CHAPTER - IV

COLLECTION AND DISTRIBUTION OF MILK

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SECTION - A

COLLECTION OF MILK

4.1 INTRODUCTION :

After assessing the fodder resources and its requirements in the third chapter, an attempt has been made in this chapter to analyse the spatio-temporal patterns of milk production and its distribution in Solapur district.

Milk has long been recognised as the most complete single food available in nature. Milk serves the purpose of both, food as well as medicine. The value of milk in human diet is emphasised over the ill effects of non-vegeterian foods. Milk provides many inorganic and organic cells like calcium, magnesium, sodium, potassium, phosphates, chlorides, bicarbonates, sulphates and lactates (Badshab and S. Prasad, 1992).

Alike the other parts of Maharashtra State, the region under investigation has witnessed recent growth in dairy farming where it is closely associated with agricultural activities. It is generally carried as the subsidiary activity of agriculture which offers additional income to peasant community. Therefore, it has been regarded as one of the aspects of rural economy.

The milk has been obtained mainly from buffaloes and breeded cows. However, there are intra-regional disparities in

the production of milk and same is the case of collection and distribution of milk organised by the District Milk Federation.

Present chapter therefore, proposes to analyse the spatio-temporal patterns of milk collection and distribution. An attempt has been also made to examine the role of co-operative dairies in milk collection and it's distribution.

METHODOLOGY :

The study has been attempted at tahsil level and all the villages were considered to collect data pertaining to milk production and distribution. Animalwise (milch) milk production data were also collected from case study villages to determine milk productivity. The processed data is presented in the form of maps to establish the cause-effect relationship. The concentration zones of milk production are also delineated by employing Location Quotient Method evolved by Bhatia (1965) and modified by Singh Jasbir (1984) to measure the intensity of milk production in the following way.

$$\text{Index of milk intensity} = \frac{\text{Number of milch animals in an enumeration unit}}{\text{Total number of milch animals in the entire region}} \cdot \frac{\text{Quantity of milk produced in an enumeration unit}}{\text{Quantity of milk produced in the entire region}} \times 100$$

After obtaining the index values for each tahsil they are arranged in an ascending order and classed as high, medium and low zones of milk intensity.

4.2 THE DEVELOPMENT OF DAIRY IN THE REGION :

Though dairy industry started in the region during seventies, it has attained substantial development during the last two decades on co-operative basis. Dairying is the major source of the small and marginal farmers. It has an important bearing on the economy of the people. Alongwith the cultivation of crops, keeping the milch animals has become common phenomenon. The farmers are well awared about the advantages of dairy farming as it provides income to the people. The farmers receive manures from the milch animals and the fodder available from their farms has been utilised to feed milch animals. Such interrelationship has encouraged farmers to divert their attention towards dairying. Besides this, positive role of co-operatives in the collection and distribution of such perishable commodity and regular payments with attractive prices to farmers have also strengthened the development of dairy farming in the region. The programme of dairy development in the district aims to provide hyginically processed milk to people at reasonable rates and also to provide subsidiary occupation to farmers.

Presently, (1991) there are 688 milk co-operative societies (Table 4.1) attached to three milk unions viz. -

i) Government Dudh Dairy, Solapur.

ii) Shivamrut Dudh Utpadak Sahakari Sangh Limited, Akluj.

iii) Solapur District Co-operative Milk Producers Union, Solapur.

Table 4.1 : Number of dairy co-operatives in Solapur district, 1977-1991.

Sr. No.	Year	Number of co-operative dairies	
		Solapur district Sangh	Shivamrut Dudh Sangh
1	1977	-	28
2	1978	-	34
3	1979	-	35
4	1980	-	41
5	1981	-	48
6	1982	-	56
7	1983	-	84
8	1984 *	190	106
9	1985	220	133
10	1986	239	150
11	1987	262	155
12	1988	290	120
13	1989	320	128
14	1990	415	180
15	1991	505	183

* Solapur District Dudh Sangh Established in 1984.

SOURCE : Compiled by the author, 1991.

Government Dudh Dairy, with the help of town milk supply scheme, started in 1965. Three chilling centres came into existance at Akkalkot, Pandharpur and Akluj. The amount of Rs.9.5 lakh

was provided for the errection of each plant. The milk collected from rural area were chilled in these chilling plants and for further processing. During the plan, from Akkalkot 2000 litres and Pandharpur 10,000 litres of milk was processed.

"Shivamrut" Dudh Utpadak Sahakari Sangh Limited was established in 1976. Late Shankarrao Mohite-Patil, a social worker, motivated the idea of co-operative movement among the masses for dairy development in Malshiras tahsil. 'Shivamrut' Sangh comprises 110 villages with 183 societies from the Malshiras tahsil (Table 4.1). The Sangh has installed dairy plant of the cost Rs.3.58 crores with handling capacity of one million litres. In 1991, the Sangh collected about 150,000 litres of milk i.e. 5000 litres daily milk, was collected. Major part of milk is sent to Bombay and Government Dudh Dairy, Solapur.

The Solapur District Co-operative Dudh Utpadak Sangh Limited, was established in 1981 comprising the area of ten tahsils with 505 co-operative milk societies. It has been started on the basis of "Anand pattern" in the Operation Flood Scheme-II. The Dairy Development of 'Anand' in Gujarat state has created history in the country through its conspiceous success in organising dairy farming and the dairy industry on cooperative line thereby providing a host of benefits to the thousands of small and marginal milk producers (Biradar,1989). The district union collected about 6,676,000 litres of milk

in 1984. The tahsils in the area of operation of Federation are, Karmala, Barshi, Madha, Pandharpur, Mohol, North Solapur, South Solapur, Sangola, Mangalwedha, and Akkalkot. The Solapur District Milk Federation collects milk from 505 primary milk co-operative societies in 1991. The Federation has 94 milk collection routes operated in the morning and in the evening too. The year 1991 has witnessed the milk collection of the order of 29,994,000 litres.

4.3 ROLE OF DAIRY CO-OPERATIVES :

Since 1971, the dairy co-operatives have played a prominent role and made a notable contribution to the overall development of dairy industry in the country. The Maharashtra State is one of the leading states in the co-operative movement. Out of the total co-operative societies in the country, about 43,460 (27 percent) co-operative societies are in Maharashtra during 1985 (Biradar,1989). The district union collected about 6,676,000 litres of milk in 1984. The tahsils in the area of operation of Federation are, Karmala, Barshi, Madha, Pandharpur, Mohol, North Solapur, South Solapur, Sangola, Mangalwedha, and Akkalkot. The Solapur District Milk Federation collects milk from 505 primary milk co-operative societies in 1991. The Federation has 94 milk collection routes operated in the morning and in the evening too. The year 1991 witnessed the milk collection of the order of 29,994,000 litres. In 1971,

there were 39 co-operative societies in the region. Of the total co-operative societies in the state, about 353 (0.18%) co-operative societies were confined to Solapur district during 1985. In 1991, there were 688 co-operative societies in the region. These co-operative societies have been linked with the Government Dudh Dairy at Solapur. The milk from these societies has been collected by government tankers or hired vehicles at Solapur.

Late Shankarrao Mohite-Patil made sincere efforts to strengthen co-operative movement in the district. He started "Shivamrut Co-operative Dudh Utpadak Sangh" at Akluj with an an area of operation of Malshiras tahsil only. In 1977, 28 dairy co-operatives were recorded which were run by this Sangh in Malshiras tahsil. This set an example to entire district and dairy development took place in the region. Now the people in Solapur district have adopted co-operative way of life for socio-economic development.

Solapur Milk Federation, Solapur was established in 1981 and 296 dairy co-operatives were linked to it. About 106 co-operative societies were recorded in Malshiras tahsil in 1984. Table 4.1 reveals the fact that the number of milk co-operatives attached to District Dudh Sangh has increased from 190 in 1984 to 505 in 1991. Similarly the number of milk co-operatives has increased from 28 in 1977 to 183 in Malshiras tahsil attached to Shivamrut Dairy.

4.4 STRUCTURE OF MILK CO-OPERATIVES :

Fig.4.1 exhibits the structure of milk co-operative in the region. It reveals that how milk producers are linked with the state dairy through the network of dairy co-operatives. The milk producers supply milk to the village dairy co-operatives where milk has been collected regularly twice a day. The collected milk at village level is further collected by the milk tankers and is sent to the chilling plants located at central places (Fig.4.13). Chilling process has been adopted to enhance the durability of collected milk which is perishable in nature. Such chilled milk is sent directly to District Milk Dairy for further chilling purpose. No other process is made except chilling of milk to preserve it for long time. Weekly payments are made to the farmers as the prices are controlled by the state government. Thus, an assured market has been provided by the government to farmers through the co-operatives. Here, co-operatives play dual role of milk collection and distribution providing marketing facilities.

4.5 NATURE OF MILK COLLECTION :

Primary milk producers co-operative societies in each village collect milk from the milk producers. Milk collection system is implemented twice a day. The timings of milk collection are fixed in the morning and evening. The samples of milk are taken to test the ratio of fats on which the rates are fixed.

STRUCTURE OF MILK CO-OPERATIVES 1991

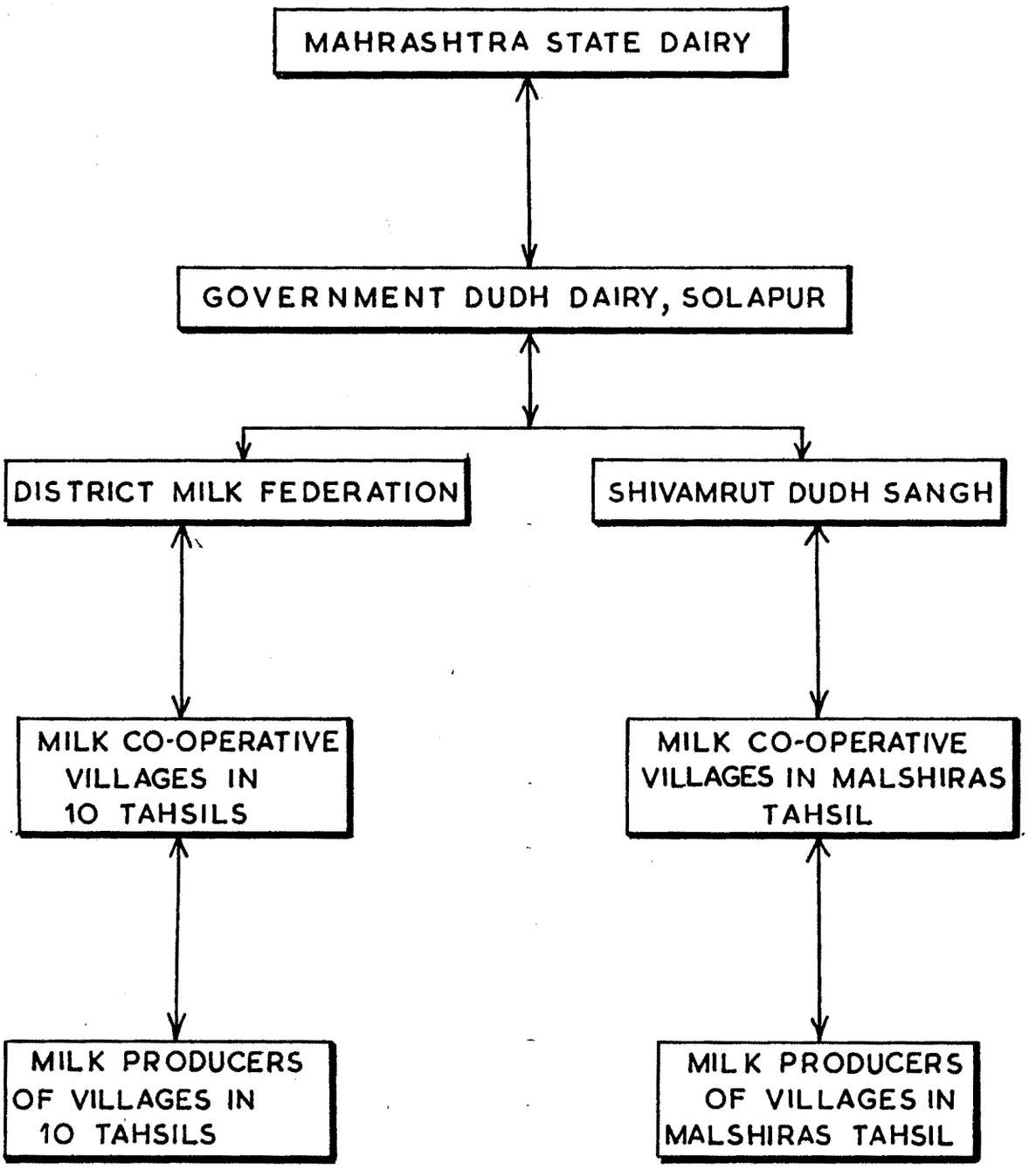

Fig. 4·1

Finally, the milk is collected in clean alluminim cans. The quantity of milk supplied by individuals is recorded against his name in the register. The payments are made at the week end. The collected milk transported by tempo or trucks at the chilling centres. Further chilled milk has been transported to the district dairy plant which is channelised to Bombay.

4.6 SPATIAL PATTERN OF MILK COLLECTION :

Fig.4.2 shows the spatial pattern of milk collected at tahsil level. This consists of milk obtained from buffaloes and cows. The region accounted for 54,843,300 litres of milk collected in 1991 of which buffaloes shared 4,853,000 litres (8.85%) and cows contributed to nearly 49,990,000 litres (91.15%). High proportion (above 3,000,000 litres) has been recorded by seven tahsils and Malshiras has attained first ranking position (23,984,000 litres) due to substantial infrastructure for dairy development. The other tahsils have also sustained development of dairying during the last three decades. Akkalkot tahsil has moderate position and Mangalwedha, South Solapur and Karmala have low proportion (less than 1,500,000 litres) which is resulted from unfavourable physio-socio and economic constrastrains.

Fig.4.3 reveals the spatial pattern at tahsil level, of milk obtained from breeded cows. Cows contribute substantial

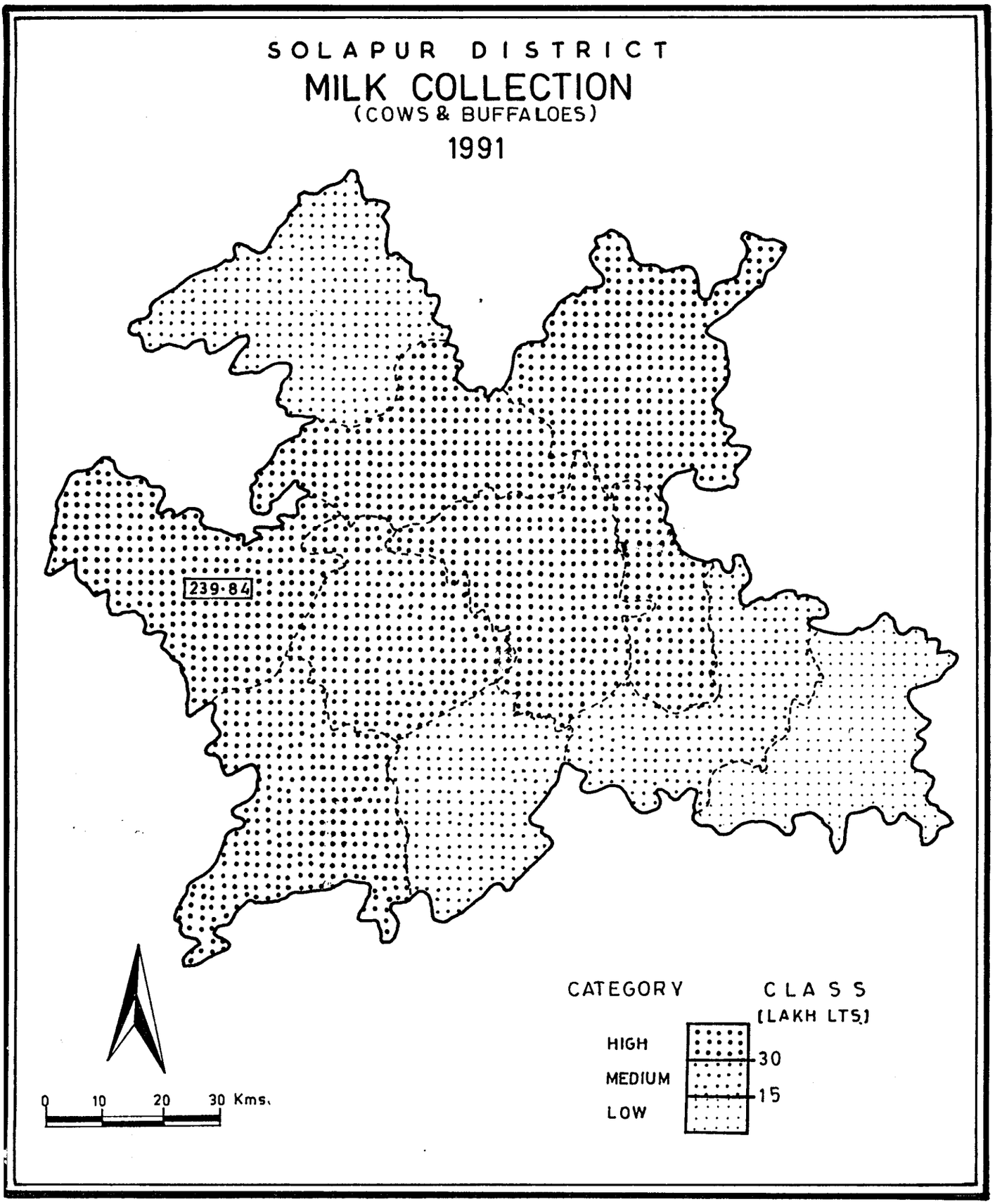
SOLAPUR DISTRICT
MILK COLLECTION
(COWS & BUFFALOES)
1991
239·84
0 10 20 30 Kms.
CATEGORY
CLASS
(LAKH LTS.)
HIGH
MEDIUM
LOW
30
15

Fig. 4·2

share in the total milk collected in the region. The tahsils of Sangola, Malshiras (2,398,000 litres), Barshi and Madha have attained high ranking position. The sincere efforts of late Shankarrao Mohite-Patil, a social worker, who encouraged farmers for keeping breeded cows and established 'Shivamrut Dairy' at Akluj. The central tahsils (Fig.4.3) have recorded moderate position (1,500,000 to 3,000,000 litres) and Akkalkot marked low level.

Fig.4.4 exhibits spatial distribution of milk collected from buffaloes in 1991. Buffalo is traditionally domisticated for dairy purpose all over the region except Malshiras tahsil. Seven tahsils in the central and eastern parts have marked low position. The tahsils of Sangola, Karmala and Barshi have moderate position. The above intra-regional disparities in the milk collection has been resulted from the spatial variations in the physical and socio-economic factors. In Malshiras tahsil, whatever milk produced from buffaloes is relatively small in quantity. But the milk from cows is sold out to earn money. Besides this, buffaloes are not economically profitable as compared to breeded cows. Pandharpur tahsil is known for it's 'Pandharpuri' (Gavlau) specy which offers more milk than traditional one. Moderate production of milk is found in Madha (429,000 litres), South Solapur (420,000 litres), North Solapur (425,000 litres), Mohol (420,000 litres), Mangalwedha (400,000 litres) tahsil. The lowest production of milk from buffaloes is recorded in Karmala (182,000 litres) and Barshi (200,000 litres) tahsil.

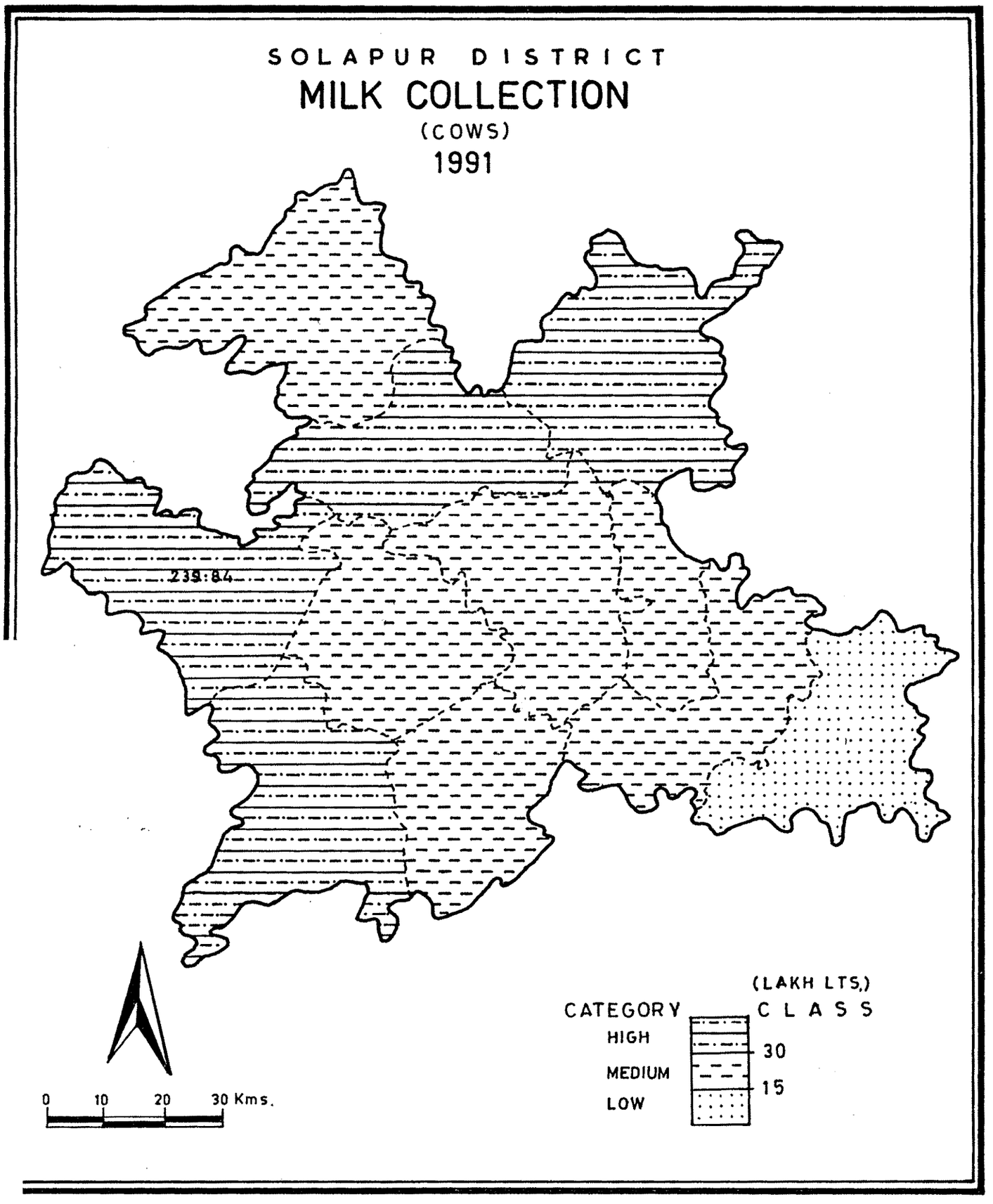
SOLAPUR DISTRICT
MILK COLLECTION
(COWS)
1991
239.84
0 10 20 30 Kms.
(LAKH LTS.)
CATEGORY
CLASS
HIGH
MEDIUM
LOW
30
15

Fig.4·3

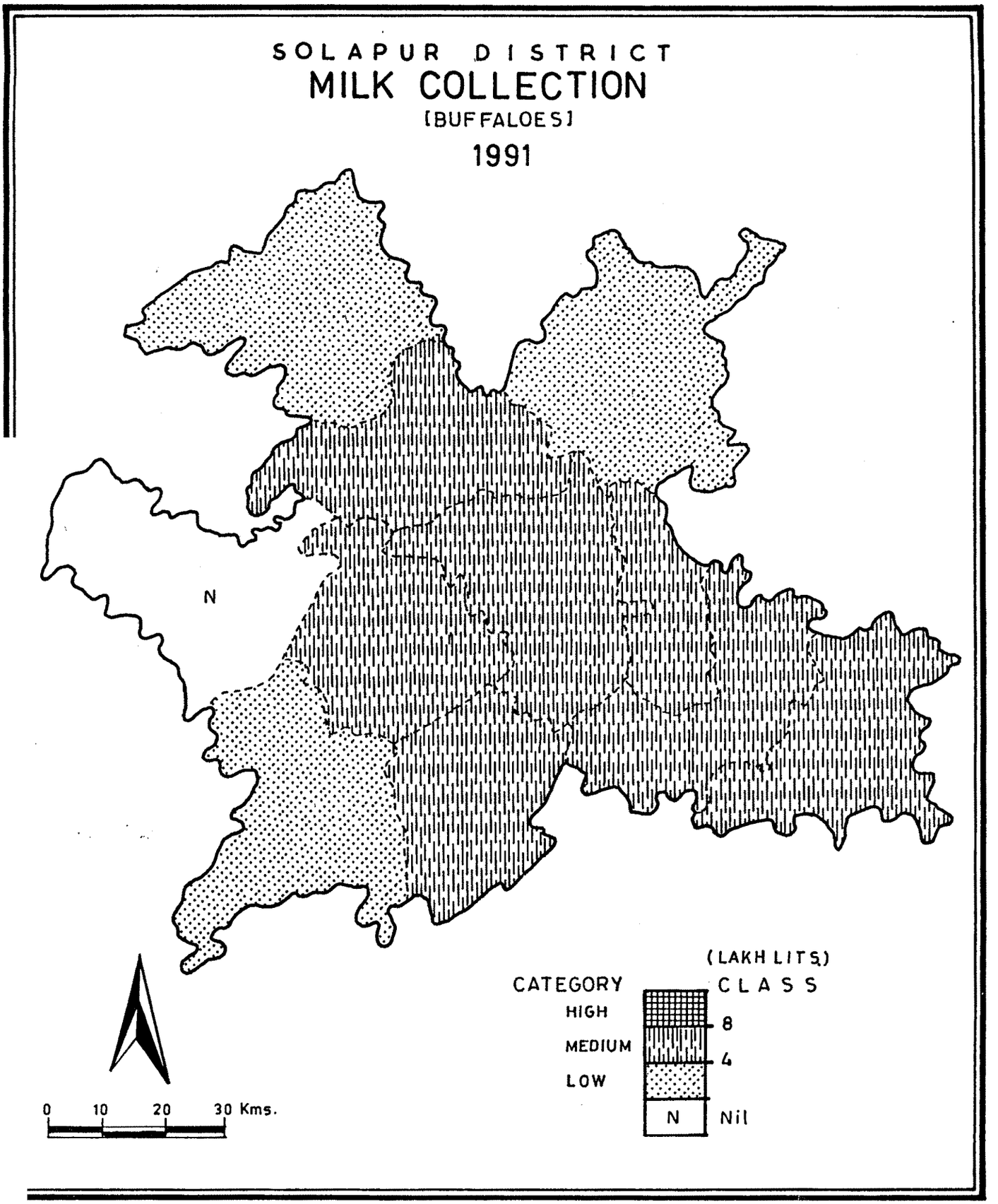
SOLAPUR DISTRICT
MILK COLLECTION
(BUFFALOES)
1991
N
(LAKH LITS.)
CATEGORY
CLASS
HIGH
8
MEDIUM
4
LOW
N
Nil
0 10 20 30 Kms.

Fig. 4·4

4.7 INTENSITY OF MILK COLLECTION :

The milk production is available from both cows and buffaloes. However, intra-tahsil variation occurs in the region. The position of each tahsil in the total milk produced could be assessed by examining the intensity of milk production. The statastical procedure adopted here has been explained in the earlier pages. The intensity of total milk collected from buffaloes is represented in Fig.4.5. Obviously, there are three distinctive zones of intensity of milk from buffaloes collected in 1991. The zones are as follows -

(1) High Intensity Zone (Above 75) :

It is mainly confined to Malshiras tahsil where cows have contributed largely (8,532,000 litres) to milk production. This tahsil possesses highest number of breeding cows.

(2) Moderate Intensity Zone (50-75) :

This is an extensive zone covering the area of nine tahsils where physical and socio-economic conditions are moderately favourable. All these tahsils have experienced an increasing trend in milk production. The marginal as well as farming community in general has been attracted towards dairying especially through the domestication of either cows and buffaloes.

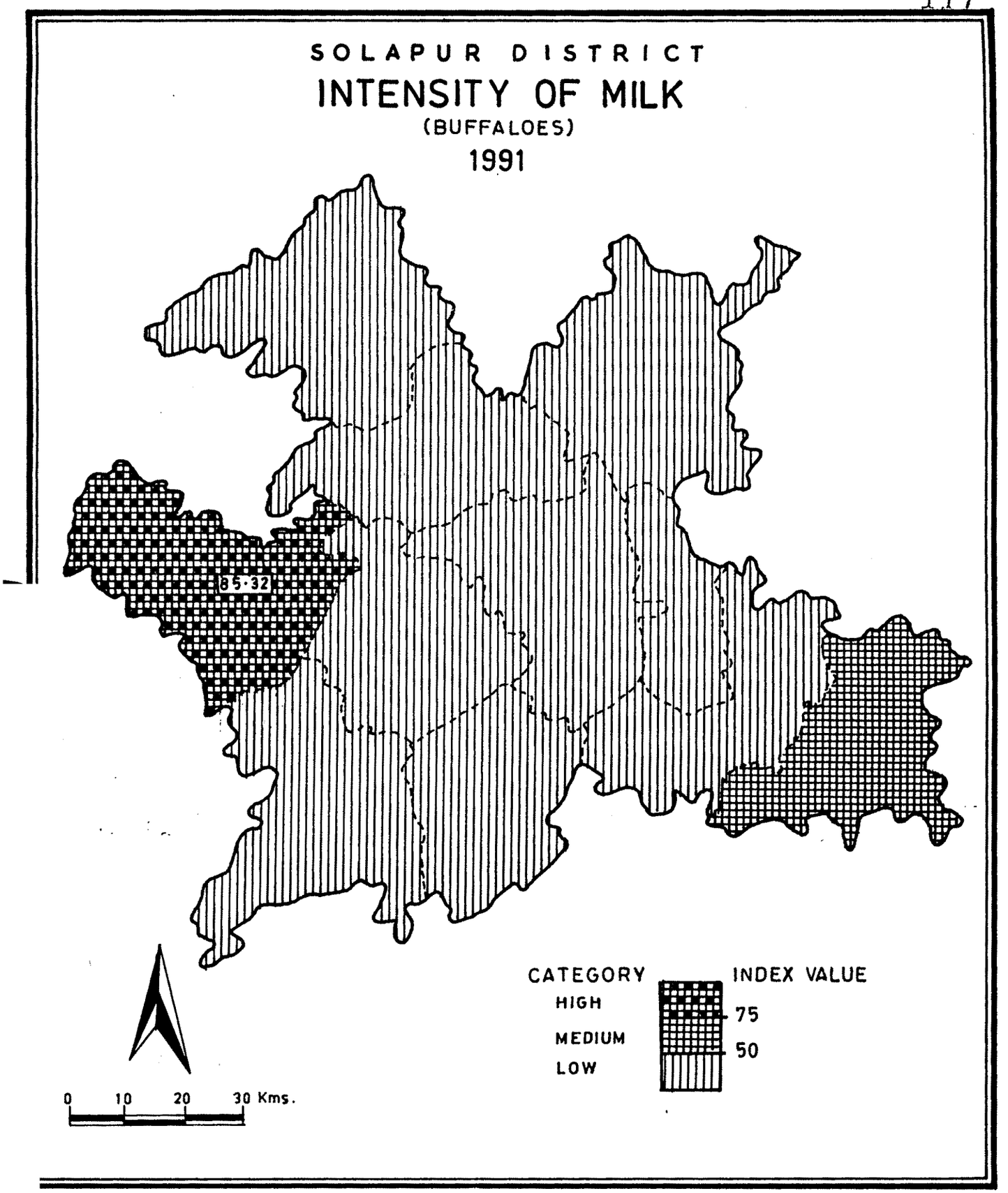
SOLAPUR DISTRICT
INTENSITY OF MILK
(BUFFALOES)
1991
85·32
CATEGORY
INDEX VALUE
HIGH
75
MEDIUM
50
LOW
0 10 20 30 Kms.

Fig. 4·5

(3) Low Intensity Zone (below 50) :

This includes Akkalkot tahsil only, the number of milch animals is less than the other tahsils. The socio-economic conditions seem to be unfavourable causing low intensity of milk production.

Intensity of milk collected from cows - 1991 :

In 1991, the highest intensity of milk from cows is recorded in Malshiras (8,532,000 litres), Sangola (1,152,000 litres), Madha (1,143,000 litres), Barshi (1,096,000 litres) tahsils (Fig.4.6).

Moderate intensity of cows milk production is found in Karmala (10,000,000 litres), Pandharpur (896,000 litres), Mohol (938,000 litres), North Solapur (950,000 litres), South Solapur (919,000 litres), Mangalwedha (929,000 litres) tahsils.

4.8 TEMPORAL PATTERN OF MILK COLLECTION :

The progress of dairying largely depends upon the adequate and regular supply of milk. It is also related to remunerative prices given to milk producers. Besides these, the supply of quality fodder, and that too in adequate form are also essential. However, during the last three decades the region has witnessed the seasonal fluctuation in the milk supply which is common phenomenon. The milk production level

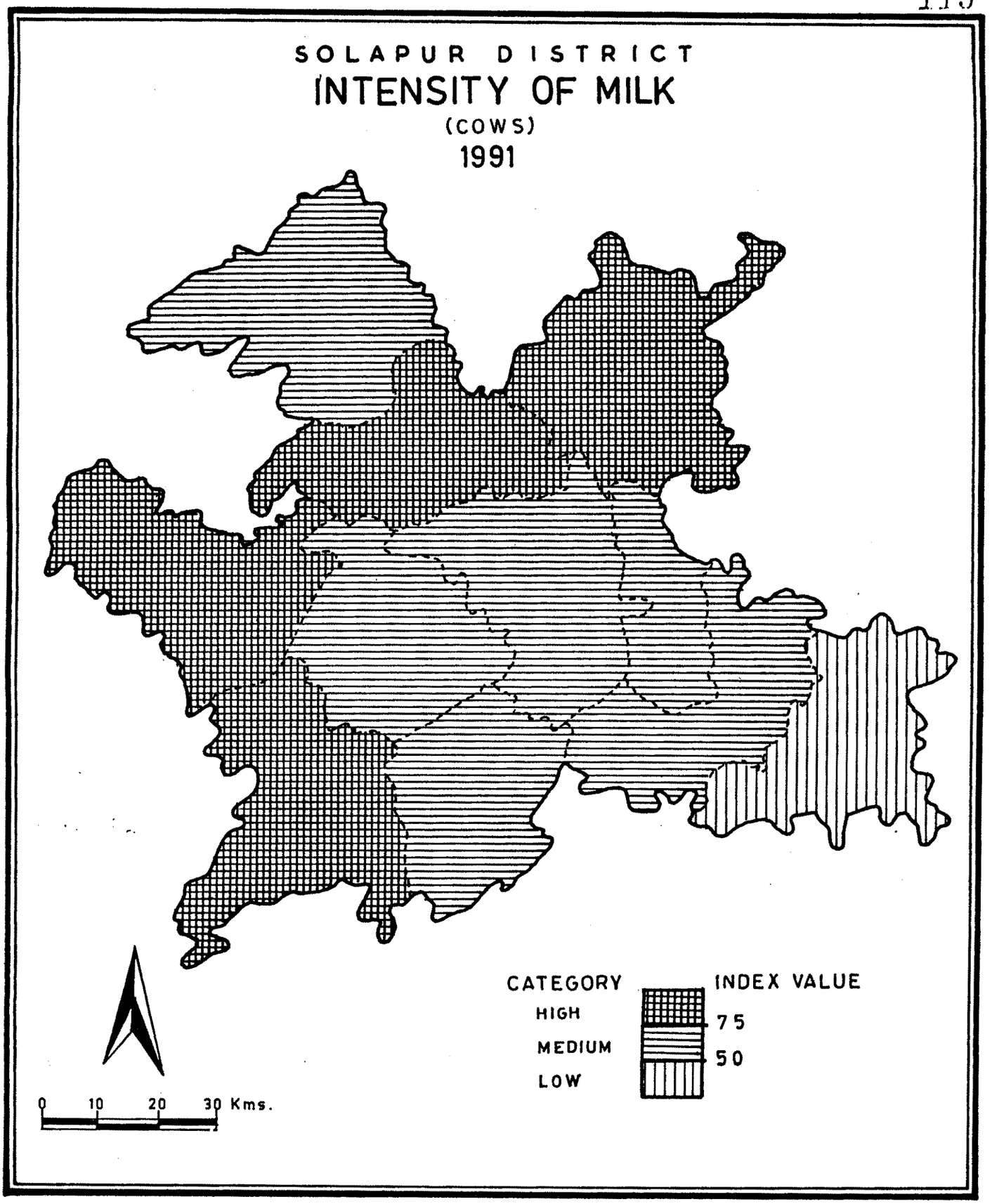
SOLAPUR DISTRICT
INTENSITY OF MILK
(COWS)
1991
CATEGORY
INDEX VALUE
HIGH
75
MEDIUM
50
LOW
0 10 20 30 Kms.

Fig. 4·6

is closely associated to timely and qualitative availability of fodder. Since green fodder is seasonally available, it is reflected in milk production. As the data at tahsil level is not available, the temporal analysis of milk collected by government dairy, Soalpur and Shivamrut dairy at Akluj has been considered here.

4.8-A Figure 4.7 shows the ranking position of each tahsil under the area of operation of Government Dairy, Solapur. Malshiras tahsil has been treated separately as it has attained top ranking position and the production of milk is quite higher than any other tahsil in the region. It has not been, therefore, compared to other tahsils. The ranking status of ten tahsils is attempted in Fig.4.7 from 1971 to 1991. Five years running averages of milk production are considered to analyse temporal variation in milk production.

It is evident from the fact that Pandharpur tahsil has attained first ranking during 1971-91. The fertile and irrigated tract of Bhima Valley, dense network of transport, tradition of keeping buffaloes, recent establishment of chilling plant and sound co-operative movement has encouraged the milk production in this tahsil.

The second ranking position has been recorded by Barshi tahsil. In 1971, this tahsil had 2500 litres of milk production which reached to 5600 litres milk production in 1991. The remaining tahsils have shown less fluctuations from 1971 to 1986.

RANKING STATUS OF TAHSILS IN MILK COLLECTION
(5 YEARS RUNNING AVERAGE)

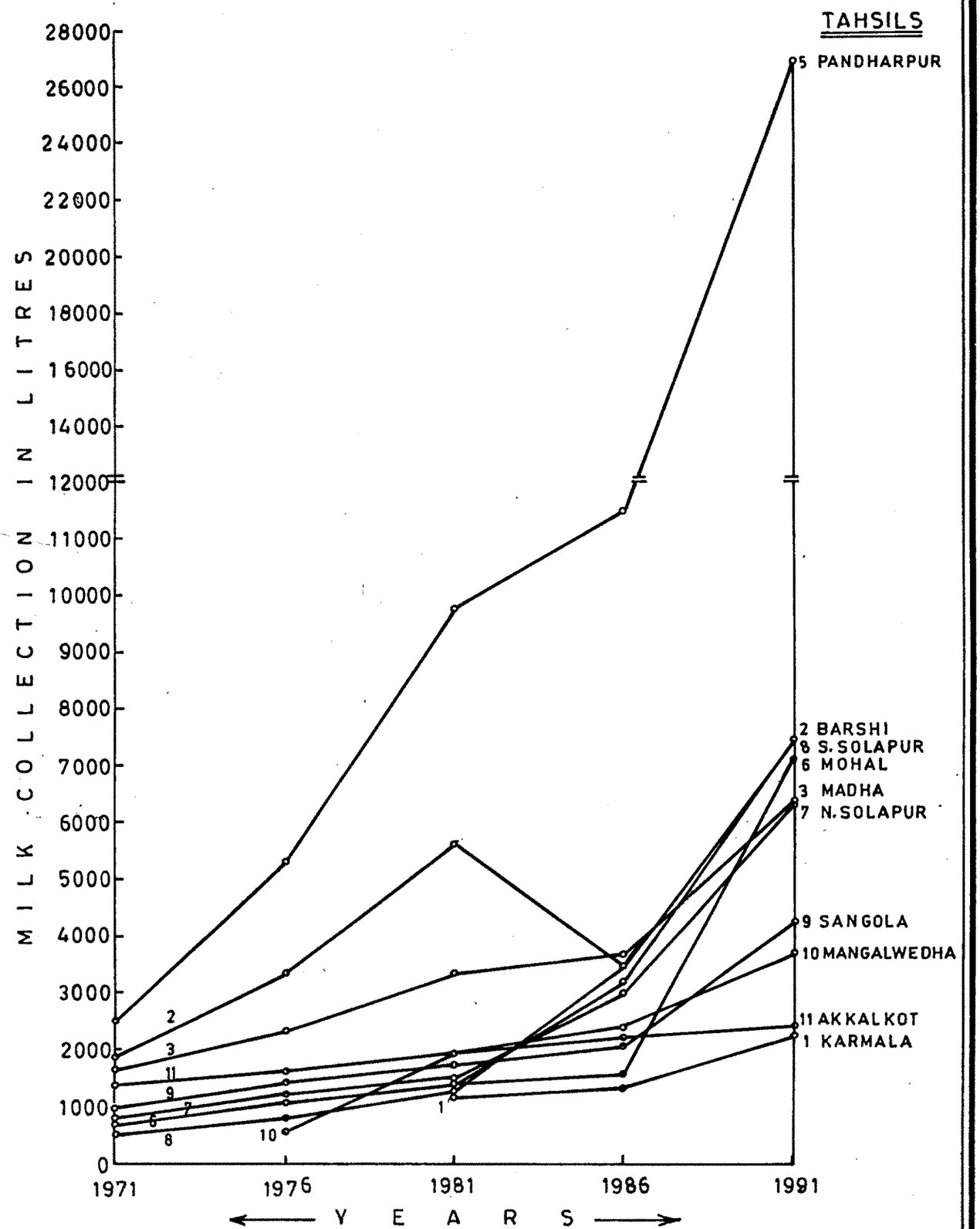

Fig. 4·7

However, from 1986, all these tahsils have shown upward trend in milk production ranging between 2,000 to 65,000 litres. The recent increase may be attributed to positive role of the District Co-operative Dairy encouraging the farmers for milk production.

Fig.4.8 exhibits the growth of milk collection during 1971 and 1991 in Malshiras tahsil. In 1971, tahsil had 1800 litres production. Malshiras tahsil has always shown an upward trend in the milk production and collection too. As mentioned earlier, this tahsil has received the leadership of Late Shankarrao Mohite-Patil, a social and political leader of this part. He motivated the co-operative movement among the farmers and advised poor farmers regarding the economic importance of dairy farming. Financial facilities were made available through co-operative banks for breeded cows and their feeds. This has been resulted into an increase in cows and consequently the production was reached 21,000 litres in 1991. Milk from buffaloes is insignificant but it has been consumed by the family members of farmers. Presently each milk producer is closely linked to 'Shivamrut' dairy, located at Akluj, through the membership of milk co-operatives. Farmers receive remunerative prices for their milk. Thus, assured market is available to the farmers through milk co-operatives in each village. The collected milk has been chilled and send to Bombay for distribution.

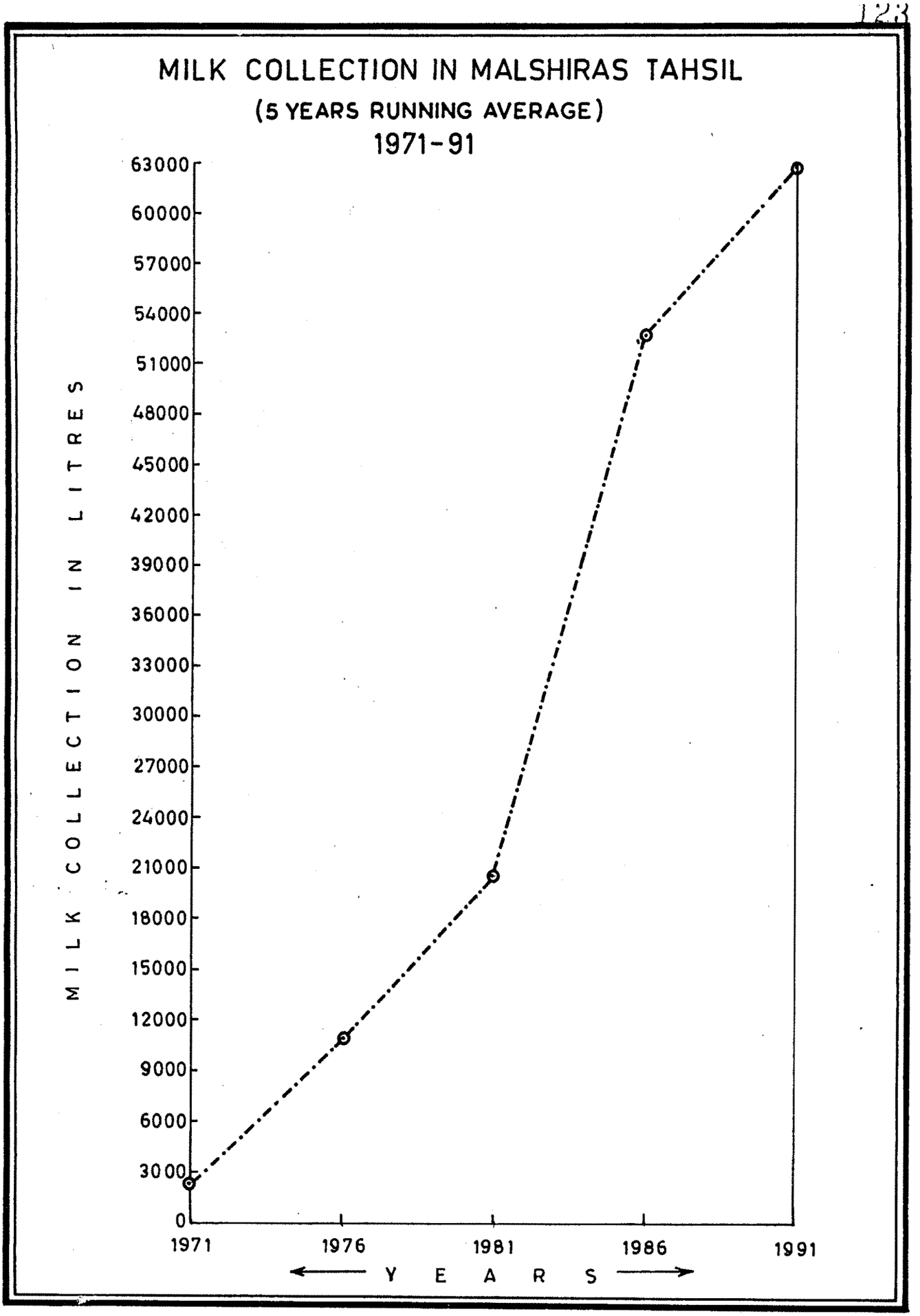
MILK COLLECTION IN MALSHIRAS TAHSIL
(5 YEARS RUNNING AVERAGE)
1971-91
MILK COLLECTION IN LITRES
63000
60000
57000
54000
51000
48000
45000
42000
39000
36000
33000
30000
27000
24000
21000
18000
15000
12000
9000
6000
3000
0
1971
1976
1981
1986
1991
YEARS

Fig. 4·8

4.8-B The trend of milk collected by Shivamrut Dairy (1977-91) :

The area operated by Shivamrut Dudh Utpadak Sangh comprises 110 villages in Malshiras tahsil. Milk has been collected from these villages by means of road transport.

Fig.4.9 reveals the trend of milk collected by Shivamrut Dairy from 110 villages. In 1977, 1,463,000 litres of milk was collected and about 6,207,000 litres of milk were collected in 1981. However, the year 1977 recorded 4,744,000 litres.

In 1991, the milk collection is increased to 23,984,000 litres. Nearly 50 percent of milk is collected by Shivamrut as compared to the total milk collected in the district. The village milk co-operative societies play important role in the collection of milk from farmers. Each village has at least one milk co-operative. The payments are made at the end of a week. Such additional income has encouraged the farmers to undertake this enterprise sincerely. In general, there has been upward trend in the milk, collected by Shivamrut dairy.

4.8-C Trends of milk collected by Solapur District Milk Federation :

Fig.4.10 exhibits the trend of milk collected by Solapur District Milk Federation from ten tahsils during 1984-91. The

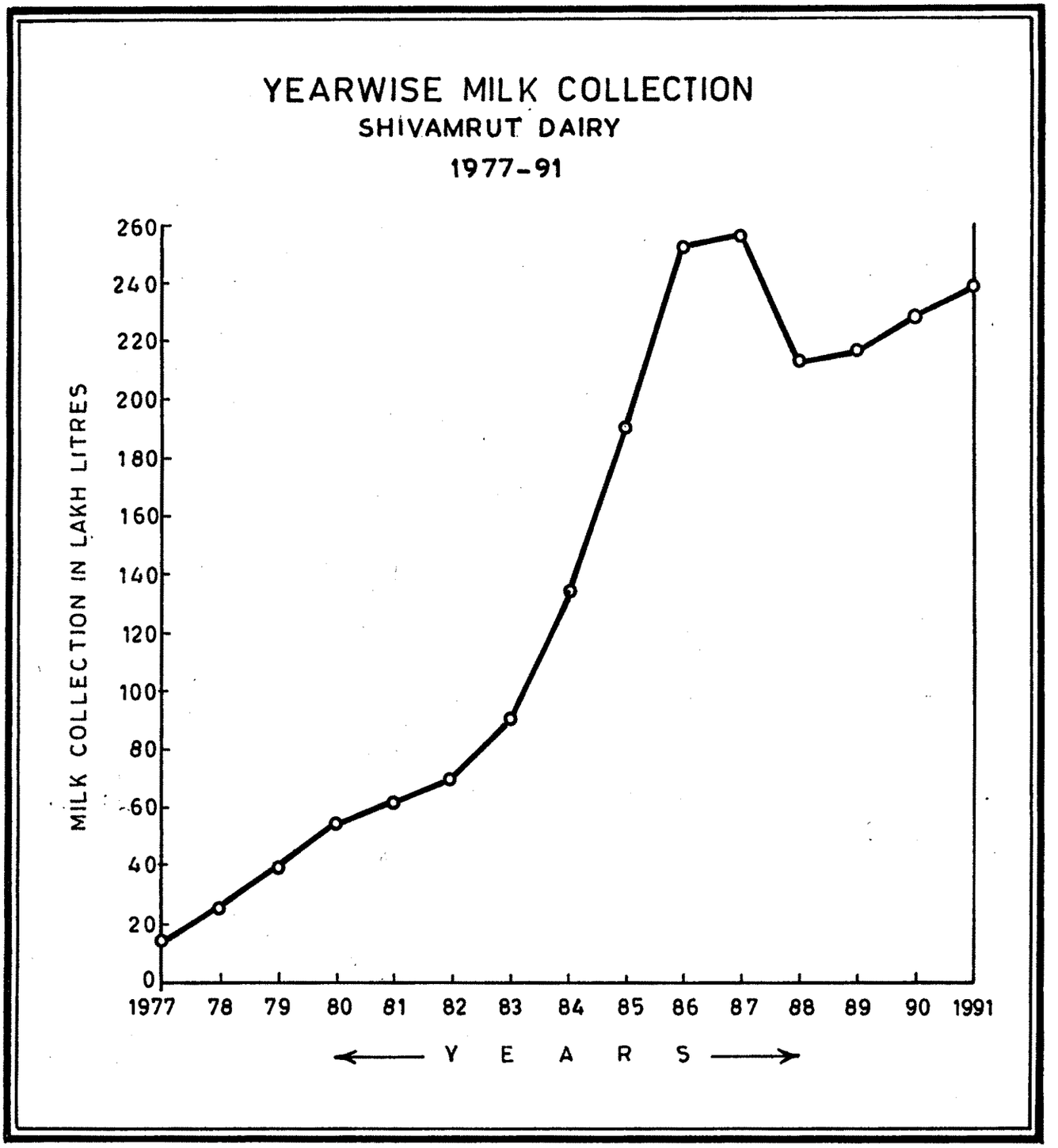
YEARWISE MILK COLLECTION
SHIVAMRUT DAIRY
1977-91
MILK COLLECTION IN LAKH LITRES
260
240
220
200
180
160
140
120
100
80
60
40
20
0
1977 78 79 80 81 82 83 84 85 86 87 88 89 90 1991
Y E A R S

Fig. 4·9

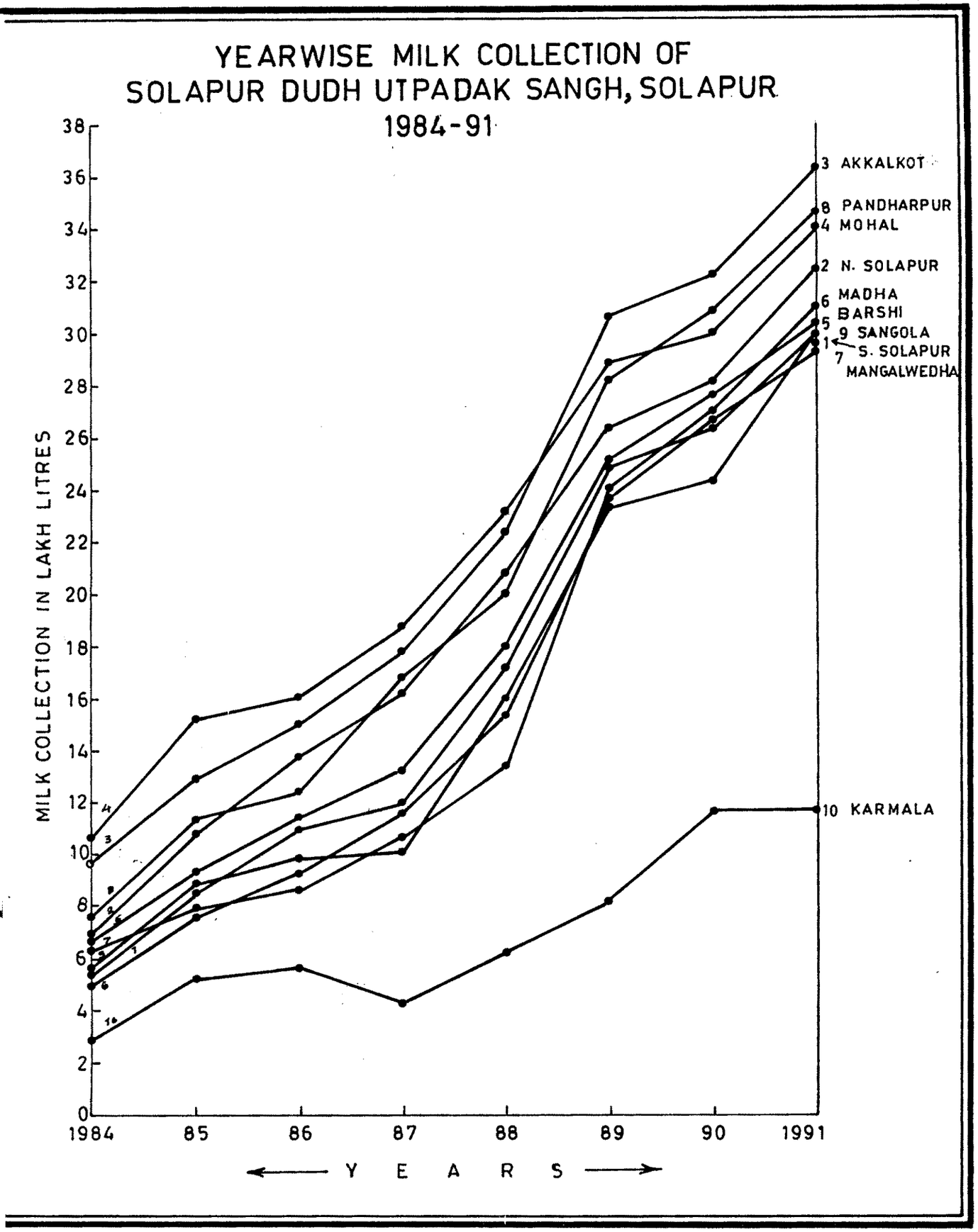
YEARWISE MILK COLLECTION OF
SOLAPUR DUDH UTPADAK SANGH, SOLAPUR
1984-91
MILK COLLECTION IN LAKH LITRES
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1984
85
86
87
88
89
90
1991
← Y E A R S →
3 AKKALKOT
8 PANDHARPUR
4 MOHAL
2 N. SOLAPUR
6 MADHA
BARSHI
5
9 SANGOLA
1 S. SOLAPUR
7 MANGALWEDHA
10 KARMALA

Fig. 4·10

Federation was started in 1984 which covered the area of ten tahsils in Solapur district. The total milk is collected through 72 routes and is further distributed to the various places ie. Pune, Bombay.

In 1984, about 6,674,000 litres of milk was collected. Of this, Pandharpur (1,058,000 litres) ranking first in the collection of milk which is followed by Sangola (771,000 litres), and Barshi (675,000 litres) tahsils. Milk collected from Karmala tahsil was accounted for 545,000 litres in 1984 and further it was increased to 2,982,000 litres in 1991. Thus, absolute increase of 2,437,000 litres has been recorded by this tahsil.

Barshi is second ranking tahsil recorded 675,000 litres of milk collected in 1984. In 1991, the tahsil has collected 3,245,000 litres recording an increase of 2,570,000 litres as compared to the production of 1984 year.

Madha is third ranking in the region collecting 976,000 litres of milk in 1984. Further, the milk collection was increased in 1987 (1,789,000 litres) and increased four times in 1991 (3,629,000 litres).

Pandharpur is most important tahsil in the production of milk from buffaloes. It has recorded 1,058,000 litres of milk in the year 1984 which is doubled in 1988 (2,31[illegible],000 litres) and further, it is increased by 2,351,000 litres. This tahsil has tradition of keeping buffaloes. Besides, increase

in irrigated as well as sugarcane area has encouraged the development of dairy associated with socio-economic awareness among the farmers.

Mohol tahsil has recorded 667,000 litres of milk collected in 1984. It is doubled in 1987 (1,327,000 litres) and further the collection of milk is increased to fifth times in 1991 (3,045,000 litres).

North Solapur tahsil has recorded 498,000 litres of milk collected which is increased by four times (1,551,000 litres) in 1988 and six times in 1989. In 1991, the collection of milk has reached to seven times (3,085,000 litres) compared to the 1984 milk collected.

South Solapur tahsil has recorded about 637,000 litres in 1984. This has been increased by two times in 1988 (i.e. 1,348,000 litres) and in 1989, it reached to 2,425,000. In 1991, the total collection of milk recorded 2,972,000 litres in this tahsil. Such increase in North as well as South Solapur tahsils may be the result of expanding urban market of Solapur city in the close vicinity of both tahsils.

Sangola tahsil recorded about 771,000 litres in 1984 which is doubled in 1987 (1,684,000 litres). Further, it is increased three times (2,009,000 litres) in 1988 and nearly 2,685,000 litres in 1991.

Mangalwedha tahsil has also recorded an upward trend with the total collection of milk about 561,000 litres in 1984. It is doubled in 1987 (1,018,000 litres) and milk collection was reached to 2,439,000 litres in 1991.

The Federation has, thus played an important role in the collection of milk from ten tahsils. Apart from tahsil-wise picture, the total milk collected by the Federation accounted for 6,674,000 litres in 1984, a beginning year. Further, it has been increased to 29,994,000 litres in 1991. The above analysis indicates that the within seven years the district has made considerable progress in the milk production. This could be attributed to favourable socio-economic atmosphere and especially healthy co-operative movement in promoting the diffusion process in the region and adoption by the farmers.

4.9 MILK PRODUCTIVITY :

The term milk productivity here refers to the quantity of milk obtained from each milch animal per day. The data were collected from the villages selected on the basis of 20 percent random sampling technique. Table 4.2 gives an idea that how there has been regional variation in per day milk obtained from either per cow or buffalo. This table clearly indicates that Malshiras tahsil has recorded high proportion with 18 litres per cow per day which followed by Karmala (14 litres), Madha (12 litres) and Sangola (12 litres).

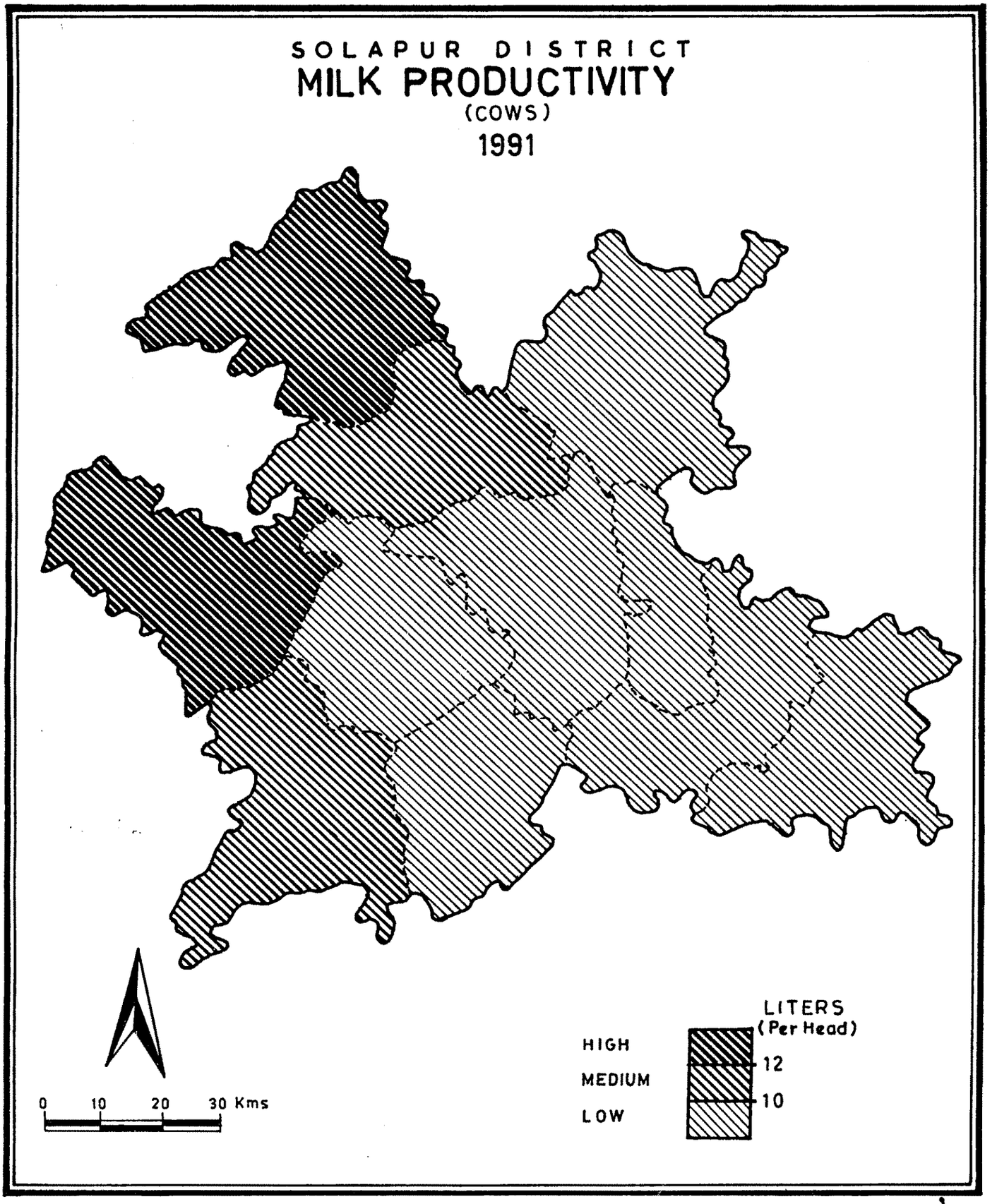
SOLAPUR DISTRICT
MILK PRODUCTIVITY
(COWS)
1991
LITERS
(Per Head)
HIGH
MEDIUM
LOW
12
10
0 10 20 30 Kms

Fig. 4·11

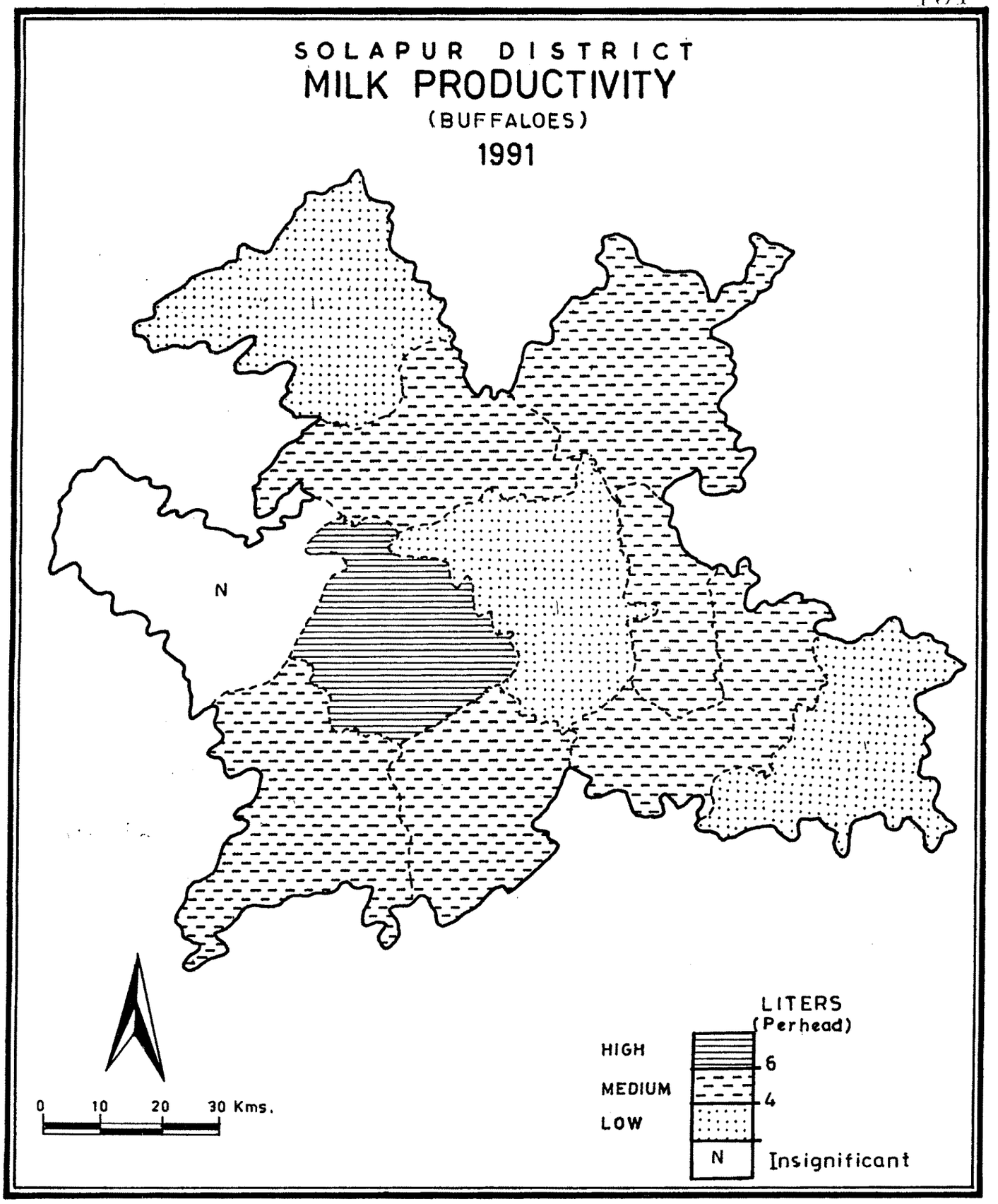
SOLAPUR DISTRICT
MILK PRODUCTIVITY
(BUFFALOES)
1991
N
0 10 20 30 Kms.
LITERS
(Perhead)
HIGH
6
MEDIUM
4
LOW
N
Insignificant

Fig. 4·12

Table 4.2 : Per day/per head of milk productivity (cow and buffalo) 1991.

Sr.No.	Tahsils	per Cow	Per Buffalo
1	Karmala	14	4
2	Barshi	10	5
3	Madha	12	6
4	Malshiras	18	-
5	Pandharpur	10	7
6	Mohol	10	4
7	North Solapur	8	5
8	South Solapur	10	5
9	Sangola	12	6
10	Mangalwedha	10	5
11	Akkalkot	8	4

SOURCE : Compiled by the author, 1991. Based on fieldwork.

The Distributional Pattern :

The zone of low productivity of cows is confined to the tahsils in the central and eastern parts of the district (Fig. 4.11). Such regional variation in the productivity of cows is closely related to a number of variables viz. the availability of green fodder, water, network of milk co-operatives, transportation and the responsive nature of farmers to the adoption of breeded cows.

In case of buffaloes milk productivity, Pandharpur tahsil has recorded highest position (7 litres/per day/ per buffal) in milk production. This due to the cross breed 'Gavlau' mostly occurred in this tahsil. Malshiras tahsil has insignificant milk production from buffaloes as the majority of farmers keep crossbreeded cows. Akkalkot (4 litres per day per animal), Karmala (4 litres per day per animal) tahsils have low productivity of milk from buffaloes. If above mentioned per head milk productivity is compared to the buffaloes of Haryana, the region has poor yield of milk per head/per day for buffaloes. In Haryana, buffaloes yield about ten litres per head/per day (Duhan and Singh, 1982).

Recently 'Pandharpuri' buffaloes have recorded sound milk productivity which is substantial in the region. All this shows that a great potential exists for dairy development in the district. Through the network of milk cooperatives a large number of milk producers, including even the weaker sections should be encouraged by eliminating financial constraints. Medium milk productivity zone is confined to Barshi (4 litres), Madha (6 litres), Sangola (6 litres), Mangalwedha (5 litres), North Solapur (5 litres), South Solapur (5 litres) tahsils in the district.

Low milk productivity occurs in Mohol (4 litres), Karmala (4 litres), and Akkalkot (4 litres) tahsils. Recently

majority of farmers keep the cross breeded Jersey cows in the region due to which high yield of milk is obtained. But, this has not been diffused all over the region. The efforts have to be concentrated on tapping the potential of this zone too.

4.10 ECONOMICS OF MILK PRODUCTION (CASE STUDY) :

Here an attempt has been made to assess the economics of milk production through which net profit received to milk producer is determined. Besides, emphases have been placed to understand the economics of milk obtained from cow as well as buffaloes. Such input-out analysis is useful to guide the farmers as what kind of milch animal should be kept for milk purpose.

In order to assess the economics of milk one village from each tahsil was selected as case study village. From these villages one milk producer for cows and another one for buffaloes were randomly selected. Finally, the aggregate picture of the entire district is attempted.

The economics of milk production for the district, in the case of 'A', one local buffalo and for 'B', one cross breed cow is presented here. The expenditure mainly includes the expenses for dry fodder, green fodder, concentrates and the veterinary aids etc. The instalment of loan and the interest on the loan are also considered towards expenditure side.

The income includes from sale of milk, sale of F.Y.M. and sale of bull calves in the case of cross breed cows. The individual contribution is considered at the rate of 25 percent, in the form of cash or subsidy. The loan obtained from the bank is considered as Rs.3,000/-. The interest on the loan will be at the rate of twelve percent per annum which is prevailing in the region has been considered.

Following statements have emerged out from the field work undertaken by the author which may give an idea about the economics of milk from either per head of cows or buffaloes in the region under study.

STATEMENT - I

(A) Unit of one local buffalo :

(i)	Cost of one buffalo	Rs.4,000 = 00
(ii)	Individual's contribution 25 percent	Rs.1,000 = 00
(iii)	Loan from the Bank	Rs.3,000 = 00

- Expenditure of 13 months :

(18 months of milking + 5 months dry)

(1) Feeding and other expenses -

a) Dry fodder 15 kg. per day - 390 days
(It will come from the farmers own farm)

b) Green fodder - 10 kg. per day for
390 days. Rs.1.00 per kg. (390 days) Rs.3,900 = 00

c) Concentrates 2 kg. buffalo/per day
Rs.4,00 per kg.(240 days only) Rs.1,920 = 00

d) Veterinary aid Rs.10/- per animal/
per month Rs. 130 = 00

e) Interest on bank loan Rs.12/- percent
per quarter days Rs. 175 = 00

f) Bank loan instalment Rs. 400 = 00

Total expenditure for one Buffalo Rs.6,525 = 00

- Income (from one buffalo)

During one lactation 240 days

a) Milk 4 litres per day
rate Rs.8/- per litre Rs.7,680 = 00

b) F.Y.M. 8 carts load during
15 months (Rs.50/- per cart) Rs. 400 = 00

Total income from one buffalo Rs.8,080 = 00

Net Surplus ⟶ Rs.1,555 = 00

STATEMENT - II

(B) Unit of one cross breed cow :

a) Purchase of one cross breed cow	Rs. 9,000 = 00
b) Construction of cattle shed	Rs. 2,000 = 00
Total investment	Rs.11,000 = 00
Farmer's contribution 25 percent --	Rs. 2,250 = 00
Bank loan - - - - - - - - - - -	Rs. 6,750 = 00

- Expenditure :

(1) Feeding and other expenses -

a) Initial investment of one cow during 300 days of lactation	
(i) Green fodder 10 kg./cow/day Rs.1,000/- per kg.	Rs. 3,000 = 00
(ii) Dry fodder 15 kg./cow/day Rs.0.50/kg.	Rs. 2,250 = 00
(iii) Concentrates - Maintainance 2 kg./cow/day)Rs.4/-kg.)	Rs. 2,400 = 00
b) Veterinary expenses Rs.25/- per month	Rs. 250 = 00
c) Interest on bank loan	Rs. 350 = 00
d) Bank loan instalment	Rs. 900 = 00
Total expenditure	Rs. 9,150 = 00

- Income (from one cross breed cow)

i) During 300 days of lactation 9 litre/ day, Rs.5/- per litre	Rs.13,500 = 00
ii) Sale of F.Y.M. 10 carts load per animal, 10 months Rs.50/-per cart	Rs. 500 = 00
Total income	Rs.14,000 = 00
Net Surplus	Rs. 4,850 = 00

SOURCE : Compiled by the author, based on Fieldwork, 1991.

The above case study indicates that breed cows appear to be profitable to the farmers. However, special attention has to be given to these animals which is beyond the reach of farmers. However, rich farmers can afford to keep these cows and they are highly benefited during the recent past, especially in sugarcane belt. They have easy access to loan facilities too. The small and medium farmers are also gradually turning to such enterprise but it will take time. The region has greater potential if breeded cows are kept by farmers. The milk co-operatives will have to play an important role in encouraging the farmers by providing infrastructural facilities. The financial facility is the main constraint which may be solved through co-operatives. Moreover, the behaviourial nature of farmers is significant factor that will determine the nature and extent of such enterprise.

SECTION - B

DISTRIBUTION OF MILK

4.11 INTRODUCTION :

The milk collected from the villages, through co-operative organisation, is sent to the chilling plants located at the central places (Fig.4.13). The chilled milk has to be sent to the markets immediately as it is a perishable in nature. Urban centres are invariably provide market for such milk. Thus, Bombay and Poona are the major markets for milk produced in the region. The sequence of agencies through which the produce passes is called channel of distribution. The market for packaged milk is predominantly urban. The marketing system differs according to the distances between dairy and the retailer. Sometimes dairy distributes milk through commission agents through predefined routes. The transportation cost from the dairy to booth, is borne by the dairy. In some places, distribution of milk is done twice a day through trucks and tankers to retail outlets.

In Solapur district, the distribution of milk done by three unions to the various places with the help of truck and tankers. However, the role of chilling plant is very significant in the preservation of such perishable commodity.

4.12 FUNCTIONING OF CHILLING PLANTS :

Fig.4.13 shows the location of chilling plants at which the milk collected by the village milk co-operatives, is assembled through trucks or tempo. The collected milk is processed at low temperatures in order to preserve it for a long time. The location of these chilling plants is important factor because they are in the vicinity of villages. This has facilitated to assemble milk quickly. The distance factor is important to reduce the time and cost. In the beginning at Akkalkot, Pandharpur and Solapur chilling centres were started with the capacity of 7,000 litres each. Daily 30,000 litres milk however, chilled at Pandharpur. The capacity of these chilling plants depends upon the milk produced in the nearby villages. Presently, there are seven chilling plants i.e. Akkalkot, Solapur, Barshi, Temburni, Pandharpur, Sangola and Akluj. However, with the increase in milk production, resulted from the positive role played by milk co-operatives, there was need to establish more number of chilling plants. Of the above, during the last decade, three more chilling plants with 700 litres capacity each, were started at Temburni, Barshi and Sangola. Presently, Akkalkot chilling plant has shown decrease in the collection of milk and about 2500 litres of milk has been chilled per day. Sangola and Temburni handle about 12,500 litres per day each in 1991.

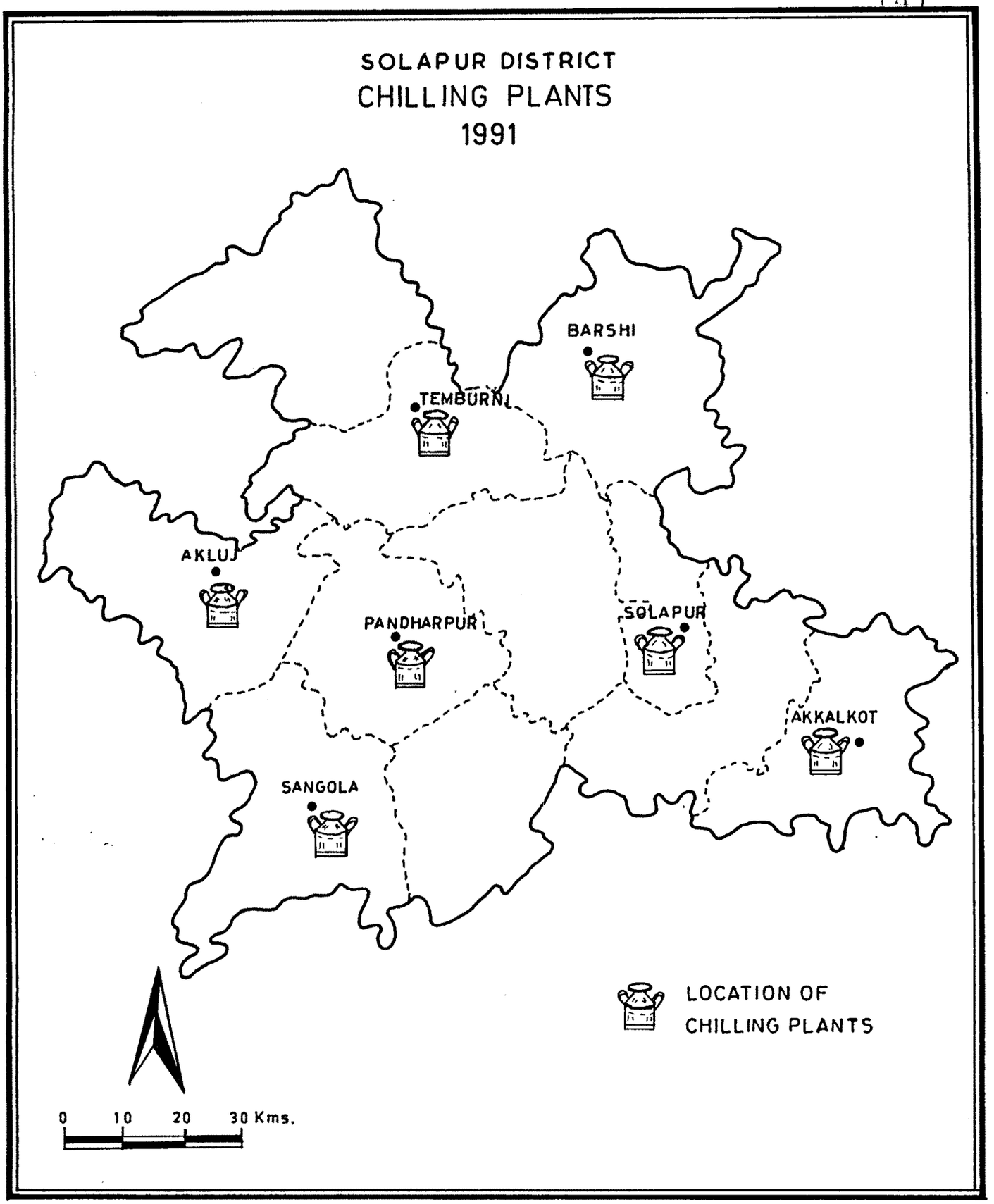
SOLAPUR DISTRICT
CHILLING PLANTS
1991
BARSHI
TEMBURNI
AKLUJ
PANDHARPUR
SOLAPUR
AKKALKOT
SANGOLA
LOCATION OF
CHILLING PLANTS
0 10 20 30 Kms.

Fig. 4·13

The case of Malshiras tahsil is altogether different from the rest of the region. Because, this tahsil alone produced 23,984,000 litres of milk in 1991. Late Mr.Shankarrao Mohite-Patil encouraged the farmers of this tahsil for 'White Revolution' and he motivated the small as well as rich farmers to undertake such lucrative enterprise. With his encouragement there was introduction of breeded Jersey cows associated with the facilities like veterinary, financial, village milk co-operatives, chilling plants etc. in Malshiras tahsil. This has resulted into substantial increase in milk production. In the beginning year, the total milk produced was 1,462,806 litres which reached to 2,398,400 litres in 1991.

Presently, this tahsils has five chilling plants located at Sadashivnagar, Shankarnagar, Vizori, Tandulwadi, and Velapur with the total chilling capacity of 156,000 litres of milk per day. Shivamrut Dudh Dairy, located at Akluj, looks after the distribution of milk chilled at these five chilling plants. Of this, 50 percent of milk is chilled at Shankarnagar and Sadhashivnagar chilling plants. Presently, the district has chilling capacity of 307,000 litres of milk per day which is sent to urban markets like Bombay, Poona and Solapur local (Table 4.3).

Table 4.3 : Distribution of milk by The Government Dudh Dairy, Solapur.

(figures in litres)

Sr. No.	Year	Local litres	Distribution percent	Bombay		Total litres
				Litres	percent	
1	1971	5,000	39.68	07,600	06.32	12,600
2	1976	6,385	22.49	22,000	77.51	28,385
3	1981	7,060	14.10	43,000	85.90	50,060
4	1986	8,573	09.90	78,000	90.10	86,573
5	1991	10,000	07.35	126,000	92.65	136,000

SOURCE : Compiled by the author, ffom the Records of Dairy Development Office, Solapur, 1991.

4.13 DISTRIBUTIONAL PATTERN OF MILK (COLLECTED) :

Distribution of milk is depended upon the milk procurement in the region. The Solapur, District Milk Union, Shivamrut, and Government Dudh Dairy are three organisations distributing the total collected milk from the district. The milk is mainly sent to cities and a very small fraction is locally distributed.

1) Milk distribution by the Solapur District Union :

Table 4.3 presents an upward trend in the milk distributed by this organisation. From the beginning (1971) there has been substantial share of milk supplied to Bombay city. A small amount

has been distributed locally. In 1971, about 5000 litres (39.68 percent) milk was distributed locally, mainly to Solapur city and remaining 7600 litres was sent to Bombay. Thereafter, there has been an increasing trend in the supply. In 1991, local distribution was accounted for 10,000 (7.35 percent) litres whereas about 126,000 litres (92.65 percent) to Bombay of the total 136,000 litres of milk collected.

Table 4.4 : Distribution of milk (1984-91) by Solapur District.

Sr. No.	Year	Distribution of Milk				Total
		Solapur Dist. Union	Percent	Shivamrut Sangh	percent	
1	1984	6,445,000	33.25	13,341,000	66.75	19,986,000
2	1985	9,506,000	33.31	19,033,000	66.69	28,539,000
3	1986	11,240,000	31.00	25,020,000	69.00	36,260,000
4	1987	13,090,000	33.72	25,735,000	66.28	38,825,000
5	1988	17,214,000	44.66	21,329,000	55.34	38,543,000
6	1989	24,256,000	52.68	21,789,000	47.32	46,045,000
7	1990	26,365,000	53.30	23,104,000	46.70	49,469,000
8	1991	29,445,000	55.11	23,984,000	44.89	53,429,000

SOURCE : Compiled by the Author, 1991.

The milk distributed by the remaining two major organisations viz. Solapur District Co-opeative Union and Shivamrut Sangh of Akluj

is shown in Table 4.4 which reveals the fact that considerable quantity of milk has been distributed mainly to Bombay by these organisations. The yearwise analysis (from 1984 to 1991) indicates that the share of Shivamrut Sangh is more than District Co-operative Union till 1988 which is laging behind in the later period (1989 to 1991). However, in general, both organisations supplied milk to Bombay showing increasing trend.

The Solapur District Co-operative Union supplied 6645000 litres (33.25%) in 1984 of the total of 19,986,000 litres. There has been gradual increase in the milk supplied. In 1989, nearly 24,256,000 litres (52.68%) of milk supplied to Bombay by this organisation surpassing Shivamrut Sangh. In 1991, the first ranking position was maintained by sending 29,445,000 litres (55.11%) milk to Bombay.

The contribution of Shivamrut Sangh of Akluj cannot be overlooked because this organisation collects milk from the villages of Malshiras tahsil alone whereas Solapur District Co-operative Union, Government Dudh Sangh, both are collecting milk from the remaining ten tahsils. Shivamrut Sangh supplied about 13,341,000 its (66.75%) milk to Bombay in 1984,19,033,000 litres (66.69%) in 1985 and 25,735,000 litres (66.28%) in 1987; which was higher than any other co-operative organisations in the district. From 1988 onwards, though, there has been upward trend in the milk supplied, the Solapur District Co-operative Union surpassed Shivamrut Sangh. In 1991, Shivamrut has sent 23,984,000 litres (44.89%) of milk.

4.14 SEASONAL TRENDS IN THE MILK DISTRIBUTION (1990-91) :

There are mainly two seasons considered. June to December duration may becconsidered as flush season and from January to May as lean season (Fig.4.14).

Table 4.5 : Seasonal trends in the distribution of milk by 'Shivamrut' Akluj,1990-91.

(fig.in lakh litres)

Sr. No.	Month and Year	Mahananda - Bombay	Washi - Bombay	Local	Total
1	July 1990	9.83	10.39	0.03	20.25
2	August 1989	6.86	12.83	0.04	19.73
3	September 1990	8.22	11.38	0.04	19.64
4	October 1990	9.39	09.32	0.01	18.72
5	November 1990	8.52	08.10	0.02	16.67
6	December 1990	7.71	11.27	0.03	19.01
7	January 1991	7.22	12.46	0.03	19.71
8	February 1991	6.02	13.78	0.03	19.83
9	March 1991	6.46	14.41	0.04	20.91
10	April 1991	11.14	10.87	0.007	22.017
11	May 1991	12.46	09.73	0.003	22.193
12	June 1991	7.59	12.70	0.002	20.292
	TOTAL	101.45	137.24	0.282	138.972

SOURCE : Shivamrut Dudh Sangh, Akluj, 1991.

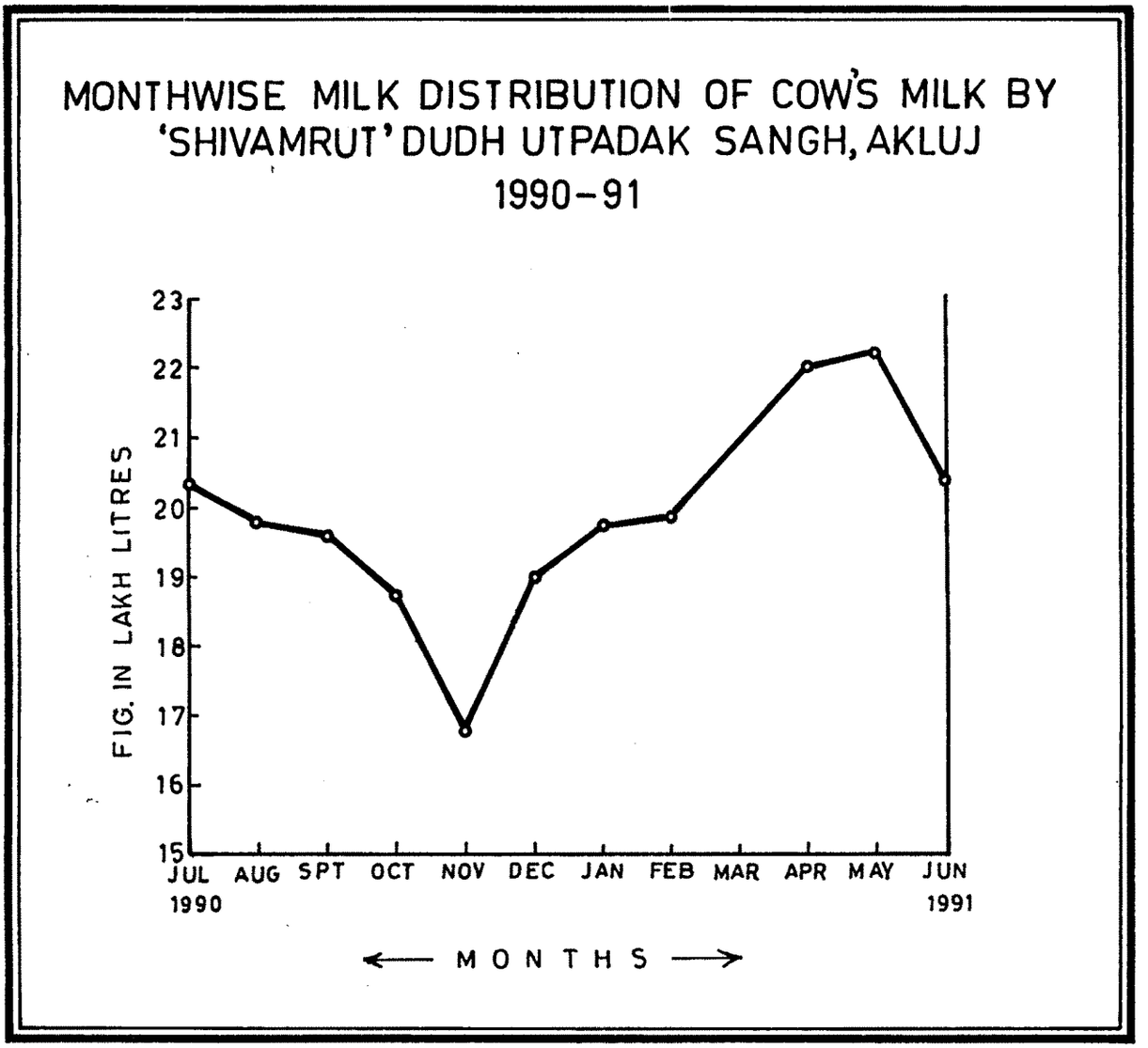
MONTHWISE MILK DISTRIBUTION OF COW'S MILK BY
'SHIVAMRUT' DUDH UTPADAK SANGH, AKLUJ
1990-91
FIG. IN LAKH LITRES
23
22
21
20
19
18
17
16
15
JUL
1990
AUG
SPT
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
1991
MONTHS

Fig. 4·14

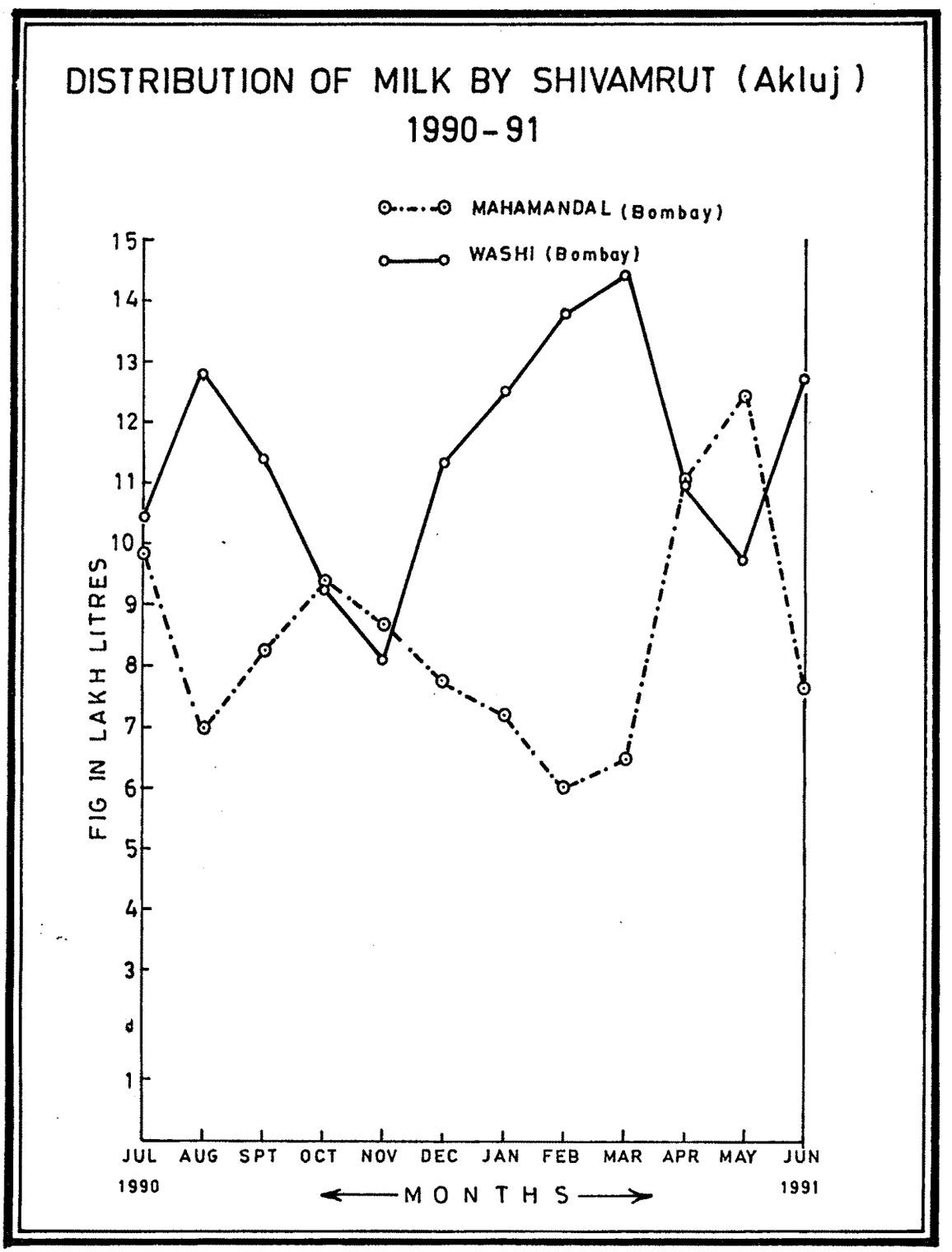
DISTRIBUTION OF MILK BY SHIVAMRUT (Akluj)
1990-91
MAHAMANDAL (Bombay)
WASHI (Bombay)
FIG IN LAKH LITRES
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
JUL AUG SPT OCT NOV DEC JAN FEB MAR APR MAY JUN
1990
MONTHS
1991

Fig.4·15

The seasonal trends in the milk distribution by Shivamrut Sangh, Akluj and Solapur District Union are presented in Fig.4.14 and 4.15. It is clear from these figures that nearly 10,145,000 litres of milk from cows was distributed. Of this, maximum 5,815,000 litres (57.32 percent) milk from cows is distributed in flush season. Minimum 4,330,000 litres (42.68 percent) of milk distributed by Shivamrut Dudh Sangh in lean season.

The Solapur District Union has recorded the collection of 3,044,000 litres of milk from cows and 1,583,000 litres of milk from buffaloes which were distributed in the year 1990-91. Of this, maximum 1,800,000 litres (59.13 percent) milk from cows and 800,000 litres (50.54 percent) of milk from buffaloes were distributed in flush season. And minimum 1,244,000 litres (40.46 percent) milk from buffaloes were distributed.

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