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# OPERATION FLOOD

## DEVELOPMENT OR DEPENDENCE ?

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This report was completed in December 1981 but could not be published earlier due to various reasons. Since the report does not include detailed discussion on Operation Flood II, its value lies basically in its analysis of Operation Flood I and the emerging trends for the future. Should the trends cautioned against in Operation Flood I be rectified and reversed Operation Flood II, may prove to be more beneficial than Operation Flood I.

- Authors

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## INTRODUCTION

Today, any programme that is based on foreign aid should be critically assessed keeping in mind the likely implications of foreign aid and the constraints it might place on the country which has opted for it.

There is an increasing awareness that the indiscriminate import of Western aid and technology might, in the long-term, adversely affect the development of the Third World.

In many cases, substantially documented in recent years, foreign aid, instead of putting a country on the road to self-sufficiency, has actually succeeded in increasing its dependency. The imports of sophisticated and capital-intensive models of development may be made in spite of little infrastructural facility or experience.

In this study we are concerned with the implications of Operation Flood (OF), a dairy development project based on foreign funds and the capital raised from sales of imported butter oil (BO) and skimmed milk powder (SMP) gifted by surplus stock with the European Economic Community (EEC).

The study concentrates on evaluating the performances of OF and examining whether it will help in making India self-sufficient in dairying or if it will pull the country further into the vortex of aided development that stems from the developed world and threatens to engulf the Third World.

We begin by placing the inception of OF within certain chronological parameters.

There is a review of the historical growth of Indian dairying till OF. We have shown how Gujarat and specifically the Kaira District Cooperative Union were in an ideal position to exploit the potentialities of OF and, therefore, even today, can boast of an exceptional record. The rest of the country has, however, not witnessed the intensive development evident in Gujarat.

A detailed evaluation of the "action items" through which the National Dairy Development Board (NDDB) and Indian Dairy Corporation (IDC) proposed to develop dairying, reveals the almost negligible impact of the project all over the country.

Since the underlying thrust of the paper is to examine dependency on foreign technology, a section of the study deals with the imported and/or indigenous content of plant equipment and machinery. This is followed by a brief examination of the implications of the choice of technology and the possible constraints that this will place on the programme.

Also considered, is the growing commercialisation of a developmental programme as is evident from the track record of Amul and the fortunes of the Gujarat Cooperative Milk Marketing Federation (GCMMF).

We have concluded with an overall perspective of the entire programme and tried to analyse why the country is getting increasingly dependent as is borne out by the launching of a second phase of DF which is likely to end in mid-1985.

To begin with, a pertinent question: What were the intentions of the government in offering its unqualified support to the project? According to the National Commission on Agriculture, the gains of the Green Revolution ... "flowed towards progressive farmers who also happened to be those with larger holdings having irrigation facilities. Farmers with smaller holdings and poorer means have, by and large, had to be left out. This resulted in one kind of major imbalance in the rural areas. As a large proportion of rural population could not share the economic benefits resulting from this new strategy of agricultural development, a strong feeling of dissatisfaction developed among the less affluent farmers giving rise to social tension in the rural areas. Social justice demands avoidance of such imbalances. It is not desirable to have growth without social justice and this points to the need for an integrated development of all sections of people in the rural areas by reducing the present widespread poverty, unemployment and under-employment. In our efforts to achieve this objective in the rural areas, intensification of cattle rearing and milk production programmes can play a vital role".

This then seems to have been the primary objective behind the adoption of DF and not, as has been often stated, the need to enhance the intake of animal protein via milk or the equitable distribution of milk in Indian cities.



## DAIRYING IN INDIA: A HISTORICAL BACKGROUND

### Pre-Independence Period

Even though India has the largest cattle population in the world and is the third largest producer of milk, the output from its cattle accounts for barely one-third of its needs.

Through the ages, cattle have been part of the Indian agricultural system but they have been used primarily as draught animals and for manure purposes. Unlike the European tradition, where dairying has long since been established as an occupation worthy of devoting arable land and manpower, milk in India has mainly been a by-product, meeting domestic needs. Perhaps dairying never developed in the sub-continent because of the low-yielding breeds of milch cattle or because of the pressure on land which necessitated the allocation of all arable land for foodgrain production.

Till the turn of the century, there was little effort to establish dairying officially. Whatever enterprise there was, was limited to supplying local pockets of demand, chiefly European. A few plantation owners imported various European breeds in an effort to augment the low yields derived from indigenous cattle, but did not seriously attempt cross-breeding European and Indian stocks.

The inception of a semi-organised dairying industry can be traced back to the establishment of large-scale dairy farms by the British authorities. The first such farms began in Allahabad in 1891. The imminence of war, at a later stage, led to accelerated efforts to cater to the demands of the imperial forces.

Before the onset of the First World War, the imperial department of agriculture and the provincial agricultural departments had attempted cross-breeding Indian cattle with exotic European breeds. While the experiment proved successful, inasmuch as it raised milk output, a concomitant hazard observed was the increased susceptibility of cross-bred animals to the tropical climate and disease.

By 1916, it was found necessary to recognise the growing importance of the dairy sector. An imperial dairy expert was appointed in 1920, whose responsibilities included reviewing the state of the sector and outlining feasible growth plans for the future to help in the establishment of a commercial dairy industry.

In a pioneer venture in 1926, the government invited Dr. N.C. Wright, director of the Hannah Dairy Research Institute, Scotland, to study the state of the industry and propose suitable recommendations.

In his report 'Marketing of Milk in India' (1940), Dr. Wright highlighted the need to organise a steady and hygienic supply of milk to the cities and to increase milk production in the catchment areas.

The Second World War, however, intervened and the short-term focus was limited to the war situation of providing milk and milk products to the troops.

In 1941, the Imperial Dairy Research Institute was established at Bangalore. A few efforts were made to help private entrepreneurs in selected milk pockets, concentrated in the urban areas. In rural India, the age-old traditions of household milk being obtained from domestic cattle continued.

On the whole, the role of the British in the dairying sector was limited mainly to meeting urban demand and in ensuring a regular supply for troops.

#### Post-Independence Period

Following independence and the formulation of the five year plans, the government concentrated on upgrading the quality of indigenous stocks of cattle through Key Village Schemes. In certain key areas, chosen for their communication facilities, outlets for milk, suitable agronomic conditions for fodder production and most importantly, the local herd stock, artificial insemination schemes were begun.

The Key Village Schemes focussed on the rapid multiplication of farm-bred, high-yielding bulls to make up the stock of indigenous milch cattle.

A few exotic breeds were imported into the country by agencies such as the Heifer Project Inc., U.S.A. Meanwhile, research in cross-breeding was conducted by the National Dairy Research Institute (NDRI), Bangalore and the Allahabad Agriculture Institute.

In the First Five-Year Plan no specific provision was made for developing dairying because of a lack of trained personnel. In states which had the required personnel, however, there were sizeable

programmes like the Bombay Milk Scheme, the Anray Milk Colony, Anand Milk Union Ltd., Anand and the Greater Calcutta Milk Scheme.

The Second Five Year Plan continued to concentrate on schematic cattle development programmes. Despite a larger allocation of funds, the project was unable to utilize it due to a lack of trained personnel and a shortage of dairy equipment.

By the Third Five Year Plan, the government began to recognize the urgency of increasing milk production in the country and in 1960, its approach to dairying underwent a radical change. Two reports by American experts on increasing India's food output were submitted to the Indian government. The recommendations in the study were implemented and resulted in the Intensive Agricultural District Programme (IADP or Package Programme) by which various earlier schemes and structures were revamped.

The IADP envisaged a cooperative effort that would include the entire structure of government, from the centre, state and district down to the block, village and individual cultivator. An outlay of Rs.350.85 million was allocated for the project, to provide all the inputs essential for cattle development in the country.

For the first time, the government's emphasis shifted from improving the milch cattle stock to a full-scale development of rural milk production.

Provisions were made to set up eight rural creameries and four milk product factories to utilize milk surplus in areas that lacked a ready market.

The third plan also strengthened dairy training and research programmes recognizing the acute shortage of trained personnel in this sector.

The NDRI, established during the second plan was extended; regional stations were established in Bombay and Haringhatta; and a dairy science college was opened at Karnal.

A new feature in the third plan was the decision to create a separate dairy development department in each state. With the rapid development of milk processing plants and the sluggish increase of marketing surplus at the milk producer's level, the states were advised to take up comprehensive rural dairy extension programmes and link these up with the Key Village Schemes.

In 1966, the NDDB was set up under the aegis of the ministry of agriculture in order to step up the planning and execution of dairy development on a national scale. Although the government financially assisted the NDDB in the first year of its operation, the Board has since met its expenses from outside sources. The NDDB

headquarters were stationed at Anand, Gujarat, where the Kaira District Cooperative Milk Producers Union Ltd., set up in 1946, had already established itself as one of the leading dairies in the country. They gave NDDB initial support to build up the technical knowhow and several experts were absorbed from the union.

It was during those years, impressed by the performance of the milk cooperatives in Kaira district (whose remarkable history and growth will be subsequently taken up) that the government accepted in principle the cooperative mode of dairy development in India. This structure hoped to ensure the equal participation of every individual milk producer in the country. The NDDB began to send spearhead teams all over the country to establish milk cooperative unions at a village level, reporting to a district union, which in turn would be responsible to an apex body at the regional level. This was the essence of what would come to be known as the 'Anand pattern'.

The Fourth Five Year Plan, once again, emphasized the build-up of cross-bred stocks and formulated certain policies regarding milk production in all the IADP districts and Key Village Blocks (located in the milk-sheds of existing and proposed milk dairy schemes). Additional cattle breeding and progeny testing programmes, frozen semen banks, expansion of herd registration and milk recovering centres, too, were launched.

#### Operation Flood Launched

A major project launched during the fourth plan, to stimulate milk marketing and dairy development, was Operation Flood (OF). Based on the Anand pattern, OF aimed at meeting the four major cities' demand for milk and speeding up the process of dairy development by increasing milk procurement and production in the rural milk-sheds supplying these cities. This was to be done with funds generated from the sale of World Food Programme (WFP) commodities supplied to it by the European Economic Committee (EEC). One hundred and twenty six thousand metric tonnes of skimmed milk powder (SMP) and 42,000 metric tonnes of butter oil (BO) were to be recombined to liquid milk and sold to the existing dairy systems.

The Indian Dairy Corporation (IDC) was established under the Company's Act in 1970, to implement the objectives proposed by OF and, primarily, to monitor finance and to coordinate the development of milk enhancement programmes from the generated funds.

The National Dairy Development Board (NDDB) acted as a technical consultancy body to the IDC preparing feasibility reports and construction of dairy installations, etc.

Operation Flood I, originally designed for five years, went on for eleven. Operation Flood II, launched on October 2, 1979, for a period of seven years is essentially a continuation of OF-I but, on a much larger scale, with a budget of \$4,800 million.

Originally aimed at bringing about a 'white revolution' in the country, OF is not just a prestigious but also a highly controversial project.

Although OF at this point accounts for only 1/10th of the total milk production in the country it has attracted an inordinate amount of both national and international attention and has come to be regarded as a model for dairy development in the Third World. In Bangladesh, for instance, Milk Vita a dairy development programme (again based on EEC surpluses) is "basically a copy of the AMUL project in India (Operation Flood or the White Revolution)". (1)

## THE EMERGENCE OF ANAND

### Pre-Operation Flood

Before beginning our analysis of DF, it is necessary to take a close look at Anand - to understand how and why this model it is based on, developed into the international showpiece that it is today.

Firstly, Anand was not built in a day. Kaira district has had a long history and tradition in dairying. Since the turn of the century, the district has been gradually inducted into modern production, processing and marketing techniques which have ensured that it remained at the forefront of all dairy development programmes in the country. Around 1900, A.C. Strafford, a Swede, established a dairy plant. In 1911, a German, A.M. Collar started manufacturing casein in Gamdi, a few miles from Anand. Later, G.R. Rives, an Englishman, established a dairy farm at Nadiad, to produce pasteurised milk, butter, milk powder and cheese on a large-scale. In 1929, Polson, a Parsee entrepreneur, installed a modern plant at Anand to manufacture butter, cheese, casein and milk powder. This was done mainly to cater to the armed forces' needs during the Second World War. A creamery had also been put up at Anand early in the century.

Meanwhile, in the early 1940s, the then imperial government decided to improve the standard of milk consumed in Bombay by setting up the Bombay Municipal Corporation Milk Supply Scheme. Since local production was insufficient it was decided to bring milk to Bombay from Kaira district in Gujarat where a fixed amount of milk was to be purchased from Polson Ltd., a private enterprise. Due to mismanagement, the Bombay Municipal Milk Supply Scheme ran into financial difficulties and the government of Bombay took over the programme, renaming it the Bombay Milk Scheme.

Initially, the Bombay Milk Scheme awarded a monopoly right for the procurement of milk from Polson in Kaira. This decision evoked strong political opposition from the burgeoning Patels of Kaira, a dominant land-owning caste who were interested in supplying milk

to Bombay.

On December 14, 1946, a union of milk producing societies - the Kaira District Cooperative Milk Producers Union Ltd. - was formed and under political pressure, the Bombay Milk Scheme agreed to purchase a part of its milk from the union. The union began by competing against Polson, first in the collection of milk from the local producers at Kaira, and secondly, in its sales to the Bombay Milk Scheme. By the early 1950s, the union had obtained a monopoly in the supply of milk to the Bombay Milk Scheme from Kaira.

#### Political Patronage

From its inception the union grew under the patronage of important political personalities like T.K. Patel and M.D. Patel. Since the area was devoid of any significant industrial activity milk provided the main source of income to the people who were mainly dependent on traditional agricultural activities and the union naturally attracted the attention of the national bourgeoisie.

Many prominent Congressmen and promoters of the cooperative movement who were inducted into the first Nehru government, came from Gujarat and Bombay - Sardar Vallabhai Patel, B.G. Kher, Morarji Desai, and K.M. Munshi, all played a significant role in the promotion of Amul - which served to improve their images in the eyes of their electorate. Sardar Patel and Rajendra Prasad were deputy prime minister and food minister respectively. B.G. Kher was chief minister, Morarji Desai, minister of revenue and Dinker Rao Desai minister of law and supplies of Bombay State. K.M. Munshi was later appointed food and agriculture minister at the centre. For all of them, caught up in the early flush of post-independence, 'cooperativisation' was an effective catchword.

The Anand cooperative structure is certainly unique. It "consists of a two-tier system of the District Cooperative Milk Producers' Union at the district level and the Village Milk Producers' Cooperative Societies at the village level. The societies in every village are the base level units and the union at the district level is their apex body". (2). This organisation of milk producers is owned by farmers and designated as the 'Anand Pattern'.

"The union has three important objectives. It has to develop the marketing facilities for all the milk its members want to sell, sustain the growth of the milk cooperatives and to provide a package of technical inputs to the members to enhance milk production throughout the district". (3).

### Turning Point

The year 1950 was a turning point in the fortunes of the Kaira union and for the development of the policy to create "many Anands". The same year witnessed the appointment of Dr. Verghese Kurien, who was to rise to a position of great power in the milk cooperative movement in India.

In the epoch-making year of 1950 the government of Bombay decided to establish the Aarey Milk Colony. The scheme envisaged the removal of cattle, so far kept within city limits, to a colony 30 miles north of Bombay, where the necessary infrastructure for shelter, feed and production was erected. The milk produced at the colony was bought by the Bombay Milk Scheme, pasteurised, bottled and delivered to stalls in Bombay, where it was sold.

The Kaira district union had planned to supply fluid milk to the Bombay Milk Scheme and the establishment of the Aarey Milk Colony upset the union's future expansion plans.

Around the same time, the Bombay Milk Scheme began to import vast quantities of PL480 SMP from the U.S.A., which was reconstituted into toned milk. Anand was facing the problem of surplus milk and the Kaira union had little choice but to convert its surplus into milk powder. The cost of production of milk powder at Amul was, however, much higher than the PL480 supplies and the Bombay Milk Scheme continued its imports.

Faced with this unhappy situation, the Kaira union reacted by acquiring a new range of manufacturing facilities. Concomitantly, the union also recognised the urgent need to develop managerial and technical skills in marketing while making efforts to increase productivity at the farm level.

Over the decade 1947-57, this decision was concretised, as is reflected in the balance sheets of the Kaira District Cooperative Milk Producers Union Ltd. (established on December 14, 1946). Expenditure for plant and machinery in 1947 was \$78. By 1957, the outlay amounted to \$580,408.

Not that the conflict between Kaira and Aarey had gone unresolved. Political pressure was brought to bear on the central government who intervened, and the decision went in favour of the Kaira union. This resolution was to have a significant influence on the pattern of dairy development in India.

### Important Victory

The central government accepted the principle of rural production of milk as is borne out by an extract from a health ministry report:



"Aarey is an example of a nationalised sector of industry, whereas Anand is an excellent example of the cooperative sector of industry. Aarey stands for the limited purposes of the city's milk need, but it is depending on the village cooperative for a considerable portion of the needed quantity. But Anand stands for the purpose of both milk supply and comprehensive development of the village economy with prospects of producing the entire quantity of milk for the city on its own, if needed, and at the same time providing excellent opportunities as a subsidiary occupation for the farmers". (4).

For Anand, this was an important victory. One more threat to its burgeoning business had been tackled. By this time Anand had become quite adept at handling rivals. The secret of their successful techniques has been outlined as follows: "Although the union was essentially a commercial venture and vigorously followed the policy of remaining a workable business concern, it always projected the image of a concerned corporate citizen. It emphasised its social and national obligations. In its association with the Bombay Milk Scheme, it expressed its concern for the consumers in Bombay city. While dealing with the government of India, the union showed its concern for the national interests. The union actively helped the government of India to expand the internal production of dairy products to meet defence needs. In undertaking its expansion the union emphasised the advantages that were likely to accrue to the country". (5).

A somewhat harsher commentator, described Amul (Anand Milk Union Limited and the trade name for their range of milk products) as "nothing but a joint-stock company in the garb of a cooperative". (6).

#### Enter the EEC

In the late sixties the EEC, which had built up milk powder mountains, began looking around for countries to dump it in. They soon sighted India and vast quantities of SMP and BO were offered as gifts.

Amul and Dr. Kurien were justifiably alarmed. Having suffered (though temporarily) from the previous PL-480 food aid consignments, Kurien knew that this enormous influx of SMP and BO into the country would impair Amul's fortunes and future irretrievably. The answer was Operation Flood. A national dairy development programme that would not jeopardize Anand's interests. If anything it would further them.

## OPERATION FLOOD I

Operation Flood I, financed by an initial investment of Rs.954 million (revised estimate Rs.1164 million), was the largest dairy development programme ever launched in the world. The project aimed at creating a 'white revolution' in the country with a flood of surpluses produced milk by establishing many Anands. The proposal was submitted by the NDDB to the Indian government in 1969 which in turn proposed it to the Food and Agricultural Organisation (FAO) of the United Nations - World Food Programme (UN-WFP) to obtain butter oil and milk powder donations from the EEC.

"Project India 618" of the WFP, was launched in 1970 for a five-year period. It embraced 57 selected districts and milk-sheds in 10 states. A total of hundred and twenty six thousand tonnes of SNP and 42,000 tonnes of BO would be gifted over the period, reconstituted into liquid milk and sold by the organised sector dairies at Delhi, Calcutta, Bombay and Madras. The finances generated, Rs.954 million, would be utilised for dairy development and milk marketing in the milk-sheds around the four metros. A national milk grid was also to be established to facilitate the levelling of seasonal and regional imbalances between milk supply and demand.

The government of India designated the IDC as the implementing agency for the project and the NDDB was to provide the necessary technical and managerial assistance and consultancy services. In the concerned states, either a dairy corporation federation or a project cell was to be set up, to implement the programme. The Indian government supervised this project through its department of agriculture.

Operation Flood envisaged achieving the following objectives:

- \*a. To make available wholesome milk at stable and reasonable prices to the bulk of city consumers, including vulnerable groups, namely pre-school children, nursing and expectant mothers, etc. with major effects on protein intake;

- b. To enable the dairy organisations involved in the project to identify and satisfy the needs of consumers and producers, so that consumers' preferences can be fulfilled economically and producers can earn a larger share of rupees paid by consumers for their milk;
- c. To improve productivity of dairy farming in rural areas with the long-term objective of achieving self-sufficiency in milk thereby bringing major increases in agricultural output and incomes with special emphasis on improvement of the income of small farmers and landless people;
- d. To remove dairy cattle from the cities where they represent a growing problem in terms of genetic waste, social cost and public health; and
- e. To establish a broad basis for accelerated development of the national dairy industry in the project period as well as the post-project period". (7).

To achieve these objectives the following action items were drawn out:

- \*1. Expansion of the capacity of existing dairies.
- 2. Erection of new dairies.
- 3. Storage and long distance transportation.
- 4. Rural milk collection and chilling centres.
- 5. Feder balancing milk plants.
- 6. Resettlement of city kept cattle and buffaloes in the rural areas.
- 7. Provision of technical inputs for milk production enhancement.
- 8. Development of improved milch animals.
- 9. Organisation of milk producers' cooperatives of the "Anand pattern".
- 10. Project planning, implementation and manpower development.
- 11. Miscellaneous, including unloading, storing and transportation of WFP commodities". (8).

Besides being a well-thought out plan for milk production and marketing, including factors such as the utilisation of professional management and high technology, the programme also emphasised the need for building up cooperatives at the village level. Thus, while professionalism was introduced to generate profits as a viable business venture, the concept of rural cooperativisation was the bait offered to attract development finance.

Thus, DF, though entitled 'Milk Marketing and Dairy Development', was positioned in a social context with developmental objectives (a,b,c of the objectives listed earlier) and an emphasis of grass-root level participation.

### Instrument of Change

Dr. V. Kurien periodically emphasised the socio-economic benefits that would accrue: "Sarabi Hatao", the national programme to banish poverty can be effectuated in our most neglected rural areas by introducing the Anand pattern of dairy development". (9) The Kaira District Cooperative Milk Producers Union in Anand, he said, had proved how cooperative dairying could be an instrument of social and economic change.

In January 1979 an NDDB booklet reiterated this claim. "The government is pledged", said the introduction, "to improve the economic and social conditions of the weaker sections of society such as the small and marginal farmers, landless labourers, and the vulnerable sections of the urban population who do not own enough resources and generally remain unemployed or underemployed. In order to eradicate the poverty of these poorer sections of society such programmes which concentrate on creating more jobs and are readily acceptable to these people need to be taken up. Dairying has assumed a great significance from this point of view to ameliorate the lot of weaker sections of the population". (10).

That the project should be reviewed in socio-economic terms was recognised by the WFP, the Indian government and the FAO. In the summary of recommendations in a review of DF-I, the project authorities were asked to "consider the desirability and feasibility of using the intervening period of 2 years before September 1981 to carry out in-depth studies of the impact of DF on:

- a. income and levels of living of the landless and very small farmer populations involved in the project; and
- b. the improvement of the nutritional status of the rural population involved". (11)

An earlier mission concluded that they were convinced that by the time the WFP assistance was terminated the project "will have achieved its real objectives, i.e. being a major step in rural development and in the use of modern science and technology for a socially well-balanced improvement of the quality of life for large numbers of people". (12)

### Convenient Appendage

Although constantly stressed by DF exponents and figuring largely as part of the outlined objectives, socio-economic change is nowhere targeted in quantifiable and explicit terms. The omission of any mention of it in the "action items", would lead one to assume that socio-economic gains were a convenient appendage tacked on when found useful.

Any evaluation of DF, however, must be carried out in terms of both its short and long-term developmental impact. Our analysis of its

success and/or failure, will be made keeping in mind both the stated objectives as well as the stated action items.

#### Evaluation

In 1951 the per capita consumption of milk in India was 150 gms. a day (see Table I on page 16) which declined to 126 gms. in 1961 and continued declining till 1971 to 107 gms. a day. Thereafter it picked up marginally to 110 gms. in 1972 and 1973. Though currently it has risen to 122 gms. and is expected to go up to 144 gms. by 1984-85 it will still not reach the 1951 level of 150 gms. a day. In other words all developmental efforts put together will not make people as well off in milk consumption as in 1951 ... The per capita per day availability in metropolitan areas is 230 gms. and in small cities is 170 gms. While it is as less as 63 gms. in rural areas.

It is against this background of the milk situation in the country that an evaluation of GF should be made.

Operation Flood can be classified under three major activities: Capacity increase, production increase and others, which includes transportation, man-power planning, storing, etc.

#### Allocation of Funds

Let us begin by examining the allocation of funds to each "action item", which provides clues for understanding the performance or non-performance under each item.

Table II on page 17 shows that as of January 31, 1981, the total expenditure crossed the targeted expenditure of Rs. 1,164 million by Rs. 16.97 million. During February and March (according to the IDC Background note for WFP Terminal Review Mission, February 1981) an additional estimated Rs. 82.443 million was expected to be expended. As recommended by the joint WFP/FAO/government of India Mission, the expenditure in excess of the total generation of the WFP commodities would be met from the working capital fund of the IDC.

TABLE - I  
INDIA'S MILK PRODUCTION, PER CAPITA

		Milk production (million tonnes)	Population (million)	Per capita availability (gms/day)
1941	..	17.11	319	147
1951*	..	19.72 (1.5)	361 (1.3)	150
1961*	..	20.37 (0.3)	442 (2.2)	126
1966*	..	22.10 (1.7)	493 (2.3)	121
1967	..	20.93 (-5.5)	504 (2.2)	114
1968	..	20.99 (0.3)	515 (2.2)	112
1969	..	21.20 (1.0)	526 (2.1)	110
1970	..	21.21 (neg)	538 (2.3)	108
1971	..	21.43 (1.0)	550 (2.2)	107
1972	..	22.50 (5.0)	562 (2.2)	110
1973	..	23.20 (3.1)	574 (2.1)	111
Annual average growth				
rate in				
1971 over 1951		0.4	2.6	-1.4
1973 over 1971		4.1	2.2	3.7
1977-78**	..	27.96	644	118
1978-79**	..	28.65 (2.5)	657 (2.0)	119
1979-80**	..	29.72 (3.7)	669 (1.8)	120
Projection				
1984-85	..	37.66	718	144
1989-89	..	50.15	751	185

NOTE : Bracketed figures indicate percentage change over the previous year.  
\* Indicates annual average percentage.  
\*\* Indicative.

SOURCE: The Economic Times, May 13, 1981.

TABLE - II

GROUP-WISE AND ITEM-WISE POSITION OF DISBURSEMENT OF GENERATED FUNDS UNDER OPERATION FLOOD.  
(% in millions)

Group	Action Item	Description of Action Item	Original allocation	Revised Allocation		Disbursement upto 31.1.81 (Provisional figures)	
				1975	Sept. 1979		
I Capacity Increase	1	Expansion of 4 cities existing capacity	19.1	29.1	35.1	32.10	
	2	Setting up of new city dairies	140.0	236.2	303.0	262.20	
	4 & 5	Chilling centres and feeder balancing dairies	209.8	363.8	415.55	479.69	
	6	Resettlement of	154.0	87.5	2.05	2.05	
		SUB TOTAL:	522.9	716.6	755.70	776.04	
		7	Increasing milk production of technical inputs	285.0	269.1	230.0	230.68*
II. Production Increase	8	Development of milch animals	40.0	40.0	30.0	28.94**	
	9	Organisation of rural procurement	18.0	26.0	32.45	31.31	
		SUB TOTAL:	343.0	335.1	292.45	290.93	
		III.	3	Storage and long distance milk transport facilities	31.7	37.7	30.55
	10	Project planning, implementation and manpower development	35.8	35.8	33.30	32.96	
	11	Misc. including unloading, storing and inland transportation	20.6	38.8	52.00	50.01	
		SUB TOTAL:	88.1	112.3	115.85	114.00	
		GRAND TOTAL:	954.0	1164.0	1164.00	1180.97	

NOTE: The revision in 1975 was due to increase in local milk procurement prices

\* Including Rs.9.67 million out of DANIDA assistance.

\*\* Including Rs.1.95 million out of DANIDA assistance.

- SOURCE: 1. IDC Background Note for WFP Terminal Review Mission, February 1981.  
2. Revised allocation 1975: Plan of Operations agreed upon between the government of India and the UN/FAD/WFP concerning assistance to a project for milk marketing and dairy development (WFP Project No.618).

#### Uneven Expenditure

A significant factor which is evident from the table is that the emphasis on capacity build-up and installation of machinery (Group I) has been constantly growing. The original allocation was 54.8%, in 1975 it was increased to 61.6% and in 1979 to 64.9%. Up to January 31, 1981, the disbursements increased to 65.7%.

Group II which pertains to increase in milk production has had a severe cut-back. From 36% of the budget in the original allocation, it was reduced to 28.8% in 1975 and subsequently to 25.1% in September 1979. The disbursements up to January 31, 1981 were only 24.6%. It is quite clear that Group I has grown at the expense of Group II.

Group III pertaining to transportation, project implementation and manpower, has remained more or less constant, with a slight upward revision from 9.2% to 10%.

#### Cattle "Resettlement" Marginalized

Thousands of quality milch animals are brought to the four metropolitan cities every year, mainly from the breeding tracts of Punjab, Haryana, etc., for city milk production. In the cities these animals are kept in unhygienic and insanitary conditions and are usually slaughtered after the completion of one lactation period. Every year fresh cattle are brought to the cities. This continuous process depletes the national herd and poses a great problem in terms of genetic waste, social cost and public health.

To tackle this problem OF-I had set aside a sum of Rs.154 million for the removal of milch cattle from the four metropolitan cities. As of January 31, 1981 only Rs.2.05 million was spent and the authorities have accepted their failure to implement this "action item". But the problem is, in fact, increasing (see Table III on page 19).

Instead of evolving more effective means of solving the problem, however, the IDC "considers that coercive and legislative means of removing city kept cattle would not be successful". (13). "It is important to remove them, but it is recognized that this can be achieved not by administrative measures but by economic pres-



sures. (14).

TABLE - III  
NO. OF MILCH ANIMALS

	Delhi	Bombay	Madras	Calcutta
Pre-project 1970	60,000	70,000	50,000	60,000

SOURCE: G.S. Kshlon, Indian Dairymen August 1981.

Also, this "action item" finds no place in the plan of operation for DF-II.

#### Reallocation of Funds

Following this line of argument, "action item" 6 i.e. resettlement of city-kept milch animals, earlier positioned in Group II was shifted to Group I. The original allocation of Rs.154 million for the section was brought down to Rs.2.05 million in September 1979 by the joint WFP/FAD/government of India mission. "The funds available under this "action item" (No.6) was re-appropriated in consultation with the WFP/government of India and concerned state implementing agencies for expansion of milk facilities in the metropolitan cities". (15). This means that a total of Rs.152 million from the original allocation was added to the expansion of processing facilities and capacity building.

#### Selective Statistics

For the world's most ambitious dairy programme, DF seems to suffer from a remarkable dearth of satisfactory information. National Dairy Development Board and Indian Dairy Corporation are virtually the only organisations who possess the necessary statistical information. Often, this is slanted towards reflecting only the success of the programme. The March 1981 UN Inter-Agency Terminal Evaluation Mission, for instance, asked for a simple chart of average throughput figures for the four mother dairies. As usual, (as will be amply borne out in this chapter) the figures that were given were not average figures but those for a particular day and a particular month - naturally in the flush season.

In a statistical evaluation of DF, one encounters several problems, some of which seem to have been deliberately created to obfuscate analysis.

Firstly, the procurement and throughput figures given by the OF authorities are not comparable. The pre-project (1970) throughput figures relate to the summer month of June, when milk is relatively scarce. But present throughput figures always relate to a flush season. It is vital to get comparable figures to evaluate the extent to which actual throughput has improved during the project period. Unfortunately, the IDC and the NRDD have persisted in providing figures of current procurement and throughput only of the flush season.

Secondly, the figures available are often not comparable due to the fact that at times a volumetric measure is used and at others a weight measure. For instance, when throughput figures are given in litres and procurement figures in kilograms, it is practically impossible to assess the percentage of local procurement in the total throughput of rural dairy plants.

Confusing too is certain basic data. For instance, on statistics relating to milk production, the thirtieth round of the National Sample Survey placed annual milk production for 1975-76 at 20 million litres. The dairying authorities, however, cite the agricultural ministry's figures of 25 million litres for the same period, possibly to emphasise the success of the project.

Finally, the project was initially conceived for five years, to be implemented in three phases. Signed on March 4, 1970, it was extended for three years, unto 1978, and eventually ended on March 31, 1981 after eleven years. Any analysis of a project which takes more than double the time that it was designed for, is extremely difficult. For instance, when a claim is made that a certain target has been achieved in the course of implementing this project, it has to be examined in the context that the project took eleven years, instead of the original five.

Evaluation of "Action Item" 1 & 2  
Competitive transfer of the bulk of the milk markets in the 4 metropolitan cities to the modern dairies

Before we analyse Table IV on page 21, it is necessary to reiterate that the two sets of figures of pre-project (1970) and achievement (1980) are not comparable. The 1970 figures relate to a lean month and the 1980 figures to December, a flush month. Even so, for lack of any other available figures, we are attempting to make a few general observations.

TABLE - IV

Targets/Achievements

	(100,000 litres daily)								
	CAPACITY			PROCUREMENT			THROUGHPUT		
	Pre-pro- ject (1970)	Target * (1974 -75)	Ach- is- vs- ment (Dec. '80)	Pre-pro- ject (1970)	Target * (1974 -75)	Ach- is- vs- ment (Dec. '80)	Pre-pro- ject (1970)	Target * (1974 -75)	Ach- is- vs- ment (Dec. '80)
Delhi	3.00	7.00	7.75	2.03	6.00	4.37	2.63	7.00	6.99
Bombay	5.00	10.00	11.00	3.50	8.75	9.06	4.45	10.00	9.88
Madras	.50	3.00	3.25	.37	2.40	1.77	.45	3.00	2.28
Cal- cutta	1.50	7.50	7.00	.97	5.60	.91	1.45	7.50	2.83
Total	10.00	27.50	29.00	6.87	22.75	16.11	9.02	27.50	21.98

NOTE : Since the programme was to be complete by 1975, the targets are set for the end of the programme

SOURCE: 1\* Procurement and throughput target figures: Plan of operations agreed upon between the Government of India and the UN/FAO/WFP.  
2\* Capacity target figures from Background Note for Terminal Review Mission, February 1981.  
3 Pre-project and achievement figures: IDC Background Note for WFP Terminal Review Mission, February 1981.

Procurement

The Calcutta scheme, which was procuring over 97,000 litres of milk per day in a lean month ten years ago, is today procuring only 91,000 litres in a flush month. It is interesting to note that at least 13% of this amount is imported from Gujarat. (See Table V on page 22).

More than half the increase in procurement (i.e. 556,000 litres out of 924,000 litres) has been in Bombay alone. Since Maharashtra accepted the DF programme in a limited way and developed its rural areas of its own accord, achievements in Bombay cannot be wholly attributed to DF.

TABLE - V

## PROCUREMENT: CALCUTTA MOTHER DAIRY

Milk received from	Quantity procured (kg)
Bhagirathi Cooperative Producers' Union Ltd.	23,45,197
Himalayan Cooperative Milk Producers' Union Ltd.	94,290
Kalyani	13,81,171
Haldighata	1,84,622
Gujarat Cooperative Milk Marketing Federation Ltd.	6,32,210
Cooperative Milk Producers' Societies	1,50,733
	49,88,223

SOURCE: NDDB Annual Report 1979-80.

After ten years of the project the increase in procurement Madras is a marginal 140,000 litres a day.

The increase in procurement in Delhi is largely due to the contribution of fresh milk brought from far-flung places, mainly Gujarat. Delhi's milk-shed area comprises the villages of the union territory of Delhi, parts of Haryana, Punjab, Uttar Pradesh, Madhya Pradesh and Rajasthan. Even so, 28.5% of the milk comes from Anand (Gujarat), which is not part of Delhi's milk-shed. (See Table VI below)

TABLE - VI

## PROCUREMENT: DELHI MOTHER DAIRY

Milk received from	Quantity procured (kg)
Rajasthan Cooperative Dairy Federation Limited, Jaipur	2,99,07,878
Pradeshik Cooperative Dairy Federation Limited, Lucknow	1,26,11,370
Punjab State Cooperative Milk Producers Federation Limited, Chandigarh	88,40,440
Punjab Dairy Development Corporation Limited, Chandigarh	21,54,400
Haryana Dairy Development Cooperative Federation Limited, Chandigarh	37,85,950
Gujarat Cooperative Milk Marketing Federation Limited, Anand	2,35,51,438
Madhya Pradesh State Dairy Development Corporation Limited, Bhopal	18,51,990
	TOTAL: 8,27,51,438

SOURCE: Delhi Mother Dairy, Annual Report, 1979-80

Can one assume that an increase in procurement actually reflects an increase in local production? "It is not possible", says a review mission, "to assess at this stage the extent to which the rise in milk procurement reflects increasing milk production or decreasing retention by the milk producers for local consumption and manufacture of milk products". (16).

#### Throughout

Although the all-India throughput in ten years has gone up from 902,000 litres to 2,198,000 litres per day (see Table IV on page 21), again, as in the case of procurement figures the pre-project and achievement figures are not comparable.

The difference of 587,000 litres per day (i.e. the difference between throughput and procurement) represents the extent of milk powder and butter oil that is being used daily for recombination into liquid milk. This amounts to 26.7% of the total throughput.

If it were not for Bombay, where the contribution of milk powder and butter oil is only 8.3% of the throughput, the all-India percentage (26.7%) would have been much higher. In their total individual throughputs, Madras, Delhi and Calcutta utilise 22.4%, 37.5% and 66.8% of milk powder and butter oil respectively and a large portion of this is imported.

#### Capacity

Capacity increases seem to have taken place in a disproportionate manner - disproportionate to both the throughput and procurement - resulting in a lot of idle capacity. Even in a flush month like December 1980 there is under-utilised capacity in all four cities (see Table IV on page 21). The maximum is in Calcutta where the throughput is only 40% of the total installed capacity.

Capacity increases are to be considered under "action items" 1 and 2. Whilst "action item" 1 represents the expansion of existing capacity, "action item" 2 involves the setting up of new capacity or city nether dairies.

As can be seen in Table VII on page 24, the expansion of 500,000 litres per day on existing installed capacity has taken place at a cost of Rs.32.1 million. (Refer Table II on page 17). This works out to about Rs.64/- per litre of installed capacity.

TABLE - VII  
EXISTING CAPACITY EXPANSION

	(in 100,000 litres daily)		
	Pre-project 1970	Expansion	Total (as in Dec. 1980)
Delhi	3.00	0.75	3.75
Bombay	5.00	2.00	7.00
Madras	0.50	0.75	1.25
Calcutta	1.50	1.50	3.00
TOTAL:	10.00	5.00	15.00

SOURCE: IDC Background Note for WFP Terminal Review Mission, February 1981.

The setting up of mother dairies or new capacity of 1,400,000 litres per day has cost Rs.262.20 million (refer Table II on page 17) so far, amounting to Rs.187/- per litre of new capacity. Although the mother dairy in Calcutta has been commissioned, the distribution system is yet to be completed. This may partially account for the low throughput in Calcutta, but does not explain fully the dismal performance. In fact, even in Bombay, where an efficient distribution system exists, the mother dairy is being utilised only upto 69%. The cost of Rs.187/- per litre for setting up new capacities seems far too expensive when compared to Rs.64/- per litre for expansion of existing capacities. It is not quite clear why in these four cities, new capacity build-up is being favoured against the less expensive expansion programme.

TABLE - VIII  
CAPACITY (SETTING UP OF NEW CITY MOTHER DAIRIES)

	(in 100,000 litres daily)	
	Capacity	Throughput (March 1980 figures)
Delhi	4.00	3.45
Bombay	4.00	2.77
Madras	2.00	0.78
Calcutta	4.00	0.43
TOTAL:	14.00	7.43

SOURCE: 1. Capacity figures: IDC Background Note for WFP Terminal Review Mission, February 1981.  
2. Throughput figures: IDC Annual Report 1979-80.

**Market Share**

The above facts give us some pointers to evaluate the performance of "action items" 1 and 2.

The transfer of milk markets to organised milk dairies has, to a certain extent, taken place in Delhi and Madras but there has been no significant improvement in Calcutta. In Bombay, even before the programme began, the organised dairies had a commanding share of the market. Although the situation in Madras, is 100% better than what it was before the beginning of the programme, its market share is still only 50% and could tilt one way or the other in the future. In fact, the IDC Background Note for the WFP Terminal Review Mission, February 1981 shows that Madras' mother dairy's market share was only 39% in December 1980.

Table IX shows the progress made in increasing market shares by the organised dairies in the four cities. As for the market share of the poorest groups in the four metropolitan markets in terms of quantity and value in both Calcutta and Madras the percentage share of the market of organised dairies is very much below commanding position. (See Table X on page 26).

TABLE - IX  
SHARE OF ORGANISED DAIRIES IN THE FOUR METRO MARKETS

	Bombay		Calcutta		Delhi		Madras	
	Pre- prog. (1972)	Post- prog. (1980)	Pre- prog. (1973)	Post- prog. (1980)	Pre- prog. (1971)	Post- prog. (1980)	Pre- prog. (1972)	Post- prog. (1980)
No. of house-holds, '000	1,018	1,264	1,138	1,389	598	794	400	794
No. of house-holds buying milk, '000	987	1,239	776	945	588	780	398	643
Market share of organised dairies, %	62	70	27	32	37	60	25	50

SOURCE: A private study conducted for WDDB/IDC.

TABLE - X

## SHARE OF MARKET OF POOREST GROUPS BY ORGANISED DAIRIES

	Bombay		Calcutta		Delhi		Madras	
	Pre-prog. rest seg-ment	Post-hot-tom quar-tile	Pre-prog. rest seg-ment	Post-hot-tom quar-tile	Pre-prog. rest seg-ment	Post-hot-tom quar-tile	Pre-prog. rest seg-ment	Post-hot-tom quar-tile
No. of house-holds, '000 & share of market:	136	316	221	345	70	182	60	209
Quantity	43	71	13	26	29	59	11	39
Value	36	72	9	18	25	52	9	31

NOTE : The segmentation procedures for the two periods were not identical. For the pre-programme year, the four segments were arrived at on the basis of per capita income and were hence unequal in size; the 1980 study was segmented into four equal sized quartiles.

SOURCE: A private study conducted for NDDB/IDC.

A possible reason for this non-achievement of commanding shares of the markets could be that both procurement and throughput, which were estimated to be 2,275,000 and 2,750,000 lakh litres per day by 1974-75 had not even been achieved by December 1980.

Evaluation of "Action Item" 4 & 5  
Build-up of milk processing capacities in the hinterland milk-sheds to enable farmers' organisations to provide a remunerative channel for rurally produced milk.

Table XI on page 27 shows that the physical targets of establishing seventeen feeder balancing dairies have been achieved. The milk processing capacity created is almost double of what was envisaged. The throughput, (see Table XII on page 28) although higher than what was envisaged in the project, is only 76.7% of the built-up capacity, i.e. about 24% under-utilised. The explanation offered for creation of capacity far in excess of what was envisaged is "Additional capacity has been created in view of the normal two-third utilisation (flush-clean average) and also to provide for manufacture of milk products. The average level of utilisation of these capacities is estimated to be 79%". (17).

It may be recalled here, that funds were made available for the



expansion of capacity by curtailing the original allocations made for increasing milk production and removal of city kept milch animals. "This amount" says G.S. Kahlon (ex-director, eastern region, NDDB & IDC) "has been spent without any rationale on building brick and steel structures which are easier to raise through the agencies of contractors". (18).

TABLE - XI

Targets	Pre-project	Target envisaged in the project	Achievement as on December 1980
Feeder Balancing Dairies completed/expanded.	3	17	17*
Rural milk processing capacity (Lakh lit/day).	6.55	14.8	34
Average throughput (Lakh lit/day).	4.60	14.8	26.08

SOURCE: 1. IDC Background Note for WFP Terminal Review Mission, February 1981.  
2. \*Achievement 17 feeder balancing dairies: NDDB Annual Report, 1979-80 (as of 31-3-80).

#### Wide Variations

Table XII on page 28 throws some interesting light on the individual utilisation pattern of feeder balancing dairies. In places like Varanasi and Patna the throughput is only 8,000 and 9,000 litres per day as against built-up capacities of 100,000 litres per day. Thus, they are working at only 8% and 9% capacity, respectively.

G.S. Singh Kahlon, states: "Varanasi and Patna, with a population of over five lakhs each, were starving for milk. Interestingly, feeder balancing dairies without fluid milk sales section were set up in these cities to function as repositories of the national milk grid for feeding mother dairy at Calcutta. The feeder balancing dairies, like others, have a strong milk powder section to be used in case of surplus milk - a stage which may never come in the next decade". (19).

Out of a total raw milk processing capacity of 1,375,000 litres per day, in the four unions in Gujarat, i.e. Sabarkantha, Anand, Mehsana and Banaskantha, the throughput is as high as 1,347,000 litres per day i.e. together operating at 98.2% capacity. At the lower end, plants such as the ones in Muzahidabad are operating at 11% capacity, Bikaner at 14% and Matigara at 15%. Rohtak, Bhatinda, Erode, Ludhiana, and Madurai are operating between 34% and 32.6%. Some plants such as Sabarkantha, Mehsana, Banaskantha (all Gujarat) Jalgaon and

Vijayawada are operating individually at more than 100% capacity.

One of the reasons advanced by the DF authorities for creating feeder balancing dairies was the conversion of excess milk during the flush months into powder for reconstitution into liquid milk in the lean months.

TABLE - XII  
FEEDER BALANCING DAIRIES

Location	Raw milk processing cap. ('000 L/D)	Current throughput Dec. '80 ('000 L/D)	Milk powder manufactured during Dec. '80
Sangamjagarlanudi	150	117	315
Patna	100	9	-
Anand (DF expn.400)	800	580	2253
Sabarkantha	175	313	717
Mahsana (DF expn.300)	450	499	1400
Banaskantha	150	155	281
Rothak	100	34	9
Jalgaon	100	113	72
Koehnepuz	50	92	-
Ludhiana (DF expn.100)	150	64	121
Bhatinda	100	35	95
Bikaner	100	14	-
Madurai (DF expn.100)	150	79	74
Erode (under construction)	100	41	-
Meerut	100	76	-
Varanasi	100	8	11
Natigara	100	15	-
Muzhidsbad (under construction)	100	11	-
Beroda	175	108	-
Vijayawada	150	180	225
Salem	-	-	-
TOTAL:	3400	2608	5573

SOURCE: Background Note for WFP Terminal Review Mission, February 1981.

Table XII above, shows that in the month of December 1980 (flush month) over 83% of the milk powder manufactured in Gujarat while the share of Rothak (Punjab) and Varanasi (Uttar Pradesh) was only .16% and .19% respectively. Such drastic imbalances in inter-states production of milk powder belies the reason advanced for feeder balancing dairies which is to make milk available for the whole year from its respective milk-shed dairies at a steady rate.

Even in a city like Bombay (where the marketing performance of DF has been by far the best) the availability of milk in a lean month (June) is dismal.

"The city (Bombay) is in the grip of a milk crisis" says Anjana Pasricha "with most consumers managing to get just about 50 per cent of their normal quota since last week ... The situation is much worse this year than what it normally is during the summer months, when a slight shortage always occurs". (20). The situation in Delhi and Calcutta with their network of feeder balancing dairies is anybody's guess.

As with "action items" 1 and 2, in "action items" 4 and 5 too, the expenditure incurred on plant and machinery has been more than double the original allocation, from Rs.209.8 million to Rs.479.69 million.

It would have been revealing to compare raw milk procurement figures in these milk-shed areas to throughput, to estimate the extent to which the expansion of capacity is being utilized with imported milk powder. Unfortunately, such figures are not available. Evaluation of feeder balancing dairies have always been in terms of capacity build-up and throughput. If milk procurement figures in these milk-shed areas are given at all (as in the case of the IDC annual report, 1979-80), they are given in lakh kilograms per day (while liquid milk procurement, throughput and capacity figures for the four metros are provided in litres).

Evaluation of "action item" 8  
Facilities for development of improved milch animals.

Target set by the NDDB: To establish 14 bull mother farms to provide bulls for artificial insemination services.

TABLE - XIII

Achievement No. of Bull Mother Farms Established	No. of Bulls	No. of Cows	Growing Stock		
			Males	Females	
12	Produced:	1459	Initial	329	495
	Sold :	914	Stock	901	
	Retained:	113	Sold	674	
			Present		
			Stock	691	

SOURCE: IDC Background Notes for WFP Terminal Mission, February 1981.

Out of the total original allocation of Rs.40 million, only Rs.26.94 million had been disbursed till January 31, 1981 which is even less than the 1979 revised allocation of Rs.30 million.

Under "action item" 8, 14 bull mother farms were to be established to produce good pedigres bulls for cross-breeding so that the imports of exotic animals could be eliminated in the long run. According to the latest available statistics, (February 1961), 12 bull mother farms have been established that have produced, reared and sold 914 bulls (Jersey & Holstein Friesian variety) which are being used in cross-breeding programmes.

Table XIII on page 29, shows the achievements of this "action item", and going by it, DF seems to have done well by this "action item".

#### Cross-breeds Controversy

But there are certain questions pertaining to the long-term implications of upgrading stock in a country like ours. Raymond Crotty, for example, is of the opinion that cross-bred cows in spite of superior feed conversion rates at high levels of nutrition are not necessarily more efficient milk producers than local ones at lower levels of nutrition. "The likely impact of exotic breeds on the performance of Indian cows", says Crotty, "has probably been exaggerated. These breeds could indeed dramatically improve the genetic potential of Indian cows to produce milk, as indeed would any form of selection from the indigenous herd, other than natural selection for low capital cost, have done in the past. The realisation of this potential may now be profitable for larger farmers, using large amounts of valuable feed, with relatively abundant capital to produce high priced milk; it is unlikely to be profitable for the landless using ever more costly feed, with little capital". (21).

M.G. Jackson makes a similar point: "They (cross-bred cows) produce several times more milk than their Indian mothers, provided they are fed liberally on concentrate feeds, or provided farmers grow nutritious green fodder for them. They are considered to be more efficient simply because they produce more milk per head. In terms of the efficiency with which they convert scarce national concentrate feed resources to milk, however, they, like the city milch cow and buffalo, are such less efficient than their mothers". (22).

Also, since feeds remains the single most expensive input in the maintenance of the cross-bred, the programme becomes viable only for those who can afford such investments unless they are continuously subsidised or financed by way of loans with very small or no interest.

"If cross-breeding with exotic sires", Crotty continues, "results in a technological breakthrough that reduces the cost of milk production on larger farms, this will be reflected in the price of cross-bred heifer calves. Small farmers without capital and landless labourers will be unable to participate, unless their capital costs are subsidised continuously - and that is not envisaged. Once the subsidies for cow rearing cease, herd replacement will revert to

natural selection, as at present and in the past. Public resources will meanwhile have been used to subsidise the rearing of more cows to add to the 180 million cattle India already has, and further to depress output from its overstocked communal grazing lands". (23).

Besides the problem of inefficiency of cross-breeds in a feed-scarce economy like India, the cross-bred animal is also delicate and disease prone.

Evaluation of "action items" 7 & 9.

Provision of inputs in enhancement of milk production and development of milk procurement systems.

Target:

- Farmers' organisations to be built up in each of the 18 hinterland milk-sheds.
- Under the project, some 10,00,000 milk producers operating close to two million animals will be provided with new or improved marketing facilities for their milk inputs required for production increase and an organisational structure starting at the village level ensuring a coordination of inputs and market outlet.
- The project is planned to cover 1,875,000 million milch animals.

Achievement:

An overview of "action items" 7 and 9, shows that out of a total of Rs.303 million originally allocated for these production-increase oriented actions, only Rs.261.99 million has been spent. Both in 1975 and 1979 the allocations for this section were revised and brought down, first to Rs.295.1 million and then to Rs.262.45 million. Although in the revised allocation in September 1979, expenditure on "action item" 9 was revised upwards to Rs.32.45 million from the Rs.18 million, in the case of "action item" 7, it was progressively revised downwards at every reallocation. The allocation on increasing milk production by provision of technical inputs was brought down from Rs.285 million to Rs.230 million.

The DF areas encompass about 1.4 million cows and 0.7 million buffaloes (total 2.11 million) with an estimated daily milk production of about 4 million litres. Since the intended daily throughput of indigenous milk was about 2.75 million litres by mid-1975, keeping in mind the farmers' own milk needs, a daily production of 5.5 million litres in the DF areas was needed.

Since very few targets have been originally set for "action items" 7 and 9, one can only analyse their performance in terms of the total outlay of these two "action items", the trends in expenditure and the overall impact of the various programmes related to production enhancement on an all-India basis. For production enhancement under DF-I it was envisaged that an 'Anand Pattern' Dairy Cooperative Union

natural selection, as at present and in the past. Public resources will meanwhile have been used to subsidise the rearing of more cows to add to the 180 million cattle India already has, and further to depress output from its overstocked communal grazing lands". (23).

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An overview of "action items" 7 and 9, shows that out of a total of Rs.303 million originally allocated for these production-increase oriented actions, only Rs.261.99 million has been spent. Both in 1975 and 1979 the allocations for this section were revised and brought down, first to Rs.295.1 million and then to Rs.262.45 million. Although in the revised allocation in September 1979, expenditure on "action item" 9 was revised upwards to Rs.32.45 million from the Rs.18 million, in the case of "action item" 7, it was progressively revised downwards at every reallocation. The allocation on increasing milk production by provision of technical inputs was brought down from Rs.285 million to Rs.230 million.

The DF areas encompass about 1.4 million cows and 0.7 million buffaloes (total 2.11 million) with an estimated daily milk production of about 4 million litres. Since the intended daily throughput of indigenous milk was about 2.75 million litres by mid-1975, keeping in mind the farmers' own milk needs, a daily production of 5.5 million litres in the DF areas was needed.

Since very few targets have been originally set for "action items" 7 and 9, one can only analyse their performance in terms of the total outlay of these two "action items", the trends in expenditure and the overall impact of the various programmes related to production enhancement on an all-India basis. For production enhancement under DF-I it was envisaged that an 'Anand Pattern' Dairy Cooperative Union

TABLE - XIV

Operation Flood I Milk-shed Districts	Cooperative Union registered		Village Dairy Cooperative				Farmer Members (*000)		Dairy plant commis- sioned: Union	
	Month	Year	Anand Pat.	Others	Anand Pat.	Others	Total	Women	Year	Yes/No
<b>OPERATION FLOOD</b>										
<b>Eighteen Anands</b>										
Guntur	2	77	210	350	210	350	10.9	1.5	77	Yes
Patna	4	77	118	-	29	-	2.7	NA	78	No
Banskantha	1	69	984	-	700	-	75.8	NA	73*	Yes
Kejva	12	46	895	-	895	-	308	31.0	Expan- ded 70	Yes
Mehsana	11	60	887	-	887	-	159.8	NA	Expan- ded 74*	Yes
Sabarkantha	11	64	975	-	950	-	89.7	NA	74*	Yes
Rohak	3	72	179	108	154	-	17.0	0.7	77*	No
Jalgaon	11	71	436	204	366	204	36.4	NA	76*	Yes
Kolhapur	3	63	129	354	129	354	24.5	NA	-	-
Bhatinda	3	78	131	-	122	-	NA	NA	74	Yes
Ludhiana	7	72	34	-	33	-	1.9	0.5	74	No
Bikaner	8	72	265	-	172	-	13.0	NA	73*	Yes
Erode	2	75	184	-	182	-	24.3	2.5	Dus in 80	-
Madurai	-	-	766	382	651	382	267.0	NA	Expan- ded 75	No
Muzut	-	-	132	166	132	150	10.9	NA	78	No
Vazonsai	-	-	63	-	6	-	2.6	NA	79	No
Muzhidabad	10	74	182	-	118	-	7.6	NA	-	-
Matigara	1	73	261	-	188	-	6.7	NA	74	Yes
SUB-TOTAL			6831	1564	5986	1440	1058.8	36.2		

Operation Flood I Milk-shed Districts	Cooperative Union registered		Village Dairy Cooperative ORGANISED FUNCTIONAL				Farmer Members ('000)		Dairy plant condns- with Union	
	Month	Year	Anand Pat.	Others	Anand Pat.	Others	Total	Women	Year	Yes/No
<b>ADDITIONAL DISTRICTS</b>										
Bazoda	12	57	644	-	579	-	68.5	6.9	Expan- ded 72*	Yes
Ahmedabad	3	77	115	3	92	3	5.6	NA	-	-
Madras	4	79	260	132	260	132	30.9	9.4	Expan- ded 74	No
Doty	10	78	86	20	79	19	15.0	NA	-	-
Vellore	-	-	628	46	627	46	NA	NA	-	-
Salem	10	78	294	-	294	-	42.0	-	Dug in	-
Midnapore	8	77	76	-	33	-	2.4	NA	82	-
Gurgaon	4	72	146	42	144	34	21.0	NA	-	-
Ropar	7	78	28	-	24	-	1.2	0.1	-	-
<b>TOTAL OPERA- TION FLOOD</b>			<b>9109</b>	<b>1807</b>	<b>8118</b>	<b>1674</b>	<b>1245.4</b>	<b>52.6</b>		

\* Expansion in progress at year-end

**SOURCE:** IDC Annual Report, 1979-80, Annex 3, Milk Production Enhancement Inputs (Progress as on March 31, 1980 and Annex 2, Farmer's Organisations, As on March 31, 1980.

National Dairy Development Board Annual Report 1979-80, Status in the Milk-shed Districts.



would be established in each major milk-shed district which would own a dairy plant and a cattlefeed factory. Village cooperative dairy societies, artificial insemination and mobile veterinary health covers were also to be provided under this programme. The assessment of these programmes will determine the progress in local milk production enhancement.

#### Cooperatives

Table XIV on pages 32-33 shows that out of 27 milk-sheds, no unions have so far been registered in four areas, Meerut and Varanasi in Uttar Pradesh and Madurai and Vellore in Tamil Nadu. Although DF-1 was a national programme, aimed towards creating an infrastructure for milk production, it is more than apparent that the programme has been largely geared towards one state i.e. Gujarat. Closely following Gujarat in performance is Tamil Nadu.

But according to G.S. Kahlon, "For the achievement made in Tamil Nadu the NDDB/IDC cannot claim any credit. These are actually the results of the cooperatives infrastructure and the foundation laid much earlier and further nurtured by a devoted individual. The pattern of cooperatives in this state is of its own nature and has not even the distant relation with the much publicised Anand pattern". (24).

Out of 6,831 village dairy cooperatives organised under the Anand pattern in the 18 primary districts, 3,741 are in four districts of Gujarat - Bansa Kantha, Kaiza, Mehsana and Sabarkantha (54.8%). If one includes the additional districts, then out of a total of 9,109 village cooperatives organised under the Anand pattern, 4,501 come under Gujarat (including Baroda and Ahmedabad).

In the primary districts, Tamil Nadu contributes 14% of the organised Anand pattern village dairy cooperatives and 16% of all dairy cooperatives (Anand pattern and others). Including the additional districts, 24% of the Anand pattern village dairy cooperatives and 26% of all cooperatives are based in Tamil Nadu.

The above analysis shows that Gujarat and Tamil Nadu, share over 75% of all organised village dairy cooperatives and only a little below 25% of the cooperatives are shared among the remaining eight states of Andhra Pradesh, Bihar, Haryana, Punjab, Maharashtra, Rajasthan, Uttar Pradesh and West Bengal.

Among the functional Anand pattern cooperatives in the 18 primary districts, 59% and 16% are in Gujarat and Tamil Nadu and, including the additional districts it works out to 51.5% and 27% respectively. Thus, among the functional dairy cooperatives only 21.5% are located in the rest of the country.

Farmer Members

The same pattern is observed even for the number of farmer members in these cooperatives. Nearly sixty per cent of the total number of farmer members in the 18 "mandals" came from Gujarat. If one includes the additional districts, the percentage although slightly reduced is still much over 50 the number of members. 27.5% and 30.4% of the total number of members are located in the primary districts and all districts (primary and additional) of Tamil Nadu respectively. Thus 87.2% of all farmer members are located in Gujarat and Tamil Nadu alone and only 12.8% in all the other eight states.

Although a claim is made that DF has involved women farmers in the dairying process it will be seen that only 4% of the total farmer members are women, and of these 95% are based in Gujarat and Tamil Nadu (72% is the share of Gujarat alone).

Dairy Plants

With regard to dairy plants it can be seen that in the 27 milk-shed areas 17 plants have been established and/or expanded. Out of these, only 10 are with the union of which five are based in Gujarat. Significantly, the Tamil Nadu union has no dairy plant.

Table XV on pages 36-37, shows that nine cattle feed plants have so far been established/expanded in the 27 milk-sheds covered under DF. Six of these nine are with unions and five among them are based in Gujarat. In the remaining eight states no cattle feed plant has been established yet.

Out of the 3,352 societies marketing cattle feed in the primary districts, 2,434 (72.6%) are in Gujarat. Including the additional districts 2,826 out of 4,299 (65.7%) are based in Gujarat. Including Tamil Nadu's 606 societies (primary plus additional districts), 3,432 societies out of a total of 4,299 (80%) are in the two states. Only the remaining 20% are based in the other eight states of India.

What is even more startling than the number of societies marketing cattle feed is the quantity sold. During March 1960, in Gujarat, a total of 14,312 million tonnes were sold out of a total of 15,713 million tonnes (91.1%). Including the additional districts, although the percentage drops slightly (89.9%), the amount is still, in actual terms, as high as 14,877 million out of a total of 16,546 million tonnes. On this count even Tamil Nadu comes nowhere close to Gujarat, having sold only 293 mt of cattle feed during the month.

TABLE - XV

Milk-sheds	Cattle-feed plant		Balanced Cattle Feed		SELLING PRICE (Rs/Kg)
	commissioned:	with Union	SOCIETIES MARKETING	QTY. SOLD DU- RING THE MONTH (mt)	
year	yes/no				
<b>OPERATION</b>					
<b>FLOOD</b>					
<b>Eighteen</b>					
<b>Anands</b>					
Guntur	Due in 81	-	4	15	.80
Patna	77	no	-	-	-
Banskantha	76	yes	624	1144	1.00
Kaiza	64	yes	892	7753	1.03
Mahsana	Expanded 77	yes	615	4376	.90
Sabarkantha	76	yes	303	1039	.98
Rohtak	76	no	154	71	1.30
Jalgaon	78	yes	300	783	1.04
Kolhapur	Due in 81	-	44	76	1.13
Bhatinda	Due in 81	-	-	-	-
Ludhiana	74	no	31	30	1.20
Bikaner	Due in 81	-	111	153	1.05
Erode	Due in 80	-	-	-	-
Meduraj	-	-	142	104	1.10
Muzut	Due in 80	-	12	25	1.05
Varanasi	Due in 80	-	-	-	-
Muzshidabad	Due in 81	-	106	143	1.12
Matigara	Due in 80	-	14	1	1.25
<b>SUB-TOTAL</b>			<b>3352</b>	<b>15713</b>	<b>-</b>

Milk-sheds	Cattle-feed plant		Balanced Cattle Feed		
	commissioned:	with Union	SOCIETIES	QTY. SOLD DU-	SELLING PRICE
year	yes/no	MARKETING	RING THE MONTH	(mt)	(Rs/Kg)
ADDITIONAL DISTRICTS					
Bazoda	78	yes	366	521	1.00
Ahmedabad	-	-	26	44	1.13
Madras	-	-	62	41	1.10
Goty	-	-	90	70	1.27
Vellore	-	-	200	39	1.10
Salem	-	-	104	39	1.10
Madhapore	Due in 81	-	67	61	1.40
Gurgaon	-	-	-	-	-
Ropar	Due in 81	-	24	18	1.18
TOTAL OPERATIONS FLOOD			4299	16546	-

**SOURCE:** IDC Annual Report, 1979-80, Annex 3, Milk Production Enhancement Inputs (Progress as on March 31, 1980 and Annex 2, Farmer's Organisations, As on March 31, 1980.  
National Dairy Development Board Annual Report 1979-80, Status in the Milk-shed Districts.

TABLE - XVI

Milk-shed	Artificial Insemination Services		Animal Health		Programms			
	NO. OF SOCIETIES (Villages) PROVIDING THE SERVICES	A.I. PERFORMED SINCE INCEPTION ('000)	NO. OF SOCIETIES COVERED	NO. OF SOCIETIES WITH FIRST AID	MOBILE VET CLINICS	VET BRG. WITH UNION		
	Cows	Buffaloes			Reg.	Emgcy.		
<b>OPERATION FLOOD</b>								
<b>Eighteen Anands</b>								
Guntur	16	0.01	0.49	160	4	4	1	12
Patna	3	0.56	0.16	-	-	-	-	1
Banasikantha	94	3.83	1.42	780	200	6	9	10
Kaizra	782	30.70	1102.85	856	845	22	22	58
Mehsana	82	20.23	11.73	855	730	20	11	43
Sabarakantha	120	6.84	5.58	450	120	5	4	20
Rohtak	5	0.05	0.02	154	63	5	1	7
Jalgaon	60	6.45	0.92	375	128	8	9	14
Kolhapur	3	-	-	77	77	2	2	2
Bhatinda	-	-	-	127	-	3	1	3
Ludhiana	-	4.74	3.65	24	-	1	-	1
Bikaner	55	1.60	-	179	-	4	3	6
Ennda	25	1.35	0.74	184	109	4	1	-
Madurai	453	25.88	42.75	463	463	11	3	22
Masut	9	1.02	0.01	218	218	6	1	-
Vazanasai	-	-	-	63	-	2	-	4
Muzhidabad	78	40.26	-	107	107	3	1	4
Matigaze	64	10.75	-	168	168	7	7	7
<b>SUB-TOTAL</b>	<b>1859</b>	<b>154.39</b>	<b>1170.34</b>	<b>5240</b>	<b>3232</b>	<b>113</b>	<b>76</b>	<b>214</b>

Milk-shed	Artificial Insemination Services		Animal Health		Programme			
	NO. OF SOCIETIES (Villages) PROVIDING THE SERVICES	A.I. PERFORMED SINCE 'NCEP-TION ('000)	NO. OF SOCIETIES COVERED	NO. OF SOCIETIES WITH FIRST AID	MOBILE VET CLINICS	Reg.	Engcy.	
	Cows	Buffaloes					VET DRS. WITH UNION	
<b>ADDITIONAL DISTRICTS</b>								
Baroda	124	2.78	24.20	525	210	7	3	13
Ahmedabad	-	-	-	-	-	-	-	-
Madras	151	24.18	33.24	287	287	7	2	13
Doty	98	42.60	-	98	98	7	-	16
Vellore	460	109.36	55.14	550	-	11	5	19
Salem	243	3.04	6.80	160	256	5	1	16
Midnapore	46	8.29	-	67	34	2	2	3
Surgeon	10	0.20	0.39	144	10	3	2	6
Ropax	-	-	-	24	-	1	-	-
<b>TOTAL OPERATION FLOOD</b>	<b>2991</b>	<b>344.84</b>	<b>1290.11</b>	<b>7095</b>	<b>4127</b>	<b>156</b>	<b>91</b>	<b>300</b>

**SOURCE:** IDC Annual Report, 1979-80, Annex 3, Milk Production Enhancement Inputs (Progress as on March 31, 1980 and Annex 2, Farmer's Organisations, As on March 31, 1980, National Dairy Development Board Annual Report 1979-80, Status in the Milk-shed Districts.

### Price of Cattle Feed

A close look at the selling price of cattle feed shows that while, on an average, it costs Re.1.01 in Gujarat, it is as high as Re.1.14 in the rest of the country. Feed costs, which are by far the most expensive input for the farmer producer in dairying, have a sharp inverse relationship to production and it is not surprising that in Gujarat the average price is less than the rest of the country.

### Artificial Insemination

Fifty-eight per cent of the cooperative societies providing artificial insemination services are based in Gujarat (Table XVI on pages 38-39). Including additional districts it is 84% together with Tamil Nadu.

Since the inception of the project however, the number of artificial inseminations performed on cows is slightly less in both percentage and absolute terms in Gujarat. This is primarily because Gujarat has been concentrating more on buffalo development and has historically been known for its buffalo rather than cows' milk. But where Gujarat has lagged behind, Tamil Nadu has made major gains. In the case of cows, 60% of all artificial inseminations performed ever since the inception of DF have been in Tamil Nadu. Including the marginal 19% of artificial inseminations done on cows in all districts of Gujarat, the two states together account for 79% of all inseminations performed under the project. In the case of buffaloes the figures are in the reverse. It is as high as 96% in the primary districts and 89% including the additional districts of Gujarat. Including Tamil Nadu's marginal 7% (all districts) the two states together account for 96% of all artificial inseminations performed on buffaloes under the project. This therefore means that only 4% of the total artificial inseminations performed were in the other eight states of Andhra Pradesh, Bihar, Haryana, Punjab, Maharashtra, Rajasthan, Uttar Pradesh and West Bengal. Even if we assume that artificial insemination is in fact the right process for increasing milk production in the country, out of the 9,199 villages covered under DF (there are 5,76,000 villages in India) only 2,991 (.5% of the entire country) villages were reached through DF's artificial insemination services.

### Animal Health Programmes

Out of the total of 5,240 societies covered under animal health programmes (shown in Table XVI on pages 38-39), 2,941 were in Gujarat (56%). Including the additional districts, the percentage for Gujarat falls slightly lower, to 49%. Tamil Nadu accounts for 25% of the societies covered under the animal health programmes in all the districts. Thus, 74% of all the societies covered under animal health programmes were located in Gujarat and Tamil Nadu.

TABLE - XVII  
FODDER DEVELOPMENT PROGRAMME

Milkshed	AREA UNDER FODDER CROPS (Ha)	NO. OF DEMONSTRATION FARMS
OF		
18 Anands		
Guntur	15	24
Patna	-	-
Banaskantha	358	10
Kaira	-	15
Mehsana	304	8
Sabarkantha	-	-
Rohtek	1	11
Jalgaon	10	60
Kolhapur	-	7
Bhatinda	-	-
Ludhiana	-	-
Bikaner	-	-
Erode	24	14
Madurai	216	-
Meerut	-	-
Varanasi	-	-
Murshidabad	8	2
Metigara	7	1
SUB-TOTAL	935	152
ADDITIONAL DISTRICTS		
Baroda	200	9
Ahmedabad	-	-
Madras	168	36
Ooty	-	-
Vellore	53	-
Salem	23	-
Midnapore	19	1
Gurgaon	17	-
Ropar	-	-
TOTAL OPERATION FLOED	1415	198

SOURCE: IDC Annual Report, 1979-80, Annex 3, Milk Production Enhancement Inputs (Progress as on March 31, 1980 and Annex 2, Farmer's Organisations, As on March 31, 1980).



Fifty nine per cent and 18% of the societies in primary districts who have been provided first aid facilities are based in Gujarat and Tamil Nadu respectively. Including the additional districts, Gujarat and Tamil Nadu account for 51% and 29%, respectively. Thus, 80% of all societies with first aid facilities are in Gujarat and Tamil Nadu alone.

Thirty eight per cent and 30% of regular mobile veterinary clinics and 54% and 13% of emergency clinics are based in Gujarat and Tamil Nadu, respectively. Out of 300 veterinary doctors associated with the unions and involved with DF, 144 (48%) and 86 (29%) are based in Gujarat and Tamil Nadu respectively. This means that a total of 230 doctors (77%) are based in Gujarat and Tamil Nadu, leaving 70 doctors, or 23% for the remaining eight states of the country.

Out of the total area under fodder crops, 70% of the land in the primary districts is in Gujarat (Table XVII on page 41). Including the additional districts the percentage, although slightly less, is as high as 60%. Together with land under fodder crops in Tamil Nadu, 95% of all the land in all the districts are in Gujarat and Tamil Nadu.

In the case of demonstration farms, 92 farms (46%) are located in Gujarat and Tamil Nadu. In states such as Bihar, Punjab, Haryana and Uttar Pradesh there are neither any demonstration farms nor any areas under fodder crops.

With such a heavy bias in favour of Gujarat and Tamil Nadu one wonders how such a project can be given a national character. But more of this later.

Meanwhile, while on the subject of fodder development, let us deviate slightly. It is essential to understand various issues/questions that are being raised on the subject of cross-breeds (discussed earlier) and their feed-fodder requirements. Especially in relation to the conversion of arable land from food to fodder cultivation.

#### Feed, Food and Fodder: Some Questions

In India, animal husbandry has never been in competition with crop production. These two aspects of agriculture have always been complementary. A symbiotic relationship has been maintained, so that on the one hand animals are used for draught purposes and to meet fertiliser and fuel requirements for a domestic unit and on the other hand, the main constituents of animal feeds are crop by-products - green forages and concentrates like damaged grain oil-cakes and milling by-products.

The area under cultivated fodder and concentrates has a bearing on cropping patterns. A large area allocated to fodder cultiva-

tion will naturally force a reduction in the land available for growing other crops, particularly when the increase in gross cultivated area is proportionately low.

The decision of OF policy-makers to upgrade the low-yielding quality of indigenous milk animals through selective cross-breeding has, therefore raised some doubts, keeping in mind the acute shortage and high costs of green fodder and concentrates, essential to maintain the genetic cross-bred stocks and their high-yields. Dairy animals with high performance figures can be maintained at peak production only when fed with high-quality rations and concentrates. In India, out of a land area of around 297 million hectares only about 4 per cent of the total area is under permanent pasture (FAO Production Yearbook, 1977) and severe constraints on arable land mean that the huge quantities of feed required would be almost impossible to grow.

It thus appears that the shortage of green fodder and concentrates are likely to hamper the success of OF.

It has been argued that in view of the severe limitations on high-quality feeds, intensive efforts should be made in certain areas where milch animals should be bred for their ability to convert such high-quality feeds into milk. M.G. Jackson an expert on animal husbandry has, however, surmised that "from the point of view of a national livestock feed budget and a situation in which supplies of quality feeds are limited, we face the classical economic problem of the best pattern of allocating a scarce input (feed) to a large number of producing units (animals). Thus, if the use of scarce supplementary feeds is concentrated in one area, some other area gets relatively less". (25).

The question then is: will a given limited amount of supplementary feed return more milk if fed to a large number of poorly-fed village stock or to a few, well-fed high-yielding animals? The data of Mellor and de Pouteres (1964) favour the former alternatives. They found that "one kilogramme of concentrates given to a low-yielding (because poorly-fed) buffalo returns more milk than if given to a high-yielding (because well-fed) milk colony or experiment station buffalo". (26). M.G. Jackson concedes that this conclusion must be verified against all kinds of livestock, but, if correct, this is a crucial argument against intensive livestock development.

The inception of cross-bred milch animals in a large way has also been questioned in terms of feed conversion efficiency. High-quality feeds are almost a prerequisite for a producer who wishes to keep high-yielding cross-breds. Increasingly, a few experts are coming to believe that the policy might not be so advantageous. Vinod K. Huria and K.T. Achaya in an article entitled 'Dairy Development in India: Some critical issues' in the Economic and Political Weekly (November 8, 1980) have sought to point out that

feeding animals with materials that could be used for feeding humans represents a very wasteful use of such foodstuffs. Traditionally, dairy animals in India have consumed grass, leaves, stalks, stem and stubble, or grain residue. Such a feeding practice may have led to inferior genetic structures of low-yielding animals but in terms of the input-output exchange, whatever small contribution such animals made was a positive contribution in energy terms. Huria and Achaya further contend that when feeding includes some concentrates like grains and oilcakes, yields of milk rise and the net energy balance is still positive. But, when feeding of these materials further increases, as a cross-bred cow warrants, and pasture of good quality is also utilised, the energy balance becomes negative. (Refer Table XVIII below).

TABLE - XVIII  
CALORIE BALANCE FOR DIFFERENT FEEDING SYSTEMS

	INPUT OUTPUT BALANCE		
	Megacalories per year		
1. Indigenous cows fed on agricultural waste in addition to wayside grazing.	0	135	135
2. Indigenous cows fed on 1 kg. concentrated feed/day during lactation in addition to wayside grazing.	200	318	118
3. Cross-bred cows fed 60 kg. of concentrated feed annually and crop from one-third hectare of land	1000; *2800	1350	-2450

\* potential food production from 1 hectare of land

SOURCE: Jul, McGens 'Dairy Development in India II' World Animal Review, 1978.

It is significant that the  $\frac{1}{3}$  hectare of land used for grazing, if used for agriculture, would give a winter crop of some 120 kg. of wheat and a kharif crop of 80 kg. of rice. In the case of the cross-bred cow in the table, the energy input of this  $\frac{1}{3}$ rd hectare has actually led to a negative balance. The Western model of dairying based on grain and oilcake feeding, is not likely to be suitable in its entirety for dairy development in an Indian situation, where a meagre economy does not have the surplus grains and oilcakes.

In addition to the problem of maintaining the genetic potential of cross-bred milch animals, the constraints on feed and fodder have severe implications on the avowed objectives of OF, viz. raising the lot of small and marginal farmers through dairying and dispelling regional disparities. Surinder Singh in an article in Economic and Political Weekly 'Operation Flood II: Some constraints

and implications' (October 27, 1979) argued that the shortage of feed stuffs will hit small farmers the hardest. Because their cropping patterns are determined by the subsistence nature of their household needs and other in-built restraints, the small farmers do not have the opportunity to affect changes in their cropping pattern which will ensure availability of high-quality feed-stuff.

In addition, the small farmer has no possibility of buying feed from the market since in rural areas a feed market is virtually non-existent. Such a constraint does not bear upon a farmer with large land holdings who can take a risk, comfortably buffeted by surplus capital and the ability to experiment with optimal cropping patterns.

So much for the gains of OF accruing to the small and landless farmers, who cannot, in fact, either afford a high-yielding cross-bred nor ensure maintaining it optimally.

In the regional context, it must be recognised that the availability of feed and fodder depends, to a large extent, on irrigation, apart from the obvious effects of quality of land and climatic variations.

Since green fodder is a perishable commodity, it is not possible to transport it over distances, and thus the shortage of fodder is likely to be region-specific.

In such a situation, it can be assumed that the gains of cross-breeding technology will remain confined to some selected number of regions, and not reach the comparatively less irrigated and low productivity regions. This will aggravate further the existing regional disparities instead of resolving them. The case of AMUL, SUMUL (a milk cooperative in Gujarat) and Gujarat, and their record performance when compared to the failure of OF in backward areas in Bihar and Uttar Pradesh amply highlights the contention.

It can be observed that this vital area of raising feed and fodder for high-yielding cross-breds, might get drawn into a vicious circle, which will not be easy to break. Cross-breds are reared to augment milk production. But they need additional concentrates and fodder, which are difficult to provide unless there is a significant shift in cropping patterns away from crop production for human consumption. This in turn will lead to food shortages, which cannot be withstood. The enhancement of milk production seems destined to remain in the doldrums till the parameters of cross-bred feed requirements, their conversion efficiency, and the country's food and milk requirements are not worked out.

Policy Reversal

"Action items" 7 and 9 were clearly production enhancement items but most of the emphasis was placed basically in two pockets. While consumers in the four metros may have gained marginally by this lop-sided development, critics would naturally question how much producers have benefitted.

All these years several excuses and explanations were offered for the non-performance on the production front. But lately there has been a complete reversal of policy. Operation Flood authorities now claim that OF was never a production enhancement programme.

Mr. G.S. Kahlon states: "After spending about Rs.20 crores it is now being circulated by the concerned authorities that OF-I, was not meant for increasing milk production". (27). Mr. K. Kurien, writing under the pseudonym 'Zachary' claims: "OF-I was not a milk production scheme" and therefore "these figures (of low production) are irrelevant". (28). "Operation Flood I" according to him, "attracted interest among marketing management people because it was primarily a marketing scheme, meant to secure a commanding share of the milk market in the metropolises for farmers in the hinterland". (29).

At this point it seems relevant to ask 'Zachary' how else he expects farmers to "call all the shots as in the industrial sector" (30) besides boosting local production.

The importance of increasing the indigenous production of milk, cannot be countered by rhetoric. It is a vital component in the entire milk supplies development programme and should be given top priority. Having discussed the performance of OF it appears natural to now explore the reasons for its imbalances and/or dismal performance. To what extent can its limited achievements be ascribed to its dependence on foreign aid? This and other related issues will be examined in the following chapter.

## AID TO DEVELOPMENT

For nearly a decade now, food aid has no longer been seen as a succour to developing countries. In fact, some critics maintain food aid is a weapon in the hands of the developed world which is brandished if the receiving country does not 'fall in line'. If the policy of food aid is traced back to the PL 480 grants, it is seen that America has been at the forefront of food aid and in time has even come to be disarmingly frank about the exact motives that have dictated this policy.

"I have heard", Hubert Humphrey once remarked, "that people may become dependent on us for food. I know this is not supposed to be good news. But to me that was good news because before people can do anything they have to eat. And if you are looking for ways to get people to lean on you and to be dependent on you in terms of their cooperation with you, it seems to me that food dependency would be terrific". (31).

Today, however, American food aid is viewed with skepticism and suspicion. But America is no longer the only food donor. The EEC, too, has of late started donating its surplus stocks. But, while American food aid programmes have been scrutinized by critics, the implications of aid from the EEC await critical analysis. Already there is growing concern, reflected in a survey of the EEC's trade policies in the Third World. According to the survey, "the overall picture for developing countries expecting more assistance to combat world hunger is bleak. It recalls the recent European Parliament resolution calling for increased assistance and argues that this will not be achieved if the member states continue to negotiate trade agreements based entirely on internal considerations and political expediency". (32).

### The Food Aid Debate

European food aid, critics claim, in the form of SMP and BO is a way of disposing of Europe's surplus production. By purchasing surplus milk in Europe with European Development Fund finance, the EEC is in fact holding its own price line and pampering the rich dairy lobby in the EEC. Thus, tax payers in Europe are in a sense subsidizing the rich agriculturists of the EEC.

Dr. Kurien however has a positive outlook. "Food aid", according

to him "can be used for investment by its recipients in the production, processing and marketing of food - and it can thereby serve to eliminate the need for further such aid in the future... An overriding objective of all aid should be to eliminate the need for aid and, if this is so, its use of food aid as investment which is most likely to accomplish our (Operation Flood) objective". (33).

What does Dr. Kurien mean by food aid as investment? "Food aid as an investment" he says,

- has to be given with an assurance of continuity;
- cannot be a dumping ground for sub-standard products;
- must be divorced from commercial interest;
- must not be manipulated to protect industrialised countries' markets;
- must be accompanied by disinterested financial and technical assistance". (34).

Can food aid be successfully used as an investment to become self-sufficient in the future, as Dr. Kurien believes?

S.C. Ray, a prominent dairy expert in the country, founder member of the Indian Dairy Association and former president, cautions against the "short-cuts" used by DF authorities to provide cities with milk by recombining gifts rather than by building up rural procurement. He points out the dangers of dairy aid becoming an end in itself rather than a means to an end. "For India's developing dairy industry", he states, "we have to use imported milk solids only as a means towards launching schemes of enhancement of indigenous milk production. As otherwise, how can dairying be an instrument to improve the lot of poor milk producers in the villages which is the basic tenet of Operation Flood?" (35).

This view is reiterated by others. "The Operation Flood project... has been justified essentially on the ground that dairy farming constitutes an ideal means of increasing rural incomes, especially of the poor in the villages with no land or very little land. However, in its actual operation, milk production has been the Achilles' heel of the scheme - the highly sophisticated propaganda about what has been achieved in the Kaitha district of Gujarat notwithstanding, the fifth plan had explicitly criticised the scheme for its lack of emphasis on the indigenous milk production programmes". (36).

Is this emphasis on capacity build-up in DF at the expense of enhancing local production a result of food aid?

This chapter attempts to assess the programme from India's point of view. Is it possible in the long run to eliminate aid altogether? Can food aid be successfully used as an investment to become self-sufficient in the future, as Dr. Kurien believes?

In the following pages we shall examine Dr. Kurien's concept of aid juxtaposed with that of the critics, who maintain that food aid:

- depresses local production;
- creates dependency;
- encourages the activities of transnational corporations.

#### Food Aid As Investment

Let us assume that food aid can be used as an investment for future development. One of the criterions listed by Dr. Kurien is that food aid should be given with a certain assurance of continuity. Continuity not only implies length i.e. number of years, but also a certain minimum quantity that is required to fulfill the objectives of the project. Thus continuity and quantity are both equally important.

In the case of OF it is interesting to examine the pattern of WFP's supply of SMP. Table XIX on page 50, shows that ever since the project began, OF never received the quantity that was indentured for by the IDC. This is in spite of the commitment made by WFP in item 1 (b) Article (II) of the plan of operations, to supply commodities in instalments according to the needs of the project. On the lower side, IDC received as little as 9,000 mt. tonnes as against an indent of over 22,000 mt. tonnes in 1973-74. On the other hand, in 1975-76 when the indent was for only 12,000 mt. tonnes it received nearly 27,000 mt. tonnes.

#### Fluctuating Supplies

That is not all. If one relates the figures of SMP supplies received to domestic production, another significant fact emerges. In 1973-74 and 1974-75, when local production fell considerably, aid too in the same years was reduced. In 1975-76 when there was a reversal trend i.e. a rise in local production, there was also an increase in aid.

A complaint was made by the IDC to the second WFP review mission March 1979: "The mission was informed that the project almost ran out of butter oil during the last quarter of 1974 and nearly ran out of milk powder during the early part of 1975. The mission explained that WFP, dependent as it is on its donors, cannot always ensure regularity of supply". (37).

This is definitely not the kind of continuity that Dr. Kurien talks about. Whatever be the reason for the cut in aid, if each time there is a slump in domestic production aid is also reduced then the very idea of aid as investment becomes highly questionable.



TABLE - XIX  
REGULARITY OF SUPPLY OF WFP SMP

Year	Domestic Production (000 MT)	Indented by IDC (000 MT)	Received (000 MT)
1970-71	22.43	9.3	6.3
1971-72	26.50	20.00	9.9
1972-73	35.44	10.00	12.0
1973-74	29.36	22.09	9.0
1974-75	23.59	20.00	10.6
1975-76	38.39	12.00	26.9
1976-77	44.62	21.00	17.6
1977-78	48.50	-	7.8
1978-79	59.60	25.00	15.4
1979-80	64.00	-	2.9
1980-81	NA	-	4.5
			+ 1.2 (expected to be received by March '81)

SOURCE: Extracts from WFP Terminal Review Mission, February 1981 and Economic Times, May 13, 1981.

#### Dumping Ground?

Dr. Kurien also insists that countries which receive food aid cannot be regarded as a dumping ground for sub-standard products. Yet products which were below the agreed standard were shipped to India. According to a complaint made by the IDC to the second WFP Review Mission, "The earliest consignment included somewhat old powder of early 1969 manufacture which had been drawn from EEC stocks purchased by the EEC and withdrawn from the market as part of the farm prices support programme. This powder was considered by the IDC to be stale and unsuitable for recombination purposes". (38). During 1975-76, 901 mt. tonnes of SMP and 585 mt. tonnes of SD which were earlier rejected by the IDC "was subsequently accepted as per WFP's instructions". (39).

Thus, on the counts of continuity, (including quantity) and quality of aid there have been major lapses on the part of the EEC. This is certainly not aid as investment.

Dr. Kurien's other points that aid must be divorced from commercial interests; that it must not be manipulated to protect industrialised countries' markets and must be accompanied by disinterested financial and technical assistance, could be dispensed with by critics as a naive and unrealistic understanding of world economic relations and will be contested later. Let us now examine the contentions of DF critics.

### Depress Local Production

"No dairy development programme", says the NDDB "was taken up in the country to increase milk production ever in a systematic way before Operation Flood". (40). "The use of food aid as investment in production, processing and marketing invariably requires that the implementors should undertake an integrated programme which involves helping indigenous producers to produce more of the foods in question, linking the production to whatever processing facilities may be required - to establish an efficient marketing channel for the additional production thus achieved". (41).

During the project period processing facilities have been either newly installed at substantial cost or expanded. Transportation and other marketing facilities have been developed. But procurement has been much below the throughput and the capacity build-up, both at the city and rural dairy levels. (This has been explained in detail earlier, where we discuss reallocation of finances and the great emphasis on capacity build-up at the expense of increasing production).

During December 1980, ten years after the project began, there was still a difference of over 550,000 litres of milk per day between procurement and throughput in the four cities, the gap being filled by imported milk powder. (Refer Table IV on page 21). It is assumed that when the NDDB/IDC were planning OF, the targets were based on certain realistic calculations. Today, in a flush month there is a gap of over 650,000 litres per day from the projected target of 2,275,000 litres. (Refer Table IV on page 21). The dismal performance of the Calcutta Mother Dairy where procurement has fallen lower than what it was in pre-project days has been discussed earlier.

Dr. Kurien's explanation for the short-fall in targets, while heavy on rhetoric, is pelted in substance. "Would you like me to set very soft targets that I can meet very easily", he asked in a recent interview. "Would you, knowing the requirements of the country for milk and milk products rather expect me to set almost impossible targets for me to reach, in the hope that I may achieve them?..I think there is no harm in aiming at the stars. That is one way of hitting the trees tops". (42). And missing them.

### Does Food Aid Depress Price?

To examine the poor performance on the production front it is also necessary to see if food aid has actually depressed prices paid to milk producers. The NDDB is quite aware of this inherent danger in large gifts of food aid.

"Food aid", according to an NDDB handout, "may have disincentive effects on the farmer if it results in a depressed price. This aspect is particularly taken care of at every stage and the commodities for

recombinations were not made available at unduly low prices". (43).

The Kaira District Cooperative Milk Producers Union Ltd., Anand (Amul) annual report 1979-80 says quite the contrary. "In spite of this increase in milk purchase price, the union could not pay prices as per the expectation of the milk producers. Unless the producers are given a fair price, they will not have sufficient incentive for increasing their milk production". If this is the situation in Gujarat, the most favoured state, it does not bode well for the other states.

For the purpose of analysis let us assume that milk powder was available to the city plants at the same cost as local raw milk. But is the price paid for raw milk itself remunerative? Or, is it just opportunity costs?

According to the current union agriculture minister, Rao Birendra Singh: "The only achievement of the programme was to make available cheap milk to urban consumers at the cost of the rural milk producer". He believed that, "producers were not getting remunerative prices for the milk which was procured from them by the cooperative unions for processing and supply to urban consumers". (44). The same item reports that Dr. V. Kurian "agrees with the minister that higher prices should be paid to the milk producers. But, this is possible only if the consumer price is raised. Is the government prepared for this?" (45).

On the whole, there seems to be enough indication from the rural areas that the price paid to rural producers is unremunerative. The recent 'non-supply' of milk agitation in Tamil Nadu is just one of the cases in point. "Among the reasons the dairymen list for the fall in local milk production", a recent article states, "are drought, floods, shortage of feeds and fodder, a high cost of cattle maintenance and uneconomic prices the modern dairies offer to the farmer". (46).

It is a simple economic fact that unless an activity yields sufficient returns, it is not worthwhile to go into it. If we go by what the agriculture minister and the rural producers' organisations have to say, then the activity of milk production does not seem to be very remunerative. One way of enhancing production could be by offering more remunerative prices to producers and shifting the emphasis of dairy development from being a programme to benefit urban consumers to rural producers, or at least be equally favourable, as was the intended objective.

In a Planning Commission report on DF, this is one of the reasons offered by the project authorities for the shortfall on the rural side: "It was assumed that the concerned authorities would wish to have a price structure which gives milk producers fair returns and which did not incur large deficits. However, the reverse happened". (47).

Unrealistic Costing

In India, unfortunately, where milk is considered only a by-product, no scientific data to estimate the cost of producing a litre of milk is available. From several studies conducted with differing premises, calculations and approaches, one thing is clear - the cost of the production of milk has been steadily increasing during the last 15 years.

"Realistic costs estimates may well be a deciding factor in determining the viability of dairying in the long run" say Vinod K. Murria and K.T. Acharya. "If the true overall cost of milk production is higher than the price paid to the producer, dairy development could eventually even have adverse effects on the economy". (48).

The costs of feed and fodder forms the largest part of the costs in milk production. In his study, Whyte, a dairy research scholar, has arrived at a figure of Rs.5.43 per litre of whole milk by taking into account the cost of all feed given to the dairy animal right from birth till the end of its first lactation, a component that has been disregarded by earlier authors.

Labour, the second major factor after feeds, also needs to be taken into account for cost calculation. Rising labour costs and the shortage of labour, even in rural areas during peak periods of farm activities, mean that the labour component has assumed value in the cost of milk production. It should not simply be regarded as opportunity cost of nil value.

The cost of milk production is dependent upon the number of animals maintained and quantity of milk produced. In a survey-based study conducted by Shyatar Singh, K.C. Reut and Sushila Kaul it was assumed: "Producers maintaining milch cows equal to or more than the average milch stock maintained per household, were considered efficient with respect to size of stock. This criterion was considered as there was significant correlation between the number of milch stock maintained in a household and the net production cost in the sense that as the number increased the net cost per unit of milk decreased". (49).

Unrealistic costing undoubtedly affects milk production. If for instance, there were no supplies of SMP and BD, the authorities might have been compelled to go in for more incentive-oriented production schemes. But since there was no urgency to raise production as supplies of imported SMP and BD were available, realistic costing was never regarded as essential.

Since DF was geared towards marketing, the authorities were most interested in raising throughput figures in order to capture commanding shares in the four city milk markets and since the

throughput did not necessarily entail enhanced procurement, milk production lagged behind.

Meanwhile, a market for milk and also milk products has been created. Milk products, like butter and cheese, have over the years, come to be regarded as essential items amongst the urban upper classes. (The subject of taste transfer will be subsequently taken up).

Let us now examine the import content of SMP and BD in the DF programme.

TABLE - XX  
TREND IN PRODUCTION AND IMPORTS OF MILK POWDER (000 MT)

YEAR	DOMESTIC PRODUCTION	IMPORT OF MILK POWDER				Total avail-ability of milk powder	%age of imports to total avail-ability	
		Whole Milk Powder	Commercial SMP	Other SMP (Imports)	Total Imports			
1	2	3	4	5	6	7	8	9
1969-70	22.53	3.45	27.38	-	-	30.83	53.35	57.8
1970-71	22.43	.45	8.42	6.27	15.91	31.05	53.48	58.1
1971-72	20.50	2.10	15.13	9.89	13.00	40.12	68.70	58.4
1972-73	33.40	9.88	16.88	11.98	8.82	47.56	81.00	58.7
1973-74	29.36	2.97	12.19	9.05	5.67	29.88	59.24	50.4
1974-75	23.59	0.47	15.00	10.56	2.28	28.31	51.90	54.5
1975-76	38.39	5.73	-	26.86	5.67	38.26	76.65	49.9
1976-77	44.62	-	-	17.63	10.14	27.77	72.39	38.4
1977-78	49.90	-	-	9.21	4.33	13.54	63.44	21.3
1978-79	59.60	-	-	15.44	6.46	21.90	81.50	26.9
1979-80	64.00	-	-	1.21	18.00	19.21	83.21	23.1

NOTE : The sharp fall of imports in 1977-78 as explained by the NDDB is due to irregular shipment schedules of WFP aid commodities.

SOURCE: Economic Times, May 13, 1981.

#### Imports

The above Table (XX) shows the ratio of domestic production to

imports. The figures are from 1969-70, the year prior to OF, upto 1979-80.

From Table XX (on page 54), we see that domestic production of milk powder rose from 22,530 mt to 64,000 mt., a growth of 185%. Although a sharp fall was registered in 1973-75, the recovery was noteworthy, especially in 1978-79 when the increase was almost 10,000 mt. over the previous year.

Commercial imports of SMP stopped completely from 1975-76.

Column 6 ("Others") represents SMP aid received from sources other than the WFP. This amount of 90,280 mt. is quite significant. There were no "Other" sources before OF. It is significant that even today, after a decade of OF, more than one-fifth of available milk powder is imported.

In addition to SMP, 42,000 mt. of SO was also to be gifted to OF, of which 39,700 mt. was received during the eleven years of the project. (Refer Table XXI below).

TABLE - XXI  
WFP AID OF BUTTER OIL DURING OPERATION FLOOD 1

(000 MT)

Year	Schedule	Receipts
1970-71	3.50	2.29
1971-72	10.00	2.45
1972-73	13.00	3.71
1973-74	10.20	4.28
1974-75	5.30	0.21
1975-76	-	7.16
1976-77	-	1.78
1977-78	-	4.68
1978-79	-	2.55
1979-80	-	2.58
1980-81	-	-

SOURCE: Economic Times, May 13, 1981.

According to the NDDB, the percentage of imports in 1979-80 in relation to the total milk production in the country, was only 0.64% as against 1.48% in 1969-70. This implies a .84% increase in the share of domestic milk of the total milk production.

However, these figures are misleading for they do not place the data in a proper perspective. OF-I accounted for only 10 per cent of the entire milk production in the country and only 4 per cent of the total production is procured under this scheme. It is in

this context that 0.64 per cent is to be viewed.

Operation Flood II involves the import of 186,000 tonnes of SMP and 76,000 tonnes of BO, to be disbursed over seven years, as against the 126,000 tonnes of SMP and 92,000 tonnes of BO of OF-I.

Dr. V. Kurien had stated several times that all milk powder imports (commercial and gifted) would end by 1975 (i.e. the end of OF-I targeted period). But instead they were extended to eleven years and now will continue at least till 1985.

Kurien's reply: "I have no comments to make. I can only say that for the last four years India is not commercially importing any milk powder and the gifted imports we are receiving are much smaller now than the gifts we were receiving before". (50).

But, according to the Planning Commission Project Appraisal (1978) the share of imported supplies in OF-II (Table XXII below) would be 15% in 1980-82 after which it was expected to recede and, by the end of the project, 1985, fall to 2 per cent. This appraisal is based on the projections of milk production that the report incorporates. It points out that "milk would continue to remain in short supply when compared with demand estimates. The really substantial growth in milk production will come in the period after 1982-83 when the full benefits of the cross-breeding programme will accrue". (51).

TABLE - XXII  
SHARE OF IMPORTED SUPPLIES

1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
9%	11%	15%	15%	8%	4%	2%

SOURCE: Planning Commission, Projects Appraisal Division, 1978 National Dairy Project, Operation Flood Two.

However, the report also warns that under OF-I "procurement and throughput have been well below target ... Progress has been particularly slow with regard to the programme for increasing milk production by the provision of technical inputs and development of improved milch animals". (52).

The table of decreasing dependence which hinges on increased production is thus based on the benefits the cross-breeding programme is expected to generate. If OF-II goes the way of OF-I, it is likely that milk production in the country is not going to increase substantially. And, at the end of the project, when gift supplies run out, it is likely that we will be compelled to go in for commercial imports. Dr. launch OF-III.

An article in the Economic and Political Weekly, cautions against

this dangerous trend.

"Having set up the processing capacity and also created a marketing system in the form of the milk supply schemes in the large cities - which under stage II of Operation Flood, are proposed to be extended to 144 towns with populations of over 1 lakh - the stage is set for large-scale and continuing import of SMP and butter oil to be reprocessed into milk (and, of course, such vital necessities for the urban well-off as cheese and chocolate). Initially, the SMP and butter oil may be made available as gifts by Operation Flood's sponsors abroad, but if at some point the gifts dry up, these items have to be imported on commercial terms to keep the show going.

"We seem to be in precisely such a predicament just now. According to one newspaper report, at a recent high-level meeting of all the concerned parties called by the Department of Agriculture to discuss the crisis caused by non-availability of imported SMP and butter oil, the representative of the World Food Programme, through which the gifts of SMP and butter oil to India are channelled, was unable to give any firm indication about when further instalments of the promised gifts of these items were available for commercial purchase in the international market.

"Clearly, it is time to take a hard look at this whole Operation Flood business to determine to what extent it is really intended to create a market in this country for the surplus dairy products of some of the developed, especially West European, countries and to what extent the pipe-dreams of indigenous dairy development are meant to prettify this confidence-trick". (53)

#### Advent of "Agribusiness"

Operation Flood marked a great leap forward in the industrialisation of a hitherto agricultural activity, the advent of what Susan George terms "agribusiness", where "food systems" take over from "agriculture". Her definition of "food systems", detailed in her analysis of world food policies, may also be applied to dairying. Briefly, it implies the division of the chain-activity into three components: inputs, production and post-harvest or storage processing and distribution.

The chain, she points, is shortest in self-provisioning farming communities and longest in countries like the U.S.A. where "industry has taken over the provision of all the agricultural inputs, where the farming community itself is just a tiny segment of the line, where storage, processing and distribution are immensely sophisticated operations and cost two-thirds of every dollar spent on food". (54).

Susan George warns Third World countries against adopting food



systems which have evolved in the West and have progressed to high-technology, capital-intensive models. Erroneously equated with "agricultural progress" and "modernisation", these models are followed by developing countries the world over.

Largely, though not exclusively, through multinational corporations she says "there is a concentrated effort to introduce the food system model they have devised at home to the underdeveloped nations", (55) in order to find widening markets for their products.

Operation Flood - and the entire package of new agricultural techniques it has introduced into Indian dairying - is an interesting example of a developing country adopting a Western "food system".

Before OF apologists react defensively by stating that the model, far from being an imported one, evolved and has been tried, tested and found successful in Anand, we have to recall that Anand (as we explained in an earlier chapter and will subsequently reassert) was able to emerge in the forefront of Indian dairying precisely because of the favourable environment that had engendered the growth of the Keira district milk union. This included an existing procurement, processing, distribution and marketing infrastructure as well as accumulated dairying capital and political patronage. At every stage of its growth, Keira had access by way of aid and/or direct purchase to sophisticated equipment and western technology.

Even the much talked-of cooperative structure of Amul, for instance, is not unique. In 1882, Denmark saw the establishment of the first cooperative dairy, by 1930 the number of cooperative dairies in that country reached 1414 and "the cooperative dairy became the dominating factor, especially with regard to butter and cheese". (56).

The fact that OF has in fact converted dairying into an agribusiness, or at any rate acted as a catalyst in the process, is evident from the entry of a host of industries - ranging from the pharmaceutical to the engineering - into every sector concerned, the input, production and the final distribution and marketing stages. A distinguishing characteristic of these industries is that they use sophisticated technology and require a considerable capital outlay.

Briefly reviewing OF, we shall examine the appropriateness of the choice of technology, evaluate the import content of the programme, review the progress made by indigenous producers of dairy machinery and discuss the needs and dependencies created in OF-I, projected for OF-II and for Indian dairying on the whole. In addition, we will consider the question of taste transfers.

If, as Susan George states, food systems are foisted on Third World countries, not with the aim of making them viable and independent but in order to dominate them most effectively, OF must be

studied in terms of how far it has succeeded in placing Indian dairying on the road to self-sufficiency or how closely it has tied up Indian interests with the developed world.

#### Dairy Equipment: A Historical Review

"Until about 25 years ago" says B.N. Khurody, "the state of dairying was such that the need for dairy equipment and machinery was not felt". (37). Dairying, being as it was an adjunct to an agricultural activity, was not specialised. "Even today", says Khurody, "nearly half the country's milk production is made in the villages using simple village-made equipment. Specialised transport is not necessary. Even at the stage of refining the product at terminal markets very little equipment other than large steel cauldrons placed over open fire is used. In the handling of the remaining portion of the rural milk, and 85% of the urban supply, nothing more than hand-made milk cans, made out of galvanised sheets (not very sanitary) are used for collection and distribution. The only mechanical device used was the conventional type bicycles for transport of milk in cans from villages to towns and cities". (58).

Organised dairying in India, set up to meet the needs of the allied troops, saw the import of dairy equipment and the establishment of Western-model dairy farms.

The initial dairy equipment items imported were a few hand-driven cream separators and hand-driven wooden churns for butter making, some of which are still used today.

These imports were made primarily by the military farms who also began utilising small-sized power driven churns (100 to 150 kg. capacity), refrigeration equipment for small cold stores, a few batch pasteurisers and small steam boilers. The first large butter making factory set up in 1929 at Anand was totally imported from New Zealand and Europe.

In 1937, Vulcan Trading Company Private Limited, a wholly owned subsidiary of the Swedish Match Company, was established. It represented a number of leading Swedish manufacturers in India - primary among them Atlas Copco, Sandvic and Alfa Laval, the world's largest suppliers of dairy equipment.

In 1938, two Danish engineers, Holck Larsen and S.K. Toubro set up Larsen and Toubro - a trading company. Coming as they did from Denmark, which had a highly developed dairy industry, it is not surprising that among the first areas the two Danes decided to go into, was dairying.

Larsen and Toubro served as agents for various Danish and later European firms manufacturing dairying equipment. They began by

importing a range of relatively simple equipment - batch pasteurisers, milk vats, milk cans and small refrigerator plants. The pasteurisers and milk vats were supplied by the Danish firm Silkeborg, now Fasilac, the refrigeration equipment by Atlas another Danish firm, while a small Danish company provided the milk cans.

In 1945, the A.P.V. Engineering Company Limited, (founded by Richard Saligman in England, in 1910) set up shop in New Dum, near Calcutta. Though A.P.V. initially intended to go in for chemical and fertilizer plants they took to providing dairy equipment to buyers in the country. In 1948, the company received a contract to install the first large bottling dairy plant in India at the Aarey Milk Colony in Bombay. The plant had a capacity of 20,000 litres per hour and the equipment was imported from Britain and the refrigeration system from the U.S. Even the bottles and crates were imported.

#### Gifts From Abroad

Other dairies that were set up were also supplied with imported equipment and gifts. Countries from where India was importing milk powder and milk products like New Zealand and Australia, were generous in providing machinery and training personnel.

During the First Five Year Plan the Industries (Development and Regulation) Act, 1951, was enacted by the government of India. Aimed at assisting Indian manufacturers in making machinery and equipment needs for industries, the act recommended import licences for raw materials and components. However, dairying was still an undeveloped field and little progress was made by indigenous producers. And the demand created by the early organised attempts to supply urban consumers with pasteurised milk continued to be met mainly by imports. Even the simplest equipment, like milk cans were not manufactured in the country.

During the implementation of the Second Five Year Plan, a few dairies were planned in the public sector and the need for establishing the dairy equipment manufacturing industry on a more organised scale began to be keenly felt.

#### Enter The "Big Three"

In 1958, the government of India's policy on imports was tightened considerably and A.P.V., Vulcan Leval and Larsen and Toubro were unable to continue merely as trading agents. In 1958-59, the three firms were issued licenses to begin manufacturing dairy equipment. Their combined licensed capacity was Rs.20.9 million, per annum.

"Since the 'industrialisation' of milk handling came to India at a much later stage as compared to countries in the West", said the head of the Food processing division of one of these firms, "we

were afforded the advantage of their experience accumulated over a considerable period. To achieve a rapid development of factory level dairying, it was necessary as well as desirable to make use of this experience". (59).

"When Indian dairying was organized into an industry, it adopted the same modes of processing as used in the West. It was, therefore, also possible to use the equipment already developed in the West with only minor modifications to suit the climatic conditions which are typical of this country". (60).

"The units which were originally licensed to manufacture equipment in India, therefore, started this work in collaboration with well-known equipment manufacturers in the West". (61). A.P.V. and Vulcan, had of course, access to the latest technology through their parent companies, A.P.V. and Alfa Laval. Larsen and Toubro obtained their expertise from a number of collaborators, including Capper Neil, Pasilac, Atlas, Niro, Sig, Westfalia, Dessel, Rennis and Cerekes. These units were therefore established with foreign technical know-how. But in spite of the setting up of these three units, "60% of the foreign exchange spent by the dairy industry was towards the purchase of equipment in this period". (62).

#### Aid and Infrastructure

The launching of OF was to result in a sea-change in Indian dairying for the magic formula which would usher in the 'white revolution' would also herald the era of agribusiness.

Susan George points out that "Multinationals are the chief agents of penetration of Third World food systems but they are frequently dependent on the prior efforts of centre Governments or of the international development agencies for providing infrastructure and employ able personnel. The World Bank and several UN specialised agencies have been instrumental in creating many of the indispensable underpinnings of industry, while agencies like USAID have concentrated on training personnel that will be receptive to a particular food system" (63).

This process, it must be pointed out, began, before OF, in fact ever since dairying began to be organized in the country.

Various forms of aid trade existed before OF. The initial aid inputs that came in from the West may be classified as follows:

- \*1. Aid in the form of surplus dairy products.
2. Supply of plant and machinery and stainless steel;
3. credit facilities;
4. running of dairy training courses;
5. experts from F.A.O., Colombo Plan and other agencies;
6. supply of specialised laboratory equipment;
7. sponsoring dairy personnel for training abroad and admission

into institutions; and  
8. giving pedigree cows and bulls". (64).

#### Reinforcing the Connection

The collective experience of the Indian dairying sector and its Western orientation - facilitated by the aid and gifts from abroad - paved the way for the package programme of OF. This package programme included several in-built clauses, some of which further reinforced the connections with the west and western systems. One clause for instance compelled the Indian government to provide the necessary foreign exchange for imported dairy equipment.

Article III clause VII of the agreement stated: "The Government (of India) will provide the foreign exchange necessary, presently estimated at U.S. \$20 million either from its own resources or by obtaining assistance from aid giving agencies for the procurement from abroad of such dairy processing and other equipment and materials, as may not be available in time in the country for the purpose of the project. Government will arrange for prompt clearance of the imported equipment and materials, from customs and other authorities, to ensure timely implementation of the Project". (65).

Another clause, ensured the continued presence of western expertise, transmitted through foreign dairying personnel. Article III clause IV stated: "The Government may obtain assurance of the following assistance from the United Nations Development Programme to a total estimated value of U.S. \$1 million for technical assistance in the form of 400 man-months:

Eight FAD/TA experts to assist the IDC and the National Dairy Development Board (NDDB) in the technical aspects of planning and operations. These experts will comprise one management and market expert, one systems analyst, two design engineers and four section engineers". (66).

On May 14, 1979, a question on this subject was raised in parliament. M.P. Saugata Roy asked "Whether it will be in national interest to seek services of about 20 experts from FAO etc. for Operation Flood II Scheme". (67). The agriculture and irrigation minister replied, "For effective implementation of Operation Flood II, provision has been made in the project for the selective and minimal use of international expertise in the fields of dairy plant management in the context of farmers organisation, bio-engineering computer applications for genetics, dairy design engineering etc. Apart from restricting the use of such experts to the minimum necessary, care is also being taken to ensure that simultaneously adequate indigenous expertise is developed in association with the internationally recruited experts ... This is necessary for ensuring continuous upgrading of knowledge". (68).

The second question asked was whether "the Government would also take immediate steps to ensure that any Expert with the National Dairy Development Board/Indian Dairy Corporation who have stayed in the country for more than five years are not given any further extensions as per General Government policy". (69). The minister replied "No, Sir. In certain special cases where Government are satisfied, a few foreign experts who have developed good understanding of the conditions under which dairying can be developed in India should continue". (70).

The transfer of 'expert advice' is therefore not only foisted on developing countries. In many instances the developing countries themselves are anxious to retain them, to maintain their links with western science and technology.

Under OF-II also, The World Bank Appraisal Report on Flood (II) says that "3rd of the equipment supply would be from outside India". (71).

#### Faulty Figures

Faced with criticism that OF has made the country more dependent on imports of dairy equipment and capital-intensive technology, the NDDB contended that, "Out of a total purchase of equipment worth Rs.50.34 crores (505.4 million) during Operation Flood I, only 16.6% of it were (sic) imported. In other words, equipment worth Rs.42.12 crores (421.2 million) were procured from within the country". (72).

This 16.6% that Dr. Kurien throws back at his critics, however, represents direct imports made by the IDC. It does not take into account the foreign component percentage in the equipment "procured from within the country" i.e. from Vulcan Laval (an MNC) APV (also an MNC) and Larsen and Toubro.

For instance, the HMT Dairy Machinery Project Proposal of 1979, points out that so far three organisations were meeting the demand "but through substantial import of components".

Although a separate breakdown of their expenditure on dairying is not available, Vulcan Laval, according to its 1980 annual report, expended over Rs.5 million in foreign currency by way of royalty, technical fees, know-how fees and 'other matters'. In addition, the value of their imports, calculated on CIF basis, on raw materials, components and spare parts and capital goods came to over Rs.19 million. Dairying accounts for 50% of their total business.

Tabulating the import content of OF, therefore, goes far beyond calculating direct imports by the IDC.

However, OF-I did provide a stimulus to indigenous entrepreneurs,

(see Table XXIII below). From 10 dairy equipment manufacturing industrial units in 1967 there was an increase to 72 in 1980 (See Appendix 1)

TABLE - XXIII  
THE DAIRY EQUIPMENT MANUFACTURING INDUSTRY

	1967	1980
Number of Industrial Units:		
Small Scale	7	62
Medium and Large Scale	3	10
Persons Employed :		
Direct	775	4,500
Indirect	1,500	10,000
Ancillary Units Supported :		
Value of Goods Produced	Rs.60 Million	Rs.300 Million
Fixed Assets	Rs. 5 Million	Rs.28.5 Million

SOURCE: "Status of Indigenous Dairy Equipment Manufacturing Industry" Report submitted to visiting mission from W.F.P., presented by Representatives of indigenous dairy equipment manufacturing industry, February 1981.

While the leap in the value of goods from Rs.60 million in 1967 to Rs.300 million in 1980, seems impressive, the amount includes the value of goods produced by the two multinationals, Taka Vulcan Leval, for instance. According to its annual report, in 1980, the turnover for 'Dairy machinery and equipment' was (approximately) Rs.45 million. But, although Vulcan Leval quotes dairy machinery and equipment as a separate class of goods which account for Rs.45 million, there is no estimate of what percentage of the other classes of goods go into dairying. These categories include stainless steel fittings, pumps and refrigeration plants (Rs.17 million), plate heat exchangers, (Rs.15 million) evaporation spray and flash drying plants (Rs.24 million), and packetting and wrapping machinery (Rs.10 million). This Rs.45 million accounts for as much as 15% of the total value of goods produced by the entire industry i.e. 72 units according to Table XXIII (above). The NDDB in fact maintain that "Today, we find as many as 125 manufacturers in the field". This was in a press release, replying to criticism that DF depended too heavily on imported equipment.

#### Monopolistic Advantages

Another point related to the import of dairy machinery that NDDB constantly stress is that an increasing number of items, previously imported are now locally procured. As can be seen (see

Appendix-II), India does manufacture far more dairy machinery items than it did previously. This is only natural in view of the growing demand created by DF-I and the projected needs for DF-II.

A senior official with one of the top three dairy equipment manufacturing companies complained about the problems his firm faces in India - the 'low locals' within the industry and the ease with which Indian manufacturers had taken to imitating low-technology items. He stressed however, that his company had retaliated by merely shifting focus and they now concentrated on supplying high-technology items whose low volume and high profitability ensured that the lead they had set as pioneers was not affected. A private company, which possesses unique technology, will inevitably hold a monopolistic advantage and the whole business of industry, after all, is the competition between firms who seek such monopoly positions.

A statement by the industry spokesman reiterated this view: "Though the number of dairy equipment manufacturers have increased, healthy competition is prevailing in the industry, with the large and established manufacturers undertaking high valued and technically sophisticated equipment and small scale manufacturers sharing the supply of balance equipments". (73).

Larsen and Toubro, for instance, previously supplied 1,000 litre capacity silos. Today, they produce 5,000 to 10,000 litre capacity silos. Earlier, the company had an arrangement with a French firm, Thimmoher, to produce sachets. A few years ago, however, when smaller Indian firms entered the field, Larsen and Toubro terminated their agreement with Thimmoher.

This corporate philosophy is recognized if not sponsored by international funding agencies like the World Bank. "Major items of machinery and packaging equipment" says a World Bank report on DF-II "for the milk process and distribution system totalling U.S. \$210 million would be bulked and procured by international competitive bidding in accordance with IDA guidelines. Local manufacturers will secure a margin of preference in bid evaluation of 15% of the prevailing customs duty, whichever is lower. Minor equipment, such as electrical components and other fixtures and fittings for the plants, milk vending equipment and materials for research and training (U.S. \$35 million) would be procured on the basis of local competitive bidding ... It would not be practical to bulk these equipment and supplies because the items are many and varied, of individually small value and spread over time and place. As there is adequate representation of local suppliers and local agents of foreign suppliers, competition is assured". (74).

However, till today, the dairy machinery industry is by no means a broad-based one. An indication of the monopoly position of the 'big three' in the dairy industry can be obtained from the list of companies that have supplied the machinery installed at the mother



dairy, Kurle, in Bombay. (See Appendix III).

#### Politics of Technology

"The idea that technology is a potential source of monopoly", says Charles Cooper "and is therefore itself monopolised by private companies, is of course in contradiction with the assumptions that economists conventionally make about access to technology. It questions the generally held opinion that technology is a 'free good', equally accessible to all potential producers. The transfer of technology does not take place because some enterprise in the underdeveloped countries 'draws from the shelf of world technology'. Rather, it is the outcome of a process in which technology-owning enterprises in the advanced countries, exploit their quasi-monopolistic advantages in Third World markets. These advantages may be exploited directly - for example, when the technology owner sets up a wholly owned subsidiary in the underdeveloped country. Or they may be shared with another enterprise already established in the underdeveloped country - possibly by means of a licensing contract". (75).

Dr. Kurien certainly belongs to the category which regards technology as a 'free good' and imagines that all developing countries need to do is to draw from the shelf of world technology. In any case, "There is nothing wrong in my importing something which agriculture needs", he feels, "if there is a new technology which makes a nitrogen container more efficient than that is a desirable thing to be brought into this country. All that I should do as an Indian is to make sure that the technology is made available in India so that we can make it ourselves". (76).

Anticipating the demand for DF-II three large engineering industries owned by the government of India were to start manufacturing dairy equipment items which are still being imported. HMT Limited, a large manufacturer of machine tools have set up a plant at Aurangabad to manufacture plates for heat exchangers, automatic butter wrapping and moulding machines and homogenizers.

M/s. Indo Burma Petroleum Company Limited, a highly diversified company engaged in development of high vacuum technology has established a plant at Masik to manufacture a complete range of liquid nitrogen cylinders.

M/s. Bharat Heavy Plates & Vessels Limited are in the field of cryogenics and have developed the necessary skill and expertise to manufacture nitrogen plants, storage tanks and transportation vessels required for artificial insemination programmes.

Since no high technology know-how is available in India, even if public sector firms do go in for the manufacture of dairy equipment, they will be dependent on foreign technology. The NMT project, for instance, has technical collaborations with Veb Fort-

schrift Landmaschinen (FLM of Artern, GDR) for manufacturing milk processing and butter making machinery and with Veb Ngema for manufacturing butter packing machinery. The HMT project put forward the advantages of the FLM-Ngema collaborations as they are the major suppliers to the COMECON group. Whether political expediency in the country prompts India to collaborate either with the Eastern bloc or the Western bloc, is irrelevant. What is relevant is that India does not possess the necessary technology. Moreover, it is common knowledge that even Eastern bloc countries are very often dependent on know-how from their Western counterparts.

Also, technology transfers pertain mainly to the know-how of assembly. What is never parted with, as long as a company is able to retain its monopoly, is the basic component, popularly known as the 'core' technology.

For example, Larsen and Toubro, who erect enormous milk plants in India in collaboration with Niro are still forced to import from abroad the stomizer - the vital ingredient in spray dryers.

At every stage of the milk industry, India remains dependent on imports for essential equipment. In the procurement stage on milk-testers, in the processing stage on flow meters, homogenizers and plates for heat exchangers; in the marketing stage on aseptic milk packaging equipment and butter packing machines.

There are certain specific and general hurdles that impede the progress of the industry.

For one, a major raw material in the manufacture of dairy equipment i.e. stainless steel, has to be imported. (Also, various units, who registered as dairy machinery producing units do so only in order to get quotas of stainless steel, which are then diverted into other areas).

Secondly, a problem that will always characterise the industry, is the lack of supportive relevant research and development.

#### The Dynamics of Dependency

While there are a number of research programmes underway at the various institutions connected with dairy development and animal husbandry - the National Dairy Research Institute (NDRI) headquartered at Karnal with sub-stations at Bangalore and Bombay, the Indian Veterinary Research Institute (IVRI) at Izatnagar and the host of other research institutions like the Indian Council for Agricultural Research (ICAR) and agricultural universities - the actual input of their applied research into DF is indeed negligible.

This is because there is little coordination between ongoing re-

search and development and actual production needs. In effect, this means that while the qualitative content of research and development might be justifiable, inasmuch as it contributes to the volume of pure research, the development of a theoretical premise might not actually have any bearing on its commercial viability. This has been termed as the 'marginalisation' of research and development. This argument is amply borne out by an examination of the requirements of DF, which have been met by technological know-how imported from such advanced countries as U.S.A., Denmark and Sweden.

We have already seen how the bulk of the plant equipment used in DF, in the production and marketing of milk and its by-products, has had to be either imported or, else, has been manufactured under licensed technical agreements with various multinational corporations. In any case, since organised dairying in India developed along the same lines as in Europe and America, the formulation of a gigantic plan to augment dairy production had to be based on a Western model which automatically meant a reliance and dependence on Western technology and, in this case, capital too.

The NDDB/IDC now claim that a major portion of plant equipment is being manufactured in India. This claim has been questioned earlier. Assuming that Indian industry has been able to assimilate the foreign technology and adapt itself to the requirements of DF, there is one major area that remains out of their purview. This vital sector, what might be called the inputs stage, deals with the requirements of the National Milk Head that DF wishes to build up.

#### Genetics

Ultimately, milk production in the rural areas can increase significantly only if the low-yielding capacity of the common Indian milch animal is increased. This can be done through cross-breeding programmes with exotic stocks imported from abroad and progeny testing that will finally evolve a suitable milch animal for India.

It is in this field, more than any other, that self-sufficiency is questionable since the import of exotic stocks and rearing of cross-breeds takes the programme into the realm of genetics, a neglected field in India. This is evident from certain recommendations made at the First Annual General Conference of Animal Genetics and Breeding at Ajeer in February 1980.

"The need for strengthening the training and research programmes in the field of animal genetics cannot be over-emphasised. Considering the enormity of the problem and the limited resources and time available to us, the problem has to be tackled from various angles. There is a need to diversify the research in various branches of genetics...

"Unfortunately, efforts to set up an Institute of Animal Genetics in India have met with no success, though such a scheme was approved in the Fourth Five Year Plan. The National Commission on Agriculture has also strongly recommended the establishment of an Animal Genetics Research Institute".

The participants stressed the fact that "Zebu breeds are endowed with some highly desirable characters and resistance to certain diseases. A reliable and objective assessment of indigenous breeds with special emphasis on disease resistance and adaptability to harsh environments is essential". (77).

#### Disease and Vaccination

Since the requirements of the cross-breeds are altogether different from the common wayside cow, it also raises the contingencies of adequate feeding formulations and adjustments to a tropical environment. The latter, in turn, brings in the high degree of vulnerability of the cross-bred to foot and mouth diseases and bovine tuberculosis. This is an area where India is almost exclusively dependent on foreign know-how.

As it is, a major segment of the Indian pharmaceutical industry is in the hands of a few multinational corporations renowned the world over - Sandoz, Hoechst, Pfizer, Elaco, Roche, Burroughs Wellcome Inc., Alembic and American Dynamic to name only a few. Undoubtedly, as the market opens out for the pharmaceutical requirements of the cross-bred milch animals, these corporations will be the first to address their needs since they already possess the relevant know-how.

According to a report by the National Commission of Agriculture, FMD outbreaks occurred throughout the country. From 1962 to 1973, there were, on an average, 5,000 outbreaks per year, leading to an estimated annual loss of Rs.40 million. Around five years ago, it was estimated that the annual demand for vaccines would be around ten million quadrivalent doses. At that time, current production levels were around half-a-million totally.

Of this half-a-million, the MRI at Izatnagar was manufacturing only 2,500 doses, while Hoechst, although possessing a licensed capacity of 10 million doses, manufactured only around 500,000 doses. (78).

To counter this massive shortfall in FMD doses the government allowed a number of small production centres in various states to produce FMD vaccines but their performance and quality was "far from satisfactory", according to the report of the National Commission on Agriculture. In an attempt to overcome this problem the IDC entered into an aid and collaboration agreement with Burroughs Wellcome Inc., for Rs.180 million project to manufacture

FMD vaccines. In all, the government sanctioned the production of 57.5 million doses. Notably, almost all the major projects have been secured by the multinationals.

However, since the cost of vaccination is steep (Rs.40 for the first vaccination and Rs.20 per year after that), a milk producer will not vaccinate his animal unless it is very productive. There is a possibility, therefore, that the sanctioned capacity for 57.5 million doses might not find a ready market.

Moreover, the entire concept of vaccination against FMD is questionable in a tropical environment which possesses numerous strains of bacteria. Vaccination can, at best, be trivalent or quadrivalent, immunising an animal only to a certain extent, beyond which immunisation is not possible. D.N. Khurody explains, "This country can be considered a museum of all diseases. The Zebu cattle, however, have an amazing power to resist them and maintain a host-parasite balance in respect of certain parasitic diseases. The cross-breeds, though more resistant compared to their exotic parent, are more susceptible compared to the Indian parent. For instance, foot and mouth disease affects the Indian cattle in a somewhat mild manner, although there may be losses in reduced production of milk or the bullocks being unable to work during the outbreak of the disease. On the other hand, in the case of exotic cattle and their cross progeny, the disease runs a violent course. Mortality and economic losses can be very high. In calves mortality could be over 50 per cent. Its after effects are even worse, as the udders of many cows get affected, and others suffer from reproductive failures. Vaccines, though available, does not provide a complete answer". (79).

The entire controversy around FMD vaccines is carried a step further when the implications of collaborations with foreign firms are taken into consideration. National Dairy Development Board/Indian Dairy Corporation will argue that research on the FMD vaccine had been going on in India and that the only way this research can be supplemented and assimilated in this country is by an import of the technology, whereby working skills will be transferred to Indian scientists and technicians. This argument needs to be examined carefully on both counts.

Firstly, as it has already been pointed out earlier, even though Indian research work might have had the capability to develop the vaccine in a laboratory, it was not geared towards production on a large-scale. Indian Veterinary Research Institute, for instance, could produce only 2,500 doses when ten million were required. For which we had to look abroad for help.

Secondly, whatever skills that were expected to be transferred working with foreign technology would not be those required for the manufacture of machinery required in FMD production, which is

after all the key factor in the process. A working knowledge of operating an imported plant does not amount to access to and assimilation of that technology.

In the case of the FMD vaccine, the basic process involved the development of cell cultures which are then used to send larger quantities of the vaccine. The main raw materials, available in India, al-hydrogen, el-amino acids and vitamins, were deemed unfit to meet the standards required and thus had to be imported.

The key equipment in the process is the fermentor, in which the cell cultures are developed. But this basic piece of equipment is not available in the country. Thus, while the foreign collaborator might part with the know-how for operating the equipment, the 'core technology' will not be transmitted.

The claim from NDDB/IDC quarters about the future self-sufficiency is therefore baseless, since at no time has the country had access to 'core technology' which no corporation will part with because it would lose its competitive advantage over other firms in similar fields.

One of the reasons why Indian research has languished and has been confined to the labs is that research requires unlimited funds which can be justified only if applied commercially. The NDDB/IDC is not willing to take the risk of going into production independent of a licensed arrangement for technology and aid. Secondly, since the need for FMD vaccines was felt only with the inception of a number of cross-breeding programmes, developing the necessary technology would take too much time.

It is true that DF policy makers have had little choice. As the entire programme hinges on increased milk yield from cross-breeds, it has been virtually essential to take adequate measures to preserve their genetic potential. But, apart from the fact that the exotic sires themselves have had to be imported along with imports of exotic semen stocks, the need to cater to their requirements has further opened out new areas of dependencies.

#### Choice of Breed

There have thus been a few limited efforts which question the viability of the entire concept of a cross-breeding programme. For instance, it has been pointed out that even though no Indian breed can match the output of a Jersey, Holstein-Freissen cow which might average upto 5,000 kgs. per lactation there are certain Indian breeds like the Gir and Sahiwal which are capable of a yield upto 3,000 kg. per lactation, with 4.5 per cent fat and 9.15 per cent SNF. In addition, to their considerable output, these breeds which are organic to India, have the added advantage of an in-built resistance to the harsh tropical weather conditions as

well as the bacterial infections which cross-bred Jerseys, Holstein-Friesian do not possess.

Unfortunately, the high-yielding Indian breeds do not seem to have found a place in the DF programs which seem to rely almost exclusively on exotic sires. This has two implications: On the one hand, the potential existing within the country has not been tapped adequately and on the other, an area of dependency on foreign herd stock and the concomitant problems of FMD and other high-nutritional feeds have arisen. Many animal husbandry experts have stressed numerous times that the Indian breeds like the Gir and Sahival are amongst the hardiest of the high-yielders in the world. As opposed to this the Jerseys etc., are far too delicate to survive in tropical conditions and need special attention. Thus, they are not only more expensive to procure (or for a producer, to buy) but they also need additional inputs of energy, which, if computed in an equation of input-output balance, is negative as has been illustrated in an earlier chapter (refer Feed, Food and Fodder: Some Questions).

The NDDB/IDC continue to import calf heifers, sires and semen and hope to raise the quality of Indian stocks through progeny testing and artificial insemination.

The latter warrants our attention. Artificial insemination offers a choice of two techniques: The usage of liquid semen or frozen semen. It is noteworthy that the government key village and related animal husbandry programmes relied on liquid semen for artificial insemination. Not surprisingly, NDDB/IDC have chosen frozen semen which is a relatively more capital-intensive, skill-intensive and sophisticated technique. It is also more efficient and involves closer ties with foreign firms and agencies.

The NDDB/IDC's decision to use frozen semen also makes the service more costly for a milk producer who has to pay for the service, whereas the government service is free.

At this point it is necessary to point out that in trying to 'replicate Ahmad', NDDB/IDC have consistently chosen the most advanced models of growth (in any field) available in the West overriding all other considerations of a developmental policy which should emphasise lower levels of sophistication and skill and lesser capital outlay, to enable the programmes to be spread as evenly as possible over the country by using appropriate technology.

#### Capital-intensive Models

National Dairy Development Board's and Indian Dairy Corporation's determined efforts to push through a capital-intensive model was probably inspired by the hope that quicker results would accrue in a shorter span of time. However, the process is self-defeating

for to sustain the capital-intensive, high-technology infrastructure that has been created, they are forced to opt for similar models that will fit into such a framework. At the same time, because of the massive expenditure on the programme, the emphasis shifts from development to commercial success. Which means that only those who possess the capital have access to the facilities the NDDB/IDC have created.

Frozen semen storage requires liquid nitrogen containers which the country was not capable of producing. The NDDB/IDC have constantly talked of import substitution but actual experience has shown that this chant is only used to placate those who are worried about the imports of even those items which can be made within the country.

An important clause in the terms of agreement which govern the World Bank loan to the IDC states that all tendering for plants and equipment will be on a global scale. Since the Indian dairy industry has limited experience in the field, and its international bidding cannot be competitive with a firm that has been manufacturing dairy equipment for years and has sufficient research and development, the clause operates to its detriment.

#### Container Controversy

In 1977, an Indian public sector company, Indo-Burma Petroleum Company Ltd., had secured approval from the NDDB for 10 litres liquid nitrogen containers. However, in 1978, the NDDB suddenly announced that it was no longer interested in 10 litre containers and instead required 20 litre containers, which it would purchase on the basis of a global tender. IBP was taken aback, since there was little time to prepare for the production of 20 litre containers and the government had to intervene to prevent the NDDB from placing the order abroad.

NDDB argues that in 1975 it decided to develop indigenous manufacture of liquid nitrogen containers. This it did by placing a global tender and placing an order with L'Air Liquide of France. Due to governmental intervention (this is not stated in their 'case'), however, a tripartite meeting was held on July 24, 1978, between the representatives of NDDB, IBP, and M/s. L'Air Liquide, wherein the following was decided: 10,000 containers of 20-litre capacity would be obtained directly from M/s. L'Air Liquide, France, either through a direct order or through an order on M/s. Indo-Burma Petroleum Company Ltd., whichever should work out to be lower in price; in case the order was placed directly, it would be such that IBP could thereby receive a quantity credit.

An order for another 5,000 such containers was to be placed with IBP after IBP re-examined their own offer and submitted a revised offer not later than August 1978. Because it was found that the direct order on M/s. L'Air Liquide worked out to be lower than



the alternative through M/s. Indo-Burma Petroleum Company Ltd., by Rs.171/- per unit, an order for 10,000 containers was placed with M/s. L'Air Liquide. Another order for 5,000 containers was placed with IBP on the basis of their revised offer which was 5% lower than their original offer, although it was still higher in price than M/s. L'Air Liquide's offer. This order on IBP was placed to encourage indigenous manufacture of liquid nitrogen containers. The total order, which was originally intended to be 57,000 containers was also reduced to meet the requirement for 2 years only, giving time for the IBP and BHPV to go into commercial production". (80).

The above does not mention that finally IBP entered into a collaboration with L'Air Liquide for the manufacture of liquid nitrogen containers.

We have tried to examine the various implications that have arisen out of relying on increasing milk production through cross-breeding programmes. Apart from the constraints that operate on the cross-breds themselves, their rearing leads to dependencies in other fields which the country can ill-afford.

To cope with these problems the NDDB/IDC have been forced to veer towards an aggressive marketing policy which will possibly open out markets among the elite, in urban areas, for the packaged products that the programme envisages. That most of these products are produced and marketed by the dairies located in Gujarat will be detailed at a later stage.

#### Tetra Pak

The decision of the DF authorities to introduce Tetra Pak generated a great deal of controversy in the country but, notwithstanding the opposition to what was considered a needless and irrelevant extravagance, the IDC was given the go-ahead. Critics of the project maintain that the only reason the Tetra Pak deal came through was because H.M. Patel, finance minister during the Janata government, and a close associate of Dr. Kurien, ratified the scheme during his tenure.

Earlier Mrs. Indira Gandhi had turned it down. In 1974, says the Economic Times, "the Prime Minister had rejected the Tetra Pak project saying 'it would not only be unsuitable for the country but also a luxury'". (81).

That Tetra Pak is a luxury item, which will make an already expensive item even more prohibitive, is undeniable. The comparative costs of distributing milk in Tetra Pak, milk bottles and polyethylene sachets is given in Table XXIV on page 75).

TABLE - XXIV

## STATEMENT SHOWING COMPARATIVE ECONOMICS OF DISTRIBUTING MILK IN TETRA PAK, MILK BOTTLES AND POLYETHYLENE SACHETS

	Tetra Pak	Bottling	Polyethylene Sachets
	(Paise per litre)		
1. Processing cost	4.1	3.4	3.4
2. Materials & services	25.58	4.8*	16.0
3. Administrative overheads	4.2	3.3	3.0
4. Depreciation on equipment and buildings	5.2	3.6	4.0
5. Insurance & interest	4.5	4.2	4.5
6. Retailing	8.0†	2.0	2.0
7. Distribution (Transportation Cost)	2.2	3.0	2.2
	53.7	26.0	35.1

‡ Includes the cost of Tetra Pak paper, Polystrip and paper wastage.

\* Includes aluminium foil, breakage, etc.

† The cost could be cut down from 8 paise per litre to nearly 4 to 5 paise per litre in case the existing distribution channel for milk bottles were utilised; but if that is not done certain advantages of the Tetra Pak system will be lost.

SOURCE: A Note on the Need for Introducing Aseptic Tetra Pak System to Packaging and Marketing Milk.

At a finance ministry meeting to discuss the Tetra Pak project, D. T. Lakdawala, deputy chairman of the Planning Commission, "enquired about the comparative cost of milk sold in aseptic containers and milk sold in bottles as at present". (82). Dr. Kuzien indicated that while milk in aseptic containers would be costlier than milk distributed in bottles, if Tetra packing was done at the producing centres, "say at Anand, and milk sold in Bombay, prices would come down". (83).

The DF authorities maintained, "While the absolute difference between the bottling and Tetra Pak operations is 27.3 paise, the actual difference between the Anand-Bombay system would be only 13.7 paise per litre if milk were packed in Tetra Pak at Anand and distributed in Bombay. (84). The IDC also pointed out, "Tetra Pak milk produced at rural feeder/balancing plants and marketed in the four cities is expected to cost some 11 paise more than the operations of a city bottling plant procuring its milk, in bulk, from rural feeder/balancing dairies. This element of 14 paise includes a retailing charge of 8 paise for Tetra Pak, and only 2 paise per litre for bottled milk. The actual difference

between the production costs of the two systems is therefore only 8 paise per litre. The advantages offered by Tetra Pak in terms of its life and conveniences offered to the consumers, more than offset the marginal increase in the production cost". (85).

The IDC rationale for introducing Tetra Pak changed from time to time. "National" interests were stressed: in areas where transportation is difficult and milk is scarce, Tetra Pak would be useful i.e. "This becomes of great advantage to defence services in case of emergency". (86). But, essentially, convenience was the catch word: "No more buying milk at unearthly hours of four in the morning and no more long queues for milk". (87). Since Tetra Milk was sterile and immune to bacteriological spoilage "it therefore does not require any refrigerated storage". The point is, convenient to whom? The category who can afford the price difference in Tetra Pak are those who, having servants, don't need to queue up at four in the morning, those who already possess refrigerators and for whom longer shelf-life becomes an irrelevant advantage.

The concept of supermarket shopping, which Tetra Pak facilitated was devised in the West, and does not exist in India. Meanwhile, to address ever-changing consumer-oriented needs in the West the Tetra Pak has already given away to the Tetra block as the tetrahedron shape which had one of the least surface to volume ratios did not suit consumers. Tetra Pak thus outlived its usefulness. So, apart from going in for up and expensive commodity which had little relevance or place in India, IF authorities chose one which had already grown obsolete in the countries where it originated.

"It would appear", says *The Economic Times*, "that the Europe-based multinational corporations have no takers for their machines in Europe and need an Asia-based buyer who would be a good selling point for other oriental markets. It is difficult to understand why the Indian Dairy Corporation should have spent a good decade negotiating a collaboration to put up an obsolete milk packet unit that is not to the benefit of the common man". (88).

The outflow of foreign exchange incurred by the project, not taking into consideration the foreign exchange required for the import of filling machines and sterilizing unit, is given in Table XXV on page 77.

At the finance ministry meeting, other questions thrown up included one on the laminated paper necessary for the project. The minister for agriculture and irrigation, mentioned, "that some representations had been received from Paper Manufacturers Association that capacity was already available for manufacture of laminated paper and therefore his Ministry had written to the Chairman IDC, to treat the general clearance earlier given for the laminated paper project as withdrawn for the present, suggesting further trials with indigenously produced laminated paper". (89).

TABLE - XXV  
 OUTFLOW OF FOREIGN EXCHANGE

The requirement of foreign exchange estimated for a period of 7 years as per collaboration agreement.

	Rs. in lakhs
i) Import of machinery for manufacture of laminated paper.	100.00
ii) Royalty for 7 years.	73.64
iii) Fees for the consultants.	2.00
	Total Rs. 182.64 lakhs

SOURCE: A Note on the Need for Introducing Aseptic Tetra Pak System to Packaging and Marketing Milk.

The Chairman of the IDC replied: "As M/s. Tetrapak would insist on use of either their own laminated paper or paper certified to be equivalent, it may be difficult to use straight away paper produced by other manufacturers and the earlier trials with locally made papers had not been successful". (5D).

Eventually, however, locally made paper seemed to have come up to the mark and it was decided that the Indian Petrochemical Corporation Limited (IPCL) Baroda, could provide the low density polyethylene required. "A feasibility report submitted by Tetra Pak International AB/Sweden on the investigation for the raw materials situation regarding base paper for Tetra Pak found that the existing Indian Paper Industry can supply the Tetra Pak base paper both in quality and quantity". (5I).

Significantly, notwithstanding Dr. Kuzian's doubts about the quality of the paper produced in India, M/s. Tetrapak approved of the Indian industry's capability to provide it. However, the paper is only an input in the entire process of producing laminated aseptic packaging of which only Tetrapak has the relevant know-how. The IDC might claim that over the seven years, Indian dairy personnel will be able to assimilate the process and operate the installed machinery. But this does not mean that seven years later, India will be in a position to produce the machines themselves.

This seems to be a minor consideration to DF authorities. An insignificant yardstick to measure the progress made by the dairying industry. Tetra Pak becomes a symbol of achievement, of modernisation. India can proudly claim that she too has Tetra Pak.

Taste Transfer

"India has been importing Western type dairy products from Australia, Western Europe and New Zealand long before the country became independent. They were then used by the British residents, troops etc". (92). During British rule, India, like other colonies, developed its own local elite who adopted the lifestyles and habits of the Western colonists.

To most Indians, however, even in urban areas, products like chocolates, cheese, butter, ice-cream etc., were relatively less known and at that time the only products that were available were foreign ones.

Cadbury Schweppes, the British MNC that brought the taste of chocolates to India began its operations in India only after independence. In the early stages of large-scale chocolate manufacture in India various kinds of aggressive advertising and marketing techniques were utilized. "You never sell a product, you sell an idea", is a popular marketing adage. And the 'idea' of chocolates was so effectively sold that by 1965, an article in a national daily read, "Chocolates are one of the world's most valuable foods. Highly nutritious it is rich in carbohydrates, albumen, vitamins and minerals, thus figuring high in calories ... Chocolate is valuable food ... In no other form can it be said that there is such a wealth of valuable nutrition packed in so small a space. In its usages, chocolate is universal. Many medicines are embedded in it, restorative health foods and drinks are based on it... A chocolate drink stimulates the activity of the nervous system, increases body performance and helps the mental worker over tired spells without curtailing sleep". (93).

Over the years increasingly more value added milk products are being added to the Indian diet - butter, cheese, infant milk powder, brown beverages and now flavoured milk. Sales of all these products have continually been on the upswing and the market widened to encompass not only the four metros but also the mini-metros and class I and II towns.

An estimate of the growing market for dairy products can be made from the phenomenal growth of Amul's product production figures in the seven years between 1957 and 1964 (See Table XXVI on page 79).

"Make the Rich Pay".

Operation Flood too, based as it is on the 'Amul' model, has joined the bandwagon. Why not make the rich pay asks Dr. Kurien. Unfortunately, he seems to have forgotten that he was committed to supply milk at reasonable prices to the four metropolitan cities and, during lean months, when there is a shortage of milk in the cities, there is no dearth of products for the rich.

TABLE - XXVI

PRODUCTION OF DAIRY PRODUCTS BY THE KAIRA DISTRICT CO-OPERATIVE MILK PRODUCERS' UNION LTD. FROM 1957 to 1963-64

YEAR	BUTTER	GHEE	SWEETENED CONDENSED MILK	CHEESE	BABY FOOD
(1b)	(1b)	(1b)	(1b)	(1b)	(1b)
1957-58	1725364	174302	none	none	2877
1958-59	1749449	481453	708184	none	none
1959-60	1685284	200512	106537	2555	none
1960-61	1903783	279851	219785	9797	133918
1961-62	2608285	363099	459785	none	1323719
1962-63	3348326	490057	151458	2445	3033426
1963-64	3077355	777977	36513	91674	3864399

**SOURCE:** From the files of the Kaira District Cooperative Milk Producers' Union Ltd, Anand quoted in Amul, An Experiment In Rural Economic Development, by S.P. Singh and Paul L. Kelley.

Commercial considerations, however, demand a product mix for 'development' hinges on 'success' which hinges on 'profits'. "Processing investment estimates", says a World Bank report, "are based on a model that assumes a mix of plant expansion and new plant construction and on a product mix that assumes 80% of sales as liquid milk and 20% for conversion to butter, milk powder and other dairy products". (94). Following the same logic, 20% of the milk procured by the dairy plants were earmarked to be converted to milk products. By itself 20% seems relatively small but, considering the amount it can saturate the limited market, it is definitely quite substantial.

Take cheese, one of Amul's prestige products, for example. Till the early 1940s most Indians barely knew the product. "During World War II, Polson was asked by the Supply Department of the British Government to manufacture cheese for the defence forces". (95). Today, stiff battles are being fought in the urban markets by two state milk federations/corporations of Gujarat and Andhra Pradesh each selling their products under their own brand names - Amul and Vijaya respectively.

Moreover, reports the Economic and Political Weekly, "the Amul dairy at Anand ... proudly announced sometime ago, would soon be making and selling Italian mozzarella cheese. The dairy, the announcement disclosed, had been sending limited supplies of the cheese to the Italian embassy in New Delhi and the results had been 'satisfying'". (96).

"Many varieties of cheese could be introduced in India", said a delegate at a dairy industry conference. "Considering that we have many varieties of milk available, the different kinds of cheese could be developed looking at the specific needs of the situation. However, there are some constraints in the manufacture of cheese, as market for cheese is still limited and the taste of the consumer requires such cultivation". (97).

Having entered into the business of making the 'rich pay', a whole new range of products are either being researched upon or experimented with on test markets. And now the development of different products no longer seem to have any relation to making the 'rich' pay. Different products are developed for different income groups. This market segmentation and product positioning is based on careful calculations on which income group can pay how much for which product.

Liquid milk has the widest market spread (in terms of different income groups). If you can afford it, you may start applying butter on your bread or better still buy cheese for your family and chocolates for your children. "When you are hungry or thirsty" says an advertisement, you can even have 'Energys' (a soft drink substitute). If you are the conventional type and yet have the money to spend, Amul has a product for you too - sweetseta, shrikhand, dahi, pedas and now chaisathi (a tea additive).

Satisfied with the IDC's performance of OF, conclusion no.25 of the UN Inter Agency Terminal Evaluation Mission which visited India recently, states:  
"The efforts of the dairy industry to broaden its product mix have led to:

- i) Diversification of liquid milk production and marketing so as to take account of purchasing power of different consumers groups;
- ii) Diversification of the milk manufacturing sector so as to exploit remunerative markets, such as those for milk powder, baby food and table butter. While initially largely oriented along Western product mix patterns, there has been more recently the introduction of traditional Indian items, such as milk sweets and fresh cheese products;
- iii) Successful competition of flavoured milk with soft drinks;
- iv) Manufacture of cheap, socially oriented products, containing vegetable and milk ingredients and marketed in low income areas". (98).

Point (i) and (iv) certainly do not indicate that only the 'rich' are paying. 'Diversification' or 'successful competition' means not just satisfying existing demands but actually creating them.

The concept of creating new products that did not have a market earlier has even affected our research institutes.

"According to information", states an item in a dairy journal, "sweetened flavoured yoghurt acceptable to Indian consumer has also been developed at NDRI". (99). National Dairy Research Institute handouts on research done by the institute include, dairy by-products for biscuits - instant concentrate biscuits, butter milk concentrate biscuits, cheese whey concentrate biscuits - fruit and flavoured yoghurts, coffee complete, tea complete, paneer, manufacturing technique for Kaznal cheese, etc.

A recommendation voiced at the dairy industry conference 1980 stated: "Malted milk foods, protein foods, and other specialities also offered a scope for extending market for milk solids. The technical know-how for manufacture of these products is slowly expanding and it is likely that in course of time, this would become an important avenue for development". (100). Whether in fact, this will become a lucrative avenue or not, one thing is clear, a vast untapped potential market exists for dairy products and all efforts will be made by the dairying authorities, including DF, to exploit it.

Taste transfer is an inherent part of a programme like DF, a package along with dairy development. New product categories, new product packaging (Tetrapak), new milk sale systems (bulk vending machines), new artificial insemination aids for producers (frozen semen), in short - a whole new concept of agribusiness based on sound principles of marketing management.



### CAN THERE BE MANY ANANDS ?<sup>1</sup>

Although conceived of as an all-India development programme, the success of OF has been virtually confined to Gujarat. In fact, till today, the focus of the entire scheme is directed towards the six unions of Kaira, Sabarkantha, Mehsana, Banaskantha, Baroda and Surat. Kaira is, however, an exceptional showpiece even amongst the lot of the most favoured unions. Considering the economic assistance, political patronage and the region-specific factors (dealt with earlier) that resulted in the meteoric rise of Anand, its success has often been flaunted as a model for developing over the country - "replicating Anand" and "creating many Anands" has been a constant refrain since the inception of OF.

In this section, we will attempt to illustrate the favoured status conferred upon Anand and Gujarat. This will lead us to a very important query: can Anand then serve as a model? And is it possible to replicate it?

The first fact that strikes us is the large amount of aid that has been extended to Anand, both, as loans and grants, from within the country and without. This trend began even before the conception of OF.

#### Aid to Amul

In a question raised in the Lok Sabha, on December 19, 1977, Member of Parliament, D.P. Tyagi asked for the details of "the equipments and capital gifted or provided with loans/grants/concessions from world organisations, central and state governments to Amul and its associate bodies, with outlines of individual schemes". (101). The reply of the minister of agriculture is shown in the following Table (See Table XXVII on pages 84-85).

A total of these flows of aid, reveals that in 30 years Amul has received Rs.186 million by way of grants and Rs.311 million has been loaned. It might be pertinent to ask if any other district union, received such largesse, which has definitely helped to ensure the predominance to Amul over all other unions in the country.

Among the other factors that have led to doubts being raised about the possibility of replicating Anand, is the benefits that have accrued to it since, institutionally, the entire OF project has been headquartered in Anand and Baroda. The NDDB and the IDC only represent two apex bodies responsible for the coordination of the programme.

The other national level institutions at Anand include:

- i) Institute of rural management
- ii) Pilot intensive market project
- iii) Management information and economic analysis centre
- iv) Computer and data processing centre (biggest in India)
- v) Manpower development centre
- vi) Applied research and development centre
- vii) Animal diagnostic diseases laboratory
- viii) Solar energy and gober gas research project
- ix) Tetra Pak machinery and laminated paper manufacturing factory (Headquartered at Baroda).

However, the Foot and Mouth Disease Vaccine Plant - which can be a source of hazards - is not located in Gujarat but in Andhra Pradesh.

Because of the affinities that have developed within the state of Gujarat, it is not surprising that the flow of funds, generated in the course of OF, have been largely directed within the state. Naturally this has given rise to resentment in other member states, who feel that they are not equal partners in the project.

"Up to the end of 1979", says G.S. Kahlon, "Gujarat alone got the lion's share of Rs.1666.50 lakhs". (102). Compare this to the allocations made to the five states of Haryana, Punjab, Rajasthan, Bihar and Andhra Pradesh, which, together, received only Rs.1732 lakhs. Kahlon goes to state that, "This trend is going to be maintained in OF-II. Out of the funds generated upto September 1980 under OF-II, the total disbursements made were Rs.253 lakhs. A sum of Rs.241 lakhs out of those has been made available to the state of Gujarat alone, whereas the remaining three states of Punjab, Kerala and Orissa got Rs.5 lakhs, Rs.2 lakhs and Rs.5 lakhs respectively". (103).

To counter the arguments of Gujarat being developed as a showpiece to attract more aid from donor countries and support from the government, the NDDB has pointed out that the government was keen to

TABLE - XXVII

STATEMENT SHOWING ASSISTANCE PROVIDED TO AMUL AND ITS ASSOCIATE BODIES BY CENTRAL AND STATE GOVERNMENTS, INTERNATIONAL AGENCIES AND OTHER ORGANISATIONS FOR THE PERIOD 1947-48 TO 1977-78

Aiding Agency	Grants (amount in Rupees)	Loans	Outline of Schemes for which assistance has been given
(1)	(2)	(3)	(3)
1. Govt. of Bombay	6,00,000	10,23,000	Plant & machinery, water pumps for village societies, extension of capacity of dairy, construction of new dairy & its subsequent expansion.
2. Govt. of India	25,20,000	-	Setting up baby food & cheese plant.
3. Govt. of New Zealand under Colombo Plan	1,57,477.50	1,57,477.50	Supply of dairy equipment.
4. UNICEF	-	9,41,690.39	Machinery & equipment for setting up a dairy plant at Anand.
5. Technical Co-operation Mission of USA.	49,728.51	33,152.01	Three units of bulk farm cooling tanks.
6. Govt. of Gujarat	-	83,825	Acquisition of land for dairy.
7. Govt. of India	20,00,000	72,00,000	Setting up second milk drying plant.
8. Indian Dairy Corpn. Under Operation Flood I Programme	63,20,070	1,47,46,830	For increasing milk handling capacity under Operation Flood Programme.
9. Govt. of India	70,000	-	For conducting research on solar energy.

(1)	(2)	(3)
10. OXFAM	12,03,792	-
11. World Food Programme 348 through Govt. of Gujarat	49,59,887.13	-
12. Gujarat Khadi Gramo- dhyog Board, Ahmedabad	9,700	-
13. UNICEF	-	69,50,093.80
14. FAO under Freedom from Hunger Campaign	8,02,691.94	-
Total Rs.	1,86,93,347.08	3,11,36,068.70

**SOURCE:** Answer to question No.4493 in the Lok Sabha, December 19, 1977 .

develop the dairy industry as fast as possible. The NDDB, therefore, contends that if it had decided to spread the money evenly over the whole country it would serve no useful purpose. It further explained that Gujarat already has a history of dairy development and referred to the yeoman service it had done in providing a developmental model for the country. As T.N. Ninon has wryly observed, Operation Flood "would have been nowhere near any of its goals if it were not for the phenomenal successes in Gujarat, where these could probably have been achieved without Operation Flood". (104). The Table (XXVIII) below, from an official source, demonstrates the importance of Gujarat and the rest of India.

TABLE - XXVIII  
ALLOCATION OF FUNDS

	Expected Disbursements upto 31-3-81	Percentage
	(Rs. in millions)	
<u>Action Item 4 &amp; 5</u>		
Gujarat	131.245	37.6%
Rest of India	347.859	62.4%
<u>Action Item 7</u>		
Gujarat	69.276	38.6%
Rest of India	179.292	61.4%
<u>Action Item 8</u>		
Gujarat	5.124	20.8%
Rest of India	23.625	79.2%
<u>Action Item 9</u>		
Gujarat	2.194	6.7%
Rest of India	30.256	93.3%
<u>Total of above Action Items</u>		
Gujarat	207.839	35.8%
Rest of India	581.032	64.2%

SOURCE: Extracted from WFP Terminal Review Mission, Feb. '81 .

#### No Choice

Another policy that has been resented by member states participating in DF is the Hobson's choice they have been given with respect to their dairy development programmes. Almost all the states had existing state corporations, before DF was conceived. However, once IDC cornered almost all the funds for developing the country's dairying, through international donor agencies and the government, the

states were given a clear-cut option: either they rejected the IDC/NDDB programme and thus languished for want of funds and the accompanying know-how, or they sacrificed their autonomy and joined the OF bandwagon.

This issue was highlighted at the XVII Dairy Industry Conference, 1981, held at Ahmedabad. A few dissenting members questioned the so-called "benefits" that OF represented, and the large allocations that Gujarat had obtained compared to the paltry funds they had received.

To compound matters, the previous state dairy corporations have not been disbanded while the OF model of cluster federations has been thrust upon the state governments, resulting in confusion within the state, as well as, in some cases, conflict between the two structures. As Kahlon aptly pointed out in a paper at the conference in Ahmedabad, "These corporations had already created an infra-structure which was capable of rapid development; and if these had been left alone they would have certainly made appreciable contribution, almost fulfilling the targets which the new concept of 'Anand Pattern' kept in view. It may be relevantly stated here that these dairy corporations, in fact, had evolved and worked on the formula of cooperatisation by starting its implementation from the village level, with cooperative impetus coming from the villages, upwards - rather than from the new concept of cluster federations - downwards". (105).

#### Maryana Fails

A recent news item stated, "Maryana may have to abandon the OF-II, an ambitious milk production and distribution programme based on Gujarat's Anand experiment ... The programme in Maryana which entails central assistance of about Rs.36 crores, including a grant of Rs.11 crores, has been a non-starter because of the disorganised cooperative dairying structure expected to sustain it. Desperate attempts are being made to salvage the programme by modifications in its blueprint prepared last year by the NDDB".

"The government is understood to have told the NDDB that OF-II will not succeed unless it is freed from the "Anand Pattern". The chief minister of Maryana, Mr. Bhajan Lal, met the chairman of the NDDB, Dr. V. Kurien recently to convey to him his apprehensions about the success of this pattern in Maryana. The programme is now being considered by a cabinet sub-committee. One proposal under consideration is that the Maryana dairy development cooperation should be revised to provide a sound basis to the programme". (106).

#### Two Models

It must be noted here that the government had, till recently, preserved two models of dairy development. The previous model, envi-

saged till the Third Five Year Plan, had been one of phased-out growth employing low-cost technology which was labour intensive and consequently a more decentralised model. As opposed to this, NDDB/IDC conceived of a high-cost model that was capital-intensive and, therefore, centralised with a concentration of technocrats and professionals at Anand and Baroda. The Anand model also favours the large-scale induction of funds from abroad, which it is thought will yield quick results. Large amounts of capital employed in the shortest period of time is thought to be equal to success in development.

The only hitch in the programme is that whereas Amul, with its early record of success in dairying, has been able to assimilate the model, absorb the technology and capital and emerge successful as a trail blazer, the rest of the country is not akin to Amul - in fact, there is a virtual generation gap between the presently advanced stage of development that can be seen in Gujarat as opposed to the rest of the country.

Therefore, Amul is predominant and will retain this predominance because it has always been at the forefront of dairy development in India. We have examined its superiority in the light of its emergent history and how that imparted it a lead in the field of technological advancement. This in turn put it in a position where it attracted funds on a large-scale. It remains to be shown, how Amul and the Gujarat Cooperative Milk Marketing Federation (GCMMF) plan to maintain their lead through professionalism and marketing.

#### Professional Marketing

The Gujarat Cooperative Milk Marketing Federation Ltd (GCMMF) formed in 1973, is an apex marketing body consisting of six district milk producer unions of Gujarat - Kaira, Mehsana, Sabarkantha, Banaskantha, Baroda and Surat.

The evolution of the federation was an important chapter in the history of the movement which was to climax in the predominance of its product range in urban markets all over India. The present state of the federation's marketing policies also illustrates, the rather obvious benefits that it has obtained out of coalescing the six units - in production, distribution and marketing - and applying the latest techniques of professional management which have ensured the commercial viability of the venture. It must be noted that the inputs into the enterprise have been high, but then the returns have justified the expenditure.

For our understanding, product development in Gujarat can be classified into two periods - the pre-GCMMF and the post-GCMMF period. In the pre-GCMMF period, barring the limited marketing of common brand products by the different constituent units, product deve-

lopment was largely dependent on a single unit production base i.e. Amul. The creation of the GCMMF, however, envisaged common brand marketing under the banner of the federation and, consequently, the product range became the activity of a multi-unit production base.

In the pre-GCMMF period, the Amul dairy, as a precursor, started the marketing of milk way back in the 'forties and 'fifties. In the next decade, Amul put up a roller dried baby food plant, which can be said to have heralded the era of milk product marketing by a cooperative institution. As the availability of milk grew, Amul went into the production and marketing of table butter, cheese and also established a modern spray dried baby food plant. This was followed by the commissioning of a high protein weaning food plant. By this time, the other district unions of Gujarat were on the brink of manufacturing a similar range of milk products. At least, within the state, the possibility of "many Anands" was very real.

Since the early 'seventies were essentially a time for consolidation and growth, it was wisely decided that instead of waging destructive campaign wars, which would surely reap negative results, it was safer to fuse all the units into one apex body, which could then coordinate the movements in supply of milk, ensuring a steady flow to all the units. The supply of milk was an essential part of GCMMF's marketing policy, since it alone could ensure optional yearly production at peak levels and it became a key factor in the growth and development of the federation. An increased and pooled supply of milk helped the long-term planning of product development and diversification. The present status achieved by the federation is largely due to the systematic development of milk as a commodity and the generation of a market in the urban areas for western milk products. In this respect, it was rightly envisaged that a common banner for the GCMMF's product would help in ensuring consumer acceptance and brand loyalty.

The opinion within the NDDB, with respect to the product diversification witnessed in Gujarat, is that the existing market potential still remains to be tapped. It is quite categorically stated by the NDDB that the growth strategy of the GCMMF is basically dependent on the increased availability of products. Particularly, their strategies are dependent on making use of all the available markets for milk and milk products by determining the extent of demand in different markets and then following a planned distribution by creating the channels and infrastructure for systematic release of stocks to different markets. This strategy, it can be seen, is aimed at long-term growth.

In the application of this policy the GCMMF has been fortunate, and it is well aware of this fact. On the one hand, it has been able to emerge at the forefront of the cooperative milk marketing scheme



as envisaged by OF, by as it has been pointed out, overriding the rest of the country's programme.

On the other hand, because of the government's favourable disposition towards the programme and the accompanying disfavour towards the multinational cooperations traditionally in the field, the GCMMF has had the advantage of facing virtually no competition in the market. Nestle's, Hindustan Lever's and Glaxo's milk product licensed capacities have not been allowed any increase. For instance, in the relatively short span of 30 years, Amulspray, an infant milk food, has been able to capture almost 55% of the market share. It must, however, be conceded that in the infant milk food market, as in other milk products, Amul can be credited with expanding the capacity of the market to absorb its output. This amounts to a virtual creation of demand.

A great deal of Amul's success may be attributed to its quality control which ensures high standard products in the market and, more importantly, a very aggressive advertising campaign, using almost every available media.

Besides western dairy products, the GCMMF has also entered into Indian milk products which are meant mainly for the consumption of the upper class. The Baroda dairy for example, has now entered into the shrikhand market in a big way. In 1980, it sold Rs.10 million worth of shrikhand at Rs.14/- a kg. It is now on the verge of marketing gulabjamuns which sell at Rs.20/- a kg. (although the cost of the ingredients is the same as in shrikhand).

In fact, costing of products has no relevance to the cost of inputs because, as a smart marketing organisation, wherever GCMMF finds itself in a monopoly it tends to over-price and in a competitive market it makes an issue of its low price.

A recent advertisement campaign for Nutramul (a brown beverage) illustrates this point. (See advertisement in Appendix IV). The economics of mass production also work in such a manner that in a flush season a tin of Balamul (weaning food) at Rs.24/- a kg. (equivalent to 8 litres of milk) is cheaper than 8 litres of milk!

The present dominance of GCMMF will, however, be threatened in the near future, as other apex federations begin to exploit their installed capacities in the GCMMF manner. This is bound to happen, as the infrastructure that OF creates, with its emphasis on western technology and capital management, has to be exploited within the scope and limitations of western dairying systems. Thus it is not economic, once a massive, capital-intensive structure has been created, to rest content with the procurement, processing and distribution of fluid milk alone. The model necessitates a diversification into other milk products if the input costs are to be met.

This process has already begun, as is evident in the present competition in the table butter market in Delhi, where Amul, Sagar and Vijaya are vying for larger market shares, notwithstanding Amul's traditional hold. Notice the competition in the cheese market in the urban sectors between Amul and Vijaya. How is this problem going to be resolved once other state federations and dairy cooperatives enter the fray too? There are several possible scenarios.

One way out of the impasse might be that the prices of milk products come crashing down in a glut situation. But this would make their production uneconomic - leading to yet another problem.

Another more likely scenario is that only two or three more federations like the GCMMF, will emerge out at the front, in the footsteps of Amul. Between them the market for milk products will be saturated, thereby severely constraining the entry of any more likely competitors in the field.

After all, the market for milk products can be expanded up to only that point, at which purchasing power can sustain the supply. Beyond a certain level, the market will not bear any more products.

There is yet another option - if the home market gets saturated or cannot buy milk products any more - that of export of Indian milk products to other, even lesser developed Third World countries. This option has, in fact, been exercised but it must be remembered that the export of Indian milk products is done at the cost of depriving the home market of a scarce commodity - fluid milk. There are, even today, several areas in the country which face acute shortages of fluid milk.

It is ironic that a programme that had been devised to balance out regional imbalances in milk supply through the proposed National Milk Grid, might even begin export of milk products out of the country. In fact, a few months ago, Bombay city was in the grip of a shortage of milk and table butter which virtually disappeared out of the market.

But urban consumers have got accustomed to harrowing shortages of agriculturally produced consumer items - like vegetables, meat and fruit. For instance, because of the export of mangoes and bananas to west Asian markets, those fruits which were within the reach of even the poor have now gone beyond the reach of all but the rich.

Meanwhile, in the home market, fierce competition will ensue, bringing us close to Susan George's thesis that agricultural activity is increasingly becoming an industry - agribusiness, where marketing of the end product is the most important sector in the handling of an agricultural commodity. Agribusiness relies on monopolistic, or at best oligopolistic structures - which, it must be borne in mind, was not what DF wished to create.

## IN FORMA PAUPERIS

Operation Flood, as envisaged when the agreement with the WFP was finalised on March 4, 1970, was meant to last five years. In March 1975, however, an interim evaluation report recommended an extension of the project by two years, which was further extended by another two. And the project was meant to terminate in 1979. But it finally terminated in 1981 while OF-II had already been officially launched on October 2, 1979.

What is interesting is that till April 1976, when an interim evaluation report was submitted by the WFP, there was no mention of a second part of the project. Operation Flood was not meant to be a programme spread over two phases of growth.

This might appear to be an interesting sidelight, but it is actually an integral part of our study which has constantly spoken in terms of growing dependencies on aid in the form of foreign funds, as well as technical know-how.

However, now that OF-II is a fait accompli, it is worthwhile considering its salient features, especially in terms of the content of food, monetary and technical aid, which, it may be recalled, was meant to gradually diminish and then vanish.

The actual implementation of OF-II was telescoped into the earlier phase on July 1, 1978, even though it officially began a year later. This phase is slated to end on June 30, 1985, but judging by past experiences, we should not take this date for granted.

Operation Flood II is also going to be funded in much the same way as its precursor, only at this stage, the inputs have magnified and the second half of the project therefore, envisages a much larger investment.

The NDDB/IDC claim today that the import content of OF-II is going to be significantly lower than phase one. We have already tried to

demonstrate how this claim might not be justifiable, given the growing dependencies on foreign technology. Even with respect to funds for investment in the scheme, an NDDB report states that a World Bank loan and funds generated through the recombination of imported and donated milk powder will be ploughed into the development of cluster federations and dairy processing units.

In an interview with T.N. Ninon, in early '81, Dr. Kurien had claimed that the import content of OF-II had decreased from 70% in 1971 to 10% in 1981, and would soon be only 3% to 5%. The World Bank report, however, states: "Project costs are based on estimates of the investment mix past experience indicates each union and federation requires. They are estimated at Rs.3,128 million, including duties and taxes which would amount to Rs.310 million. The foreign exchange component would be about Rs.1,005 million representing 32% of the total costs (or 35% of the project costs net of duties and taxes". (107). ①

It may be recalled that amongst the main objectives cited in favour of the project in 1969 was that it would ensure an increased availability of per capita milk which was then only 108 gms. per day as against a world average of 288 gms. per day. The project authorities had stated that they would ensure raising the per capita availability of milk to the minimum required level of 150 gms. per day as suggested by the Nutritional Advisory Committee. Ten years later, the per capita availability still languishes at a mere 122 gms per day. The achievement of OF can thus be questioned if in the span of a decade it has only raised the per capita availability of milk by 15 gms. ②

Over the next four years the country is going to witness the ushering in of a 'white revolution'. How the NDDB/IDC propose to do this, having failed to make a significant impact in ten years, is not very clear, but their sights have been set on some very laudable objectives for OF-II (See Appendix V).

#### The Crux of the Matter

Amongst a host of criticisms, several experts have questioned the efficacy of the claim put forward by the NDDB that cooperative dairying benefits the small and marginal farmer and even the landless. At various points we have shown how this is not possible. Briefly, this is not so because:

- (a) The credit structure does not favour those who cannot guarantee financial stability in terms of security of land holdings or capital stocks;
- (b) The capital-energy inputs for rearing a cross-bred milch animal, (the basic unit in increased milk productivity) yield either negative results or do not endure a profitable enterprise ;

- (c) The infrastructural facilities for the upkeep of high-yielding cows are not sufficiently developed (outside of some prestige areas) and access to them is limited in terms of physical effort and capital input, since they are considerably expensive.

At this point, we must stress that the criticisms levelled at the potential 'benefits' of OF to the underprivileged have arisen mainly because NDDB/IDC have consistently maintained that the project is a developmental programme. If the project were to be assessed merely in terms of a successful marketing operation, many of the avenues which NDDB/IDC themselves opened up for criticism would be closed.

#### Conflict or Harmony?

Dr. Gerrit Huizer, director, Third World Centre, the Netherlands, says that poor peasants form one of the main stumbling blocks to development in most Third World countries. And their increasing numbers and worsening poverty are becoming a nightmare to national and international agencies.

According to him, there are two basic strategies of development - the harmony-based model and the conflict-resolution model. Briefly, the harmony-based model assumes that in a developing nation all classes have some common interests and are dependent on external inputs for development. In keeping with this line of thought, intervention in the development process, in the form of aid at a community level, would eventually result in benefits for everybody. Even if it did not help the weaker sections immediately, the benefits would 'trickle down' and percolate at some stage to the more needy sections.

The conflict-resolution model, on the other hand, recognises that classes are antagonistic to each other. It recognises that different classes have different interests and only a conflict between the rich and the poor can bring about a qualitative change in the lives of the majority of the people.

Operation Flood, a model of development based on cooperation, fits well into the harmony model. Competitive production (between farmers) of milk holds out the promise of economic betterment to all.

The introduction of commercialism into the countryside, or rather, the induction of a primarily 'integrative' system, speaking in holistic terms, into the alien grip of a 'competitive' system, which agribusiness represents, has certain implications which do not portend well for the future.

We have seen how this competitiveness actually effects the functioning of OF by creating unhealthy competition within the overall structure e.g. the predominance of Amul and the likelihood of

a fierce grappling for larger shares of the market for milk and milk products.

It has also been suggested that because, after all, OF has only a limited amount of inputs for developing the country's dairying, and there is the pressure of time, most of the funds and other forms of aid have gravitated towards one institutionalised framework - the GCMMF, which has been the only 'success story' in OF.

Other members participating in ushering in the 'white revolution' have languished, barely meeting the targets to justify the continuance of the programme. Of course, there are several other reasons for such a development, predominant amongst which is the earlier history and management of the Kaira cooperative union, but on the face of it, and in view of the evidence, it seems unlikely that the 'Anand Pattern' can be replicated. Anand will continue to be a generation ahead of its followers.

This relationship of following the leader - it might be called - is going to be maintained as one of the most elementary tenets of capitalism in that capital begets capital. Considering the fact that Anand has been a major recipient of aid and this practice continues even today, the future needs little elaboration.

#### Planned Aberration

An interesting fact which needs to be highlighted, since it has an important bearing on the future, is that judging from Amul's track record, the enforced application of sophisticated technology and large inputs of capital, when governed by the pressure of time, lead to an aberration in a planned 'developmental' programme - if development is understood as an equitable and an egalitarian distribution of the country's resources. This also presumes the fact that access to the developmental inputs is not limited to a few or inhibited by in-built constraints, for e.g. a time-lag that obtains because of a difference in terms of more efficient modes of production.

This aberration might be observed in OF, which is a classic example of the commercialisation of a primarily developmental programme.

Because of the link-up with international <sup>①</sup> aid and foreign <sup>②</sup> technology, the former emphasises the latter which is very expensive, the programme has to operate at certain levels of economic efficiency so as to enable it to pay the price of the inputs. It is also observed that the increasing expenditure on the programme has to be justified to the government and the people as apt for 'modernisation' and 'progress' - the two issues are often confused.

Thus, the emphasis of development shifts from ensuring that small and marginal farmers benefit in equal measures from cross-breeding programmes to a greater emphasis on technical efficiency and capital management. In terms of DF, this could mean the growing alienation of a milk producer from the end product as Amul increasingly diversifies its product range to encompass infant milk foods, cheese, table butter, chocolates and beverages. And while doing so it actually manages to justify this divergence from stated objectives through effective public relations which softens the blow, cushioning it with developmental rhetoric.

Amul, and thus the 'Anand Pattern', has become a prestige issue - for those associated with it, as well as for the government of India which can boast of a highly-advanced dairy industry by citing the success story of Amul - yet another extravagant show-piece which at first glance may belie what is behind it.

But, there is no getting out of the situation DF finds itself in. The causative chain of heavy doses of capital and technology necessitate a more commercial outlook for the enterprise if its 'developmental' potential is to be exploited - putting the decision out of the hands of the policy makers who are victims of circumstances, albeit of their own making.

"The age of worship of the cow is gone, it is now a biological machine", said a scientist to a reporter who visited the NDDB at Anand and found "that the emaciated Indian cow has fattened to a 'super-bovine' breed capable of higher yields of milk - much of which finds its way into the profitable ventures of the Anand dairy". (108).

Apart from the socio-cultural implications of the scientist's remark, inasmuch as the cow has symbolised the Indian farmer's relationship with his animal and land which is devotional, the scientist is right.

Today, the 'products' of our 'biological machines' can be bought in any general merchandise store in the country, and there's nothing wrong with that except for the fact that commercialism was meant to have been a by-product of development. As it stands, the 'Anand Pattern' has only engendered commercialism. It is unfortunate that development is not a commercial by-product.

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## APPENDIX I

List of Manufacturers

1. Larsen & Toubro Ltd.
2. Vulcan Laval Ltd.
3. Unicorn Industries.
4. XL Equipments Private Ltd.
5. Stainco Enterprises (P) Ltd.
6. Mohan Artman & Herbet Ltd.
7. Process Equipment.
8. Unitech Engineers Private Ltd.
9. Hindustan Machines Tools Ltd.
10. Bern-Standard Ltd.
11. Bharat Heavy Plates and Vessels.
12. APV Engineering Company Ltd.
13. Anup Engineering Company Ltd.
14. Dany Dairy & Food Engineers.
15. I.A.E.C. Ltd.
16. Thakore Dairy Machinery Supplies Co.
17. Samarpan Fabricators (P) Ltd.
18. Swastik Safe & Iron Works (P) Ltd.
19. Mulk Raj & Company.
20. Panchal Workshop.
21. Khambata Kothari Cane & Allied Products (P) Ltd.
22. Dairy Udyog.
23. Bharat Crown & Metal Industries.
24. Kaira Can Co. Ltd.
25. Choksy Tubes Ltd.
26. Nekka Tubes Ltd.
27. Venus Trading Co.
28. SPARC.
29. Sinhal Metal Industries.
30. National Plastic Industries.
31. Indian Dairy Equipment Company.
32. Lakshmi Milk Testing Machinery Co.
33. Wanson (India) Ltd.
34. Greaves Cotton Ltd.
35. Power & Instrumentation.
36. Switch Gears & Controls.
37. General Mechanical Workshop.
38. Arransis Ltd.

SOURCE: Status of indigenous dairy equipment manufacturing industry, report submitted to visiting mission from World Food Programme, presented by representatives of indigenous dairy equipment manufacturing industry, February 1981 .

## APPENDIX II

List of Equipment Earlier Imported, But Presently ManufacturedA. Dairy Equipment

Can Washer.  
 Milk Wigher.  
 Milk Clarifier and Separator.  
 Milk Chiller.  
 Milk Pasteuriser.  
 Cream Pasteuriser.  
 Milk Silo.  
 Milk Condensing Unit.  
 Milk Drying Unit.  
 Butter Churn.  
 Butter Packing Machine.  
 Bottle Washer.  
 Road Milk Tanker.  
 Switch Boards.  
 Pneumatic Controllers for CIP  
 Bottle Filler.  
 Roller Dryer.  
 Ghee Filling and Packing Equipment.  
 Casein Vat.  
 Casein Dryer.  
 Casein Shredder.  
 Casein Press.  
 Milk Pump.  
 Powder Packing Machine.  
 Cheese Making Equipment.  
 Steam Generating Equipment.  
 Refrigeration Plant.  
 Rail Milk Tanker.  
 Instruments and Controllers.

B. Cattle Feed Equipment

Conveyor.  
 Blower.  
 Control Panel.  
 Batch Weights.  
 Batch Mixer.  
 Pellet Mill.  
 Elevator.  
 Cleaning Machine.  
 Fan.  
 Bin Discharger.  
 Molasses Admixture.  
 Pellet Cooler.  
 Cyclones.  
 Bagging Off Weigher.  
 Slat Conveyor.  
 Dust Collecting Unit.  
 Stitching Machine.  
 Boiler.

SOURCE: Status of indigenous dairy equipment manufacturing industry, report submitted to visiting mission from World Food Programme, presented by representatives of indigenous dairy equipment manufacturing industry, February 1981 .

## APPENDIX V

Operation Flood II

The objectives of Operation Flood II are:

- i) To enable some ten million rural milk producers' families to build a viable, self-sustaining dairy industry by mid-1985;
- ii) To enable the milk producers to rear a National Milch Herd of some 14 million cross-bred cows and up-graded buffaloes during the 1980's
- iii) To erect a National Milk Grid which will link the rural milk-sheds to the major demand centres with urban populations totalling some 150 million.
- iv) To erect infra-structure required to support a viable national dairy industry; including a national frozen-semen; vaccine production and delivery systems, indigenous development of dairy processing and conservation methods (for traditional and modern dairy products), with enlarged facilities for indigenous design and manufacture for dairy equipment; provision of man-power development programmes, with special emphasis on professional, managerial and technical cadres for rural industries, such as dairying; ad-interim programmes to supply butter-oil as a medium-priced cooking medium and extruded foods as the basis for infant supplementary feeding programmes, especially in integrated rural development programmes based on the Anand Pattern - and erection of a Management Information System, to provide timely information to local decision-makers responsible for development of the constituent parts of the National Milk Grid;
- v) By means of the improvements thus achieved in milk production and marketing, to enable milk and milk products to form an appropriate part of a stable, nutritionally adequate national diet - currently estimated at an average per-capita availability of 180 grammes of milk daily, which is to be achieved for a population of 750 million during the 1980's.

SOURCE: Operation Flood II - a proposal by NDDB, Anand.



**The quality is tops...  
and the price rock-bottom.**

Nutramul from Amul. That's your guarantee of excellence. Rich cocoa. Wholesome Amul milk. Choicest malt. Essential vitamins and minerals. And matchless strength-building qualities. All this for about Rs. 4 less than the rest! Be a Nutramul 'dada' ....and keep the change.

About  
Rs. 4 less  
than  
others!

COMPARISON OF BROWN BEVERAGE PRICES (Rs.)  
NON-FLEXIBLE PACKAGING

	500g	800g	1000g
NUTRAMUL Tin	13.83	-	26.67
MALTOVA Bottle	17.58	-	-
BOURNVITA Tin	17.68	26.97	-
BOOST Bottle	18.87	-	-

\*Max. Consumer Price as on Mar. 81. Local taxes extra.



Marketed by Gujarat Co-operative Milk Mktg. Fed. Ltd., Anand 388 001

deCunha/81/GCM/53

## APPENDIX III

Mother Dairy KurlaDairy Machinery Installed In Mother Dairy, KurlaB O M B A Y

S. No.	Name of the Unit machinery	Name of the Supplier & Make	Capacity per Unit	Year of instal- lation
1	2	3	4	5
<u>RECEPTION SECTION</u>				
1.	Weigh bridge (for road milk tan- kers)	1 M/s. Avery India	30 ton	1974
2.	Milk Pumps	2 M/s. Alfa Laval	60000 lt/hr.	1975
3.	Flow control tanks	2 M/s. Alfa Laval		1975
4.	Milk Stainers	2 M/s. Vulcan Laval	-	1975
5.	Milk Flow Meters	2 M/s. Siemens	30000 lt/hr.	1975
6.	Milk Chil- lers	2 M/s. Alfa Laval P -14 RB	30000 lt/hr.	1975
7.	Raw Milk	2 M/s. Vulcan Laval	100000 lt.	1975
<u>PROCESSING SECTION</u>				
8.	Pasteurisers	2 M/s. Alfa Laval P -14 RB	18000 lt/hr.	1975
9.	Clarifiers cum Standar- disers	2 M/s. Alfa Laval MRPX	18000 lt/hr.	1975
10.	Homoginers	2 M/s. APV. Gaulin	18000 lt/hr.	1975
11.	Processed Milk Silces	4 M/s. Vulcan Laval	100000 lt/hr.	1975
12.	Milk Pumps	2 M/s. Vulcan Laval FM	30000 lt/hr.	1975
13.	C.I.P. Tanks	6 M/s. Vulcan Laval	5000 lt.	1975
14.	Cream Chiller	1 M/s. Alfa Laval P-5-VRB	1000 lt/hr.	1975
15.	Double toned milk tanks	2 M/s. Vulcan Laval	10000 lt.	1978

1	2	3	4	5	6
<u>PACKAGING SECTION</u>					
16.	Can fillers	2	M/s. APV-Volumetric	4-5 Cans/m	1975
17.	Pouch filling machines	10	M/s. Prepac IS-5	5000 pouches/hr.	77-4 79-6
18.	Milk balance tanks	3	M/s. Vulcan Laval	10000 lt.	1978
		2	M/s. Vulcan Laval	2000 lt.	1975
19.	Can washers (bulk distribution)	2	M/s. Unicorn Engr.	10 Cans/Mil.	1976
20.	Can conveyors	2	M/s. Unicorn Engr.		1976
21.	S.S. Tanks	2	M/s. Vulcan Laval	2000 lt.	1976
22.	Rubber belt conveyors	6	M/s. Vulcan Laval	-	1979
<u>BYPRODUCT SECTION</u>					
23.	Butter churn tanks	1	M/s. Vulcan Laval	500 lt.	-
24.	Ghee Kettles	2	M/s. Vulcan Laval	1000 lt.	1979
			M/s. Vulcan Laval	500 lt.	1979
25.	Butter Oil tanks	2	M/s. Alfa Laval	1000 lt.	1975
<u>SERVICES-BOILERS SECTION</u>					
26.	Boilers	2	M/s. I.A.E.C.	4000 kg/hr	1974
		1	M/s. I.A.E.C.	4000 kg/hr	1981
27.	Furnace oil tanks	2	M/s. S. Navinchandra	30000 lt.	1975
28.	Water softeners	2	M/s. T.S. Navinchandra	5000 lt/hr	1975
			M/s. Techno Consultant	6000 lt/hr	1980
29.	Soft water tank	1	M/s. S. Navinchandra	4000 lt.	1975-1
30.	Service oil tank	1	M/s. S. Navinchandra	4000 lt.	1975
31.	Oil pumps	3	M/s. S. Navinchandra	2000 lt/hr	1975
32.	Feed water pumps	4	M/s. I.A.E.C.	6000 lt/hr	1975
33.	Steam pipes, insulation set	1	M/s. S. Navinchandra	-	1975

1	2	3	4	5	6
<u>REFRIGERA-TION SECTION</u>					
34.	Refrigeration compressors	6	M/s. Kirloskar K-60	283000 KCL/h	1975
35.	Electric motors for (34)	6	M/s. N.G.E.F.	150 H.P.	1975
36.	Ice building coils in water	48	M/s. Vulcan Laval	20 Sqm.	1975
37.	Glycol cooling coils	1 set	M/s. Vulcan Laval		1975-5
38.	Condensing coils	6 sets	M/s. Vulcan Laval	186000 KCL	1979-1
39.	Liquid Ammonia receiver	2	M/s. Vulcan Laval	2000 lt.	1975
40.	Chilled water pumps	6	M/s. Becon Best Co.	60000 lt/hr	1975
41.	Glycol pumps	2	M/s. Becon Best Co.	30000 lt/hr	1975
42.	Condenser water pumps	6	M/s. Becon Best Co.	30000 lt/hr	1975 1980
43.	Diffusers	14	M/s. Vulcan Laval	6 of 15 tons	1975-7 1979-8
44.	Air curtains	8	M/s. Ventura	8 of 10 tons	1979- 1980
<u>ELECTRICAL</u>					
45.	Electrical Transformer	2	M/s. Bharat Bijali	750 KVA	1974-2
		1	M/s. Tata Elec	750 KVA	1981-1
46.	Electric H/T Canal Boards	1	M/s. Siemens	-	1981-1
	Electric L/T Canal Boards	1	M/s. Arnik	-	1978
47.	HT OCB	5	M/s. Siemens	600 amps.	1974
48.	LT ACB	3	M/s. Larsen & Toubro	1000 amps	1978
<u>MILK PUMPS</u>					
49.	Pasteuriser Milk Pumps	3	M/s. Alfa Laval	18800 lt/hr	1975
50.	Transfer milk pumps	3	M/s. Vulcan Laval	30000 lt/hr	1979

1	2	3	4	5	6
51.	Powder hoppers	2	M/s. Vulcan Laval	1000 kg. 250 kg. "	1974 1974
52.	R.C.M. Pumps	2	M/s. Vulcan Laval	20000 lt/hr	1974
<u>WATER SUPPLY</u>					
53.	Water sto- rage tanks	3	Shree Engr.	450000 lt/hr	1974-2 1978-1
<u>COMPRESSED AIR SUPPLY</u>					
54.	Air Compressors	2	Ingersol	6 kg/cm <sup>2</sup>	1975-2
55.	Crate Washers	2	M/s. Dynatson	10 cats/min.	1980

SOURCE: Mother Dairy, Kurla WFP - 618 Aided Dairy Development  
Government of Maharashtra.