CHAPTER - III

INSTITUTIONAL FACTORS OF GRAPE-VINE CULTIVATION

3.1 INTRODUCTION :

In the earlier chapter general profile of the region has been highlighted. The present chapter proposes to study spatial aspects of basic inputs of grape-vine i.e. irrigation and fertilizers. The nature and extent of farming is essentially a product of physical environment by the decisive factors are manmade, such as, institutional and socio-economic variables (Sandhu,1981). The availability of water for irrigation may change the attitude of farmers towards the use of land and particularly spatial pattern of grape-vine gardening in the study region. The role of irrigation in grape-vine cultivation is well known and needs no elaboration. Water is, in fact, the main limiting factor in crop production and the only way to improve our agricultural economy is to ensure an adequate supply of irrigation water at the proper stage of crop growth (Behl,1959).

Rainfall is deficient and characterised by variations in time and place within the region. Average rainfall is about 625 mm. Thus, the existing rainfall conditions have created acute need for irrigation without which grape-vine cultivation is impossible. The nature of watertable is determined by the rainfall. Any change in rainfall conditions may lead to the fluctuations in watertable.

3.2 IRRIGATION :

3.2.1 A decisive factor for grape-vine cultivation :

The region under investigation belongs to dry sub-tropical zone. Here, the climatic conditions are favourable for grape-vine cultivation in regards to it's quality and quantity. Irrigation is indispensable for grape-vine cultivation because it's cultivation is wholly depended upon irrigation facilities in the region. The availability of water for irrigation vary considerably in the tahsil. The western part, in Krishna river plain proper, has lift irrigation facilities which are basically ment for sugarcane cultivation. However, recently many farmers have undertaken the enterprises of grape gardening in view of the differentiation in cost-benefit of both crops. Besides, the eastern part belongs to drought prone area where rainfall is not sufficient even during rainy season and rate of evaporation is also more. Under such conditions the grape-vine cultivation has become risky and the existing vine-yards are confined to well irrigation only which further affected by the seasonal nature of wells.

3.2.2 Water requirement of grape-vines :

Each crop has specific requirements of water depending upon various factors like, soil types, drainage, soil moisture temperature, rate of evaporation etc. In the study region the requirement of water for grape-vine differs with time and place

due to regional variations in pedological and climatic conditions. Table 3.1 gives idea about the water requirements of grape-vine in three zones of the study region. The year has been divided into three distinctive seasons as rainy season, post-rainy season and pre-rainy season.

TABLE 3.1 : Seasonal water requirements of grape-vine in Miraj tahsil, 1985-86.

Zone	Rainy season (Kharif) June-September	Post-rainy season (Rabi) October-January	Pre-rainy season Februay-May
Western zone	21 days interval	8 days interval	10 days interval
Middle Zone	15 days interval	6 days interval	8 days interval
Eastern Zone	11 days interval	4 days interval	4 days interval

SOURCE : Compiled by the author, based on field work,1987.

i) Rainy season :

Relatively western zone receives more rainfall than the eastern zone (100 mm). The rainfall decreases eastwards and consequently the number of irrigation has increased from west to east. Irrigation at 21 days interval is observed in the west, 15 days and 11 days in the middle and eastern zones respectively.

The rententivity of deep black soils of the west and substantial moisture content have led to less turns of irrigation. Contrasting to this, increasing temperatures, coarse soils and more evaporation require more turns of irrigation eastwards.

ii) Post-rainy season :

In fact, this is significant season during which bud development and later fruiting takes place. After the cutting and inter-cultural practices fertilizers and manures are applied. This requires frequent watering to the grape-vines. However, the variations in nature of soils and climatic conditions have led to the differences in water turns in three zones of the region. The grape-vine yards of the western zone require number of irrigation at 8 days interval whereas the middle and eastern zone have 6 and 4 days interval.

iii) Pre-rainy season :

Moreover, the middle and eastern zones are marked inadequate water supply. It is observed that many wells are dried up during this season in the east. In order to ensure minimum water supply to grape-vines, many farmers provide water through tanks. This leads to increase the cost of production. Generally, in middle and eastern parts 8 and 4 days intervals are found. Owing to sufficient water supply through lift irrigation and high moisture holding capacity of black soils the western zone has 10 days interval.

3.2.3 Irrigation in the region :

Present position of region in regards to irrigation is shown in Table 3.2. Of the total cultivated area of 70,940 hect. about 13,410 hect. area is under irrigation in 1986-87. Of this about 565 hectares area is under grape-vine cultivation. But it's proportion is varying from village to village due to different sources of irrigation. The villages in the vicinity of Krishna river in the west have the advantage of perennial water availability which is supplied to the fields through lift irrigation schemes owned by co-operatives or individuals. As a matter of fact, the villages like Mhaisal (22446 hect.), K.Digras (1033 hect.), Samdoli (460 hect.) Kupwad (521 hect.), Kavalapur (433 hect.) have registered high proportion of irrigated area (Appendix - I). Owing to unfavourable pedological conditions, these villages however, have recorded less proportion of grape-vine hectareage. Since the villages in the north and the east are lying away from the river plain have low hectareage under irrigation. In view of favourable physical conditions, the villages of this part have recorded substantial proportion of grape-vine hectareage of the available irrigated area based on wells. Considering the role of irrigation in promoting grape-vine cultivation it would be worthwhile to highlight spatial aspects of different sources of irrigation.

TABLE 3.2 : Irrigated area from different sources in Miraj tahsil, 1986-87.

Sr. No.	Source	Irrigated area (hect.)	Percent to net sown area	Percent to irrigated area
1	Lifts	9,800	13.81	73.07
2	Wells	3,610	05.08	26.93
	Total	13,410	18.89	100.00

SOURCE : Compiled by the author, 1987.

3.2.4 Sources of irrigation :

There are two major sources of water in Miraj tahsil i.e. surface water and ground water. The most important of these is the surface water in the form of rivers, which is used for irrigation (Cantor,1967). Both sources of water are, however, unevenly distributed in the region as they are affected by topography, geological structure, rainfall conditions etc. The surface water is supplied by lifts whereas ground water from wells.

i) Lift irrigation

Lift irrigation accounts for 98,000 hectares (73.07%) during 1986-87 in 63 villages of the tahsil (Appendix - II). The lift irrigation happens to be modern means of irrigation using surface water from river Krishna in the region. It is

promoted mostly by co-operative sector encouraged by Sangli Shetkari Sahakari Sakhar Karkhana Ltd. The course of Krishna river is made perennial by regulating the water from the reservoires in it's upper reaches like Koyana, Dhom, Kanner etc. In order to promote sugarcane cultivation in the flood plain area many lift schemes have been installed along the banks during the last two decades. Thus, lift irrigation is basically ment for sugarcane cultivation in the western parts of the tahsil. However, realizing the cost-benefit economy of sugarcane and grape-vine many farmers have turned towards vine cultivation replacing their sugarcane area irrespective of unfavourable pedological conditions and hazards like deep black soils and salinity problems. There are at present 63 lifts along this river banks.

(a) Spatial Distribution (1986-87) :

A remarkable progress of lift irrigation has been achieved by some villages like Dhamani (78.89%), Ankali (63.21%), Padmale (61.77%), Mhaisal (56.86%), Savalwadi (53.63%) and Malwadi (53.17%). This zone can be considered as having very high intensity of lift irrigation (Fig.3.1). This has been followed by high proportion (20 to 40%) in the villages of Kasaba Digraj, Tung, Samdoli, Kupwad and Dhavali. Moderate proportion (10 to 20%) is confined to areas of Dhudhgaon (13.81%), Takali (12.55%), Bolwad (18.22%), Vaddi (18.70%), Nilji (10.26%) and Narwad (12.22%) villages. The low (5 to 10%) and very low (75%) proportions are

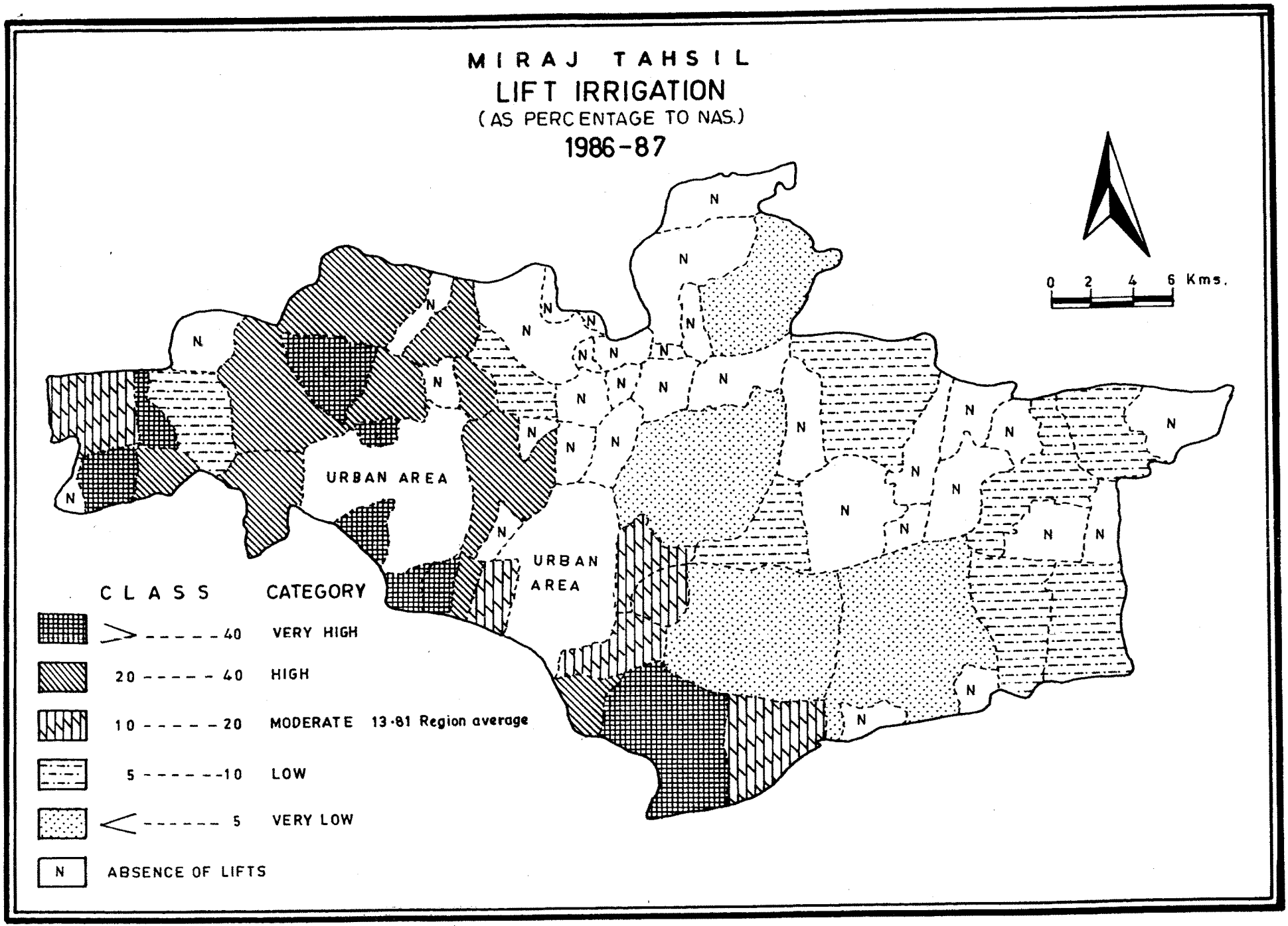
MIRAJ TAHSIL
LIFT IRRIGATION
(AS PERCENTAGE TO NAS.)
1986-87
0 2 4 6 Kms.
URBAN AREA
URBAN AREA
CLASS CATEGORY
> ----- 40 VERY HIGH
20 ----- 40 HIGH
10 ----- 20 MODERATE 13-81 Region average
5 ------ 10 LOW
< ------ 5 VERY LOW
N ABSENCE OF LIFTS

Fig 3-1

found in rest of the villages (Fig.3.1). Thus, western zone of the tahsil is largely benefitted from lift irrigation. Recently small patches of coarse and medium black soils are being used for vine cultivation in the lift irrigated areas. Thus, after sugarcane, vine cultivation has achieved sound position in the economy of this zone.

ii) Well Irrigation

Well irrigation is traditional form of irrigation in the region. Of the total cultivated area (70,940 hect.), about 3,610 hectere (5.08%) area is irrigated by wells in 49 villages in the region. Some villages have exceptionally recorded substantial area under this means like Mhaisal (600 hect.), Soni (155 hect.), Kavalapur (176 hect.), Kasabe Digraj (150 hect.), Shipur (150 hect.).

Well irrigation contributes about 26.93 percent of the total irrigated area of the region. The underground sources of water are mainly tapped by wells and it is essentially a main source for grape-vine cultivation. The villages in the east and north are deprived of the lift irrigation. As a result, vine cultivation has to depend upon wells. The nature of terrain, geological structure, type of soils and climatic conditions are responsible for the development of well irrigation.

(a) Distribution of wells (1986-87) :

The distribution of wells is shown in Fig.3.2 which is uneven. The largest concentration (7800) is observed in Arag,

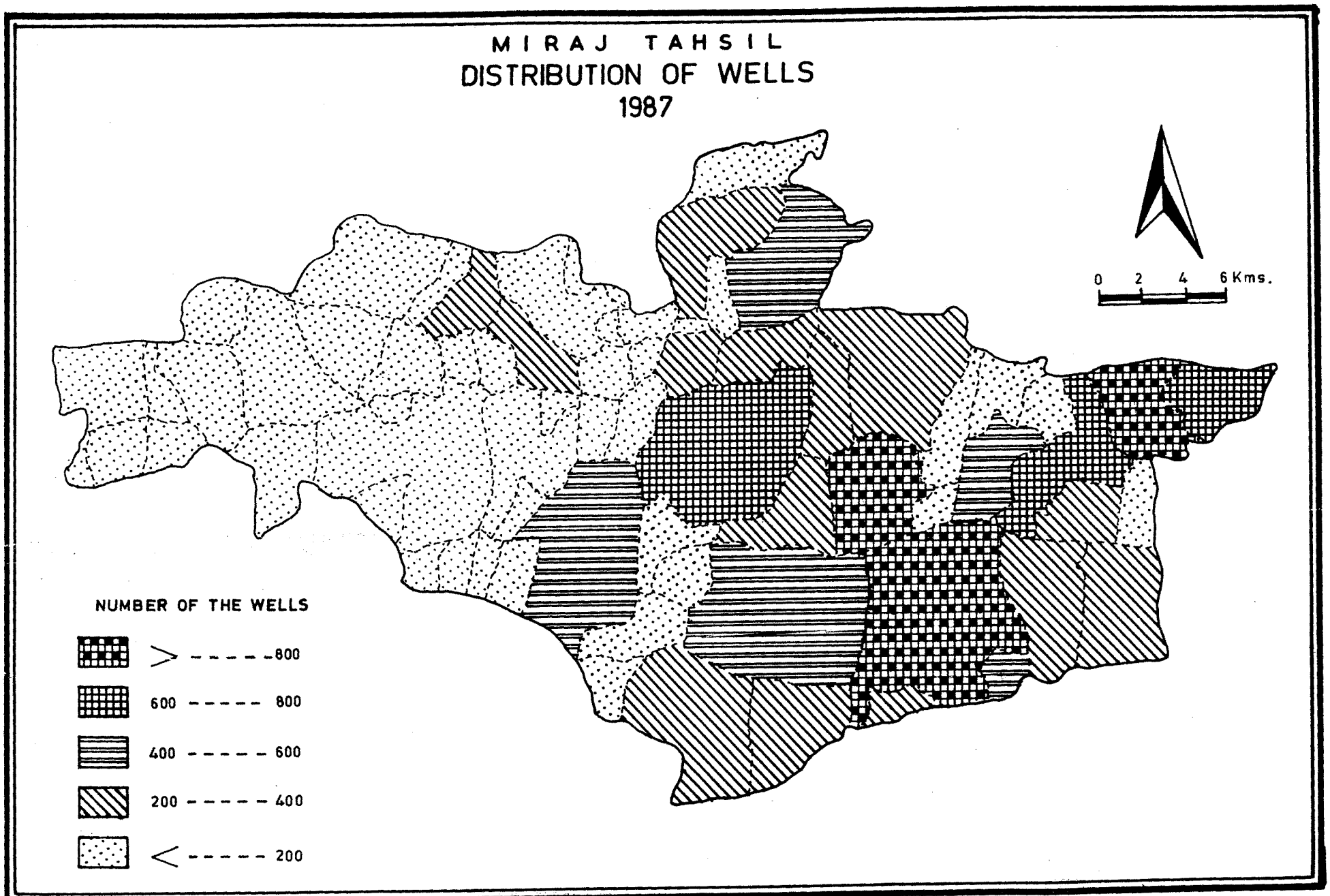
MIRAJ TAHSIL
DISTRIBUTION OF WELLS
1987
0 2 4 6 Kms.
NUMBER OF THE WELLS
> ----- 800
600 ----- 800
400 ----- 600
200 ----- 400
< ----- 200

Fig. 3·2

Belanki and Erandoli villages. Whereas, the low number of wells (200) is confined to western parts of the region where lift irrigation is pre-dominantly observed. There are 15,036 wells distributed in 70 villages. A large number of wells are found in Erandoli (1236), Arag (1769), Belanki (708) and Salagare (896) villages. The number of wells ranging between 400 to 800 is mainly found in the central, northern and eastern parts of the region. Of the total number of wells (15,036), there is considerable number of wells (2,684) which are not used due to depletion of watertable (Appendix - IV). Recently many farmers have adopted bore wells ranging upto 100 meters depth which account for 347 number in 1987. The details regarding the katchha and pucca wells is shown in Appendix - IV.

(b) Watertable of the wells (1986-87) :

The region possesses substantial number of wells (15,036) and vine cultivation is closely concerned with the well irrigation. The seasonal changes in watertable have affected the volume of water available for irrigation purpose. Fig.3.3-A, B and C reveal the watertable in different villages during rainy, summer seasons and average respectively. The average depth of wells in the west is 15.75 metres whereas it is 21.30 and 19.5 metres in the middle and eastern parts of the region (Table 3.3). Due to recharge from surface runoff during rainy season the average watertable is 4.3 metre in the region.

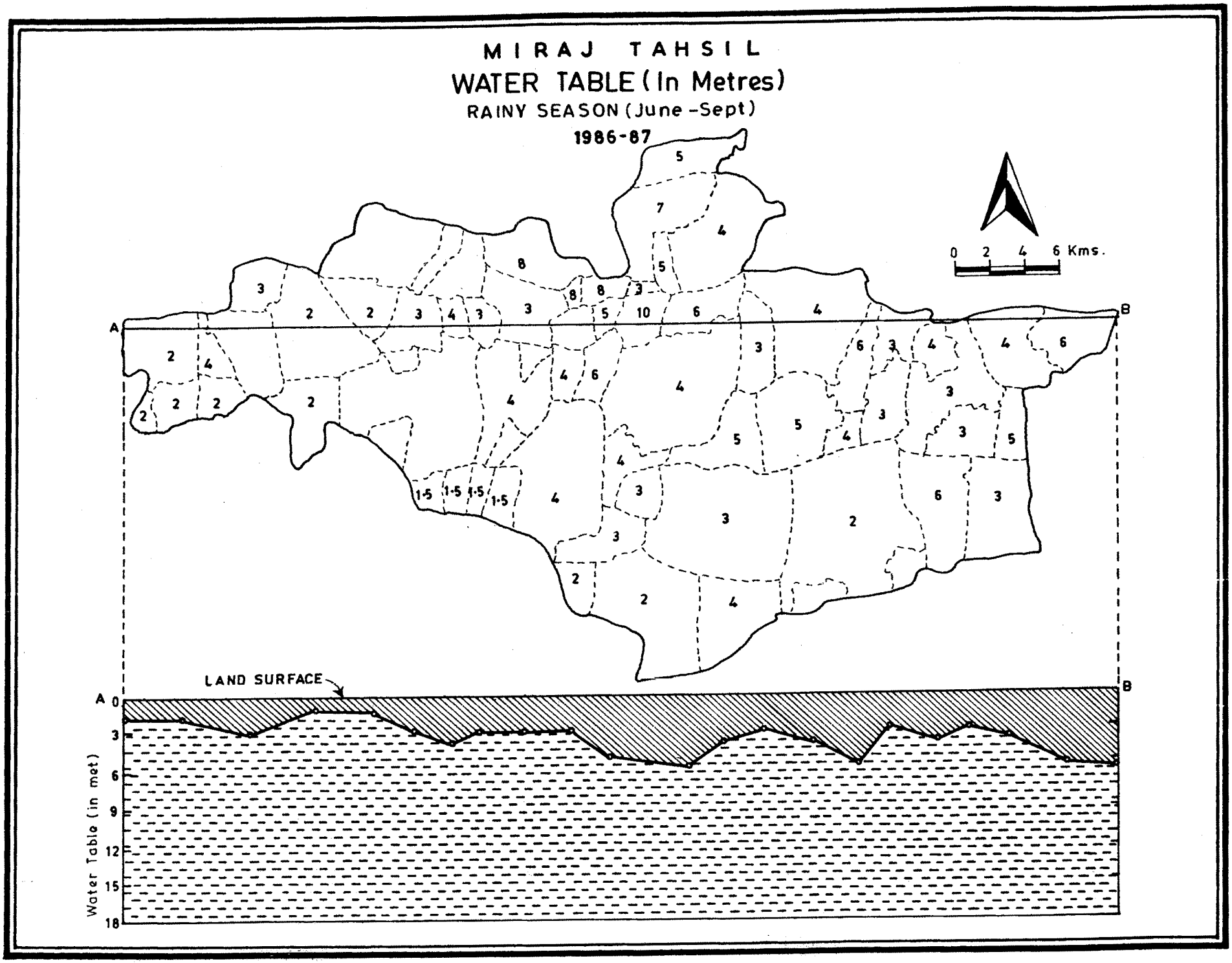
MIRAJ TAHSIL
WATER TABLE (In Metres)
RAINY SEASON (June -Sept)
1986-87
0 2 4 6 Kms.
A
B
LAND SURFACE
Water Table (in met)
0
3
6
9
12
15
18

Fig. 3-3 A

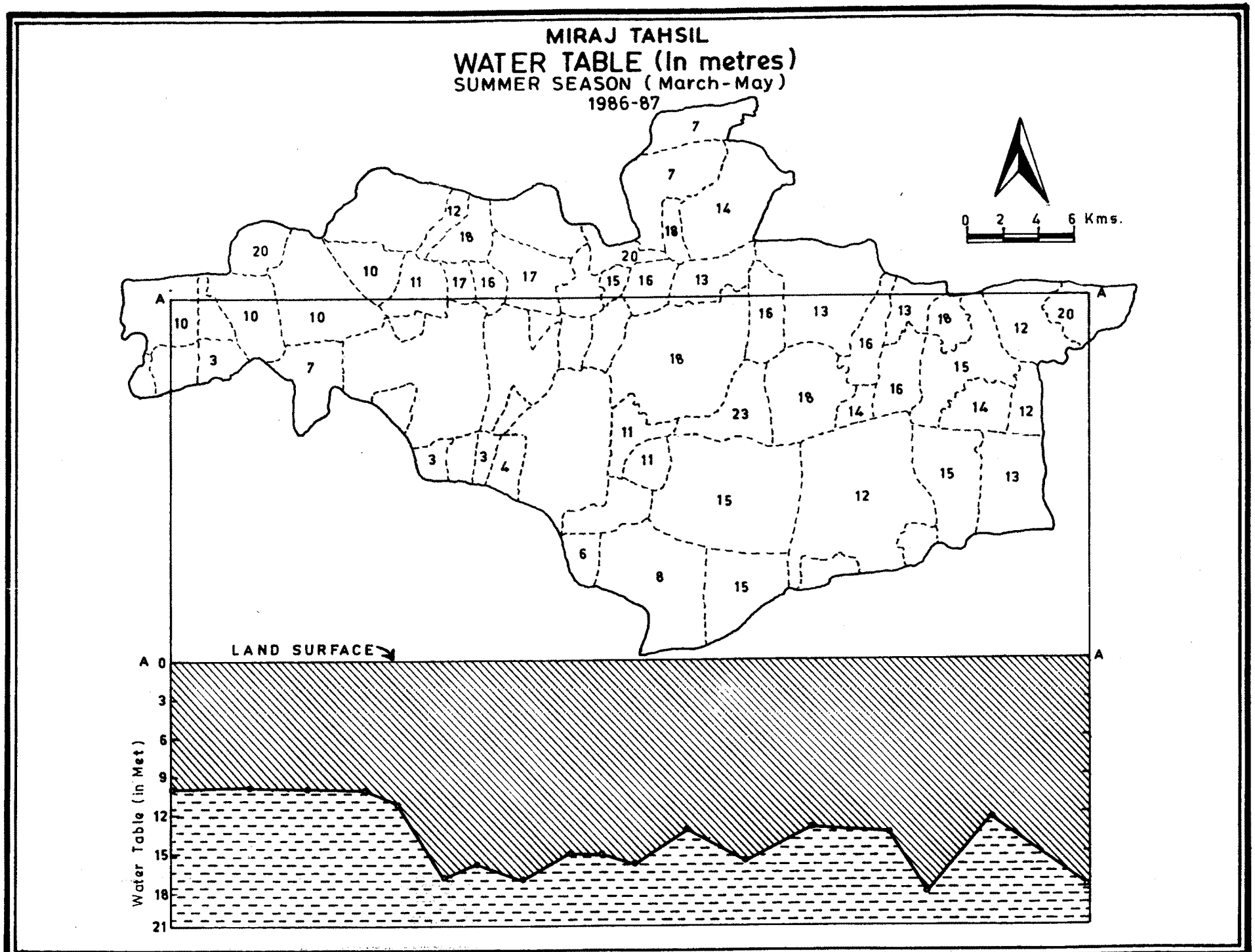
MIRAJ TAHSIL
WATER TABLE (In metres)
SUMMER SEASON (March-May)
1986-87
0 2 4 6 Kms.
A
A
LAND SURFACE
A 0
3
6
9
12
15
18
21
Water Table (in Met)

Fig. 3·3 B

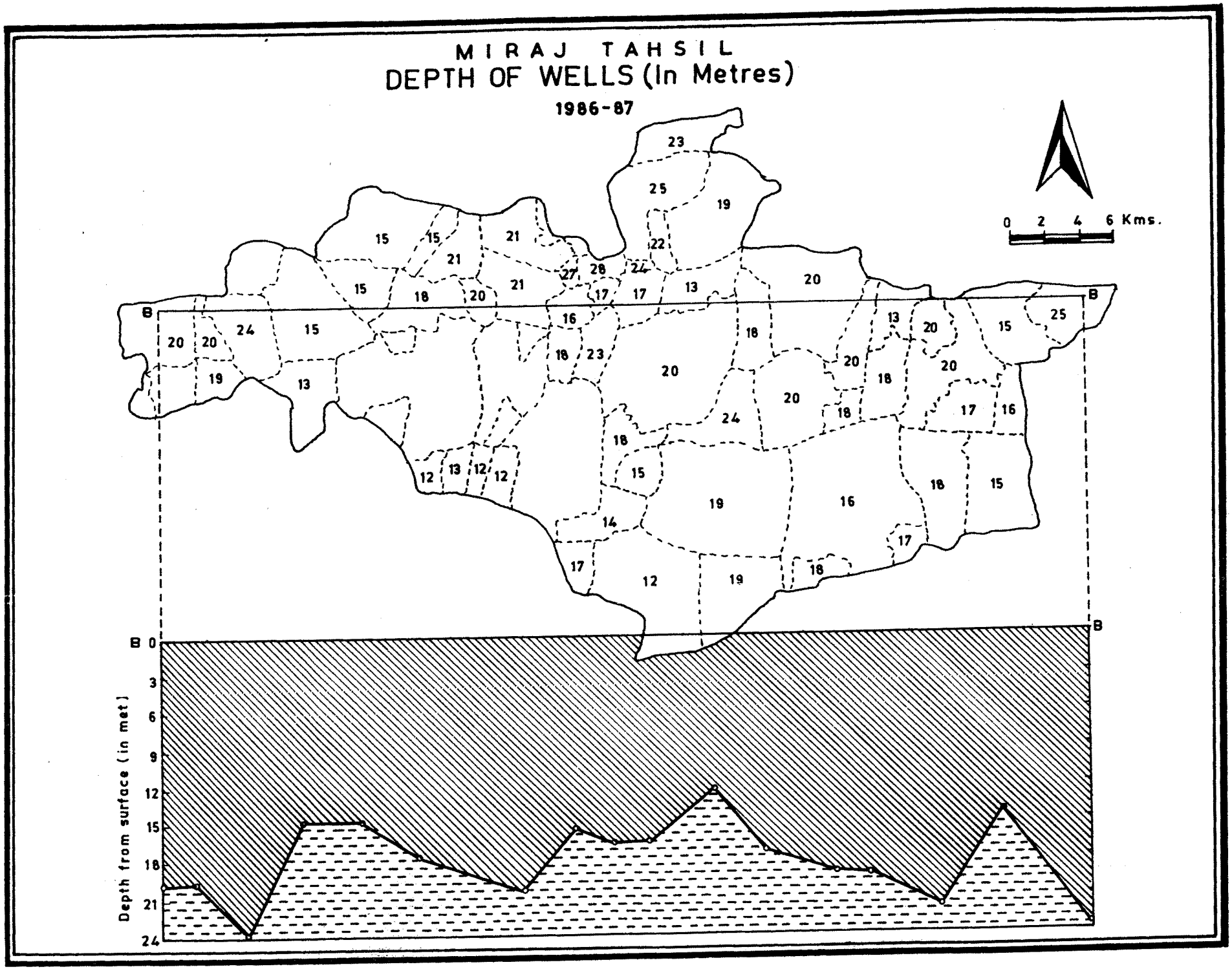
MIRAJ TAHSIL
DEPTH OF WELLS (In Metres)
1986-87
0 2 4 6 Kms.
B
B
B
B
Depth from surface (in met)
0
3
6
9
12
15
18
21
24

Fig. 3·3 C

TABLE 3.3 : Average depth of wells (metre) and watertable from the surface during rainy and summer season, 1986-87.

Zones	Average Depth of wells (Metre)	Watertable	
		Rainy season (Metre)	Summer season (Metre)
Western	15.75	2.50	10.50
Middle	21.30	5.40	19.30
Eastern	19.50	4.50	15.50

SOURCE : Compiled by the Author (based on field data).

But there is regional variations in watertable. The watertable, at greater depth, is observed in the wells of Wanlesswadi (11.50 Metre), Tanang (10.70 Metre) and Kalambi (10.00 Metre) (Appendix - III). The villages in the west and the south have less than 3 metre of watertable from the surface. A remarkable reduction in watertable during summer season is observed in the region. Fig. 3.3-B exhibits summer watertable of the region. Here, again eastern, north eastern and central eastern parts have recorded quite a greater depth of watertable which may hamper the vine cultivation due to scarcity conditions. The basaltic nature of this plateau region has incluenced the recharge of water. Furthermore, the deficiency of rainfall in the east have also adversely affected. These conditions also lead to provide water by tankers to vine yards. This is the common practice in many villages of

the east and central east. The successive drought conditions during the last one and half decade has created the scarcity of water. As a result, the cot of production has increased and productivity of vines has declined considerably. The small vine yard owners are affected more from this phenomenon.

(c) Spatial pattern of well irrigation (1986-87) :

A cursary glance at Fig.3.4 reveals the fact that well irrigation is found almost all over the region. However, it's proportion is varying in the region. The high proportion above 12% is observed in the villages of Mhaisal (600 hect.), Kavalapur (176 hect.), Takali (160 hect.), Sherekavathe (140 hect.). All these villages have sufficient watertable and have recorded more than 20 percent well irrigation to net sown area. The moderate proportion (6 to 12%) of well irrigation is found in 16 villages located mostly in the north. The low proportion (less 6%) is recorded by the villages in the east and north. The sub-terrainian structure, nature of topography, intensity of rainfall have determined the extent and nature of well irrigation in the region. Recently some vine growers have attempted bore wells upto 100 metre depth and water has been lifted by sub-marcible pumps. However, in the east some bore wells have become unsuccessful due to lack of ground water within the basaltic formations. Specific data regarding bore wells has not been collected here for analysis and hence they are included in common well irrigation due to negligible numbers.

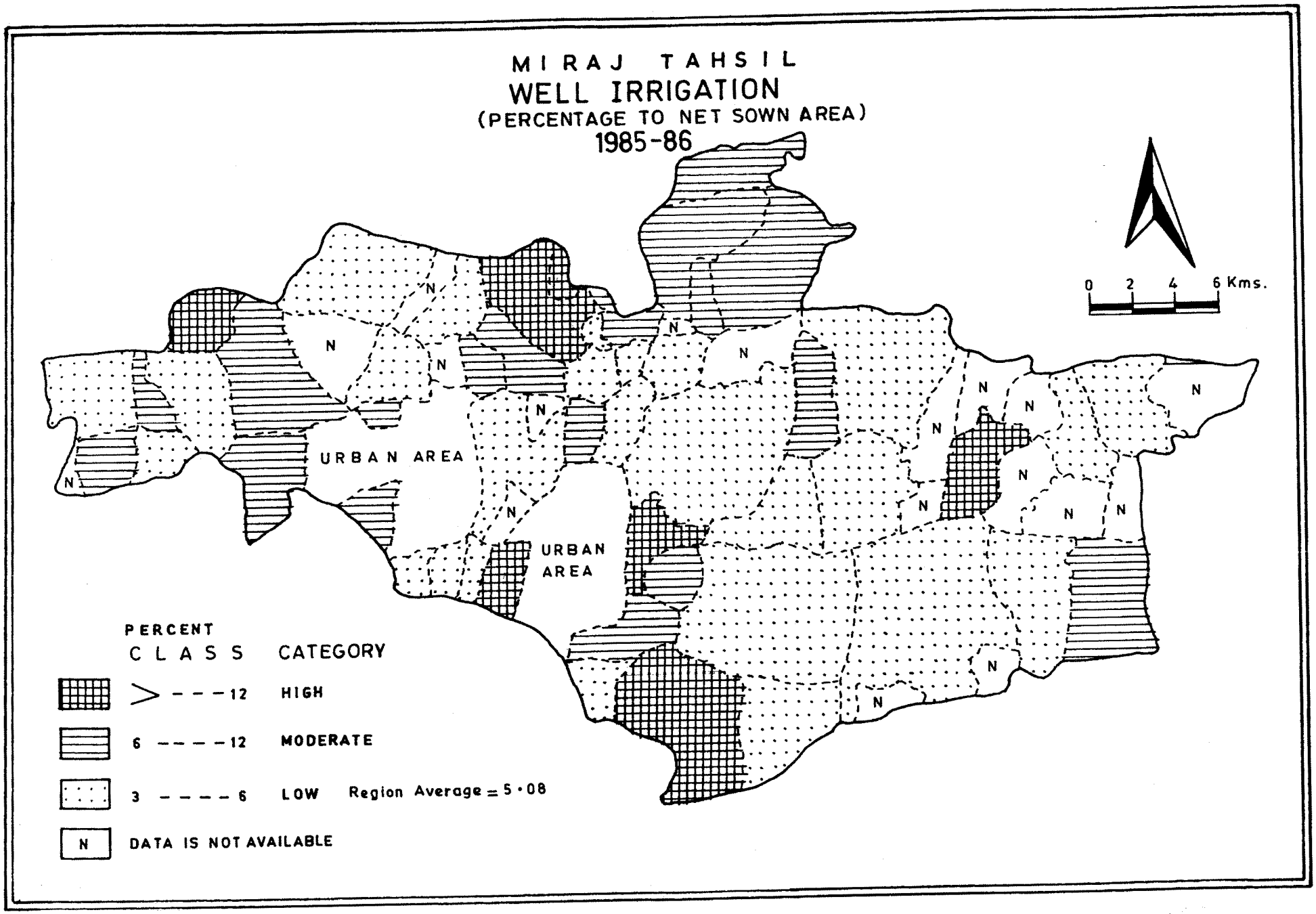
MIRAJ TAHSIL
WELL IRRIGATION
(PERCENTAGE TO NET SOWN AREA)
1985-86
0 2 4 6 Kms.
URBAN AREA
URBAN AREA
N
PERCENT
CLASS CATEGORY
> - - - 12 HIGH
6 - - - - 12 MODERATE
3 - - - - 6 LOW
Region Average = 5·08
N DATA IS NOT AVAILABLE

Fig. 3·4

3.2.5 Intensity of irrigation (1986-87) :

The proportion irrigation from all sources of water to net sown area is shown in Fig.3.5. The intensity of irrigation always indicate the proportion of area having assured water supply to net sown area where crops have less risk during dry conditions. The study of spatial pattern of intensity of irrigation is useful in understanding the distributional pattern of grape-vine cultivation. The very high intensity (above 40%) is observed in 12 villages which are confined to Krishna river plain (Fig.3.5). This is followed by high intensity (30 to 40%) in 5 villages in the above tract. Assured water supply from lift schemes have led to high intensity of irrigation in the above villages. Moderate intensity (20 to 30%) is found in the areas of 3 villages whereas low intensity (10 to 20%) is found in 14 villages located in the extreme east, north and west (Fig.3.5). Very low intensity is observed in the rest of the villages. The high proportion of low and very low intensity of irrigation may be attributed to either limitations for lift irrigation or less proportion of well irrigation in the region. Thus, except the western lift irrigated area, the middle and eastern zones of the region has considerably low proportion of intensity of irrigation discouraging the cultivation of grape-vine or other irrigated crops like sugarcane.

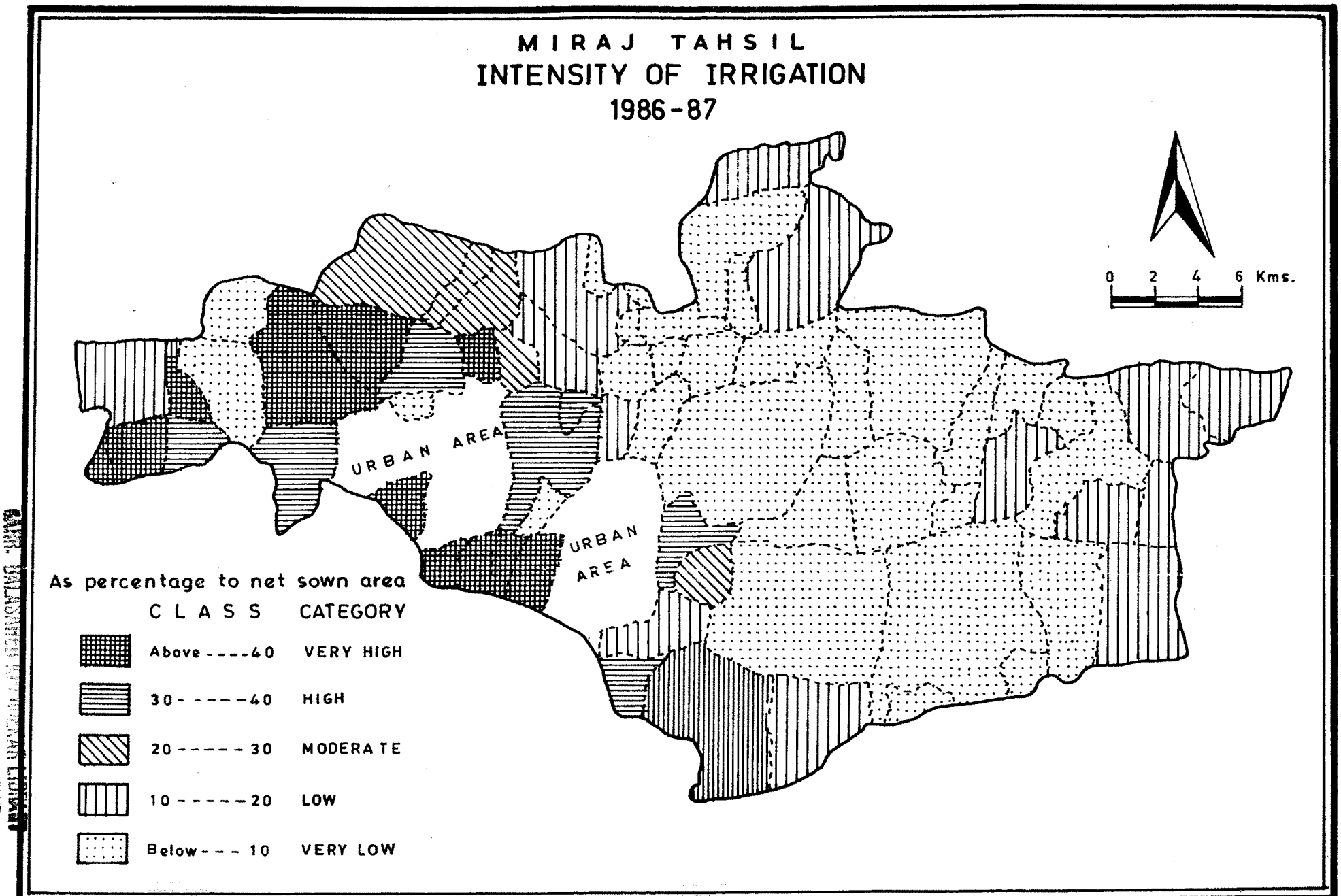

Fig. 3·5

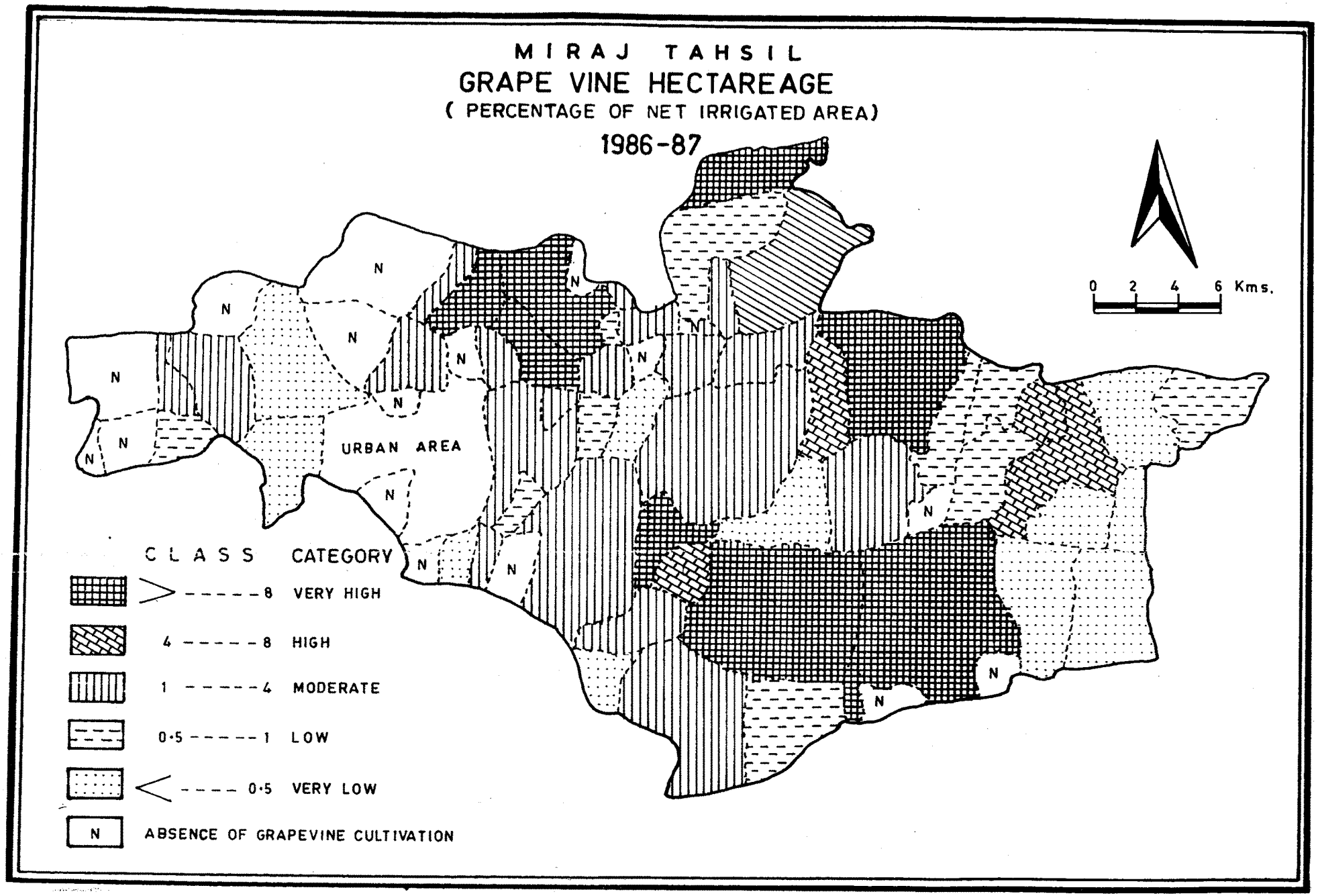
MIRAJ TAHSIL
GRAPE VINE HECTAREAGE
(PERCENTAGE OF NET IRRIGATED AREA)
1986-87
0 2 4 6 Kms.
URBAN AREA
N
CLASS CATEGORY
> ----- 8 VERY HIGH
4 ----- 8 HIGH
1 ----- 4 MODERATE
0·5 ----- 1 LOW
< ---- 0·5 VERY LOW
N ABSENCE OF GRAPEVINE CULTIVATION

Fig. 3·6

3.2.6 Irrigated area and grape-vine hectaraage (1986-87) :

As stated earlier, that grape-vine cultivation is only possible in assured irrigated areas. However, the constraint of scarcity of water during summer season is mitigated through the provision of water tanks by most of the vine growers in the eastern parts. Fig.3.6 exhibits spatial pattern of grape-vine hectareage as the proportion to irrigated area. This indicates that how irrigation is controlling factor for grape-vine cultivation. Very high proportion of grape-vine to irrigated area is found in the villages of Khanderajuri (17.31%), Kavalapur (16.42%), Bedag (14.20%), Kakadwadi (11.42%) and Arag (8.65%). Mention should be made of Khanderajuri and Kavalapur that both village have 222 and 433 hectares of irrigated area out of which 38.44 hectares and 71.44 hectares are under grape-vine respectively. The favourable pedological conditions, availability of water from lift and wells have encouraged grape cultivation in this part. Khanderajuri and Kavalapur have 14 and 8 wells respectively and remaining is irrigated by lifts. High proportion of grape-vine hectareage is found in 5 villages in the north and north-east. This has been followed by moderate proportion in 15 villages ranging between 1 to 4 percent. The availability of water is major constraint for the development of grape-vine in this part. The low (0.5 to 1%) and very low (less than 0.5 percent) is observed in 9 and 10 villages respectively. No availability of water has set the limitation for such proportion.

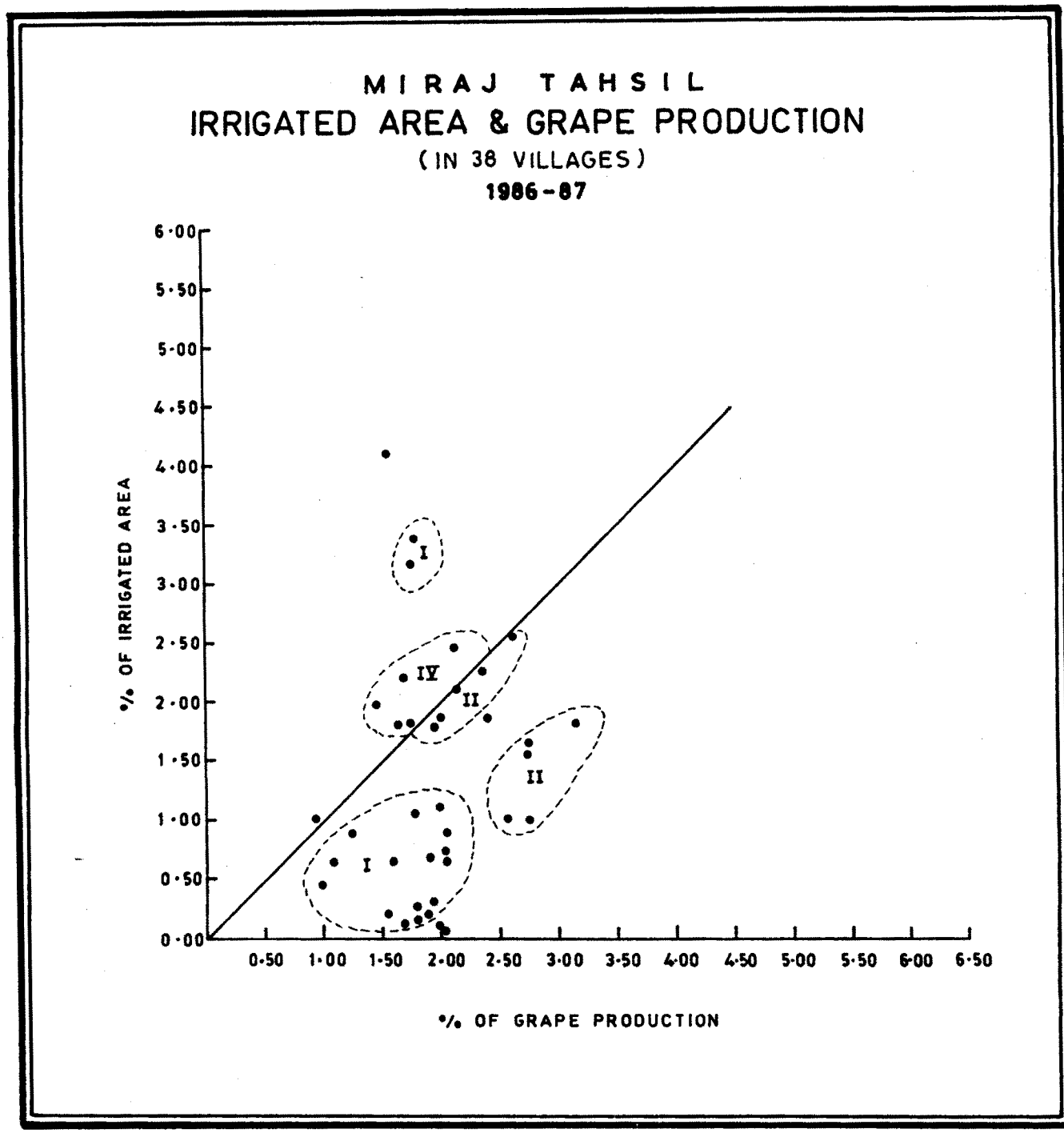
MIRAJ TAHSIL
IRRIGATED AREA & GRAPE PRODUCTION
(IN 38 VILLAGES)
1986-87
% OF IRRIGATED AREA
% OF GRAPE PRODUCTION
6·00
5·50
5·00
4·50
4·00
3·50
3·00
2·50
2·00
1·50
1·00
0·50
0·00
0·50 1·00 1·50 2·00 2·50 3·00 3·50 4·00 4·50 5·00 5·50 6·00 6·50
I
II
III
IV

Fig. 3·7

3.2.7 Irrigated area and grape production, 1986-87 :

As analysed above irrigation has proved to be important determinent for boosting grape-vine cultivation in the region. Since, it is water loving crop it's cultivation is not possible without irrigation. The availability of water for irrigating grape-vines determines the productivity of this crop. When irrigated water is timely available substantial production has been achieved by the farmers. The relationship between irrigated area and grape production is shown in Fig.3.7. The proportion of area under irrigation varies from village to village which leads to spatial disparities in grape production. Fig.3.7 exhibits that there is positive relation between the irrigated area and grape production in terms of percentages. The revealing fact is that three clusters of villages (29) are located below normal where ratio of irrigation (0 to 2 percent) and grape production(0 to 3 percent) is low. However, in cluster IV and V (above normal), the proportion of irrigation (1.50 to 4), though high, the production has not been increased (below 2 percent). This is mainly observed in the western parts where deep black soils with their saline nature have adversely affected the productivity of this crop. The availability of water is satisfactory in this zone but the productivity is not reached to that mark.

3.2.8 Watering to grape-vine in Miraj tahsil, 1987 :

Table 3.4 reveals that the watering to grape-vine varies from season to season. A detailed discussion is attempted in the

earlier pages. However, average picture of the region is shown in Table 3.4 which depends upon the intercultural practices, availability of water and rainfall conditions in the region.

TABLE 3.4 : Average watering to grape-vines in Miraj tahsil - 1987.

Sr. No.	Period of watering	Number of turns
1	After April cutting to 15th June	Per week
2	15th June to 15th Sept.	As per rainfall occurances
3	After October cutting upto 15th November	After ten days
4	15th November to 15th January	Per week
5	15th January to February end (upto harvest)	After 12 to 15 days

SOURCE : Compiled by the Author, based on field work - 1987.

It is evident from the above table that there is much need of water after April and October cuttings (per week). This period is important during which growth of grape-vine is favourably affected. During rainy season, however, the watering depends upon the occurances and intensity of rainfall. The eastern parts

do not receive sufficient rainfall and hence watering per week is adopted even during rainy season. Obviously, watering to grape-vine depends upon the rate of evaporation, temperature conditions and growth stage of grape plant.

3.3 FERTILIZER AND MANURE APPLICATION :

Chemical fertilizer is an essential in gradient for the fair growth of grape-vines. It has become symbol of green revolution in India. However, there is regional disparity in the use of fertilizers in the country and the region too. In present analysis an attempt has been made to highlight the spatial pattern of fertilizer consumption in Miraj tahsil, particularly for grape-vine cultivation. The data regarding the use of fertilizers has been collected by the author through intensive field work by visiting each vine yard.

3.3.1 Fertilizer application :

Fertilizer application has become the important part of grape-vine cultivation without which the study cannot be completed. The use of fertilizer to grape-vines depends upon the texture, structure and depth of the soils. The proportion to be applied also varies from time to time and from the initial stage of growth to its mature stage. It is observed that the nitrogen content within the vine is sufficient where as there is difficency of potash and phosphorus. Table 3.5 gives the idea about general requirements of fertilizers per hectare to obtain 10 tonnes of grape production.

TABLE 3.5 : General requirements of fertilizers for grape-vine (per hect.), 1986-87.

Fertilizer content	Before Oct.cutting Kg per hect.	After Oct.cutting kg per hect.
Nitrogen	40 to 60	395 to 435
Phosphorus	10 to 15	445
Potash	50 to 70	495 to 550

SOURCE : ' Baliraja,' May 1987, Khilari, J.M.,p.84.

It is evident from the above table that fertilizers are applied to grape vines twice a year which is followed by frequent doses provided there is deficiency felt. The pre-cutting season is characterized by less proportion of fertilizer to be applied, whereas during post-cutting season there is heavy application of fertilizers. The proportion of above doses are, however, very remarkably in the region. This is due to the response of soil and availability of water. Recently the fertilizers are applied in liquid form by spraying on the grape plants.

In addition to N.P.K. there are different elements required for the growth of grape-vines as boron, zink, copper, magnesium, sulphur, maganesium, iron, calcium and sodium. Vines, however, unlike most crop plants do not readily manifest a need for nitrogen (Winkler et al.,1974).

3.3.2 Spatial pattern of fertilizer consumption :

In the present analysis the emphasis is given on the spatial pattern of fertilizers consumption in the vine gardens at village level in the region by visiting each garden for the period of 1986-87.

The index values showing intensity of fertilizer consumption are calculated by employing following equation.

$$IF = \frac{VP}{RP} \times 100$$

Where, IF = Index of fertilizer consumption,

VP = Per hectare fertilizer consumption in 'x' village and

RP = Per hectare fertilizer consumption in entire region.

i) Intensity of fertilizer application (Pre-plantation period) :

Fig.3.8 exhibits the spatial pattern of fertilizer application to grapewvines before the plantation. The region's average intensity of fertilizer application is about 101.94. The high intensity (above 150 kg) is confined to five villages located in the central part. The moderate intensity (75-150 kg) is found in many gardens of 28 villages, low intensity (50-75 kg) is found in 11 villages located in the extreme eastnorth and west.

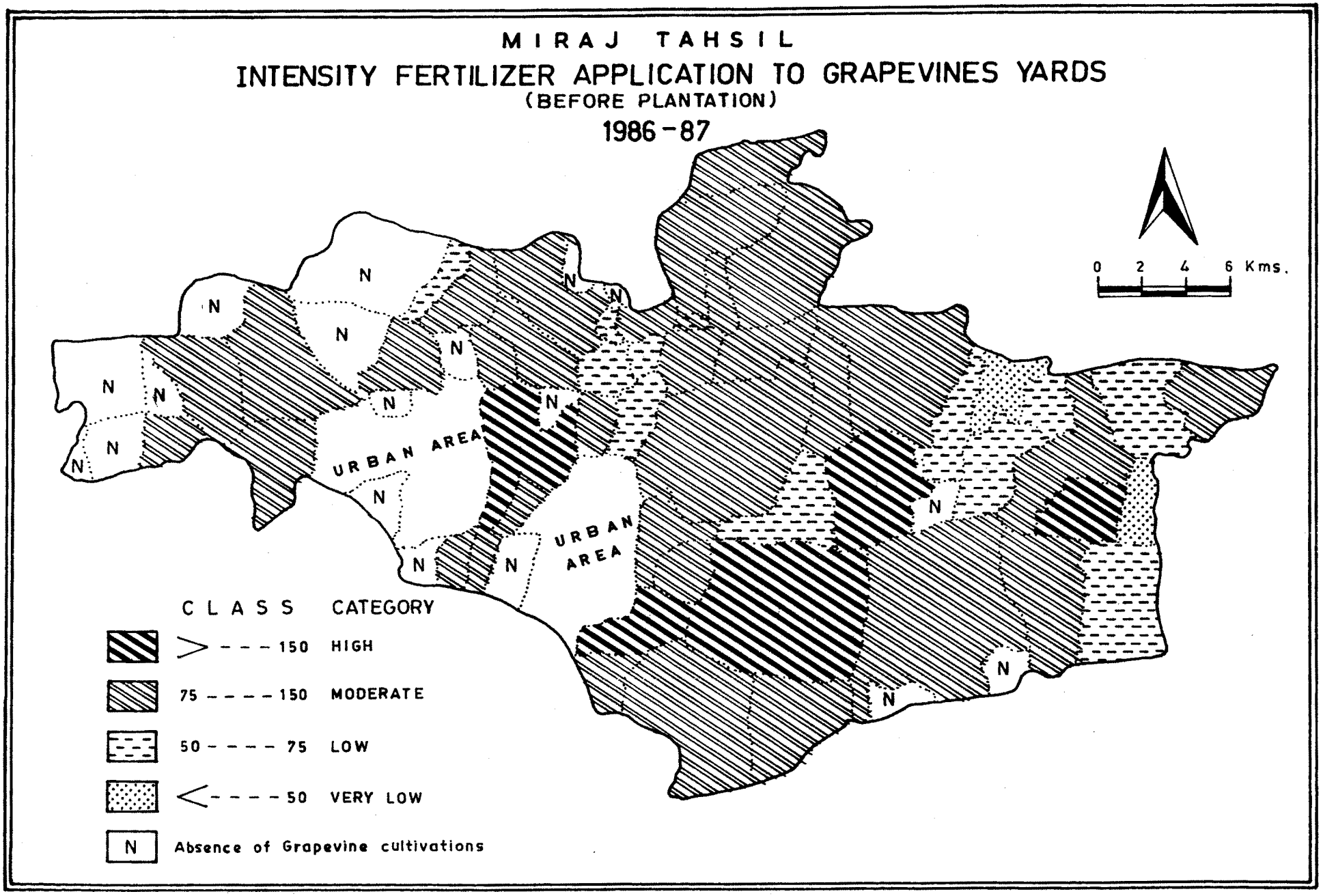
MIRAJ TAHSIL
INTENSITY FERTILIZER APPLICATION TO GRAPEVINES YARDS
(BEFORE PLANTATION)
1986-87
0 2 4 6 Kms.
URBAN AREA
URBAN AREA
CLASS CATEGORY
> - - - 150 HIGH
75 - - - - 150 MODERATE
50 - - - - 75 LOW
< - - - - 50 VERY LOW
N Absence of Grapevine cultivations

Fig. 3·8

The very low intensity (less than 50 kg) is observed on Janrao-wadi and Dongarwadi. The regional variation in the application of fertilizer is determined by the availability of water and soil conditions. The eastern and northern parts are deprived of water which is reflected in low application of fertilizers. This tract is having coarse soils and farmers do not take risk under such conditions.

ii) Intensity of fertilizer application (Post plantation period) :

When grape plants are matured for one and half years, the fertilizers are applied before first cutting. Fig.3.9 shows the distribution of fertilizer intensity. The high intensity (276.73 kg) is recorded by the gardens in Karoli village which is followed by the gardens in the villages of Kavalapur (141.89), Kavaji Khotwadi, Bamni (141.11), Kupwad (133.66) and Arag (133.26). The lift irrigation is recently introduced in those villages providing assured water supply and eliminating the danger of water scarecity. Mention should be made that about 2941.66 kg fertilizers are applied per hectare in the gardens of Karoli village whereas lowest fertilizer consumption is (175 kg) recorded by gardens of Erondoli village. However, the average application of fertilizer is about 1063 kg. About 9 villages have recorded moderate intensity (75 to 100) and 14 villages that of low intensity.

Per hectare consumption of fertilizer is very low in the villages of Janraowadi, Kalambi and Kandwadi. In the above analysis

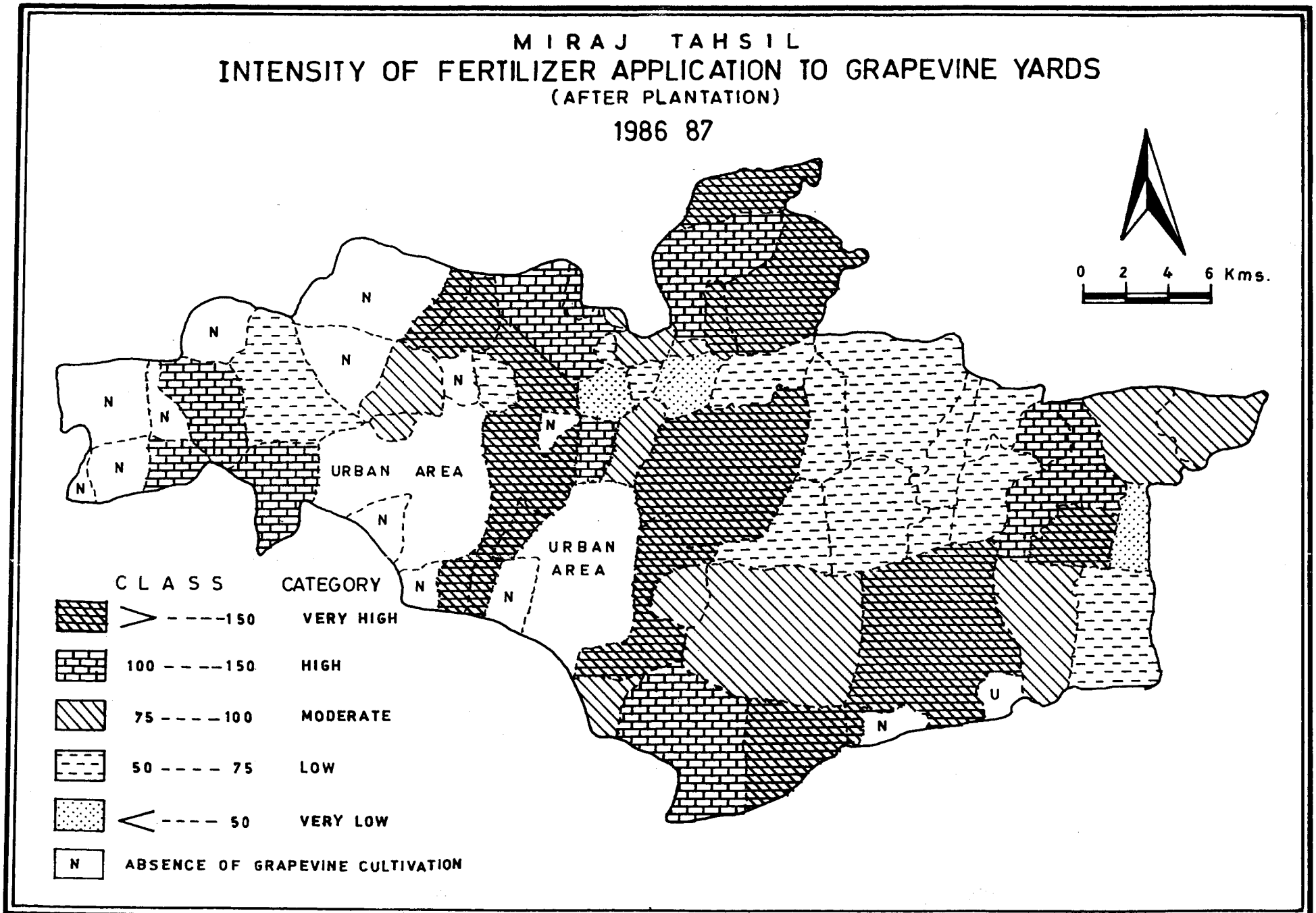
MIRAJ TAHSIL
INTENSITY OF FERTILIZER APPLICATION TO GRAPEVINE YARDS
(AFTER PLANTATION)
1986 87
0 2 4 6 Kms.
URBAN AREA
URBAN AREA
U
N
CLASS
CATEGORY
> ----150 VERY HIGH
100 ----150 HIGH
75 ----100 MODERATE
50 ---- 75 LOW
< ---- 50 VERY LOW
N ABSENCE OF GRAPEVINE CULTIVATION

Fig. 3-9

it is found that water availability is the governing factor for the application of fertilizers. The gardens in the villages on the east and north are characterized by the scarecity of water. Well irrigation is the basic source of irrigation in those villages and the seasonality of wells has further aggrivated. There is also remarkable decline in the average watertable in this zone. Consequently the tempo of fertilizer application is grately determined by such conditions.

3.3.3 Manure application :

The application of manures to the soils is traditional method due to which fertility status is enriched. Manures are applied substantially to grape-vine yards. The trenches are filledup with the decay of vegetation along with farm yard manures. A detailed discussion is attempted for the procedure of filling the trenches in Chapter IV. The following discussion is related to spatial aspects of manures applied during pre-plantation and after plantation period. The quantity of manures is always high in case of pre-plantation whereas the post plantation period is characterized by the application of manures every year to grape-vine yards. The field data (gardenwise) is collected and analysed as follows.

i) Spatial pattern of manures (pre-plantation) :

Fig.3.10 indicates the regional pattern of manures in different gardens of the region. It is observed that more than

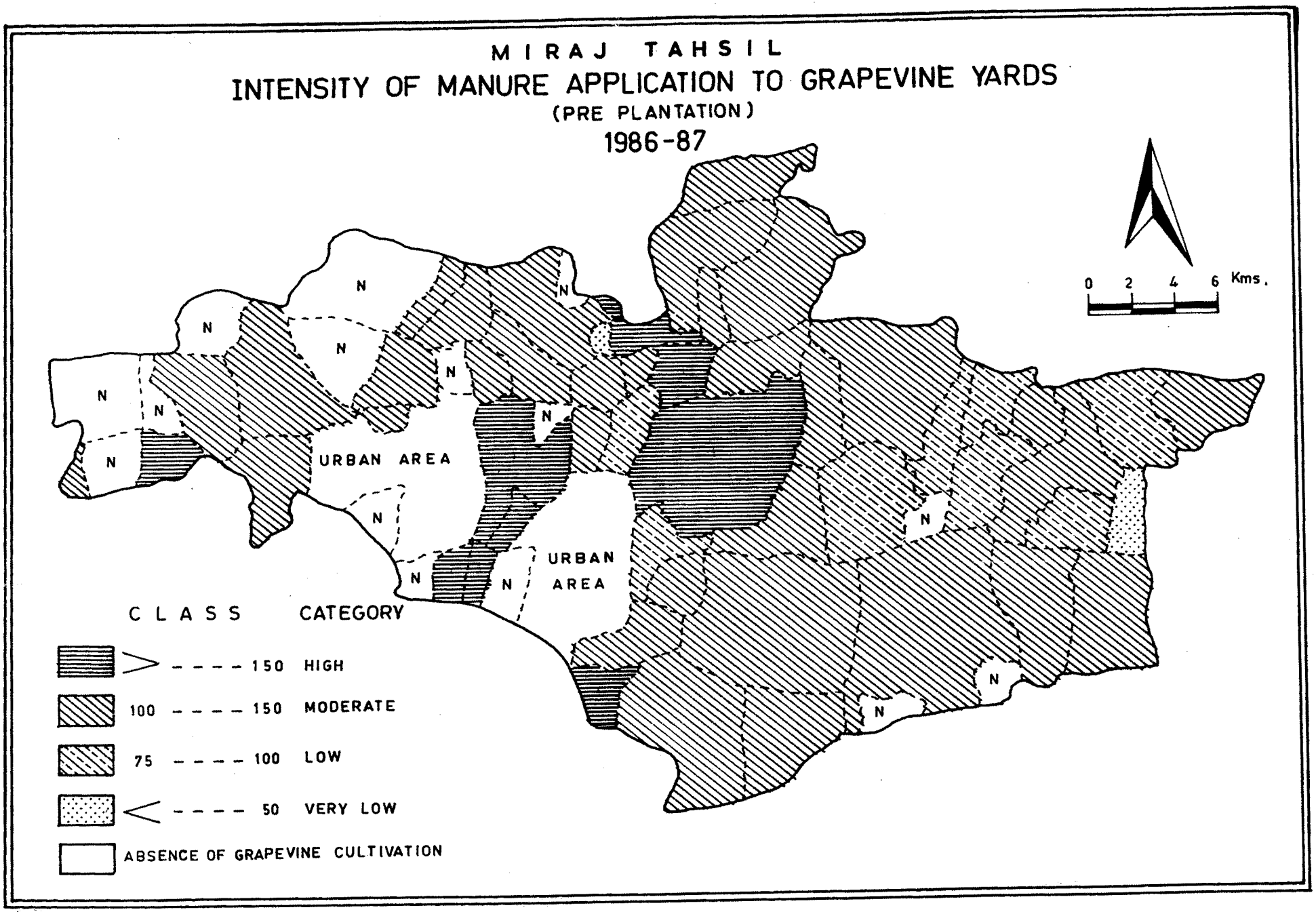
MIRAJ TAHSIL
INTENSITY OF MANURE APPLICATION TO GRAPEVINE YARDS
(PRE PLANTATION)
1986-87
0 2 4 6 Kms.
URBAN AREA
URBAN AREA
CLASS CATEGORY
> ---- 150 HIGH
100 ---- 150 MODERATE
75 ---- 100 LOW
< ---- 50 VERY LOW
ABSENCE OF GRAPEVINE CULTIVATION

Fig. 3-10

(100) bullock carts of manures are applied to the tranches in the villages of Dhamni, Dhavali, Kharkatwadi, Wanlesswadi and Kupwad. This zone records more than 150 index value. This has been also followed by Malgaon, Shindewadi villages. Moderate intensity ranging (between 100 and 150) is confined to the villages in the southeast, north and northeast. The heavy application of manures is due to the awareness among the farmers to avoid ill-effects of high doses of fertilizers in order to mentain fertility of grape soil. The low intensity is observed in 21 villages located in the east. Very low category is found in Janraowadi village.

ii) Spatial pattern of intensity of manures (post-plantation period) 1985-86 :

Fig.3.11 exhibits spatial pattern of intensity of farm yard manures which are locally available from livestock and straws of crops. Despite the regional variations, the average application of manures is about 39.60 bullock carts per hectare of vine yards. The highest intensity (214.32) is attained by Wanlesswadi followed by Kharkatwadi (201.11), Tung (155.47). The deep black soils of these villages are suceptable for salinity hazards due to fertilizer application. The use of manures have proved to maintain fertility status. Besides, high intensity zone (above 150) is confined to the vine yards of seven villages. About 9 villages have attained moderate intensity

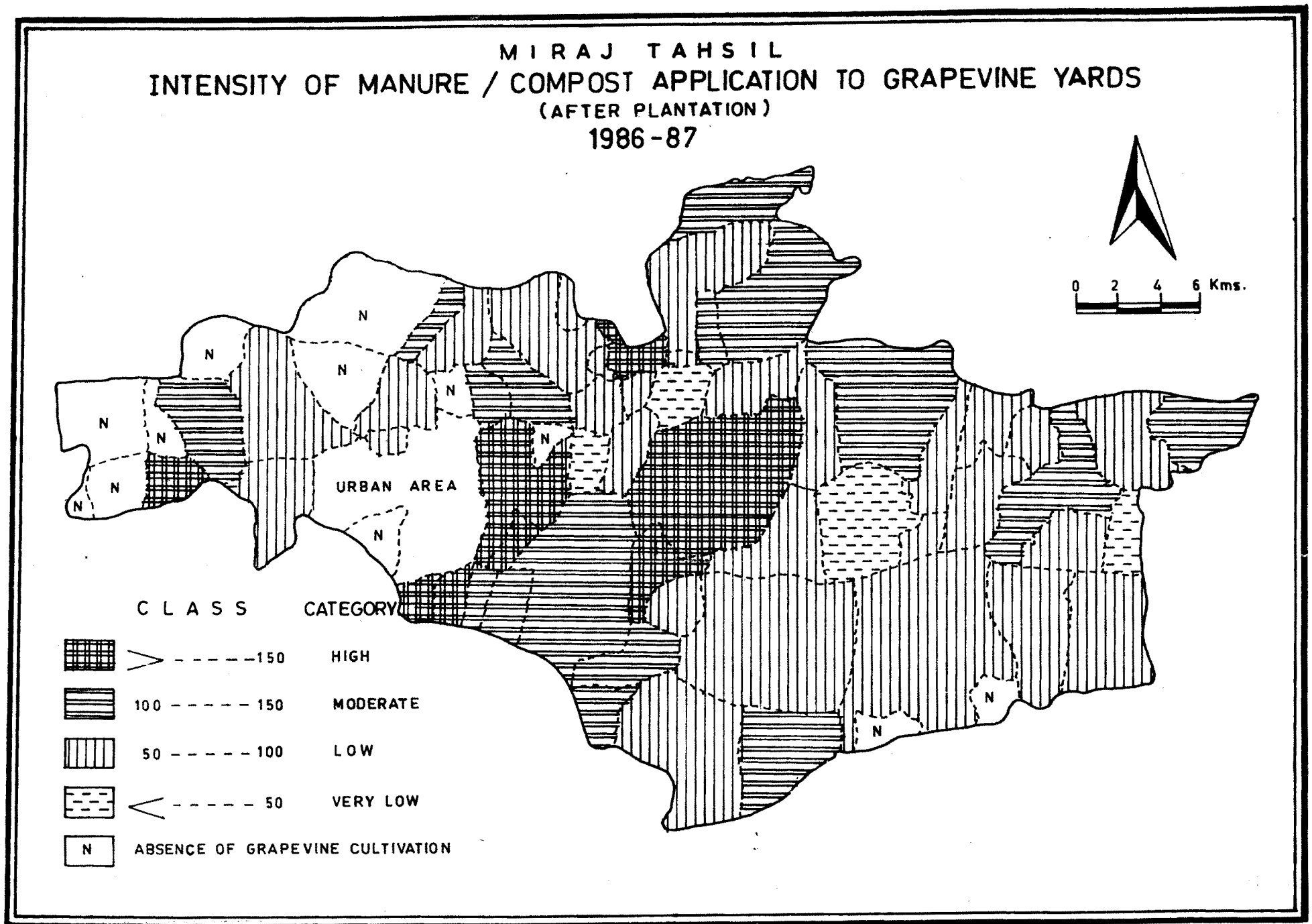
MIRAJ TAHSIL
INTENSITY OF MANURE / COMPOST APPLICATION TO GRAPEVINE YARDS
(AFTER PLANTATION)
1986-87
0 2 4 6 Kms.
URBAN AREA
N
CLASS CATEGORY
> ------150 HIGH
100 ------ 150 MODERATE
50 ------ 100 LOW
< ------ 50 VERY LOW
N ABSENCE OF GRAPEVINE CULTIVATION

Fig. 3-11

(100 to 150) whereas low intensity (50 to 100) is observed in the vine yards of 24 villages. Moreover, this zone is mainly confined to the eastern parts. The vine yards of Janraowadi, Erandoli, Karnal and Savali have recorded low intensity (less than 50) i.e. less than 20 bullock cart loads of manures per hectare. Uneven pattern of manure application is invariably related to type of soils and availability of water for irrigation. Manure application is made before October cutting after loosening the soils either by hand or plough drawn by bullock pair.

3.3.4 Fertilizer application and Grape-vine productivity :

The main objective here is to examine the relationship between productivity of grape-vine and fertilizer application. The data pertaining to per hectare production of grape and fertilizer consumption was collected through gardenwise survey. A graphical representation is shown in Fig.3.12. There are six groups of villages out of which three having positive trend but below the normal (19 villages). This indicates that the gardens of these village have the production ranging from 1.50 to 3 percent with the fertilizer ratio ranging between 1 to 2 percent above normal in 23 villages. The ratio of fertilizer application varies from 1.50 to 2.75 percent and that of production of grape between 0.75 and 2.50 percent. From this analysis, it is observed fertilizer application has become essential phenomenon promoting increase in grape production in the region. However, location

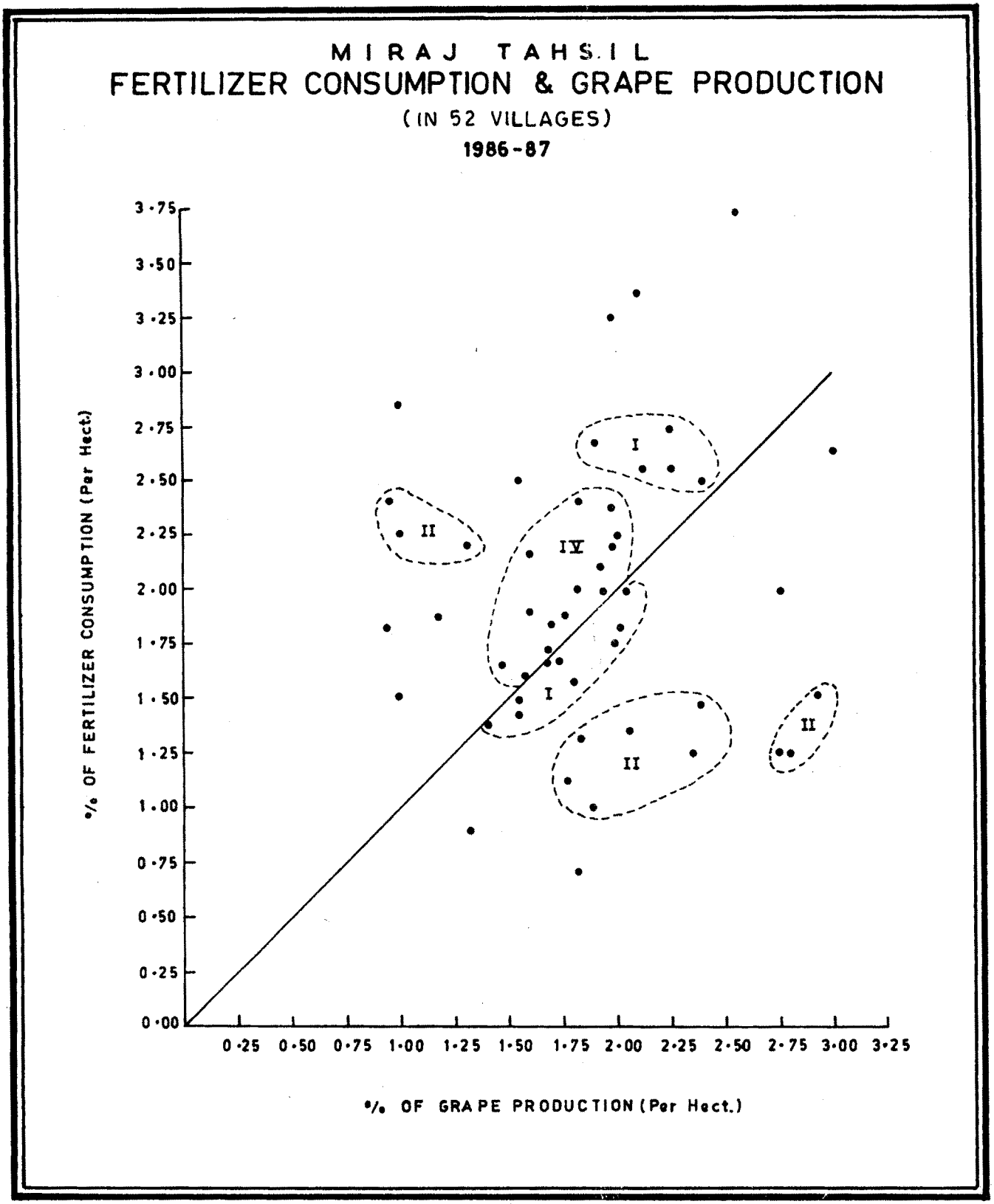
MIRAJ TAHSIL
FERTILIZER CONSUMPTION & GRAPE PRODUCTION
(IN 52 VILLAGES)
1986-87
% OF FERTILIZER CONSUMPTION (Per Hect.)
3·75
3·50
3·25
3·00
2·75
2·50
2·25
2·00
1·75
1·50
1·25
1·00
0·75
0·50
0·25
0·00
0·25 0·50 0·75 1·00 1·25 1·50 1·75 2·00 2·25 2·50 2·75 3·00 3·25
% OF GRAPE PRODUCTION (Per Hect.)
I
II
IV
I
II
II

Fig. 3·12

of some villages (7) in the south-western quarter of this graph shows that though fertilizers are applied substantially (1.50%,3 percent) the production of grapes has not been increased (below 1.25 percent). The soils in vine gardens of these villages are deep black showing saline nature and low productivity.

3.3.5 Manure application and grape production :

Table 3.6 reveals per hectare application of fertilizers and manures and resultant production of grapes. A considerable variation in the use of inputs is observed. The middle zone ranks in fertilizer application with average of 4182.43 kg per hectare. This zone has partly medium deep black soils and partly coarse soils which are responsive for fertilizer application. Per hectare average application is about 4060 and 3122.40 kg in western and eastern zones respectively. The major constraints are deep black soils in the west and inadequate water in the east. The western zone has attained first rank regarding the application of manures (170 bullock cart loads per hect.) which is followed by middle (155) and eastern (137) zones. The heavy application in black soils of the western zone can be attributed to improve the fertility status of soils. In view of proper drainage of soils and availability of water, middle zone has recorded high yields per hectare i.e. 38,912 kg.

TABLE 3.6 : Area under grape-vine, per hectare consumption of fertilizer and manures and grape production in Miraj tahsil, 1987.

Sr. No.	Zone	Number of grape procurring villages	Area under grape-vine (hect.)	Average per hectare consumption of gertilizers Kg.	Average per hectare use of manures (Bullock carts)	Per hectare grape production
1	Eastern zone	15	96.75	3122.40	137	26,665
2	Middle zone	10	429.36	4182.43	155	38,912
3	Western zone	27	22.82	4060.00	170	28,879

SOURCE : Compiled by the Author, 1987.

3.3.6 Seasons and doses of fertilization :

In the region under study, the fertilizers, though unevenly applied in quantity, are applied to grape-vine yards twice a year i.e. before and after the cutting takes place in April and October. Following Table 3.7 gives the idea about the quantity, quality of fertilizers and manures to be applied.

TABLE 3.7 : Type and quantity of fertilizers and manures applied (per hect.) in Miraj tahsil before and after April cutting - 1987.

Sr. No.	Period	Type of fertilizer/ manures	Per hectare application kg/tonnes
1	Before cutting (April)	Composts	30 to 40 tonne
		Mixed fertilizers 7.10.5	1250 kg
		Sulphate of potash	1000 kg
		Nim oil cakes	1800 kg
		Magnesium sulphate	60 kg
2	One month after cutting (May end)	Urea	250 kg
3	2 to 3 months cutting (June end or July)	Urea	250 kg
		Mixed 18.46.0	250 kg

SOURCE : Compiled by the author, based on field data, 1987.

Table 3.7 shows the doses of manures and fertilizers applied to grape-vines in the region before and after April cutting. The per hectare use of compost (30 to 40 tonnes) is substantial and associated with the use of mixed fertilizers (7.10.5), potash, oil cakes etc. This application is adopted ater ploughing the grape soils and followed by weekend watering. It was also observed that the farmers in the east and northeast do not take risk to apply high doses of fertilizers due to inadequate water supply from wells. The proportion of doses is made according to the availability of water. One month and two to two and half months after April cutting two doses of urea are applied (250 kg per hectare) each time.

Before October cutting the grape-vine soils are ploughed and loosened and about 40 tonnes of composts are mixed. But such proportion varies in the region due to non-availability of manures. Besides the use of Nim oil cakes, mixed fertilizers (18.46.0) and magnesium sulphate (60 kg) is made before cutting. This has been followed by frequent watering as per soil texture and availability of water (Table 3.8).

The period after cutting mainly of blooming, fruiting and maturity of berries is characterised by the use of urea (250 kg) and mixed fertilizers (7.10.5) of 250 kg doses. In fact, it is observed that the grape growers are not maintaining the same proportion all over the region. The above picture shows the generalized characteristic of the application of fertilizers

and manures. Moreover, water availability in the eastern and north eastern parts is major controlling factor for fertilizer application.

TABLE 3.8 : Type and quantity of fertilizers and manures applied (per hect.) in Miraj tahsil - 1987, (Before and After October cutting).

Sr. No.	Period	Type of fertilizers/ manures	Per hectare application kg/tonnes
1	Before cutting	Composts	40 tonnes
		Mixed fertilizers 7.10.5	750 kg
		Sulphate potash	500 kg
		Nim oil cakes	1800 kg
		Nitrogen & Phosphate (18.46.0)	1000 kg
		Magnesium sulphate	60 kg
2	Blooming (November)	Urea	250 kg
3	Fruiting (Dec-Jan)	Urea	250 kg
4	Before maturity of grapes (Feb-March)	Mixed fertilizers	250 kg

SOURCE : Compiled by Author, based on field work, 1987.

3.3.6 Problems related to Fertilizer/Manure application :

The author examined some problems in the context of this vital input during gardenwise survey. Recently the grape growers are awared about the doses to be applied in view of the efforts made by Grape Growers Association and the experiments of some leading farmers in the region. However, many small sized holders use below the normal doses. The major hinderance is the scarecity of water due to successive drought conditions in the eastern parts. Secondly, the problem of salinity of deep black soils in lift irrigated areas of the west has affected the quantity and quality of grapes. In fact, the farmers are inclined to use manures and composts substantially to maintain the balance of pH value. It is also observed that fertilizers are not available when they required. This happens in case of murite of potash. Besides, the small grape growers are unable to afforded themselves to high prices of fertilizers. Many times sufficient quantity of manures is not available during pre-plantation period.

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