected for coverage by the Project. Other than in Gujarat State, the officials concerned were believed either to be against the concept -- or to be doubtful of its feasibility. The NDDB set up a high-level group of three experts in 1970 to visit each of the States involved and to discuss, with the concerned decision-makers, how and where Anand Pattern Co-op's could be started, but no real action ensued.

In 1971, the Project Executive & Adviser, Animal Husbandry, and the NDDB's Adviser, Management & Manpower Development, were discussing the whole problem of how to start Anand Pattern milk Co-operatives in State where the milk producers were not familiar with the Anand Pattern. Ultimately, the two Advisers drew up a "scenario" for "rural milk producers' organisation" (under Action Item 9), in which the main instrument was depicted as a "Spearhead Team", which was to have practical experience in working with the farmers in the Anand Co-operative. This Team would go into a milkshed selected to have an Anand Pattern Milk

Co-op' under Operation Flood -- and it would first demonstrate the true value of dedicated veterinary doctors to the milk producers; then it would actively persuade the produceres to form their own village milk co-operative societies -- and finally, it would train the village secretaries, milk testers etc. and help them start the process of milk collection and payment....

In late 1971 and early 1972, the two Advisers took further advice on the matter and elaborated their original scenario into a recommended "model" for action under Action Item 9. The model included not only the Spearhead Teams as the main action-getting instrument, but also the use of funds available under Action Item 9 to help the new village co-op's to pay their Secretary etc. in the early years, to obtain milk testing equipment, ledgers etc. and to help a new Union of village milk co-operatives to establish a small centre which would become its nucleus particularly with regard to setting up its own programme to market technical inputs which would help the milk producers to increase their milk production -- these programme were to be funded under Action Item 7.

Meanwhile, in late 1971, the senior officers responsible for Haryana State's part of Operation Flood had asked the NDDB for a team of experts which could help them to set up Anand Pattern Co-op's in their state. As NDDB had no staff with practical experience in this field, a Specialist with long experience of working with the milk producers and two teams of veterinary doctors, fodder extension-men etc. were "borrowed" from the original Anand Co-op's field staff and seconded to Haryana (at the Anand Co-op's expense). The Teams found that they faced three difficulties: the administrative structure was departmental and less flexible than that to which they were accustomed; the procedures for getting funds from the IDC into the State Government's hands and then getting them released, at the Team's behest, proved very cumbersome-- and the milk co-operative structure had so far been based on handing out rather liberal "cattle loans" to farmers, on the "condition" that they would sell milk to their village society....The Team's first job was to persuade the farmers not to take such loans...

By February, 1972, twenty societies had been started in a Haryana milkshed (Rohtak)--and by May, 1972, fifty in a Punjab milkshed (Ludhiana). However, jurisdictional problems between each State Dairy Development Corporation (the State Government's designated authority for its part of Operation Flood) and the Registrar for Co-operative Societies (the State's Official with statutory authority over all co-op's) made the working of the societies difficult -- and the Teams returned at the end of the year. Left with no local professionals to support them the societies which had been started did not in general flourish.

In 1972, the NDDB, formed a new Division, the Animal Husbandry & Farmers' Organisation Division. It was headed by the officer recruited in 1969 as Project Executive & Adviser, Animal

Husbandry, who became Deputy Director, AH & FO. When the Specialist and field teams borrowed from the Anand Co-operative had returned from Haryana they rejoined duty with the Anand Co-operative, of course -- but the specialist was frequently consulted by NDDB for advice on farmers organisation; he also assisted NDDB in recruiting two of his senior colleagues -- both veterinary doctors with five years' experience in working with the farmers -- as well as sixteen Graduate Apprentices in veterinary medicine, animal husbandry, fodder production. The Graduate Apprentices were then given six months' practical training in working with the farmers by the Anand Co-operative. They then joined duty with AH & FO Division, to be key members of its future Spearhead Teams.

By early 1973,, the Haryana State Dairy Development Corporation had again sought NDDB's help. This time, the Anand Co-operative's senior Specialist, who had led the previous effort in Haryana, was deputed to the State's Dairy Development Corporation for six months as its "Manager (Procurement)" and, a little later, one of the NDDB's Spearhead Teams went to work in Haryana State's second Operation Flood Milkshed, Gurgaon. The Specialist was able to see that the co-operatives' bye-laws etc. were changed, to conform to those of the Anand Co-operative; this helped to ensure that the societies were led and managed well. He also helped to train the Dairy Development Corporation's staff to look after the societies. But, after he returned to Anand, there were reports that the State Government's co-operative staff felt that the societies should be under their jurisdiction and the members were confused as to the status of their co-operatives.

On his return to Anand, the Anand Co-operative's Specialist discussed his experience in Haryana with the senior policy makers in the NDDB, who in turn discussed the matter with the management of the Anand Co-operative. The NDDB then offered the specialist a position as Deputy Director, to head a new Farmers Organisation Division within the NDDB, (subordinate only to the Secretary, the NDDB's senior executive). The NDDB was often said to be more bureaucratic than the Anand Co-op' -- and its salary scales were much lower than those of the Anand Co-operative. On the other hand, the specialist felt that his career until then had been built for him by the trust that his superiors in Anand had placed in him and by the fairness with which they had always administered such matters as selection and promotion of staff. Dr. Kurien, Chairman of NDDB, had been his General Manager at the Anand Co-op' ever since he had first joined the co-op, an inexperienced young veterinary graduate. Now, the NDDB was offering him a chance to prove that what he had helped to build in Kaira District could be built wherever the milk producers wanted it. After much heart-searching, in June, 1974, he resigned from the Anand Co-op', joined the NDDB and started to build the NDDB's new Farmers Organisation Division.

Meanwhile, the NDDB had also had one related experience which its leadership considered important. In 1973, the NDDB had been approached for assistance in starting Anand Pattern milk Co-operatives in Bihar, a State where the Co-operative movement was generally believed to have been so corroded by corruption and incompetence that the rural people themselves no longer had faith in it. Faced with this problem directly, during a visit to Bihar in 1973, Dr. Kurien, as Chairman of the NDDB, had invited the farmers to visit Anand -- and, on his return, he had arranged with the Anand Co-op' that it should host twenty milk producers from Bihar on a 10 day visit to Anand. Selected from among the poor and small farmers of Bihar milksheds, as potential leaders and managers of village milk societies, the twenty visitors were accommodated with milk-producer members of the Anand Co-op's Village Co-operative Societies. They saw how the co-op's served its members. They were encouraged to ask questions of the Co-op's officers, the NDDB's officers -- and of the Chairman himself. They remarked openly on the "respect" with which they were treated. They commented that they felt none of the "distance" that they had experienced between themselves and departmental officials at home. They were amazed at the reasonable price of the Co-op's cattle-feed -- and they noted the absence of middle men, of phoney loans, of cheating in measurement and testing of producers' milk ... and they returned to Bihar ready to support the idea of forming an Anand Pattern Milk Union to manage their milk business.

Thereafter, the Farmers Organisation Division developed a modus operandi. Its staff was organised into groups of 6-12, each with a senior veterinary doctor at its head, and with young veterinarians, fodder specialists etc. These groups were called "Spearhead Teams". When a State requested NDDB's help in setting up an Anand Pattern Co-operative, one Spearhead Team Leader would first work with the State's concerned officials and help them to draw up an agreement with the NDDB, to amend the State milk co-operative bye-laws so that they conformed to the Anand Pattern -- and to select a "Shadow Team" of veterinary doctors etc., which would work with the NDDB's men in the fields. When all this preliminary work had been completed with the State's designated implementing agency for Operation Flood, the implementing agency's shadow team would come to Anand, for a least ten weeks' work in the field with the Anand Co-operative's mobile veterinary teams, co-op supervisors etc. Finally, when all was ready, a survey was made of the State's first milkshed selected to participate in Operation Flood and the first fifty villages would be identified for forming the first 3-4 milk-truck routes. From each of these villages, one or two milk producers were selected to spend three days at Anand as the NDDB's guests, but living with the Anand Co-op's milk producers members.

When these visitors had returned home, the NDDB's Spearhead Team plus the Shadow Team would set up shop in the milkshed, at the place where the proposed co-op's feeder balancing dairy was being built. The Teams then jointly visited the villages intensively, persuading milk producers to support the idea of the

co-op' (much helped by the milk producers who had visited Anand, of course). When a village was convinced, at least a minimum number of initial members (prescribed by each State's co-operative law -- usually between eleven and twenty five) would register their village society with the State Co-operative Registrar's local office -- and the producers would select their Managing Committee, their Chairman and their paid Secretary (the manager of the village milk society) as well as a milk tester and a collector. The Teams then trained the Secretaries, the testers and the collectors.

At least 10-20 village societies on a route would be ready, a truck would be hired to ply the route each morning and evening -- and the milk societies would "open for business". That morning, for the first time in their lives, the village milk producers would see their own man measure the milk that they wanted to sell -- and another of their men test that milk for fat content -- and, that evening, yet another of their men would pay them for their morning milk (on the basis of quantity and quality). The hardened diluters found it a little disturbing, of course -- and, at first, some producers could hardly trust the objectivity of the system. But they would soon come to trust it.

Soon, one or more officers of the NDDB's Animal Husbandry Division who were also attached to the Spearhead Team, would start the first mobile veterinary route -- and they would talk with producers about growing fodder, about using artificial insemination to improve their stock etc.

After the Farmers Organisation Division had operated for a year, the Head of the NDDB's Animal Husbandry Division was appointed to head up the IDC's Animal Husbandry side of its work. The NDDB's Farmers Organization and Animal Husbandry Division were amalgamated into one (FO & AH), under the leadership the Director of the original Farmers Organisation Division.

This had now become quite a complex operation in itself. A few years earlier, the NDDB had been asked to take over the management of three farms in the Ahmedabad area, with a total of some 600 acres of land. Using its earlier experience with the Jersey herd at the Anand Agricultural Institute, the NDDB had established purebred herds on two of these farms. These had become the NDDB's own practical learning-cum-demonstration centres for its programmes of milch animal improvement under Action Item 8. At one of the farms, a "Bull mother Farm" was established, stocked with purebred cows which were kept for the purpose of producing high-quality bulls for future artificial insemination programmes -- and another of the farms was equipped so that it would train artificial inseminators from the villages, who would return to their villages to be employed by the village co-operatives as inseminators. By 1975, this centre had trained 190 inseminators from Gujarat's village co-op's -- and it had become a model and training centre for personnel to man such centres in other states.

By 1975, the bull-mother farms set up under Action Item 8, in the ten States participating in Operation Flood, were producing one-hundred pure-bred bulls annually. Experience had shown that these centres became self-supportive financially when their stock of pure-bred cows rose to about seventy-five -- and it was planned to raise most of them to this level in the next phase of Operation Flood; this would mean that the entire system would ultimately be able to produce 300 pure-bred bulls annually. It was also planned to set up such farms to produce cross-breed bulls and buffalo bulls -- and the entire plan would provide enough genetic material for the artificial insemination systems which were designed to produce a high-yielding National Milch Herd of some 200-260 lakhs (20-26 million) in the 1980's.....

The Director quietly initiated daily "classes" (held before the NDDB's offices opened), at which officers of the previous Farmers' Organisation Division learned about basic animal husbandry -- and the previous Animal Husbandry Divisions' officers learned about the basic structure of Anand Pattern milk producers' co-operatives. After three months, the division was re-organised on a unified basis. Two officers stationed at Anand were assigned responsibilities for liaison with Spearhead Teams in the field on a regional basis, while others were given responsibilities on a functional basis: i.e. for "animal nutrition", "breeding" etc.

However, the Director of the FO&AH Division still felt that the Division faced difficulties in getting the technical inputs programme implemented in the milksheds. During 1973 and 1974, the NDDB and the IDC had helped each of the state implementing organisations to draw up a technical-inputs programme for each of the selected milksheds -- and funds to support these programmes under Action Item 7 had been approved by the IDC. However, the Spearhead Team's were largely kept busy in helping the producers to organise their societies. The state implementing agencies had difficulty in translating paper plans into action. Now the idea had been mooted of putting an extra NDDB animal husbandry specialist into each milkshed, to be attached to each milkshed union as its "milk production adviser"-- but even the NDDB itself had limited number of such men among its staff for this purpose.

Both the IDC and the NDDB had noted with interest that some participating States had used their experience with their original Spearhead Teams to create other such Teams, who were attached to the State's implementing agency which was responsible for Operation Flood in that State. Some of these Teams seemed to be achieving considerable success in setting up Anand Pattern milk co-operatives in milksheds not so far selected for Operation Flood but often adjacent to the Operation Flood Milksheds(see exhibits 3.3.1,3.3.2, 3.3.3 in pages 94,95,& 96).

Exhibit 3.3.1: Action Item 9: Anand Pattern milk producers' co-operative in Operation Flood and associated milksheds, early 1976

	Dairy capacity 1000 ltrs daily	Village Societies organi- zed	Producer- members	Co-op's union status	Spear- head Team	Av. milk daily 1000 ltrs.
<u>North</u>						
<u>Operation Flood Milksheds</u>						
Punjab: Bhatinda	100	n.a.	n.a.	1/	Nil	20.0
Ludhiana	150	63	2,375	2/	3/	67.2
Haryana: Rohtak	1001	252	18,150	2/	3/	12.8
U.P. (W): Meerut	100*	214	7,205	2/	4/	29
Rajasthan: Alwar	60*	77	1,800	2/	3/	14.5
Bikaner	100*	165	5,286	2/	3/	16.5
<u>Associated milksheds:</u>						
Haryana: Gurgaon	-	192	12,332	2/	3/	7.9
<u>South</u>						
<u>Operation Flood Milksheds</u>						
Andhra Pradesh : Guntur	150*	-	-	-	-	-
Tamil Nadu : Erode	-	82	n.a.	2/	5/	16.0
<u>Associated Milksheds:</u>						
Tamil Nadu: Madurai	100	188	12,125	1/	Nil	30.0
Vellore	-	79	7,573	1/	Nil	8.9
Madras	-	6	1,059	1/	5/	3.1
Ooty	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<u>East</u>						
<u>Operation Flood Milksheds:</u>						
Bihar : Patna	100*	33	648	1/	5/	1.9
West Bengal : Darjeeling	100	54	1,569	2/	5/	6
Uttar Pradesh (E):						
Murshidabad	-	87	2,342	2/	5/	11
Varanasi	100*	50	775	2/	5/	1.7
<u>West</u>						
<u>Operation Flood Milksheds:</u>						
Gujarat: Sabarkantha	175	400	30,000	1/	Nil	88
Banaskantha	150	390	32,000	1/	Nil	56
Kaira	800	829	2,60,000	1/	Nil	361
Mehsana	700	569	1,69,000	1/	Nil	295
Maharashtra: Jalgaon	100	190	n.a.	1/	5/	72

1/ = Not Registered; 2/ = Registered; 3/ = Withdrawn

4/ = Work done by PCDC; 5/ = Working; * = Plants under execution.

Exhibit 3.3.2: Action Item 7: Technical input programmes in Operation Flood and associated milksheds: early 1976

	Cattle feed plant	Stud bulls	Village A.I. centres	A.I. wkrs tr'd	Insemina- tions: cow	buff.	Mobile vet. units	Villages with AH cover
<u>North</u>								
<u>Operation Flood Milksheds:</u>								
Punjab : Bhatainda	1/	-	Nil	--	-	--	-	-
Ludhiana	*	12	25	25	n.a.	-	3	75
Haryana : Rohtak	+	11	95	n.a.	n.a.	n.a.	-	-
U.P.(W) : Meerut	+	10	Nil			-	3(E)	178
Rajasthan : Alwar	1/	5	36	36	477	782	1	40
: Bikaner	1/	6	Nil	18	Nil	Nil	1	57
<u>Associated Milksheds:</u>								
Haryana : Gurgaon	--	--	Nil	--	Nil	Nil	--	--
<u>South</u>								
<u>Operation Flood Milksheds:</u>								
Andhra Pradesh: Guntur	1/	--	Nil	--	--	--	-	-
Tamil Nadu : Erode	+	9	31	49	3,866	4,103	18(E)	154
<u>Associated Milksheds</u>								
Madurai	Nil	10	23	37	900	653	8(IE)	62
Vellore	Nil	8	40	53	5,283	2,223	18(IE)	129
Madras	2/		33	54	1,373	2,229	18(IE)	105
Ooty	Nil	24	17	23	5,059	Nil	7(E)	12
<u>East</u>								
<u>Operation Flood Milksheds:</u>								
Bihar: Patna	+	--	Nil	--	-	--		--
West Bengal : Darjeeling	+	12	24	37	20	n.a.	1	26
Murshidabad/ Beldanga	3/	5	32	35	518	n.a.	1	48
U.P.(E): Varanasi	+	--	Nil	--	-	--	1(IE)	35
<u>West</u>								
<u>Operation Flood Milksheds:</u>								
Gujarat : Sabarkantha	+	--	31	60	163	361	23	60
Banaskantha	+	--	33	47	-	--	1(2E)	103
Kaira	2/	63	665	685	4,127	205,000	23(19E)	823
Mehsana	2/	--	25	48	1,175	--	10(6E)	600
Maharashtra: Jalgaon	+	5	14	26	508	209	4(4E)	106

1/ = Proposed

* = Completed

+ = Under completion

E = Emergency

2/ = Existing

3/ = Under planning

Exhibit 3.3.3: Action Item 8: Development of improved milch animals: pure-bred bull-mother farms : early 1976

	Herd Strength ^{1/}				Calves		Current performance Cows in milk		Dry No.
	Initial		Current		M	F	No.	Dy.pdn. ltrs.	
	C	B	C	B					
<u>North</u>									
Punjab DDC	30	4	42	4	24	33	31	12.70	11
Haryana DDC	25	3	29	4	14	27	25	11.13	4
UP: PCDF	20	2	20	2	16	25	19	10.77	1
Literacy House	23	2	34	2	17	26	24	7.30	10
Raj.State DDC	60	3	59	3	48	51	56	9.50	3
Sub-totals:	158	14	184	15	119	162	155	10.22	29
<u>South</u>									
Tamil Nadu : DDC	15	2	18	2	13	10	14	10.70	4
Upasi	16	7	17	2	5	10	15	11.70	2
A.Pradesh : DDC	15	2	14	2	1	4	3	5.80	11
IDL	16	7	14	9	6	7	10	6.79	4
Sub-totals:	62	18	63	15	25	31	42	9.78	21
<u>East</u> ^{2/}									
West Bengal PC	30	3	22	7	15	18	21	8.30	1
<u>West</u> ^{3/}									
Gujarat : IAA	96	4	85	1	46	75	80	12.00	5
NDDB	55	19	50	-	24	46	47	11.90	3
Sub-total:	151	23	135	1	70	121	127	11.96	8

^{1/}C= Cows B= Bulls ^{2/} = Figures for Bihar not included

^{3/} = Figures for Maharashtra not included.

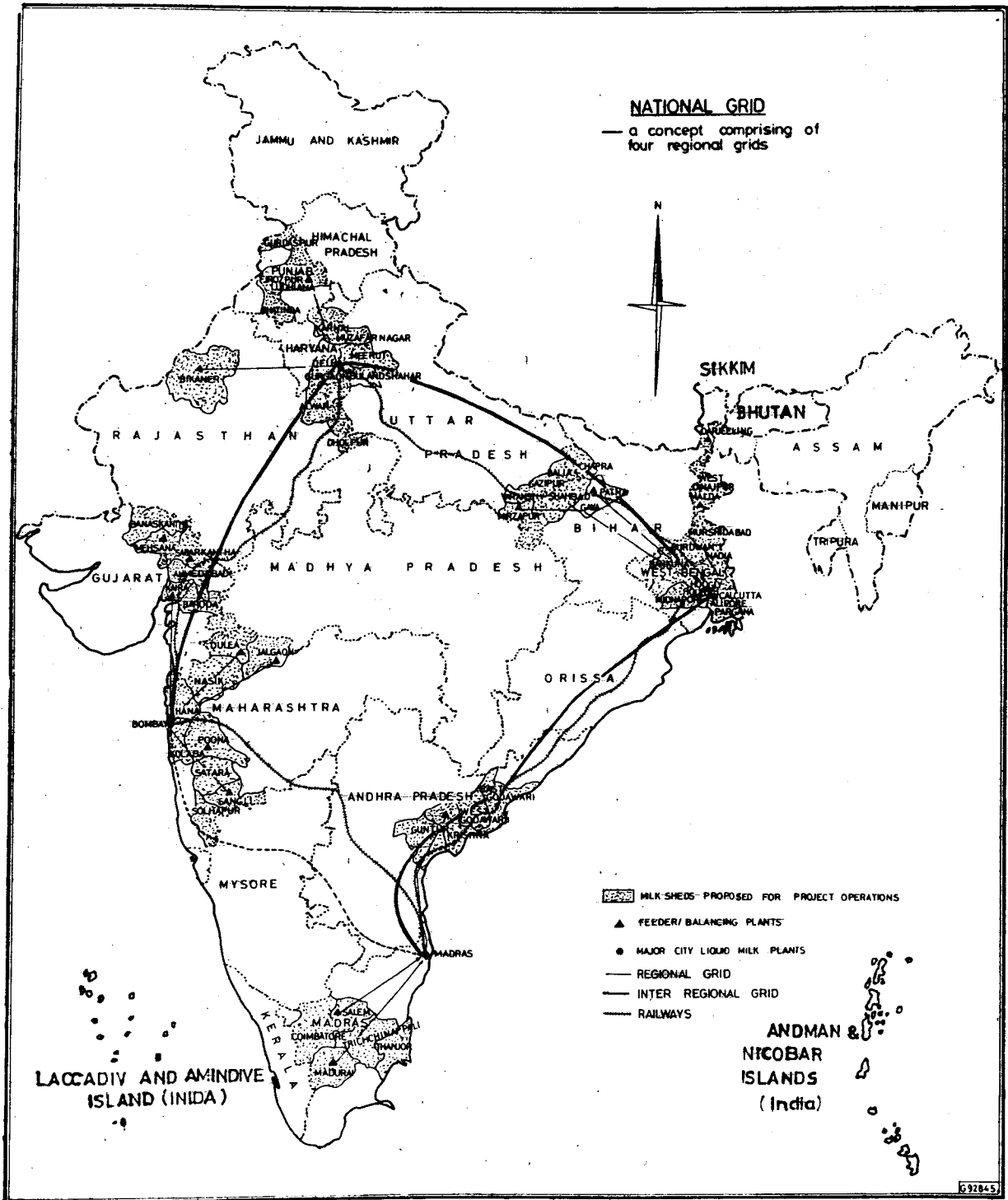
3.4 The remaining Action Item

In addition to the Action Items relating directly to engineering (discussed in Section 3.2) and those relating directly to farmers' organisation and animal husbandry (discussed in Section 3.3), the Plan of Operation also included three other Action Items: No.3, "Storage and long distance transport facilities;" No.10, "Project planning, implementation and manpower development"-- and No.11, "Miscellaneous, including unloading, storing and inland transportation of WFP Food." Much of the work on Action 3 and 10 was executed by the NDDDB under contracts with the IDC -- and it involved the NDDDB's original "Management & Manpower Development Division," as well as other Divisions. The work to be done under Action Item 11 was the direct responsibility of the IDC.

The main purpose of the financial provision under Action Item 3 was that the Project should have the maximum flexibility in coping with regional and seasonal imbalances between milk supply and milk demand. The vagaries of the monsoon made it inevitable that, periodically, one region or another would suffer temporary set-backs in milk production and procurement. On the other hand, the Anand Pattern milk producers' unions would be developing in the rural milksheds -- but, in a given region, the rural feeder-balancing dairies would not necessarily develop exactly in step with the modern dairies in the region's major city -- and, in any case, it would be expected that many of the feeder balancing dairies would develop their manufacturing of butter and milk powder ahead of their ability to market those products.... For all these reasons, it seemed prudent to ensure that the Project Authority would have reasonable transport and storage capacities, so that it could shift liquid milk (whole or in condensed form) between the four major citys' regions -- and so that it could hold supplies of milk powder and butter, in order to use them in balancing the system as a whole ... Ultimately, it was envisaged that these facilities would become parts of a National Milk Grid, which would even out seasonal and regional imbalances between milk supply and milk demand for the country as a whole (see Section 3.8)

When the Project had started, the idea of ever having any milk available to shift around the country was only a gleam in the Project Authority's eye. Most of the national and international dairying community's reactions to the idea ranged from benign tolerance to ill-concealed impatience with such day dreams.

Nevertheless (as discussed in 3.2), the Project Authroity knew that fabrication of any significant number of road-and rail-tankers would take a long time. So work on the design and fabrication of tankers was initiated in mid-1971 -- and road tankers, each with a capacity of 13,000 litres, began to be delivered in mid-1972 -- and by January 1976, 106 had been delivered. Almost all of them had been snapped up gratefully by the urban dairies, because their milk procurement had risen more



rapidly than expected -- and they were funded under Action Items 2 and 3.

Altogether, twenty-seven of the thirty rail-tankers ordered (each of 40,000 litres capacity) had been delivered to the Project Authority by January, 1976. Most of these were being held in reserve by the IDC, in the expectation that they would be required when the new urban dairies in the major cities stepped up their throughputs.

The Project Authority's policy on storage facilities had been somewhat different. Suitable warehousing for WFP commodities had been available when the Project had started in 1970, so the IDC had simply hired the space required. By January 1976, it had hired storage capacity totally nearly 14,000 tonnes for butter oil and over 15,000 tonnes for skim milk powder. These capacities were adequate for the Project's needs -- and more space could readily be hired if needed. All unloading, quality control, storage, inland movement etc. of WFP milk powder and butter oil was done by IDC staff in its four regional offices (in Bombay, Calcutta, Delhi and Madras) and controlled by the IDC HQ in Baroda, 25 miles from Anand. This work was found under Action Item 11.

For the longer-term purposes of the National Milk Grid, however, the Project Authority felt that purpose-designed warehousing should be constructed close to where the stored products were most likely to be used -- the new, large, urban dairies; however, if the stored commodities were to be the IDC's property, there could be some complications involved in putting the warehouses within the compounds of dairies which were the property of State Governments ... Ultimately, it was decided that warehouse within the compounds of dairies which were the property of State Government... Ultimately, it was decided that warehousing with capacities totalling some 3,240 tonnes of skim milk powder and 2,490 tonnes butter/cream/butter oil would be built adjacent to the new dairies in Calcutta, Delhi and Madras (no site had been found in Bombay). These warehouses were expected to be ready during the first half of 1976.

"Project planning," under Action Item 10, was administered in several "layers". The entire planning of the Project had, of course, been broadly laid out in the Plan of operations. The siting of almost all the rural feeder balancing had been decided every early also, within the Districts which the participating State Governments had designated as comprising the hinterland milksheds of the project, largely on the basis of each area's milk-marketing potential -- and the road-and rail - transport facilities locally available. It was then for each State's designated implementing agency to evolve a plan for each milkshed which would ensure co-ordination between the construction of milk processing facilities in each milkshed, the development of milk producers' organisations, the provision of technical inputs for milk production -- and any manpower

development required -- using the services of the NDDB for such planning, if required. In practice, as described in Section 3.3, planning for producers' organisation and for technical-input marketing had proceeded separately. Similarly, it was up to each concerned State or Central implementing agency to plan for the development of the new urban dairies.

However, the Plan of Operations had provided for monitoring milk supply and demand in the milksheds and major cities coming under the Project. This was a large task: the four major cities had human populations totalling 200 lakhs (20 million) -- and the districts comprising the hinterland milksheds had a total milch animal population estimated at some 15 million of which 1.875 million were to be covered, by the end of the Project, in its farmers' organisation and technical-input programmes. As a first step in its own detailed planning, the project authority initiated a series of sample surveys of the milksheds, analysing milk production and marketing by classes of producers defined by ecology, sub-ecology, total operated land holdings and proportion of land irrigated, milch-animal holding size etc. In the four cities, demand for milk and milk products was analysed by consumer market segments. Most of these studies were completed in early 1972, each as a "one-off" bench-mark study.

Largely as a result of this experience, the IDC contracted with NDDB that it should erect a continuing information system (referred to below as the "CIS") on milk supply and demand in the rural milksheds covered by the Project and in the four major cities. After some pilot runs, field-work for CIS began in 1975 and reports on the first annual round, and on the first year's three seasonal rounds of information-gathering, were expected to be ready by June, 1976.

At the time when the 1971-72 bench-mark studies were made concerned Divisions of the NDDB had also completed model plans for each Action Item, including manpower development. In fact, almost the entire series of studies and model plans had been completed by the time the first UN Inter-Agency Review Mission visited the Project in early 1972. Because it was bound in blue covers, the series was known within the NDDB and the IDC as "the blue books" and was often referred to as such. The series was distributed to the first UN Inter-Agency Review Mission, to the Ministry of Agriculture, New Delhi, and to participating State Governments' designated implementing agencies for the Project.

The Blue Book on manpower development had projected the needs of each part of the Project for manpower development -- and the projections were massive. However, in 1972, the NDDB had initiated five steps which it believed would make the manpower programme feasible: (1) the NDDB's hostel and classroom facilities at its Anand head quarters were to be enlarged to take eighty participants at a time; (2) a Technicians Training Centre was being built by the NDDB, with the financial support of the Mehsana District Co-operative Milk Producers' Union, next to the Union's dairy at Mehsana, 100 miles north of Anand; (3)

hostel and training facilities for animal husbandry men, specialists and technicians in artificial insemination, frozen semen systems etc. were being set up on the farms managed by NDDB in the area of Ahmedabad City, 56 miles from Anand;(4) the NDDB had planned that the Institute of Co-operative Management, Ahmedabad, would work with concerned NDDB staff in providing programmes for Anand Pattern Co-operative organisers, extension workers etc.-- and (5) the NDDB planned to mount a new, enlarged Farmers Induction Programme, for which an additional hostel would be built at Anand, in order to induct a large number of farmers from the milksheds into the Anand Pattern.

In 1972-75, however, the NDDB had found that the demand for manpower development programmes had been much smaller than it anticipated, as indicated in Exhibit 3.4.1.next page.

Despite poor effective demand for its manpower services, the NDDB had noted with growing apprehension the number of dairy plants and Anand Pattern milk producers' co-operative organisations which were coming up without adequate recruitment and development of the men who would be needed to run them. In order to tackle the problem afresh, the NDDB took two steps:(1) in mid-1975, it established a new Technical and Manpower Development Division, to handle purchasing (which had previously been under NDDB's general administrative section) and also to handle, with a new sense of urgency, Manpower Development. Subject had been first under NDDB's original Management & Manpower Development Division, which had in the interim been titled the Management services Division -- and which, in 1975, was renamed as the "Planning Division". The new Technical and manpower Development Division had as its Director the previous Director of NDDB's Engineering Division, who had had a long and distinguished career in university teaching before he had joined the NDDB -- and (2) The NDDB had earlier received a grant from an overseas Foundation, to enable it to obtain short-term consultants (from India and from overseas) to recommend ways in which the NDDB could help to increase the services of dairy co-operatives in a number of areas; it was therefore decided that a small consultant team should study the problem of manpower development afresh with the Director of the new Technical & Manpower Development Division.

Thus, in early 1976, an overseas consultant (with considerable experience in manpower development work within the farmers' co-operatives in his own country) was hired for six weeks' consultancy-work with NDDB. It had been intended that he should be part of a 2-man team and that the team's other member should be an Indian with comparable experience. In the event, however, no suitable Indian was found to be available, so the expatriate adviser simply worked with the Director of the new Division and his concerned Officers. His report recommended more instructional staff in NDDB, some modification of the policy whereby the NDDB's professional staff from other Divisions provided most of the lecturers for its manpower programmes --

3.4.1 : Operation Flood : Projected manpower requirements and NDDB manpower development programmes

1. 1970-75: mainly custom-tailored for small groups:
total trained, 350; average duration, 2 ½ months

2. Projected requirements

	<u>Bull m. farms</u>	<u>Chilling centres</u>	<u>F & FB dairies</u>	<u>Mother dairies</u>	<u>Cattle-f. plants</u>	<u>Total</u>
Managerial	14	24	252	32	168	488
Supervisory	28	24	2628	146	420	3246
Skilled Technician	84	24	2668	197	980	4153

3. Programmes proposed in 1976-77

	<u>Number of programmes</u>	<u>Total parti- cipants</u>	<u>Programme duration</u>
Executive development:			
Milk plant personnel	2	60	2 m.
Cattle-f. plant personnel	2	38	2 m.
Procurement & technical inputs programme	9	243	2½ m.
Drought-prone area programme	6	140	2-2½ m.
Dairy plant operators	2	40	3 m.
Dairy plant maintenance	2	40	3 m.
Artificial insemination			
Vety. doctors prog.	4	48	1 m.
Lab. tech./lvstk. insp.	4	48	1½ m.
Field tech. lay ins'r.	10	12	1 m.
Miscellaneous	7	164	-

and that there should be more emphasis on the use of modern teaching aids. NDDB's management believed that the Board would accept such recommendations and that the NDDB would seek both technical and financial assistance to help it implement the new manpower development programme which the Director of the Technical & Manpower Development Division had proposed on the basis of the consultant's recommendations.

The mandate of the original Management and Manpower Development Division (and of its successor, the Management Services Division) had included the subjects of marketing and product development. These had passed to the New Planning Division, when the NDDB's divisional structure had been modified in 1975. The Plan of Operation had stipulated that the project authority would assist dairies in devising optimal product-price mixes to help maximise their services to both producers and consumers. In 1970, the NDDB had a consultancy contract intended to produce a practical plan whereby the Baroda Dairy could both expand and capture its market. The Baroda Dairy was owned and operated by the Baroda District Co-operative Milk Producers' Union. It was an urban milk plant which supplied liquid milk to Baroda, a city 25 miles from Anand with a population of some 550,000 in 1970-75.

In 1970-71, the NDDB had also developed a new product, composed of approximately 40% milk solids and 60% vegetable solids, which was almost as nutritious as cow milk, but which could be retailed at only two-thirds of the price of cow milk. It was a white, opaque fluid and -- although it did not taste like milk, if taken alone -- and excellent cup of tea could be made with it, if the tea was made the Gujarati way (by boiling the ingredients together in a certain sequence).

The first version of this product had been formulated in 1970 by the NDDB's senior dairy technologist, the Deputy Director, Management & Manpower Development, working with a short-term consultant from overseas. Since then, the NDDB's senior dairy technologist had done much more work on the product. He had also designed the NDDB's Product & Process Development Workshop, supervised its installation -- and supervised the installation of equipment in the Baroda Dairy, which would enable it to produce 20,000 litres daily of the new product. In 1973, the senior dairy technologist had become the Director of the Management Services Division and, in 1975, he became the Director of the Planning Division.

In 1975, the NDDB had obtained the services of a short term marketing consultant from overseas, whom it had asked to review the marketing aspects of Operation Flood. His final report to the NDDB had emphasised the importance of evolving viable product-price mixes (similar to that which the NDDB had worked on for Baroda Dairy) for the major cities' urban dairies; it also emphasised the importance of NDDB's helping the major cities to develop and train their marketing managers. The NDDB certainly felt that this would become increasingly important as the four

major cities' new, large dairies came on stream. Instead of more-or-less "rationing" their milk, the dairies would have to market it. On the other hand, the NDDB had always based its work on practical experience. For any innovation connected with rural milk producers' organisation, for example, it had always had the Anand Co-operative as its "live-lab." The NDDB felt that it should follow the same approach to urban milk marketing. In early 1976, therefore, it proposed a project to the IDC, whereby the IDC would contract with the NDDB to devise a line or branded products suitable for marketing by urban dairies and to provide the marketing services needed to help the Baroda Dairy to market this line. At the same time, the IDC contracted with the Baroda Dairy that it would make and market the new line, with the NDDB as its marketing consultant. Financial agreements were worked out to the mutual satisfaction of three parties: the Baroda Dairy the IDC and the NDDB.

The NDDB hoped that the Project would enable its people to learn how to help an urban dairy to evolve and market an optimal product-price mix. It also hoped that Baroda would then become a "training ground" for the marketing managers of other urban dairies. Thus, in early 1976, the Director of the Planning Division was enthusiastically activating his new product & Process Development Workshop; he felt that the Baroda Project would enable the Workshop to show its true worth. He also supervised the work of the Marketing Cell in his Division, which had until recently consisted of one Project Executive (Marketing) -- and which was led by the Project Executive (Marketing) with a group of three supporting staff.

The Director of the NDDB's Planning Division had two other major areas of responsibility; he supervised the work of the NDDB's Planning Cell and of the NDDB's Management Information Services Unit, both of which were in his Division.

The Management Information Services Unit was responsible for the devisement and operation of Management Information Systems, including the Continuing Information System on milk supply and demand in Operation Flood's areas of operation. The Unit was also responsible for computer applications within NDDB. Much of its work centered on developing the Management Information System required for the National Milk Grid, which is described in Section 3.8.

The Planning Cell in the Planning Division was a small multi-disciplinary group. It worked on feasibility studies, project proposals etc., drawing on the staff of the NDDB's Engineering and Farmers' Organisation & Animal Husbandry Division when the nature of the particular planning job required it. The Planning Cell was also responsible for watching over the detailed dovetailing of Operation Flood with other developmental activities undertaken by the Central Government and the State Governments. A grant from the Government of India to the NDDB financed 50% of the costs of the Planning Cell.

When the Planning Cell had first been formed, in 1972, the NDDB had intended it should monitor the progress of Operation Flood. Soon, however, it became clear that this could more easily be done by the continuing Information System which operated a number of data-gathering teams of field-staff. By 1975, however, "monitoring" had become a large task -- and a separate Monitoring Group had been set up as a part of the office of the NDDB's Chairman. The Monitoring Group received and analysed reports on each part of Operation Flood, usually through the concerned operating divisions of NDDB or from the IDC. Its major job was to point out to the NDDB's management any serious delays in project implementation and any discontinuities which developed in project structure. In early 1976, the head of the Monitoring group was also appointed to fill the vacant post of the Executive Assistant to the Chairman, NDDB.

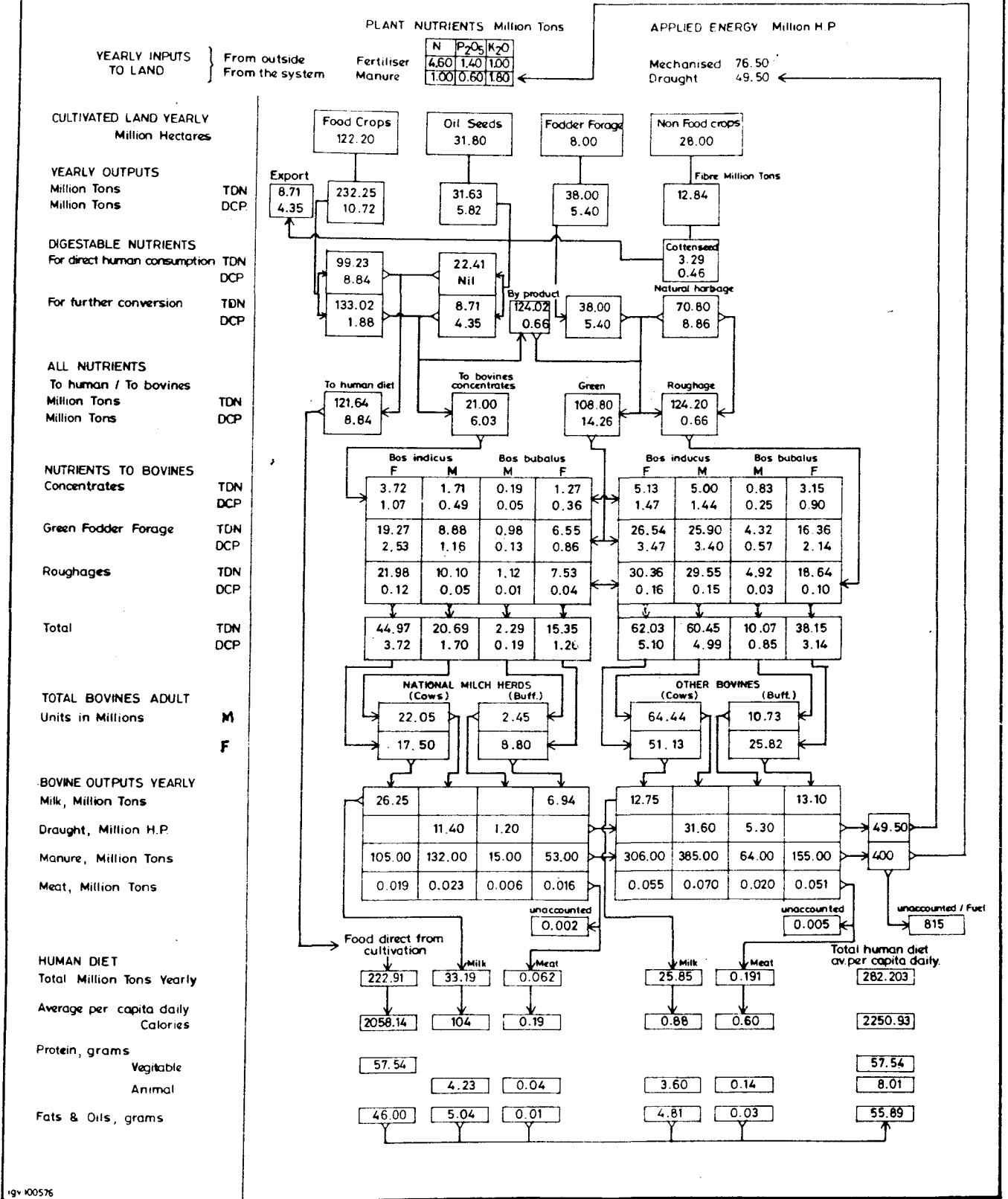
The Planning Division now had a relatively simple structure. It consisted of the Computer Services Unit, the CIS, the Planning Cell, the Marketing Unit and the Product & Process Development Workshop, each of which was so staffed that it could "run itself" and required only routine administrative attention from the Director, who concentrated largely on seeing that each unit's projects kept to schedule and to budget. He participated more directly in the work of the Product & Process Development Workshop, because its work involved his special field.

Now that the Division could run reasonably smoothly, he was thinking particularly of two aspects of his Division's work, its integrative function with other Divisions and its responsibility for seeing that process technology was duly attended to whenever necessary, in NDDB's projects.

The Division's "integrative function" was inherent in its responsibilities for planning and for management services. Planning involved bringing the right "mix" of skills available from all NDDB's Divisions to bear on the conception and design of the Projects which it undertook, right from the start (which was usually signalled by a Pre-feasibility Study). Management Services involved seeing that relevant information, both from the field and also from within NDDB, was exchanged between all NDDB's Divisions that were concerned with a given project's design and implementation. In this sense, much of the Division's work had an integrative function.

"Process technology" involved the whole cycle of events from the time that a food (in NDDB's case, usually milk) was produced -- to the time that it ended up in a (hopefully satisfied) consumer's mouth. While, at any given point in time, the process capabilities to be installed in a given dairy factory were fairly simply arrived at, one always had to be aware of (and, if possible, to anticipate) advances made possible by improved technology and by changes in production and consumption practices. This was the main reason why "marketing" had always been strongly related to "product and process development in the Division. Now that the Product & Process Development Workshop was complete, he felt that it would be particularly important to see that its work was made useful to any NDDB project which could use it.

ESTIMATED CONVERSION EFFICIENCIES & THEIR EFFECT ON THE HUMAN DIET : 1985



3.5: State implementing agencies

When Operation Flood had been launched in 1970, the Government of India already had to hand the National Dairy Development Board ("NDDB"), which was an autonomous, self supporting integrative service agency for all aspects of dairy development. The Government had also set up the Indian Dairy Corporation ("IDC"), which it owned wholly, to act as a "finance and promotion house" for Operation Flood and related dairying activities. The NDDB was designated as the IDC's technical consultant in its Memorandum of Association. The combination of the IDC and the NDDB, under a common Chairman, comprised an implementing agency for the Project which was subject to the Government's overall direction, but which was designed to be able to act with administrative flexibility and technical objectivity.

Because agriculture was designated as a State subject in India's constitution, the Governments of the ten States participating in the Project were each responsible for getting their own state's part of the Project implement. However, most of the States had no equivalents to the IDC-NDDB which they could designate as their implementing agency for their parts of the project.

The question could be considered simply as: what organisation, in each State, should be responsible for the things which were supposed to happen in the four major cities and their 20 hinterland milksheds under Operation Flood -- and what entity should be the legal owner of the assets, such as dairy plants, which were to be created by the Project? The question did not really arise in the same way with regard to publicly-owned dairies in Delhi city, because the Delhi Milk Scheme came under the Ministry of Agriculture, the Government of India, which was the parent Ministry of the IDC. But the remaining three major cities' dairies -- and all the milksheds -- were in the ten participating States, in which each State Government had to designate its implementing agency for Operation Flood.

In Gujarat State, however, there was little difficulty. Its co-operatives had always done their own developmental work, within policies laid down by the State Government, under the guidance of the State Government's Department of Agriculture... In the event, the Gujarat Government constituted a small Cell, to operate within its Department of Agriculture, to monitor and guide the State's part of Operation Flood -- to see that the Government's papers on the Project moved smoothly. Meanwhile, the Anand Co-operative and the NDDB saw to the expansions of the Anand and Mehsana Dairy plants and also to the setting up of the State's two new Anand Pattern co-operative union, which were envisaged under Operation Flood. In 1973, all six of the State's Anand Pattern dairy co-operative unions joined in setting up the Gujarat Co-operative Milk Marketing Federation, which in effect comprised an integrative agency for the State's co-operative dairying.

In Uttar Pradesh State, also, there had been a State Dairy Co-operative Federation for many years. It was different from Gujarat's in as much as it actually owned and operated the dairy plants involved, instead of their being owned and operated by Unions of primary village societies which procured their member-producer's milk. The State Government of Uttar Pradesh designated its Federation as its implementing agency for Operation Flood in 1970.

In Punjab State, there had for a long time been a State Dairy Development Corporation, which procured milk through village co-operative societies. When the State was divided into Punjab and Haryana States, Haryana State also set up its own Dairy Development Corporation.

These Corporations were to some extent State-level counterparts to the Central Government's Indian Dairy Corporation. In States where Anand Pattern dairy co-operative unions had not yet developed to the stage where they could implement the State's parts of Operation Flood on their own, the Project Authority felt that a State Dairy Development Corporation would usually be the best implementing agency to work with, because it would have more operating flexibility than a Department of the State Government and it could operate on a commercial basis. Therefore, the Project Authority encouraged the remaining Operation Flood States to set up their own Dairy Development Corporations -- and, in fact, the IDC made funds available to each State's Dairy Development Corporation, as and when it was set up, to establish a small cell of officers, secretarial staff etc., who would be responsible for getting the State's part of Operation Flood implemented.

Two States were exceptions, however: Maharashtra and West Bengal. In Maharashtra, the Milk Department of the State Government had had a long experience in organising the city's publicly-owned dairies (the State's Milk Commissioner actually "owned" them legally speaking) -- so the Milk Department remained responsible for the State's urban-dairy part of Operation Flood in Bombay City. Similarly, the State Government's Co-operative Department was designated as the agency responsible for the rural-milkshed part of Operation Flood in Maharashtra State. In West Bengal, also, the State Government preferred that its Dairy Development Department should look after the State's part of Operation Flood directly -- and the Department established a special Cell for this purpose.

The remaining six States set up Dairy Development Corporations which were quite similar to that in Punjab State. The general principle enunciated by the Project Authority was that the State Dairy Development Corporation would promote, guide, assist and monitor the setting up of the Anand Pattern dairy co-operatives envisaged under the Project. It would also, as a matter of practicality, have to be the first owner of dairy plants constructed under the Project, although the rural feeder-

balancing plants in the milksheds were ultimately, in accord with the Anand Pattern, to be owned by the co-operative union in each milkshed and to be run by the Union's own managers and technicians. Meanwhile, however, the work was done by each Corporation -- and each Corporation would have to judge when a co-operative union had matured sufficiently to take over the running of the dairy plant; there were also questions regarding the transfer of ownership of such assets to the co-operative unions and regarding the staff involved -- the officers of a State Dairy Development Corporation might not wish to work for a milk producers' co-operative union, for example, or vice versa.

In the concerned States, answers to these questions still had to be sorted out in 1976.

3.6: The roles of bilateral and UN agencies

Since the time when Operation Flood had first been discussed with United Nations agencies in the late 1960's, it had always been clear that Operation Flood, as it had been envisaged, was already a massive project -- and was likely to grow further. Therefore, it was neither likely nor necessary that such assistance as it might need from outside India, should come only from UN agencies.

On the contrary, for example, the Plan of Operations, which was signed by the WFP and the Government of India, stipulated that the Government would find the estimated \$ 2 crores (\$ 20 million) - equivalent which the Project would need for imported dairy equipment etc. This involved an important principle regarding financial and technical assistance in general: whether they came from UN agencies, bilateral government agencies of other countries, or private agencies -- whatever funds and technical personnel might be made available to India, as some form of developmental aid and assistance, those funds and personnel were made available to the Government of India directly. It was for the Government to say how they should be developed in pursuit of its developmental objectives.

In the event, for example, the Project Authority had found that only some \$ 1.2 crore (\$12 million) - equivalent had been needed in foreign exchange for the Project. The Government of India had made this foreign exchange available for the Project by developing a mixture of credits provided to India by individual countries, such as Sweden, and of UN agency's funds, such as a grant from Unicef which was used to obtain equipment and (especially) stainless steel, for indigenous fabrication of equipment.

The largest single component of assistance to the Project had, of course, been donated dairy commodities, most of which had been received through the World Food Programme, which had made them available to the Government of India. The Government, in turn, had designated the Indian Dairy Corporation as its agency which was responsible for handling these commodities and the funds generated by their use. The main problems with donated commodities had related initially to their quality, packaging and batch-identification -- and, subsequently to the stop-start timings of shipments which were largely the result of the fact that donors "pledged" commodities to WFP on only a two-year basis. It had been agreed that the period during which commodities would be supplied to the Project would be extended by two years, to enable shortfalls in shipments and utilisation to be made good.

Again, in the matter of "technical assistance," the Plan of Operations stated that the Government "may obtain" assurance of assistance through the UN Development Programme consisting of certain technical personnel, to be recruited by the Food & Agriculture Organisation of the UN (FAO). In practice, this

meant that the Government of India reviewed the funds which would be available to it, throughout the duration of the Project, from the United Nations Development Programme (UNDP). It then proposed to the UNDP that he required share of these funds should be earmarked to support the Team of internationally recruited specialists which was to help in getting the Project implemented. The UNDP agreed to this and the FAO accordingly recruited the Team, which was supported administratively and financially by the UNDP.

The FAO-UNDP Team for the Project was envisaged in the Plan of Operations as consisting of eight personnel: a "Team Leader" two Dairy Design Engineers, four Dairy Erection Engineers and one Systems Analyst -- and each of these posts was established for five years, the original duration of the Project: 480 man-months of technical assistance in all (8 posts x 5 years x 12 months). There had been some lags in recruitment, some re-scheduling etc. -- and, to obtain the expertise required, it had been found necessary to bifurcate the systems analyst's post into two: one for systems analysis, engineering, and the other for system analysis, agriculture (expertise in the latter field was obtained by the FAO's contracting it out to consultants specialising in applications of systems analysis in agriculture) By December, 1976, when the last two Team Members' contracts were due to expire, the Team would have provided all the technical manpower covered by the budget for the Team.

The Team had generally worked in a staff relationship to officers in the Project Authority. The Team Leader (whose specialisation was application of modern management in the food-agriculture sector) worked in a staff relationship to the Chairman, the Managing Director, IDC, the Secretary, NDDB, and Division Heads, as requested. The Teams' Design Engineers worked mainly with the NDDB's Engineering Division at Anand, with the exception of one of the Team's Design Engineers, who had spent some time in Bombay, assisting the NDDB's special unit there which had worked on evaluation of the NDDB's bulk-milk vending unit. The Team's Erection Engineers had mainly been posted to the NDDB's regional offices, where each had advised and assisted in the erection of the dairy processing plants which were to be erected in each region under Operation Flood.

The Team's Systems Analysts had mainly worked at Anand with the NDDB's staff responsible for management services and computer applications.

In all cases, such internationally recruited personnel had a "staff" relationship to the Project Authority. They could not exercise "line responsibility", if only because they could not be responsible for committing project funds for any expenditure...

Most of those involved felt that the main result of the Team's place in the Project Authority's structure had been the effective integration of each Team Member in the practical work of implementing the Project. Conversely, there had been no "dual

structure," such as could have arisen, between the indigenous Project authority organisation, on the one hand--and, on the other hand, the Team as a parallel structure ... In early 1976, the Project Authority was considering whether it would propose to the Government of India an extension of the Team for two years -- and, if so, what "mix" of expertise would now be most useful to the Project.

Another United Nations input to the Project had been the two Inter-Agency UN Review Mission, whose visits to the Project had been written into the original Plan of Operations. Both Missions included professional dairymen with practical experience and other experts. Both had examined the detailed working of the Project -- with both the Project Authority and also the State Implementing Agencies. Their discussions and comments had often been found helpful in highlighting not only aspects of implementation which appeared to be effective, but also those which appeared to be susceptible to improvement. Most of these discussions had been cordial and there was wide agreement that the Missions had been both constructive and professionally objective.

3.7: The evolution of the Project authority

In the early 1970's, when the Project Authority was still gearing itself up for implementation of the Project, a story (possible apocryphal) went the rounds in New Delhi that a senior administrator in a bilateral aid agency -- after studying his agency's somewhat tortuous file on Operation Flood long into the night -- had simply noted on the file, "I conclude that Operation Flood is not merely a Project, it is also a Way of Life..." and, certainly to examine in minute detail the evolution of the IDC's and the NDDB's divisional structure would be lengthy process.

In any case, both organisations had a conventional line structure. Perhaps there only unusual organisational feature was to be found in the NDDB, which (mainly because of the some what novel nature and extremely rapid growth of its responsibilities) had elected to grow more by inducting relatively large numbers of young professionals into its staff--and less by the conventional recruitment of staff "with appropriate experience" (as recruitment advertisements in the newspapers usually put it). In 1970-71, for example, the NDDB recruited altogether twenty-three Graduate Apprentice Engineers. The next year, it recruited a further 16 Graduate Apprentices in animal husbandry, agriculture and related sciences. In 1973-74, it recruited a total of one hundred and fifty-three professionals. The evolution of the NDDB's structure is illustrated by the informal organisation charts which are shown on the next page.

Throughout 1970-75, the Indian Dairy Corporation had remained a compact organisation. By 1975, it had thirty-five officers and five Divisions: Finance & Accounts, Personnel and Administrative; Milk Production & Enhancement Programmes; Movement & Storage -- and the Project Division. It had Regional Offices at Bombay, Calcutta, Delhi and Madras.

In addition to being the Government of India's "finance and promotion house" for Operation Flood, in 1972, the Corporation had been designated by the Government as being the sole importer into India of skim milk powder. Henceforth, all imports of SMP were made by the Corporation, including any imports made on a commercial basis.

In early 1976, the Corporation was actively persuing its intention to set up a subsidiary to manufacture dairy machinery and equipment. It was also proposing to set up a unit for mass-manufacture of immunological and biological veterinary products, especially Foot & Mouth Vaccine. The Corporation continued, of course to promote, guide and monitor the implementation of the original O.F and the Fifth 5-Year Plan proposal included provisions for the second stage of O.F. which was to expand the scope of the project -- and, in particular, to complete the job of getting nucleus organisations into the ground in one hundred milkshed areas, to provide the basis whereby the National Milch Herd of higher-yielding animals would be produced in the 1980's.

NDDB: informal organisation chart, 1970-71

<u>Board - Chairman</u>	Executive Asstt. to Chairman
Designated Advisers & FAO Team Leader	Secretary
<u>Administration & Finance Division</u>	<u>Management & Manpower Development Division</u>
1 Deputy Secretary 1 Treasurer/Sr.Ac.Off. 1 Assistant Secretary 1 Project Executive 1 Asst. Ac. Off. 1 PR Off.	1 Director (MMD) 3 Snr. Project Exec. 3 Asst. Exec.
	<u>Engineering Division</u>
	1 Director (Technical) 3 Snr.Pjct.Engineer 1 Civil Engineer 5 Pjct. Engineer 5 Deputy Engineer 1 FAO Team Member (Design Engineering) 4 FAO Team Members (Erection Enginee- ring)

NDDB; informal organisation chart, 1974-75 (partial)

<u>Board - Chairman</u>					
<u>Admn. & Commercial Division</u>			<u>Chairman's office</u>		
Director (A&C) 9 Officers			Private secy. to Chmn. Asstt. Executive		
<u>Finance Division</u>		Vice-Chmn. XIX Int'n'l Dairy Congress --		Secretary	
Treasurer 11 Officers		FAO Team Leader --			
<u>Technical Division</u>	<u>Engineering Division</u>	<u>Audit Divn.</u>	<u>Management Services Divn.</u>	<u>Animal Husb Divn.</u>	<u>Fmr's Org'm Division</u>
1 Dep'y.Dir. 2 Officers	Director (Engg) 24 Officers 1 FAO TM (Des.Eng.)	Internal Auditor 3 Officers	Director (MS) 16 officers 1 FAO TM (Syst.An.)	Dep'y. Dir.(AH) 8 Off.	Dep'y. Dir.(FO) 38 Off.
<u>XIX Int'l Dairy Cong. Secretariat New Dairy Delhi</u>		<u>Regional Offices</u>		<u>Planning Cell</u>	
1 Pjct. Admn. 18 officers.		Bombay - 10 officers 1 FAO TM (Erec'n Eng)		Pjct. Execu- tive 9 officers	
		Calcutta - 12 Officers 1 FAO TM (Erec'n Eng.)		<u>Mansinh Inst. of Training, Mehsana</u>	
		Delhi - 23 Officers 1 FAO TM (Erec'n Eng)		Principal Vice-Principal	
		Madras - 14 Officers, 1 FAO TM (Erec'n Eng)		<u>Sperm Station & AI Centre, Ahm'd</u>	
				Project Exec. 2 officers <u>Bidaj Farm</u> Sr.Pjct.Exe 2 officers	

3.8: The National Milk Grid

The National Milk Grid was based on the concept of linking the major cities and their hinterland rural milksheds -- first, in a set of four Regional Grids -- and ultimately, in a National Grid. With medium-term storage facilities for conserved milk solids (SMP/Butter Oil/frozen cream/butter etc.) and long-distance transportation, the Grid was intended to help even out seasonal and regional imbalances between demand and supply.

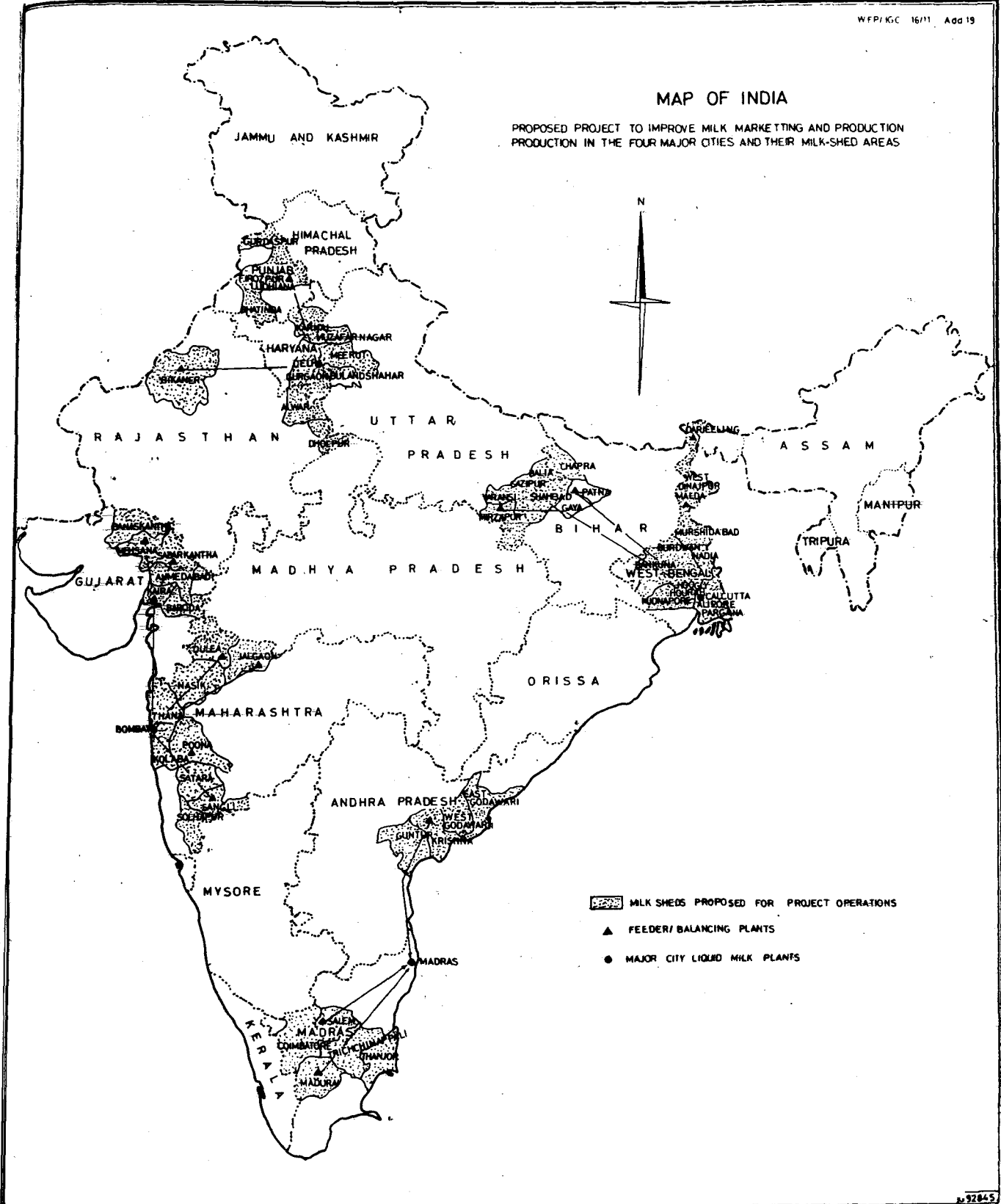
The balance between the increased capacities, envisaged under Operation Flood, of the major cities' dairies - and the new and expanded rural feeder-balancing dairy plants -- had been calculated when the project was first proposed (see the maps page no. 116 & 117). By early 1976, most of the physical plant and facilities envisaged for the Grid were well under way. However, the Project Authority had also been aware that the Grid would also require an extensive information system on such factors as milk production, milk marketing, dairy product-price mixes, stocks held etc. Ultimately, it was envisaged that information systems such as the Continuing Information System, which the NDDB was setting up, would feed into the Grid's information system, for example. The NDDB had also done considerable work, in consultation with the Anand Co-operative, on a model for a Regional Grid which it thought could ultimately provide the basis for a model of the National Milk Grid.

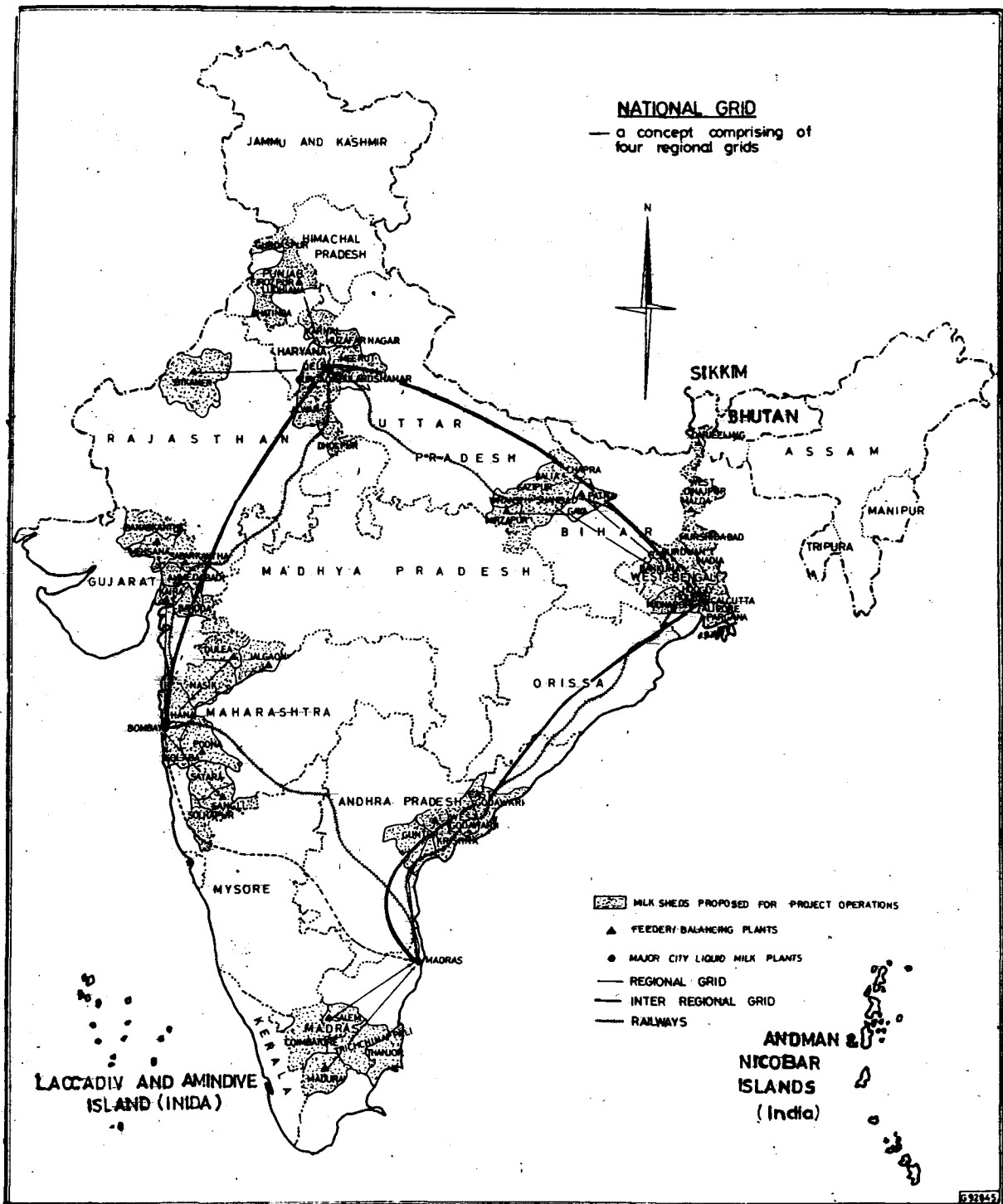
In early 1976, assisted by grant funds received from an overseas Foundation the NDDB had set up a team of Indian and internationally recruited experts, which had made a set of recommendations on how development of the model and the management information system for the Grid could be expedited. The computer systems group in the NDDB's Planning Division was drawing up a proposal on the basis of the consultant team's report, which it hoped the board would accept as the basis for a plan of action to develop both the model and the information system.

The physical movement and storage of milk solids envisaged under the Grid had, of course, started long ago when the Anand Co-operative started to ship liquid milk to Bombay. The balancing role of the rural dairy plants had been amply demonstrated in 1973-74, when the expanded capacities of the co-operative dairies, especially those in Gujarat, handled a sudden and large increase in the Region's rural milk marketings. More recently, the Indian Dairy Corporation's purchase of 5,500 tonnes of indigenously manufactured SMP demonstrated the system's potentiality for a dairy commodity "pool" which might or might not include imports in any given year.

MAP OF INDIA

PROPOSED PROJECT TO IMPROVE MILK MARKETTING AND PRODUCTION
PRODUCTION IN THE FOUR MAJOR CITIES AND THEIR MILK-SHED AREAS





A major topic for discussion of the Grid centred on how it would be "managed" - whether by a net-work of trading agreements between dairy plants (urban and rural) and the IDC or wholly or in part by some centralised body...Meanwhile, the State's dairies were erecting their own Grids and, by ordinary trading agreements, they were exchanging milk and milk products in informal net works which could be expected to become Regional Milk Grids.

Operation Flood 1970-75 - a study

Section 4: Decisions facing policy makers and executives in early 1976

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Section 4: Decisions facing policy-makers and executives in early 1976

4.1: The dairy situation in early 1976 and the perspective for Operation Flood

During the period 1970-75, the main improvement in the overall food situation in India had been the achievement of greater stability in the per capita availability of staple foods.

The Fifth Five-year Plan, had been drafted under the shadow of a decline in world trade and a steep rise in internationally traded petroleum products' prices, but it foresaw a significant increase in the country's rate of investment (see Exhibit 4.1.1, on next page). Launched on April 1st, 1974, the Plan was moved into high gear at its mid-point, 1976-77, when in the annual plan the Central Plan outlays provided for exceeded those for the previous year by 30%, while the outlays for agriculture, irrigation and allied services (including animal husbandry and dairying) rose by almost 50%.

The most important element in the diet had of course continued to be cereals. Changes in the cereal system had made a contribution to the stability of food supplies. The crop-year 1972-3, for example, was "bad-year (with adverse weather conditions) - yet cereal production fell by less than 6% below the level achieved in 1971-2, which had been a "good year" (see Exhibit 4.1.2 on page no. 12.2).The chief reasons underlying the improved stability of the cereal system appeared to be increased cropping intensity(made possible by investment in irrigation and soil conservation) and a steady increase in the adoption of high-yielding varieties, which were being cultivated on 30% of land devoted to cereals by 1974-75.

In fact, food production generally increased a little faster than population in the priod 1970-75. The main exceptions to this improving trend were pulses and milk, for which intensive production technologies were yet to be adopted on a large scale(see Exhibit 4.1.3 on page no.123).

Future development of the agriculture-food sector, however, was by no means being left to depend wholly on intensive production technologies. By 1975-76, in addition to propagation of high-yielding varieties and construction of large irrigation projects, the Plan laid equal stress on area-specific programmes (in dry-land farming techniques and drought-prone area development, for example) which could produce high marginal returns on relatively small per-hectare investments in areas considered to have a poor agricultural resource base.

Exhibit 4.1.1: Plan allocations and expenditures for agriculture and irrigation : 1970/71 - 1975/76

	5th FYP 1969/70- 1973/74	5th FYP		
		1974/75- 1978/79 Draft	1974/75	1975/76
Total Plan allocations:				
In Rs. crores*	15,902.00	37,250.00	4,844.00	5,978.00
At constant prices, % of 1st FYP	265.01	393.10 ^{1/}	-	-
Total Plan expenditures				
In Rs. crores	15,779.00	n.a.	-	-
At constant prices, % of 1st FYP	254.18	-	-	-
Agriculture and Irrigation:				
Allocations:				
In Rs. crores	3,682.00	7,131.00	1,024.00 ^{2/}	1,159.00 ^{2/}
At constant prices, % of 1 FYP	156.90	239.38 ^{1/}	-	-
Expenditures:				
In Rs. crores	3,490.00	-	-	-
At constant prices, % of 1st FYP	148.73	-	-	-
Dairying and Animal Husbandry:				
Allocations:				
In Rs. crores	233.00	522.00	-	-
At constant prices, % of 1st FYP	33.33	590.81 ^{1/}	-	-
Expenditures:				
In Rs. crores	166.00	-	55.00	74.00
At constant prices, % of 1 FYP	332.31	-	-	-

* One crore = 10 million

Sources: 1. Economic Survey 1975-76, Government of India
2. Draft Fifth Five Year Plan 1974-79, Planning Commission, Government of India, January, 1974.

^{1/} Allocations deflated on the basis of All India Consumer Price Index, 1949=100 Records & Statistics, Vol. 26, No.4, August, 1975, the beginning of the Plan 1974-75.

^{2/} Includes also allocation for flood control.

^{3/} Anticipated expenditure.

Exhibit 4.1.2 : Cropping patterns, yields and irrigation : 1971-72 to 1974-75

	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>
Cereals: Area in lakhs* of hectares	1,004	983	1,032	990
average production: kgs./hect.	936	886	909	915
Pulses: area	222	209	229	226
average	501	474	426	459
Vegetable, fruits & nuts : area	370	360	38	n.a.
Five major oilseeds: area	166	147	150	156
average	546	465	575	537
Sugar cane: area	23	24	27	28
est. extraction: kg/hect.	4,864	5,206	5,159	5,165
Cotton & Jute: area	86	84	84	159
Total cropped area, in lakhs of hectares	1,640	1,573	1,662	n.a.
Area sown more than once, in lakhs of hectares **	246	246	267	282

* 10 lakhs = one million

** Estimated on the basis of additional area brought under large medium & small irrigation projects, Economic Survey - 1976.

Sources: Indian Agriculture in brief, April 1975, Ministry of Agriculture & Irrigation page. 68, 32, Records & Statistics - Vol. 27 No.2, Feb. '76.

Indian Pocket book of Economic Information, 1973 & 74, October '75
Government of India.

Exhibit 4.1.3: Population and per capita availabilities of major foods: 1971-72 to 1974-75

Availability in grammes per capita daily	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>
Cereals	420	383	412	374
Pulses	47	41	42	
Vegetables & fruits	n.a.	n.a.	118	n.a.
Sugar, gur and like products	49	51	56	n.a.
Vegetable oil, unprocessed	8	7	9	9
Vegetable oil, hydrogenated	3	3	2	2
Meat, fish & eggs	14	15	15	n.a.
Milk & milk products, milk eqvt.	110	n.a.	108	n.a.
population, in crores*	56.2	57.4	58.6	59.8

* One crore = 10 million

Source: Indian Agriculture 8th brief, Fourteenth Edition, April '75 Ministry of Agriculture & Irrigation.

Economic Survey - 1975-76, Government of India.

In fact, by 1975-6, despite the increasing international popularity of dooms-day prophecy, India was planning at least to achieve adequacy in food and fibre production. The feasibility of such planning can be demonstrated on the basis of a ten-year perspective. Allowing for the population to rise to some (75 crores) by 1975- and assuming a reasonable continuum in relative preference for cereals, pulses, milk etc. plus increased consumption of protective foods, as incomes rise - in order to achieve adequacy by 1985, total food production should increase by some 50% over the production levels of the mid-1970's. One way to examine the feasibility of such a target in more detail is to assume that India's agricultural production technology will tend to advance uniformly toward yield-levels already achieved in countries which have been modernising their agricultural sectors for longer. For example, it can be calculated that, if India closes 25% of the gap which existed in the early 1970's, between Indian and American yields, then adequate production would be achieved, assuming a continuation of current trends in irrigation (allowing cropping intensity to increase from 1.2 to 1.4) and continued addition of 40,000 units yearly to the country's stock of tractors (see Exhibit 4.1.4 on page no.125)

Of course, this is a rather mechanical exercise-but it does illustrate how the evolution of agricultural production technologies can interact with increases in incomes. These interactions work their way through to new land-use patterns, which provide adequate diets in accord with dietary preferences. The "average" increases in yield involved are, of course, expected to be achieved by applications of area specific production technologies. For example, an average increase in production of cereals from 0.9 tonnes/hectare to 1.2 tonnes/hectare might result from intensive production of high-yielding varieties on 40% of cereal-cropped land - producing, say, 2.25 tonnes per hectare -- with half the remaining land producing 0.6 t./hect.(by application of a small investment per hectare in semi-arid areas), while the remaining cereal-cropped land may produce only 0.4 t./hect. by the application of minimal inputs to land of low productivity.

The "layering" of technological advance is inevitable in such an ecologically diverse country as India. It implies that as one moves from ecologies of low productivity, so also would one find more people per hectare working on the land and a larger proportion of their production being "exported" from the area, mainly to feed the urban population. Indeed, this is what is expected to happen with regard to India's milk production. The dairy perspective for 1985 envisages the build-up of a National Milch Herd consisting of some 2.6 crore (26 million) cross-bred cows and up-graded buffaloes. These high-yielding animals (30% of the country's total milch stock) are expected to produce almost 60% of the country's milk - and they will mainly be located in one hundred milkshed areas, concentrated in one-third of the country's districts, where intensive systems of artificial insemination and fodder production (as well as milk procurement

Exhibit : 4.1.4:

Consumption, production and land use:
a pattern for adequacy in 1985

	Per capita, daily grammes			Production:		Required:	
	Produced 1973-74	Required vegeta- rians	1975 non- vegeta- rians	achieved 1973-74 Hectares, millions	kg./ hect.	1985 Hecta- res millions*	kg./ hect.
Cereals	438	370	370	103.24	909	75.2	1500
Pulses	45	69	55	22.88	426	26.2	730
G. nut	27	10	10	6.90	840	2.6	1170
Vegetables	75	232	232	2.30	6980	7.3	9340
Fruits, nuts, etc.	43	37	37	1.50	6133	1.5	7304
Milk (M.tonnes per year)	108	241	154	-	-	-	-
Fodder storage	-	-	-	6.70	-	-	-
Fats & oil	11	35	39	8.19	120	29.4	152
Meat, fish and eggs	12	-	50	-	-	-	-
Sugar etc.	66	40	40	2.72	5150	2.0	5805
						<u>144.2</u>	

One million = Ten lakhs.

Notes: It has been assumed that the intensity of cropping would increase from 120% in 1975 to 140% by 1985. Thus, total cropped area in 1985 is estimated to be 20 crore (200 million) hectares. Allowance has been made for fibres (2.8 crore hectares), cultivated fodder (8 crore hectares) and miscellaneous crops (2 crore hectares).

and processing) can be efficiently organised. Rural milk processing is projected at some 60 lakh (6 million) tonnes annually by 1985.

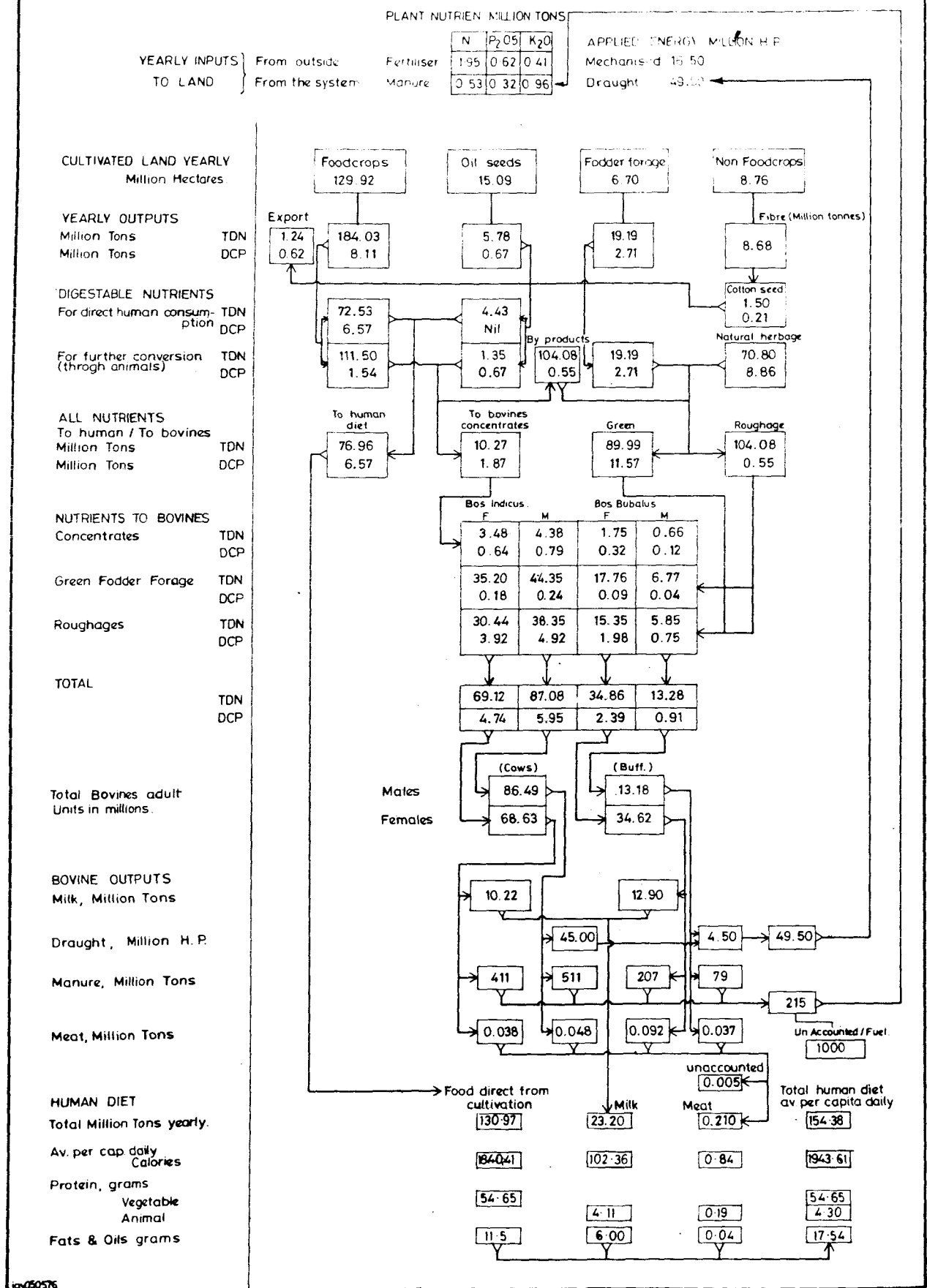
Such a modernisation of India's milk system would not necessarily be the same as the modernisation of, say, American milk production. India's milk production will for a long time stem from the country's availability of rural labour and natural herbage inedible to man. By adding to these inputs some relatively small amounts of cultivated fodder and forage, plus compounded concentrates -- and by applying these inputs to milch animals which are more efficient convertors than India's present, mainly non-descript herd--very significant increases in milk production can be obtained in a way which enhances the complementarities of the entire mixed farming system, vis a vis straw utilisation, leguminous fodder, nitrogen fixation, manurial practices etc.(see Exhibits on page nos. 127 & 128) illustrates how the conversion efficiencies and complementarities which are involved fit into the mixed - farming system - and the gains to be obtained by improved conversion efficiency.

By early 1976, the 18 new Anand Pattern dairy plants under Operation Flood were almost completed. The new and expanded rural dairy processing capacities created by the project were to handle up to 900,000 tonnes of milk annually, with an estimated coverage of some 2 million milch animals. Other rural dairy plants in related milksheds had an estimated capacity of 3 - 400,000 tonnes of milk yearly. These comprised the nuclei of the "100 milkshed complexes" which the dairy perspective envisaged by 1985. This perspective postulated not only coverage of some 260 lakh (26 million) milch animals, but also related processing of 42.8 lakh (4.28 million) tonnes annually of the milk produced by these animals, by 1978/9 (the end of the Fifth 5-Year Plan.

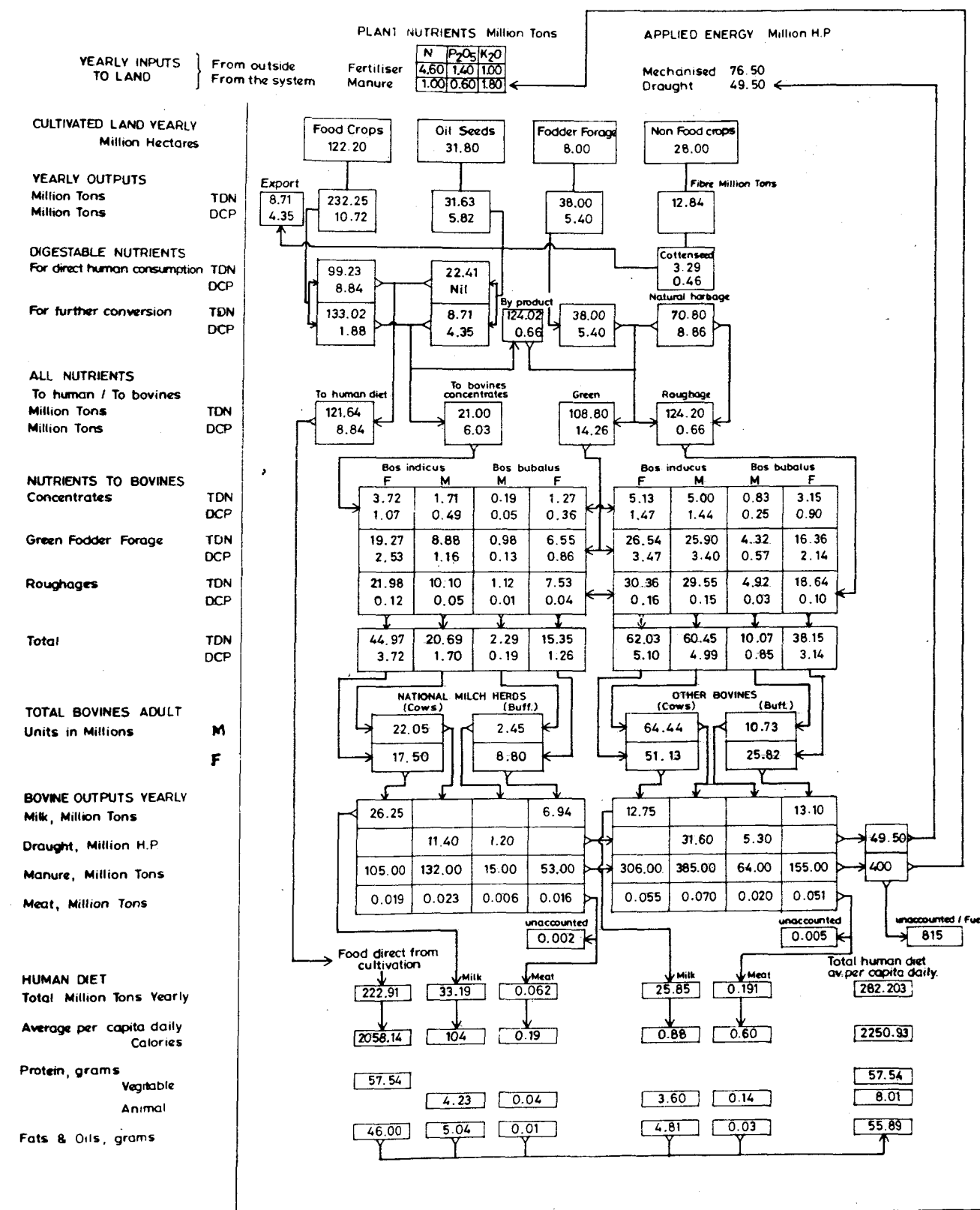
Total rural processing capacities were projected as almost doubling by the end of the Fifth Plan period. The World Bank had agreed with the Government of India to help finance Anand Pattern dairies in at least three States -- and it was expected that this investment would double by 1978/9. It was widely agreed that these targets (especially the target for milch animal coverage) could assure the achievement of adequacy in India's milk production by 1985. If this was the case, the 1978/9 target for milch-animal coverage could be scaled down accordingly.

Another school of thought existed with regard to targets for milch animal coverage. With some variations in detail, the argument ran thus (1) Whether our modern breeding systems are to produce 150-200 lakh (15-20 million), or 260 lakh (26 million) improved milch animals, by 1985, depends on the extent to which their production and productivity is increased - and on growth in effective demand, both of which are difficult to predict. (2) In any case, the modern dairy production system will certainly need some one-hundred rural nuclei; by 1985 (e.g. Anand Pattern Co-

ESTIMATED CONVERSION EFFICIENCIES & THEIR EFFECT ON THE HUMAN DIET : 1975



ESTIMATED CONVERSION EFFICIENCIES & THEIR EFFECT ON THE HUMAN DIET : 1985



operatives with integrated facilities for modernised milk production, processing and marketing) and these can be expected to cover all or a part of 100-150 dist. (out of the total of some 350 Districts in the entire country). (3) Exactly how many animals are covered at each of these nuclei - and the extent to which their production and - productivity are increased - depends on the success of the breeding programmes, on the adoption of improved milk production programmes by the farmers and on the state of demand. (4) At this stage, therefore, the most important target is the establishment of efficient nuclei, which can reach out to the milk producers in the target 100-150 Districts; if these nuclei are successful, milk production will rise to meet effective demand by 1985.

Such considerations, were, of course, the substance of national-level dairy planning. Most dairy policy-and decision makers, however, were inevitably concerned mainly with more immediate matters. The remainder of this text presents case studies of four situations which provide examples of the kinds of policy-making questions which faced most of those involved in India's dairy development, at various levels, in early 1976.

Case study

4.2: Butter, baby-food and Bal-Amul

By early 1976, the Kaira District Co-operative Milk Producers' Union had grown to be a Union of 830 village milk producers' co-operatives, with total annual sales of some Rs.45 crores (Rs.450 million). The village milk co-operatives covered all but a few of the most remote villages in the Union's statutory area of operations, Kaira District, and had a membership of 233,000 milk producers.

Though their village societies' membership in the Union, the members "owned" the Union's large dairy processing plant (popularly known as "Amul Dairy"), as well as the Union's other facilities. The Union had succeeded, in all but two-years, in paying a competitive price for members' milk, including a year-end subsidiary payment of some 2%, but the Union's professional management had for some time been advising members that milk prices would not in future rise ahead of other prices.

The Union's membership and milk procurement had grown significantly during 1965-75. By early 1976, daily milk procurement could be expected to vary between 300,000 and 500,000 litres daily in the lean and flush seasons; but, in any one year, the volume and pattern of milk procurement was unpredictable. Thus, although annual milk procurement had risen by slightly more than 40%, if one compared the 1965-70 average procurement with the 1970-75 average procurement, it was also true that year-on-year increases had been punctuated by one-year decreases of 10-25% - and, in any one year, daily procurement at the "trough" of the lean season was often only 50% of procurement at the peak of the flush season.

The Kaira Union was, of course, the precursor of the "Anand Pattern" of milk producers' co-operative unions. Throughout the 1950's and 1960's, it had helped other such milk unions to establish themselves in Gujarat State. In 1973, the State's six leading milk unions had formed the Gujarat Co-operative Milk Marketing Federation and the Federation had thereafter been responsible for marketing all six member which had been handed over to the Federation, when it was formed. by the Kaira Union and the Mehsana Union (another member of the Federation)

The Federation's Board of Directors consisted of the elected Chairman of the six member-unions plus one technical member and the State Registrar of Co-operatives. At their first meeting, the Directors had appointed as Chairman and Managing Director Dr. V.Kurien (General Manager of the Kaira Union and technical member of the Federation's Board), who had then resigned as General Manager of the Kaira Union, to be succeeded by Shri H.M.Dalaya, previously Joint General Manager. Both Dr. Kurien and Shri Dalaya had been with the Kaira Union since 1950.

By early 1976, the Federation's total sales were running at an annual level of some Rs. 80 crores (Rs. 800 million). Its policies were set by the Board of Directors, of course. Operating decisions on the implementation of policy were made by the Federation's Programming Committee at its monthly meetings. This committee consisted of the General Managers of the Federation's six member-unions; its Chairman was the Federation's Managing Director, although most of its meetings were in practice chaired for most of the time by Shri Dalaya.

In addition to being a dairy technologist of international repute, Shri Dalaya was highly regarded as a professional manager. In addition to managing India's largest dairy plant, during 1975, he had in effect guided the work done at the National Dairy Development Board on a computerised management information system for a Regional Milk Grid. This work included the development of sub-programmes for Grid-wide optimal product-price mixes, optimising inter-dairy transfer prices, as well as medium - and long-term investment planning. Although completion of this system-work was expected to take three years, Shri Dalaya considered that it was already turning up some interesting decision-alternatives - it was never, of course, expected to substitute for management's decision-making.

In the 1950's, the Kaira Union had pioneered in establishing a nation-wide system for marketing, under refrigeration pasteurised fresh-cream butter. Amul Butter had very quickly replaced imports of butter, which had previously run at some 4,000 tonnes yearly. By 1976, the total market for butter was believed to be some 20-25,000 tonnes yearly.

The Kaira Union procured raw milk with 7-7.5% fat content. The Union had started to market skim milk powder ("SMP") and table butter in 1956: SMP was made by separating the solids-not-fat milk and drying them, while butter was made from the resultant joint-product, separated cream. In 1960, the Union had significantly expanded its butter-making capacity, while also launching Amul Baby Food. For baby-food manufacture, the fat-content of milk was first reduced to about 3% by separation- and the resultant joint-product was (as with SMP manufacture) separated cream, which was mostly turned into table butter. Thus, from the Co-op's point of view, baby-food and butter were complementary products. Both had been launched under the brand-name "Amul" and this brand-name had won very strong consumer acceptance: so strong, in fact, that when the Federation had its member-union, the Mehsana Union, had tried to establish a competitive "sour cream" table butter, under the brand-name "Sagar," even in cities where it was promoted heavily, sales of "Sagar Butter" had not exceeded 15% of "Amul Butter" sales; and the Amul brand-name was at least equally powerful in the baby-food market, where it accounted for 70-80% of sales, the remainder being shared by multi-national brands (Glaxo, Nestle etc.) who had dominated the Indian baby-food market in the early 1950's.

The Kaira Union's other infant food-product was a formulated weaning food, "Bal-Amul" ("Bal"= "infant," in Hindi). Its launch had marked a significant extension of the Amul line. It was a weaning food, containing cereals and pulses, in addition to milk solids, sugar, added vitamins etc. It had a high protein content. It could be bottle-feed only when mixed 50:50 with milk food for babies, but it could be fed as a gruel when mixed with milk or water - or it could be added other foods. The multi-nationals already had cereal-based weaning products which were well established in the market, when Bal-Amul had been launched. But the market for formulated weaning foods in India had not developed consistently with the infant milk-food market. Most mothers breast-fed an infant for the first 1-2 years and gradually introduced adult foods into the infant's diet, at regular, family meal times, during the second and third years, starting with soft - foods, such as boiled rice. Consumer-packed infant milk-foods, such as Amul's, especially among mothers who had a working commitment which prevented them from breast-feeding for more than, say, 3-6 months and, of course, among mothers whose milk was deemed inadequate for their baby's needs.

However, the number of mothers feeding a formulated weaning food was believed to equal not more than 10% of those who fed an infant milk-food - and, even among the relatively few who did feed formulated weaning foods, it seemed that the multi-national's products had a strong, long-established consumer acceptance. At Rs.6.66 per kg.tin, Bal Amul cost some 10% less than the multi-national's products and it had almost twice the effective protein-content. In fact, of course, it was also better for infants, nutritionally, than almost all the adult foods on which mothers traditionally weaned their infants.

Nevertheless, Bal-Amul had not "caught on" in the market as much as had been hoped, despite intensive promotion. Even the inclusion, in each tin of Amul milk-food for babies, of a leaflet which explained the superiority of Bal-Amul as a weaning food - emphasising the ease with which it could be used while an infant was shifting from milk to a solid diet - had not had any noticeable impact on sales. Most mothers who did feed Bal-Amul appeared to feed only 15-30 grammes daily, about half the quantities recommended for infants in each age group. The only times when Bal-Amul sales had risen significantly, in several regions of India, had been times when, for one reason or another, there had been a temporary shortage of Amul Baby Food. Each time such a shortage had ended, Bal Amul's sales had fallen back to more-or-less their previous levels.

This had particularly disappointed: the Kaira Union's management. They had received assistance from the Government of India (and from international bodies) in putting the product on to the market. They were convinced that it was a good-value product - and extremely good for infants at the weaning stage. Moreover, when equipping the Union's new, composite processing plant at Mogar (five miles from Anand) they had included equipment which could have been used to expand Bal-Amul's volume greatly. This

capacity was not being wasted, because the plant (which was extremely versatile) had for some time worked at double-shift capacity to produce structured, extruded weaning foods for Government-assisted supplementary feeding programmes which were being conducted all over the country. These structured weaning foods were quite easily transported in bulk and were readily accepted by infants. They enabled a malnourished infant's diet to be supplemented to a level of adequacy at a cost of only 11-13 paise daily.

Thus, this part of the composite factory could be said to be fulfilling its social purpose (supplementary weaning foods were priced at "no-profit, no-loss" levels), but not its original objectives, which had been to market a reasonably priced, high-protein weaning food on a commercially viable basis. In any case, the Mogar plant's line as a whole had been designed to ensure that lower-volume products like Bal-Amul were "balanced" against a product-line with a higher volume-potential, such as Amul Chocolate, which had been successfully launched in 1974. So Bal-Amul's limited success had no significant effect on the Kaira Union's overall ability to pay a good price to the producers for their milk.

Reviewing the situation in a discussion with the case-writer, Shri Dalaya said: "I sometimes wonder if creamier LMC products ("Lactogen-milk-cereal products," with, say, 50% milk-solids content) will not become our real 'baby foods' in the future, while weaning foods will be structured products: something to chew on, like 'rusks' in the West. In any case, the whole situation has changed since we launched Amul Baby Food and Amul Butter. Both are premium products. Although we have been able to lower our prices over the last year, baby food is still Rs.9.25 per 1/2-kg tin; butter is Rs. 10.30 per 1/2-kg tin. It was all right when we were alone in the market. But the new Operation Flood feeder-balancing dairies will be capable of making 10-15000 tonnes of butter yearly, as well as perhaps 25,000 tonnes of milk powder, all of which could in theory be used to make baby food. Of course, a lot of liquid milk by urban dairies, to maintain their lean-season throughputs - in fact, the Bombay dairies have understood this: during the last two years' lean seasons, they recombined 500-750 tonnes, I believe, of cream and butter which they had separated and frozen in the flush season. This approach should spread, especially as liquid milk is now as profitable as processed milk products in Bombay. Indeed, we may well consider equipping ourselves to make "plastic cream," a product which can be cold-stored and recombined into liquid milk very effectively ...But then again, the new feeder-balancing dairies may try initially to act a higher margin by marketing "premium products" like table butter (and I hope they won't end up having to sell them at distress prices) - but such products are minority products. Although the bread-and-butter habit is spreading, especially in the larger, more cosmopolitan cities - and even though we keep finding that the market can absorb extraordinary increases in the supply of Amul Butter - nevertheless, ghee is the majority milk-fat product. The Amul

line neglected the ghee market, because we had to concentrate on maintaining supplies of Amul Butter when our own procurement was for less stable than the Federation's is now - but the Mehsana Union developed a wonderful franchise for its "Sagar Ghee" and I believe that we can and should henceforth pay equal attention to maintaining stable supplies to the market of branded, consumer-packed ghee. We also find that we can sell large quantities of ghee wholesale, to traditional ghee traders, at a remunerative price....."

Before returning to discuss this text further with Shri Dalaya, the case-writer studied the results of a survey which the NDDB had conducted during February and March 1976, of the milk market in Baroda, a city of some 550,000 population, 25 miles from Anand, in which the total consumption of infant milk foods was believed to be some 40-50 tonnes yearly. Some estimates based on the survey are reproduced on the preceding page.*

*See "The Baroda Dairy Project".

Case study

4.3: The Baroda Dairy Project

The Baroda District Co-operative Milk Producers' Union (formed in the 1960's) was a Union of village co-operative societies, based on the Anand Pattern, with Baroda District as its area of operations. Its headquarters and dairy plant were in Baroda, a city (25 miles from Anand) which had grown to have a population of some 550,000 in the 1970's. The main product of the Union's dairy plant was bottled milk, which it retailed to the urban population of the city.

When its dairy had been built (with a capacity of some 50,000 litres daily), the Union initially had difficulty in building up its milk procurement. The traditional milk traders had a strong grip on milk marketing in the villages of Baroda District - and, in the City, there was a tradition of diluting milk, which enabled the traders to appear to offer milk at prices lower than the Baroda Dairy's.

As a result, in the first six months of the Dairy's operations, the Union could procure only 12,000 litres of milk daily. The Anand Co-operative then agreed to supply the Baroda Union with 25,000 litres of milk daily by road-tankers at a fair price. The Baroda Dairy then bottled and marketed it enhanced supply of milk in the city - and within a year, its daily milk procurement had risen to 40,000 litres. In subsequent years, it sometimes sold milk to the Anand Co-operative in the cool flush season and bought milk from the Anand Co-operative in the summer lean season. This early experience of capturing a commanding share of an urban market, initially by pumping improved supplies of milk into the city, had contributed significantly to the market strategies used in the design of Operation Flood.

In 1969, the NDDB had made a study of the Baroda urban market at the request of the Baroda Union. For a number of reasons, the study's findings had not been formally presented until early 1976. However, the main findings had been that the Union was in a position to evolve a product-price mix which would enable it to capture the majority-share of the city's milk market - and that it could enhance the earnings of its milk-producer members by marketing milk products, snack products etc. through retail franchisers with chilled/refrigerated cabinets.

Subsequently, the NDDB had evolved a product containing 40% milk solids and 60% vegetable solids. It was a white fluid, especially formulated so that - although it did not taste like milk if taken alone - it could be the basis of a very good cup of tea, if the tea were made by the method popular in Gujarat State (which consisted of boiling the ingredients together in a certain sequence). The product was almost as nutritious as cow milk and could be retailed at about two-thirds of the price of cow milk. The NDDB believed that the product could be of great service to poor urban consumers, who could afford to buy very

little milk - and who used most of it in their morning tea. It would give these consumers "better nutritional value for each milk-Rupee they spent." The NDDB had therefore obtained assistance from the Government of India (and, through the Government, from other agencies) in setting up the equipment required to produce 20,000 litres daily of the new product in Baroda Dairy - and also in setting up a Product and Process Development Workshop, in the NDDB's headquarters at Anand, which would enable the NDDB to expand the scope and amount of its work on developing new products and processes.

By early 1976, the equipment required in the Baroda Dairy and in the Product & Process Development Workshop was almost completely installed. The NDDB now wished to launch the product as soon as possible: there would be an advantage in having it in the market by the onset of the lean season in June (although in 1975, there had been an unusual altitude of milk throughout the traditional "lean season")... In the larger context of Operation Flood, the NDDB was also keen that its personnel should get as much experience as possible in the practical tasks involved in capturing a commanding share of an urban milk market; the new, large dairies - built as a part of Operation Flood in Bombay, Calcutta, Delhi and Madras - would be increasing their throughputs of milk during 1976. They might well be requiring the NDDB to provide manpower development programmes for their marketing managers - and the NDDB wished to be able to base such programmes on practical experience, which could most readily be gained in Baroda.

In early 1976, the NDDB's Marketing Group re-surveyed Baroda City. They also consulted with a marketing expert who had visited Anand at the time.

The main decisions reached at the time were: (1) There would first be a campaign to boost the Dairy's already well established image - by painting its retail booths and trucks, for example. (2) A line of products would be launched under a common brand-name ("Suddha") had been adopted, as a "dummy brand-name," and it is used also in this text). (3) The first products to be launched would be one prestigious traditional milk-sweet product, "Shrikhand," and the NDDB's new, "tea-maker" product - which, it was decided, would be described as a "tea enricher." (4) The NDDB would stick to its original decision not to promote the product as a milk substitute and not to conceal the fact that it had a vegetable base. (5) Both products would be promoted under the Suddha brand-name: The Shrikhand, through franchised retailers with chilled cabinets, and the Tea Enricher, through franchised vendors on bicycles equipped with distinctively painted 20-litre containers, from which each vendor would dispense the product at the consumer's door.

When they had re-surveyed the City, however, the NDDB's marketing group found that several aspects of the market had changed significantly during 1970-75. In particular, the Dairy had captured 70-75% of the city's market for liquid milk (estimated

The market for milk and milk products
in Baroda City

	Income groups				
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>All</u>
Household income, Rs. monthly	< 250	251-500	501-750	< 750	
% of households	20	40	20	20	100
Monthly purchases per household:					
Ghee:					
% of group buying, rounded	27	48	68	88	55
Ave.Q.per hoho buying, kg.	0.85	1.22	1.51	2.34	1.5
Av. price pd per kg., Rs.	23.53	21.62	20.28	20.47	20.90
Total value, Rs.1000's	98	575	402	766	1841
Butter:					
% of group buying, rounded	1	2	7	9	4
Ave.Q.per hoho buying, kg.	0.10	0.25	0.34	0.84	0.5
Ave.price pd per kg., Rs.	20.00	18.06	15.06	19.60	19.45
Total value, Rs.1000's	*	4	7	27	38
Cheese:					
% of group buying, rounded	0	**	0	2	1
Ave.Q.per hoho buying, kg.	0	0.25	1.07	1.55	1.20
Ave.price pd per kg., Rs.	0	24.00	0	18.80	19.10
Total value, Rs.1000's	0	1	0	16	17
Milk Powder:					
% of group buying, rounded	0	**	3	0	1
Ave.Q.per hoho buying, kg.	0	0.50	1.17	0	1.00
Ave. price pd per kg., Rs.	0	18.80	21.71	0	21.35
Total value, Rs.100's	0	2	15	0	17
Dahi (curd):					
% of group buying, rounded	36	35	47	38	38
Ave.Q.per hoho buying, kg.	1.43	1.44	2.65	3.19	2.04
Ave.price pd per kg., Rs.	2.30	2.30	2.60	2.60	2.45
Total value, Rs.1000's	22	53	62	57	194
Liquid Milk:					
% of group buying, rounded	88	99	97	100	97
Ave.Q.per hoho buying, kg.	0.63	1.02	1.35	2.03	1.2
Ave.price pd per kg., Rs.	1.92	1.92	1.99	2.03	1.97
Total value, Rs.1000's	581	2641	1501	2250	6973
All milk: products					
Total value, Rs.1000's	701	3276	1987	3116	9080

* Less than Rs.500

**Less than 0.5%

as consisting of 101,000 households which consumed some 110-120,000 litres of milk daily). Moreover, its penetration of the poorest market segment (18% of households, each earning less than Rs. 250 monthly) was some 70% - and all but about one-eighth of these poor households bought some milk daily (on average, two-thirds of a litre, although four out of ten of these households' daily purchases were of less than half a litre). Altogether, this segment of the market consisted of an estimated 18,200 households and it purchased 10,000 litres of milk daily, two-thirds of which was used in tea. Most of this milk was purchased at Rs. 1.90 per litre (for 3% fat milk from the Dairy) or at prices usually ranging from Rs. 1.50-2.00 in the very poor areas.

The NDDB's market survey had been designed to examine the Baroda market for liquid milk and milk products (Shrikhand and Tea Enricher, in particular) - and also to identify market slots for future additions to the Suddha line of products. It indicated that, for every Rupee spent on liquid milk, people spent another 25 np. on milk products: mainly ghee, but also butter, ready-made curd etc. The total city market for tea taken outside the home and for snacks taken outside the home, excluding tea, were each estimated at some Rs.900,000 monthly - which meant that each of these two markets was equal, in value, to some 10% of the city's market for milk and milk products. Tea taken outside the home accounted for an estimated 4% of the city's liquid milk consumption.

The NDDB decided to aim at an initial sales target of 5,000 litres of Tea Enricher daily, to be sold to low-income households (including some, it was hoped, which did not at present buy milk regularly. By very tight cost control, they decided that it could be retailed at Re. 1.00 per litre while covering all direct costs, including promotion.

The market for Shrikhand was estimated at 1500 kg. daily. It was sold loose, at prices ranging from Rs. 6.50 to Rs. 10 per kg; the modal price was Rs. 7.50 per kg. Some 70-80% of usage was believed to be on ceremonial occasions, such as weddings. The NDDB had conducted product tests with Shrikhand formulations of its own, testing each against the best-selling Shrikhand in Baroda, and found that the market was split fairly equally between white and yellow-coloured Shrikhands. House-made Shrikhands were usually white. The NDDB's final formulation (a creamy, white product) won a small advantage, in the final taste test, over the city's best-selling Shrikhand. It was decided to price the product at the high-end of the market - at Rs.9.10 per kg., according to the size of the pack.

The NDDB's 1976 survey had indicated that the Baroda Dairy's products and services had won a high degree of acceptance among most consumers. It was true that a significant proportion of respondents had characterised the Dairy's milk as "expensive" - but this could be said to be inevitable, because the city's traditional milk traders appeared to hold their share of the

market only by keeping their prices, on average, 15-25 p. per litre below the Dairy's price. Out of twenty-seven samples taken of traditional traders' milk, sold in poorer parts of the city, eighteen were significantly diluted - and actually cost more, per grams of milk solids, than the Dairy's milk.

In early 1976, all those concerned (including the advertising agency contracted to handle advertising, PR, etc. for the Suddha line in Baroda) were discussing a number of issues, including especially the following: (1) One reason for launching Suddha Shrikhand and the Tea Enricher simultaneously had been to give the brand-name an up-market image and to avoid making the Tea Enricher look like a "poverty product" - but there were fears that this policy might make the promotion appear "schizoid"; the advertising agency had raised the question of whether the Tea Enricher would demote the Shrikhand in consumers' minds. (2) Traditional traders almost always delivered milk loose (i.e. unpackaged/dipped out of a 10-20 litre container into the consumers' own vessel), while the Dairy's bottled milk was sold from the Dairy's own booths - and, ultimately, it was decided that the Tea Enricher should be sold from booths set up in the poorer areas of the city; but the booths were to be distinctive, brightly painted "Suddha" booths. (3) There was considerable discussion, however, as to whether it would not be more effective to start by selling only ready-made tea (made with Tea Enricher, of course) at the Suddha booths -- and to launch the Tea Enricher, as such, only after Suddha Tea had won local acceptance. (4) In any case, it was strongly felt that the main emphasis in PR and press advertising, at the time of the launch, should be on Suddha Shrikhand, while launch promotion of Suddha Tea (or Suddha Tea Enricher) should be quite low-key and confined to the localities in which Suddha booths were to be set up. (5) The opposite school of thought believed that Suddha Shrikhand would succeed with conventional, professional launch advertising - but that the launching the Suddha Tea Enricher called for extra-ordinary promotional effort; one such idea was to "recruit" the leading film heroine of Gujarat (whose latest film had played to packed houses in Baroda for months - and was expected still to be playing at the time of the launch) - and to ask her to visit the Suddha booths on launch day, so that she could be filmed enjoying Suddha Tea; but this idea had ultimately been rejected as impractical -- many of those concerned feared that the crowds would be uncontrollable.

The NDDB's Product & Process Development Workshop and the Marketing Group calculated that a cup of Suddha Tea could be retailed, without making a loss, from the Suddha booths at 20 p. per cup - whereas traditional tea-vendors' tea sold at 30-35 p. per cup. Cup for cup, Suddha Tea would, they believed, be competitive in quality and quantity with the traditional tea vendors' tea.

4.4: Case study

Helping the milk producers to establish Anand Pattern Co-operatives

In the Farmers Organisation & Animal Husbandry Division of the National Dairy Development Board ("NDDB") one Senior Executive ("SE") was directly responsible for the NDDB's headquarters liaison with 3-4 of NDDB's Spearhead Teams working in the milksheds - and each such SE reported directly to the Director of his Division regarding any problems he observed in the functioning of his Spearhead Teams. The Division as a whole was responsible for all of NDDB's work on animal husbandry and Anand Pattern milk producers' co-operatives. It was therefore the main implementing agency used by the Indian Dairy Corporation ("IDC") in getting Anand Pattern milk co-operatives established under Operation Flood. The NDDB as a whole had a close working relationships with the IDC -- and the FO&AH Division kept the IDC informed about the progress of all its Spearhead Teams.

The NDDB usually had 6-8 Spearhead Teams working in the field. A Spearhead Team included 4-6 Veterinary Doctors and 4-6 Extension Officers specialising in animal husbandry, artificial insemination, green-fodder production, village co-operative organisation, milk collection, milk testing and co-operative accounting; all Team Members worked under a designated Team Leader.

The SE was reviewing the situation of the NDDB Spearhead Team in Sirin District. Sirin was a selected milkshed in one of the States participating in Operation Flood. The state had established its own State Dairy Development Corporation ("DDC") some time earlier, which had Divisions for managing the DDC's dairies, for managing its milk procurement organisation - and for managing its work on distributing technical inputs to help producers increase their milk production.

In early 1973, the DDC had requested NDDB to provide a Spearhead Team to help organise a new Anand Pattern milk Co-op' in Sirin District. It was to be one of the 18 new "Anands" which were being created under Operation Flood and the NDDB was anxious to get all 18 started as soon as possible.

The NDDB invited the officers of the DDC, in its Milk Procurement and Technical Input Divisions, to visit the NDDB's headquarters office. Then the NDDB's officers explained how they usually tackled the task of helping to establish a new Anand. First, the State's bye-laws for village milk co-op's - and for the Unions of village milk co-op's - had to be examined; if necessary, they were amended to conform to the Anand Pattern. It was, for example, essential that all members of village milk co-operative should be milk producers, should sell to the co-op only milk which they themselves produced - and should sell milk to the co-op' on at least 180 days of the

year. There were many such details which got looked after by paying careful attention to the bye-laws...The NDDB explained how, each time it sent a Spearhead Team into a State's milkshed, it asked the concerned State implementing agency first to appoint a "shadow Team" of its own (which the NDDB would help to train, if desired). Each Shadow Team had a composition similar to that of the Spearhead Teams. After the two Teams had worked together for a year or so, the NDDB would withdraw its Team, leaving the Shadow Team to take over the work -- and ultimately to become employees of the new Anand Pattern milk union which the Teams had helped to create.

The State DDC agreed to all the NDDB's terms and conditions -- and the IDC agreed to finance the work under the related Action Items for Operation Flood.

The SE responsible for the Sirin Spearhead Team remembered well the start of the Team's work. The Team Leader had been a colleague and friend of his for some time. Both, in fact, had at different times worked for the Anand Co-operative.

In mid-1973, the SE had accompanied the Team on its journey to Sirinpura, the chief town in Sirin District, which had a population of some 75,000. The NDDB's officers all agreed that Sirin was a "good" milkshed: a perennial river ran through it, the soil was fertile and the climate well suited to bovines. Moreover, the milk producers were known to be accustomed to marketing their milk. Sirinpura was a railway centre, with good rail connections to several urban demand centres which could be reached overnight by train -- and private traders had for many years shipped milk from Sirinpura in iced cans, as well as skim-milk curds (which were cultured before shipment, so that the curd could ripen overnight during shipment). The cream skimmed from the milk was turned into butter by small, traditional processors in Sirin District.

This well established trading had accustomed the producers to producing milk for the market. On the other hand, it also meant that the new Anand Pattern milk co-operative would face some competition.

Moreover, when the Spearhead Team Members made their first survey of the milkshed, they found that they faced some hostility, also. A number of milk producers told the Team that they could do without "yet another co-operative", for example. Indeed, they found that there was Sirinpura Co-operative Retail Association, which procured milk through village co-op's and sold it in the city; there was also a Sirin District Co-operative Dairy Society, which procured milk through village co-op's in other parts of the District. There was also an unusually well established private milk dealer, who had some small, simple equipment for pasteurising and chilling about 10,000 litres of milk, which he shipped by overnight train to a large urban market.

Thus, there were two co-operative organisations and the medium-sized trader well established in the District's milk business, as well as a large number of small traditional traders. The NDDB's Spearhead Team felt that they had taken on quite a difficult job. They were not surprised to learn that the State DDC had been unable to procure any appreciable amount of milk from Sirin.

Their reactions were confirmed when, following their usual practice, they surveyed a number of villages in detail, in order to decide where to establish the village milk co-operatives which would comprise their first two milk-truck routes. Here they had met a number of private "milk contractors" (so named because they made contracts each year with milk producers in the villages, often on the basis of a "loan," or advance, which obliged the producer to sell his milk to the contractor, at the contractor's price, for the next twelve months). Some contractors made it clear to the Team that it was unwelcome - but most of them seemed confident that the Team would not last long in Sirin, in any case.

In villages where they could examine the working of village milk co-operatives which already existed, the Team found that many of the members were actually milk contractors. These men sold to the co-operative not only the milk which they produced, but also milk which they bought from milk producers under contract to them.

The Spearhead Team followed its usual routine of talking with the proprietors of small teashops along their proposed milk-truck routes. The "teashop wallas" were usually friendly -- and they were a good source of information on milk prices. A minor slurry occurred when the Team started this part of its work, because a number of Team Members were from Gujarat and spoke Gujarati among themselves. As some of the Sirin milk merchants were also Gujarati, the people recognised the language - and to the Team's amazement, a rumour went around that the Gujarat Government was establishing its own dairy in the District and would "take away all the milk."

However, the Team dispelled such misgivings as it went around the villages selected for the first truck-routes. They told the producers about the Anand Pattern, encouraged and helped the producers to start their own village milk co-operatives on the Anand Pattern - and, in particular, told the milk producers how, when they formed a Union of their village milk co-operatives, the Union would be able to organise a proper Mobile Veterinary Care System for them, as well as supplying them with inputs (such as cattle-feed concentrates) at reasonable prices.

At first, this work was made all the more difficult by the fact that the Spearhead Team Members did not speak the local dialect -- and the State DDC had, as it turned out, been unable to appoint its Shadow Team. Shadow Teams were always recruited locally, so their presence removed any problems which a Spearhead Team might face with a local dialect.

However, the Spearhead Team Members soon picked up enough of the local dialect to enable them to communicate with the milk producers. Also, the Team Leader decided that, pending formation of the co-operative milk union, he would hire and train twelve locally recruited Co-operative Supervisors, to help with the Team's work. This he did and the Supervisors were soon working effectively.

The Team Leader had also had to deal with another unexpected difficulty: one of the most promising villages, selected to be the linch-pin of one of the truck-routes, turned out to be the village of the elected Chairman of Sirin District Co-operative Dairy Society. He was a highly respected gentleman in the areas who had been one of its leaders for many years -- and he openly scoffed at the idea that NDDB's "youngsters" (the Team Leader was in his mid-30's) could teach Sirin's co-operatives anything about milk co-operatives.

The Team Leader had been worried by the Chairman's reactions to the Team's work. Nevertheless, he steadfastly visited the Chairman very few days and talked differentially with him.....

Meanwhile, the work went on. Within six months, the Team had 32 villages milk cooperatives functioning, which were procuring some 7,500 litres of milk. In achieving this, they had two particular difficulties: each Assistant Cooperative Registrar (an office in which the incumbent seemed to change very frequently, once the Team started functioning) was dilatory in completing the legal formalities required in order to register each village milk co-operatives; the Team Leader had had to appeal at one point to the State DDC, to take steps to prevent such frequent changes of Assistant Registrar - and to get the incumbent to move the papers faster ... A second source of difficulty had been the processing of the milk collected from the 32 villages co-operatives. The State DDC had long had a contractual agreement with a small dairy processing plant in the District that it would handle milk for the DDC, pasteurising and chilling it for onward shipment to a large city dairy. But the Team Leader found that there was much confusion over the business: the Dairy's operators said that the milk delivered was of less quantity and quality than was stated on each truck's invoice, for example -- and the empty cans provided to each truck (for bringing back the next delivery of milk from the village co-operatives) were not clean: indeed, they seemed almost uncannily capable of souring the milk en route. The truck operators complained that, in any case, even when they brought a delivery to the dairy, they were left to wait in the sun, while private milk merchants' trucks, which had arrived later, were given priority...Ultimately, the Team Leader had posted two men full-time at the dairy, to supervise deliveries weight and quality-testing of the village co-operatives' milk -- and this has solved most of the troubles with the dairy.

Some nine months later, there was another helpful development: twenty milk producers were able to visit Anand, on the NDDB's regular Farmers' Induction Programme. At Anand, they saw for themselves how the full Anand Pattern could work; they saw the Mobile Veterinary Clinics, the village Artificial Insemination System and the Village First Aid Workers, tending the milk producers' animals; they saw the Union's cattlefeed compounding plant -- and, when they returned to Sirin, they took up the Team's work voluntarily, organising meetings of milk producers in the villages and telling them that they should all adopt the Anand Pattern of milk co-operative.

The Chairman of Sirin District Co-operative Dairy Society had also visited Anand. He had become more friendly with the Spearhead Team. Indeed, a few months after the Sirin milk producers had returned from Anand, he accepted the Team Leader's invitation to inaugurate Sirin's first Mobile Veterinary Clinics (The Team had decided to set up and operate its own Mobile Veterinary Clinic, using a Project Jeep and two of the Team's skilled veterinary and animal husbandry specialists, because the Shadow Team still had not been appointed -- and the Team felt that it could not continue to promise the producers a veterinary service without ever actually providing it).

As the number of co-op's grew, so did the competition. In one village, when the new milk co-operative was started, the traditional traders offered three times the co-op's price for milk. But the DDC had already agreed to pay a reasonable premium on the milk procured through the village co-op's organised by the Team - and the co-op's continued to hold their own against the traders' competition. In fact, skimmed milk seemed to be coming into Sirin from outside the District, presumably because of the "price war."

At this juncture, the Sirin District Co-operative Dairy Society had disbanded itself, in anticipation of the formation of an Anand Pattern milk union in the District. Its highly respected Chairman had been elected, indeed, Chairman of the Sirin Co-operative Retail Association -- and the Team Leader had agreed that 10,000 litres of his co-operative's milk would be supplied to the Association daily. The Chairman had re-organised the Association's co-operative in Anand Town, which he had observed closely and approvingly during his earlier visit to Anand.....

Thus, by early 1976, the Spearhead Team had helped to organise altogether some 90 village milk co-operatives which were collecting nearly 20,000 litres daily (half of which went to Sirinpura while the other half went to the DDC's dairy in a large city by overnight train). The village Societies had earned and paid a small year end bonus to their members. The Spearhead Team was operating more Mobile Veterinary Clinics and the producers were reportedly very happy with the Team's work.

At NDDB's headquarters, however, the SE responsible for liaison with the Sirin Team -- as well as colleagues in his Division and those in other Divisions who were responsible for other parts of the Sirin Project - were wondering what had held up formation of the Sirin Union. When the Union became a legal entity, it could own and operate a bull centre as the base for its own Artificial Insemination System; it could own and operate its own cattle feed compounding plant. Also, decision making would be easier, which it became the responsibility of the Union's Board of Directors, who would represent the village Co-operatives and reflect the milk producers' wishes. Moreover, there were many requests coming in from other places for the services of Spearhead Teams - and the NDDB did not usually leave a Team in a milkshed for more than two years.

4.5: Case Study

Extending the services of Anand Pattern milk co-operatives

By 1976, the Kaira District Co-operative Milk Producers' Union had achieved effective 100% coverage of its area of operation, Kaira District. Its 830 village milk producers' co-operative societies covered all but the most remote and small villages - and from even these, some milk producers sold milk to their nearest village milk co-op's. The 1971 Census had indicated that the District contained 957 villages and a rural population of 1,973,000.

The Union had pioneered in delivering high-quality veterinary care to the milk producers' doorstep by means of its mobile veterinary clinics which visited every village society once weekly (and which were available round the clock for emergency calls). An equally important part of the Union's system for animal health-care delivery was a set of village First Aid Workers and Artificial Inseminators whom the Union had trained. These were people whom each village milk society had selected - and who were usually paid partly by the society and partly by the Union; they lived in the village and (using simple medicines, equipment and fresh semen provided by the Union) they delivered, respectively, basic health care and insemination services for the producers' milch animals every day of the year. The First Aid Workers also provided a referral service for the veterinary doctors who visit the villages every week.

The Union's leadership, management and members, seeing the effectiveness of its animal health-care services, had become increasingly interested in providing an equally effective human health-care service. When Shri Tribhuvandas K. Patel retired in 1973, after being the Union's Chairman for some 25 years, the farmers presented him with a purse of Rs. 650,000..... Shri Tribhuvandas accepted this purse -- not as a personal gift, but to be held in trust with a view to its being used for the purpose of providing human health-care services in Kaira District, with special emphasis on the health of the District's infants. Accordingly, the Tribhuvandas Foundation was set up as a Registered Charitable Society, with the aim of providing a human (and, especially, an infant) health-care service in the District.

Subsequently, the NDDB received a grant from an overseas Foundation for the purpose of obtaining consultancy services (from within India and from overseas), in order to advise the NDDB on various ways in which the services provided by dairy co-operatives to rural people could be extended. One of the subjects chosen for study was the question of how a human health-care delivery system could be built on to the Anand Pattern of dairy co-operatives.

In preparation for the Consultant Team's arrival, information was collected on the District's current health status, the public health facilities already available in the District etc. and a survey was made of thirty villages, to study their population's health status in detail. The co-ordinator of this work, who was also to be the Counterpart for the Consultant Team, was a veterinary doctor who had worked for Kaira Union for many years and who had an intimate knowledge of the District's villages and also of how the Union functioned.

In early 1976, the Consultant Team arrived at Anand and worked with its Counterpart for 6-8 weeks, visiting the District's villages, meeting Doctors, health workers, social workers, several of whom had worked in the District for 10-20 years. The Team included an Indian Doctor and nutritionist, with practical experience of rural health-care and nutrition programmes, as well as non-Indians with experience of health service co-operatives and environmental sanitation. The Team also took advice -- particularly at the end of its assignment -- from professionals working in voluntary human health-care services in India.

At the end of its assignment, the Consultant Team presented its 200 page report to the NDDB. Its main recommendations were:(1) The training and placement of lay Village Health Workers in the Villages (1 per 2,000 rural population: some 980 in the final phase of the Project); (2) The recruitment of professionally trained nurses (one per 5 VHW's) to be assigned to existing Primary Health Centres, where they could also live: one per 10,000 of human population, each Nurse being provided with transport, so that she could visit altogether an average of 5 villages once every week; (3) Recruitment of "Field Doctors": one per 8 nurses or 40 societies: to be based at six of the existing Primary Health Centres - the Doctors at each of the six Centres would cover some 160 villages (one new "block" of 160 villages to be taken up each year, so that coverage would be complete after six years) - the Doctors would back up the nurses and provide a referral service for serious cases etc.; (4) A nutrition package to be delivered for a period of 1-3 months to infants and mothers identified as malnourished (the Team estimated that this group was 7.3% of the rural population) -- and (5) A subsidy (and an incentive bonus to health extension workers) to encourage installation of one latrine per household. (the Project would provide, for each 10,000 of human population, one Mason and worker; each pair would work with the Nurse covering the same "block" or 10,000 people). The report also detailed a host of other recommendations on health care, nutrition and environmental sanitation. For the first year of the Project, non-recurring costs of the service per annum per capita were estimated at Rs. 3.80 -- and recurring costs per capita at Rs.2.30 -- for each human covered (plus any costs incurred in sanitation).

The NDDB appreciated that the Team had worked hard and that its report contained valuable professional advice. But the NDDB's management was not sure if the report's recommendation would really "build on" the Anand Pattern's co-operative structure. They wondered if it would not create a dual structure.

The NDDB's management consulted further with professionals working on voluntary rural health-care services in India, who advised that NDDB should next examine first-hand information on such services, before finally deciding what it would do about the Kaira District Health Proposals. Accordingly, a highly regarded rural health project was identified, based at Jamkhed, a small town in Maharashtra State -- and one of NDDB's Specialists in the Anand Pattern of co-operative structure was deputed to visit the Jamkhed project. At his request, he was accompanied by a professional sociologist from NDDB's Planning Division.

Their main observations on the Jamkhed Project were as follows:(1) The Project provided remarkably effective preventive and curative health care for 40,000 people, living in 30 villages -- and it was currently being expanded;(2) Started by two highly qualified and dedicated Doctors (Dr.Rajnikant Arole and his wife, Dr. Mable Arole), the Project had built up a dedicated professional staff which worked very hard for very little financial reward; (3) The structure was based on the Village Health Workers (the "VHW": one in each village, selected by the village, paid Rs. 30 monthly by the Project--and trained by the Project in basic first aid, in identification of frequently occurring illnesses and in simple, hygienic midwifery etc); (4) Every village covered by the Project was visited (once weekly, at first -- and later, once every two weeks) by a Mobile Health Team led by a professional nurse, supported by a para-medical worker specialising in selected diseases such leprosy, tuberculosis etc.; the Teams were sometimes accompanied by a Doctor, mainly so that the Doctors kept in touch with the villages; (5) The Project encouraged each village to set up a Young Farmers Club, to help build youthful leadership in agricultural development; (6) Young Farmers Clubs grew and stored foodstuffs for supplementary feeding programmes: they saw to the preparation of these foodstuffs -- and the VHW supervised the distribution of this food each day to under-fives and their mothers or siblings who had been identified as malnourished; (7) To the extent that its modest funds permitted, the Project assisted villages in provision of clean drinking water and it assisted Young Farmers Clubs in obtaining bullocks, repairing wells, etc. The Project also distributed to resourceless households batches of about six young goats to the Project, once their goats were established and breeding satisfactorily; (8) The Project included a small hospital at Jamkhed which was a net "earner" for the Project; (9) All participants paid for medicines and hospital services, except a few indigent; (10) The Project had helped participating villages significantly to decrease their birth rate -- and (11) The Project ran on a net out-go of about Rs. 5 per capita per

annum, including some 8% for overhead, administration etc.

Jamkhed had a poor agricultural resource base and had been badly hit by droughts in the early 1970's. When they returned from Jamkhed, the visitors from the NDDB felt that, if so much could be achieved with such limited funds in Jamkhed, surely even more should be achievable in a relatively well-off District, such as Kaira, especially as Kaira already had the institutional structure provided by the Anand Pattern of milk co-operatives. They recognised, however, that the Kaira Project would necessarily be different from the Jamkhed Project ...

After much deliberation, they listed the following principles which they would try to follow in formulating their proposals: (1) In order to build a health programme on to the Anand Pattern (first in one District and ultimately in many milksheds), the dominant motivation of the Project must be expected to derive from the professional dedication of the Anand Pattern co-operative's management and technical staff, rather than on the almost-spiritual dedication which motivated the Jamkhed Project; (2) The Anand Pattern provided a "ready made" institutional structure for decision-making and for arriving at a consensus in each village, which the Kaira Health Project should learn to apply to health programming; (3) The focus of the Project should be the family - and its main objective should be to help to ensure that each family covered would be viable, in its familial relationships within, and in its economic relationship without; (4) Committed expenditures on staff and over-head should be minimised -- and the Kaira Union should be insulated from demands on it for non-commercial expenditures which could ultimately weaken its viability - and (5) The Project's programming should be designed so that discretionary expenditures could be made effectively whenever funds were available, without the basic programming being endangered in, say, a "bad year", when the funds available suddenly be reduced.

The NDDB's management felt that these principles should provide a sound basis for the Project. Accordingly, the NDDB's Specialist in co-operatives was asked to work further with his sociologist-colleague, in order to finalise the Project proposal, on the basis of the principles which they had suggested for building the Project on to the Anand Pattern structure -- and incorporating the technical content of the Consultant Team's report. As they worked on the details of the final proposal, they tentatively concluded that it should contain the following elements: (1) In each participating village, the village milk co-operative's elected Managing Committee should be asked to guide and monitor the village's participation in the Project, appointing if it wished a Health Sub-Committee which could include concerned citizens not on the Managing Committee itself; (2) Each village should have one VHW, paid jointly by the Society and the Tribhuvandas Foundation, on a scale comparable to that of the village society's Secretary-member; (3) Total District coverage could be achieved in seven years -- and would require 45 Mobile Health Teams, each headed by a professional nurse and including a

para-medical worker, as well as an extension worker in basic animal husbandry, agriculture and environmental sanitation; (4) The Project should have a Centre at Anand with modest facilities to enable a mother and child to stay overnight for observation and diagnosis; ultimately, six such rooms would be needed; the Centre would be the "base" for the Project's 9 Doctors, who would visit villages with the Mobile Health Teams and help the Nurses in training the VHW's; (5) Each participating village would be encouraged to set up a Young Farmers Centre on the outskirts of the village, with at least one or two acres of land and a simple building, one side of which could be used by the Young Farmers for extension lectures etc.; the YF Centre would demonstrate modern methods of agriculture and animal husbandry; the food produced could be used for supplementary feeding programmes; (6) All but unviable families would pay for medicines consumed and would also pay a membership fee of Re.1.00 monthly, up to half of which would be used to support supplementary feeding programme; the remainder would be used to help economically unviable families to become viable.

Apportioning the costs on what the drafters of the proposal felt was a reasonable basis, projections indicated that the Kaira Union's commitment would rise from Rs. 243,000 in the first year to Rs. 2,736,000 in the seventh year. The Tribhuvandas Foundation's share would rise from Rs. 96,000 in first year to Rs. 2,568,000 in the seventh year. In addition, the share of the cost which would normally be borne by participating village milk societies was projected at Rs. 13,000 per society in the first year, but it stabilised at Rs. 3,000 per society in the sixth year, as a result of scalar economies. The NDDB drafters wondered if the Kaira Union would feel that its proposed commitment would be acceptable -- and what would be the most suitable source from which the Tribhuvandas Foundation could obtain the funds required to cover its share of the costs. They also felt that the village society's share of the annual costs should be set at the level projected in the sixth year -- and that the balance in the first years should be found from other source and given as a grant towards the developmental costs of the Project.

Assuming that not more than 7.3% of the population covered would need the supplementary feeding programme, they calculated that half the monthly membership fees would be adequate to cover the costs of supplementary feeding. During the first seven years, the balance of monthly membership fees would amount to a total of Rs.4,902,000. They wondered if this would be enough to help the economically unviable families to become viable. It was difficult to project the numbers involved -- but they estimated that about 20% of the District's estimated 389,000 families depended on agricultural labour as their sole source of income. It was possible that significant proportion of these families did not get enough opportunities for gainful work to enable them to be economically viable. To enable such a family to acquire a crossbred cow would, for example, cost Rs. 1500 -- and, thereafter, the family could earn a net income of Rs.800 from

their cow, which would normally be enough to set the family on a road to viability. But there were other roads to viability of course: intensive horticulture, bee-keeping, poultry-keeping etc. The two drafters felt that what they called the "family viability programme" was a key part of the Project, but they realised that its implementation would call for great skill on the part of the Project's extension workers in identifying applications of modern agricultural-production techniques etc. which economically unviable families could make use of.