
CROPPING PATTERN AND CHANGES

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INTRODUCTION :

In the previous chapter an attempt is made to highlight the spatio-temporal pattern of irrigation facilities during the period under review. Present chapter proposes to examine the general landuse and cropping pattern of Wai taluka with the help of areal data from Wai taluka Namuna No.20 and the annual Socio-Economic Review and the District Statistical Abstract of the Satara district.

3.1 THE GENERAL LANDUSE PATTERN :

The area under investigation has been divided into five major landuse categories (Table 3.1). They are as follow :-

1) Forests :

The region under study has about 21.99 percent area under forests. The forests are confined to the hilly areas of the western parts of the region, where intensity of rainfall is high. The high (over 50 percent) concentration of forest is confined to the villages of Jambhali, Kironde, Jor, Kondhavale, Vasole, Kondhavali Bk. and Dhavali. The moderate concentration (25 to 50 percent) of area is observed to the south of Mandhardeo, the north-eastern and the south-eastern parts of the region. It is also noted in the villages of Vadoli, Golegaon, Ulumb, Borgaon Kh., Varkhadwadi etc. Very low forest area is found in the central and in the south-western parts of the region.

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TABLE 3.1 : The general landuse pattern of Wai taluka
(1985-86).

Sr. No.	Major landuse categories	Area in hectare	Percentage to total geographical area
1	Forests	13,155.33	21.99
2	Barren and unculturable land	2,293.13	03.84
3	Permanent pasture and other grazing land	3,668.16	06.13
4	Fallow land	366.49	05.13
5	Net sown area	37,627.85	62.91
Total		59,810.96	100.00

SOURCE : Record of Circle Inspectors of i) Pasarni circle ii) Dhom circle iii) Surur circle and iv) Bhuinj circle of Wai taluka (1985-86).

ii) Barren and unculturable land :

This category includes land put to non-agricultural use, barren and unculturable land like mountains, river beds etc. which cannot be brought under cultivation unless at a very high cost. About 3.84 percent of total geographical area is under this category. High concentration (over 15 percent) is noted in the villages of Bhivadi, Kondhawali Bk., Velang and Asgaon. The villages of Vasole, Vaigaon, Borgaon Bk., Shirgaon, and Degaon have moderate (5 to 15 percent) concentration. Remaining parts of the region have low (under 5 percent) proportion of this category.

iii) Permanent pasture and other grazing land (excluding fallow) :

The entire region has 6.13 percent area under this category. Over 10 percent area is confined to this category in the villages of Kikali, Asale, Kadegaon, Vyajwadi, Kenjal, Shendurjane and Gulumb. It is also found in the villages of Pasarni, Menavali, Eksar, Dasavadi, Dhom and Panas. The moderate (5 to 10 percent) concentration of this category is found in the western and the south-eastern parts of the region. It is also noted to the south of Mandhardeo and in the villages of Asare, Velang, Malatpur, Vaigaon and Kholavadi. Very low (under 5 percent) concentration is found in the western parts of the region and in the villages of Kusgaon, Nagewadi, Kanur, Bavadhan, Ozarde, Pande, Chandak, Lohare and in the south-eastern parts of the region.

iv) Fallow land :

The fallow land includes current fallow and other fallow. And it is largely found due to inadequate water supply extensive holding etc. Sometimes soils are kept fallow for improving the fertility. About 5.13 percent of total geographical area is under this category. High (over 15 percent) percentage of area is significantly noted in the villages of Pande, Nikamwadi, Go've, Amuratwadi, Boriv, Vyahali, Dhom, Panas and Dhavali. Moderate (5 to 15 percent) percentage under this category is noted in the western parts of the region and in the villages of Kanur, Bavadhan,

Pasarni, Dasavadi and Vasole. Very low (under 5 percent) concentration of area is found in the western and in the northern parts of the region. It is also noted in the villages of Shendurjane, Kenjal, Chandak, Gulumb, Lohare, Kikali, Lagadwadi and Kholawadi.

v) Net sown area :

Of all the categories of landuse, this category occupies the major area i.e. 62.91 percent which shows the dominance of agricultural activity in the region. Significant (over 80 percent) percentage of area under this category is noted in the southern parts of the region, especially in the Krishna river valley, where soil is fertile and irrigation is developed. It is also found in the villages of Surur, Abhepuri and Chikhali. Moderate concentration (50 to 80 percent) is observed in the north-eastern parts of the region and in the villages of Golewadi, Kondhavale, Menavali, Dhavadi, Vyajawadi and Lagadwadi. Under 50 percent net sown area is observed in the western hilly area and in the villages of Shirgaon, Degaon, Belamachi and Kholawadi.

3.2 A) CROPPING PATTERN AND CHANGES :

A variety of crops are grown in the region. Cropping pattern of the region is determined by the physical and socio-economic factors such as soil, climate, terrain, irrigation facilities and the use of high-yielding varieties and chemical fertilizers, size of land holding, market facilities, fragmentation of land etc. "The magnitude of crop diversification

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TRENDS IN CROPPING PATTERN

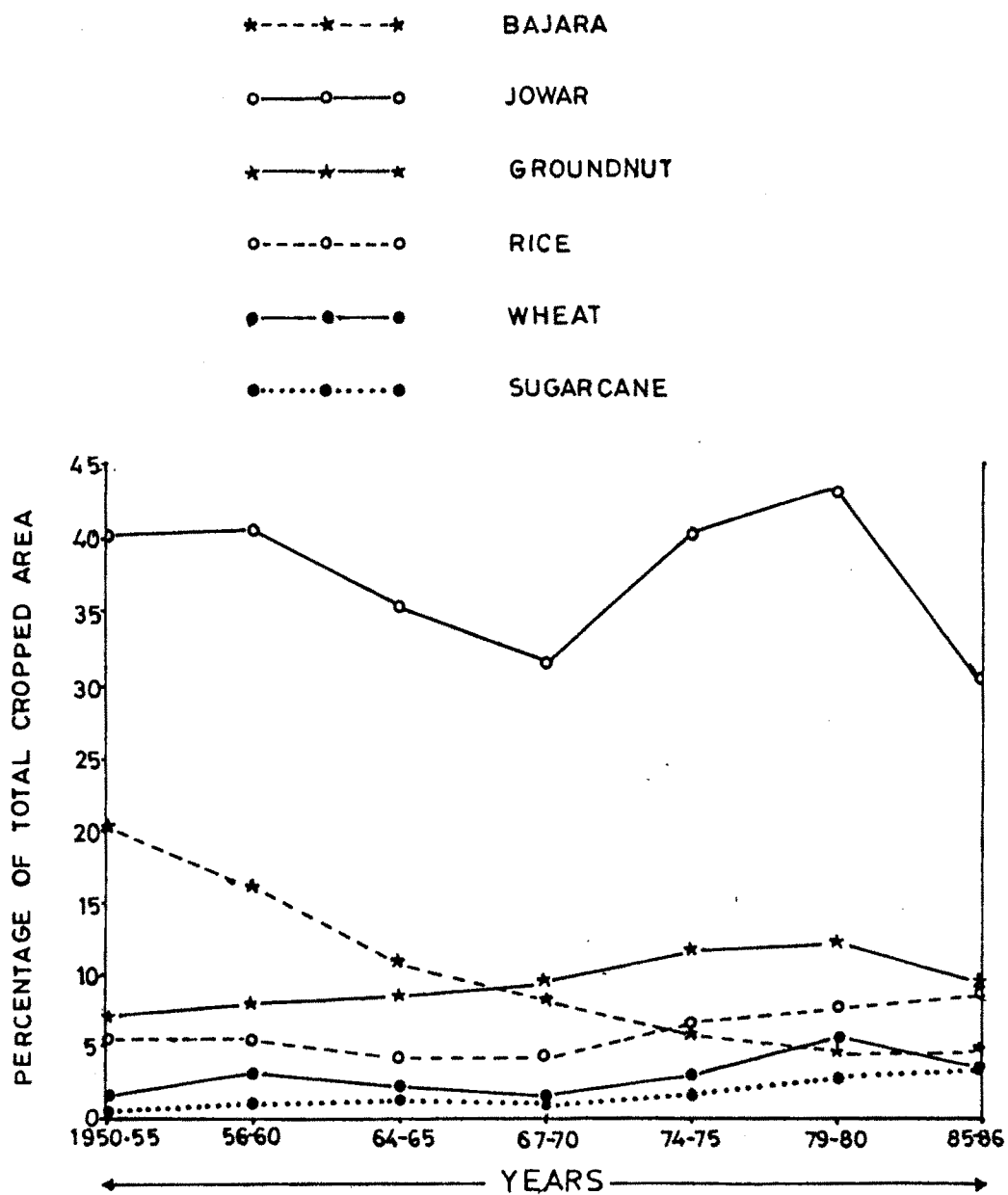


FIG. 3-1

mirrors the impact of physical, socio-economic and techno-organizational influents but more strong are the physical environs" (Singh, 1976). The physiography and climate of the region differs from place to place and its influence is observed on the spatial variation in the cropping pattern in the region. In western part laterite soil and high rainfall is favourable for rice cultivation. Jowar and bajara are cultivated in the eastern parts of the region where soil is infertile and intensity of rainfall is very low. While sugarcane is cultivated in the Krishna river valley where soil is fertile and canal irrigation is developed. Due to the availability of market facilities fruits and vegetables are cultivated around the Wai city.

Jowar, rice, bajara are the staple crops occupy 30.13 percent, 6.81 percent and 3.92 percent of the total cultivated area respectively. Jowar is grown as a kharif and rabi crop, while bajara is only a kharif crop confined mainly to the eastern drought area. The other food crops grown here are wheat (3.0 percent), gram (2.49 percent). Sugarcane occupies 2.88 percent, fruits and vegetables 2.38 percent, condiments and spices 1.63 percent area of total cropped area. Groundnut is an important crop grown in the region and ranks 2nd in the region, occupying about 8.63 percent of the gross cropped area. " The spatial distribution of leading foodgrains show their climatic and edaphic preferences and also human need," (Shinde, 1980). The major crops, their spatial distribution and changes therein are as follow.

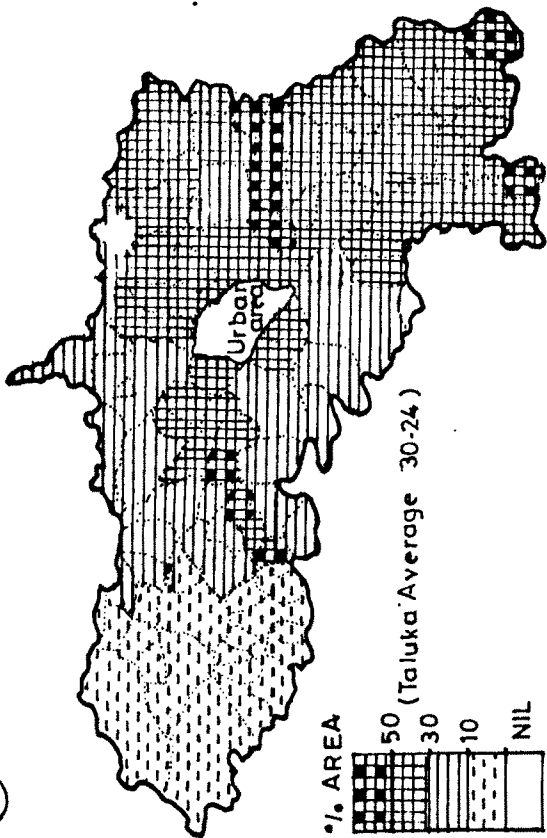
1) Jowar (1985-86) :

Jowar, a staple food in the region occupies 30.13 percent area of the total cropped area. Jowar is grown as the kharif and the rabi crop. Fig.3.2-A shows the spatial distribution of jowar in the region. Jowar is mainly confined to the eastern parts of the region, where the intensity of rainfall is very low. Over 50 percent and 30 to 50 percent of gross cropped area under jowar is significantly noted in the eastern parts of the region. 10 to 30 percent of area is observed in the south-central and the north-central parts of the region and below 10 percent area under jowar is found in the western parts of the region.

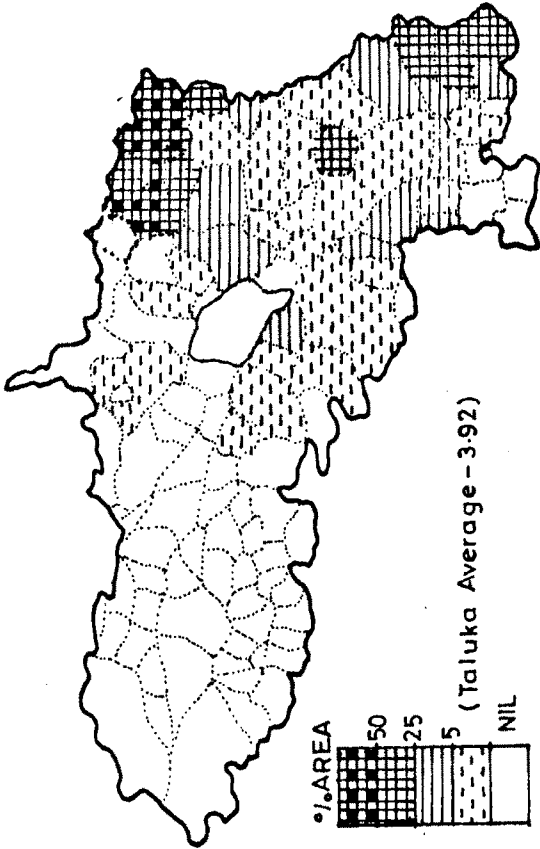
The changes in the area under jowar is exhibited in Fig.3.2-B. The area under jowar has decreased from 32.61 percent to 30.24 during the last fifteen years. It has witnessed negative change (-2.48%) in the region as a whole. However, significant increase in area by 15 percent is noted in the villages of Vyahali, Varkhadwadi, Kadegaon, Vahagaon, Degaon and Kholawadi. The moderate positive change (5 to 15 percent) is observed in the eastern part of the region, particularly in the villages namely Gulumb, Vele, Parkhandi, Khanapur, Shirgaon and Kalangwadi. It is also noted in the villages of Malatpur, Yeruli and Panas. The low positive change (under 5%) is found in the villages of Balakwadi, Golegaon, Ulumb, Partawadi and Vaigaon in the west and in the villages of Pachawad, Amuratwadi, Chindhavali, Vyajawadi in the east.

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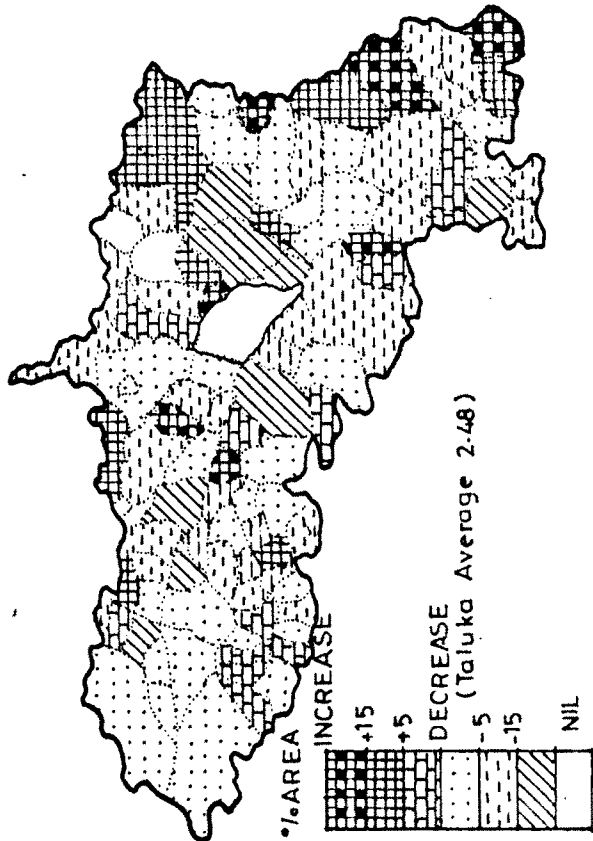
(A) JOWAR (1985-86)



(A) BAJARA (1985-86)



(B) CHANGE IN JOWAR (1970-71-1985-86)



(B) CHANGE IN BAJARA (1970-71-1985-86)

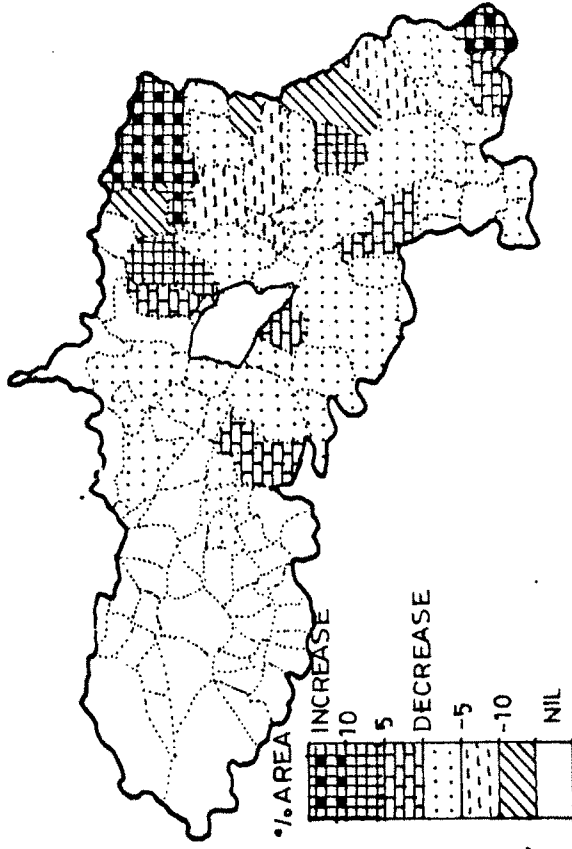


FIG. 3-2 A-B

FIG. 3-3 A-B

The negative change is noted in the south-eastern part of the region along the Krishna river, where positive change in irrigation is found (Fig.2.5-B). The increased irrigation facilities are devoted for sugarcane cultivation. The negative change (below 5 percent) is noted in the western upland areas of the region. It is also found in the villages of Dhavadi, Dasavadi, Kusagaon, Vahagaon, Surur and Kawathe. The significant negative change (over 15%) is found in the villages of Kanjal, Shendurjane, Pasarni and Velang.

ii) Bajara (1985-86) :

This is another staple foodgrain cultivated in the drier parts of the region. It is drought resistant crop requiring less amount of rainfall. Bajara comprises about 3.92 percent of gross cropped area in the region. Fig.3.3-A reveals that bajara cultivation is largely confined to the eastern parts of the region. The villages Chandak and Vele have a relatively higher proportion (above 25 percent) under this crop. The moderate (15 to 25 percent) percentage under this crop is observed adjacent to the above villages and it is also found in the villages of Lagadwadi, Belmachi and Kholawadi. The villages of Degaon, Kikali, Nikamwadi, Asale, Kalangwadi, Kadegaon, Shendurjane, Kerjal, Vahagaon have 5 to 15 percent of area under bajara, elsewhere, it is very insignificant. It is not cultivated in the western parts of the region.

Fig.3.3-B reveals the change in area under bajara. The last fifteen years have witnessed the insignificant positive change (0.4 percent) in area under bajara in the region. However, the significant positive change (over 10 percent) is noted in the north-eastern part of the region in the villages of Gulumb and Vele. It is also found in the village Kholawadi. The moderate positive change (5 to 10 percent) is observed in the villages Parkhandi, Mungasewadi and in the village Anavadi, where negative change in irrigated area is noted. Low positive change (below 5%) is observed in the villages of Kusgaon, Eksar, Songirwadi, Lohare, Kadegaon and Asale.

The negative change in bajara cultivation is observed in the south-eastern part of the region. High negative change (over 10 percent) is noted in the villages of Chandak, Vahagaon, Shirgaon. The moderate negative change (5 to 10 percent) is found in the villages of Kenjal, Kawathe and Degaon. The low negative change (below 5 percent) is noted along the Krishna river and in the villages of Dhavadi, Abhepuri, Pandewadi, Boriv, Vyahali and Pasarni. It is also found in the villages of Mohodekarwadi and Surur. The bajara has been replaced by sugarcane and wheat where area under irrigation has increased.

iii) Rice (1985-86) :

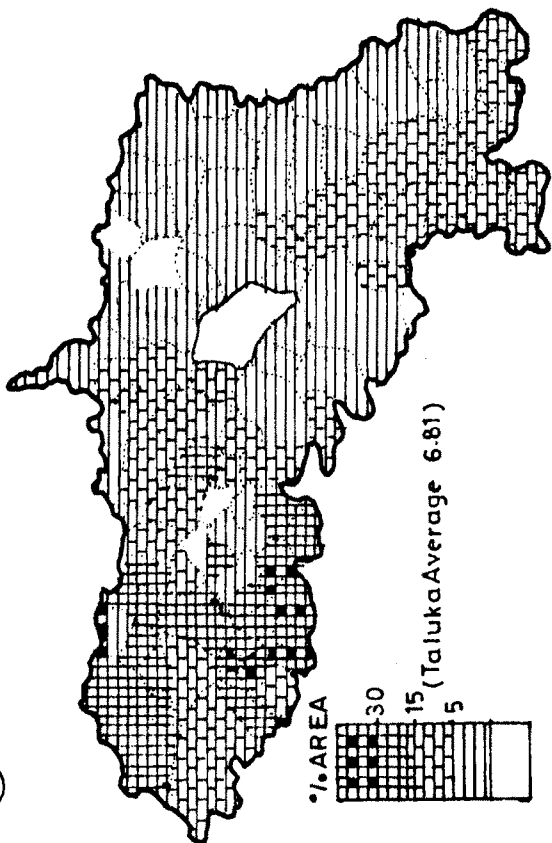
Rice is a tropical monsoon crop requiring high temperature and high rainfall. It occupies about 6.81 percent of gross

cropped area in 1985-86. It is largely grown in the western parts of the region, where intensity of rainfall is high. Rice cultivation is closely related to climatic and soil conditions in the region. Laterite or red, clay or loamy clay soils are suitable for its growth. Fig.3.4-A, exhibit the spatial distribution of rice in the region. Very high (over 30%) percentage of the total cropped area is found in the villages of Oholi, Balakwadi, Vaigaon and Dhavadi. About 15.30 percent area under rice is noted adjacent to the above villages of Jor, Kondhavale, Velang, Asare, Abhepuri, Varkhadwadi, Pandewadi, Dhavadi and it is also observed in the villages of Ozarde, Asale, ^uBh_Ainj, Pachawad, Chindhavali and to its southern part. Remaining villages have very low (under 5 percent) percentage of area under this crop.

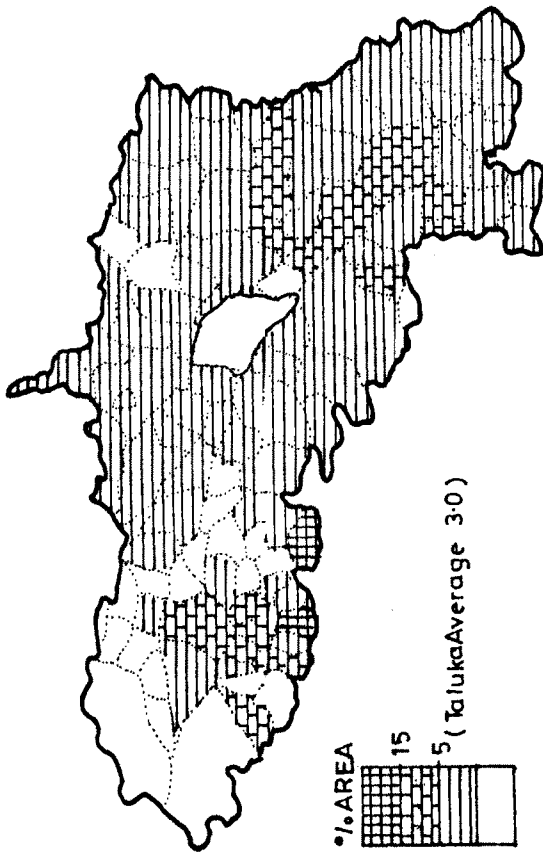
The area under rice cultivation has increased from 5.03 percent to 6.81 percent during the period under investigation. Fig.3.4-B reveals the change in rice cultivation in the region. Significant positive change (over 10 percent) is observed in the villages of Khadaki, Jamb, Khanapur, Golewadi and Dhavali. The moderate positive change (5 to 10 percent) is noted in the south-eastern part of the region along the Krishna river. It is also noted in the north-western part of the region and in the villages of Dhom, Varkhadwadi, Pandewadi and Bhogaon. The low positive change (below 5%) is noted along the eastern border of Wai taluka. It is noted in the villages

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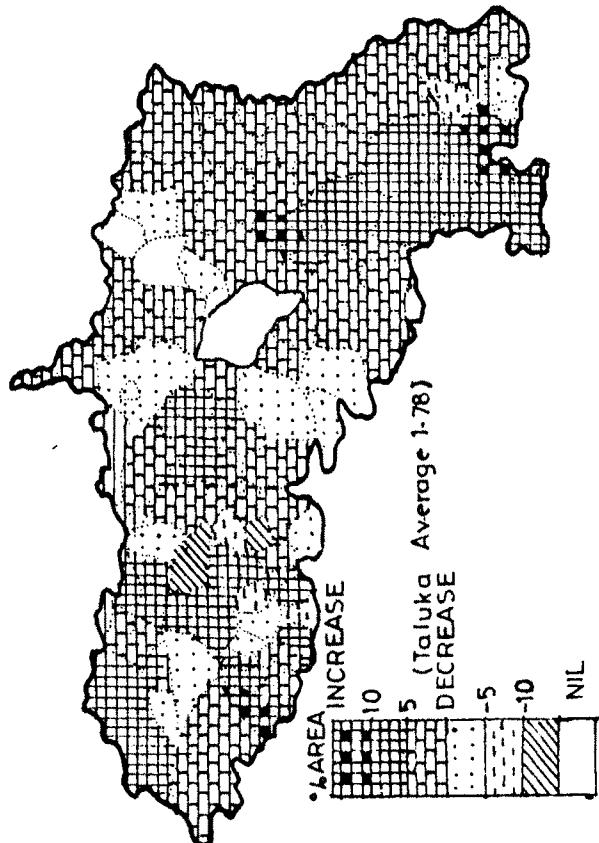
(A) RICE 1985-86



(A) WHEAT 1985-86



(B) CHANGE IN RICE (1970-71-1985-86)



(B) CHANGE IN WHEAT (1970-71-1985-86)

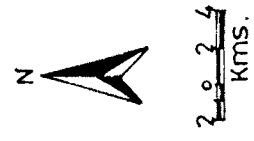
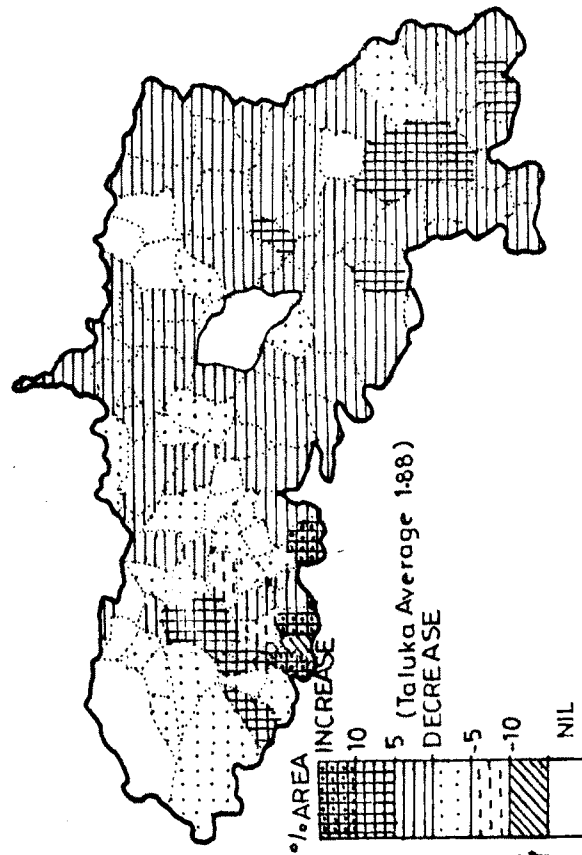


FIG. 3.4 (A,B)

FIG. 3.5 (AB)

of Jor, Abhepuri, Velang, Kusgaon and Bavadhan. The positive change in rice cultivation is occurred ^{due} to the increased irrigation facilities and introduction of high yielding varieties in the region.

The significant negative change (above 10 percent) is noted in the villages of Bhivadi, Gove and Mugaon. The moderate negative change (5 to 10 percent) is observed in the villages of Borgaon Bk. and Kondhavali Bk. The insignificant negative change is found in the remaining villages.

iv) Wheat (1985-86) :

Wheat is the rabi crop, sown after the monsoon. It can be grown in the areas where rainfall is less than 500 mm with the help of irrigation (Plate 4-B). Over 3.0 percent of total cropped area is occupied by wheat. Fig.3.5-A exhibits the spatial distribution of the wheat in the region. High percentage area (over 15 percent) under this crop is observed in the villages of Chikhali and Borgaon Bk. Moderate percentage (5 to 15 percent) of area is noted along the lower Krishna river valley especially in the villages of Chindhavali, Bhuinj, Pachawad, Amuratwadi, Ozarde, Vyajwadi, Khanapur and Pande, where soil is black fertile and canal irrigation is developed. It is also found in the western part in the villages of Vasole, Golegaon, Nandagane, Balakwadi, where laterite soil is suitable for its growth and the private canal provides water to this crop. Very low percentage (under 5%) of area is noted in the central part and along the eastern border of the region.

The Fig.3.5-B shows the change in wheat cultivation in the region. Area under wheat cultivation has increased from 1.12 percent to 3.00 percent during the fifteen years. The villages of Vaigaon, Borgaon Bk. and Chikhali have significant increase (over 10 percent) in the area under wheat. The moderate increase (5 to 10 percent) in area under wheat is noted in the villages of Vyajawadi, Bhuinj, Chindhavali, Nikamwadi, Kalangwadi and Khanapur. It is also noted in the western part of the region particularly in the villages of Golegaon, Nandagane, Balakwadi and Vasole. Low increase in (below 5 percent) area under wheat is noted in the eastern and central part of the region.

The negative change (over 10 percent) is noted in the village Dahyat. The moderate negative change (5 to 10 percent) is observed in the villages of Gove, Akoshi and Partwadi. Low negative change (below 5 percent) is noted in the western part of the region and in the villages of Degaon, Anavadi, Songirwadi and Parkhandi.

v) Sugarcane (1985-86) :

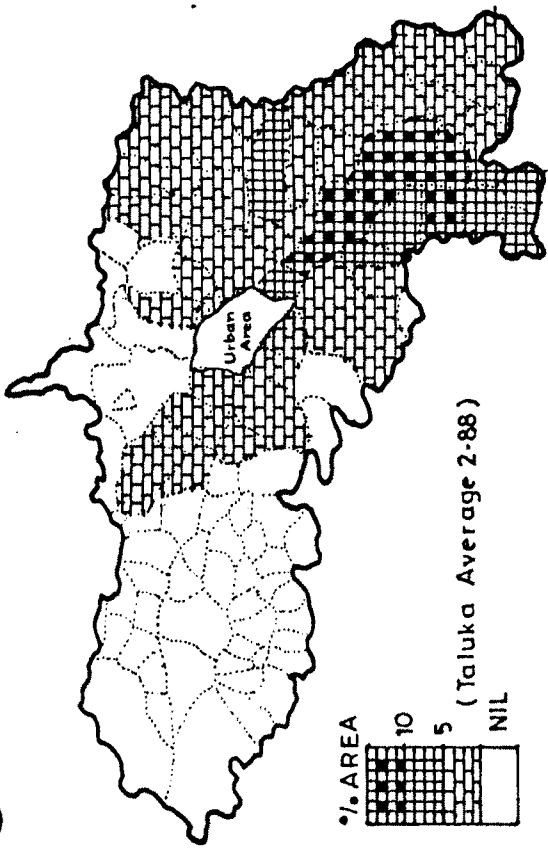
Sugarcane crop require certain geographical conditions for its fair growth i.e. deep, rich loamy fertile soils, assured supply of water and high temperature (Plate 4-B). Such favourable conditions are existing in the southern parts of the Krishna river valley in the region. And this part of the region is significantly devoted for sugarcane cultivation (Fig.3.6-A). The high

percentage (over 10 percent) of area under this crop is significantly noted in the villages of Ozarde, Bhuinj, Pachawad and Chindhavali. The moderate percentage of area (5 to 10 percent) under this crop is observed adjacent to the above villages. This is the area where soil is fertile and canal irrigation is developed. Under 5 percent of the total area is found in the western and central parts of the region particularly in the well irrigated area. Due to the development in canal irrigation the area under this crop has increased by 1.8 percent during the study period.

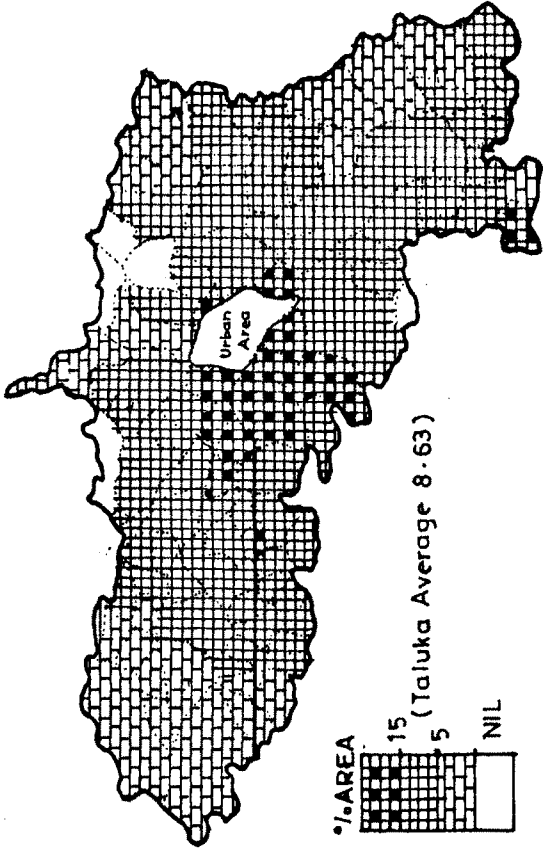
Fig.3.6-B reveals change in area under sugarcane in the region. The period under investigation has witnessed the significant increase in the area under sugarcane from 473.50 hectares in 1970-71 to 1,299.62 hectares in 1985-86. The significant increase is confined to the lower reaches of river Krishna, where new irrigation project (Dhom project) has brought additional land under irrigation. The significant positive change (over 10 percent) is noted in the villages of Chindhavali, Kalambhe and Udatare. The moderate positive change (5 to 10 percent) is found adjacent to the above villages along with the village Kawathe, whereas insignificant positive change is confined to the villages of Menavali, Eksar, Vyahali, Bhogaon, Pandewadi and Bavadhan. It is found along the eastern border of the region and in the central part of the region. In general the increase in the sugarcane is

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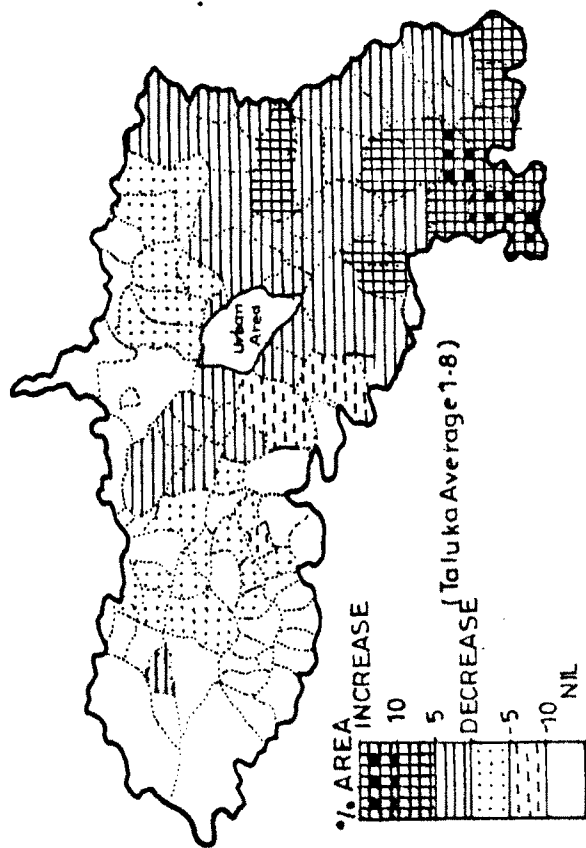
(A) SUGARCANE 1985-86



(A) GROUNDNUT 1985-86



(B) CHANGE IN SUGARCANE (1970-71-1985-86)



(B) CHANGE IN GROUNDNUT (1970-71-1985-86)

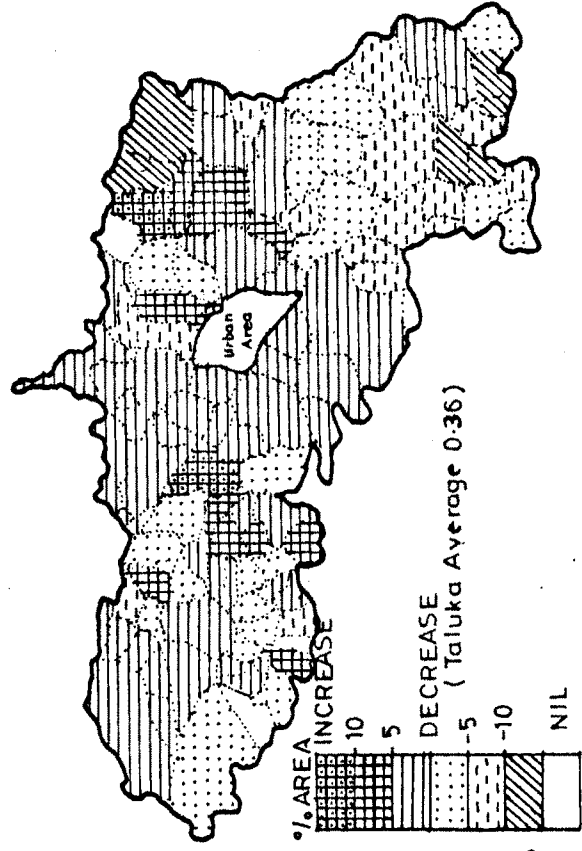


FIG. 3.6 (A-B)

FIG. (3.7 A-B)

proportionate to the increase in the irrigated area. The insignificant negative change is noted in some of the villages located in the north-eastern and western part of the region.

vi) Groundnut (1985-86) :

Groundnut crop is widely distributed through out the region (Fig.3.7-A). About 8.63 percent of gross cropped area is under this crop and ranks 2nd in the region in respect of area. More than 15 percent of the total cropped area is devoted to groundnut cultivation in the south-central parts of the region, especially in the villages of Vyahali, Eksar, Bhogaon, Menavali, Pasarni, Kanur, Songirwadi and Sidhanathwadi, where the light well drained coarse shallow soils are existed, which is suitable for groundnut cultivation. The moderate percentage (5 to 15 percent) of area under groundnut is confined mostly to the central part of region. The western and the eastern part of the region have low (under 5 percent) percentage of area under this crop.

Fig.3.7-B exhibits the change in the area under groundnut in the region. The high positive change (over 10 percent) is noted in the villages of Chandak, Vyahali, Varkhadwadi and Mugaon. The moderate (5 to 10 percent) positive change is found in the villages of Kenjal, Khanapur and Lohare. It is also found in Boriv, Asgaon, Vaigaon, and Chikhali. The insignificant increase (under 5 percent) is found in the central and the north-western

part of the region. It is also noted in the villages of Surur, Mohodekarwadi and Kikali.

The area under groundnut has decreased by 0.36 percent during the last fifteen years. The significant negative change (over 10 percent) is found in the north-eastern part of the region and in the villages of Chindhavali, Khadaki, Kalangwadi and in the Songirwadi. The moderate negative change (5 to 10 percent) is observed in the south-eastern part of the region and in the villages of Bopardi, Vahagaon, Panas, Borgaon Kh. and Bk. Insignificant decrease (below 5 percent) is noted in the villages of Jor, Golegaon, Khondhavali Kh. and Bk., Partwadi, Nandagane, Velang, Asare, Kusagaon. It is also noted in the villages of Ozarde, Pande, Kawathe, Shirgaon, Kalambhe, Ndatore and Kholawadi. It is observed that as soon as the irrigation water is made available the groundnut is replaced by sugarcane crop.

3.2 B) QUANTITATIVE ANALYSIS - CORRELATION REGRESSIONS :

The requirement of water differs from crop to crop. Some crops requires assured supply of water for its fair growth viz. sugarcane, wheat, rice etc. There are some crops which do not need assured supply of water viz. jowar, bajara, pulses etc. Therefore, in the irrigated area the crops which requires assured supply of water, are cultivated. In the last decade irrigation facilities have been developed in the study region after the construction of Dhom dam. There is close

relationship between the irrigation and crop land occupance. Fig.3.8 shows the relation between net area irrigated and crop hectarage in the region. The relationship between net area irrigated and crop hectarage is as follows.

- i) Jowar : Fig.3.8-A shows the insignificant positive ($r=0.061$) relationship between jowar hectarage and area under irrigation. Being a hardy grain, jowar does not require much water for its growth. Therefore, it shows the insignificant positive relationship with the irrigated area in the region.
- ii) Bajara : Fig.3.8-B reveals the negative ($r=-0.513$) relationship between bajara hectarage and the irrigated area. It is due to the increase in irrigation facilities the area of bajara is replaced by irrigated crops viz. sugarcane, rice, wheat etc.
- iii) Wheat : Wheat is grown in the irrigated area because it requires water for its fair growth. The area of wheat has been increased with the increased irrigation in the region. There is positive ($r=0.599$) relationship between the area under irrigation and the wheat hectarage (Fig.3.8-C).
- iv) Rice : If the rainfall is inadequate and erratic the rice cultivation requires irrigation water. As the rainfall in the region is inadequate rice cultivation depends upon the facilities of irrigation. Hence, there is positive ($r=0.864$) association between rice hectarage and irrigated area (Fig. 3.8-D).

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RELATION BETWEEN NET IRRIGATED AREA & CROP HECTAREAGE

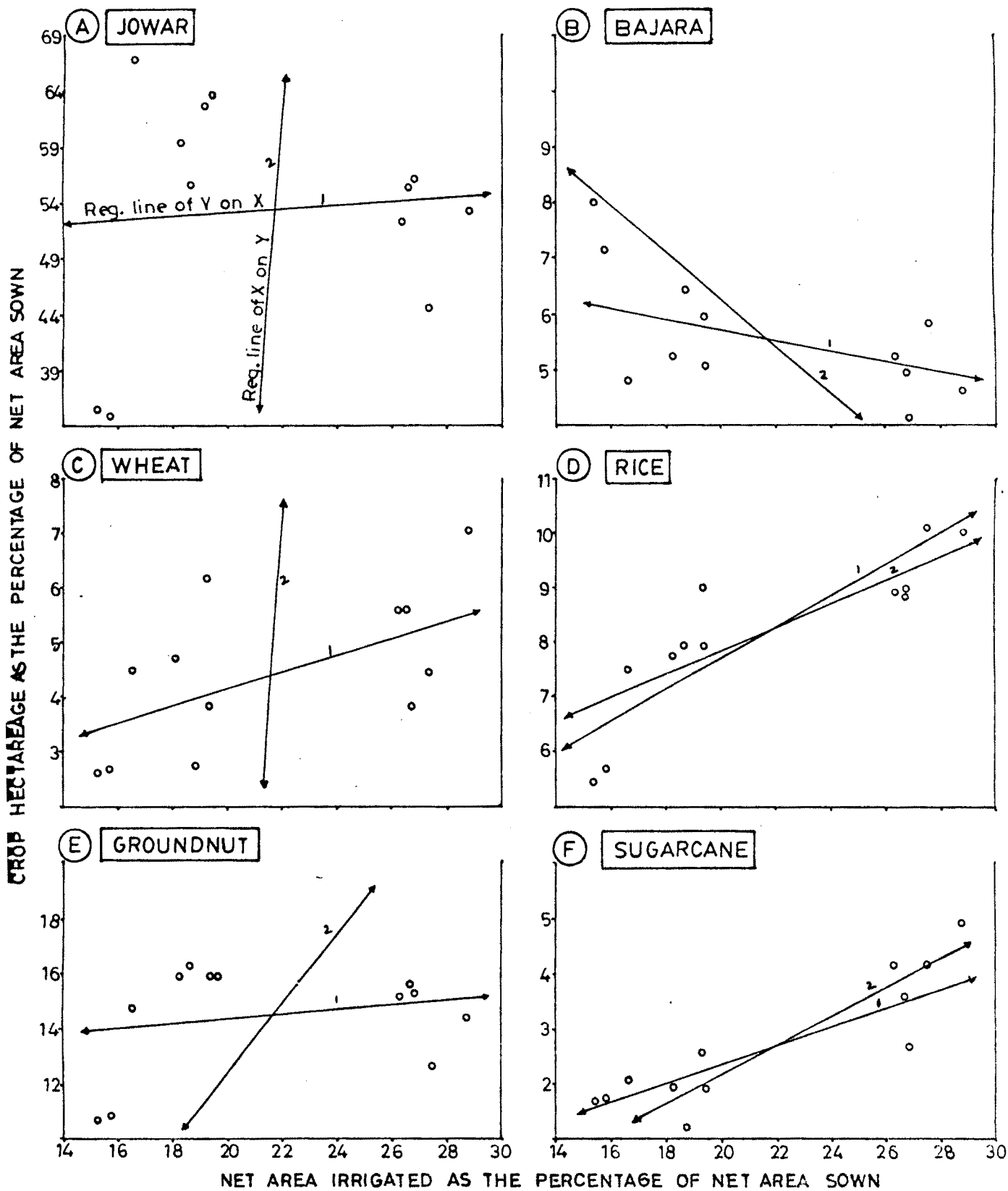


FIG 3-8

- v) Groundnut : This crop also requires water for its growth. Fig.3.8-E shows the positive ($r=0.209$) relationship between groundnut hectarage and the net area irrigated.
- vi) Sugarcane : Fig.3.8-F reveals the significant positive ($r=0.884$) relationship between hectarage of sugarcane and the irrigated area in the region. It is so because it requires large quantity of water throughout the year. In the study region canal irrigation is developed. It provides water regularly to this crop. Therefore, the area of sugarcane has increased with the increased irrigated area in Wai taluka.

In brief, the positive and very close relationship between hectarage of sugarcane, rice, wheat and groundnut on one hand and the net area irrigated on the other hand has been observed in the region as a whole. Whereas the insignificant positive relationship is noted between jowar and net area irrigated. The negative association between area under irrigation and the area under bajara is noted in the region (Fig.3.8-B).

It is evident from above analysis that irrigation plays vital role in changing the cropping pattern of a region. The farmers cultivate the crops which give good return to irrigation. With the increased irrigation facilities inferior food crops have been replaced by superior crops like sugarcane, wheat, rice etc.

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2. Singh, J. (1976) : Op cit. p.309.