Apart from its economic value to the country, modern dairy industry has a vital role to play in maintaining and promoting the health of the people. In importance, it is next to agriculture only as a source of income to the rural households. In India, there is a tremendous potential for increasing production of milk, though it has not yet been fully realized because of several technological, physical, financial, and institutional constraints. Also, woefully, lacking is research and education in this direction resulting in a state of insufficient awareness of issues at stake.

With the growth of population and change in patterns of life with urbanisation, there has been a rapid increase in demand for milk and its products particularly in urban areas where these items cannot be, and are not being, produced in sufficiently large quantities.

Since the manufacturing of milk products depends on milk production in rural areas, so the milk products industry and its position has been discussed by us here with respect to the development of dairy industry in general, and that of milk products factories in particular.
Importance of the Industry

India, with a population of over 685 million people, has a great problem to provide everyone with adequate food, both in terms of quality and quantity. Most of the regions in the country are afflicted with under-nutrition and malnutrition. A large number of people depend upon milk and its products as the most important source of nourishment, next only to staple food, rice and grains. Milk products are considered the most perfect food, as these are the excellent sources of proteins, carbohydrates, calcium, vitamins and other important ingredients which are essential for physical and mental well-being of human beings.

Apart from nutritional importance of milk products, dairying, which is a base for the production of milk products, is indispensable for the uplift of the rural economy. It activates various agricultural operations including irrigation, transport and also manure for the fields. It is also important as a supplementary source of income being a subsidiary occupation to small and marginal farmers. Thus, dairying promises to be a vitally significant pre-occupation of the farmers. Besides, organised dairying also creates substantial employment opportunities. Milk products factories are essential near big cities to ensure that urban population do not have to maintain milch cattles in
congested areas and yet are supplied with milk products of good quality at normal prices. Dairy industry, besides providing additional employment, reduces the burden of population on agriculture. Moreover, proper industries can obviate many an evil practice like abnormal profits, adulteration and high prices, etc.

Keeping in view, the importance of dairying, it is necessary to develop the dairy industry very fast for overcoming the problems of income, employment and nutrition in the country.

I. GROWTH OF THE INDUSTRY

Before the Independence of India, in the first half of the 20th century, dairying in the country was largely unorganised. Fluid milk and its products were, generally, not saleable commodities, and there was no long distance movement of these products. Organised dairying, as understood in the West, started in a small way when military dairy farms and creameries were established towards the end of the 19th century to meet the demands of the armed forces and their hospitals. Some private dairies, such as, Keventers and Poisons, with more or less modern processing facilities, were encouraged to make pasteurised butter, primarily for use by the British army.
The establishment of dairy farms by the military authorities led to the need to organise training courses to acquire competence in the operation of modern dairy plants, and in the handling and processing of milk and milk products. As a result, the Imperial Institute of Animal Husbandry and Dairying (fore-runner of the National Dairy Research Institute) was established in 1923 at Bangalore.

There had been one major effort in the early 1940's when milk produced in rural areas of Kaira District was collected in bulk, pasteurized and transported by rail for distribution in Bombay by "The Bombay Milk Scheme", operated by the Bombay Municipality.

Post-Independence Developments

When India became independent in 1947, one of the major milk schemes to be included in the country's planned development was the Greater Bombay Milk Scheme (GBMS), which consisted of a market milk plant in Bombay, supplied with milk by the Kaira District Cooperative Milk Producers' Union. Although dairy cooperatives have existed in this country since 1913, for, mostly, collecting and selling fresh milk to local consumers, the first large scale and systematic breakthrough in dairy cooperatives in India was made in 1948 by the Kaira District Cooperative Milk Producers' Union at Anand. This was done by first using the old Government
of India Creamery for processing and despatch of milk for
distribution in loose form in Bombay. Ultimately, the
union came to be known as the Anand Milk Union Ltd.,
abbreviated to 'Amul' which in vernacular means "highly
valuable" or "beyond all price".

Dairy Development under Five Year Plans

Dairy development in India received an impetus
after the Independence when industrialisation and public
awakening necessitated the establishment of organised
collection, processing, and distribution of milk to cater
to the needs of the expanding urban areas.

The planned development of dairying was actually
taken up in the first National Five Year Plan (1951-56),
and the inadequacy of suitable marketing structure was
noticed as one of the inhibiting factors for milk production.
This expressed itself in an accentuated form in the remote
rural areas, where, for want of quick transport and market­
ing facilities, milk was marketed in the form of ghee,
which did not provide sufficient income to the farmers.
To solve this problem, marketing schemes were evolved and
developed in some of the major cities at the initial
stages. These schemes were planned focussing attention
on making arrangements to assure the flow of rurally

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2 Excerpts from, Report of the National Commission on
Agriculture, Part-VII, Govt of India, 1976,
pp 124-128
produced milk to the dairy plants, and for distribution of the same to the consumers after processing and packaging.

First Five Year Plan (1951-1956)

During this plan, work on dairy development, on all India level, was initiated in States like Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Tamil Nadu, Uttar Pradesh, and West Bengal. The milk schemes at Bombay, Calcutta and Delhi were already on the way. In 1955, the Indian Dairy Research Institute, transformed as the National Dairy Research Institute (NDRI), was shifted from Bangalore to Karnal. The Bangalore campus was converted into the Southern Regional Station of the newly created National Institute (NDRI). During this plan, an allotment of Rs. 7.81 crores was made to this industry.

Second Five Year Plan (1956-1961)

Dairy development on an organised basis began to take shape during this period. This programme envisaged the establishment of 36 liquid milk plants at large consuming centres, three creameries and three milk product factories, and expansion of salvage and fodder farms. Training of personnel for dealing with management and quality control problems was also undertaken. During this
plan, seven liquid milk plants were completed. Pilot milk projects, as fore-runners of larger plants, were started at eight centres. Four salvage farms were established. The expenditure on all this during this plan amounted to Rs. 120 million.

Third Five Year Plan (1961-1966)

On the basis of achievements in the previous two plans, a provision of Rs. 36.66 crores, comprising of Rs. 32.24 crores for the various schemes in the States and Rs. 4.42 crores for central government schemes, was provided in this plan. The plan envisaged establishment of 55 milk supply schemes for cities and industrial townships, eight rural creameries, six milk products and two cheese factories, four cattle feed compounding factories, and completion of spill-over schemes of the second plan.

In the course of this plan, 30 liquid milk plants, including seven completed during second plan, and 27 pilot milk schemes were in operation, and the daily average through-put of milk in the organised sector was 13 lakh litres. Four milk products factories and three creameries were also commissioned.

Formation of the National Dairy Development Board

Inspired by the success achieved by Kaira District Cooperative Milk Producers' Union, Anand (Amul), Govt of India
Ministry of Agriculture constituted in 1965 a National Dairy Development Board (NDDB) to organise and oversee the planning and execution of dairy development programmes on a national scale, and to provide technical guidance to various States in setting up projects for overall development of milk production, processing and marketing in the country by making available, on request, technical and consultancy services on all relevant aspects.


During the annual plans between 1966 and 1969, attention was paid to the completion of projects in hand, and an expenditure of Rs. 257 million was incurred.

Fourth Five Year Plan (1969–1974)

The setting up of 24 new milk schemes in towns with a population of over 50,000 persons, four milk product factories and 64 rural dairy centres, in areas with a population less than 50,000, with a view to provide chilling and marketing facilities in isolated pockets of milk production, were taken in hand. These targets, however, were tentative and the tempo was supposed to increase depending upon the performance and availability of resources. The total plan allocation to dairying was to the tune of Rs. 138.97 crores.
**Operation Flood**

The project 'Operation Flood', was conceived and formulated by the NDDB during the fourth plan period. The 'operation Flood-I' project was initiated in 1970. The project envisaged the use of dried milk powder (SMP) and butter oil (BO) donated by the World Food Programme for recombination into milk by modern dairies in the four metropolitan cities, and crediting the value of these donated commodities on an agreed basis to a fund for financing dairy development programmes. The project, initially scheduled for a period of five years, was subsequently extended thrice to 11 years and finally terminated in 1981.

Operation flood, the world's largest dairy development programme ever undertaken, aims at setting up a modern dairy industry to meet India's rapidly increasing need for milk and its products, and making it capable of viable and self-sustaining growth. The approach underlying the Operation Flood-I project was based on the operational validity of the Anand pattern. The project undertook the colossal task of upgrading the modernising production, procurement, processing and marketing of milk with the assistance provided by the World Food Programme, FAO, EEC, World Bank, and other International Agencies. The aim was to create a 'Flood' of rurally produced milk, assuring the farmer of remunerative price and ready market, and the
urban consumer of wholesome milk at stable and reasonable prices by linking the main milk producing areas to main consuming centres in urban areas.

The Indian Dairy Corporation (IDC) was established in 1970 as a specialized institution to promote and finance dairy development in India. Its functions include financing cooperative dairy development and promoting expansion of milk processing and marketing facilities.

Encouraged by the success of 'Operation Flood-I', Operation Flood-II was launched in 1978 with commodity assistance from the World Bank estimated at Rs. 4855 million over a period of seven years. The major thrust of this project was on the dispersal of dairy development activities on a wider scale in the country on a co-operative basis. The IDC stipulated that programmes under operation Flood should be implemented through a three-tier cooperative structure comprising of a primary milk producers' societies at the village level, affiliated to milk unions at the district level which in turn were federated into an apex federation at the state level. The project was designed to cover about 155 milkshed districts identified on the basis of their potential. The project was supposed to benefit ten million farm families and cover a national milch herd of about 15 million crossbred cows and upgraded buffaloes. The project has been in operation since 1982-83 in all the States and Union Territories of the country.
Fifth Five Year Plan (1974-1978)

It is envisaged to increase the number of liquid milk plants from 90 in 1973-1974 to 150 in 1978-79. The number of milk product factories, including creameries and rural dairy centres, is expected to increase from 18 to 52 and 52 to 132 respectively, during the same period.

Sixth Five Year Plan (1980-1985)

The main emphasis during the Sixth Plan is to be on implementing Operation Flood-II project. Also the following activities are to be taken up in the State Sector:

i) Completion of spill-over schemes;
ii) Consolidation and expansion of milk plants outside Operation Flood-II;
iii) Training of personnel;
iv) Completion of projects under IDA assisted projects in the three States of Madhya Pradesh, Rajasthan and Karnataka;
v) Expansion of Delhi Milk Scheme and Mother Dairy to 5 lakh and 6 lakh litres per day, respectively

An Approach to the Seventh Plan

The development of the national milk grid through the implementation of the Operation Flood-II Programme should be continued and consolidated. Constraints should be identified and remedial measures taken to accelerate its implementation.
II. PRESENT STATE OF THE INDUSTRY

During the past three decades the dairy industry in India has undergone revolutionary changes in its structure. The methods of collection and marketing and utilisation of milk for manufacturing products have been considerably improved, although from the hygienic point of view, the conditions of milk production in rural areas continue to be unsatisfactory.

Milk production in the country has doubled since the advent of planning in 1951 (See, Table 2.1). Although it has risen from 17.4 million tonnes in 1951 to 34.7 million tonnes in 1982-83, after stagnating at a level of 17-20 million tonnes for 30 years between 1940 and 1970, yet India faces shortages to meet the nutritional requirements of her population. The per capita per day milk availability was 131 g in 1981-82, after it had declined alarmingly to 107 g in 1969-70, as against the nutritional requirements of 280 g. The decline in per capita per day availability of milk, as given in Table 2.1, indicates thereby, less than proportional increase in milk production in relation to population growth.

Milk is a multiple purpose raw material utilized by the milk processing industry to be used in fresh fluid form as well as in the manufacturing of a variety of dairy products. Of the total quantity of milk produced in
TABLE 2.1. Trend in Milk Production, Per Capita Availability between 1951 and 1981

<table>
<thead>
<tr>
<th>Year</th>
<th>Million tonnes/ year</th>
<th>Per capita milk availability (g/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951</td>
<td>17.406</td>
<td>132</td>
</tr>
<tr>
<td>1956</td>
<td>19.717</td>
<td>135</td>
</tr>
<tr>
<td>1961</td>
<td>20.375</td>
<td>127</td>
</tr>
<tr>
<td>1966</td>
<td>19.368</td>
<td>108</td>
</tr>
<tr>
<td>1969-70</td>
<td>20.740</td>
<td>107</td>
</tr>
<tr>
<td>1971-72</td>
<td>22.500</td>
<td>112</td>
</tr>
<tr>
<td>1977-78</td>
<td>28.300</td>
<td>123</td>
</tr>
<tr>
<td>1978-79</td>
<td>29.110</td>
<td>124</td>
</tr>
<tr>
<td>1979-80</td>
<td>30.200</td>
<td>126</td>
</tr>
<tr>
<td>1980-81</td>
<td>31.500</td>
<td>128</td>
</tr>
<tr>
<td>1981-82</td>
<td>32.900</td>
<td>131</td>
</tr>
<tr>
<td>1982-83</td>
<td>34.700</td>
<td>-</td>
</tr>
<tr>
<td>1983-84</td>
<td>36.3 (Ant.Ach.)</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Ministry of Agriculture, (Department of Agriculture and Cooperation), Govt of India, Annual Report 1983-84, p.97; and Indian Dairy Corporation - Twelfth Annual Report 1981-82, pp.4-5

The country nearly 47 per cent is used for distribution in the form of fluid milk and the remaining quantity is used for manufacturing milk products like ghee, butter, curd, khoa, cream, ice-cream, etc. (Pawar, 1982, p.173).
With modernisation of dairy industry there has been a rapid increase in the creation of facilities required for manufacturing non-traditional products such as baby food, milk powder, condensed milk, and table butter, etc. The collection of milk from the rural producers by the organised sector is being done fairly satisfactorily. The Dairy Cooperatives, have been contributing a lot in this respect. At present, the processing and marketing activities of milk and milk products are being carried out by the following three types of organisations in India:

1. Private;
2. Government/Semi-Government;
3. Cooperatives

The private sector has mostly limited its activities to the high margin western dairy products. They plough back very little of their profits into milk-production-enhancement programmes.

Majority of the liquid milk plants in the country are owned and operated by Govt/Semi-Govt organisations. Also there are factories owned and operated by government for manufacturing milk products.

In the third system, the processing and marketing organisation is owned and operated by district level unions formed by the primary village level milk producers'
cooperative societies. This system ensures that the producers get the largest share of the profits/earnings derived from consumers (Jhala, 1978; Patel, 1981).

Several factories have been established in important milk producing areas for the manufacture of products such as butter, cheese, milk powder, ghee, khoa and milk based infant foods. There are at present a total number of 233 dairy plants of various sizes in the public and cooperative sectors functioning in the country.²

It may be worthwhile to note that as many as 85 per cent to 90 per cent of the milk products are manufactured in the organised sector, with cooperative dairy units being in the vanguard (Shah, 1982). At present the traditional products such as ghee and butter are being manufactured in increasing quantities by the organised dairy sector, and have been very well received by the consumers. Several non-traditional milk products such as milk powder, baby food, condensed milk, ice cream, chocolate, cheese etc. are also being produced in limited quantities in the organised public, cooperative, or private dairy products manufacturing plants. The estimated production of some of the western type (non-traditional) milk products between 1975 and 1981 is shown in Table 2.2.

The standard and quality attained for manufacture of these products compare favourably with those attained

² Ministry of Agriculture, (Department of Agriculture and Cooperation), Govt of India, Annual Report, 1983-84, p.105
### TABLE 2.2. Estimated Production of Selected Western Type Milk Products Between 1975-1981
(in tonnes)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk powder</td>
<td>13,365</td>
<td>18,500</td>
<td>20,965</td>
<td>23,670</td>
<td>26,510</td>
<td>29,150</td>
<td>32,460</td>
</tr>
<tr>
<td>Condensed milk</td>
<td>4,646</td>
<td>5,000</td>
<td>4,695</td>
<td>5,650</td>
<td>6,490</td>
<td>7,130</td>
<td>7,480</td>
</tr>
<tr>
<td>Butter</td>
<td>6,001</td>
<td>6,399</td>
<td>8,305</td>
<td>10,760</td>
<td>14,000</td>
<td>16,800</td>
<td>18,480</td>
</tr>
<tr>
<td>Infant milk Food</td>
<td>20,904</td>
<td>26,252</td>
<td>29,683</td>
<td>35,860</td>
<td>43,030</td>
<td>47,300</td>
<td>52,000</td>
</tr>
<tr>
<td>Malted Milk</td>
<td>14,475</td>
<td>15,500</td>
<td>17,596</td>
<td>19,900</td>
<td>22,300</td>
<td>24,500</td>
<td>26,900</td>
</tr>
</tbody>
</table>

Source: Dairy India, 1983, p.67

In countries abroad with developed dairy industry. However, milk marketing is still highly unorganized and is dominated by private traders, with an average less than 10 percent of total milk being marketed by organized sector. As shown in the Table 2.3, the installed capacity of most of the milk products manufacturing plants is at present under-utilized.
TABLE 2.3. Capacities and Through-put of Public and Cooperative Sectors of Dairy Industry (1979-80) (in million litres/day)

<table>
<thead>
<tr>
<th>Type of plants</th>
<th>No.</th>
<th>Installed capacity</th>
<th>Average through-put</th>
<th>Percentage capacity utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid milk plant</td>
<td>98</td>
<td>5.655</td>
<td>4.211</td>
<td>74.46</td>
</tr>
<tr>
<td>Product factories</td>
<td>32</td>
<td>4.185</td>
<td>2.520</td>
<td>60.22</td>
</tr>
<tr>
<td>New dairy and mini dairy plants</td>
<td>67</td>
<td>0.367</td>
<td>0.156</td>
<td>42.50</td>
</tr>
<tr>
<td>Under implementation</td>
<td>31</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Under expansion</td>
<td>24</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Present supply capacity</td>
<td></td>
<td>10.207</td>
<td>6.887</td>
<td>67.47</td>
</tr>
</tbody>
</table>

Source: Dairy India, 1983, p.64

Reduction in Import Dependence

A wide-range of milk products, such as butter, cheese, baby food, malted food and skim/whole milk powder, are being produced in India. This has helped the process of import substitution, which is indicated by the fact that according to a study carried out by the Central Statistical Organisation, the share of import in the total...
availability of milk products was about 30 per cent in
1960-61 but has gradually decreased to 6 per cent during
1975-76 (Shah, 1982).

III. PROBLEMS OF THE INDUSTRY *

1. Fluctuations in the supply of milk

   The first problem of this industry is the scarcity
   of fluid milk. The demand for milk products is almost
   uniform throughout the country in all seasons of the year,
   whereas, by and large, milk production is small and scattered,
   and that too is distinctly seasonal. The summer months of
   April to July record acute shortage of milk, while in winter
   months of November to February, supply of milk would be
   200 to 300 per cent higher. So the industry requires
   diversification for production of milk powder, condensed
   milk, processed cheese, instant milk foods and other
   products which can be preserved and sold throughout the
   year.

2. Irrational pricing policy

   The price of milk is determined on the basis of
   price in the open market, which, in turn, determines the
   price of milk products. Such a make-shift pattern does
   not help to build a permanent, workable relationship
   between the milk schemes and the producers. Unless the

* see Shenoi (1975)
producers are guaranteed a reasonable price on a long term basis, their economy is bound to be affected adversely. Thus the industry should provide an incentive price for milk to the rural producers over and above their cost of milk production.

3. **Poor means of transportation**

The inadequacy of suitable marketing structure and the absence of necessary infra-structure for collection of milk and its transporation is another problem of the industry. Because of poor means of transporation, collection of milk is not easy. This is more so in the rural areas where for want of quick transport and marketing infra-structure, milk is marketed in the form of ghee which does not bring proper returns to the farmers.

4. **Quality control**

Quality aspect of milk and milk products has not received much attention due to the general shortage of milk. Milk cattle of a low breed are reared by farmers using traditional management practices, the quality of milk they supply is far from what is required. The planned dairying, therefore, should provide farmers and entrepreneurs access to high yielding milch buffaloes/cows.

5. The cultivation of leguminous fodder crops to provide nutritious and inexpensive cattle feed and supply of balanced concentrate is another problem of the industry.