CHAPTER-II: HISTORICAL BACKGROUND OF DAIRY FARMING

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CHAPTER-II

HISTORICAL BACKGROUND OF DAIRY FARMING

2.1 Historical Background of Dairy Farming in World

The principal regions of commercial dairying in the world are:

1) East-Central North America
2) North-Western Europe
3) South-East Australia
4) New Zealand
5) Other Areas

1) East-Central North America

This region comprises Canada, Minnesota, Wisconsin, Michigan and New England in the North-eastern part of the U.S.A.

In 1979, the U.S.A. produced 56.1 million metric tons of milk. During the same year she produced 447 thousand metric tons of butter and 2,067 thousand metric tons of cheese.

In 1979 Canada produced 7.1 million metric tons of fresh milk, 105 thousand metric tons of butter and 142 thousand metric tons of cheese.

2) North Western Europe

In this region France, Holland, Denmark, Southern part of

Sweden, Switzerland, Germany and Russia are important producers of dairy products.

Table No. 2.1

Production of fresh milk, butter and cheese in 1979.

Country	Fresh milk production in million tons	Butter production in thousand metric tons	Cheese production in thousand metric tons
France	33.1	566	1,044.
Netherlands	11.6	203	435
Denmark	5.2	130	189
United Kingdom	16.0	157	235
Italy	10.7	75	578
W. Germany	24.00	566	632
Poland	16.9	290	381
U.S.S.R. (Russia)	98.3	1,409	1,495

1

Source: FAO Production Yearbook, 1979. page ?

Home consumption of dairy products in these countries (Italy, West Germany, Poland and the U.S.S.R.) is large and they have little exportable surplus. In Denmark 80 per cent milk is used for butter and 20 per cent for cheese. Dairy products value more than 75 per cent of the total value of Danish exports.

3) South East Australia

In 1979 Australia produced 5.8 million metric tons of fresh milk, 105 thousand metric tons of butter and 142 thousand metric tons of cheese. Australia provides 2.8 per cent of world's butter exports and 2.7 per cent of world's cheese export.

4) New Zealand

In 1979 New Zealand produced 6.4 million metric tons of fresh milk, 251 thousand metric tons of butter and 90 thousand metric tons of cheese. Newzealand has nearly 8.5 million herds of cows. She provides about 15.1 per cent of total exports of butter and 4.7 per cent of total exports of cheese of the world. The European markets are the main centres of exports for Newzealand.

5) Other Areas

Asia and Africa are quite backward in regard to dairy industry. In Asia the dairy industry is not organised on scientific lines. Farmers keep cows or buffaloes for obtaining milk, butter and Ghee for their families. Therefore, there is little or no surplus for the market. In Asia the only region where dairy industry on modern line has been developed. ? which region?

There are three main regions where commercial farmers derive a major portion of their income from the sale of milk. The largest is in Western Europe, a belt extending 2,000 miles

from the Atlantic coast almost to Moscow. The second dairy region is that of Anglo America, a belt from Atlantic coast to Canada extending over 20,000 miles. The third region, again a belt, is half way around the world in Australia, Tasmania and Newzealand.

Table No. 2.2

Milk Production for selected countries, 1973.

Area	Annual production 1,000 metric tonnes	Kilograms of milk per milking cow
1	2	3
World	3,74,823	1,856
Africa	10,180	485
South Africa	2,850	2,591
Sudan	1,400	549
North America	68,402	3,406
United States	54,557	4,659
Canada	8,041	3,216
South America	19,883	988
Brazil	8,100	821
Argentina	5,000	1,978
Asia	28,682	629
India	8,100	476
Japan	4,939	4,396
Europe	1,51,529	3,114
France	29,177	3,445
West Germany	21,318	3,909

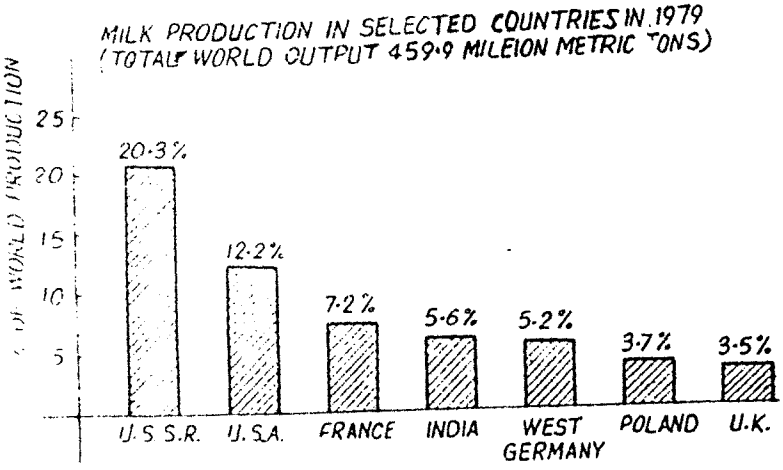
contd.

Table No. 2.2 contd.

1	2	3
Poland	15,150	2,500
U.K.	14,200	4,057
Italy	9,180	2,900
Netherlands	8,860	4,520
East Germany	7,250	3,356
Czechoslovakia	4,900	2,619
Denmark	4,500	4,049
Spain	4,400	2,362
Ireland	3,750	2,500
Oceania	13,477	2,559
Australia	7,130	2,460
Newzealand	6,289	2,700
U.S.S.R.	82,600	2,004

2

Source: United Nations Production Yearbook, 1973.



Graph No. - 2.1

Source - FAO Production Year Book 1979

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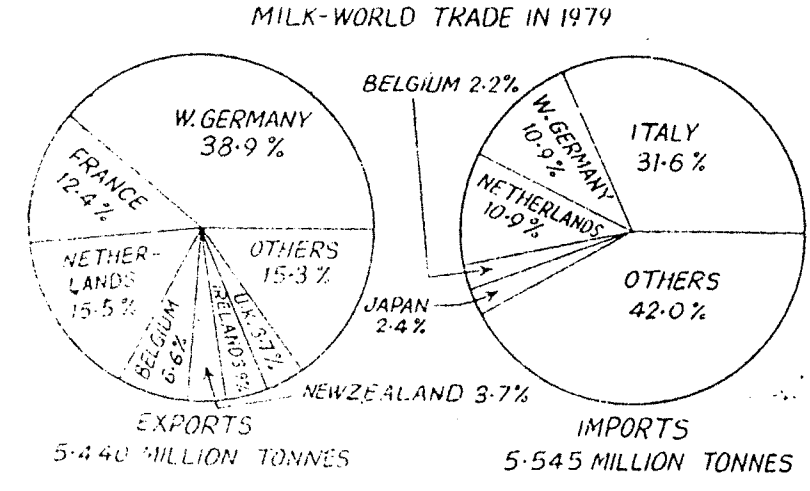


Source - FAO, Year Book of Trade 197

4

Dairy farming in India is still unorganised. India has the largest number of cattle in the world, but her milk output is rather negligible. India has about 181.8 million herd of cattle out of the total world cattle population of 1,212.0 million, but her output of fresh milk in 1979 was only 26.6 million metric tonnes as against the total world output of 459.9 million metric tonnes.

The development of dairy industry has been retarded by the lack of permanent pastures, high temperatures, associated with long dry spans, pests and diseases and poverty of the people resulting in poor demand for milk and dairy products.

The average per capita consumption of milk in India is hardly 8 oz. as against 56 oz. in Newzealand, 35 oz. in the U.S.A., 39 oz. in Great Britain, 61 oz. in Denmark and 45 oz. in Australia.[5]

India has some fine breeds of cattle like the Gir, the Sindhi and the Sahiwal, but due to the absence of permanent pasture, cows do not get green grass throughout the year. So cow's are to be fed on hay or dry fodder which is not nutritious. As a result of it cattle do not produce milk in abundance. India's annual yield of milk per cow is only 188 litres, the lowest in the world, as compared to 4,200 litres of Netherlands.

The following table shows the comparison of the total milk

production between India and the world:

Table No. 2.3

Milk production in India and world
(in '000 tonnes/annum)

Sr. No.	Types of animal	Milk production	
		India	World
1	Buffalo	11,240	20,267
2	Cow	9,550	3,67,117
3	Goat	570	6,554
4	Sheep	-	6,348
	Total	21,360	4,00,322

Source: M.S. Bedi "Dairy Development Marketing and Economic Growth", 1987, C.I. p. 11.

2.2 Historical Background of Dairy Farming in India

2.2.1 Dairy Industry

Dairying has been a part and parcel of Indian culture and civilization from the ancient times and remains so even today. Our ancestors had recognised the importance of cattle in the economic well being of the people. Therefore, they elevated cow to the level of 'Mother' and incorporated the protection of cow as an integral part of their religions and culture. This sentiment continues with the Indian masses and it is a big obstacle in the development of Indian dairy industry on the modern and scientific

lines.

Dairying plays a very important role in improving the economy of our country. Milk has an important place in the human diet. It gives palatable and nutrients needed by humans and by young animals. In India, where a large proportion of the population, nearly 40 per cent is vegetarian, milk and milk products are of special value as they are the only scurce of animal protein in its diet.[6]

Therefore, milk is the perfect food and hence its production must be increased.

Dairying undoubtedly had its beginning long before the advent of historical writings. The oldest written records of Sumeria indicate that dairying existed 6,000 years before Christ. Remains of Swiss lake include skeletons of cattle and cheese making equipments that date back to 4,000 years before Christ. One hundred years ago, dairying was largely a family affair in India. Even in towns and villages most families kept a cow for their own use, the milk was usually consumed in raw state and the surplus was made into butter and cheese in the homes.[7]

Some 50 per cent of the world's buffaloes and 17 per cent of the world's cattle are found in India. The livestock sector accounts for only 14 per cent of agriculture sector's share of gross national product. The 57 million cows in the country market

the principal contribution of male calves which even today are the primary source of farm-power. Milk production, therefore, becomes a by-product from the cattle. On the otherhand, 30 million buffaloes contribute some 60 per cent of the country's milk production, and thus stand as a 'pivot' for the industry.[8]

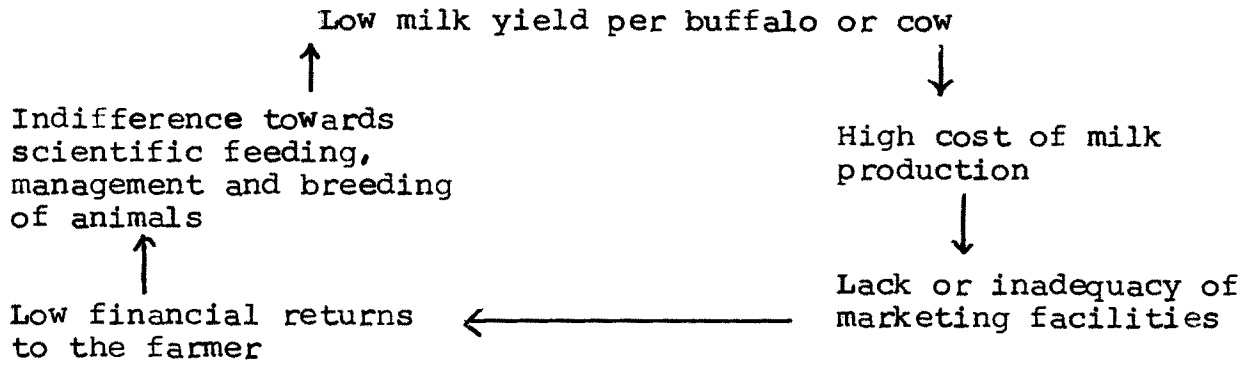
The bulk of milk production comes from milch animals owned by the country's rural population dependent on land. The small and marginal farmers and the agricultural labourers may have dairying as their subsidiary occupation.

While dairying in the developed countries is an industry largely shaped as per the needs of highly efficient milk producers competing for the consumers' food expenditure, in India, it is as a whole influenced by the fact that all households are avoiding milk consumption. The industry's structure is governed by the spectra of demand for milk-rising with incomes of the households and a milk supply derived from millions of inefficient animals and unmodernised milch herds. Despite the unmodernised production base, this industry still remains a big pervasive business.

Milk production in India has been a cottage industry, on account of small land holdings and low productivity of milch cows or buffaloes which are fed on the by-products of the farm mainly cereals and straws and are looked after by the family labour. Against the production of 15 to 20 litres of milk per day per cow in the Western countries, the average production in India is only

a little over half a litre per cow and a little less than 2 litres per buffalo per day. Whereas it is impossible to have high yielding milch cattle without scientific animal breeding, feedings and management, round the year remunerative market for milk produced in the villages is the most vital step which motivates the farmers to adopt (a) scientific animal husbandry practices to increase production and thereby their income.

The vicious cycle of low milk yield operating in India is depicted below:



The most effective way of breaking the vicious cycle of low milk production and reversing its trend is to provide the farmers with a remunerative year round market for whatever milk that they may wish to sell in the villages.

2.2.2 Marketing Systems for Surplus Milk or Producers in Different Regions

Milk collection and processing in an organised way was started in India in 1914 by Mr. Rieves in Nadiad (Gujarat). However, the progress was very slow and no major break-through was achieved. For bringing milk from the producer to the consumer several methods were tried. There were and are, dairies which have approved contractors with them to get milk. These contractors, in turn, had appointed their sub-contractors who procured milk for them. These sub-contractors either collected milk themselves or had in turn appointed mini contractors to procure milk for them. The number of such intermediary agencies varied, with the volume of business the main contractor had with him. Normally, a producer had two sub-agencies between him and the main dairy. The price paid by the milk plant/dairy was to its main contractor and, therefore, a genuine value for milk never reached the producer. The producer was further exploited by these contractors as they advanced some money at a very high rate of interest and thereby paying much lesser for their milk.

In fact one of the conditions imposed by these contractors while lending the money was that the borrower had to supply milk to him and that the adjustment could be done from the sale value of his milk.

The system failed to bring any results to prove its

efficiency. There were two main reasons behind this. First, the farmer never got the correct price of milk and second, there was no direct linkage between the plant and producers. For producers, the man who was buying their milk and paying them was their master. No wonder, there was lack of cohesion between the two. Both these units, the plant and the producers, were not knowing what was really happening. The producers never knew what the plant was paying to them and the plants never knew what the producers were getting.

The other method applied was a pseudo co-operative where the milk contractors under different brand names of suppliers formed their co-operatives and undertook the supply of milk to the dairy plant. These milk suppliers adopted almost a similar pattern as indicated above. Therefore, the only change incorporated was that an organisation of contractors started doing the same business under the patronage and protection of government using cooperatives as an umbrella. In extreme cases, the whole affairs of the co-operative were looked after by one man alone. This man used to encash the bills and utilise part of the money as advancement of loan to the milk suppliers. Here also there was no direct relation between the producer and the plant. In the north-west part of India, we come across numerous co-operatives of this type.

The third system which was adopted by some dairy plants

had the cooperatives of contractors as their registered suppliers of raw milk. These contractors used to obtain financial benefits from nationalised banks or other financial agencies in the form of agricultural credits. They used this money to disburse as loan to the farmers for purchase of cattle on a guarantee that the borrower would supply milk to them. Else, these contractors used to stand guarantee for the farmers borrowing loans straight from the bank.

In any case the borrower who was the real producer never got the right price for his milk. This system was and is mostly prevalent in Eastern India. Here also the producer has no relation with the dairy plant. In some other parts of India the private agencies have a link with the established contractor/producer(?) in getting the loan advanced by some financing agency and thereby taking the guarantee of supply of milk. At some places, these borrowers are not allowed to avail themselves of the opportunity of being a member in a cooperative organisation.

"The Central and State Governments are encouraging modern dairies. Modern dairies have been set up in Bombay, Delhi, Poona, Kudgi, Kurnool, Guntur, Kodaikanal and Haringhata. Dairy industry is also organised in Agra, Aligarh, M.P., Punjab, Haryana, Monghyr, upto Calcutta, and Otacamund. India exports Ghee to Malaysia, South Africa, Shrilanka, Mauritius and Hongkong. In 1979 India produced 25.6 million metric tons of milk and 575

thousand metric tons of butter".[9]

2.2.3 Role of Cooperation in Dairy Industry

According to H. Calvert "co-operation as a form of organisation wherein persons voluntarily associate together as human beings on a basis of equality, for the promotion of the economic interests of themselves".[10]

In India co-operative dairying is an important productive activity. The co-operative Dairy is an agency which carried production as well as sale on behalf of producers who are unable to earn good profits. In dairy industry cooperatives have been recognised to be an effective measure to improve the milk production potential and thereby to make better the socio-economic life of millions of small, marginal and landless cattle owners scattered over large areas. Even in advanced dairy countries like the U.K., Denmark and Australia dairy cooperatives have been playing important role in promoting the cause of dairy industry.

In the planning period much importance has been given to cooperative sector. The National Commission on Agriculture has also emphasised the institutionalisation of the milk programme, through cooperatives, in an increasing measure. There were 27,241 primary milk supply cooperative societies with membership of 23 lakhs as on 31st December 1978. Out of the total of 190 dairy plants in operation in the country on 31st December, 1978

80 dairy plants were in the cooperative sector. These cooperatives handled milk and milk products of the order of Rs. 1,973 crores during 1977-78 as against Rs. 70 crores during 1973-74. The primary milk supply cooperatives are federated into 209 Unions. State level federations are functioning in U.P., Gujarat, Maharashtra and Punjab. At the national level there is a National Federation of Dairy Cooperatives.[11]

The number of primary milk producers cooperative societies, the key component of the dairy development programme, will have to be greatly increased by 2000 A.D. from the present 28,000 to about 1,00,000 as nearly 5,000 new societies are now being formed every year. These societies will involve greater participation of milk producers. India's future dairying will no doubt be highly technical one and yet its very base will be the network of rural cooperatives spread across the land. The success of such enterprises will depend upon the efforts of their managers whose challenge will include efficient management of these dairy units at the village level in harmony with other socio-economic activities that are vital to rural welfare.

Table No. 2.4

Growth of the milk production in India

Year	Milk production (in million tonnes/year)	Growth during the decade (%)	Annual growth rate (%)
1940	16.61	-	-
1950	16.93	1.92	0.19
1960	19.74	16.59	1.65
1970	20.71	4.91	0.49
1980	29.71	43.50	4.35

Source: M.S. Bedi - 'Dairy Development, Marketing and Economic Growth', C.1 p. 14, 1987.

2.3 Co-operative Dairy Farming In Maharashtra

About 14 per cent of the farmers having more than 15 acres of cultivable land to each farmer owns 15 per cent of India's cultivable land. The remaining 86 per cent (about 65 million) farmers have small holdings most of which are not even upto 5 acres each.

About 70 per cent to 75 per cent of the households belong to the category of small farmers, marginal farmers and agricultural labourers. Various studies carried out in different parts of the country, have shown that dairy farming can contribute a substantial portion to the total farm income. For example a study of two

areas in Gujarat conducted by the Agri. Economic Research Centre, Vallabha Vidyanagar in 1969 shows that the proportion of the income from dairying to the total farm income was higher in the case of farmers who had small holdings.

The only way which is more feasible to improve the socio-economic status of weaker sections in rural area is dairy co-operatives.

Since its inception in 1960 Maharashtra has consistently pursued a policy of promoting cooperative movement which has played an important role in bringing about radical economic transformation of the countryside. The total number of cooperatives were 31,565 in June 1961. It went up to 71,130 in 1984. The rise in membership was from 42 lakhs to 180 lakhs during this period.

In Maharashtra cooperative sugar factories occupy prominent place in cooperative sector. At the beginning of the Sixth Plan there were 68 licensed cooperative sugar factories during the plan period. Twentythree new proposals were cleared by the Central Government. Maharashtra now produces 35 to 40 per cent sugar produced in the country.

Like sugar cooperatives, Maharashtra has made progress in the field of dairy cooperatives.

The total livestock of Maharashtra of 1978 census was 29.6 million consisting of 15.2 million cattle, 3.9 million

buffaloes and 10.2 sheep and goats and 0.3 million other livestock.

At present there are 12 cattle breeding farms. One intensive cattle development project, 29 artificial insemination sub-centres, one frozen semen station and 2,655 artificial insemination sub-centres exist in the country. Out of these 1,252 sub-centres have frozen semen facility. The special livestock production programme for milch sheep, poultry and piggry, a centrally sponsored programme is being implemented in 14 selected districts viz., Thane, Pune, Ahmednagar, Satara, Sangli, Solapur, Aurangabad, Jalna, Parabhani, Beed, Nanded, Wardha, Nagpur, and Bhandara. Marketing of livestock products and other products is being done by the MAFCO a State Government undertaking.

The dairy development programme of the State has been progressing at a fast pace and the State is leading in milk production holding the third position after Uttar Pradesh and Rajasthan. There are 8,000 dairy cooperatives at present. This number is likely to go up to 13,000 by the end of the Seventh Plan. During the year 1984-85 the government Milk Schemes in the State procured 54 crore litres or 25 per cent of the total milk production in the State. There are four dairies in Greater Bombay and a new dairy is proposed to be set up at Thane for Kalyan, Thane, Bhivandi and other townships in Thane district. The government dairy units handled 15.10 lakh litres a day during the Sixth Plan. At the end of the 7th Plan it will be raised to

25 lakh litres per day.

At present there are six milk powder plants in the State, three in the State Sector at Sangli, Osmanabad and Nanded and three in the cooperative sector at Kolhapur, Jalgaon and Pune. The State Government proposes to set up two more milk powder plants in Marathwada and Vidarbha during the 7th Plan.

The weaker section in rural area (small, marginal farmers and agricultural labourers) have milch cattle for supplementing their income. However, these animals are not good milk producers. Their quality and efficiency is low which in turn affects the capacity of these weaker sections to adopt proper husbandry practices such as improved and breeding provision of good quality for ages and balanced feeds, animal health cover etc.

There are also problems of ready and remunerative market for the surplus milk produced, the problem of milk collection and processing facilities in the areas.

What is needed is an integrated approach to dairy activity. If it is brought within the reach of the small farmers it will definitely yield better results. This has been well demonstrated by the Anand Milk Scheme. In Anand area 80 per cent of the buffaloe owners had a holding of two hectares or less and 11.5 per cent farmers maintained buffaloes without possessing any land.

The milch cattle was looked after by farmers' families. This experience revealed multiple benefits, that are derived by the small farmers by taking to milk production as a subsidiary occupation. Their income levels have improved and made possible better nutrition and it has ensured partial employment to the farm family labour also.

Table No. 2.5

Dairy Cooperative societies in Maharashtra in 1986

Item 1	1961 2	1971 3	1981 4	1985 5	1986* 6
Societies & Unions	450	2,067	7,909	11,108	12,064
Membership	175	1,359	7,191	9,596	10,200
Share capital	10	117	679	11,064	1,180
of which Govt.	N.A.	10	44	96	110
Owned funds	13	199	1,748	3,350	4,020
Borrowing outstanding	14	247	1,206	2,391	2,700
Working capital	36	624	5,095	10,006	12,050
Milk procured value a) Unions	07	784	8,541	20,319	23,000
b) Societies	67	810	8,531	20,165	22,500
Milk and milk product sold (value)					
a) Unions	08	909	8,831	22,340	25,000
b) Societies	69	855	9,132	20,440	21,500

contd.

1	2	3	4	5	6
Societies in profit	162	856	4,142	5,989	6,010
Profit	2	25	226	328	350
Societies in loss	142	711	2,053	2,584	1,950
Loss	1	13	78	173	190

Source: Cooperative Movement At a Glance in Maharashtra State, 1986, p. 39.

Note: 1) Rs. in lakhs, 2) Members in hundreds,

3) *Provisional, 4) N.A. = Not available.

2.4 Co-operative Dairy Farming in Satara District

Satara has been holding an important position on the social and political screen of India. Because of the staunch leadership of the late Y.B. Chavan and his other colleagues like the late Kisan Veer, R.D. Patil who took tremendous efforts to strengthen the cooperative movement in this district.

As far as dairy industry is concerned one must honour the strenuous working of the late R.D. Patil who erected the KSDUPS Ltd. at Karad and which is the first cooperative Sangh in the State of Maharashtra. With the rise of this Sangh the dairy cooperative reached in various remote villages and as such there are 798 primary dairy cooperatives in Satara district. The table

No. 2.6 shows the same.

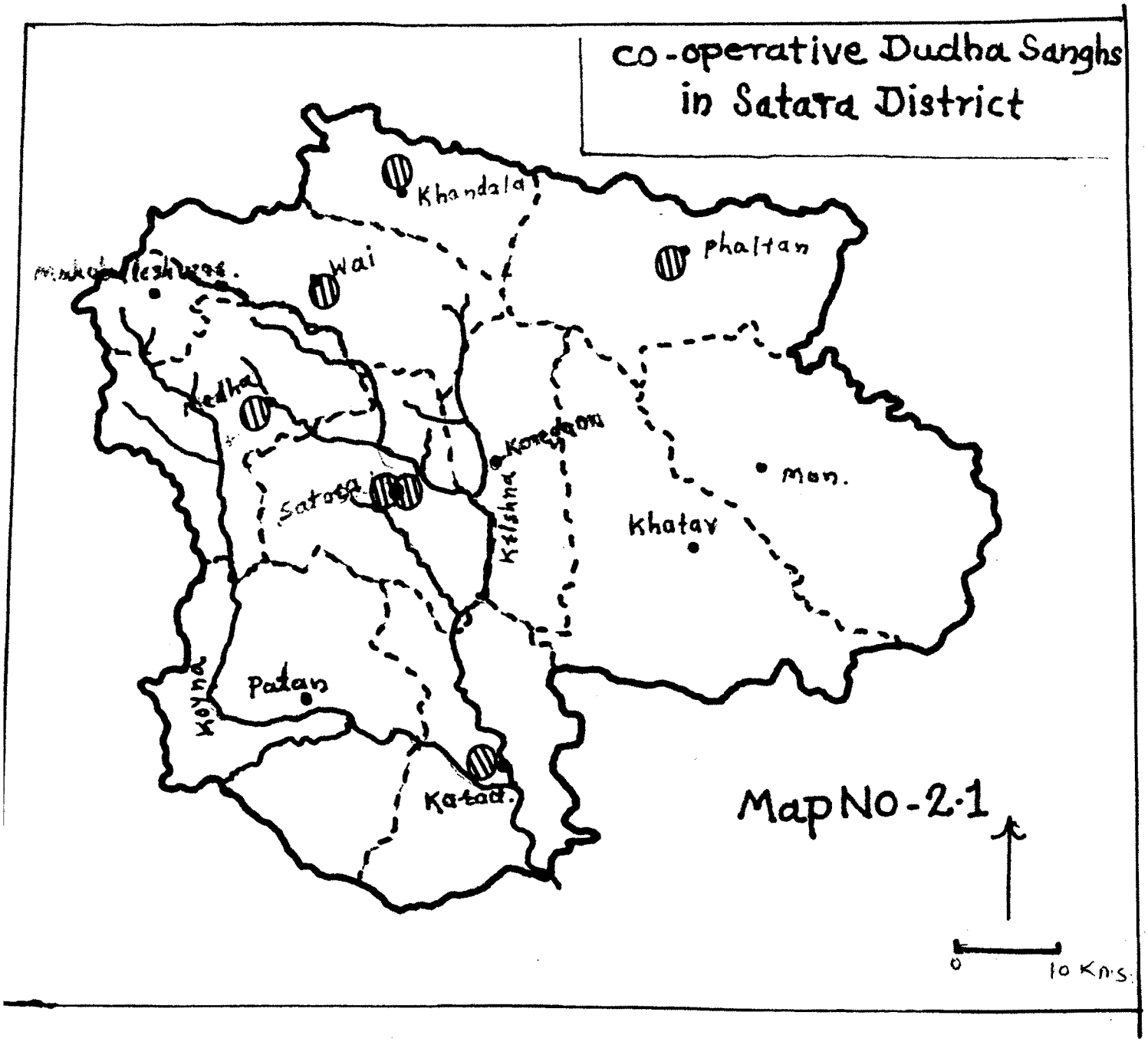
Table No. 2.6

Position of dairy farming in Satara District.

Year	Co-op. Dudha Sangh	Primary co-operative Dairy Societies	Individual members	Purchasing of milk (in '000 litres)
1981-82	07	553	42,254	10,080
1982-83	07	604	46,365	11,972
1983-84	07	642	56,532	12,278
1984-85	07	739	66,706	12,335
1985-86	07	798	67,353	19,650

Source: Statistical collection of Satara District Cooperative Societies in 1981 to 1986, p. No. 5 (Chart No. 3)

Table No. 2.6 shows the position of primary dairy cooperatives, individual and amount of milk purchased during the period 1981-82 to 1985-86. It is seen that in the year 1981-82 there were 553 primary Dairy Cooperatives whereas in the year 1985-86 the number reached to 798. Similarly, the number of individual members has reached by one and a half times. As far as purchase of milk is concerned, it is observed that these societies have nearly doubled their purchase in the period of five years. So it can be concluded that Satara district is marching towards advancement in the dairy farming.


co-operative Dudha Sanghs
in Satara District
Khandala
Wai
Phaltan
Medha
Koregaon
Satara
Krishna
Man.
Khatav
Koyna
Patan
Karad.
Map No-2.1
0
10 Kms.

2.5 Anand Pattern of Milk Cooperatives

The Kaira District Cooperative Milk Producers' Union, Anand (Gujarat) (Amul) has emerged as one of the most outstanding models of cooperative activity in India.

It has demonstrated that given the minimum conditions of leadership, professional management and technical equipment, a cooperative can emerge as a superior technological economic system effectively subserving the interests of members and the community. The 'Amul' pattern is now widely acclaimed as the relevant pattern for cooperative development in developing economy.

The foundation of Anand pattern of milk cooperatives was laid with organisation of the Kaira District Cooperative Milk Producers' Union, Ltd., popularly known as 'Amul' at Anand in Gujarat during 1946 with the blessings of the late Sardar Vallabhbhai Patel.

The Anand union started functioning with handful members from village milk producers' cooperative societies and began pasturing. For the Bombay milk scheme in June 1948 just 250 litres of milk was being handled per day. As against this, the union now collects on an average 4,50,000 litres of milk daily from 2,40,000 members in different village societies which have been organised practically in every village throughout the district.

The total annual turnover at present is about Rs. 450

million. The value added to the economy of the district is estimated to be over Rs. 120 million per year.

Several co-operatives can gainfully learn and replicate this model in other sectors of the economy as well, especially in sericulture, oilseeds, processing, handlooms, poultry and sugar cooperatives as indeed in the non-NDDB sponsored dairy cooperatives in the country.

2.6 Operation Flood I & II

The Green Revolution in this country has been followed by the White Revolution, India being an agricultural country. The economic status of people depends on land and livestock production. The dairying business is an important tool for the upliftment of weaker section. Due to technological development and increase in urbanisation for the last few years, modern dairy has a paramount importance in economy, where the industry not only gives a decent income to primary producers but also helps in the maintenance of soil fertility as well as the general health of the people.

India possesses an enormous cattle (180 million) and buffaloes (61 million) population ranking first in the world in this respect. In terms of annual milk production though it ranks fourth with annual production in 1985-86 estimated at 41 million metric tonnes which gives an average daily supply of 147 grams per person, the nutritional requirements of 280 grams of milk per capita as pointed out by Indian National Council on Agriculture

calls for further growth and development in milk production programmes like operation flood.[12]

Operation Flood I

Operation Flood I was started in July 1970 with the objective of setting up "Amul like" organisations in several states. It was confined to creating 18 Anands with an investment of Rs. 1,160 million. These 18 milk co-operative unions based on the 'Anand' pattern were linked up with four metropolitan cities of Bombay, Calcutta, Delhi and Madras. This was the world's biggest milk marketing and dairy development programme launched in any country. Operation Flood undertook the task of upgrading and modernising milk production procurement, processing and marketing, with the assistance provided by the World Food Programme (WPP), The European Economic Community (EEC), and the World Bank and other international organisations.

The objectives of operation flood I programme were -

1) To make available wholesome milk at stable and reasonable prices to city consumers.

2) To enable the dairy organisations involved in the project to identify and satisfy the needs of consumers and producers.

3) To improve productivity of dairy farming in rural areas with the long term objective of achieving self sufficiency in milk.

4) To remove dairy cattle from the cities where they represent a growing problem in terms of genetic waste, social cost and public health.[13]

The programme benefitted 1.5 million rural families of 12,000 village cooperative milk producers' societies in selected milk shed districts. The production during the project period was 1,26,000 metric tonnes of skimmed milk powder and 42,000 tonnes of butter oil. The Indian Dairy Corporation with the help of N.D.D.B. provided technical inputs to various rural milk sheds under the programme Operation Flood I like veterinary first aid, artificial insemination through liquid and frozen semen, provision of balanced cattle feed supply of seeds and other inputs for fodder production and training of farmers in latest animal management and husbandry practices. The production of milk pre-operation flood period i.e., in 1966 was 19.37 million metric tonnes. But in Operation Flood period it increased to 41.00 million metric tonnes in 1985-86.

Operation Flood II

On the basis of the success of the Operation Flood I, the Government of India approved the second phase of operation flood with an outlay of Rs. 4,835 million launching officially on October 2, 1979 with the following objectives.

1) To enable some 10.2 million rural milk producer families

to build a viable and self-sustaining dairy industry.

2) To enable milk producers to rear a national milk herd of some 14 million crossbreed cows and upgraded buffaloes.

3) To erect a National Milk Arid.

4) To erect infrastructure required to support a viable national dairy industry.

5) To enable milk and milk producers to form an appropriate part of a stable, nutritionally adequate national diet.

Against this by October 1984 three to four million families had been enrolled in primary milk cooperatives.[14]

An Appraisal of Two Programmes

In terms of milk production Operation Flood I was only a moderate success between 1971-72 and 1980-81. The average per capita milk consumption rose from 122 grams per day in 1971-72 to only 128 grams in 1980-81. By contrast in Operation Flood II from 1980-81 to 1985-86 per capita consumption has risen from 128 grammes per day in 1981-82 to an anticipated 147 grammes in 1985-86. In other words, the rate of growth practically doubled accomplishing in five years an average per capita rate of growth which took ten years to accomplish during Operation Flood I.

The II Flood operation serves as a prototype of a strategy

for accelerative agricultural income both in total output and in per capita terms. The annual growth rate of Operation Flood was merely 3.8 per cent (from 20.74 million metric tonnes to 30.20 million metric tonnes - 1969-70 to 1979-80).

But in contrast in Operation Flood II the growth rate of production was 5.4 per cent per annum (Production between 18 1981-82 and 1985-86 rose from 31.50 million metric tonnes to 41 million metric tonnes). The Operation Flood II has resulted in increasing volume of employment through processing of milk in form of butter and cheese, transport of milk, cattle feed plants.

The number of milk sheds in I Operation Flood was merely 39, while it was 150 sheds in Operation Flood II. At the end of Operation Flood I there were only about 13,270 village milk procurement societies. There are now 40,000 such cooperatives and the rate of growth has been steady at over 5,000 co-operatives each year from 1981-82 to 1985-86.

Operation Flood has thus developed considerable impact on employment at different levels and has shown dairying in India to a powerful development tool creating a stable outlet for milk produced in rural areas.

Future Developmental Needs in Dairying

In the light of increasing importance of dairying in

our rural developmental activities, the present dairy activities in the country call for several improvements. There is also a need for an integrated approach to manager-planning and training in the dairy industries, dairy husbandry and dairy technology must go hand in hand in the days to come.

Today Phase III of Operation Flood which has been started in 1985-86 and is to be completed by 1989-90. But the World Bank and EEC have not assured their financial investment. Hence the present system can aim for low investment dairy programme in the country so as to improve the living conditions of small and marginal farmers and landless labourers in its wheel of rural development.

NOTES AND REFERENCES

1 K.K. Khanna and V.K. Gupta "Economic and Commercial Geography" 19th Ed., published by S. Chand & Co., Delhi, 1982 - Chapter No. 2,pp. 6-18.

2 John P. Alexander and Lay James Gibson "Economic and Commercial Geography" 2nd Ed., 1979, Chapter No. 8, p. 93.

3 K.K. Khanna and V.K. Gupta "Economic and Commercial Geography" 19th Ed. published by S. Chand & Co. Delhi, 1982, Chapter-2, pp. 6-19.

4 Ibid., pp. 6-25.

5 Ibid., pp. 6-22.

6 Harbans Singh and Farl N. Moore "Livestock and Poultry Production" Adopted from livestock and poultry production, 4th Ed. by Clarence E Bundy, Ronald V. Diggins and Virgil W. Christensen, Prentice Hall of India Pvt. Ltd., New Delhi-110 001, 2nd Ed., 1978, p. 105.

7 P. Margoob Hussain, M.P. Mulla and Y. Sudhindra "Scope of Dairy Enterprise for Farmers Around Hospet" Livestock Adviser" Nov. 1983, Vol. VIII, Issue XI, p. 13.

8 K.K. Taimni "Booklet on Amul and Anand Pattern of Milk Cooperatives" published by Vaikunth Mehta National Institute of Cooperative Management, Poona 16, January, 1979.

9 K.K. Khanna and V.K. Gupta "Economic and Commercial Geography", Chapter No. 2, pp. 6-22.

10 H. Calvert, The Law and Principles of Co-operation (1921), p. 11.

11 Dr. Mathur, B.S. "Co-operation in India" Sahitya Bhawan, Agra, 1983, p. 506.

12 Editor S.P. Chopra 'Facts for You', Nov. 1986, Vol. 8, No. 5, p. 14.

13 Ibid., p. 15.

14 Ibid., p. 16.