

CHAPTER V

IMPACT OF IRRIGATION: A MICRO LEVEL ANALYSIS

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5.1. INTRODUCTION

In the earlier chapters, an attempt has been made to analyze the influence of physio-socio factors on the development of irrigation facilities at village level. Further, the impact of irrigation in association with mechanical inputs has also been highlighted. In this chapter an attempt has been made to examine the changes in agricultural in context of irrigation and other agro inputs at micro-level. A micro-Level (village level) analysis of these of aspects is discussed which may give the representative picture of the region under study. Metage village is selected as case study on the basis of purposive random sampling method.

The landuse and cropping pattern for the year 1995-96 and 2005-06 of the village, was recorded on the Cadastral map obtained from the office of the Inspector Land Records, Kolhapur. The interviews of the farmers and other relevant persons were conducted to generate the data related to irrigation, cropping pattern, yield, fertilizer consumption, water supply use of implements etc.

A comprehensive picture of the landuse and cropping pattern prevailing before and after the availability of irrigation facilities has been shown. For this the farmers were interviewed for factual information related to different aspects. During the survey, exhaustive field notes were also prepared which have been used for the subsequent micro-level analysis. Such plot to plot study was considered as essential, for it acts as a supplement to and check up on the broad picture and general conclusion outlined in the preceding discussion (Mac master,

1962). The following analysis is concerned with the study of Metage village.

The village Metage is a holy place known for the work of Saint Balumama. Saint Balumama was borne in October 3, 1892. This place is also a tourist centre and famous for one ancient temple. Saint Balumama's *Samadhi* is in the village Adamapur. Many pilgrims visit both the places from Maharashtra & Karnataka because of religious and historical background of the village. Saint gives his religious sermons in this village. His religious sermons are very special, which gives the message of God to the peoples. He solved social problems of Metage people. A *Balumama's Bhakari* is very famous in this region. The village possess great importance as religious & historical place because of saintly work of Balumama. The village is situated at the north and west side of the Chikotra river. There are two Marathi picture films produced on the life of Balumama. The first is 'Santh Sadguru Balumama Maharaj' and the second is 'Shri Santh Balumama'

5.2 SITE AND SITUATION:

Metage village is located on the right bank of Chikotra river, a tributary of Vedganga river in Kagal tahsil. The village has geographical area of about 336 hectares, generally slopping towards the north and west and supports 1060 population. It is situated to the south of Kolhapur city at a distance of about 60 kilometers at an elevation of about 548 Meter above mean sea level.

5.3. PHYSICAL AND DEMOGRAPHIC SETTING:

The village Metage is situation in lower reaches of Chikotra river basin. The southern and eastern parts of the village area are undulating. As a result the topography is not suitable for canal and well irrigation. Hence only lift irrigation is the main source of irrigation followed by well irrigation.

TABLE 5.1
METAGE VILLAGE: LOCATION ENVIRONMENTAL
SETTING, DEMOGRAPHIC AND TECHNOLOGICAL
PERFORMANCE .

Sr. No	Parameter	1995-1996	2005-06
1.	Location.		
	i) Latitude.		16°20'23"N
	ii) Longitude.		74°15'33"E
2.	Major Topographic feature.		Off shoots at the leeward of western ghats
3.	Mean Annual Rainfall in m.m.		1000
4.	Mean Temperature c.		26°C
5.	Soil Types.		Medium black, brown
6.	Agro-climatic zone.		Transition Zone I
7.	Rural Density (Persons).		
	i) Per 100 hectare of cultivated area.	346.0 (955)	363.01 (1060)
	ii) Per 100 hectare of irrigation area.	2122 (955)	642.42 (1060)
8.	Cultivators per 100 hectare of		
	i) Cultivated area.	123.91 (342)	126.37 (369)

	ii) Irrigated area.	760 (342)	223.64 (369)
9.	Tractor Per 100 hectare of irrigated area.	13.34 (6)	6.06 (10)
10.	Iron plough Per 100 hectare of irrigated area.	71.11 (32)	17.57 (29)
11.	Wooden plough Per 100 hectare of irrigated area.	62.22 (28)	13.33 (22)
12.	Bullocks Per 100 hectare of irrigated area.	55.55 (25)	21.21 (35)
13.	Oil engine Per 100 hectare of irrigated.	15.56 (07)	3.03 (05)
14.	Electric pump Per 100 hectare of irrigated area.	26.66 (12)	27.27 (45)

N. B : Figures in the bracket indicates absolute number of agricultural implements.

Source : Compiled by the Researcher.

Among the demographic factors, rural population, cultivators, implements and agricultural laboures are attributed to per 100 hectare of cultivated area and irrigated area. The analysis reveals that the rural density of population per 100 hectares of cultivated area has increased slightly as compare to 1995-96. So far irrigated area is concerned the density of population is very high in 1995-96 (2122, persons) as compare to the year 2005-06 (530 person). It is simply because the area under irrigation was very less in the year 1995-96.

In case of cultivators per 100 hectares of cultivated and irrigated area adverse condition is reflected, because in the year

1995-96 the cultivated area and irrigated area was less hence density of cultivators indicates high. However, in the year 2005-06 increase in the cultivated and irrigated area with the introduction of lift irrigation facilities the density of cultivators has declined.

The population of the village was 1060 (2001) consisting 560 males and 500 females. The main occupation of the people is farming. The ration of land available per cultivator is 0.32 hectares. The literacy of the village is 72 percent. The village is an electrified having good drinking water supply scheme.

5.4. CLIMATE:

The village Metage falls in rain shadow zone of western ghats. The rain fall is uncertain and inadequate. The annual average temperature is about 26°C and annual average humidity is more than 65%. The village receives rain fall from southwest monsoon, which is recorded about 1000 m.m. The heavy rain occurs in the month of August. The hottest months are April and may and the coldest months are December and January.

5.5. SOILS :

The pedological condition also vary in the Metage village. The soil of the village are formed from the Daccan trap which is the predominant rock formation of this region. The soils are alluvial, medium black and medium brown. The alluvial soils is found in the north-western part of the village along the river bank. Medium black and black soils are observed in the central and in some part of the north-west side. The medium brown and

laterite soils are observed in the elevated portion of southern and eastern part of the village.

5.6. WATER RESOURCES :

Both, surface and ground water resources are comparatively rich in the village area. The surface water of the village is available from the Chikotra river which flows to the north and west of the village. The water in Chikotra river is stored with the help of Metage K.T. weirs, that is the Kolhapur type of weirs. Due to the construction of Chikotra dam, Chikotra river has become perennial. The ground watertable in post-monsoon season is at surface level and in premonsoon period the water level falls by a meter. The wells in operation are 15 in the village.

5.7 AGRICULTURAL INPUTS

5.7.1 IRRIGATION

The environmental condition of village Metage have influenced not only the irrigation facilities but also the methods of water application employed. There are two sources of irrigation i.e. lift and well irrigation. The lift irrigation is predominant where furrow method of irrigation is in practice. Lift irrigation shares about 91.25 (150.56 hectare) percent of the total irrigated area of the village and well irrigation covers only 8.75% (14.44 hectare). The number of well is 15 in the village. There are some private irrigation schemes working efficiently. The water of the river in north and south is used to irrigated mainly sugarcane and tobacco fields.

The intensity of irrigation of the village is 56.50 percent, which markedly varies spatially. The western and Northern part of the village is highly developed in irrigation due to the river water. This zone is mostly devoted for sugarcane cultivation, But the eastern side of the village is steepy, having coarsen soil and less suitable for the development of irrigation facilities and cropping.

5.7.2 MECHANIZATION :

Mechanization of agriculture is the essential characteristic of irrigated area. As such in the case study village also the use of mechanized implements has increased considerably. (Table 5.2)

TABLE NO.5.2.

**METAGE VILLAGE : AGRICULTURAL IMPLIMENTS
1995-96 TO 2005-06**

Sr. No.	Name of agricultural implements	1995-96 (Number)	2005-06 (Number)
1.	Wooden plough	28	22
2.	Iron plough	32	29
3.	Oil engine	07	05
4.	Electric motor	12	45
5.	Tractor	06	10

Source: Compiled by the Researches based o village record.

It is observed that the farm income has improved due to the more use of different modern machines and implements like, electric motors (45), Tractor (10) in year 2005-06 However, the use of traditional implements (wooden plough, Iron plough, etc.)

have declined in year 2005-06. All this has influenced on agricultural productivity of the village.

5.7.3 FERTILIZER CONSUMPTION:

Irrigation and consumption are an important element of the agriculture and irrigation is positively correlated with the consumption of fertilizer in the village. The average fertilizer consumption per hectare of irrigated land in the village area is about 1.9 tons, which varies from crop to crop and plot to plot. It is observed that the fertilizer use for sugarcane is high (2.2 tons) in the western part of the village. It is 1.2 tons in case of Rabi crops. It is noted that the consumption is decreasing away from river course. It is be due to corresponding decrease in irrigation facilities away from river course.

5.7.4 AGRICULTURE IMPLEMENTS :

The use of traditional implements is dominant in the village. However adoption of energized implements is increasing with the development of irrigation facilities. The number of wooden ploughs per 100 hectares of irrigated area has reduced from 62.22 to 13.33 during the period under review. Similar trend is observed in case of iron plough and oil engines. (Table 5.1)

The use of modern implements such as tractors, electric pumps in obsolete number has increased but the proportion to per 100 hectares of irrigated area has reduced simply due to significant increase in the irrigated area. The use of chemical fertilizer and H.Y.V. seeds have been also increased significantly (Personal interviews).

5.8 LANDUSE PATTERN AND CHANGES :

The landuse pattern of the village shows a typical example of river basin in its lower part.

TABLE : 5.3
METAGE VILLAGE : GENERAL LANDUSE PATTERN ,
2005-06.

Sr. No.	Use Land Category	Area in Hectare		Percentage to total area		Volume of change
		1995-96	2005-06	1995-96	2005-06	
1.	Forest
2.	Area not available for cultivation	14.27	14.27	4.25	4.25	0.00
3.	Other uncultivated area excluding fallow (pasture land)	32.30	21.44	9.61	6.38	- 3.23
4.	Fallow land	13.43	8.29	4.00	2.47	- 1.53
5.	Net area sown	276.00	292.00	82.14	86.90	+ 4.76
Total geographical area		336.00	336.00	100.00	100.00	± 4.76

Source: Compiled by the Researcher Based on the field work, 2006

Table No 2.1 reveals that the area under forest is not reported. However area not available for cultivation is about 4.25 percent of total geographical area. No change has been observed during the period under review. The other uncultivated area excluding fallow particularly pasture land shares about 6.38 percent area which was 9.61 percent during 1995-96. The major landuse category in this village is Net Area Sown which shares about 86.90 percent area of the village, which was 82.14 percent during the base year. The fallow land shares only 2.47 percent of area. This is the potential area to increase in area under plough. The total volume of change is about 4.76 percent. Leading

increase in area is observed under Net area sown category. Whereas leading decrease is observed under pasture land. This land is brought under plough due to increase in area under irrigation. The general landuse status clearly indicates the influence of physiography and irrigation on use of the land.

5.9 CROPPING PATTERN AND CHANGES :

The cropping pattern simply means proportion of area under different crops at a point of time where as changes in cropping pattern refer to change in proportion of area under different crops at two different times, such changes, though governed by ecological situations, socio-economical, and technological factors also determine which of the feasible crops farmers will choose (Pawar, 1989). As such the village under study grows variety of crops.

TABLE 5.4

CROPPING PATTERN IN METAGE VILLAGE 2005-06

Sr. No.	Crops	Area in hectare		Percentage to net area sown		Volume of change +increase -decrease
		1995-96	2005-06	1995-96	2005-06	
1.	Rice	62	20	22.46	6.85	-15.75
2.	Groundnut	22	--	7.97	--	-7.97
3.	Sugarcane	34	110	12.32	37.67	+25.35
4.	Chilly	06	05	2.18	1.71	-0.47
5.	Soyabin	58	33	21.01	11.30	-9.71
6.	Tobacco	61	80	22.10	27.40	+5.3
7.	Grass	26	39	9.42	13.36	+3.94
8.	Other	07	05	2.54	1.71	-0.83
	Total	276	292	100	100	± 34.59

Source : Compiled by the field data 2006.

Table No. 5.4 reveals that sugarcane is the major crop in the village, which share about 37.67 percent of total cropped area. It is followed by tobacco (27.40 percent) and soyabin (11.30 percent) . Thus cash crop together share about 76.37 percent of gross cropped area of the village.

Table 5.4 reveals that there has been marked change in the respective position of crops after the introduction of irrigation. The area under food grain like rice has decreased significantly by 15.61 percent followed by groundnut (-7.97percent). Other important crops of leading increase is soyabin whose areal extent has decline from 21.01 percent to 11.30 percent during the period under review.

By contrast, the leading crops of increase are sugarcane and tobacco. The area under sugarcane has increased over three times i.e. from 12.32 percent to 37.67 percent during period of a decade. Similarly the area under tobacco has increased from 22.10 percent to 27.40 percent. This shift to cash crop is due to the availability of perennial source of irrigation through lift irrigation of K.T weir at Metage village.

5.10 IRRIGATED CROPPING PATTERN :

TABLE NO. 5.5

METAGE VILLAGE IRRIGATED CROPPING PATTERNS,
1995-96 TO 2005-06

Sr. No.	Crops	1995-96		2005-06		Volume of Change
		Area in Hectare	% to total irrigated area	Area in hectare	% to total irrigated area	
1.	Sugarcane	32	71.1	110	66.67	- 4.43
2.	Gram	04	8.90	11	6.67	- 2.23
3.	Grass	03	6.67	20	12.12	+ 5.45
4.	Wheat	03	6.67	10	6.06	- 0.61
5.	Maize	02	4.44	09	5.45	+ 1.01
6.	Others	01	2.22	05	3.03	+ 0.81
	Total	45	100.00	165	100.00	± 7.27

Source: Compiled by Researcher Based on the field work data 2005-06.

Table no 5.5 shows that irrigated crops sugarcane is predominant at both the period of time. Although irrigated area during 1995-96 was only 45 hectares sugarcane has shared about 71 percent of irrigated area. Other important irrigated crops were Gram (8.90 percent), wheat and maize (Fig No. 5.1 and 5.2). During a decade irrigated area increased more three times, but proportion of sugarcane has reduced by 4.43 percent. Infact actual hectarage under sugarcane has increased over three times, but proportionally the increased area of is shared by other crops such as Grass, Maize and other miscellaneous crops. Leading increasing crop is grass, which is raised as a fodder crop for milching animals. However , in absolute hectarage irrigated cropping scenario is dominated by sugarcane a major cash crop.

IRRIGATED CROPING PATTERN 1995-96

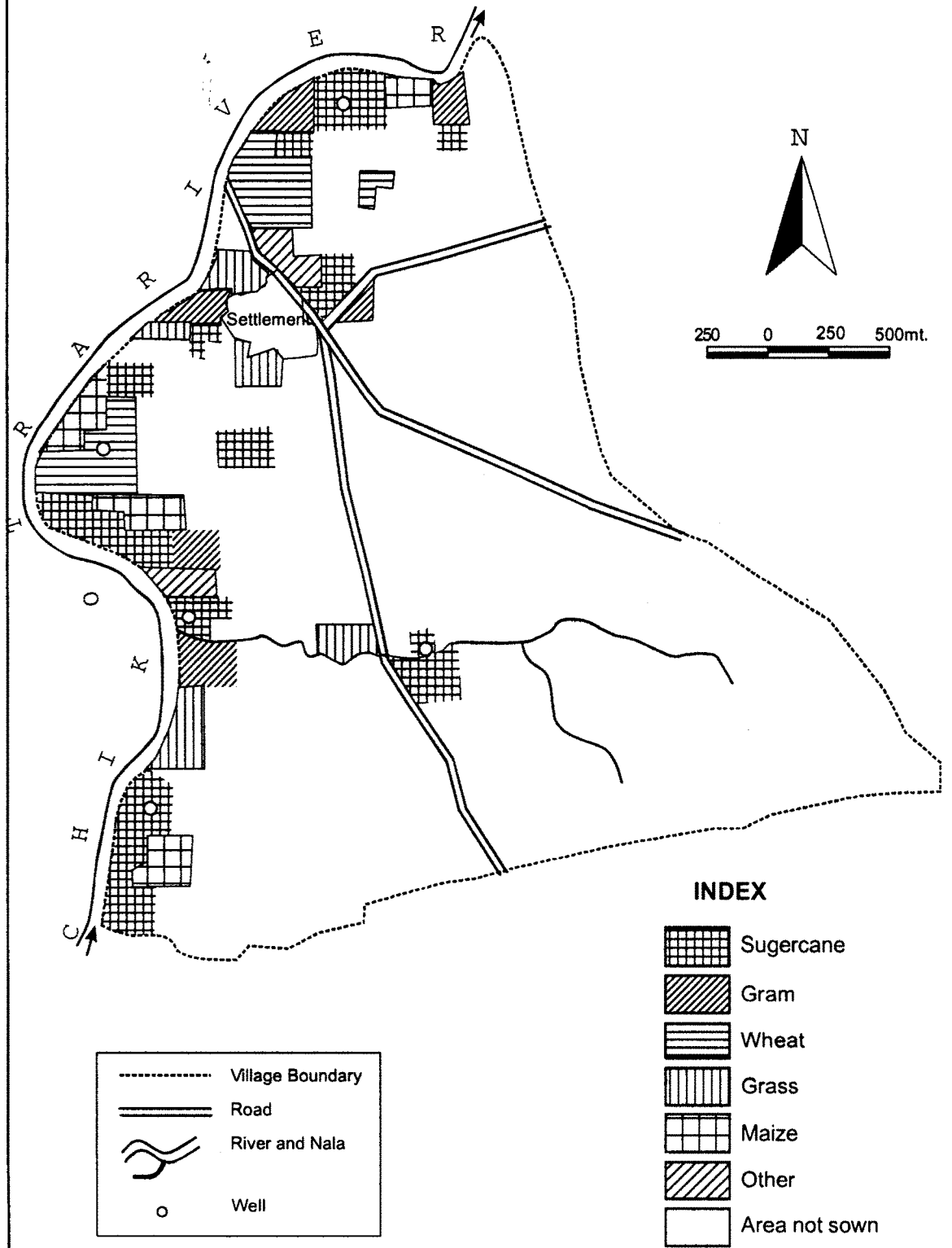


Fig. 5.1

IRRIGATED CROPING PATTERN 2005-06

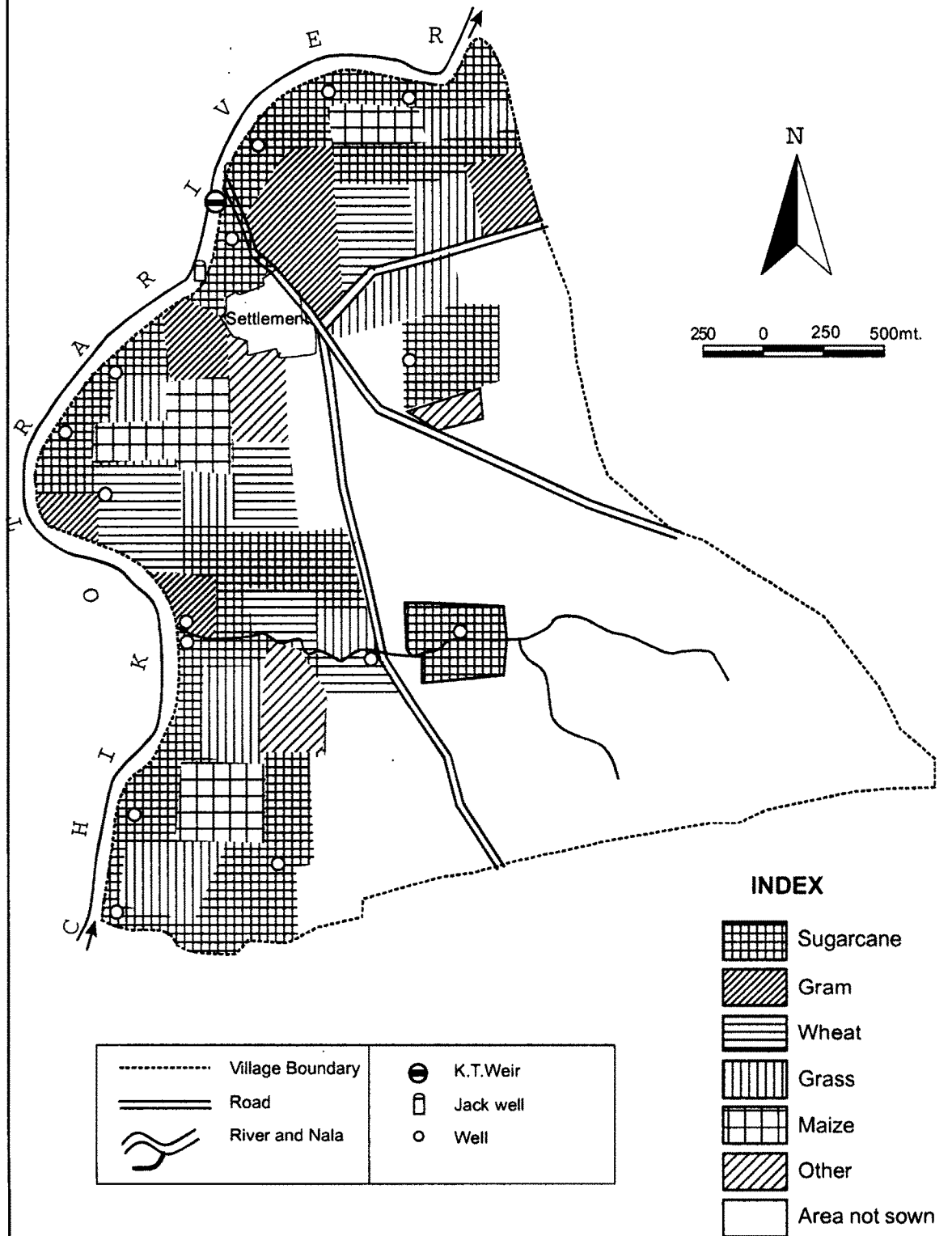


Fig. 5.2

5.11 PRODUCTIVITY AND CHANGES :

The influence of irrigation in association with increased use of fertilizer, pesticides and high yield varieties of seeds have led to increase the agriculture production per hectare.

Among the various factors responsible for the productivity of land, irrigation is one of the significant factors, which has direct relationship with crop yields. Here, productivity refers to the production of crops per hectare of land. Generally sugarcane, Rice, Soyabin and Tobacco are the major crops cultivated in the this village. Hence per hectare yield of these crops has been taken in to consideration.

TABLE NO.5.6

PER HECTARES YIELD OF SELECTED CROPS (IN KG.)

Sr. No.	Crops	Yield per hectare		+ increase - decrease
		1995-96	2005-06	
1.	Sugarcane	72,000	95,000	+ 23,000
2.	Rice	1516	1780	+ 264
3.	Tobacco	1060	1200	+ 140
4.	Soyabin	1840	2100	+ 260

Source: Compiled by Researcher Based on the field work and village record. 2005-06.

The influence of irrigation in association with increased use of fertilizer, pesticides and HYV seeds have led to the increase in agriculture productivity. The per hectare yield of most of the crops has been increased. (Table 5.6). Yield of sugarcane per hectare has been increased by 23 tones. Whereas per hectare yield of Rice, Soyabin and Tobacco has been increased by 264 kg, 260kg and 140kg respectively.

In general, as compare to the yields of all crops in the initial years, most of the crops have recorded considerable rise in yield. As rightly pointed out by Murthy (1976), "Irrigation the basic input in most parts of the cultivated land in our country, has played a vital role in stepping up food production, as other inputs like fertilizers, improved seeds etc. contribute their due share only when assured water supply is available".

5.12 SUMMARY :

The introduction and expansion of irrigation facilities have influenced the use of mechanical and biological inputs. However their use is confined largely to sugarcane field. The use of tractors is also largely observed in cane fields. The common farmers are still using the traditional implements. The use of fertilizers and H.Y.V. seeds are confined to the irrigated farms only.

The major portion of the land is under cultivation where positive change is observed thereby reducing pasture land and fallow land. Significant change is observed in cropping pattern. Shift from traditional crops to cash crops like sugarcane is noteworthy. Among irrigated crops sugarcane is major crop of leading increase. Agricultural productivity of all the crops has shown significant increase. Thus the present analysis confirms the findings outlined in the previous chapters.

REFERENCES

1. Government of Maharashtra (1973): The Report of the Fact Finding Committee For Survey of Scarcity Areas, Vol.1
2. Mc Master, D.N (1962): A subsistence crop Geography of Uganda Agriculture. world land use survey, occasional paper No.2
3. Murthy Y.K. (1976) : Utilization of Irrigation Facilities in Role of Irrigation, in the Development of Indian Agriculture, Published by the Indian Society of Agricultural Economy Bombay and the institute for Social and Economic change, Banglore Seminar Series III, pp-16-30.
4. Shinde, S.D and Pawar, C.T (1978): Bhatanwadi – A Study in Agricultural Landuse. The Daccan Geographer, Vol. XVI, 1 pp.385-396.