THE STORY OF AMUL: A PERSPECTIVE FROM ABOVE

In the previous chapter, the socio-historical context of the study, viz., Kheda district, was discussed, as it was a prerequisite for a comprehensive understanding of the analysis of MCs in Kheda district. In this chapter, the story of Amul is discussed. Such an analysis will have the perspective from above; and an analysis of milk cooperatives and social structure from such a perspective, will give a background to our study of MCs at village level.

The discussion to follow in this chapter will first of all locate KDCMFPU in the context of milk cooperatives in India and Gujarat. Next, the structure of KDCMFPU shall be discussed. Thirdly, the context under which Amul came into being, i.e., the origins, will be elucidated. This will be followed, fourthly, by tracing the subsequent growth of Amul which shall include a brief discussion on problems of organizing cooperatives faced by the organizers in the early years of Amul. In the end, the present situation of KDCMFPU shall be examined.

Much of our discussion will be based upon the works of scholars and as well as the publications and records of KDCMFPU. Our own observations and comments shall be included during the course of the discussion; and in the end a critical scrutiny of some of the claims/data presented by KDCMFPU will be made so as to get to know the actual picture.
The discussion begins by locating Amul in the context of milk and milk cooperatives in India.

In the context of Milk and Milk Cooperatives in India

Latest published figures by FAO (1982) show that, in 1981, most of the milk produced in India was by buffaloes (175 lakh metric tons from 615 lakh buffaloes in comparison to 135 lakh metric tons of cows' milk from 264.25 lakh cows), and that fa o is essentially an Asian animal, with India having 52.1% of the Asian figure of 1174.43 lakhs. On a global scale, India has slightly more than half, 50.5% to be exact, of world's buffaloes of 1216.36 lakhs (FAO, 1982:199-210). As the production of buffalo milk, the Indian share constitutes 9% of the Asian production and 62.6% of the world's production of buffalo milk. The Indian share of cows' milk production is. India produces 35.4% of Asian production figure of 1.3 lakh metric tons and 3.1% of the world figure of 82.3 lakh metric tons.2

As for the situation within India, the latest livestock figure is for the year 1977. As per the then figures, shown in Appendix C, it is noticed that Gujarat ranks seventh in terms of buffaloes and eleventh in terms of cattle. In terms of milk production from all sources, Gujarat ranks fourth after U.P., Rajasthan, and Punjab in 1977-78 (it slips to the fifth position in 1979-80). The statewise figures, latest of which is available only 1971-72, show that Gujarat ranks third after U.P. and
The northern states of Punjab, Haryana and Rajasthan produce about one-fourth of milk in India. Gujarat produces about 7.7% of milk from all sources in the country.

Although Gujarat ranks low in terms of milk produced, it ranks first when it comes to milk handled by cooperative unions as shown in Appendix D. Having 15.416% of the milk cooperatives, the MC unions in Gujarat contributed 46.132% of total milk business in cooperative sector. This is further strengthened indirectly by what has already been pointed out in Table II.3, namely, that in CF and IDA projects, Gujarat handled 17.48 lakh kg. per day of a total of 44.17 lakh kg. per day for the entire country under CF and IDA projects. Appendix D only shows how successful milk cooperatives have been in Gujarat.

Within Gujarat, the KDCMPU handles on an average of 5 lakh kg. per day. In fact, not only does it dominate the unions in Gujarat but also the entire country as already seen in Table II.3. Others have pointed out the same fact for 1973 (S.K. Patel, 1973:11).

So it is no wonder that government bodies keep referring to Amul as a symbol of success. The Working Group on Cooperation of the Administrative Reforms Commission (1968:114-115) remarks

No reference to the dairy industry is complete without mention of Kaira District Cooperative Milk Producers Union, Anand.... The activities of the Union have brought new prosperity to individual farmers in the area.... It should be the endeavour to develop cooperative dairy programmes on the lines of Kaira model....
Praise has been showered on Amul by others as well. Graham Rose (1973:1-3) writing in the Sunday Times, says, "the transformation of a tiny peasant cooperative into one of 30 top businesses in India has revolutionized the lives of more than 1 million peasants and could serve as a model for solving many of the overwhelming problems facing Asia's millions of rural poor...."

There are many others who have praised KDCMPU, but two are enough to prove our point. Let us turn our attention to the structure of Amul.

The Structure of KDCMPU

A description of the structure of KDCMPU is important to enable us to understand the subsequent discussion much better. The structure that exists is two tier and is known, as mentioned earlier, as 'Anand Pattern', and cooperatives organized thus have been termed 'Anand Pattern cooperatives'.

Figure V.1 brings out the existing structure. At the village level is the primary milk producers cooperative consisting of milk producers as members. Each village level milk cooperative is in turn federated into a union of milk cooperatives at the district level. This is the two tier organization.

The village level milk cooperative society purchases milk from the milk producer member on the basis of fat content per litre. It collects/purchases milk twice a day, once in the morning and
again in the evening. Every MC has a paid staff, headed by a secretary, who is overall incharge of day to day activities of the MC. As per the rules, he works under the overall guidance of the managing committee although in practice this may not be so. The MC secretary has other paid assistants, usually consisting of a milk tester, a milk collector called milk 'barner' while a peon is the fourth employee whose job involves cleaning the utensils/instruments for testing, the building, and the like. It is our observation that although the MC secretary is supposed to be guided by the managing committee, in the four villages studied, the MC secretary controls the MC and often determines major policy decisions as he is the only person who knows what is happening in the MC. Thus, it is not an overstatement to state that MC secretary is the linchpin in the successful functioning of MC at village level.
The other main features of the two-tier organization is that the KDCFPU has high quality buffalo bulls farm, servicing its Artificial Insemination (AI) unit, so as to improve the progeny with high yielding buffaloes. This AI facility operate everyday and one of the paid staff of the MC is trained especially for conducting this. This service is free of charge to a member. In addition, the Union has a set of veterinary doctors who visit the needy animal, on payment of a nominal sum of Rs.5/- by a member. For a non-member the charges are very high. The third input available at the level of the MC, is the provision of cattle-feed (Amuldan) from the feedplant of the Union. This feed is available in the MC where, usually, a separate room exists for a person to sit and sell Amuldan. A feedplant to supply such cattle-feed came up in 1964. It must also be pointed out that there are private companies which sell the same feed (under the brand name 'Atulcan') and sold by private retailers in the villages.

The milk collected by the MCs is taken in cans to Anand. If the place of procurement is far from Anand, then in summer months, they are taken to the nearest chilling centre before being transported to Anand. "The Union bears the cost of transport of the milk from the village societies to the dairy factory, so that producers receive a uniform price for their milk regardless of their distance from Anand" (cf.KDCFPU:n.d.1).

Nowadays, a third tier has been added to the two tier structure. The third tier is at the state level. KDCFPU is now part of Gujarat Milk Marketing Federation Ltd. with its headquarters at Anand. Amul has now become the brand name for the
products marketed by the state level federation. This third tier is concerned with marketing only.

The Amul Story: Dairying Before KDCHPU

Although Amul has been in existence for nearly four decades, it would be a mistake to assume that it is the first milk cooperative in the country. The first dairy cooperative was the Katra Cooperative Dairy Society, Allahabad, which was registered in 1913. This was the first milk cooperative that was registered after the passage of Cooperative Societies Act of 1912, under which non-credit societies could also be registered. Subsequently a number of societies came up including two unions in Calcutta and Madras (The Calcutta Cooperative Union Ltd., 1919 and the Madras Cooperative Milk Supply Union Ltd., 1927). By the end of the Thirties, there were 19 milk unions covering 264 societies with a total membership of 11602. But then except the two unions of Calcutta and Madras all others were handling less than 1100 kgs. of milk per day, the total quantity of milk marketed by cooperatives was 11000 kgs. per day i.e. nearly 40 lakh kgs. per year. This was only about one-eighth of 1% of milk marketed in the urban areas of India.

(KCDHI, 1981:5)

But it is KDCHPU amongst all the milk cooperatives that have come into existence, that has created a name for itself. It has grown in size, scale and strength and has secured a niche for itself in the history of milk cooperatives.
Although Amul has made a name for itself in the history of milk cooperatives in Gujarat and in India, the credit for opening up and utilising the tremendous potential of milk marketing in and around Anand goes to another person, Pestonji Edalji Dalal, a Parsi industrialist of Bombay. (As he sold butter under the brand name of 'Polson', it became part of his name and he was called Pestonji Polson). He must be given the credit for putting India on the dairy map of the world (John, 1975:237; SIE, 1971:22). Pestonji Polson was the first in India to invest Rs.10 lakhs to establish, at Anand, a dairy with modern equipments for the manufacture of good quality butter. This dairy was popularly known as 'Polson Model Dairy', and it "was inaugurated by Sir Frederik Sykes, the then Governor of Bombay" (John, 1975:237).

It would be pertinent to mention here that mechanized dairy industry in Kheda district has existed since about the beginning of the twentieth century. In the last decade of the nineteenth century, an engineering firm in Bombay imported cream separators. A merchant of village Naar (in Kheda district), who heard of its usefulness, bought one and started the first creamery which he operated in his house. Around the same time, one Mr. Sakharam from Bombay, is said to have bought a separator in Anand and thus "introducing a more efficient mechanism for making ghee in a district which was known for ghee production and marketing" (Tulpule and Rana, 1970:21). Singh and Kelly (1981:12) mention that a Swede, one Mr. A.C. Strafford, established a dairy plant around 1900, and he supplied 100,000 lb. of cream daily to Bombay. In 1911, a German, Mr. Kolhar, came to Anand and established a factory to manufacture casein from skimmed milk.
that time was just poured down the lanes as farmers believed that it was not consumable and would even be harmful. Initially he got the milk free, but later on paid one or two paise per maund.\textsuperscript{11} Later, one Mr. G.C. Rives joined\textsuperscript{12} the Indian Dairy Supply Company and produced pasteurized milk, butter milk and milk powder. This company was a pioneer in so far that they were the first to use "uptodate" machines (Tulpule and Rana, 1970:21; Singh and Kelly, 1981:13).

But it was Polson's efforts that generated interest in dairy activity in the district. "Many others emulated him and the Kaira Milk Union is one amongst them" (SIET, 1971:21).

Polson was attracted towards butter manufacture during World War I, when Col. Dickson, the Officer in charge of army supplies, had "complained" to Polson that he was not getting good butter.\textsuperscript{13} Polson, at that time, was a successful manufacturer of French Coffee in the East. Polson then deputed one of his European officers to Europe\textsuperscript{14} to study the latest technique of butter manufacture and to select for Polson the best butter equipment (John, 1975:237).

The establishment of Polson Model Dairy at Anand proved to be a great boon to villagers in contiguous areas of Anand, who earlier had no outlet for milk. During World War II, the Polson Model Dairy supplied 3,000,000 lb. of butter annually for the Defence Services and also operated a cheese factory at Anand, on behalf of the Government of India, and supplied cheese to the Defence Services (John, 1975:238; Singh and Kelly, 1981:13). In 1945, the outlet for milk widened when Polson agreed to sell
milk to the Bombay Government and it was Polson who successfully demonstrated that milk could be transported by rail to Bombay, a distance of 260 miles, in good condition even without up to date transport facilities (John, 1975:179; M.M. Shah, 1977:47). This milk was purchased by Polson from contractors.

The Amul Story: The Beginning

In Kheda district, for years the private milk collectors, merchants and owners of cream separators and dairies were gulping down large amounts, the middle men's margins, so that rural milk producers got a low price for their milk sales, while the city dwellers paid high price for the same milk (M.M. Shah, 1977:48).

In November 1945, the Bombay Milk Scheme (BMS, now onwards) was started by the Government of Bombay. The BMS started purchasing milk from Polson Dairy at Anand. After some preliminary trials, the BMS awarded monopoly rights for procuring milk in Anand and 14 surrounding villages 15 to Polson (M.M. Shah, 1977:47). This aroused strong reactions resulting in political opposition to this move (Singh and Kelly, 1981:2; John 1975:233; Tulpule and Rana, 1970:23).

There was already disenchantment amongst the peasants as their returns were meagre 16. Sardar Vallabhbhai Patel, who hailed from Karamasad village in Kheda district, had remarked in a letter addressed to social workers in 1942, that the only way to improve the economic position of the milk producer was through cooperatives (Tulpule and Rana, 1970:23). So when an exclusive right was granted to Polson, opposition from farmers, social workers and even from other traders in milk 17, took the form of unrest.
As a result of the agitation against the "monopoly" granted to Polson, the Government of Bombay entered into a contract in 1947 with another firm, the Anand Milk Products Ltd., to supply a portion of its requirements (M.M. Shah, 1977:48); and they continued to supply milk till the early Fifties, when their contracts were terminated. 

In the meanwhile, the discontent of farmers reached to such an extent that they approached Sardar Patel to seek his advice.

Sardar Patel replied that the obvious solution to this problem was to organise the dairy industry on a cooperative basis... He ... said that the farmers should not only demand that they be permitted to set up a cooperative, but if their demand was rejected by the Government as was most likely, they should refuse to sell their milk to the milk merchants.

(KDCMPU: n.d.i)

Sardar Patel also said that he was willing to lead them. Thereupon, he sent his "trusted deputy", Shri Morarji Desai, to Kheda district to organize a cooperative.

On January 4, 1946, a meeting of milk producers and social workers was held in village Somarkha under the presidency of Shri Morarji Desai. This meeting adopted a resolution to undertake and develop dairy industry on a cooperative basis (KDCMPU: n.d.i; Tulbule and Rana, 1970:23; M.M. Shah, 1977:49; John, 1975:234). As to what happened afterwards there are slightly different versions. Let us take what Amul itself says first. The same meeting of January 4, 1946, took a decision that village milk producers' cooperative societies would be federated into a Union which would own milk processing facilities. They also wanted that the
Government should undertake to purchase milk from this cooperative union, and give encouragement to this Union, failing which the farmers would go on strike and would not sell any milk to any milk contractor in Kheda district.

Government refused the demand. The strike was called and lasted 15 days. Not a drop of milk was sold to the milk merchants by the farmers. No milk reached Bombay and the Bombay Milk Scheme collapsed. After 15 days, the Milk Commissioner in Bombay (an Englishman) and his Deputy came to Anand, assessed the situation and agreed to the demands of the farmers.

(KDCMPU: n.d.i)

Tulpule and Rana (1970) pointed out to the dynamics that operated at that time but do not mention any strike. They remark that in the meeting of January 4, 1946, a committee was formed "after the resolution to form a cooperative was adopted.... There was much enthusiasm but no definite approach". The different elements that had united to fight against the grant of monopoly, dissipated, and "some even made efforts to see that the cooperative venture did not develop". Another issue which seized the people was whether some of the existing cooperatives should take up the function or should a new institution be formed.

Shri Tribhuvandas Patel was the Chairman of Anand Taluka Cooperative Sale Purchase Union. The possibility of this union taking up milk trade was examined, but with no result. "The vested interests manoeuvred and for a while succeeded in checking the growth of Union's milk trade." But Shri Tribhuvandas Patel and others, took a decision "in a District Board Meeting" to form a milk producers cooperative union for the district. After completing the necessary formalities, the Union was registered on December 14,
114

1946. Hadgud and Gopelpura village societies which had been functioning since October 26, 1946, and were supplying milk to Polson, started to do so for the Union \(^2\) (Tulpule and Rana, 1970:23).

A third view is that of Tribhuvandas Patel (1984) who, in a recent article, mentions that there was opposition to the monopoly right given by the BMS to Polson on November 15, 1945. "Not a drop of milk be given to Polson, that was the decision taken at village Samarkha. The other decision was to form a union of the cooperatives at district level".

Whatever be the actual course of events that took place at that time, one thing about which there is no difference is the formation of a union of cooperatives.

The Kaira District Cooperative Milk Producers Union was...incorporated with four objectives: to provide a market for all the milk which producers wished to sell; to obtain for producers a greater share of the prices paid by the consumers of their milk; to help producers of milk to increase their yield and profits; and to provide the Bombay Milk Scheme with a stable supply of fresh milk at a reasonable price.

(Kurien, 1968)

It is interesting to note that the last mentioned objective is no longer valid as KDMPU now supplies milk to other cities like Calcutta and Delhi. Further, selling of milk is no more the primary concern as, on an average, only 30\% to 35\% of milk collected is processed and sold as fluid milk. Rest of the milk is made into by-products, which are considered to be more profitable. As for giving the producers a greater share of the
price paid by consumers, grumblings of resentment are heard on this. This was heard in three villages during the course of this study.

From the above discussion, one point emerges with clarity and that is the role the political leaders played in the emergence of KDCHPU. Amongst some of the important political leaders who played an important role, mention can be made of Sardar Vallabhbhai Patel, the first Deputy Prime Minister in Independent India; Shri Morarji Desai, a one time Chief Minister of Bombay who later on became Prime Minister; Shri Dinker Rao Desai, Minister of Food and Supplies, Bombay State; and Shri Tribhuvandas Patel, who was President, Kheda District Congress and later on of Gujarat State Congress Party. Some of the others were also Congress leaders of the district level as has been shown in Appendix B. Political leaders played a role in formulating a policy which encouraged the formation and growth of cooperatives. Secondly, they intervened at crucial phases, especially in the early years of Amul's existence. Successful political lobbying by Amul was the reason for success as Amul's competitors had contacts with civil servants who made important decisions in the government (Singh and Kelly, 1981:59-62). Political leaders played a role in (1) procuring a creamery in the early years of its existence. (2) Increasing the proportion of milk sold by KDCHPU to BMS, and then ultimately giving monopoly rights to KDCHPU. This was a time when sale of fluid milk was more profitable than sale of manufactured products. Shri Dinker Rao Desai, Minister of Food and Supplies in Bombay State, first increased the quota of Amul, and then did not renew the contract of Anand Milk Products with effect from April 1, 1951.
and that of Polson with effect from January 1, 1952 (Singh and Kelly, 1981:62). (3) Fixing a higher price for milk sold by KDGMPU to BMS. KDGMPU got paid Rs.8.93 per 100 lb. of milk to Rs.7.35 given for the same weight to local producers. Initially, this higher rate was given for four months starting June 1, 1948, as the extra amount was considered "educational". Later on when Amul asked for an extension, the minister-in-charge sanctioned it. The extension was first upto three months (December 31, 1948) and then by one year (upto December 31, 1949) (Singh and Kelly, 1981:61). (4) Mobilizing financial assistance. Singh and Kelly (1961:45-6) argue that in the period 1947-57 "major financial assistance came from the Government of Bombay".

The bifurcation of Bombay State into Maharashtra and Gujarat on May 1, 1960, had also a beneficial impact on Amul. Being located in Ahmedabad district of Gujarat, Amul had access to political leaders of Gujarat. The bifurcation did not affect Amul's finances as this was the time Amul expanded into manufacture of lucrative by-products of milk; and this was more profitable than sale of milk to BMS. Amul at this time started manufacturing baby food and cheese (see Appendix E).

The Amul Story: Subsequent Growth

While Appendix E gives a chronology of major events in the development of KDGMPU, Table V.1 highlights the actual picture in the growth of societies, farmer membership, share capital of the Union, quantity of milk collected, sales and profit of KDGMPU. Appendix E will be examined towards the end of this section, so it shall not be discussed now. In Table V.1, the figures mentioned are
Table V.1
Progress Made by KDCIPU between July 1947 to March 1982

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of societies</th>
<th>No. of farmer members</th>
<th>Share capital Rs.</th>
<th>Quantity of milk collected in Kg.</th>
<th>Annual Sales Rs.</th>
<th>Profit Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1947-48*</td>
<td>8</td>
<td>432</td>
<td>40,500</td>
<td>17,233.56@ (only June)</td>
<td>26,500</td>
<td>-2,852</td>
</tr>
<tr>
<td>1955-56</td>
<td>64</td>
<td>22,828</td>
<td>3,17,400</td>
<td>1,11,11,111@ (only June)</td>
<td>74,86,000</td>
<td>2,95,127</td>
</tr>
</tbody>
</table>

Position after New Dairy was built

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of societies</th>
<th>Nom. of farmer members</th>
<th>Share capital Rs.</th>
<th>Quantity of milk collected in Kg.</th>
<th>Annual Sales Rs.</th>
<th>Profit Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956-57</td>
<td>107</td>
<td>26,765</td>
<td>3,61,500</td>
<td>1,41,49,659@</td>
<td>89,47,000</td>
<td>2,03,365</td>
</tr>
<tr>
<td>1960-61</td>
<td>195</td>
<td>40,500</td>
<td>7,41,100</td>
<td>2,39,15,000</td>
<td>1,88,72,000</td>
<td>9,642</td>
</tr>
</tbody>
</table>

Position after Dairy was expanded for Baby Food and Cheese

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of societies</th>
<th>Nom. of farmer members</th>
<th>Share capital Rs.</th>
<th>Quantity of milk collected in Kg.</th>
<th>Annual Sales Rs.</th>
<th>Profit Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961-62</td>
<td>215</td>
<td>44,000</td>
<td>7,48,700</td>
<td>5,53,76,000</td>
<td>3,18,23,000</td>
<td>72,396</td>
</tr>
<tr>
<td>1964-65</td>
<td>421</td>
<td>85,000</td>
<td>12,57,000</td>
<td>6,05,41,000</td>
<td>6,27,26,000</td>
<td>1,60,182</td>
</tr>
</tbody>
</table>

Position after Second Dairy was built

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of societies</th>
<th>Nom. of farmer members</th>
<th>Share capital Rs.</th>
<th>Quantity of milk collected in Kg.</th>
<th>Annual Sales Rs.</th>
<th>Profit Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965-66</td>
<td>518</td>
<td>1,10,000</td>
<td>13,70,600</td>
<td>6,59,05,000</td>
<td>9,22,19,000</td>
<td>1,62,714</td>
</tr>
<tr>
<td>1970-71</td>
<td>706</td>
<td>1,80,000</td>
<td>34,71,800</td>
<td>11,82,25,273</td>
<td>27,39,41,845</td>
<td>7,16,903</td>
</tr>
<tr>
<td>1975-76</td>
<td>829</td>
<td>2,50,000</td>
<td>52,92,700</td>
<td>12,90,41,218</td>
<td>42,72,55,597</td>
<td>24,84,992</td>
</tr>
<tr>
<td>1981-82</td>
<td>894</td>
<td>3,39,000</td>
<td>89,63,500</td>
<td>16,00,18,395</td>
<td>78,56,65,255</td>
<td>26,67,655</td>
</tr>
</tbody>
</table>

N.B.: * Figures for year July to June. Subsequently for April to March.
@ Figures in original in lb., converted to kg. at 1 kg. = 2.205 lb.
for the year KVKMPU came into existence and then for years before and after an important technological expansion of dairy or manufacture of baby food and cheese. This covers the period upto 1965-66. Subsequently, data have been given at five year intervals, i.e., for 1970-71, 1975-76. The last interval is a six year one and this has been maintained to include 1981-82, the year for which the latest figure was available when the study commenced. Thus, in 1981-82, there were 894 societies, with an impressive membership of 3,39,000 having a share capital of over Rs. 89 lakhs and a sales turnover of over Rs. 78.56 crores with a profit of over Rs. 26 lakhs.

Table V.2 gives the decadal growth in number of societies, membership, quantity of milk collected and sales over the last three decades. Table V.2 shows that the highest growth in number of societies, membership and quantity of milk collected was in the Fifties. In subsequent decades, the growth figures have not been as high and have shown a declining trend. As for growth in sales, it is a case apart. The growth in the Fifties by over 420% is very remarkable and much higher than the growth in the other columns (2, 3, 4) during the same decade. But the growth in the Sixties, as far as sales are concerned, was very impressive, rapid and tremendous. The rapid and high growth in sales, especially in comparison to milk societies, membership and quantity of milk, shows how successful Amul has been in marketing its products.

Table V.2 also shows that growth in quantity of milk collected has kept pace with, more or less, the growth in societies and not with membership. The figures for quantity of milk collected will be examined and analysed shortly as this would give a better
understanding of what is happening at the HC level, so no discussion will be pre-empted about them at the present moment.

Table V.2

Decadal Growth Rate of KCMPU

<table>
<thead>
<tr>
<th>Decadal Year</th>
<th>% Growth of Societies</th>
<th>% Growth of members</th>
<th>% Growth of quantity of milk collected</th>
<th>% Growth of sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951-61</td>
<td>270.7</td>
<td>389.3</td>
<td>290.0</td>
<td>420.4</td>
</tr>
<tr>
<td>1961-71</td>
<td>246.0</td>
<td>388.6</td>
<td>276.6</td>
<td>955.9</td>
</tr>
<tr>
<td>1971-81</td>
<td>20.3</td>
<td>52.1</td>
<td>20.1</td>
<td>124.1</td>
</tr>
</tbody>
</table>

Figures for profits have not been included in Table V.2 as profits tend to fluctuate from year to year. This is not to state that KCMPU has run on loss frequently. KCMPU ran on a loss only on two occasions, in 1947-48 and 1973-74. The amount of profit shown is more a reflection of tax-planning by a company, than an indicator of its economic growth. A better indicator of economic growth would be sales turnover.

While Amul has been successful in rapidly increasing its sales, it would be imprudent to state that the remarkable growth of KCMPU was as smooth as one might be made to think of. Nor was and is the overall picture of Amul all that rosy.
Taking the first point first, it has been already pointed out that Amul's growth till 1956, was not without problems. Once K.U.C.K.P.U got the monopoly rights on selling milk to B.M.S, collection of milk by Amul was all the more dependent on the purchases of milk by the B.M.S. In 1953-54, 1954-55; and 1955-56, the Union was forced
to stop acceptance of milk from primary cooperatives intermittently during October to March every year so that all the societies had on an average, to keep closed - like Bank Moratoria - for 34 days, 89 days and 108 days respectively during those years.

(M.M. Shah, 1977:52-3)

This upset the farmer's earnings and there was the threat of ghee preparation at home, or to sell the milk to private vendors. The Union, besides adopting short term measures like rationalization of milk cuts, and not forming new societies, also proposed "long term" solution which was to install a "modern dairy with large capacities for pasteurization of milk and for the manufacture of milk products". The new dairy that came into being was the largest of its kind in Asia and went into production of October 31, 1955. It cost Rs. 48/- lakhs, which was realized partly by (a) ploughing back funds from the Union emanating to Rs. 22.75 lakhs (b) a loan of Rs. 10 lakhs from Government of Bombay (c) a grant of Rs. 4.5 lakhs from Government of Bombay (d) a supply of dairy equipment worth Rs. 8 lakh by UNICEF (e) a supply of dairy equipment worth Rs. 2.75 lakh by New Zealand under Colombo Plan, where 50% was free gift and 50% was interest free loan

In 1958, the milk products factory was expanded to manufacture sweetened and condensed milk. This cost Rs. 15 lakhs, of which Rs. 6 lakhs were given as aid by Government of India (M. K. Shah, 1977:55).

In 1960, KDC&PU started manufacturing roller dried baby food and cheese. Machinery worth Rs. 10 lakhs was imported during the year. It is claimed that it was the first time anywhere in the world that cheese was being produced from buffalo milk on such a commercial level. Amul was called upon to supply milk powder to the defence services; and to meet the requirements, Amul set up a dairy plant enhancing its capacity for dried powder and butter. A new spray-dried baby food was also added to the list of products (KDC&PU:n.d.i.).

It would be pertinent to point out that after the early Sixties, the sale of manufactured dairy products became more profitable as their prices continued to rise rapidly. Kurien states, in November 1965, that:

It is worth mentioning that the price structure of milk and milk products in India has changed in the past few years to such an extent that today it is more paying to convert milk into milk products than to supply liquid milk to meet the needs of consuming public.

(Quoted in Singh and Kelly, 1981:100)

Coming to the second point, the annual average collection of milk per farmer member and annual average collection of milk per society indicate that the situation within KDC&PU is not that bright. Both the annual average collection per farmer member and
the annual average collection per society are good indicators of
the state of KDCMPU, or of any milk cooperative union on two
yardsticks — sales (and profit) the economic criterion; and the
quantity of milk collected — the product criterion. As far as
sales and profit go, KDCMPU has shown a remarkable growth as seen
from Tables V.1 and V.2. Even on the issue of quantity of milk
collected, it is noticed from the same tables, that KDCMPU has
shown a high growth. But when seen in corelation with other
figures in Tables V.1 and V.2, some doubts arise about the rosy
picture. It has already been pointed out that the growth quantity
of milk collected by KDCMPU, seem to keep pace with growth in
societies, and not with growth in membership (as is evident from
Table V.2). Now, if the annual average collection of milk per
society for each year are worked out, fluctuations, sometimes
wide, from year to year occur, while the aggregated data for
quantity of milk collected for all societies have shown a
continuous increase with exceptions on two occasions. Thus, the
average per society collection of milk shows a wider fluctuation.
To discern any trend in this, the annual average per society
collection of milk has been aggregated in terms of five year
intervals as shown in Table V.3, for last three decades starting
from 1951-52. The 1976-77 to 1981-82 interval is of six years,
so as to include, as already mentioned, data for 1981-82, which
was the year for which latest data was available when the study
commenced. From Table V.3, it is noticed that for a long period
the average declined; and it has taken KDCMPU, a quarter of
century to reach the average per society collection of milk of
early Fifties.
When the annual average collection of milk per member are examined, as shown in Table V.3, the year to year picture also shows fluctuations. This figure of annual average collection of milk per member, is a good indicator of activity of members in the KC.

Table V.3

Annual Aggregated Average of Milk Collection
Per Society and Per Farmer Member in KDCKPU
over Three Decades at Five Yearly Intervals.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Year/Interval</th>
<th>Per Society Annual Average Collection of Milk in Kg.</th>
<th>Per Member Annual Average Collection of Milk in Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1948-49 to 1950-51</td>
<td>121,144.35</td>
<td>1263.16</td>
</tr>
<tr>
<td></td>
<td>(three years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1951-52 to 1955-56</td>
<td>211,349.50</td>
<td>856.04</td>
</tr>
<tr>
<td>3</td>
<td>1956-57 to 1960-61</td>
<td>148,823.95</td>
<td>647.06</td>
</tr>
<tr>
<td>4</td>
<td>1961-62 to 1965-66</td>
<td>153,585.02</td>
<td>757.55</td>
</tr>
<tr>
<td>5</td>
<td>1966-67 to 1970-71</td>
<td>164,978.41</td>
<td>669.49</td>
</tr>
<tr>
<td>6</td>
<td>1971-72 to 1975-76</td>
<td>163,489.07</td>
<td>558.10</td>
</tr>
<tr>
<td>7</td>
<td>1976-77 to 1981-82</td>
<td>178,094.83</td>
<td>514.98</td>
</tr>
</tbody>
</table>

N.B.: The interval for 1976-77 to 1981-82 is of 6 years so as to include the data for latest year for which information was available when the study began.

In the first five years, after KDCKPU came into existence, i.e., 1948-49 to 1952-53, the figure for annual average collection per member was over 1000 kg. This figure has not been reached since
then. In fact it has only been declining. If the annual average collections of milk per member are viewed in five year intervals, the trend shows only a decline. Between 1948-49 to 1950-51, the figure was 1283.16 kg. Then onwards for each five year interval, the figure only declines. The lowest figure for annual average collection per member was 472.03 kg, and that was 1981-82, the year for which we have the latest figure. The declining trend as seen in Table V.3 only shows that the initial enthusiasm of members in participating in NC activity by supplying milk has declined. Indeed this declining trend should be a matter of concern for the Amul authorities. Viewed thus, the overall picture of Amul is not as propitious as it appears. Seen in this light, the claims made by Amul (A.3. Patel, 1983:17) of increase in productivity of buffalo milk by 83% between 1961 to 1975, can be interpreted differently. If what Amul claims is correct, then it is noticed that although productivity of buffalo milk has increased, Amul's own records show that the per member collection of milk over the same period (1961-1975) declined as seen in Table V.3. Thus increase in productivity of buffalo milk does not show an increase in collection of milk per farmer member. Indeed the NC thus has not been able to gain much.

In the end, the chronological events related to the developments of KDCM-UC as mentioned in Appendix E would be briefly clarified. Information for events till 1969, as mentioned in Appendix E, have been drawn from Singh and Kelly's (1981) work. In this regard four points of clarification need to be made: (1) First, even though it is mentioned in this chronology that Amul was less dependent upon political lobbying during 1957-65, it must be stressed that this was the era when Amul had expanded into manufacture of
lucrative by-products like baby food and cheese. So political lobbying was not needed, as there was a ready market for the products. (2) Secondly, it is mentioned that in 1962, a seven year programme was initiated to double milk production at village level. This programme's effect has not been felt at the level of quantity of milk collected by MCs, either in terms of average collection per society or in terms of average collection per farmer member. (3) Thirdly, it has been stated by Singh and Kelly that in 1964, KDCMPU expanded its programme to purchase more milk from villages. Although the total quantity of milk collected increased owing to growth in societies, the annual average collection of milk per society during the next three years, i.e., 1965-66, 1966-67 and 1967-68, were much lower than the figure for 1964-65 (1,44,040.30 kg). It has already been pointed out as shown in Table V.2 that overall growth in quantity of milk collected, has kept pace with growth in societies; and this has not shown a dramatic increase as far as growth in annual average collection per society is concerned. (4) Fourthly, the chronology has not mentioned that Polson was the first to demonstrate that milk could be transported the long distance of over 400 km. by rail to Bombay from Anand. Amul was not a pioneer and one should not arrive at this conclusion, though that is the impression given by the wordings for June 1948 in the chronology.

Keeping the above clarifications in mind, it can be stated that Appendix E gives a fairly clear picture of the main and important events relating to the development of KDCMPU. For events after 1969, other sources have been referred to, viz., A.S. Patel (1983) and IDC (1983a).
Problems of Organizing Cooperatives

KDCMPU faced problems in organizing cooperatives especially in its formative years. This has been pointed out by Kurien (1982:12) and also by Singh and Kelly (1981:51). Kurien states that the first ten years or so in the life of KDCMPU "were preoccupied with the formation of village milk producers cooperatives, the establishment of dairy processing facilities and (of utmost importance) the establishment in the market place of the brand, 'Amul'..." One need not discount Kurien's claims, for it is possible for an organization in its formative years attempting to get a foothold in market and society to face such hardships. But the arguments made by Singh and Kelly are cliche ridden. They state that farmers "did not" know the benefits of cooperation. "Vested interests against societies were strong. Middlemen who collected and sold milk had considerable influence in the villages. Confidence in Patel had not been established".

In addition to the points mentioned by Kurien and Singh and Kelly, there were other problems faced as well by the organizers. The procedure for organizing a MC was complicated. The Bombay Milk Scheme appointed an organizer for the purpose of organizing village societies. Once the organizer found the situation favourable for forming a co-operative society, he recommended accordingly to the Registrar of Cooperatives and the Milk Commissioner. This type of procedure did not enable the Union authorities to organize societies on their own initiative. Later, this was abandoned and KDCMPU organized societies without approval of Bombay Milk Scheme. Besides this difficulty, there was still competition from Polson where, in
some villages, Polson paid higher price for milk. Then every
society had to incur substantial amount of fixed costs in the
form of audit fees, salaries and quality control measures. The
break-even output of an average society required a considerable
volume of collection and sale of milk. And in winter months there
was more milk being produced than could be purchased by the Union.

Societies were finding it difficult to be viable and the
milk commissioner subsidized village societies by amounts of
Rs.1204, Rs.632 and Rs.316 for first, second and third year, in the
hope that they would be of some help. But these amounts were not
enough. In addition, there were other difficulties like absence
of trained personnel and opportunities for corrupt practices. The
last mentioned point is still valid as opportunities for corrupt
practices still exist as has been found in the course of this study.

Although many of the difficulties and odds faced by KDCAFU
have been overcome, the present situation of milk cooperatives in
comparison to what they indicated in the early years of KDCAFU, as
seen in terms of annual average collection of milk per member,
has not been showing anything encouraging. In fact when many
of the initial obstacles have been overcome, the average per member
collection of milk and average collection of milk per society has
not been at the same level as during the early years of KDCAFU.
So at present it seems that the odds are not at the level of
organizing cooperatives but in making them more effective by
increasing participation of members in the cooperative.

The Present Situation of KDCAFU

KDCAFU, in 1981-82, had 894 societies having a membership of
3.39 lakhs, and a sales turnover of Rs.78.56 crores. Of these 894
societies, 37.4% had Patidars as chairmen, while 55% had Kshatriyas as chairmen of MCs (A.S. Patel, 1983:29). 1% of the MCs had Brahmins as chairmen, and 0.3% had Baniyas as chairmen. As for Muslims who were chairmen, their percentage share was 3.4. 0.2% of the MCs had Venkars (a Scheduled Caste) as chairmen. Bharvads, the cow-herds and shepherds, had chairmen who formed 1%, while artisan castes, Suthar (Carpenter), Kumbhar (Potter), Luhar (blacksmith) and some middle and low castes like Barot, Khoi and Ravil constituted 1.7%.

The chairman of KDCMPU at present is a Patidar, Shri Hanubhai Patel. The chairman's post of KDCMPU, since its inception, has been occupied by a latidar. Shri Hanubhai Patel is the second incumbent after Shri Tribhuvandas Patel. While Shri Tribhuvandas Patel belonged to the Congress Party, Shri Hanubhai Patel belongs to the Janata Party and he contested, unsuccessfully, the December 1984 elections for Lok Sabha from Anand constituency. The interesting aspect of the milieu of Kheda district and also, by and large, of Gujarat is that the return of the Congress in 1980 under a Kshatriya Chief Minister and Kshatriya dominated Legislature as well as Ministry, did not result in the removal of the Patidar chairman of KDCMPU, who also belonged to Janata Party. This is perhaps unique in Indian context where normally political changes bring about change in leadership of cooperative organizations.

The structure of KDCMPU is now being replicated in 155 district milk shed areas in 26 States and Union Territories under OS programme. This need not imply that all is well with KDCMPU. As has already been mentioned earlier, KDCMPU has serious problems which one can discern if one delves beyond what is revealed by the statistics often shown by KDCMPU supporters.
1. In all, 31 countries in the world have significant number of buffaloes. In the continent of Africa only Egypt has buffaloes; in North America, only Trinidad and Tobago; and in South America, Brazil. In Europe, buffaloes are found in six countries, while in Asia, buffaloes exist in 21 countries. USSR also has buffaloes. A list of top ten countries in terms of cow's milk, buffalo's milk and the animals they have for the year 1981, is given below:

<table>
<thead>
<tr>
<th>Country</th>
<th>Cows Milk '000 heads</th>
<th>Cows Milk '000 metric tons</th>
<th>Buffaloes Milk '000 heads</th>
<th>Buffaloes Milk '000 metric tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>26425 (2)</td>
<td>13500 (7)</td>
<td>61500 (1)</td>
<td>17500 (1)</td>
</tr>
<tr>
<td>USSR</td>
<td>43389 (1)</td>
<td>88000 (1)</td>
<td>11794 (3)</td>
<td>5519 (2)</td>
</tr>
<tr>
<td>USA</td>
<td>10919 (4)</td>
<td>60161 (2)</td>
<td>16854 (2)</td>
<td>1410 (3)</td>
</tr>
<tr>
<td>Brazil</td>
<td>14200 (3)</td>
<td>10500 (9)</td>
<td>2347 (9)</td>
<td>1303 (4)</td>
</tr>
<tr>
<td>France</td>
<td>10011 (5)</td>
<td>33700 (3)</td>
<td>4267 (5)</td>
<td>489 (5)</td>
</tr>
<tr>
<td>Mexico</td>
<td>6800 (7)</td>
<td>6885</td>
<td>6299 (4)</td>
<td>7</td>
</tr>
<tr>
<td>China</td>
<td>7396 (6)</td>
<td>5544</td>
<td>2506 (7)</td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>6220 (6)</td>
<td>3600</td>
<td>2378 (6)</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Poland</td>
<td>5700 (9)</td>
<td>15259 (6)</td>
<td>2378 (6)</td>
<td>50 (10)</td>
</tr>
<tr>
<td>P.R. Germany</td>
<td>5469 (10)</td>
<td>24817 (4)</td>
<td>1950 (10)</td>
<td>54 (9)</td>
</tr>
<tr>
<td>UK</td>
<td>3285</td>
<td>15862 (5)</td>
<td>1031</td>
<td>305 (6)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2380</td>
<td>12148 (6)</td>
<td>103</td>
<td>72 (7)</td>
</tr>
<tr>
<td>Italy</td>
<td>3706</td>
<td>10490 (10)</td>
<td>843</td>
<td>55 (8)</td>
</tr>
</tbody>
</table>

N.B.: * Not mentioned.

Figures in brackets indicate rank.

2. Kurien (1982:2-3) estimates that "some 60% of the milk produced in India is buffalo milk and 80%-90% of milk processed in our modern dairies for market place is buffalo milk".

3. Production/yield of milk is dependent on the breed of the animal. "The buffalo, on an average, gives almost three times more milk than the cow. Buffalo milk is also richer than that of the cow and contains about 50 percent more fat" (Harbans Singh, 1966:1). There are a few breeds of cows like Sahiwal and Red Sindhi which have high yields on an average (ICAR, 1979). Since much of the milk produced in India is by buffaloes our discussion will be confined to them. There are 6 main breeds of buffaloes (Harbans Singh, 1966:11-13; Khurody, 1974:113-114). The breeds are Murrah (found in northern India), Jaffrabadi (Gir forest in Kathiawar peninsula), Nagpuri (in central and southern India), Mili (Ferozepore district of Punjab), Surti (western India) and Mehsana (near Baroda and neighbouring areas). Let us elaborate on each:

i) Jaffrabadi buffaloes: Average fat content 7.0% to 7.5%; yield about 4000 kg. in a lactation period of 330 days.

ii) The Mehsana breed is considered "economical for milk". According to Khurody (1974) they yield on an average of 2000 kg, while the ICAR estimates an average yield of 1670 kg. in a year.
iii) The Murrah buffaloes have an average lactation of 1800 to 2000 kg. according to Khurody (1974), 1500 to 2000 kg. according to Harbans Singh (1966), and 1793 kg. according to ICAR (1979) in 305 days lactation period. They are the largest breed to be found in India.

iv) The Nagpuri breed yields 6 to 8 kg. daily.

v) Nili buffaloes yield about 1700 kg. in a lactation period of 250 days according to Harbans Singh (1966), or 1600 kg. in a period of 250 days according to ICAR (1979).

vi) Surti breed has an average lactation between 1700 kg. to 2000 kg. according to Harbans Singh (1966) or 1590 to 1725 kg. according to ICAR (1979).


5. The NDDB has brought out a manual for "Spearhead Teams" and "Procurement and Input Wing" of the concerned dairies so as to help them in the replication of Anand Pattern cooperatives in other districts. It is called Milk Procurement Through Producers Cooperatives.

6. In Balasinor taluka, payment is made every ten days or so.
   So the usage of the term collection.

7. Further evidence can be given of two other village MCs in Balasinor taluka, Vasadra and Jorapura, which was visited
by us. Vasadra MC was near Parabiya, while Jorapura is near Neghaliya.

8. A number of milk cooperatives came up in the second decade of this century. Amongst them are (1) The Nizampur Cooperative Society, Baroda (1914); (2) The Belgaum Cooperative Dairy Society Ltd., Belgaum (1915); (3) The Dhulia Cooperative Milk Supply Ltd., Dhulia (1915); (4) The Bagalkot Cooperative Dairy Society Ltd., Bagalkot (1916); (5) The Hubli Cooperative Dairy Society Ltd., Hubli (1917); (6) The Mayaganj Goala Society, Bhagalpur (1919). Others that came up subsequently include the Surat City Cooperative Milk Union (1927), The Thirumala Keshuravyarasaya Mahila Cooperative Society, Trivandrum (1934), The Coimbatore Milk Supply Union Ltd., Coimbatore (1937) and The Lucknow Milk Cooperative Society Union Ltd., Lucknow (1938) (cf. NCDFT, 1981:5). Patrick John (1975:232) also mentions some of these and includes the name of the Telankhery Cooperative Dairy Society, Nagpur and the Allahabad Society (1913). Singh and Kelly (1981:22) mention that Madras, Coimbatore, Lucknow and Allahabad Milk Unions as being in existence prior to Amul. Patel, Thakur and Pandey (1977:4) mention that the Choryasi Taluka Cooperative Marketing Society Ltd., Surat as the first in Gujarat. This is not valid for there are two which pre-date it; The Nizampur Cooperative Society, Baroda (1914) and the Surat City Cooperative Milk Union (1927).
9. Interestingly, even now in Kheda district, the term "Polson dairy" is used to refer to any private dairy, both to those operating at Anand or to those operating at village level by private traders, who buy milk to sell it to some other trader at Anand.

Tulpule and Rana (1970:23) mention that the Polson dairy was inaugurated in 1930. It must also be pointed out that M.M. Shah refers to Polson dairy as "Polsons".

10. M.M. Shah (1977:47) mentions that "before the advent of Polsons, for three decades since the beginning of the century, a number of villages had witnessed the establishment and working of numerous cream separators... particularly around Nadiad and Anand.

11. Singh and Kelly (1981:13) spell the name of the German as Collar. This German kept the process of manufacturing casein a secret. He would add a certain powder to skim milk and made all believe that this alone could achieve proper curdling and casein making. One of his employees, Mr. Mansukhlal Kapasi, once forgot to add the powder and accidentally discovered that even without the powder casein can be made (Tulpule and Rana, 1970:21). Singh and Kelly mention that the employee was K.Kapasi, and he discovered the secret by spying.

12. G.R. Rives is referred to as "Reeves" by Tulpule and Rana (1970). Singh and Kelly claim that Rives established the company, Indian Dairy Supply Company, while Tulpule and Rana say that he joined it.
13. Tulpule and Rana (1970:23) state that the army person was Col. Dixen, and that he "asked" Polson to supply butter.

14. Tulpule and Rana (1970:23) also state that Polson sent his Manager to Denmark.

15. In a recent newspaper article, Tribhuvandas Patel (1964) says that the exclusive right was granted to Polson to collect milk in Anand and 70 surrounding villages.

16. M.K. Shah (1977:47-48) mentions that the monopoly resulted in the villager getting 2 and 2½ annas of milk, while the retail price for local sales ranged between 4 to 5 annas per lb.

17. One M/S. Doshi Bros. who had organized pasteurization and milk despatch to Bombay, were put to jeopardy by this decree. Other important traders in milk were Pure Milk Products and Anand Milk Products. It is not mentioned by Tulpule and Rana but assumed that they were also in opposition to the rights to Polson (Tulpule and Rana, 1970:23).

19. The Anand Taluka Cooperative Sale Purchase Union was started by Rajni Patel, a time communist leader. Being a Paticar he was supported by other Paticars. Information based on a personal interview with Prof. M.B. Buch, Keta. Dean, Faculty of Education and Psychology, M.S. University of Baroda, Baroda. Prof. Buch was a communist leader in Thirties and Forties.

20. Interestingly, other authors, John (1975:234) and M.M. Shah (1977:49) mention only the name of the village Hadgud Cooperative Milk Producers Society. M.M. Shah mentions that two villages started cooperative milk producers society on October 26, 1946, but mentions only the name of Hadgud. Singh and Kelly (1981:ch. 2 & 3) do not go into these details. The name of both the villages is given by Tulpule and Kana only.

21. These were in the dry Dalasinor taluka villages Parabiya, Maghaliya and Jorapura.

22. These figures have been worked out @ rate of 1$ = Rs. 7.90 as mentioned by Singh and Kelly. They mention the figures of 0.93 $ and 1.13 $ (Singh and Kelly 1981:61).

23. Many important leaders of Gujarat have come from Kheda district. Besides Sardar Patel and Tribhuvandas Patel, the former Chief Minister of Gujarat, Shri Madhavsinh Solanki is from Kheda district. His father-in-law, Shri Ishwarbhai Chavda, is a sitting Member of Parliament from Anand Parliamentary constituency, and belongs to Congress-I. Shri Chavda was also one of the promotees of Amul (see Appendix A).
24. Singh and Kelly (1981:50) mention that the amount granted by New Zealand government to be Rs. 3 lakhs. Amul authorities claim the entire expansion cost Rs. 50 lakh (cf. KDCMPU: n.d.i).

25. Kurien (1968) remarks "against advice of foreign dairy technologists and Indian administrators, the cooperatives Board of Directors accepted its management's recommendations to build a milk powder plant".

26. These figures are equivalents worked out from Singh and Kelly (1981:53) figures of 160 $, 80 $, and 40 $. The exchange rate as mentioned earlier is 1 $ = Rs. 7.90 (as mentioned by Singh and Kelly, 1981).