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IMPACT OF THE COOPERATIVE
MILK PRODUCERS' ORGANISATION
ON THE DAIRY HUSBANDRY

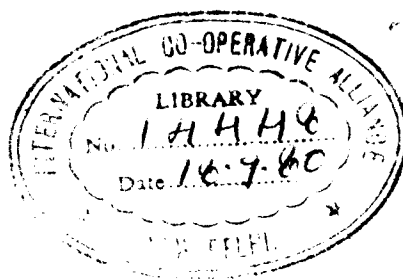
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Report on

IMPACT OF THE
COOPERATIVE MILK PRODUCERS' ORGANISATION
ON THE DAIRY HUSBANDRY

A case-study in Mehsana District in Gujarat (India)



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Patronage

International Co-operative Alliance
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and
National Co-operative Union of India
New Delhi

The opinions expressed and arguments employed in this report
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represent those of the above organisations

September 1977

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I-1 The field research training period in the curriculum of the Agricultural University of Wageningen.

In the curriculum of the Agricultural University of Wageningen one element has been included that puts an emphatic stamp on it. This element is the field research training period. Before starting his Masters' Degree studies each student should devote a six months period to "trying out the theories that he studied during the preceding years, and confronting these theories with practical situations (1)." Apart from the abovementioned no hard rules have been fixed to which the training period should apply; this admirable flexibility of the rules allows the student to experience a highly interesting half year, with or without the active cooperation of "his" department in the University. At the same time this flexibility makes it more difficult to explain the phenomenon field research training period to third parties that are involved in the matter.

In my case I had set two criteria for deciding where and how to spend my research training period : in the first place the opportunity to get to know (together with my wife) life, especially rural life, in a more or less typical developing country as thoroughly as possible, in any case more thoroughly than visiting tropical beaches, going on safari or sitting in an airconditioned office; in the second place the opportunity to engage myself in the field that is the subject of my studies, namely the agricultural development, both on the level of the individual farmer and the level of the sustaining institutions and agro-industries.

I-2 Why India?

One out of every three to four inhabitants of a developing country lives in India. India, Pakistan, Bangla Desh and Indonesia together include about half the population of the Third World. This clearly indicates that the main point of the Third World problem

(1) Landbouwhogeschool Wageningen Gids (Guide Agricultural University)

lies in South-Asia (which does not mean to say that the main cause of the problem is lying there too). Among all these Asian developing countries no country has gone further in thinking about the causes of underdevelopment and in finding out methods to stimulate development. If one further realizes that the Indian society is more open to foreigners at least than that of many other Asian countries, and that discussion about and critic on prevalent development strategies is, if not stimulated, then at least permitted, then it is not exaggerated to say that for a student in Development Economics a training period in India may be preferred to many other opportunities. The fact that the rich and old culture, the diversity of landscapes and of "subcultures", and the hospitality of the Indian people can make a stay in India to an exciting experience needs hardly be added here.

I-3 The International Cooperative Alliance and the National Cooperative Union of India.

The International Cooperative Alliance is the international federation of cooperative organisations in 63 countries and was founded in London in the year 1895. The main objectives of the ICA are to represent cooperative organisations of all kinds on the global level, to propagate cooperative principles and methods throughout the world, and to promote friendly and economic relations between the cooperative organisations, nationally and internationally (1). To serve these objectives the ICA founded a Regional Office in New Delhi in 1960, on request of the cooperative organisations in South and South-East Asia.

After my fellow-student Mr. Frank Bakx had fulfilled his research training period in India in the year 1974 under auspices of the ICA Regional Office, this same Office was willing to make arrangements for my training period. These arrangements included some excursions and discussions with experts in the field of

(1) Abstr. from P.E. Weeraman: The ICA in South-East Asia (Delhi, 1975).

cooperation and of dairying, supplying expert advice about the design of my research study, giving accomodation during my stay in Delhi, and, most important, bringing me in contact with the National Cooperative Union of India. The National Cooperative Union (NCUI) is a national confederation of cooperative organisations both on the national and on the state level. Its main responsibility is the cooperative training and education in behalf of the member organisations. The NCUI brought me into contact with the cooperative organisations on the state- and district level, by which my studies were eventually made possible.

I-4 The choice of subject and location of the study.

The choice of the subject of this study "Dairy Husbandry and Dairy Farmers' Cooperatives" has come about more or less arbitrarily, but turned out to be a good choice. The in this way limited field is reasonably surveyable, but at the same time closely interwoven with the "real" agriculture. In this limited sector many problems of agricultural development are reflected, like the necessity of a rise of productivity, the organisation of markets and marketing channels, the provision of inputs and the financing of improvement programmes.

The choice of the location of this study has not been influenced from my side but has come about purely because of the benevolence of the Mehsana District Milk Producers' Union which reacted positively on an appeal of the NCUI to the milk producers' Cooperatives in Gujarat State, to grant me facilities for my study.

I-5 Course of activities during the field research training period.

The training period falls apart in two sections, viz. a period of four months during which a thorough study was made of the dairy husbandry and the milk producers' cooperatives in Mehsana District in Gujarat, with a preceding period of preparation lasting about two weeks, and a period of two and a half months during which a study

tour led me along many cooperative organisations and government institutions, spread all over India. This report contains the results of the first period. The findings of the study tour will be laid down in a Masters' Degree thesis in a later phase of my study.

The chronological outline of the training period was as follows:

- 15-09-'75: arrival in New Delhi;
- 16-09 - 29-09: stay in New Delhi; study in the library of the ICA Regional Office; discussions with officers of the Animal Husbandry Department, the Cooperation Department and the National Cooperative Development Corporation; visit to the National Dairy Research Institute at Karnal (Haryana State);
- 30-09 - 04-10: stay in Ahmedabad (Gujarat State); visits to Amul Dairy (Kaira District Cooperative Milk Producers' Union) at Anand and to the Indian Institute of Management at Ahmedabad;
- 05-10: arrival at Mehsana Dairy;
- 06-10 - 12-10: discussions with Dairy staff; reconnaissance visits to Dairy branches and village cooperatives in the District;
- 13-10 - 28-10: preparation, designing and testing out of questionnaire;
- 29-10 - 06-11: Diwali festival holiday;
- 07-11 - 30-11: selection of sample villages; multiplication of questionnaire; preparations for field work;
- 01-12 - 07-01: field work;
- 08-01 - 22-01: preliminary tabulating and processing of gathered data; preparations for study tour;
- 23-01 - 28-01: study tour through Saurashtra (Gujarat State); visits to Rajkot Dairy and Junagadh Dairy;
- 04-02 - 07-02: attending the 7th Indian Cooperative Congress in New Delhi;
- 08-02 - 09-04: study tour through Madhya Pradesh, Maharashtra, Karnataka, Tamil Nadu, West Bengal, Uttar Pradesh and Punjab;
- 10-04 - 15-04: final stay in New Delhi;
- 16-04-'76: departure from Delhi to Holland.

I-6 Acknowledgements.

In the first place I thank Mr. J.M. Rana, Director Education in the ICA Regional Office in New Delhi for the confidence put in me. Secondly I thank Dr. R.C. Dwivedi, Director of the NCUI, for the willingness to make all kind of arrangements, essential for the success of my training period. Then I thank Mr. J.N. Mulani, Executive Officer of the Gujarat State Cooperative Union and Professor V.K. Gupta and his assistant Mr. Mathur, both in the Indian Institute of Management at Ahmedabad.

Above all I thank the Mehsana District Milk Producers' Cooperative Union in the person of Union Chairman Shri Motibhai Chaudhury, and of Dairy General Manager Shri B.C. Bhatt. Ultimately it is only owing to the hospitality and willingness of the Union that my studies in Mehsana District have been realized.

It would take some pages to mention all who have been helpful to me during my stay in India; this brings out once more the prominent place that hospitality occupies in the Indian society. Last but not least I thank Carla who stood by me during my training period and who happily could share my experiences.

II-1 Objectives of the case-study.

As explained in paragraph I-5 this report is handling about the first part of my research training period, viz. the case-study on the impact of the cooperative milk producers' organisation on the dairy husbandry in Mehsana District. At the secondary institutional level, i.e. that of the Union, the organisation clearly has been developed with considerable speed and success, and is still being developed further; the proof is there in the form of the beautifully constructed dairy plant, being a hive of activity, that forms a sharp contrast to so many other cooperative dairies in India. At the primary institutional level also a superficial study is sufficient already to reveal the successful operation of the vast majority of "milk societies" in the villages of the District; the immense quantity of milk flowing to the dairy twice daily proves it. At the institutional level not much doubts can be had about the success of this organisation.

Quite another matter is the development of the dairy husbandry at the farm level. Whether the growth of the cooperative institutions has gone hand in hand with a process of development and modernisation of the dairy husbandry in the villages cannot be judged easily. It was the main objective of this case-study to try to reveal the impact of the developments at the organisational level on the dairy husbandry practices and the economic results thereof at the farm level. Secondary came the objectives of studying on the one hand the above-mentioned developments of the organisation itself, its structure and economic-financial characteristics, especially that of the Union, and on the other hand the general characteristics of the District, especially the agricultural situation, insofar as it could give me a useful background for the farm-level survey.

II-2 Methodology of the case-study.

The study is almost totally based on primary material, collected during my stay at Mehsana. For the study of the general situation of Mehsana District I based myself mainly on the Report on the Census of

1971, on information gathered from the District Panchayat Offices and from the District Cooperative Union and from discussions with many people inside and outside the dairy. The cooperative milk producers' organisation was studied on the basis of documents provided by the U Union and some of the "village societies", of discussions with the General Manager and other staff members of the dairy and of village societies. The emphasis of this study is laying on the study of the results of a survey conducted among a number of farmers in the District with the purpose to reveal the impact of the cooperative milk producers' organisation on the dairy husbandry practices and economics at the farm level. For this purpose it was considered useful to compare a group of farmers, practising dairy husbandry, from villages that had been in the cooperative organisation for a long time, to a group of farmers, practising dairy husbandry also, from villages that had not organised a cooperative milk producers' society so far.

Mehsana District is divided into eleven taluka's. Cooperative milk producers' societies exist in all of the taluka's except Gami, the westernmost situated taluka. To have a broad base of comparison all ten taluka's in which milk societies exist were included in the survey. The selection of villages to be included in the survey was effected as follows. In each of the ten taluka's those villages having a milk society during at least ten years and having a membership of at least 50 % of the families living in the village were selected. Out of this group that village was selected that showed the highest average milk collection during the year 1974/'75. This procedure was possible on the basis of figures available at the Unions' office. In this way a selection of ten villages was obtained, spread all over the District, in which a vigorous milk society had operated during a long period. This group was called the group of "cooperative villages". Next the selection of villages having no milk society was effected by choosing one in the neighbourhood of each of the villages selected in the first group; while doing this care was taken to select comparable villages as much as possible, on the basis of the Census Report. So a second group of ten villages was obtained, comparable to the first group but possessing no milk society. This group was called the group of non-cooperative villages.

The second stage, viz. the selection of farmers to be interviewed in each of the villages, was effected in the village itself. While testing the questionnaire it appeared that the maximum number of farmers that could be interviewed in one day would be six. As a compromise between statistical exigencies and organisational possibilities this number of six farmers per village was accepted, regardless the size of the village or the taluka. In the cooperative villages the farmers to be interviewed were selected at random from the membership records of the milk society. In the non-cooperative villages the selection was made on the basis of the voters' list, maintained by the secretary of the Village Panchayat, at random equally. So in each group of villages the number of farmers to be interviewed amounted to 60. In one of the cooperative villages however only 5 farmers could be interviewed, so the total number of farmers interviewed in this group is only 59. For contacting the village officials, transport and interpretation the Union provided all necessary facilities.

II-3 The report.

In this report the findings of the studies explained in the above paragraphs are laid down in the Chapters 3 to 6. Chapter 3 deals in short with the general characteristics of Mehsana District, its geography and demography, its socio-economic structure, its agriculture, and animal husbandry in particular. In chapter 4 the development and present structure of the cooperative milk producers' organisation is treated, with special reference to the financial position of the Union. Then in chapter 5 the results are laid down that were obtained from the survey of the 59 "cooperative" farmers on the one hand and the 60 "non-cooperative" farmers on the other. Successively of both groups some socio-economic key-data, the size and composition of their cattle and buffalo stock, key-data on their milch animals, milch production and marketing of milk, then inputs and investment and financial results of their dairy husbandry are treated. In chapter 6 I have tried to formulate some conclusions that can be drawn on the basis of the material laid down in the preceding chapters. In the appendices supplementary information can be found.

III-1 Geography of Mehsana District.

The state of Gujarat is the westernmost situated state of the Indian Union, bordering Pakistan and the Arabian Gulf. It is divided in 19 districts. Mehsana District is situated in the north of Gujarat; the distance from the district town named Mehsana to the state capital named Ahmedabad is about 90 kilometers. Mehsana District covers an area of 9027 km², which is about the same area as the Dutch provinces of Groningen, Friesland and Drenthe taken together. The District area is nearly level, sloping slightly upwards from the south-west to the north-east; the height above sea level **ranges** from 50 to 200 m. The geographical position of the District is N. lat. 23^o- 24^o, and E. long. 71^o30'- 73^o.

To the east the District is bordered by the Sabarmati River, that carries water only during a part of the year; besides the area is crossed by two likewise seasonal rivers named Sarasvati and Rupen. Both these rivers disappear in the Little Rann of Kutch, situated to the west of Mehsana District; this Rann is a steppe-like area having brackish soil that is almost totally unfit for agriculture.

III-2 Soils and climate of Mehsana District.

In the southern and eastern parts of the District the soil is of a light sandy loam type having a good fertility and suitability for a wide range of crops; in the other parts a sandy soil type is prevailing in which vast spots of brackish soil are found. Throughout the District the salt forms a serious problem, especially with tubewell irrigation, but also with dry farming.

The climate in the area is characterized by a short and very uncertain wet season in the months of July, August and September. The average yearly rainfall during the decade of 1966/67 to 1975/76 amounted to 585 mm., with yearly totals ranging from 277 mm. to 1398 mm. during this period. Within the District wide differences in rainfall occur. During the abovementioned decade the "driest" taluka (taluka's

form an administrative subdivision of the districts) received on the average 342 mm. of rainfall per year, while the "wettest" taluka got 716 mm. The extremes of the yearly totals per taluka ranged from 144 mm. (Harij, '69/'70) to 2004 mm. (Visnagar, '75/'76). Rainfall rarely occurs outside the period July/August/September.

The year falls apart in three seasons, viz. the winter season during the months November through February, the sommerseason during the months March through June, and finally the wet season. The month of October performs a transitional role between the wet season and the winter season; likewise March between winter and summer. In the winter season daily ranges of temperature are very wide, the minima being about 8°C and the maxima about 28°C. In summer temperature goes up to maxima of about 42°C, and sometimes beyond 45°C.

III-3 Demography and administrative set-up of Mehsana District.

In 1971 the total population of Mehsana District amounted to 2,092,468 persons. During the decade 1961-1970 the growth of the population of the District amounted to 28 % in total, which is equivalent to an annual growth of 2.5 %. The density of population came to 232 persons per km² in 1971. For Gujarat State as a whole the figures are as follows: population 26,697,475; decennial growth rate 29 %; density 136 per km².

The population of Mehsana District is distributed over 13 townships (defined as unities having a population of more than 10,000 persons) and 1095 villages. Among the towns three have a population of more than 50,000, four have more than 20,000 upto 50,000 and six have less than 20,000. According to the abovementioned definition the urban population amounts to 18.5 % of the total; for Gujarat State this figure is 28 %.

For administrative purposes the District is divided into 11 taluka's, viz. the northern taluka's Patan and Siddhpur, the eastern taluka's Keralu and Vijapur, the southern taluka's Kalol and Kadi, the western taluka's Sami and Harij, and the central taluka's

Mehsana, Visnagar and Chanasma. The population is especially concentrated in the taluka's Siddhpur, Mehsana, Visnagar, Vijapur and Kalol. The density of population is over 500 per ha² in these taluka's.

III-4 Infrastructure of Mehsana District.

An important asset of the District is its situation along the railway and highway track Delhi-Ahmedabad. The towns of Mehsana, Kalol and Siddhpur are touched by this track. All other towns and some of the big villages are reached by the railway system. The network of paved roads reaches 321 villages; the other villages can be reached only via a sandy road. Some of the firstnamed and most of the lastnamed group of villages are not accessible for motorized transport during some months of the year. The State Transport Corp. covers 834 villages with its bus services; during the rainy season this number sinks to less than 350.

Almost all villages have a primary school; secondary education is provided in the towns and in 163 of the villages. Colleges are found in 9 out of the 13 towns; moreover two colleges are situated outside the towns. Other facilities like electricity and telephone are available in about one quarter of all villages of the District.

III-5 Socio-economic structure of Mehsana District.

The economy of Mehsana District is almost totally based on the agriculture. About 83 % of the active population of the villages and 32 % of that of the towns draw their livelihood from agriculture directly. The rest of the active village population works in craft or trade, the rest of the active town population in craft, trade, industry or in Government service. Among the agricultural population 63 % are engaged in crop farming in their own or family farm, 2 % are engaged in cattle husbandry, and 35 % are agricultural labourers. The dairy factory at Mehsana, the fertilizer factory at Kalol and

the spinning mill at Visnagar form the exceptions to the generally small scale pattern of industry in the District. All three above-mentioned industries are founded on cooperative basis.

Especially in the villages the economic structure is narrowly connected with the caste system. The two major castes, that remarkably almost never live in one and the same village, are the Patel and the Chaudhury. Both castes are landowning farmers; besides the Patel are especially engaged in small business and the Chaudhury in non-agricultural labour and services. The competition between these castes finds expression in all levels of elected government, also in the cooperative sector. Other castegroups in the District are: the small caste of the Bania, that has an important place in big trade; the caste of the Rabari or the Desai, that is mainly engaged in cattle and sheep breeding; the lowly respected castes of the Thakore and the Harijan are mainly labourers; further many quantitatively unimportant castes exist, like the carpenters, the potters, the barbers, the priests, and so on.

III-6 The cooperative infrastructure of Mehsana District.

The separate village societies in various sectors, viz. the supply of short term and middle term credit, the provision of inputs, the marketing of crops and the processing and marketing of milk are organized on the district level in the District cooperative Bank, the District Sale and Purchase Union and the District Milk Producers' Cooperative Union. In the sector of long term credit the State level forms the lowest level of organisation: the State Cooperative Land Development Bank, having branches in many taluka towns. The State executes supervision of the cooperative organisations through the staff of the Registrar of Cooperative Societies. This supervision is twofold: the bye-laws of every society (in the field of agriculture) require the approval of the Registrar, and the execution of the bye-laws is controlled by the Registrar. Besides there exists the apparatus of the District and State Cooperative Unions and the National Cooperative Union, that is entrusted with the training and

education of members, board members and staff members of the cooperative organisations and the Cooperative Department. These Unions are financed by a levy on the profits of the affiliated cooperative organisations, with supplementary State subsidies.

II-7 Agriculture in Mehsana District.

The available area for agriculture in the District accounts to 1,742,558 acres (697,023 ha.); per head of the district population the available area comes to 0.83 acre (0.33 ha.). The land is distributed among 229,239 holdings, which brings the average size of holding to 7.6 acres (3.0 ha.). The distribution of holdings over size-classes and the distribution of land over size-classes is given in table 1.

Table 1: Percentagewise distribution of holdings and land .

<u>size-class</u> <u>in acres</u>	<u>percentage</u> <u>of holdings</u>	<u>percentage of</u> <u>cultivable area</u>
upto 2	24.2	3.6
2 - 5	32.3	15.3
5 - 10	22.2	23.2
10 - 25	18.5	39.7
over 25	2.8	13.2

The average size of holding diverges fairly strongly among the taluka's; in the taluka's Visnagar, Vijapur, Halol, Siddhpur, Mehsana, Kherala and Patan this figure lies between 5.1 and 7.5 acres per holding, while in the taluka's Kadi, Chanasma, Harij and Sami it varies from 9.0 to 16.7 acres per holding.

The irrigated area in the District is estimated to be about 565,000 acres, which is about 32.5 % of the cultivable land. The reliability of this estimate is very uncertain however. The percentage of irrigated land to cultivable land ranges from 57 % to 3 % in the various taluka's. The number of tubewells in the District is estimated to be 3950, the number of Diesel engines and electric motors for

irrigation purpose to be about 34,000.

Although no complete statistics on the cropping pattern are available the impression exists that the cultivation of food crops is of paramount importance for the District as a whole. Bajari (one type of millet, *Pennisetum typhoides*) is the most cultivated grain crop in almost the whole district; in the southernmost parts paddy is also cultivated on soils suitable for this crop. Both these crops are grown in the rainy season: kharif crops. Next to bajari jowari (*Sorghum* sp.) and wheat (*Triticum sativa*) are important grain crops. These crops are grown in the winter season: rabi crops. Besides the grain species all types of pulses form an important group of food crops. Among the cash crops cotton, mustard, castor, cumin and peanut are the most important. Some crops are also grown for feeding the cattle and buffaloes, like lucern and isabgul (*Plantago oata*). The estimated area for various crops for the year 1975/'76 are given in table 2. Because no data are available on double-cropped acreage and

Table 2: Cultivated area under various crops, estimate for 1975/'76.

<u>crop</u>	<u>area in acres</u>
bajari	560,000
jowari	347,500
wheat	172,500
cotton	286,500
mustard	125,000
castor	76,750
peanut	42,500
cumin	37,500

neither on total cultivated area it is not possible to give the relative shares of all different crops.

The practised cultivation methods are of a traditional character generally. The tillage of the land is done with ox-drawn wooden ploughs having an iron point. The seedbed is made ready by a hoe. Harvesting is also done using traditional methods and implements. An important change has taken place in the field of transport: the use of pneumatic-tyred carts and the construction of paved roads have

highly facilitated the transport of the crops from the land to the village, and from the village to the market place.

The most salient point in the agricultural production is the supply of water. In view of the high level of uncertainty of the rainfall both in quantity and distribution, the irrigation of the land is a factor of paramount importance for safeguarding the harvest and the income of the farmer. The various sources of irrigation water are: in the first place tanks or reservoirs, constructed of loam that is impervious to water, in which the rainfall is stored; these tanks are shallow, have a wide surface, and have often been constructed in olden days; in the second place reservoirs in rivers by damming up the rivers, so that a part of the water running off in the rainy season is stored; the possibilities for this type of reservoirs are very limited because of the level character of the area and the low through-put of the rivers; in the third place open wells, from which the subsoil water is brought up by oxen; this system was in wide use formerly, but because of intensive exploitation of the subsoil water many wells have dried up or carry water during some months of the year only; in the fourth place tubewells that pump up water continuously and from great depth by mechanic power; this method is very costly in terms of construction costs and fuel or electricity costs.

III-8 Animal husbandry in Mehsana District.

Traditionally both the cattle husbandry and the buffalo husbandry are well developed in the District. The breeding of the "Mehsani" buffalo gave Mehsana a prominent place among the buffalo breeding tracts. The great demand for this breed of milch buffalo from the cities of Ahmedabad and Bombay gave Mehsana District a vast population of buffaloes, and a surplus of milk. Cattle breeding was chiefly practised to produce draught-oxen for the local agriculture. Buffaloes never played a significant role as draught-animals.

The significance of cattle and buffaloes is reflected in the number of animals present in the District (see table 3, next page).

Table 3: Cattle and buffalo population, by sex and age.

<u>species and sex</u>	<u>adult animals</u>	<u>young animals</u>	<u>totals</u>
cattle, females	78,539	46,534) 324,960
males	173,180	26,607	
buffalo, females	281,532	173,422) 476,627
males	1,160	20,713	
totals	534,211	267,376	801,587

The low number of male buffaloes is a consequence of the very high mortality among newborn buffalo bullock calves, which can be accounted for by the absence of any economic utility of male buffaloes apart from the procreation function. Generally neither cattle nor buffaloes play a role as suppliers of meat. The strong vegetarian tradition in Gujarat, linked to the Hindu taboo on the slaughtering of cattle, in which the buffaloes share to some extent, prevent the development of cattle and buffalo husbandry towards that role. Apart from progeny, milk and draught-services the animals supply dung. This dung is used in dried form as a fuel for household purpose and is of great importance as such.

The breeding of draught-oxen, predominantly of Kankreji breed, is generally done by the caste of the Rabari; although many Rabari have settled themselves as crop farmers their main interest still is in cattle husbandry. Although cows' milk makes a premium above buffalo-milk the production of cows' milk is commercially hardly relevant for the Rabari. Buffalo husbandry is practised by most of the landowning farmers. Traditionally the care of the buffaloes is the responsibility of the female members of the family, and they may collect the proceeds of the sale of milk also.

In the development of animal husbandry in the District the most critical problem is the problem of the provision of feed and fodder. Besides the by-products of the crop-farming green fodder is needed to maintain a healthy and productive live-stock. In most cases this green fodder is collected from community land, from roadsides, from borders of the fields and the like. During the rainy season and the winter season these seem to be sufficient sources for the small farmer in "normal" years at least. During the summer season few farmers grow lucern on irrigated plots. Most farmers keep the animals alive without

feeding them green fodder in this season. The concentrate feed sold by the Cooperative Union is very important in this connection.

Like formerly the sale of milch buffaloes to Ahmedabad and Bombay still plays an important role nowadays. Buffaloes having the best productive capacities are sold while being in calf; the calf is born in the city and dies soon; when the milk yield declines after a lapse of some months the animal is sent back to the rural districts to tide over the dry period. It seems that in this way the calves with the best genetic outfit get lost for the procreation.

Before the Milk Producers' Cooperatives had gained their dominant position the surplus milk from villages situated nearby a township was marketed by "dudhia's", traders (farmers in many cases) buying up the milk in the villages and selling it, diluted or not, in the townships. This system is still found widely. The transport of the milk was done and is still done by bicycle, so that an area with a radius of 10 to 12 km maximum around the towns can be covered by dudhia's. In the more distant villages the surplus milk is processed either by the farmers' family members or by professionally operating persons. The milk is processed into storable products like "ghee" (clarified butter), giving buttermilk as a by-product, or into "mava" or "khoa" (boiled down milk, with or without sugar added), that are used for preparing the various sweets, well-known in India.

IV-1 Development of the Mehsana District Cooperative Milk Producers' Union.

The foundation of the Mehsana District Cooperative Milk Producers' Union took place in the year 1960. In the beginning the Union was based on 15 Village Milk Producers' Cooperative Societies, that formally owned and governed the Union. The inspiration for the foundation came from Kaira District, situated in Gujarat too; in that District the Milk Producers' Union had experienced a phenomenal growth since its foundation in 1946. In 1950 the Milk Producers' Union of Ahmedabad District planned to extend its collection area to the southern part of Mehsana District, and started to organize Village Cooperative Societies in that area. Then a prominent politician of Mehsana District blocked the way for the Ahmedabad District Union by founding and getting registered the Mehsana District Union.

During the first years the milk collected by the Union was sold on contract basis to the Ahmedabad Municipal Corporation. During the summer season with low production and strong competition by the private milk traders the collection of milk showed to be very problematic, while in the winter season the collection of milk had to be limited because of too limited offtake. When in 1962 the Government of India decided to establish a number of milk powder plants for the provision of the Indian Army, Mehsana was chosen as one of the places of establishment. This choice was also made on the ground of a Unicef report made in 1958, in which the potential milk surplus of Mehsana District was estimated to be 300,000 kg per day on the average.

The "Dudhsagar Dairy" was constructed in 1964/'65, during the third Five-Year-Plan period. Its total cost amounted to Rs. 8,200,000; about 90 % of the cost was financed by Government loans. The processing capacity of the plant was to be 100,000 kg of milk per day, out of which maximum 2,400 tons of milk powder, 1,200 tons of table butter and 400 tons of ghee could be made. To step up the supply of milk, which stood at less than 4,000 kg per day on the average in the year 1963/'64, supplied by 15 village societies, a massive campaign was undertaken to establish more village societies. At the end of 1965/'66 the number of member societies had risen to about 240. At the same time the Union started to provide a number of additional services to the members, viz.

the provision of veterinary services and the sale of concentrate feed, supplied by the Union of Taira District. To be able to cover also the more distant parts of the District a chilling centre was established in the north-eastern part of the District (Kheralu), while an existing chilling centre in the south-eastern part (Vijapur) was bought from the Municipal Corporation of Ahmedabad.

In the rainy season of the year 1967/'68 the daily milk collection reached to the maximum capacity of the plant, with a yearly average of 77,000 kg per day. Thereupon the plant was extended during the years 1970/'71, to a maximum processing capacity of 250,000 kg per day, and a yearly capacity to produce 7,200 tons of milk powder, 2,400 tons of table butter and 1,000 tons of ghee. The number of allied village societies rose to about 400 in the year 1972/'73. In this same year again the top capacity of the dairy plant was reached, with an average milk flow of 196,000 per day. A new chilling centre was established in the north-western part of the District (Patan).

In the year 1970 a large-scale expansion of the Dudhsagar Dairy was sanctioned under the Operation Flood scheme(1). The total cost of the expansion scheme was estimated to be Rs. 20,500,000. The work started in the year 1973 and was near completion at the end of 1975. The processing capacity of the expanded dairy was to be 450,000 kg of milk daily, and the product capacity was to be 9,600 tons of milk powder, 3,000 tons of table butter and 1,500 tons of ghee yearly.

The tables on the next pages give a concise view of the development of the Mehsana District Cooperative Milk Producers' Union. In table 4 figures on membership and throughput are given, in table 5 selected figures of the profit and loss accounts of the successive bookyears are shown, and in table 6 an abstract of the successive balance accounts is given.

(1) Operation Flood is a large-scale program to extend reconstitution capacity of skimmed milk powder and butter oil in metropolitan dairies, and to step up milk production and procurement in selected rural areas; the scheme is run by the Indian Dairy Corporation and financed from the sale of SMP and butter oil, supplied by the World Food Program as a gift.

Table 4: Membership and milk throughput of the MDCMPU, 1960 - 1976.

<u>bookyear</u> <u>ending in</u>	<u>allied</u> <u>village</u> <u>societies</u>	<u>membership</u> <u>of allied</u> <u>societies</u>	<u>processing</u> <u>capacity</u> <u>in tons/yr</u>	<u>milk</u> <u>collection</u> <u>in tons</u>	<u>idem</u> <u>per</u> <u>day</u>	<u>idem per</u> <u>member</u> <u>in kg/yr</u>
1961	13	--	nil	219	0.6	--
1962	19	2,140	-do-	111	0.3	52
1963	15	1,885	-do-	1,545	4.2	820
1964	15	1,385	-do-	1,389	3.8	737
1965	42	4,575	-do-	3,575	9.8	781
1966	239	21,700	36,500	13,600	37.3	627
1967	253	25,000	-do-	21,560	59.1	362
1968	275	28,000	-do-	28,161	77.2	1,006
1969	276	39,815	-do-	41,885	114.8	1,052
1970	291	42,800	-do-	41,456	113.6	969
1971	346	50,200	-do-	47,173	129.2	940
1972	350	58,600	91,250	63,164	173.1	1,078
1973	370	68,220	-do-	71,669	196.4	1,051
1974	442	78,000	-do-	60,863	166.7	780
1975	544	95,600	-do-	84,509	231.5	884
1976	556	--	164,250	--	--	--

Table 5: Abstract of profit and loss accounts, 1965/'66 - 1975/'76.

<u>bookyear</u> <u>ending in</u>	<u>milk</u> <u>purchases</u> <u>in mln. Rs.</u>	<u>average rate</u> <u>per kg fat</u> <u>in Rs.</u>	<u>sales &</u> <u>stock value</u> <u>increase</u> <u>in mln. Rs.</u>	<u>gross</u> <u>margin</u> <u>in mln. Rs.</u>	<u>margin</u> <u>in % of</u> <u>sales &</u> <u>st. incr.</u>
1966	8.9	9.53	--	--	--
1967	15.3	10.51	20.7	5.4	26.1
1968	25.6	13.27	32.5	6.9	21.2
1969	39.2	13.31	50.5	11.3	22.4
1970	39.1	13.44	50.7	11.6	22.9
1971	47.5	14.33	60.3	13.3	21.9
1972	63.0	14.40	91.0	28.0	33.3
1973	74.5	15.08	118.1	43.6	36.9
1974	84.2	20.16	143.9	59.7	41.5
1975	159.6	27.97	263.8	104.2	39.5
1976	163.4	--	231.2	67.8	29.3

Table 6: Abstract of balance sheets, in millions Rs., 1966/'67-'75/'76.

bookyear ending in	net balance total	net fixed assets	(3):(2) in %	stock	(5):(2) in %	share capital	reserve fund & other funds	grants	total net worth	(10):(2) in %
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
'67	11.3	8.4	74.3	0.8	7.1	0.7	1.2	0.2	2.2	19.5
'68	16.2	8.9	54.9	4.5	27.8	1.0	1.4	1.8	4.1	25.3
'69	18.6	8.8	47.3	5.4	29.0	2.4	1.7	1.8	5.9	31.7
'70	24.2	12.4	51.2	6.2	25.6	3.6	5.1	0.0	8.6	35.5
'71	34.6	14.3	41.3	9.9	28.6	3.9	6.0	0.4	10.4	30.1
'72	49.6	15.7	31.7	16.9	34.1	4.1	6.8	2.4	13.2	26.6
'73	61.7	20.0	32.4	29.4	47.6	4.1	8.5	3.9	16.5	26.7
'74	66.0	21.7	32.9	24.3	36.8	4.1	13.0	3.9	20.9	31.7
'75	107.6	32.7	30.4	53.1	49.3	4.4	19.4	2.9	26.8	24.9
'76	82.6	33.3	40.3	27.8	33.7	7.1	20.4	3.1	30.6	37.0

Table 6: Continued.

bookyear ending in	long-term liabilities	(12):(2) in %	current liabilities	(14):(2) in %	profit
(1)	(12)	(13)	(14)	(15)	(16)
'67	7.6	67.3	1.4	12.4	0.2
'68	6.9	42.6	4.9	30.2	0.5
'69	6.4	34.4	5.3	28.5	1.0
'70	8.1	33.5	6.6	27.3	0.9
'71	13.4	38.7	9.9	28.6	1.0
'72	19.1	38.5	16.4	33.1	1.0
'73	29.0	47.0	15.3	24.8	1.0
'74	26.1	40.0	18.0	27.3	1.0
'75	47.4	44.1	32.3	30.0	1.1
'76	23.1	28.0	27.9	33.8	1.0

After the State Government had established a mixed cattle feed plant in Mehsana District, this plant was taken over by the Union in 1970 at a cost of Rs. 3.1 million. From 1975 on a program for stimulating increased milk production in the villages was started. Efforts are concentrated on breeding: in the case of buffaloes on artificial insemination with semen of selected bulls, and in the case of cows on cross-breeding with Holstein-Friesian and Jersey bull semen. Since 1973 cows' milk is collected separately in many villages and given a higher price per kg. of butterfat than buffalo milk, to stimulate the husbandry of milch cows. The dairy industry prefers the cow as milk supplier to the buffalo because the milk production of the former is less subject to seasonal fluctuation than the latter's; the buffalo is a distinctly season-bound animal as far as its procreation is concerned.

In this way the Mehsana District Cooperative Milk Producers' Union developed itself to one of the biggest cooperative undertakings in India. Presently the turnover amounts to Rs. 250 million, the balance total to over Rs. 82 million, and a net worth of over Rs. 30 million. The Union employs about 1800 persons; the wage-bill amounts to Rs. 9 million. Moreover the village societies employ an unknown number of persons, mostly part-time secretaries and milk testers; many village societies are also building up a basis of owned funds. In the next paragraphs the structure of the Union and the village societies is explained in more detail.

IV-2 Organisational structure of the District Union.

The District Union is a cooperative organisation on secondary level. Members of the Union are the Cooperative Milk Producers' Societies, that form the primary level. These societies own shares in the Union. Besides a number of individuals is member of the Union. The ownership of shares by these individuals is limited according to the bye-laws (maximum Rs. 5000). The General Meeting of the members forms the highest governing body of the Union. In the General Meeting each allied society can enter one vote. Individual members are entitled to send one representative per 25 individuals, to a maximum of one quarter

of the number of society votes. The Board of Directors is composed of 12 representatives elected by the members, and 7 to 9 others, among whom one representative of the District Central Cooperative Bank, one of the Gujarat State Milk Marketing Federation (see next paragraph), one of the Cooperative Department of the State Government, and a number of co-opted members. The chairmanship of the Board of Directors is filled by one of the society representatives.

The Board of Directors appoints a General Manager who is charged with the management of the undertaking. Its internal organisation is given in table 7.

Table 7: Internal organisation of the Union.

<u>departments</u>	<u>managed by</u>	<u>in charge of</u>
Administration & Purchase	Manager Administration Ass. Man. Purchase Ass. Man. Personnel & Administration	General administration, personnel, security, public relations, labour relations, Board meetings' recording, purchase (except raw milk).
Sales	Manager Sales	Sale of milk and milk products within the District; sale of cattle feed to societies.
Finance	Ass. General Manager Finance Ass. Manager Accounts Ass. Manager Internal Audit	Accounts, cash handling, internal audit
Production & Engeneering	Ass. General Manager Prod. Manager Production Manager Production Manager Engeneering	Running old and new plant, running chilling centres, maintenance and engeneering, civil works and transport.
Quality Control	Deputy Manager Quality Control (in service of Marketing Federation)	Quality control.
Milk Procure- ment	Three Ass. Managers Societies	Organising and supervising societies, milk transport from society to dairy, proposal of raw milk price.
Nutrition and Development	Ass. Manager N. & D.	Quality control of mixed cattle feed, A.I. of buffaloes, running cross-breeding farm.

Table 7: Continued.

<u>departments</u>	<u>managed by</u>	<u>in charge of</u>
Animal Husbandry	Ass. Manager A.H.	Veterinary services.
Feed and Fodder Development	Ass. Manager F.&F.D.	Supply of seeds and slips of lucerne and hybrid Napier, extension on cultivation, credit scheme for purchasing milch animals, milk yield competition.

IV-3 The Gujarat State Cooperative Milk Marketing Federation.

Since 1974 six of the biggest Cooperative Milk Producers' Unions in Gujarat have federated themselves in the Gujarat State Cooperative Milk Marketing Federation. This Federation is charged with the marketing of milk and milk products, produced by the Unions, outside of the "own" districts of the respective Unions. In the Federation the Kaira District Union has a dominant place; it even has a majority vote in the governing board.

Under the brandnames of "Amul" (i.e. the former brandname of the Kaira District Union) and "Sagar" (idem of the Mehsana District Union) table butter, tinned ghee, milk powder, baby milk powder, cheese and chocolate are marketed all over India. The two latter products are manufactured in the plants of the Kaira District Union only. The six federated Unions collect about 1 million kg of milk per day together. Out of this about 450,000 kg is sold for liquid consumption to the cities of Bombay, Ahmedabad, Baroda, Surat and other cities and towns of Gujarat; the rest is sold in the form of milk products. The Federation has established distribution centres in the cities of Bombay, Delhi, Calcutta and Ahmedabad; from these centres the products are supplied to wholesale dealers, who in turn supply the final retailers. The total financial turnover of the federated dairies amounts to about Rs. 700 million; the combined production capacities amount to 100 tons of milk powder, 50 tons of table butter and over 25 tons of ghee per day.

IV-4 The Village Cooperative Milk Producers' Societies.

Although the Village Cooperative Societies form the basis of the cooperative milk producers' organisations the historical development came just the other way round: after the District Union had been founded a network of village societies was spread out by the Union. In fact the Union occupies a dominant place in the whole system. It seems probable that the dominant position of the Union is one of the factors accounting for the success of the cooperative milk producers' organisations. Strict supervisions of the societies' affairs from a high quarter seems necessary in a situation in which many society members are not in a position to exercise that supervision "from below".

In principle the membership of the milk producers' societies is open to everyone who owns one or more buffaloes and/or cows, and who is willing to take one or more shares in the society at Rs. 10 each, and to pay the entry fee of Rs. 1. The liability of the members for the society is limited to five times the share capital they own. In principle the members pledge themselves to carry on trade in milk and milk products with no other party than the society.

The society is governed by the Managing Committee, elected by the General Meeting; Committee members hold office for three years, and are eligible for re-election. The Committee chooses a Chairman from its midst, who is charged with the supervision of the secretary and possible other employees of the society. The post of Chairman is generally filled by the most prominent person in the village, or by one of his relatives. The area of operation of a society is limited to one village; in rare cases some villages situated near to each other have one society together. The main objective of the society is to collect milk from its members, to pay it according to quality, and to sell it to fellow villagemen in small quantities, or to the District Union. Supplementary objectives are to sell ghee and mixed cattle feed produced by the Union to the members, to cooperate with the Union in the provision of veterinary care, artificial insemination services, cross-breeding services, and materials for the cultivation of fodder crops. Most societies operate in a rented hall or building in the village; a number of societies have constructed their own building.

The societies employ a number of persons for the realization of their objectives. Key-person is the secretary, who is in charge of the administration, the payment to the members and the supervision of the other employees of the society. Small societies employ a part-time fat-tester alongside the secretary, and a person who collects the milk, measures it, and performs all other occurring duties, like cleaning etc. Milk is collected at a fixed point of time, in the morning as well as in the evening, from the collection room by a truck sent by the Union; in case the village is not accessible the society should deliver the milk at a point that can be reached by the truck. Payment to the members is made fortnightly, while the society is paid by the Union once per month. The price per liter of milk of a certain quality, to be paid to the member by the society, is prescribed by the Union. Per liter this price is the same that the Union pays to the society per kg.; the difference between liter and kg, which is about 3 %, falls to the share of the society for covering the costs. Moreover the sample milk that is left after testing the samples is for the society.

V-1 Some characteristics of the selected villages.

The selection of the two groups of villages was made in such a way that in each taluka pairs of villages were selected that were comparable to a high extent, except for the existence of a milk society in one of them. The selection was made on the basis of Census documents, with added information from the Union staff. To check on the comparability of the selected villages some information was collected on relevant items while visiting the villages. In table 7A the results of this check are laid down. It is shown that both groups of villages

Table 7A: Some characteristics of the selected villages in the two groups (averages).

	<u>cooperative</u>	<u>non-cooperative</u>
population number	2525	2231
number of families	453	424
family size	5.6	5.3
number of communities	8.1	8.3
number of Chaudhary families	106	--
number of Patel families	141	133
villages served by all-weather road	4	3
distance to all-weather road in km.	1.1	1.1
distance to nearest town in km.	7.4	8.1
villages served by electricity	10	10
villages served by bus services	8	9
villages having primary school	10	10
number of pupils	315	380
villages having secondary school	4	3
distance to secondary school	1.5	2.3
number of pupils visiting secondary school	51.7	103.4
number of cooperative societies	2.4	1.4
number of private tubewells	10.5	5.8
number of engine wells	27.7	15.6
number of buffaloes	468	602
number of cows	66	88

are in a comparable position on most of the mentioned points. The infra-structural situation is almost equal. Differences occur on the points of secondary school enrollment and of number of tubewells and engine-wells installed.

V-2 General socio-economic data.

Among the 59 farmers in the cooperative villages 20 belong to the Chaudhury community, 15 to the Patel community, 5 to the Rabari and 3 to the Rajput community; the remaining 16 farmers belong to five other communities, viz. Brahmin, Thakore, Prajapati, Harijan and Muslim. Among the 60 farmers in the non-cooperative villages 36 belong to the Patel community, 7 belong to the Rajput and 2 to the Rabari community; the remaining 15 farmers are distributed over six other communities, viz. Thakore, Prajapati, Harijan, Muslim, Nai and Vagri. None of the farmers in the non-cooperative villages belongs to the Chaudhury community. This remarkably asymmetrical distribution indicates a certain community-linked basis of the cooperative milk producers' organisation. Especially the rivalry between the Patel and the Chaudhury communities, both consisting of land-owning farmers mainly, is reflected in the sample composition. Table 8 shows the community-wise distribution of the interviewed farmers.

Table 8: Distribution of sample farmers by community.

<u>Village stratum</u>	<u>Chaudhury</u>	<u>Patel</u>	<u>Rajput</u>	<u>Rabari</u>	<u>Others</u>	<u>Total</u>
cooperative	20	15	3	5	16	59
non-cooperative	--	36	7	2	15	60

In the cooperative villages the average age of the interviewed farmers is 44.5 years; in the non-cooperative villages this figure is 47.3 years. However the spread of this characteristic is so wide that no conclusions can be drawn from it.

Both in the cooperative and in the non-cooperative villages the interviewed farmers had received 3.8 years of formal education on the average. In the cooperative villages the spread of this characteristic is less wide than in the non-cooperative villages.

In the cooperative villages the farmers' families number 7.3 persons on the average, among who are 2.2 male adults, 2.0 female adults (1), 1.7 male and 1.5 female children. In the non-cooperative

(1) Persons aging over 14 years are counted as adults.

villages the families are constituted as follows: total 8.5 persons, among who are 2.4 male and 2.4 female adults, 1.9 male and 1.9 female children on the average. There seems to be no simple explanation for this significant difference in family composition; the difference might be related to differences in community representation, or in average income or size of landed property (see table 11). The number of economically active persons in the family is 3.8 on the average in the cooperative villages, while it is 4.4 in the non-cooperative villages (in percentages 52 in the latter against 51 in the former). Table 9 gives an overview of the family composition of the interviewed farmers.

Table 9: Family composition according to sex, age and activity (numbers).

<u>Village stratum</u>	<u>male</u> <u>adults</u>	<u>female</u> <u>adults</u>	<u>male</u> <u>children</u>	<u>female</u> <u>children</u>	<u>total</u>	<u>economically</u> <u>active</u>
cooperative	2.2	2.0	1.7	1.5	7.3	3.8
non-cooperative	2.4	2.4	1.9	1.9	8.5	4.4

Among the farmers in the cooperative villages the landed property amounts to 7.4 acres per family on the average. In the non-cooperative villages the same amounts to 8.6 acres. The spread over size-classes is shown in table 10. In a few cases lease of land occurs; in both

/classes.

Table 10: Percentage-wise distribution of landed property over size-

<u>Village stratum</u>	<u>0 - 2 acres</u>	<u>2 - 5</u>	<u>5 - 10</u>	<u>10 - 25</u>	<u>over 25 acres</u>
cooperative	16.9	33.9	28.8	16.9	3.4
non-cooperative	18.3	21.7	31.7	25.0	3.3
(for comparison:					
District total	24.2	32.3	22.2	18.5	2.8)

groups of villages an average 0.5 acre of land is leased in, while no land is leased out at all. The average size of the operational holding is 7.9 acres in the cooperative villages, and 9.1 acres in the non-cooperative villages consequently. When the farmers possessing no land holding are left out of account (in the cooperative villages they number 5.1 %, in the non-cooperative villages 8.3 % of the interviewed farmers) the size of the operational holding comes to 8.4 acres in the cooperative villages and 9.9 acres in the non-cooperative villages on the average. Per family member the possession of land amounts to

1.1 acres, both in the cooperative and in the non-cooperative villages (without taking into account the labourers that are permanently employed by the farmers, who also depend on their land possession). Table 11 summarizes the findings on landed property and operational holding.

Table 11: Landed property and operational holding per family and per family member, averages, in acres.

<u>Village stratum</u>	<u>landed property</u>	<u>leased in</u>	<u>operational holding</u>	<u>idem per family member</u>
cooperative	7.4	0.5	7.9	1.1
non-cooperative	8.6	0.5	9.1	1.1

The average area cultivated under grain and fodder crops per family in the three cropping seasons is shown in table 12.

Table 12: Average area under grain and fodder crops in winter, summer and rainy season, in acres.

<u>Village stratum</u>	<u>cropping season</u>	<u>wheat</u>	<u>bajari</u>	<u>jowari</u>	<u>fodder</u>	<u>sub-total</u>	<u>oper. holding</u>
cooperative	winter	1.5			0.5	2.0	7.9
non-cooperative		1.5			0.3	1.8	9.1
cooperative	summer		0.8		0.4	1.2	7.9
non-cooperative			0.4		0.4	0.7	9.1
cooperative	monsoon		2.7	1.4		4.1	7.9
non-cooperative			3.2	1.4		4.6	9.1

These figures indicate that the farmers in the cooperative villages cultivate a bigger share of their holding in the dry seasons; particularly they grow more fodder in winter and more grains in summer. This difference comes to the fore more pronouncedly in the number of farmers growing these particular crops in the respective seasons (see table 13).

Table 13: Percentage of farmers growing particular crops in the three seasons.

<u>Village stratum</u>	<u>winter</u>		<u>summer</u>		<u>rainy season</u>	
	<u>wheat</u>	<u>fodder</u>	<u>bajari</u>	<u>fodder</u>	<u>bajari</u>	<u>jowari</u>
cooperative	85	81	47	80	95	73
non-cooperative	70	57	20	55	92	60

The relative importance of the various sources of cash income, as estimated by the farmers, is given in table 14. It indicates that dairying as a source of cash income is much more important in the cooperative villages as compared to the non-cooperative villages; the cash income from the crops is also estimated higher in the cooperative villages. On the other hand other sources of income seem to be more

Table 14: Percentage distribution of cash income from various sources.

<u>Village stratum</u>	<u>source of income</u>	<u>classes of income, in Rs. per year</u>					
		<u>nil</u>	<u>1-1000</u>	<u>1000- 2000</u>	<u>2000- 5000</u>	<u>5000- 10000</u>	<u>over 10000</u>
cooperative	crops	1.7	16.9	18.6	33.9	25.4	3.4
	dairying	--	47.5	37.3	11.9	1.7	1.7
	other	66.1	15.3	5.4	13.6	1.7	--
non-cooperative	crops	8.3	30.0	16.7	30.0	13.3	1.7
	dairying	31.7	41.7	20.0	5.0	--	1.7
	other	60.0	8.3	13.3	16.7	1.7	--

important to the farmers in the non-cooperative villages.

V-3 Herd size and composition.

In the tables 15 and 16 the composition of the total herd kept by the interviewed farmers in the two groups of villages is shown at the beginning of the period, at the end of the period and the changes during the period (see next page). The average size of the herd per farmer at the beginning and at the end of the period is given in table 17 (see next page). The figures in these tables indicate that in the cooperative villages the farmers keep a higher number of milch buffaloes than in the non-cooperative villages; during the period however the difference grew less considerably, especially because of a low number of milch buffaloes sold during the period in the non-cooperative villages. Both in the cooperative and in the non-cooperative villages the female buffalo young stock increased considerably during the period, with highest relative increase in the non-cooperative villages. The absolute number of this female young stock is much higher in the cooperative villages however. The low

Table 15: Number of cattle and buffaloes, according to sex and age, kept in the cooperative villages on 1-11-'74 and on 1-11-'75.

	1-11-'74	increase by birth or up-growing	increase by purchase	decrease by sale	decrease by death	decrease by up-growing	1-11-'75
milch buffaloes	94	8	14	13	5	--	98
female buffalo calves	63	31	2	1	4	8	83
male buffalo calves	2	29	--	--	23	--	8
total buffaloes	159	68	16	14	32	8	189
milch cows	18	3	4	--	--	--	25
female cow-calves	12	3	2	--	1	3	13
male cow-calves & oxen	71	4	2	3	6	--	68
total cattle	101	10	8	3	7	3	106

Table 16: Number of cattle and buffaloes, according to sex and age, kept in the non-cooperative villages on 1-11-'74 and on 1-11-'75.

	1-11-'74	increase by birth or up-growing	increase by purchase	decrease by sale	decrease by death	decrease by up-growing	1-11-'75
milch buffaloes	76	7	16	6	2	--	91
female buffalo calves	32	33	3	4	6	7	51
male buffalo calves	2	22	--	--	20	--	4
total buffaloes	110	62	19	10	28	7	146
milch cows	16	--	2	--	1	--	17
female cow-calves	4	7	--	--	1	--	10
male cow-calves & oxen	60	2	4	1	3	--	62
total cows	80	9	6	1	5	--	89

number of male buffalo calves reflects their low economic value, both in cooperative and in non-cooperative villages.

The stock of cattle is small as compared to the buffalo stock. Far over half of it is composed of oxen and male calves. Their number is relatively constant during the period. In cooperative villages this

Table 17: Average number of cattle and buffaloes per farmer, according to sex and age, on 1-11-'74 and on 1-11-'75.

<u>type of animal</u>	<u>village stratum</u>			
	<u>cooperative</u>		<u>non-cooperative</u>	
	<u>1-11-'74</u>	<u>1-11-'75</u>	<u>1-11-'74</u>	<u>1-11-'75</u>
milch buffaloes	1.59	1.66	1.27	1.52
female buffaloe calves	1.07	1.41	0.53	0.85
male buffaloe calves	0.03	0.14	0.03	0.07
total buffaloes	2.69	3.20	1.83	2.43
milch cows	0.51	0.42	0.27	0.28
female cow-calves	0.20	0.22	0.07	0.17
male cow-calves & oxen	1.20	1.15	1.00	1.03
total cattle	1.71	1.80	1.33	1.48

number is higher than in non-cooperative ones. In the cooperative villages the number of milch cows increased considerably, both through purchase and growing-up of calves. Their number is considerably higher as compared to the number of milch cows in non-cooperative villages.

As to the percentage of farmers keeping one or more milch cows, milch buffaloes or oxen and male cow-calves, table 18 shows that this percentage is higher in the cooperative villages than in the non-cooperative ones. Especially the percentage of farmers possessing one or more bullocks, very important in an agriculture based on animal draught, is higher in the cooperative villages.

Table 18: Percentage of farmers keeping one or more milch animals and/or oxen and male cow-calves.

<u>Village stratum</u>	<u>milch buffaloes</u>	<u>milch cows</u>	<u>oxen & male cow- calves</u>
cooperative	94.9	20.3	72.9
non-cooperative	91.7	15.0	56.7

The trade of buffaloes and cattle seems to be relatively intensive. During the period the farmers in the cooperative villages carried out 36 transactions, while those in the non-cooperative villages carried out 28 transactions. In these transactions the following prices were settled on the average (see table 19, next page). These figures indicate

Table 19: Average prices in sale and purchase transactions, in Rs.
(number of transactions in brackets).

<u>Village stratum</u>	<u>type of transaction</u>	<u>adult buffaloes</u>	<u>adult cows</u>	<u>bullocks</u>
cooperative	purchase	1670 (14)	580 (4)	725 (2)
	sale	2165 (13)		1065 (3)
non-cooperative	purchase	1565 (16)	500 (1)	610 (4)
	sale	1720 (6)		700 (1)

that the drain of high-yielding animals is still going on to some extent. The average value of sold animals is considerably higher than that of purchased animals. For cooperative villages this applies even more than for non-cooperative villages.

V-4 Particulars of the milch animal stock.

The status of the milch animal stock, i.e. female animals over three years of age, at the middle and at the end of the period is given in the table 20. The figures in this table indicate that in the

Table 20: Status of the milch animals on 1-5-'75 and on 1-11-'75,
in percentages.

<u>Village stratum</u>	<u>animal type</u>	<u>animal status</u>	<u>1-5-'75</u>	<u>1-11-'75</u>
cooperative	buffaloes	in milk	37	50
		dry	37	36
		not calved yet	26	14
	cows	in milk	43	36
		dry	26	36
		not calved yet	30	28
non-cooperative	buffaloes	in milk	46	56
		dry	25	25
		not calved yet	29	19
	cows	in milk	50	35
		dry	39	53
		not calved yet	11	12

case of buffaloes a greater part of the animals is lactating in the cooperative villages at both points of time; with cows this is the case in the summer season only. In both groups of villages more buffaloes are lactating at the end of the period than in the summer season. With cows the opposite is the case: more cows are in lactation in summer than at the end of the period.

A better measure for the milk-production performance of the milch animals may be the percentage of months, during which the animals were in lactation, out of the total of twelve months per animal. In this computation only those animals have been considered that had calved at least one time (see table 21). In this table it is indicated that

Table 21: Average part of the year during which the milch animals were in lactation, in percentages (number of observations in brackets).

<u>Village stratum</u>	<u>buffaloes</u>	<u>cows</u>
cooperative	53.5 (84)	52.3 (18)
non-cooperative	54.2 (72)	44.8 (16)

as far as buffaloes are concerned hardly any difference is found between cooperative and non-cooperative villages. In the case of cows the cooperative villages show a better performance.

A comparison of the average age and the average number of completed lactations of the animals gives the following picture (see table 22).

Table 22: Average age in years and average number of completed lactations of the present milch animal stock.

<u>Village stratum</u>	<u>animal type</u>	<u>average age in years</u>	<u>average number of completed lactations</u>
cooperative	buffaloes	6.2	2.0
	cows	6.6	2.3
non-cooperative	buffaloes	6.1	1.9
	cows	7.4	2.5

For the buffaloes both groups of villages show the same picture; for the cows the cooperative villages show a milch cow stock of younger age and, taking into account the younger age, a more productive stock in the

field of procreation.

A comparison of the inter-calving-period and the lactation period is given in table 23. Out of the two given inter-calving-periods the

Table 23: Average duration of inter-calving-period and lactation period (last completed lactation) in months (number of observations in brackets).

<u>Village stratum</u>	<u>animal type</u>	<u>lactation period</u>	<u>last inter-calving-period</u>	<u>running inter-calving-period</u>
cooperative	buffaloes	9.1 (52)	15.6 (38)	19.4 (27)
	cows	10.5 (10)	17.4 (5)	20.0 (4)
non-cooperative	buffaloes	8.2 (45)	14.1 (33)	16.7 (11)
	cows	8.0 (10)	20.0 (3)	19.0 (2)

figure for the running inter-calving-period is probably more dependable than the figure for the last inter-calving-period. The results indicate a longer inter-calving-period for the buffaloes in the cooperative villages, as compared to the non-cooperative villages; in connection herewith the duration of the lactation period is longer for the buffaloes in the cooperative villages. As to the cows, the lactation period seems to be longer in the cooperative villages also; about the inter-calving-period no conclusions can be drawn because of the small number of observations.

The value of the milch animals, as estimated by the farmers, is as follows (see table 24). The figures indicate that in the cooperative

Table 24: Average value of the milch animals, in Rs., estimated by the farmers.

<u>Village stratum</u>	<u>buffaloes</u>	<u>cows</u>
cooperative	1558/--	454/--
non-cooperative	1420/--	450/--

the value of the milch buffaloes is estimated higher on the average, as compared to the non-cooperative villages. In the case of milch cows there is hardly any difference between the two groups.

Out of the stock present at the end of the period a considerable part had been purchased in the course of the years (see table 25). It

Table 25: Percentage of the milch animal stock purchased, and average purchase price in Rs.

<u>Village stratum</u>	<u>animal type</u>	<u>total stock</u>	<u>percentage purchased</u>	<u>average purchase price</u>
cooperative	buffaloes	98	33.7	1375/--
	cows	25	28.0	446/--
non-cooperative	buffaloes	91	28.6	1435/--
	cows	17	17.6	500/--

is shown that both for buffaloes and for cows the percentage of animals purchased is higher in the cooperative villages than in the non-cooperative ones. The average purchase price however is slightly higher in the non-cooperative villages.

V-5 Milk production and marketing.

The total quantity of milk produced by the farmers in the cooperative villages during the period is 95,906 liters. Per farmer this amounts to a production of 1,620.4 liters in one year, or 4.4 liters per day on the average. In the non-cooperative villages the total production is 85,060 liters of milk. Per farmer the production averages 1,417.7 liters in one year, or 3.9 liters per day. To realize this production the farmers in the cooperative villages kept 1.6 milch buffaloes and 0.4 milch cows on the average during the total period, which comes to 2.0 milch animals kept. The average milk production per milch animal amounts to 812.8 liters of milk per year, which is 2.2 liters per day over 365 days. In the non-cooperative villages the farmers kept 1.4 milch buffaloes and 0.3 milch cows on the average during the period, or 1.7 milch animals in total. Per milch animal the average production totals 850.6 liters of milk per year, or 2.3 liters per day over 365 days. In this computation the milk production is related to the total stock of adult female animals. It is shown that the farmers in the non-cooperative villages produce less milk on the average than the farmers in the cooperative villages, but this

production is realized through a higher average milk yield per animal.

When we relate the milk production to the part of the milch animal stock that had calved at least one time the following average figures can be computed: in the cooperative villages 1,053.9 liters per animal per year, in the non-cooperative villages 1,050.1 liters per animal per year. It is shown that the difference between the two groups of villages, that resulted from the first computation, has disappeared almost totally, because the number of animals that had not calved yet put the cooperative villages at a disadvantage as compared with the non-cooperative villages.

When we relate the milk production to the real lactation period, in the cooperative villages an average production is found of 147.1 liters of milk per month of lactation, or 4.8 liters per day of lactation. In the non-cooperative villages the average production stands at 153.5 liters of milk per month of lactation, or 5.0 liters per day of lactation. These results indicate that the production of milk per animal is not higher on any account in the cooperative villages than it is in the non-cooperative villages; probably it is even slightly lower in the former villages.

The milk production does not show an even distribution throughout the year. From the collected figures production appears to be at the top during the winter months and minimal in the summer months, as far as the cooperative villages are concerned. The non-cooperative villages however show a top production during the rainy season, while the minimum is also found in the summer season. The percentual distribution of the milk production over the three seasons is given in table 26.

Table 26: Percentual distribution of the milk production over the three seasons.

<u>Village stratum</u>	<u>winter season</u>	<u>summer season</u>	<u>rainy season</u>
cooperative	43.6	27.1	29.3
non-cooperative	35.4	28.1	36.4

The milk produced by the farmers is mainly used for three different purposes:

1. family consumption of milk and/or simple milk products (f.i. curd);

2. preparation of ghee for family consumption and/or sale; the by-product buttermilk is used for family consumption;
3. sale of milk.

The preparation of ghee is a very time-consuming process; it is done by churning sour milk until the butter separates from the buttermilk; subsequently by prolonged heating the butter is converted into ghee, i.e. almost pure butteroil, that has good keeping qualities in the prevailing climate. The use of ghee is broadly the same as that of butter and margarine in the Western European kitchen.

The sale of milk can be done to the Cooperative Milk Producers' Societies in the cooperative villages; next to the creameries run by private persons, to the local sweets-producers (1), or to merchants who sell the milk, without processing it, to nearby towns and villages, or in the village itself.

The distribution of the produced milk over the three above-mentioned destinations among the interviewed farmers is given in table 27. It is indicated that in the cooperative villages the

Table 27: Percentual distribution of produced milk over different destinations.

<u>Village stratum</u>	<u>family consumption</u>	<u>ghee production</u>	<u>milk sale</u>
cooperative	27.7	8.3	64.0
non-cooperative	29.0	36.9	34.1

production of ghee has been displaced almost totally by the sale of milk, while the family consumption in these villages stands almost at the same level as in the non-cooperative villages, percentually taken. In this context it should be noted that along with the displacement of the ghee production in the cooperative villages also the consumption of the by-product buttermilk will have been driven back. Whether the situation in the non-cooperative villages can be regarded as a reflection of the situation that prevailed in the presently cooperative villages before the foundation of the Milk Producers' Cooperative Societies, is not sure. Perhaps the very fact of the development of the "Milk Societies" in the cooperative villages drove back the sale of milk in the non-cooperative villages. The

(1) By boiling milk is converted into khoa (dry matter), which is the basis for a great variety of sweet products.

original situation then must have been somewhere between the present situation of the cooperative and the non-cooperative villages.

The distribution over the different destinations varies in the course of the seasons (see table 28). According as the production in

Table 28: Percentual distribution of produced milk over different destinations in the three seasons.

<u>Village stratum</u>	<u>season</u>	<u>family consumption</u>	<u>ghee production</u>	<u>fresh milk sale</u>	<u>season share</u>
cooperative	winter	25.5	9.2	65.3	43.6
	summer	32.3	9.0	58.7	27.1
	rainy	26.7	6.5	66.8	29.3
non-cooperative	winter	28.9	39.4	31.7	35.4
	summer	29.8	34.5	35.7	28.1
	rainy	28.5	36.4	35.1	36.4

the season is lower a bigger part of the produced milk is consumed by the families; it appears that the families try to maintain their level of milk consumption while production varies. The variation in the share of the milk used for ghee production cannot be explained in a simple way, just like the variation in the share of the sold milk.

The monetary proceeds from the milk production consist on the one side of the sale of milk, on the other side of the sale of ghee. Table 29 shows the proceeds in the three seasons out of the two sources. In

Table 29: Monetary proceeds from milk and ghee sales in the three seasons, averages per farmer, in Rs.

<u>Village stratum</u>	<u>season</u>	<u>milk sale</u>	<u>ghee sale</u>	<u>total</u>
cooperative	winter	799/07	0/42	799/49
	summer	444/44	0/22	444/66
	rainy	499/07	0/42	499/49
	total	1742/58	1/07	1743/64
non-cooperative	winter	219/13	107/03	326/17
	summer	213/37	58/83	272/20
	rainy	231/10	71/80	302/90
	total	663/60	237/67	901/27

the cooperative villages the proceeds consist almost totally of the milk sale proceeds. Sale of ghee is not attractive because of the price of milk offered by the cooperative society on the one hand, and the price of ghee produced by the Union and sold by the society in the village on the other hand. The average monetary return per farmer per day is Rs. 4/78 in the cooperative villages and Rs. 2/47 in the non-cooperative ones.

The average selling price per liter of milk in the three seasons is shown in table 30. In the cooperative villages the selling price is significantly higher than in the non-cooperative villages in each of the seasons; it varies between 125% and 115% of the level in the non-cooperative villages. Each of the interviewed farmers in the

Table 30: Average selling price per liter of milk in the three seasons, in Rs.

<u>Village stratum</u>	<u>winter</u>	<u>summer</u>	<u>rainy season</u>	<u>whole year</u>
cooperative	1/73	1/72	1/57	1/68
non-cooperative	1/38	1/50	1/28	1/37

cooperative villages sold milk to the cooperative society in the course of the period; moreover one of them sold a quantity of ghee. Out of the 60 farmers in the non-cooperative villages 19 sold no milk or ghee at all, 18 farmers sold a quantity of ghee, 22 farmers sold more or less liters of milk, while 1 farmer sold both milk and ghee in the course of the period. The ghee production in the cooperative villages amounted to a total of 438 kg., out of which only 2.5 kg. was sold. To realize this production 8,015 liters of milk were used, or 18.3 liters per kg. of ghee. In the non-cooperative the total ghee production amounted to 1,689 kg., out of which 625 kg. or 37% was sold. For this ghee production 31,425 liters of milk were used, i.e. 18.6 liters per kg. of ghee. The proceeds of the sale of ghee are negligible for the cooperative villages; for the non-cooperative villages the proceeds during the year amounted to Rs. 14,260/-. In relation to the total sales of 625 kg. of ghee the proceeds per kg. come to Rs. 22/82 on the average throughout the year. In view of the 18.6 liters of milk spent the proceeds of one liter of milk sold in the form of ghee amount to Rs. 1/23 on the average, not taking into account the value of the by-product that is

left over from the ghee production.

Among the 10 cooperative villages there are 4 in which besides the "milk society" a private milk trader operates on a commercial scale: in 2 villages there are private creameries where ghee is produced, in one village a mavavalla operates who converts milk into khoa, and in the fourth village both a mavavalla and a private creamery occur. According to the results from the enquete no one among the interviewed farmers sold milk to these private traders during the period. In 5 out of the 10 non-cooperative villages no commercial marketing channel for milk exists;; in 2 villages a private creamery operates, in 1 village a mavavalla , in another village both a mavavalla and a private creamery carry on trade; in the tenth village a private creamery is settled while at the same time sale of milk to the cooperative milk society of a neighbouring village appeared to happen. Among the farmers in the non-cooperative villages 23 sold milk in the course of the year; 14 out of these sold milk to a private creamery, 4 sold milk to a mavavalla and 3 sold milk to a "milk society"; 2 farmers found still other ways to sell their milk. The private creameries and mavavalla's to whom the farmers sold their milk operate during the whole year. Generally they collect milk at their place of residence; one or two however collected milk at the farmers' place. Some of the creameries pay for the milk on weight basis, others however on fat content basis, while sub-standard milk is refused. The mavavalla's pay on the basis of nava content, which is roughly equivalent to total-solids-basis. Payment is effected twice monthly, and sometimes weekly, while the mavavalla's pay daily in general. In some cases the private dairies make payment in advance, if the farmer wishes so.

V-6 Inputs and investment.

The inputs for the sake of the milk production fall apart into purchased inputs on the one hand and inputs produced in the own farm or collected by own efforts on the other hand. The costs of inputs include the following categories:

1. costs of feeding, which form the most important category; these may consist of greenfodder, viz. grass and lucerne, dry fodder, viz.

- straw, and concentrates, viz. oilseeds, grains or mixed feeds;
2. costs of veterinary care, by a veterinary doctor or by a local man;
 3. costs of insemination, natural or artificial;
 4. costs of a shepherd, if done by a third party;
 5. costs of maintenance and depreciation of stable and utensils;
 6. costs of labour for the care of the animals and the execution of all required side-activities;
 7. costs of interest on capital tied up in the milch animal husbandry;

ad 1. among the costs of feeding a part is formed by the costs of purchased feedstuffs: compound cattle feed is always purchased, while all other feedstuffs may be purchased; many feedstuffs however are produced in the own farm, like lucerne, straw, grains and other seeds, or are collected from public grounds, like grass; the valuation of not-purchased feedstuffs is a very difficult matter;

ad 2. these costs refer to services that are really paid for; the valuation does not present many difficulties;

ad 3. these costs are also paid for to third parties, so that they are well-known;

ad 4. payment for the herding of the animals to third parties is done in money or in kind; the valuation does not present difficulties;

ad 5. the valuation of the stables and other forms of shelter and of utensils is a very difficult matter; especially the value of stables, penthouses or stabling inside the farmers' dwelling-house is hardly fixable; the determination of the life of these investments is highly arbitrary; assesment of depreciation charges is hardly possible therefore; fortunately, this category of costs forms only a small part of the total costs;

ad 6. the costs of labour for caring the animals again form a category that cannot be valuated easily; the valuation of a unit of labour spent can be assessed only in an arbitrary way; in many families the animals are taken care of by the women; the alternative employment of their labour is either in the household, in which case the opportunity cost of their labour may be fixed at zero, or on the own land, or on another man's land as hired labour, in which cases one is not allowed to suppose the opportunity cost to be zero;

ad 7. the magnitude of the fixed capital can be assessed only by approximation; the value of the animals can be assessed quite well, as opposed to the value of the shelter and the utensils; the level of the rate of interest to be applied can be derived from alternative capital investment opportunities.

The volume of the tied-up capital can be estimated as follows. The average value of the female stock per farmer amounted to Rs. 2963/-- in the cooperative villages and Rs. 2257/-- in the non-cooperative villages. The average initial value of the stabling of the animals can be estimated to be Rs. 800/-- per farmer both in the cooperative and in the non-cooperative villages, while the life can be estimated at 20 years. The average value of all other utensils is about Rs. 50/-- per farmer in all villages, with a life of 5 years. The average fixed capital per farmer amounts roughly to Rs 3400/-- in the cooperative villages and Rs. 2700/-- in the non-cooperative villages.

The costs of depreciation on stable and utensils comes to about Rs. 50/-- per year in both groups of villages. Charging for costs of interest on the fixed capital is disputable; for the animals as such may serve as investment objects in many cases, because of the absence of other interest-bearing investment opportunities (cf. the roll of golden ornaments). When we charge however at a rate of 6 % the costs of interest come to Rs. 204/-- per year per farmer in the cooperative villages and to Rs. 162/-- in the non-cooperative villages.

The costs of current inputs fall apart into the costs of feeding, the costs of labour and "other costs". The average volume of the "other costs" is given in table 31. The total "other costs" amount to Rs. 39/--

Table 31: Average volume of "other costs" in Rs. per year per farmer.

<u>Village stratum</u>	<u>veterinary costs</u>	<u>breeding costs</u>	<u>grazing charges</u>	<u>total</u>
cooperative	24/--	6/--	9/--	39/--
non-cooperative	9/--	5/--	10/--	24/--

per farmer in the cooperative villages or Rs. 20/-- per animal, and Rs. 24/-- per farmer or Rs. 14/-- per animal in the non-cooperative

villages, on the average. The costs of feeding, as far as purchased feeding-stuffs are concerned, are given in table 32. The costs of the

Table 32: Average costs of purchased feeding-stuffs in Rs. per farmer per year.

<u>Village stratum</u>	<u>green fodder</u>	<u>dry fodder</u>	<u>concentrates</u>	<u>total</u>
cooperative	10/--	176/--	723/--	908/--
non-cooperative	7/--	125/--	463/--	595/--

non-purchased feeding-stuffs cannot be assessed on the basis of the available material; it is probably allowed to suppose that these costs consist predominantly of costs of own labour. Table 33 summarizes the costs per farmer for the total period, excluding the costs of own or hired labour.

Table 33: Average paid-out and not-paid-out costs, excluding labour costs, per farmer per year, in Rs.

<u>Village stratum</u>	<u>paid-out</u>			<u>not-paid-out</u>		<u>total</u>	
	<u>feeds</u>	<u>other</u>	<u>sub-total</u>	<u>depreciation</u>	<u>intrest sub-total</u>		
cooperative	908/--	39/--	947/--	50/--	204/--	254/--	1201/--
non-cooperative	595/--	24/--	619/--	50/--	162/--	212/--	831/--

V-7 Financial results.

For the income out of the dairy husbandry per farmer the following average picture can be drawn (see table 34). No attempt has been made

Table 34: Average income per farmer out of dairy husbandry during the period, in Rs.

	<u>cooperative</u>	<u>non-cooperative</u>
proceeds of milk and ghee sale	1744/--	901/--
calculated value of own consumption	987/--	1041/--
increase in value of female stock	253/--	478/--
balance of transactions of female animals	41/--	minus 254/--
increase in value of male cattle stock	34/--	17/--
total	3059/--	2183/--

to find the value of the dung production because of too many problems involved; moreover it is not probable that differences should exist in this field between cooperative and non-cooperative villages, so that the dung production is less relevant in this context. The total cost, excluding the cost of own labour and hired labour, amounted to Rs.1201/-- in the cooperative and Rs. 831/-- in the non-cooperative villages, average per farmer (see table 35). The total farm labour earnings can be computed now (see table 35). Per adult female animal the average

Table 35: Average total farm labour earnings per farmer, for the total period, and per day, in Rs.

<u>Village stratum</u>	<u>total gross income</u>	<u>total cost excl. labour</u>	<u>total farm labour earnings</u>	
			<u>total period</u>	<u>per day</u>
cooperative	3059/--	1201/--	1858/--	5/10
non-cooperative	2183/--	831/--	1352/--	3/70

total farm labour earnings amount to Rs.934/-- in the cooperative villages and to Rs. 810/-- in the non-cooperative villages for the total period; per day it is Rs. 2/60 and Rs.2/20 respectively. Per liter of milk produced during the period the following picture appears (see table 36).

Table 36: Gross income, cost (excl. labour cost) and total farm labour earnings per liter of milk, averages for the period, in Rs.

<u>Village stratum</u>	<u>gross income</u>	<u>costs (excl. labour)</u>	<u>farm labour earnings</u>
cooperative	1/88	0/74	1/14
non-cooperative	1/54	0/59	0/95

VI-1 Conclusions on the methodology of the case-study.

A comparison of the farmers' questionnaire reproduced in Appendix 1 with the results of the survey among the farmers will show that a part of the questionnaire has not resulted into information that could be reported about. Especially the sections XIV and XV, that were included in the questionnaire to be able to relate a "cooperative" farmer's relative success or failure in the field of his dairy husbandry to his knowledge of and involvement in the matters of the milk society, have not served their purpose. It appeared to be impossible to have a comparison within the group of cooperative farmers alongside with the inter-group comparison of cooperative and non-cooperative farmers. The sections XVI, XVII and XVIII, that were taken up at the instance of the management of the Milk Union mainly, did not result into useful information either. On the one side the presence of dairy staff for the sake of interpretation prevented the farmers from speaking openly, while on the other side the wording of the questions turned out to be not suited to make the farmers understand the purport of the questions. That is why chapter VV does not report on the results under these sections.

Two other sections that have not resulted into reportable information are the sections VI and IX, on the feed rations of the animals and on the labour spent for the dairy husbandry. The form of the survey, viz. a single visit to the farmers to question them on the matters of a full year turned out to go wrong on these points. On other points the dependability of the results certainly has been diminished by this form (which was the only possible form in the framework of my research training period), but the purport of the results and the conclusions are still valid probably.

VI-2 Conclusions on the results of the survey.

The results of the survey indicate that the cooperative milk producers' organisation in Mehsana District fulfills its main purpose by offering the farmers a profitable marketing channel for their milk, in this way providing the member-suppliers with a continually flowing

and dependable source of supplementary income. On other points the cooperative organisation seems to have achieved considerably less success. Especially in the field of the productivity of the milch animals no improvement seems to have been achieved, in spite of the development programs undertaken by the Milk Union. In all points that characterize the milk producing capacity of the animals the cooperative villages seem to score equally high or lower than the non-cooperative villages, at least not higher. It seems that the various development programs of the Milk Union are not equally successful. The use of compound cattle feed is widespread among the interviewed farmers in the cooperative villages. The "grow-lucern-campaign" also seems to have achieved success to some extent, judged from the number of farmers growing it. To the other programs the response of the farmers seems to be less positive. Veterinary services and artificial insemination services are seldom made use of. Crossbreeding of the milch cows is far beyond the farmers' comprehension.

What does prevent the members of the milk societies from taking full profit of the services offered by the Union? Maybe it is just a matter of time before the work done so far will start yielding profits. Maybe the remuneration in the form of the price of milk is judged to be insufficient to make a more intensive dairy husbandry attractive. No conclusion can be drawn on this point from the material collected during the survey.

VII-1 The questionnaire.

Questionnaire for milk producers; reference year November 1 to October 31 (1974/'75).

date _____ area covered by Dairy
 intermediate _____ area not covered by Dairy

I IDENTIFICATION AND SOCIO-ECONOMIC CHARACTERISTICS

1.1 Name of the village _____ Taluka _____

1.2 Name of the milk producer _____

1.3 Age of the head of the household _____

1.4 Educational level of the head of the household _____

1.5 Household composition:

	total number	economically active	actively involved in dairying
a) Adults Male	_____	_____	_____
Female	_____	_____	_____
b) Children Male	_____	_____	_____
Female	_____	_____	_____

1.6 Ownership of land:

- a) Owned land _____ acres
- b) Leased in _____ acres
- c) Leased out _____ acres
- d) Operational area _____ acres
- e) Area under permanent grass _____ acres

1.7 Area under grain and fodder crops:

- Kharif crops: a) Bajra _____ acres
- b) Paddy _____ acres
- c) Jowar _____ acres
- d) Fodder _____ acres
- Summer crops: a) Bajra _____ acres
- b) Fodder _____ acres
- Rabi crops: a) Wheat _____ acres
- b) Fodder _____ acres

1.8 Occupation: primary _____ ; secondary _____

1.9 Annual family income (approximate, in Rs.):

	below 1,000	1000-2000	2000-5000	5000-10000	above 10000
Primary	_____	_____	_____	_____	_____
Secondary	_____	_____	_____	_____	_____
Total	_____	_____	_____	_____	_____

II COMPOSITION OF BOVINE ANIMAL STOCK		1-11-'74	1-11-'75
2.1 Buffalo stock:	a) Work stock	_____	_____
	b) Milch animals	_____	_____
	c) Young stock	_____	_____
	females - upto 1 year	_____	_____
	- 1-2 year	_____	_____
	- 2-3 year	_____	_____
	males	_____	_____
2.2 Debu cattle stock:	a) Work stock	_____	_____
	b) Milch animals	_____	_____
	c) Young stock	_____	_____
	females - upto 1 year	_____	_____
	- 1-2 year	_____	_____
	- 2-3 year	_____	_____
	males	_____	_____
2.3 Crossbreeds stock:	a) Work stock	_____	_____
	b) Milch animals	_____	_____
	c) Young stock	_____	_____
	females - upto 1 year	_____	_____
	- 1-2 year	_____	_____
	- 2-3 year	_____	_____
	males	_____	_____

III PURCHASE AND SALE, BIRTHS AND DEATHS OF ANIMALS

3.1 Purchases:	type of animal	age	date	amount	
1)	_____	_____	_____	_____	
2)	_____	_____	_____	_____	
3)	_____	_____	_____	_____	
4)	_____	_____	_____	_____	
3.2 Sales:	type of animal	age	date	amount	
1)	_____	_____	_____	_____	
2)	_____	_____	_____	_____	
3)	_____	_____	_____	_____	
4)	_____	_____	_____	_____	
3.3 Births:	type of animal	date			
1)	_____	_____			
2)	_____	_____			
3)	_____	_____			
4)	_____	_____			
5)	_____	_____			
6)	_____	_____			
3.4 Deaths:	type of animal	age	date	value	cause
1)	_____	_____	_____	_____	_____
2)	_____	_____	_____	_____	_____
3)	_____	_____	_____	_____	_____
4)	_____	_____	_____	_____	_____
5)	_____	_____	_____	_____	_____
6)	_____	_____	_____	_____	_____

IV PARTICULARS ABOUT MILCH CATTLE

		status of the animal	present age in years and months	age at first cal- ving	date of last cal- ving	dura- tion of last lact- ation	date of last but one cal- ving	breed	date of pur- chase if pur- chased	cost of pur- chase	pres- ent value	num- ber of cal- vings

4.1	Buffaloes											
1												
2												
3												
4												
5												
6												
7												

4.2	Zebu cattle											
1												
2												
3												
4												
5												
6												
7												

4.3	Crossbreeds											
1												
2												
3												
4												

V INVESTMENT ON DAIRYING

	type and number	year of acquis- ition	amount	present market value	expected life
1.	Cattle shed				
2.	Open yard				
3.	Feeding trough				
4.	Chaff cutter				
5.	Utensils				
	a) basin				
	b) drums				
	c) other _____				
	utensils _____				
6.	Chains				
7.	Other items _____				

VI DAILY RATIONS OF MILCH ANIMALS (in kg.)

	green fodder	dry fodder	Sagar Dan	other mixed feeds	grains	oil cakes	others _____
6.1	Buffaloes						
	a) dry - monsoon						
	- summer						
	- winter						
	b) in - monsoon						
	milk - summer						
	- winter						
6.2	Lebu cows						
	a) dry - monsoon						
	- summer						
	- winter						
	b) in - monsoon						
	milk - summer						
	- winter						
6.3	Crossbreeds						
	a) dry - monsoon						
	- summer						
	- winter						
	b) in - monsoon						
	milk - summer						
	- winter						
6.4	Average price						
	per kg. - monsoon						
	- summer						
	- winter						

VII PURCHASE AND USE OF FODDER AND FEED (monthly, in kg.)

	purchases			use		
	monsoon	summer	winter	monsoon	summer	winter
1. green fodder						
2. dry fodder						
3. Sugar Dan						
4. Other mixed feeds						
5. Grains						
6. Jaggery						
7. Oil cakes						
8. _____						
9. _____						

VIII MISCELLANEOUS COST

	monsoon	summer	winter
8.1 Repairs and maintenance			
8.2 Veterinary and breeding charges - buffaloes			
- cows			

IX LABOUR COST

	hours per day			number of days			daily wages		
	monsoon	summer	winter	monsoon	summer	winter	monsoon	summer	winter
9.1 family labour									
9.2 permanently hired labour									
9.3 casually hired labour									
9.4 grazing charges									

X MILK PRODUCTION PATTERNS (in liters)

	Buffaloes							Zebu cows							Crossbreed				
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	
November } December } January } February }	winter																		
March } April } May } June }	summer																		
July } August } September } October }	monsoon																		

XIV FARMER'S KNOWLEDGE OF THE COOPERATIVE'S MATTERS

- 14.1 Since how many years has the milk society operated in the village? _____
- 14.2 a) Who is the Chairman of the society? _____
b) Who is the Secretary of the society? _____
- 14.3 What are the objectives of the milk society? _____

- 14.4 Which activities are undertaken by the society and the Union? _____

- 14.5 Is the society running on profit, on no-profit-no-loss or on loss?
b) What destination is given to the profits of the society? _____

XV FARMER'S INVOLVEMENT IN SOCIETY'S MATTERS

- 15.1 How did you come to know about the milk society in the village? _____
- 15.2 When did you become a member of the milk society? _____
- 15.3 a) How many shares do you own in the society? _____
b) Did you place any deposits at the society's disposal? _____
- 15.4 a) Are you a member of the executive body? _____
b) Have you been a member in the past? _____
c) Is one of your relatives a member of the body? _____
- 15.5 How many meetings did you attend last year? _____
- 15.6 a) Did you put forward any concrete suggestions for the better working of the society? _____
b) In case your suggestions were not accepted, what are your reactions towards the attitude of the society members? _____

XVI FARMER'S OPINIONS ON SAGAR DAN

- 16.1 Have you ever used Sagar Dan? _____
- 16.2 If yes, do you make a regular use of it? _____
- 16.3 If no, what are the reasons for not making use of it? _____

- 16.4 Year of first purchase of Sagar Dan? _____
- 16.5 What were your first reactions regarding:
a) quality of the Sagar Dan? _____
b) acceptance by the animal? _____
c) price of the Sagar Dan? _____
- 16.6 What are your present opinions about:
a) quality of the Sagar Dan? _____
b) price of the Sagar Dan? _____
c) availability of the Sagar Dan? _____

XVII FARMER'S USE OF THE VETERINARY SERVICES

- 17.1 Which agencies provide the veterinary services? _____
- 17.2 When did you start using these services? _____
- 17.3 Frequency of utilisation in the last year: _____
 - a) Veterinary first aid? _____
 - b) 10-days visits by veterinary doctor? _____
 - c) Emergency visits by veterinary doctor? _____
- 17.4 Do you apply preventive vaccination for your milch animals? _____
- 17.5 What are your opinions about:
 - a) veterinary first aid? _____
 - b) regular visits by veterinarian? _____
 - c) emergency visits? _____

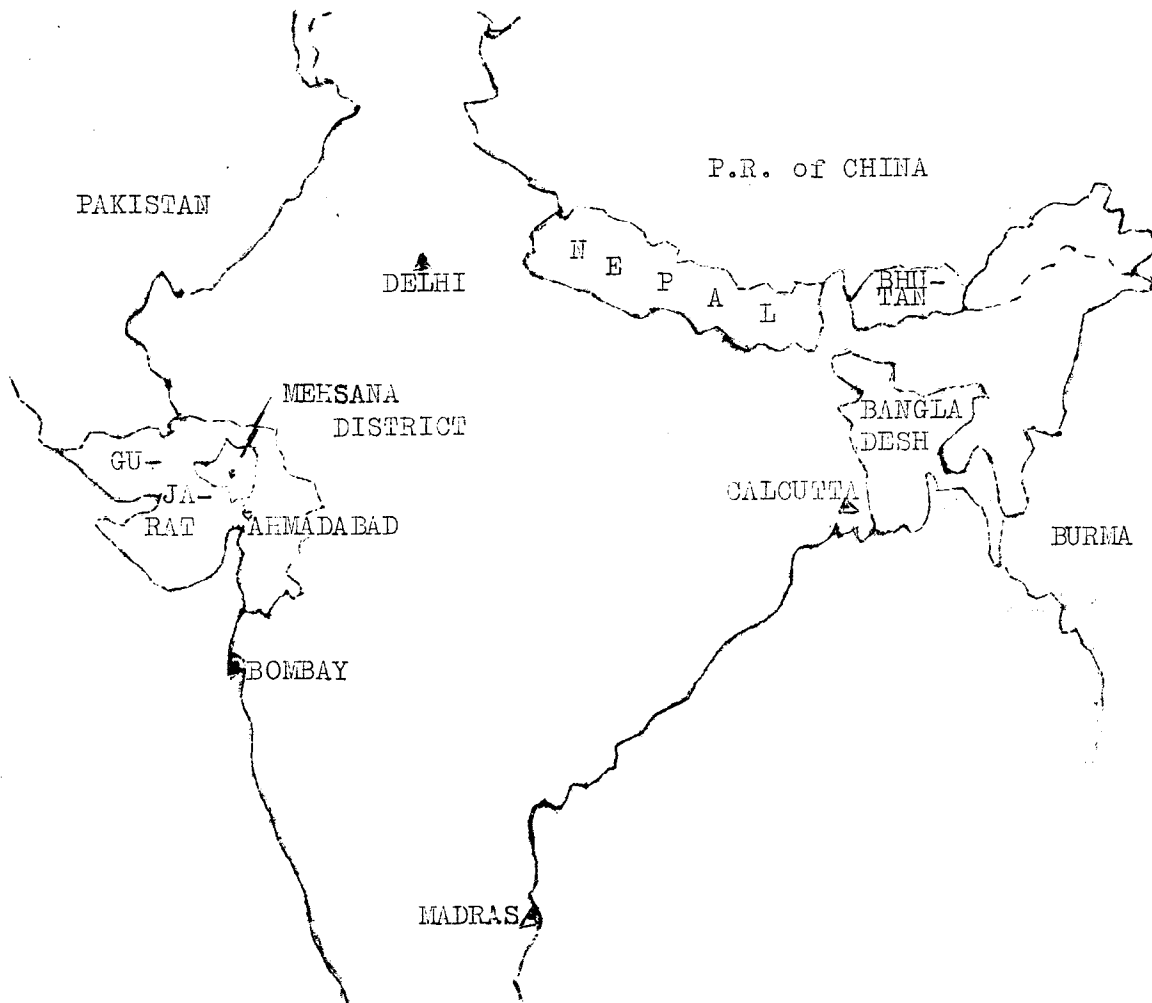
XVIII FARMER'S OPINIONS ON FUTURE DEVELOPMENT OF THE DAIRY HUSBANDRY

- 18.1 Do you have any plans to improve _____
your dairy husbandry? _____
- 18.2 How will you finance your _____
improvement program? _____
- 18.3 What expectations do you have regarding _____
the assistance by the cooperative milk _____
producers' organisation for the future _____
development of your dairy husbandry? _____

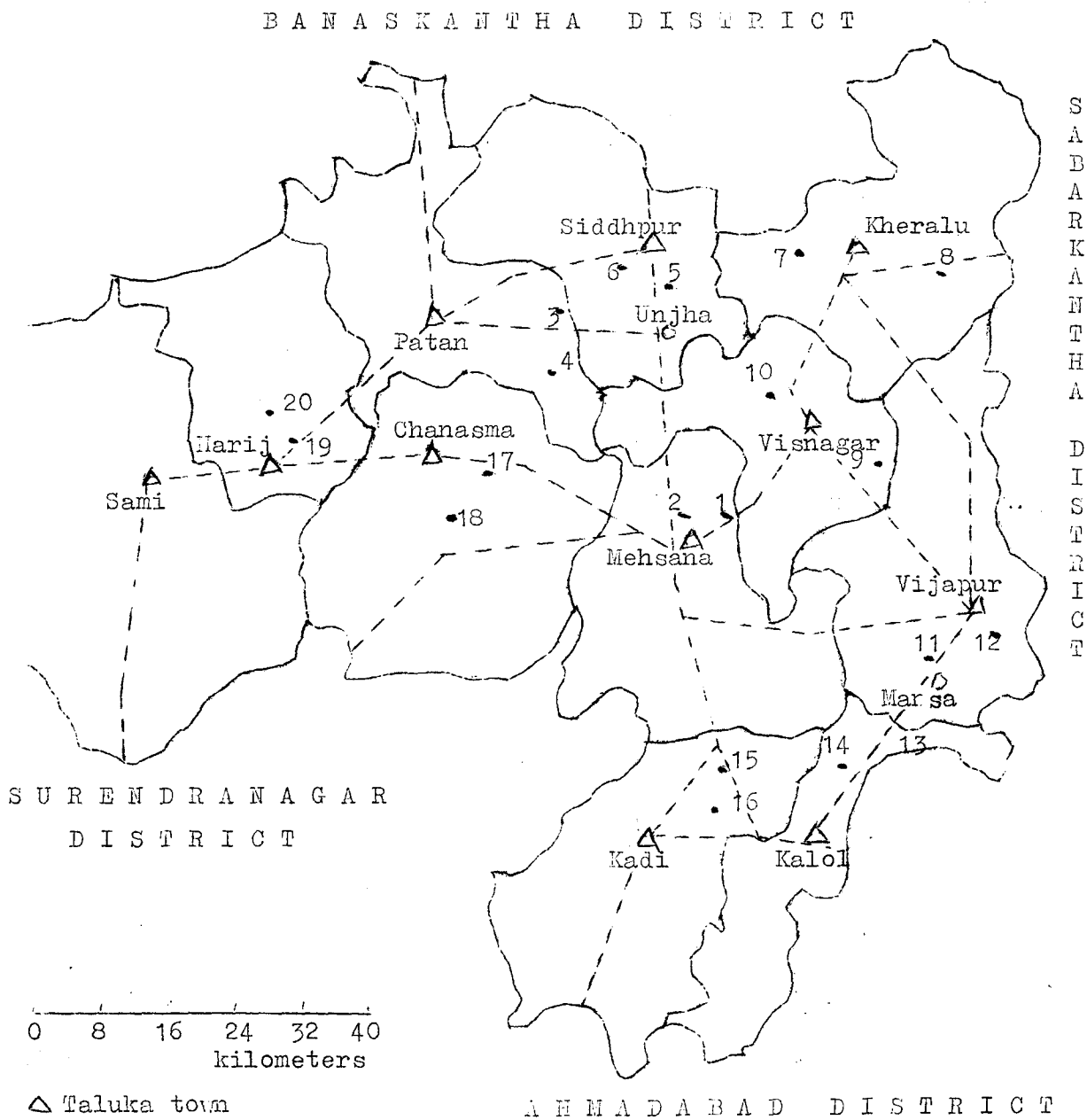
VII-2 List of selected villages (numbers refer to the map on the next page).

<u>Taluka name</u>	<u>cooperative</u>	<u>non-cooperative</u>
Mehsana	1. Dela	2. Tareti
Patan	3. Kani	4. Dabhadi
Siddhpur	5. Kamli	6. Manesara
Kheralu	7. Mani Hirvani	8. Khanpur
Visnagar	9. Bakarpur	10. Rampura
Vijapur	11. Bapupura	12. Danasan
Kalol	13. Amaja	14. Bhadol
Kadi	15. Mandasan	16. Rajpur
Chanasma	17. Jhilia	18. Vadavali
Harij	19. Boratvada	20. Juna Manka

VII-3 Map showing the location of Mehsana District.



VII-4 Map of Mehsana District.



- △ Taluka town
- Other town
- Survey village
- Main roads



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 18.9.86
 334.4:637(540)
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