CHAPTER - II

-:- IRRIGATION PATTERN -:-

In the previous chapter, the research design, the physiographic factors such as topography, climate, soils, which distinctly influence irrigation and agriculture are presented. The present chapter aims at, to highlight the sourcewise progress of irrigation facilities for the period 1961-64 to 1984-87. The overall irrigation and changes therein are also attempted in this chapter. Irrigation is essential for crop cultivation and better yield. The success of agriculture depends upon wise use of irrigation water. Irrigation plays a vital role particularly in the areas where rainfall is low and uncertain. Therefore, it is one of the significant inputs in the transformation of subsistance to commercial agriculture. Irrigation, being an artery and pulsing heart, is an absolute constant as well as a sufficient command over the location of commercial crops important in agricultural production per hectare, sowing in the cropping pattern, change in the mechanics of landuse of a region (Singh,1976).

2.1 EVOLUTION OF IRRIGATION :

Irrigation an artificial supply of water to the plants for their proper development is as old as civilization. Irrigation in India is an old cultural technique and it has been existing from three to four thousand years. In India, the early development of irrigation took place in the valley of Ganges and Indus. The Britishers systematically developed irrigation to diminish the effect of famines. After independence, political

stability has stimulated irrigation development which brought green revolution. Many attempts were made to tap water for irrigation through the minor, medium and major irrigation schemes.

In the region under study, irrigation was started in the early period of British rule with opening of Krishna canal in 1867. But actual construction of weir was started in 1864 which was completed in 1867. The weir is 60.66 metre long and 7.01 metre high which is situated across Krishna river near Khodshi in Karad taluka. The canal discharges 160.06 cubic meter water for per second in the Krishna canal, irrigating 13,079.72 hectare of cultivable land. Prior to this project the main source of irrigation was mostly by wells and mot and water wheel were used for lifting the water. Nowadays, farmers of the study region have started using extensively electric motor pumps and diesel engines for lifting water from wells and rivers. Recently, the sprinkle irrigation is practised on trial basis by some farmers which promote economic use of water.

In the taluka, the government policies have encouraged to utilize surface and ground water resources by giving financial assistance and subsidies. Many co-operative societies have emerged and formed a dense network of lift irrigation along the banks of river Krishna and Koyana. The topographical obstacle has been surmounted by lift irrigation to some extent. Further, the sugar factories which have been established during the last

two decades, have developed irrigation facilities by making special efforts in command areas. Apart from this rapid rural electrification, the awareness of the farmers and increasing trend of education have stimulated irrigation development.

The irrigated area in the taluka has increased tremendously. In 1961-64 the area under irrigation from all sources was 21.84% (10,463.25 hect.) which rose to 35.26% (20,564.76 hect.) in 1984-87 against 11.41% of Satara District. Thus, the absolute increase was 10,101.51 hectares of the cultivated area.

2.2 METHODS OF IRRIGATION :

Different methods of irrigation are practiced in the region according to the nature of terrain, soil type and climatic conditions. Mostly surface methods of irrigation are practiced which include flood irrigation, border furrow and corrugation irrigation. However, the predominance of flood and border irrigation are observed in the central part of the plain region. The furrow irrigation in which water is run in furrows is used in the eastern and western part of the region where slopes are moderate. By this method water is applied to the crops like sugarcane, maize and some of the vegetables. Furrow irrigation is very common because it is adoptable to a great variety of landslope. The corrugation irrigation where water is applied to the ground in rills or small shallow furrows is practised along the Krishna Valley.

The sub surface and overhead irrigation methods are not practiced in the region because they are relatively more expensive though they are economic to water. But in future these economic methods of irrigation may be used.

2.3 SOURCES OF IRRIGATION :

The sources of irrigation in the study region are largely affected by the physical features, such as topography, geology, soil and presence of ground water etc. Presently the region has four different sources of irrigation viz. well, canal, lift and other sources of irrigation. The topography of Krishna Basin is mostly suitable for the development of lift irrigation and less suitable for the tank irrigation (Pawar,1985).

The lift irrigation is wide spread in the taluka, where about 51.32 percent of the irrigated area is covered by this source only. The well irrigation occupies about 27.84% of the total irrigated area. The canal irrigation occupying about 14.71 percent of total irrigated area is observed only along the lower reaches of river in the taluka. The tank irrigation in the study area is nil. It is due to unsuitability of topography. A brief discription of major sources is attempted below.

A) Lift Irrigation :

The term lift irrigation refers to lifting of water from the surface flow of nala, river, canal, tank, lakes etc. with

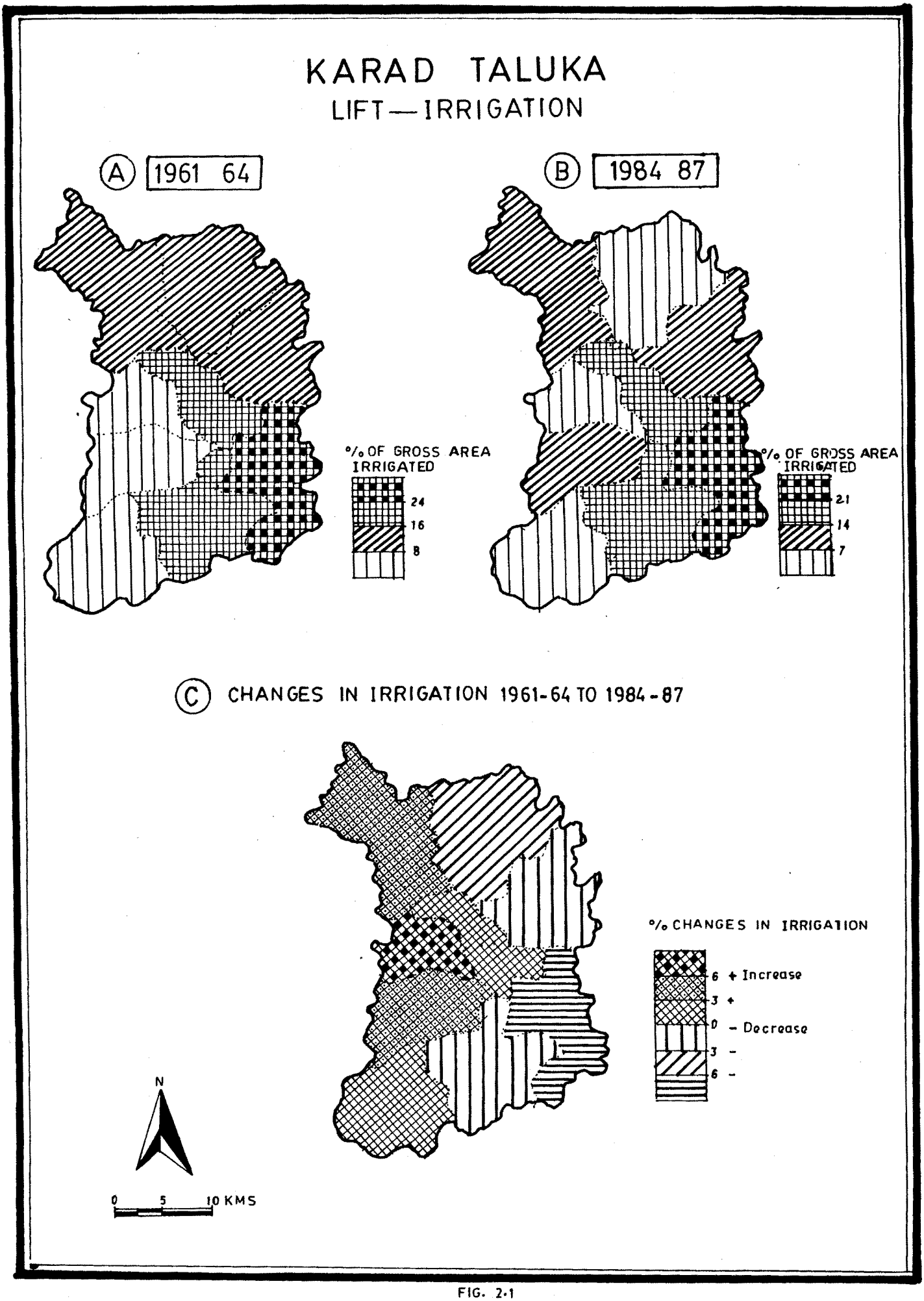

KARAD TALUKA
LIFT—IRRIGATION
A 1961 64
B 1984 87
% OF GROSS AREA IRRIGATED
24
16
8
% OF GROSS AREA IRRIGATED
21
14
7
C CHANGES IN IRRIGATION 1961-64 TO 1984-87
% CHANGES IN IRRIGATION
6 + Increase
3 +
0 - Decrease
3 -
6 -
N
0 5 10 KMS

FIG. 2·1

mechanical power and supplying to nearby farms through cement or plastic pipes. The success of lift irrigation schemes depends upon perennial rivers. The obstacle of slope is eliminated here as the water is supplied to the fields for a distance ranging from 5 to 23 kilometers from the river banks.

The present lifts are operated on river banks in the study area by constructing 'Kolhapur type weir'. The region is well known for the lift irrigation schemes in Satara District. Industrious farmers of the region with the spirit of development have formed the co-operative lift irrigation societies. These schemes helped to bring larger areas under irrigation.

i) Regional pattern :

In the taluka about 51.32% area is irrigated by this source but the spatial spread of lift irrigation in the Karad taluka is uneven. About 14 to 21 percent of the irrigated area by this source is noted in the Shenoli, Karad and Kale circles. The prepondenrance of lift irrigation is observed in south and southeastern part of the region (Fig.2.1-B). It is mainly due to river Krishna and its tributaries. The rivers are perennial due to Kolhapur type of weirs. Hence, water is lifted from river as well as canal. The high proportion under this source is due to the hilly terrain of the circles. The moderate percentage (7 to 14%) is observed in Koparde, Umbraj and Kole circles where canal and well irrigation are equally dominant. The low percentage

(0 to 7%) is noted in Undale, Masur and Supne circles due to physiographic impediments in the northeast and southwest and lack of perennial streams.

ii) Changes in Lift Irrigation :

The area under lift irrigation has increased from 2,101.55 hectares in 1961-64 to 10,554.25 hectares in 1986-87 i.e. absolute increase of 8,452.65 hectares (Table 2.1).

The positive change in area (below 3%) under lift irrigation is observed in the Undale and Karad circles. The moderate (3 to 6%) change is noted in the Kole and Umbraj circles, whereas above 6% change is in only Supne circle of Karad taluka (Fig.2.1-C).

The negative change (below 3%) in lift irrigation is observed in the Koparde and Kale circles while moderate (3 to 6%) negative change is noted in the Masur circle only and above 6% negative change is observed in the Shenoli circle due to influence of canal irrigation and lack of perennial supply of water.

B) Well Irrigation :

Well irrigation is an indigenous source of irrigation in Karad taluka. It is widely practiced in the areas where irrigation by canal is not possible. Well irrigation in the taluka is 27.84 percent of the total area in 1984-87.

KARAD TALUKA
WELL-IRRIGATION

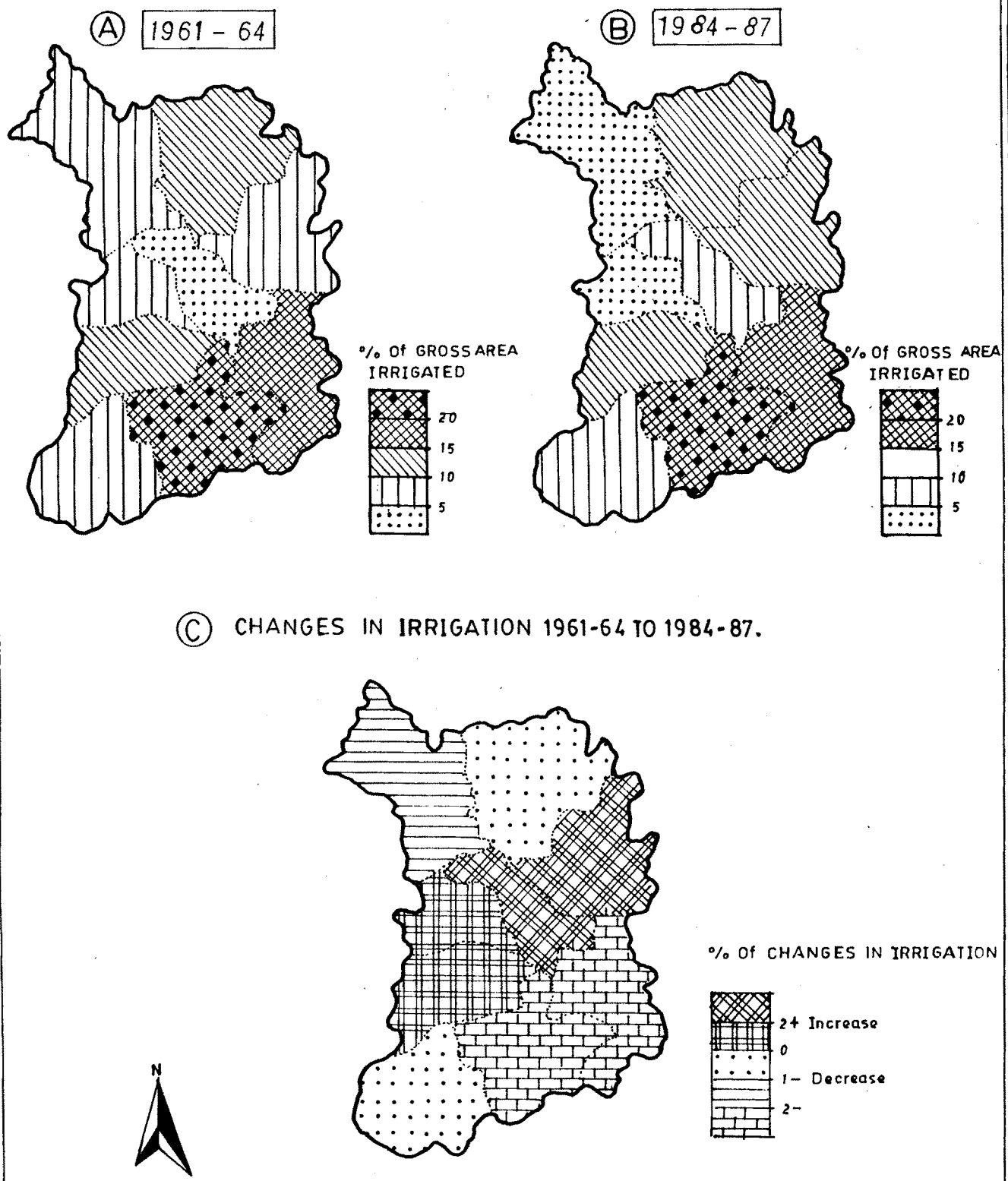


FIG. 2-2

Well irrigation is not advisable where the depth of the sub-soil water is over 10 metres, far beyond that depth the cost of lifting water is excessively high as compared to the value of the crops raised (Singh,1976). From this point of view, especially well irrigation is suitable during dry period in the central and eastern part. The study region receive monsoon rain which is confined to 3 or 4 months of the year. When the monsoon fails the rainfed crops also fails. Hence, this source has prepondnarance place in eastern part of the study area.

i) Regional pattern :

Over 60 percent of the total irrigated area is watered by wells in the eastern part of taluka. However, its distribution varies from west to east. The very high (above 20%) and high (15 to 20%) of well irrigation is observed in Kale and Shenoli circles, due to favourable ground water. The north eastern circles viz. Koparde, Masur and Kole have moderate (10 to 15%) area irrigated by wells. The low (5 to 10%) and very low (below 5%) is noted in Undale, Karad, Umbraj and Supne circles of western part of the taluka. This can be attributed to physiographic handicap, relatively high proportion of lift and fluctuation of watertable.

ii) Changes in well irrigation :

The last 27 years have witnessed an increase in well irrigation. It is increased from 4760.77 hectares in 1961-64

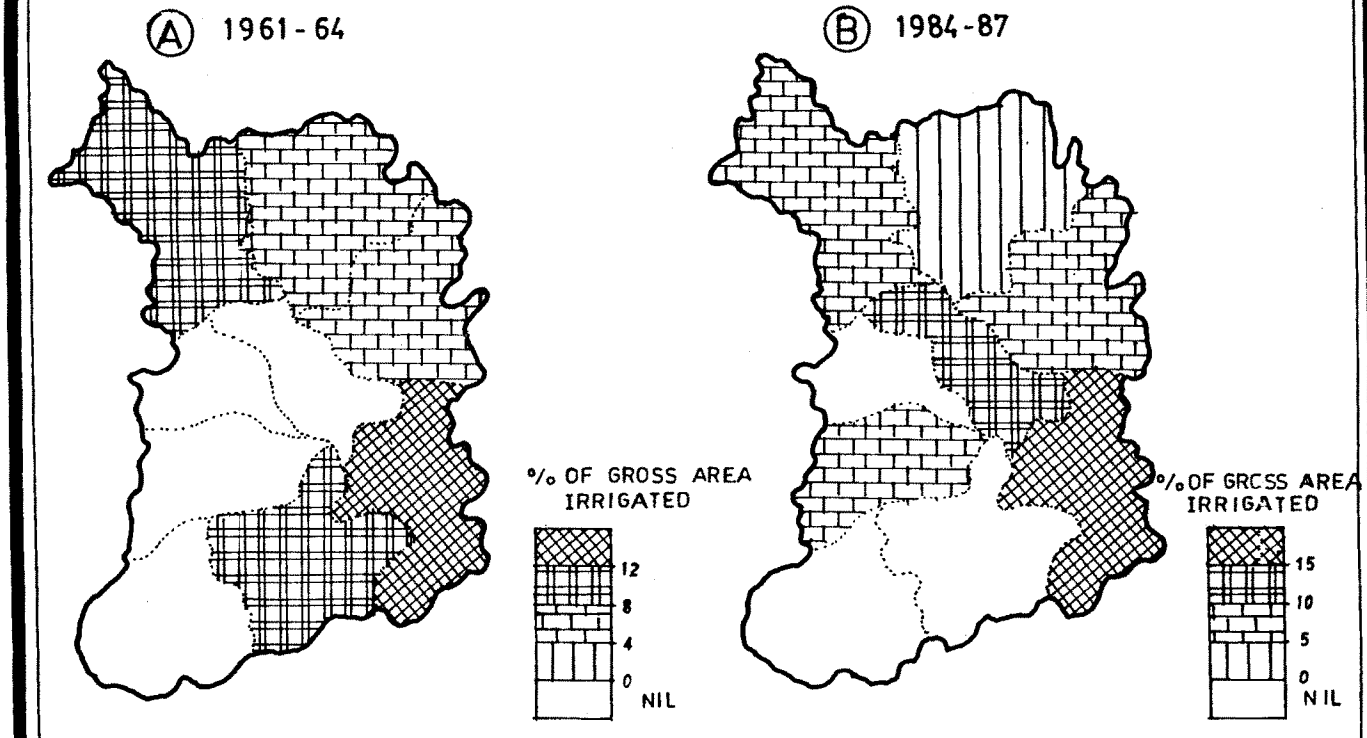
to 5725.53 hectares in 1984-87. Moreover, as compared with the development of other sources it has lost its share by 17.66 percent. The significant positive change in area (above 2%) under well irrigation is observed in Karad and Koparde circles (Fig.2.2-C). The low positive change (0 to 2%) is noted in Kole and Supne circles.

The negative change (below 1%) is noted in Undale and Masur circle, whereas (1 to 2%) is noted in Umbraj circle only. The negative change (above 2%) is observed in Shenoli and Kale circles of the study area. The tremendous growth of lift irrigation has retarded well irrigation significantly during the last decade, elsewhere the change is negligible.

C) Canal Irrigation :

The canal irrigation is the most significant source, due to its cheapness, the ease and certainty of water. It is developed only along the river Krishna, where black and deep black soils, moderate slope of land and perennial source of water are available. In the north western hilly part private canal system by diverting local stream water in the field for irrigation purpose is another feature of canal irrigation. It contributes about 14.71% of the total irrigated area in the study region. Government canals are developed only along the Krishna Valley since 1915-16 where the first masonry dam has been constructed on river Krishna at Khodshi near Karad in 1867.

KARAD TALUKA
CANAL IRRIGATION



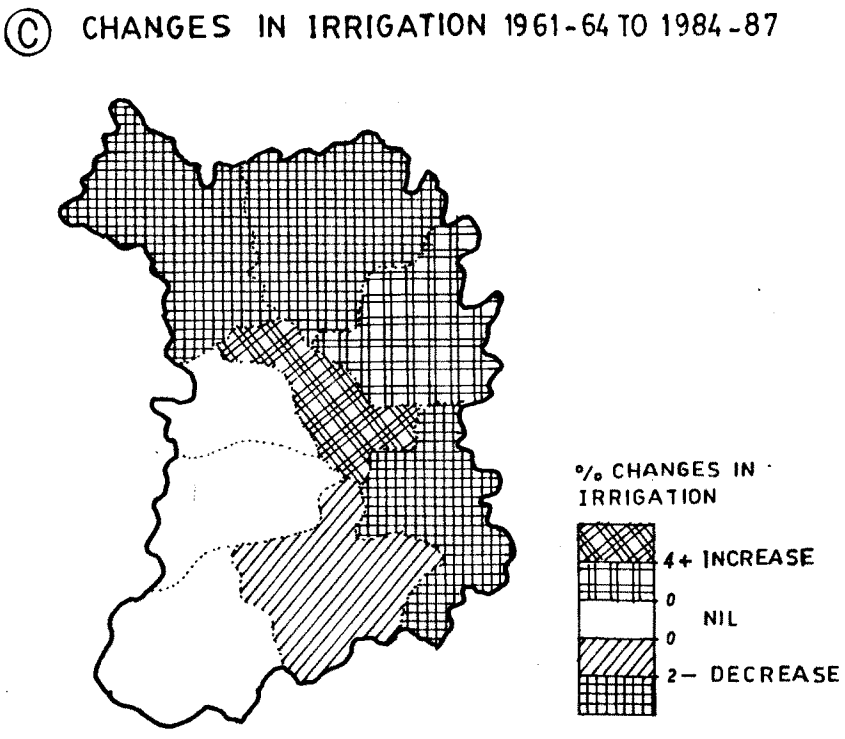


FIG. 2·3

The Krishna canal is an extensive canal system in the region, irrigating alluvial tract on the left bank of the river Krishna.

i) Regional pattern :

The canal irrigation is confined to the south eastern part of the Karad taluka and its regional development is uneven. There is comparatively higher percentage (above 60%) of the irrigated area by canal in Shenoli circle of the study area. Moreover, high (10 to 15%) is noted in Karad circle (Fig.2.3-B). Moderate percentage (5 to 10%) by this source is observed in Umbraj, Koparde and Kole circle. Masur circle experiences low percentage (below 5%) of canal irrigation.

ii) Changes in Canal Irrigation :

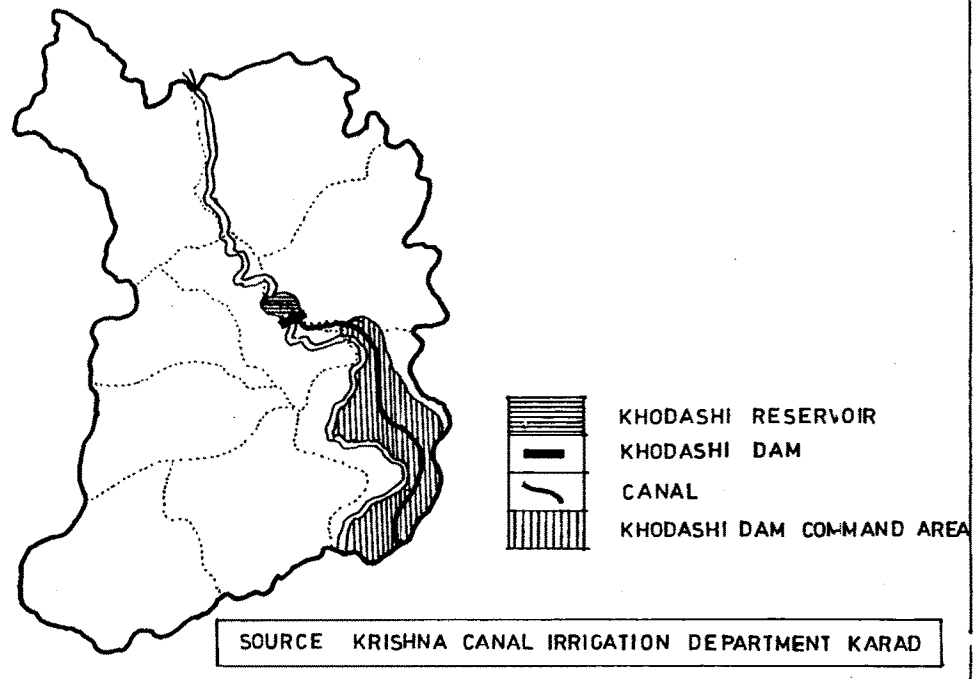
The positive change (below 4%) in area under canal irrigation is observed in Koparde circle. Whereas (above 4%) change is noted in Karad circle. The negative change (below 2%) in canal irrigation is observed in Kale circle and (over 2%) negative change in the Umbraj, Masur and Shenoli circles of the study area.

2.4 OVERALL IRRIGATION :

Irrigation is one of the most significant components in the agricultural development. It is a primary innovation in itself and also a pre condition for stimulating further innovation adoption. The term overall irrigation referes to percentage, share of net area irrigated to net area sown and it is an indication of the developed water resources in the region.

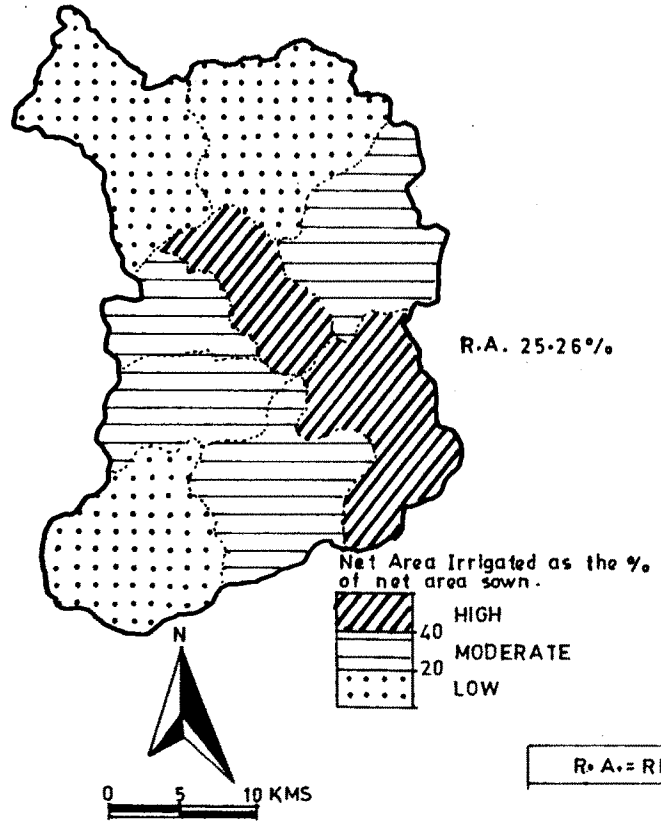
KARAD TALUKA

KHODASHI DAM COMMAND AREA

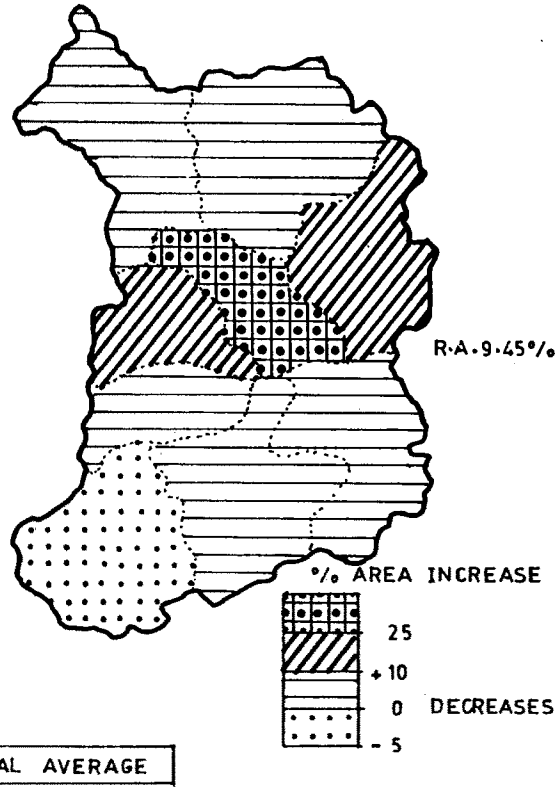


SOURCE KRISHNA CANAL IRRIGATION DEPARTMENT KARAD

Ⓐ OVERALL IRRIGATION 1984-87



Ⓑ CHANGES IN IRRIGATED AREA (1961-64 TO 1984-87)



R.A.= REGIONAL AVERAGE

FIG. 2.4

The proportion of irrigation is not uniform in the study area. In fact it is controlled by the prevailing physio-socio economic conditions. The intensity of irrigation is usually meagr in areas where irrigation is only needed as a stand by to overcome the moisture paucity (Singh and Dhillon,1984). The taluka is grouped into three categories of irrigation proportion as below.

i) High Irrigation :

The high irrigation (above 40%) is observed in the Shenoli and Karad circles of the study area. Here canal and lift irrigation facilities are developed, because of moderate slope of land and availability of perennial source of water. A good response for irrigation from black and deep black soils may be another reason. The development of co-operative sugar factories and innovative nature of farmers are also partly responsible for the development of lift irrigation. Shenoli and Karad circles are the old irrigated area covered by the most fertile soil where the new lift and canals are extended during the last twodecades.

ii) Moderate Irrigation :

The moderate proportion of irrigation (20 to 40%) is observed in Koparde, Supne, Kole and Kale circles of the study area. The rugged topography is the hindrance in the development of irrigation in this area. The well irrigation is the

major source of irrigation. Hence, the region is noted for moderate intensity of irrigation.

iii) Low Irrigation :

The low proportion of irrigation (below 20%) is noted in the Umbraj, Masur and Undale circles of the Karad taluka. This may be attributed to physical handicap and water scarecity due to non-perennial nature of the rivers of the area.

Changes in the Irrigation (1961-64 to 1984-87) :

The changes in irrigation during the period under investigation are shown on the map (Fig.4.8) It is increased from 20.71 percent to 25.26 percent of the net sown area. The changing trends in the intensity of irrigation portray man's dynamic attempts to overcome the environmental limitations in the transformation of physical attributes of the areas into agricultural resources (Singh,1976). The proportion of irrigation has increased predominantly in the central and southern part of the study area.

However, the positive change (over 25%) in overall irrigation is noted in the parts of Koyana and Krishna river Valley, particularly in the Karad circle (Fig.4.5). This can be well attributed to spread of canal and lift irrigation schemes. The moderate increase (10 to 25 percent) is observed in east and west central part of the study region where well and lift irrigation are dominant. Under 10 percent positive

change in the intensity of irrigation is registered in the Shenoli, Umbraj, Masur, Kole and Kale circles.

The negative change in intensity of irrigation is observed in southwestern part of the study region in Undale circle. It is mainly due to non-perennial river and rugged topography of the circle.

2.5 SCOPE FOR IRRIGATION DEVELOPMENT :

Irrigation is one of the significant inputs and socio-economic basis of agriculture. The success of agriculture depends to large extent on how successfully water requirements of crops can be met (Arora,1976). Availability of water in the region presents the scope for the development of irrigation.

Presently many schemes on Krishna and Koyana are under construction which would create large irrigation potential and may lead to an extention of commercial crops in future. The more and more lift irrigation schemes will be developed by improving rural electrification and financial assistance.

The rain water can also be tapped in the east by constructing a chain of water perculating tanks. About 18 perculating tanks have been completed and 7 are under construction which would create total potential of 136 hectares for irrigation. There is however, need to harness streams and other possible sites. In general lift irrigation in the west and central parts and well irrigation the east have better future in the region.

R E F E R E N C E S

1. Pawar, C.T. (1985) : Regional disparities in irrigation development - A case study of Maharashtra. Unpublished Research Project, submitted to Shivaji University, pp.19-26.

2. Singh, Jasbir (1976) : An agricultural Geography of Haryana. Vishal Publications, Kurukshetra University Campus, pp.131-157.

3. Singh, Jasbir (1976) : Op.cit.,p.309.

4. Singh, Jasbir and Dhillon, S.S. (1984) : Agricultural Geography, Tata McGraw Hill Publishing Co.Ltd., New Delhi, pp.235-238.

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