PART TWO

THE INDUSTRIES UNDER STUDY
The following THREE organised industries have been selected here for a detailed study of LMR in them:

(1) Refinery Industry.
(2) Fertilizers Industry.

An overview of these industries is presented in this Chapter, so as to help grasp the nature of the respective industry in terms of its brief history, usefulness, products, capital investment, manpower employment, etc.,

(1) REFINERY INDUSTRY

**Brief History:** Oil was discovered in India in the year 1890 at Digboi in Assam. This led to the establishment of the first Oil Refinery in 1901 by a British Company, viz., Assam Oil Company. Till the fifties, this was the only Oil Refinery operating in the country and most of our requirements of petroleum products were met through imports. It was in the early fifties that the Government of India licensed three
Foreign oil companies operating in the country, viz., Burmah Shell (now, Bharat Petroleum Corporation), B330 and Caltex (now, Hindustan Petroleum Corporation) to set up refineries in the country. All of them were operating in the Private Sector.

In view of the vital role of oil in the country's economic development, GOI in its Industrial Policy Resolution of 1956 categorised petroleum as a "strategic mineral". It was decided to build some national petroleum organisations in the Public Sector, which would not only conserve valuable foreign exchange by producing indigenous petroleum products but also reduce our dependence for this strategic commodity on foreign countries. 'Oil India Limited' (OIL) and 'Oil and Natural Gas Commission' (ONGC) were founded for developing indigenous resources of crude oil production. The availability of crude from the oil fields in Assam led to the establishment of Indian Refineries Limited (IRL) in August 1958, with the sole objective of constructing and operating refineries in the Public Sector for the manufacture of various petroleum products. Another company called 'Indian Oil Company' was floated by the Government in 1959 for the purpose of marketing and distribution of petroleum products. These two companies operated independently till September 1964, when they were amalgamated in Indian Oil Corporation Limited (IOC). Presently there are eleven refineries in operation. Ten of these are in the Public Sector, and are
located thus: One each at Bongaigaon and Gauhati (Assam), Barauni (Bihar), Koyali (Gujarat), Cochin (Kerala), Madras (Tamil Nadu), Maldia (West Bengal), and Vishakhapatnam (Vizag) (Andhra Pradesh), and two at Bombay. The only one refinery in the Private Sector is situated in Digboi (Assam). One more refinery at Mathura (U.P.) is in the process of completion and may soon start its commercial business. Table IV.1 gives particulars of the different refineries in India. The refinery at Koyali in Gujarat is biggest one among all of them.

**TABLE IV.1**

**OIL REFINERIES IN INDIA**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Place</th>
<th>Company</th>
<th>Refining capacity in million tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Barauni</td>
<td>Indian Oil Corporation</td>
<td>3.30</td>
</tr>
<tr>
<td>2.</td>
<td>Bombay</td>
<td>Bharat Petroleum Corpn.Ltd.</td>
<td>5.25</td>
</tr>
<tr>
<td>3.</td>
<td>Bombay</td>
<td>Hindustan Petroleum Corpn.Ltd.</td>
<td>3.50</td>
</tr>
<tr>
<td>4.</td>
<td>Bongaigaon</td>
<td>Bongaigaon Refinery Corpn.Ltd.</td>
<td>1.00</td>
</tr>
<tr>
<td>5.</td>
<td>Cochin</td>
<td>Cochin Refineries Ltd.</td>
<td>3.30</td>
</tr>
<tr>
<td>6.</td>
<td>Digboi</td>
<td>Assam Oil Ltd.</td>
<td>0.50</td>
</tr>
<tr>
<td>7.</td>
<td>Gauhati</td>
<td>Indian Oil Corporation</td>
<td>0.85</td>
</tr>
<tr>
<td>8.</td>
<td>Maldia</td>
<td>-do-</td>
<td>2.50</td>
</tr>
<tr>
<td>10.</td>
<td>Madras</td>
<td>Madras Refineries Ltd.</td>
<td>2.80</td>
</tr>
<tr>
<td>11.</td>
<td>Vizag</td>
<td>Hindustan Petroleum Corpn.Ltd.</td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>31.80</strong></td>
</tr>
</tbody>
</table>

GUJARAT (KROYALI) REFINERY

Genesis & Capacity: The discovery of crude oil in Gujarat at Ankleshwar and North Gujarat oil fields provided the necessary impetus for establishing an oil refinery in Gujarat. Based on various techno-economic considerations, the present site of the refinery was selected, which is about 10 kms from Baroda (Vadodara) railway station. It was commissioned in October 1965, and was designed to process 3 million tonnes (M.T.) of crude per year and has been built with USSR collaboration at a total investment of about Rs. 31 crores.

During the early seventies, the three distillation units were debottle-necked by ceaseless efforts of our engineers through various technical innovations and by addition of very little hardware to achieve the annual processing capacity of 4.2 M.T. of indigenous crude. This amounted to 40% increase over the originally designed capacity.

In view of the increasing demand of petroleum products in the country as well as the supply and demand pattern of this area, the refining capacity has been further expanded by another 3 M.T. per year to process imported crude and the expansion facilities were commissioned in October 1978. The present total capacity of this Refinery is of 7.2 M.T. annually, inclusive of an additional distillation unit of 3.0 M.T. per year along with down-stream processing units like Vacuum Distillation, Visbreaker, Bitumen and Treating Units.

It is for the first time that such a big project in petroleum industry with a total investment of about Rs. 56 crores has been independently handled by Indian engineers.
Products: At present the Refinery produces 13 products having end-uses as exhibited in Table IV.2.

**TABLE IV.2**

**PRODUCTS AND THEIR END-USES IN GUJARAT REFINERY**

<table>
<thead>
<tr>
<th>Product</th>
<th>End-use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Liquid Petroleum Gas (L.P.G.)</td>
<td>Cooking gas (marketed as 'Indane')</td>
</tr>
<tr>
<td>2. Benzene</td>
<td>Raw material for production of fertilizers and petro-chemicals.</td>
</tr>
<tr>
<td>3. Toluene</td>
<td>-do-</td>
</tr>
<tr>
<td>4. Naptha</td>
<td>-do-</td>
</tr>
<tr>
<td>5. Motor spirit (85 Octane)</td>
<td>Fuel, commonly known as 'Petrol' for cars and scooters.</td>
</tr>
<tr>
<td>6. Motor spirit (9 Octane)</td>
<td>High Octane petrol fuel for imported cars having higher compression engine.</td>
</tr>
<tr>
<td>8. Superior Kerosene</td>
<td>Illuminant used for domestic purposes.</td>
</tr>
<tr>
<td>9. High-speed Diesel</td>
<td>Fuel for Diesel locos, trucks and buses, ships, etc.</td>
</tr>
<tr>
<td>10. Light Diesel Oil</td>
<td>Fuel for small engines attached with irrigation pumps, etc.</td>
</tr>
<tr>
<td>11. Low Sulphur Heavy Stock (LSHS)</td>
<td>Fuel for Thermal Power Stations.</td>
</tr>
<tr>
<td>12. Fuel Oil</td>
<td>Fuel for Industrial Furnaces, Boilers, etc.</td>
</tr>
<tr>
<td>13. Bitumen</td>
<td>Material for road surfacing and other industrial needs.</td>
</tr>
</tbody>
</table>

Source: Administration Office, Gujarat Refinery; Jawaharnagar.
Capital Investment and Labour Force: The total funds employed as on 31-3-1981 had amounted to Rs. 392.75 crores and the fixed assets to Rs. 88.73 crores. It employs as many as 2,000 persons, including the officers.

As Mother Industry: The refinery is playing a very vital and significant role in the area of supplying the energy needs of the country through production of the various fuel products. It has assumed the position of a mother stimulating other industrial activities in Gujarat as well as in the other parts of the country. Naphtha produced in the refinery, for example, goes to fertilizer plants like Gujarat State Fertilizers Company (Fertilizernagar) and Shri Ram Fertilizers and Chemicals (Kota) for production of much needed fertilizers in the country. Naphtha is also being supplied to the Naphtha Cracker Plant of IPCL for production of Ethylene, Propylene and Butylene/Butadiene, which are the basic raw materials for production of plastic and rubber. Also, special-cut Naphtha is being supplied to IPCL for their Aromatic plant for production of Xylenes and DMT*, which are the raw materials for polyester fibre and polyester films. Benzene from the refinery is supplied not only to GSFC for their plant which is producing Caprolectum, the basic raw material for Nylon, but also to many other industries for producing a wide range of chemicals like Chlorobenzene, Nitrobenzene and Styrene that are used in the manufacture of pesticides, plastics and rubbers.


* Dimethyl Terephthalate.
(2) FERTILIZER INDUSTRY

Brief History: Fertilizers, an essential item in India's drive for self-sufficiency in food grains and other agricultural crops on which some leading industries like cotton textiles depend, has received considerable attention. The Central Government included fertilizers in Schedule-B of the Industrial Policy Resolution of 1956, as an area in which 'the State will generally take initiative in establishing new undertakings but in which private enterprise is also expected to supplement the efforts of the State.' The importance of this industry in terms of the needs of food production, employment generation and income enhancing of the rural sector needs no emphasis. In fact, the first fertilizers plant, viz., E.I.D. Parry (India) Ltd., was installed as early as in 1906 at Ranipet in Tamil Nadu to produce Single Superphosphate (SSP). Since then, particularly after Independence, the industry has grown in different parts of the country, so that in 1976, (a) there were 27 nitrogenous and 33 phosphatic fertilizers factories with a total installed capacity of about 27 lakh tonnes and 9 lakh tonnes respectively, (b) the gross investment was of about Rs. 1,500 crores, and (c) the direct employment - actual was of 50,000 persons.

Units: Gujarat has had many facilitating factors like relatively stable governments committed to industrialization, considerable entrepreneurial abilities and talents, a peaceful industrial relations climate, fairly good natural resources including oil resources, and arable land of high quality in many areas.

It is the Anil Starch Products Ltd., to which the credit goes for pioneering the production of single superphosphate at Ahmedabad in 1949. In view of the great demand of SSP in Saurashtra region, another large unit for its production was established in 1964 at Bhavnagar with a licenced capacity of 34,000 tonnes per annum. Presently there are eight operating fertilizer plants in Gujarat, being five in the Private Sector, two in the Co-operative Sector, and one in the Joint Sector. Among these, two plants in the Private Sector are quite small, viz., Anish Chemicals at Ahmedabad and Viraj Chemicals at Nandesari, producing SSP at the rated capacity of 9,000 tonnes and 2,200 tonnes per annum, respectively. Two more fertilizer plants, viz., (1) Gujarat Narmada Valley Fertilizer Co. Ltd. (GNFC), Chavaj, and (2) Krishak Bharati Co-operative Ltd., Hazira, are in the process of construction. The former is in the Joint Sector, while the latter is in the Co-operative Sector. It is interesting to note that there is not a single fertilizer unit falling exclusively in the Public Sector in Gujarat. Yes, the Government of Gujarat is the largest single
shareholder having 49% of the share capital of Gujarat State Fertilizers Company Ltd. (GSFC), the biggest fertilizer unit in Gujarat.

The data for different fertilizer units pertaining to their sector, products, rated capacity, capital outlay and labour employment etc., are presented in Table IV.3.

Products: Table IV.3 shows that the small units like Adarsh, Anil, Anish, Faushak and Viraj are manufacturing single superphosphate (SSP), while the large units like GSFC and IFCC are producing Urea, Ammonia, Ammonium Sulphate (AS), Diammonium Phosphate (DAP) and Nitrogen, Phosphorous and Potash (NPK).

Capital and Labour Force Employed: As per the available information, the total capital employed in the working units was about Rs. 96 crores and the labour force was nearly 3,600 during the year 1979-80.
Growth: Like in other developing countries, the consumption of cereals constitutes the main food intake for the masses in India, and that of dairy products has, for centuries, remained low and marginal. As a result, the dairy products industry in our country is still in its infancy. Of late, however, it has been growing fast, and it is believed that in a few years' time it will emerge as an impressive instrument for attaining rural uplift in India. Synoptically reviewed: (a) In 1960-61, there were 40 dairy factories employing 5084 employees, as against 183 factories employing 31431 employees working in 1975-76. It meant a 4.5 times rise in the number of factories and a 10.5 times increase in the number of persons employed. (b) The fixed capital employed had grossed Rs. 312 crores in 1960-61, and Rs. 65.74 crores in 1975-76. That meant a 21 times rise. (c) The total output at current price was put at Rs. 11.95 crores in 1960-61. The figure had shot up to Rs. 39.00 crores in 1975-76, reflecting a 3.25 times rise.

5. Ibid, p.3.
The progress was, thus, consistent and considerable.

The implementation of Rs. 95.4 crores Operation Flood-I Project has accelerated the growth of Dairy Industry in the country. Again the revised Rs. 483.6 crores Operation Flood-II Programme is bound to make a stupendous impact. It has been designed by NDB and IDC to develop a viable modern dairy industry to serve the country's needs for milk and milk products during 1980's. It will benefit 10 million rural milk producers' families in 155 districts in the country. The milk production under the Project is targeted to rise from 68.7 million litres per day in 1980 to 103.2 million litres per day in 1984.

POSITION IN GUJARAT

Brief History: Even before the turn of the century, the Kaira District in Gujarat was known for its milk products.

6. The Programme was designed by the National Dairy Development Board in 1968-69. The concepts involved were: enlargement of the modern dairies in the major cities, to enable them to capture a commanding share of their markets in order to replace city-produced milk, thereby preventing the premature destruction of higher yielding city-kept milch animals calves, establishment of milk producers' co-operative unions in the cities' logical hinterland milk-sheds with provision of processing facilities to conserve members' milk and technical inputs to help members to improve their milk production, in the first 5-7 years. The project was not dependent on increased national milk production, rather it was a matter of shifting resources now used in urban and para-urban milk production to production in hinterland milk-sheds, where it is more economic. The first phase of Operation Flood received assistance from United Nations World Food Programme and the Food and Agriculture Organisation. This Phase covered the cities of Bombay, Calcutta, Madras and Delhi plus eighteen hinterland milksheds in ten States of India. (See: Dairying in India: XIX International Dairy Congress India, 1974: p.10)

Kaira District has had a long tradition of dairying dating back to 1892, when an Englishman by name Mr. Walter Reeves came to Kaira district and started a small butter business. However, the credit for putting India on the list of dairy production countries goes to the skill and enterprise of Mr. Pestonji E. Poison — earlier coffee powder manufacturer in Bombay. During the First World War, a big demand for butter made Pestonji to move to Anand, where he found vast potential of fresh milk in the contiguous area. He invested Rs. 10 lakhs for the first time to erect a model dairy for butter manufacturing at Anand, through a network of milk and cream collection centres in the Kaira District. Construction of this pioneer dairy was completed in the year 1929 and was inaugurated in the following year. This was, incidentally, the first dairy of its kind in India and perhaps in the East.

The outlet of milk widened much in 1945 when this Model Dairy agreed to supply milk to Bombay at the request of the then Government of Bombay. It was first Mr. Poison who successfully demonstrated that pasteurised milk could be transported by rail in a good condition even at a distance of 427 kms.

But, since 1950, most dairy activity in the Kaira District has centered around the Kaira District Co-operative Milk Producers Union Ltd., popularly known as Amul Dairy, that was promoted


in 1946 to protect the milk producers against the mal-practices and exploitation of private trade. 30 years have witnessed a stupendous cooperative growth in the field. "The activities of Amul Dairy have been foremost in fostering the claim, that today dairy industry in Gujarat leads the country — both with regard to quality and variety of dairy products manufacturers."11

District Cooperative Milk Producers' Unions have been established in most of the districts of the State. However, Kaira, Mehsana, Surat, Baroda, Banaskantha and Sabarkantha have progressed most rapidly. Dairies in the cooperative sector have the merits of combining the advantages of small scale pattern in milk production with those of large scale organisation and management in milk processing, centralised products manufacture and marketing.

Dairy Plants: There were modern dairy plants working in 13 Districts in the State, whose total installed processing capacity was 18.85 lakhs litres per day at the end of 1978-79, with the actual milk quantity handled amounting to 16.06 lakh litres per day.12 (See: Table-IV.4). In the remaining Districts — Valsad, Panchmahals, Kutch, Surendranagar, Gandhinagar and Dangs — the dairy plants are at different stages of construction/erection.

While the other dairy plants are owned and managed by the District Cooperative Milk Producers' Unions, the five that belong to Gujarat Dairy Development Corporation (GDDC), are


Products: Plants which constitute dairy-products industry in Gujarat are mainly engaged in the manufacture of pasteurised milk, baby food, butter, cream-ghee, casein, cheese, condensed milk, skimmed and toned milk.

Impact on Employment and Other Allied Industries: As seen in Table IV.4, direct employment was available directly to over 8200 skilled, semi-skilled and unskilled employees in the organised dairy plants in Gujarat. In addition, a good number of people was also employed indirectly in the related occupations like transport, distribution, marketing, chilling centres, cooperative milk collection centres, etc.

One of the outstanding contributions of the modern dairies is the development of small industries allied to dairy industry. It has so happened, particularly in Kaira District, that the big plant of "Amul Dairy" has led to the continuous growth of small scale and transportation industries catering to the needs of the dairy industry.

UNITS SELECTED FOR THIS STUDY

We have concentrated for this intensive research on 7 units in the three industries. In the Refinery Industry, there is only one unit in the State, viz., Gujarat Refinery (also known as Koyali Refinery) started at Jawaharmagar (Baroda), which is studied. This unit is in the public sector, owned

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* The ABAD Dairy of Ahmedabad was owned and managed by the Ahmedabad Municipal Corporation until 23-12-1979, when it was taken over by GDDC, Gandhinagar.
and managed by Indian Oil Corporation. Three units, viz., (i) Gujarat State Fertilizers Co. Ltd., Baroda, (in Joint Sector) — the biggest fertilizer plant in the State, (ii) Indian Farmers Fertilizers Cooperative Ltd., Kandla, (in Cooperative Sector), and (iii) Paushak Ltd., Baroda (in Private Sector) have been picked up. Similarly, three units have been selected from out of the Dairy Industry. These are (i) The Kaira District Cooperative Milk Producers' Union, Anandi, (Amul Dairy) — the biggest dairy, (ii) The Mehsana District Cooperative Milk Producers' Union, Mehsana (Dudhsagar Dairy) — the second biggest dairy, and (iii) Ahmedabad Municipal Dairy (in the Public Sector). Abbreviation codes, viz., R, F, F0, F2, D1, D2 and D3 respectively have been used to indicate them in the following chapters.