

CHAPTER III

PATTERN OF IRRIGATION

- 3.1. Introduction
- 3.2. Need of Irrigation
- 3.3. Limitations of Irrigation
- 3.4. Sources of Irrigation
 - 3.4.1. Lift Irrigation
 - 3.4.2. Well Irrigation
 - 3.4.3. Other sources of irrigation
- 3.5. Overall Intensity of Irrigation
- 3.6. Summary
- References

3.1. INTRODUCTION :

In the earlier chapter the physical and demographic factors have been discussed in the context of irrigation. An attempt is made here to assess the growth of irrigated area under different sources of irrigation along with the consideration of methods of irrigation, intensity of irrigation and regional pattern of leading sources of irrigation in the study area.

Irrigation is regarded as an integral part of sound infrastructure and is one of the basic ingredients of agricultural activities. To be successful and well developed agriculture requires supply of water at regular interval and in required quantity. This could be done by artificial application of water to land for growing crops and is known by the term "Irrigation". (Pawar, 1989).

Irrigation is the very valuable element in the progressive agriculture. It determines landuse and cropping pattern of a region. It prominently affects the region of scanty rainfall and assures the crops growth, crop yield as well as productivity. Thus availability of perennial water for irrigation encourage farmers to accept more scientific technique and intensive cultivation.

3.2. NEED OF IRRIGATION :

The region under investigation has acute need of irrigation due to erratic and unassured distribution of rainfall in time causing water scarcities.

In those areas where rainfall is plentiful and well distributed over the year, there is no need of irrigation. But in areas where rainfall is very scanty and uneven, the artificial

application of water is absolutely essential. In certain areas rainfall may be abundant but may be concentrated in a short period of year, in these areas, provision of irrigation will facilitate growing of more than one crop in a years (Datta and Sundaram, 1974).

The rainfall is unevenly distributed in the lower Chikotra basin. The isohyetal map shows the annual rainfall distribution in the region. The rainfall decreases remarkably from west to east (1500 to 1000 mm). It indicates that the distribution of the rainfall varies from part to part. In such areas the need of irrigation for successful cropping is essential, particularly, when there is a long gap between two spells of monsoon rain. Hence an assured water supply is one of the conditions, which is very essential for crop growth in the region.

Moreover the distribution of a rainfall in the region within a year is also uneven (Table 2.1). The region, as a while, has 1504 mm annual average rainfall. Out of it 93.42% percent is concentrated in four months viz. i.e. June to September. The months from December to March are almost rainless. Thus, there is greater need of irrigation after rainy season, when growing crops require artificial supply of water with the increase in temperature and consequent dryness during summer month (March, April, May). The requirement of irrigation water is further intensified particularly for sugarcane cultivation as it consumes more water.

3.3 LIMITATIONS OF IRRIGATION:

The physico-socio-economic conditions restrict the development of irrigation in the study area. The undulating topography of west and east along the riverside, restricted the development of canal and well irrigation. The fluctuation in the water table is the main constrains in the development well irrigation along the river sides. Though the wells have enough water up to February they face the problem of scarcity of water in the months of April and May. In the foot-hill zone, however, the natural springs are important sources of irrigation but they are very seasonal in nature.

The prospect of irrigation varies from soil and soil, there is less scope for the development of irrigation in the inferior soils, particularly, in the western portion whereas irrigation is developed in the eastern region due to fertile soils. It is therefore, necessary to plan irrigation schemes, keeping in mind the moisture deficiency, the texture, structure and alkalinity and salinity characteristics of the soil. (Pawar and shinde, 1986)

Basically Chikotra river is not perennial river. The flow of water declines from March to May, hence puts limits for the successful crop production. The development of well irrigation depends upon watertable which deplit during summer season consequently, it puts restrictions on the intensity of irrigation and multiple cropping pattern. The rationing of water for lifts on Chikotra river after February, dry course of river in summer months and fluctuation in watertable are the major obstacles for the planning of crops.

3.4 SOURCES OF IRRIGATION :-

The sources of irrigation are greatly affected by the geological, physical and climatological conditions. The important sources available in the region are lift, wells, and other sources of irrigation in particular area.

TABLE NO. 3.1

**COMMAND AREA OF LOWER REACHES OF CHIKOTRA
IRRIGATION PROJECT: AREA UNDER DIFFERENT
SOURCES OF IRRIGATION 1995-96 TO 2005-06**

(Area in Hectares)

Sr No	Sources	1995-96	2005-06	Percentage change 1995-96 to 2005-06	Absolute increase in hectares
1)	Lift	122.48 (31.15)	1145.36 (64.51)	+33.36	+1022.88
2)	Well	191.29 (48.65)	480.65 (27.07)	-21.58	+289.36
3)	Other	79.42 (20.20)	149.45 (8.42)	-11.78	+70.03
	Region	393.19 (100.00)	1775.46 (100.00)	+33.36	1382.27

NB : Figures in bracket indicate percentage of irrigation area to total.
Source : Village Record, 2006.

The different mode of irrigation were characteristics by the change in their ranking order. Consequently the lift is ranking first (64.51) followed by Well (27.07) and Other sources during 2005-06 (Table 3.1). But before the construction of Chikotra irrigation project the first position was occupied by Well irrigation. Followed by lift and other sources of irrigation.

The distribution of irrigated hectarage related to total irrigated area and total cultivated area may, therefore, give a more realistic picture. Such ratios are computed and mapped

source wise for each of the areal unit where as, volume of change for two different period of times is computed by considering the change in occupancy strength of individual source of irrigation.

3.4.1 Lift irrigation :

A lift is an installation of pump at a height close to the river bank that taps water from the river and allows it to reach the field through small channels constructed for this purpose. Before the advent of water pumps farmers in the region used to make full use of river water for growing sugarcane. Presently the lifts are operated on river banks to which the water supply is regulated by constructing Kolhapur type of weirs on Chikotra river.

- **Spatial pattern and changes :-**

At present Lift irrigation shares about 64.51 percent of total irrigated area in the region. The preponderance of this sources is observed in the North- east, southern parts and central part of the region. The villages namely Khadakewada, Lingnur, Metge, Nandyal, Kapsi have high proportion (above 75 percent) of area under lift irrigation whereas moderate proportion (50 to 75 percent) is found in the villages namely Hamidawada, Galgale. This can be well attributed to relatively plain area of the region.

The low proportion (below 25 percent) is observed only in three villages. This low proportion is observed due to physiographic empediments (Fig No 2.1 relief map). .

After the construction of the Chikotra irrigation project, people have changed their attitude towards the development.

The area irrigated by this sources has increased by 1022.88 hectares. (Fig No 3.1) It has shared additional 33.36 percent of total irrigated area as compared to 1995-96.

3.4.2 Well Irrigation:-

Well irrigation is indigenious method largely suitable for individual farmers wherein water is lifted by ' Mote' worked out by a pair of bullocks. Nowadays these 'Mots' are replaced by oil engines and electric motors. Recently tube wells are also practiced by the farmer. The total wells in operation are 187(Fig No 3.2) which were 125 in 1996.

Spatial pattern and changes :-

Wells are the second leading source of irrigation occupying 27.07 percent of the total area irrigation in the region. However, its spatial distribution at village level deviates much. As such the significant areas irrigated by this source are confined along the Chikotra river's banks (Fig 3.3.). Here perennial streams are absent and so the farmers have to relie on groundwater through wells.

After the construction of Chikotra irrigation project, the irrigated area by this by this source has increased by 289.36 hectares in last decade. However, as compared the other sources, it has lost its share by 21.58 percent.

The physical setting of the wells in general is governed by the surface topography and also by the behavior of grand water. As a result the village level distribution of wells are uneven. The total number of wells has increased in 2005-06 (Wells 187) as compared to 1995-96 (Wells 125).

COMMAD AREA OF LOWER REACHES OF
CHIKOTRA IRRIGATION PROJECT
LIFT IRRIGATION 2005-06
AS THE PERCENTAGE OF TOTAL IRRIGATED AREA

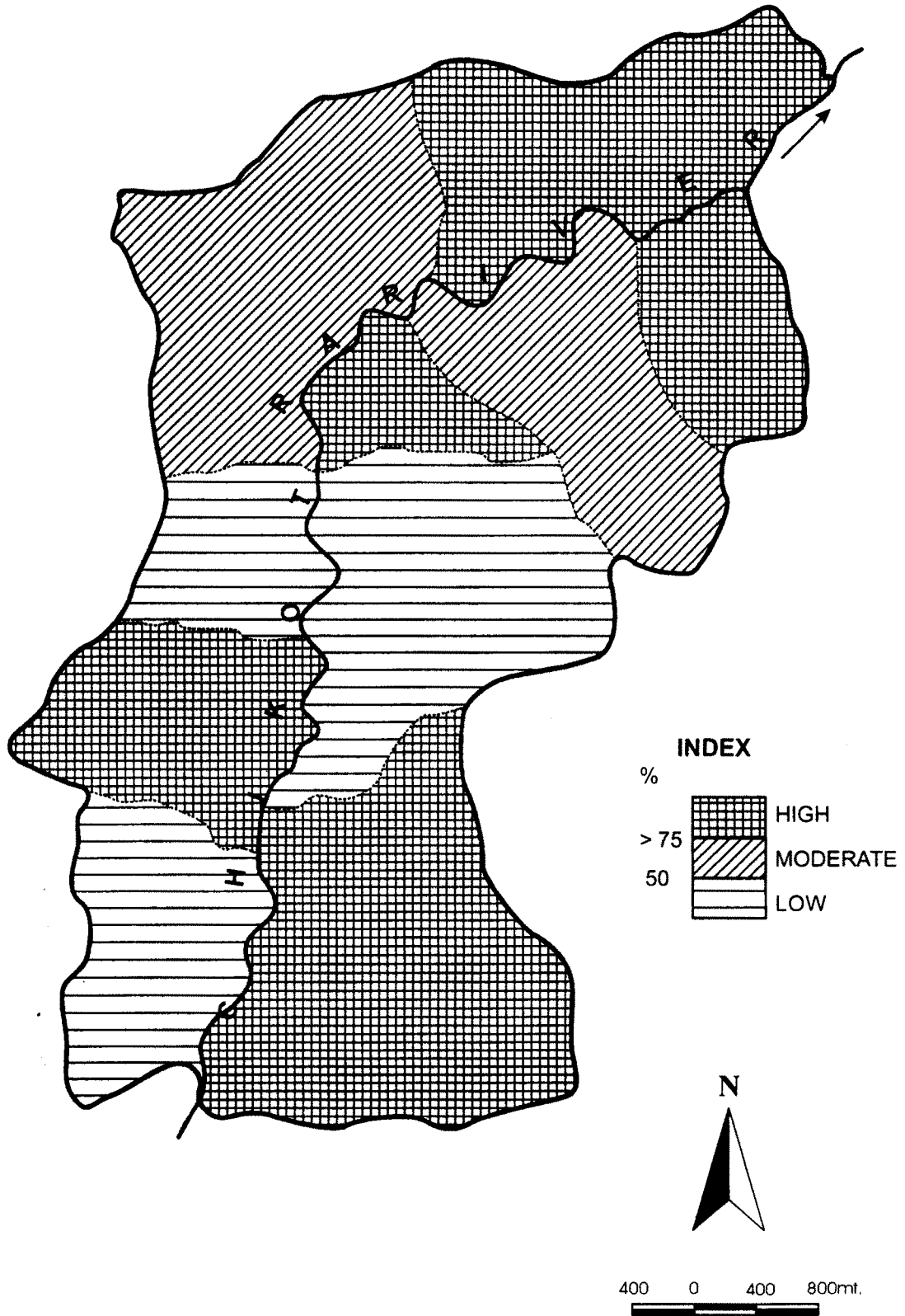


Fig. 3.1

COMMAD AREA OF LOWER REACHES OF
CHIKOTRA IRRIGATION PROJECT
LOCATION OF WELLS

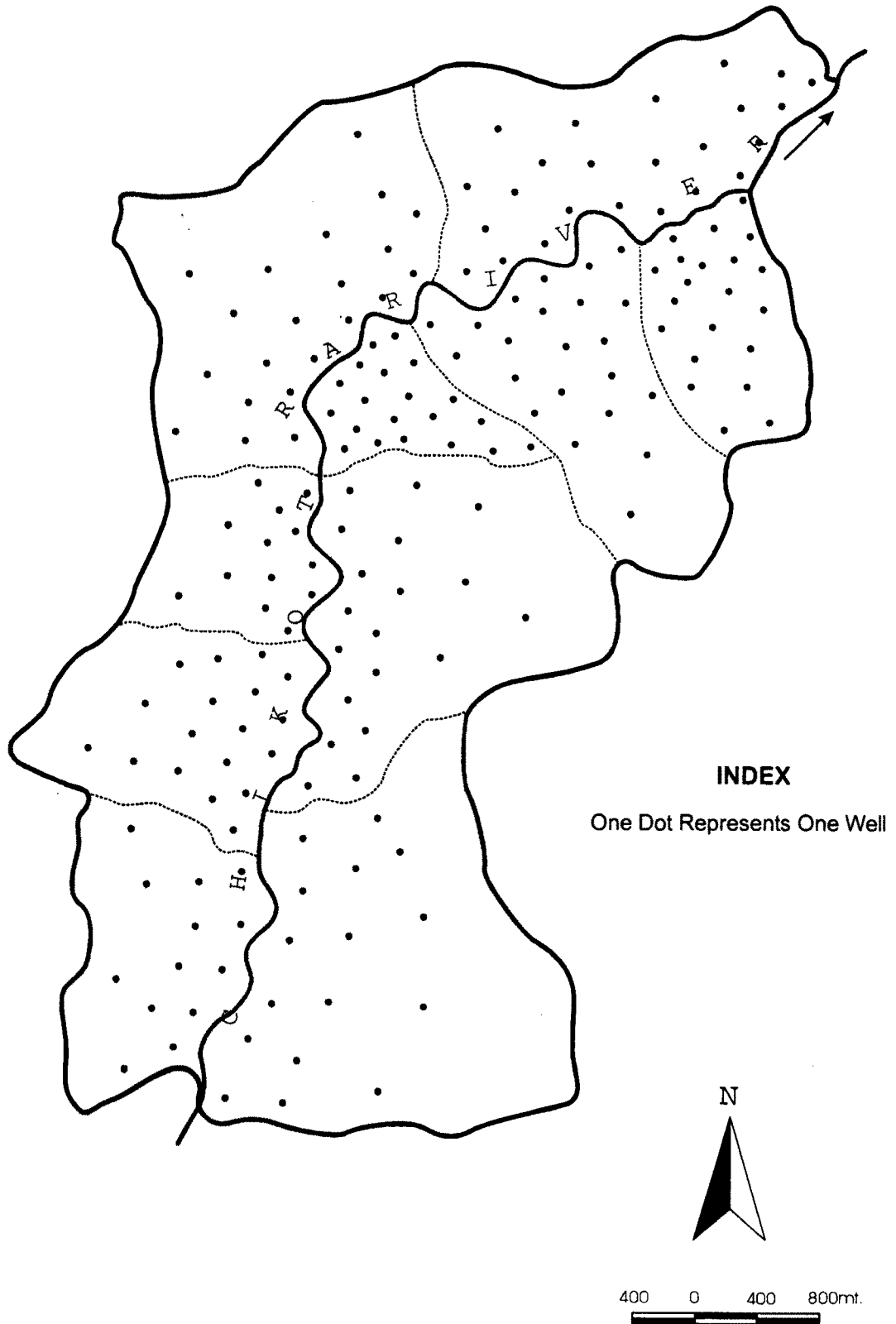


Fig. 3.2

3.4.3 Other sources of irrigation :

This is another important source of irrigation in the region. This source of irrigation refers here to the surface water, schemes such as small streams. The local peoples are involved in this system of irrigation individually. After rainy season, every year, the seasonal flow of streams is diverted by constructing small earthen dams. Obviously, these local sources play significant role in irrigating surrounding crop lands for kharif season only. Moreover these sources of irrigation have great advantage as these schemes can be completed quickly by using local talents and small capital.

The other sources of irrigation shares about 8.42 percent of the total irrigated area in the region and the high concentration of this source is confined to the North and south part of the region.

The area under this source of irrigation has increased by 70.03 hectares during the period under review. However, its contribution to the total irrigated area as compared to other sources has declined to about 11.78 percent.

3.5 OVERALL INTENSITY OF IRRIGATION :-

The term intensity of irrigation here refers to the net area irrigated to net area sown. The intensity of irrigation in the region is about 33.69 percent. (Fig No 3.3).

The high intensity of irrigation (>40%) is observed in the northern part of the region particularly in the villages namely Khadkewada, Lingnur and Metage. This is due to relatively main area and presence of fertile soil in these villages. The

moderate intensity of irrigation (30 to 40%) is noted in the Nandyal, Arjunwada, Galgale whereas no intensity (below 20 percent) is noted in the rest of the villages. It is due to hilly topography and presence of coarser shallow soils in these villages.

During the period under review the intensity of irrigation has been increased by 25.64 percent. However, significant increase in the intensity of irrigation is observed in the lower Chikotra basin. This can be well attributed to the spread of individual lift irrigation schemes in this part of the region.

The method of the irrigation for application of water to the crop vary from crop to crop and village to village, depending on the slope of the region (Personal observation). In general curration method is still applied largely for sugarcane crop. The flood irrigation is applied for jowar, wheat and maize crops. The adopting of water-saving methods such as drip and sprinkle are not adopted by the farmers of the region, as the agricultural development is still in a initial stage.

3.6 SUMMARY :-

The present situation of irrigation is characterized by some physiographic variations which inturn have resulted in the development of particular source in particular area. As such, lift irrigation a predominant source, sharing about 64.51 percent of the total irrigated is developed particularly, on the river banks. This is followed by dominance of Well irrigation (27.07%). These Wells are observed along two side of river banks because after the completion of Chikotra irrigation project increased irrigated

COMMAD AREA OF LOWER REACHES OF
CHIKOTRA IRRIGATION PROJECT
INTENSITY OF THE IRRIGATION 2005-06

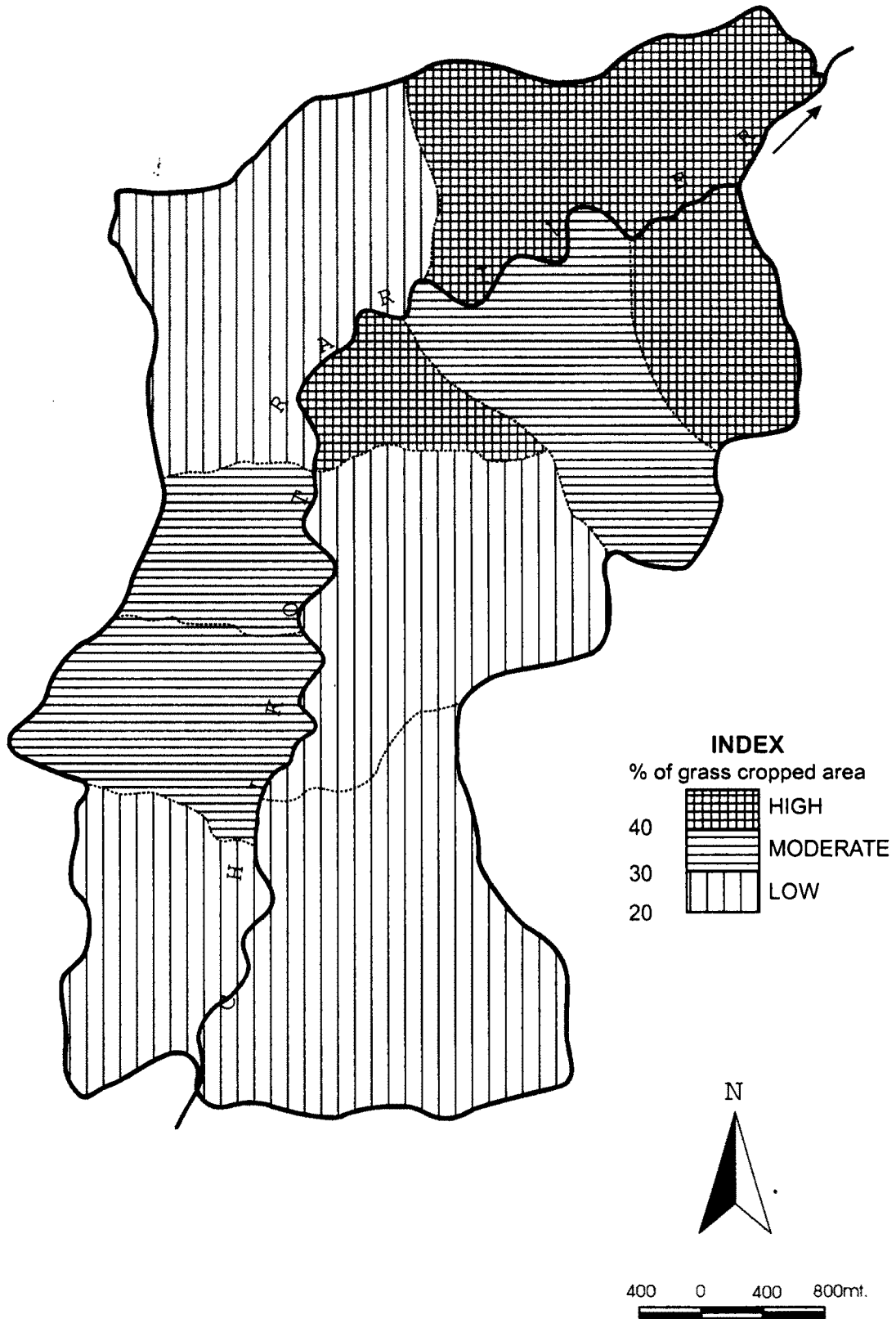


Fig. 3.3

area has helped indirectly to increase the water table of wells (personal interviews). The other sources (by local diversion dams) contributed only 8.42 percent of the total irrigated area. The period under review has witnessed of about 1382.27 hectares of additional irrigated land. The intensity of irrigation in the region is 33.69 Percent which has also increased by 25.64 percent. The methods of irrigation are largely traditional such as furrow and flood. The variation in the regional pattern of irrigation and its intensity which in turn influences the adoption of agricultural technology crop pattern, crop yield and intensity are discussed in successive chapters.

REFERENCES

1. Datta and Sundharam (1974) : Indian Economy
2. Govt of Maharashtra : Manual of Minor Irrigation I and P Department works.
3. Pawar C.T (1989): Impact of Irrigation: A Regional Perspective, Himalaya publishing House, Bombay, PP.55-71.
4. Pawar C.T and shinde S.D (1986): Irrigation in Maharashtra : A spatio-temporal perspective. The national Geographical Journal of India Vol.32, No.2 P. 107.