

CHAPTER - III

IRRIGATED CROPPING PATTERN

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References

3.1 INTRODUCTION :

In the earlier part an attempt is made to investigate how far the natural and human conditions have led to the development of irrigation facilities during the period under review. It is proposed to analyse the irrigated cropping pattern and changes therein in the current chapter. An attempt is also made to find out intensity of cropping crops of leading increase and decrease and overall changes therein. It is ultimately governed by the farmers cropping choices. This implies decision making on the part of the farmers in favour of one or preference for one over other competing irrigation crops. These choices are directly governed by specific purposes for which the irrigated crops are to be grown and these are conditioned by geographical factors and modified by the emergent social and economic circumstances (Mamoria, 1979).

3.2 IRRIGATED CROPPING PATTERN (1950-53 & 1980-83) :

In the irrigated cropping pattern of the state wheat alone shares more than 26.13% of the irrigated land followed by jowar, rice, sugarcane, bajara, grams and groundnuts (Table 3.1). However, the concentration of individual crop is influenced by the degree of development and nature of water resources. An attempt is made therefore, to correlate the facilities of irrigation with the spatial distribution of crops and changes therein during the period under review by considering the percentage occupancy strength of each irrigated crops.

Table 3.1 : Irrigated area under different crops in Maharashtra 1950-53 to 1980-83.

		(Area in '000' hectares)				
Sr. No.	Crops	1950 - 53		1980 - 83		Volume of Change in %
		Area in hectare	% to gross cropped area	Area in hectare	% to gross cropped area	
1	Rice	904	26.48	3,827	18.52	- 7.96
2	Wheat	345	10.10	5,397	26.13	+16.03
3	Jowar	683	20.02	4,599	22.26	+ 2.24
4	Bajara	96	2.81	696	3.36	+ 0.55
5	Ragi	-	-	-	-	-
6	Maize	52	1.52	294	1.42	- 0.10
7	Other Cereals	123	3.60	250	1.14	- 2.46
Total Cereals		2,203	64.53	15,043	72.83	+ 8.30
8	Grams	384	11.25	712	3.45	- 7.80
9	Tur	46	1.35	23	0.11	- 1.24
10	Other pulses	76	2.22	78	0.38	- 1.84
Total pulses		506	14.82	813	3.94	-10.88
Total food-grains		2,709	79.35	15,856	76.77	- 2.58
11	Sugarcane	580	16.99	3,577	17.32	+ 0.33
Total food-crops		3,289	96.34	19,444	94.09	- 2.25
12	Groundnuts	75	2.20	463	2.24	+ 0.04
13	Cotton	34	1.00	656	3.18	+ 2.18
14	Tobacco	11	0.32	68	0.33	+ 0.01
15	Other non-food crops	5	0.14	34	0.16	+ 0.02
Total non-food crop		125	3.66	1,221	5.91	+ 2.25
Gross irrigated area		3,414	100.00	20,654	100.00	+21.40

SOURCE : i) Statistical Abstract of Maharashtra ii) Districtwise general statistical information of agricultural department, Pune (Epitome Part II).

IRRIGATED AREA UNDER DIFFERENT CROPS

1950-53 TO 1980-83

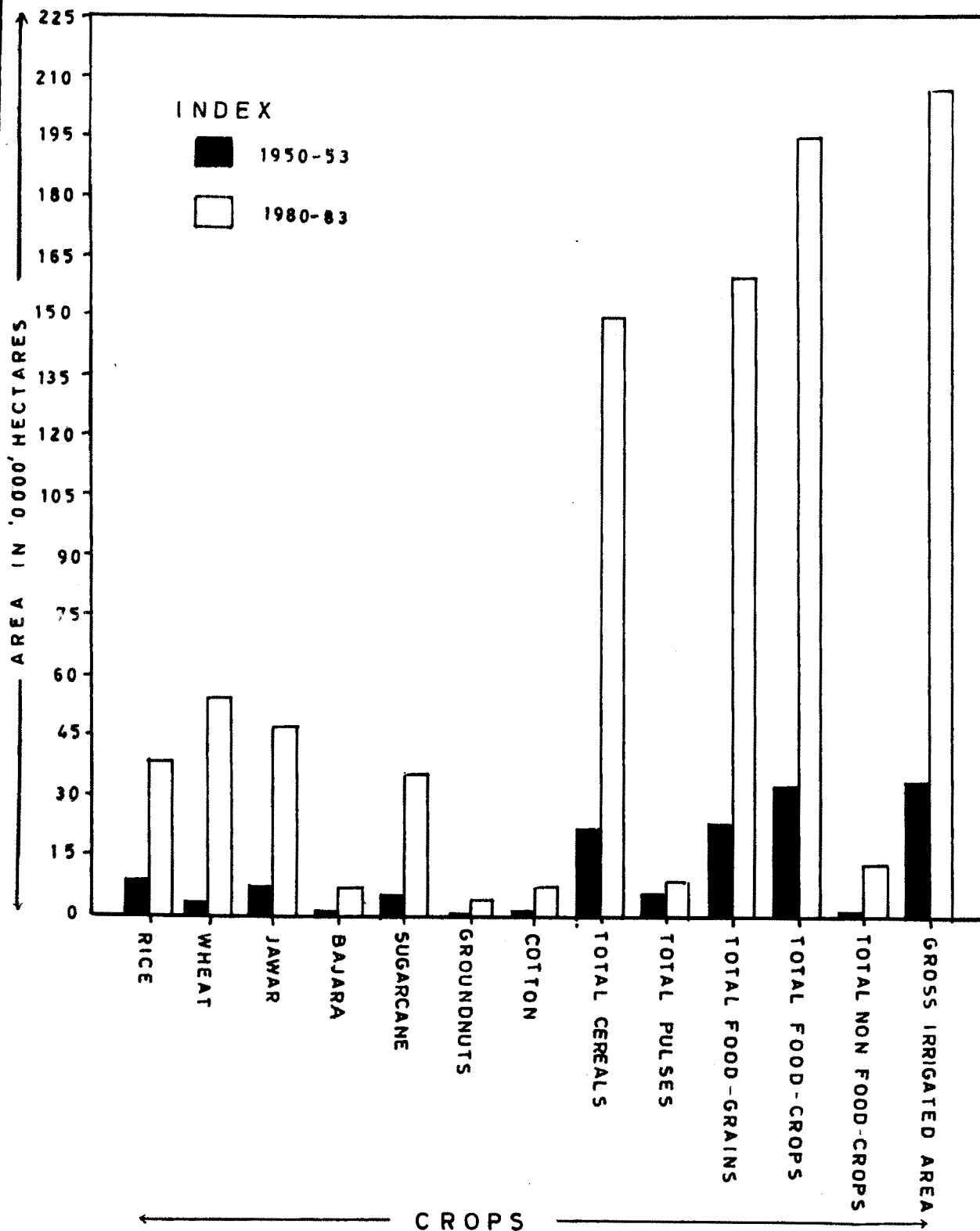


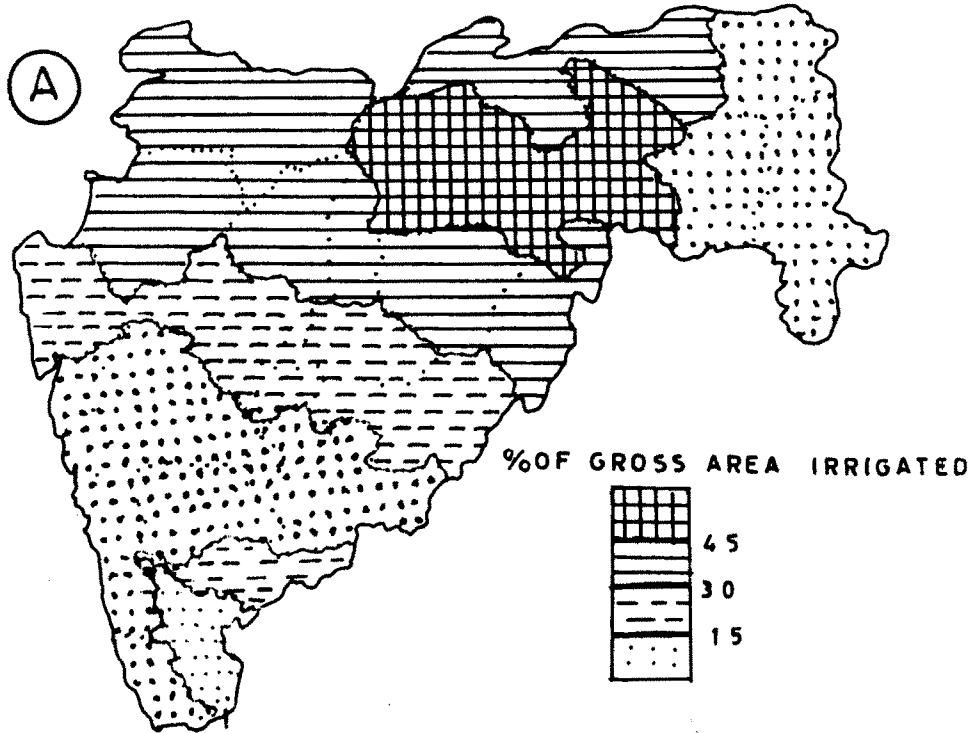
FIG. 3.1

Nearly 76.77% of the gross cropped area is under food-grains. Among the foodgrains the major crops are jowar, bajara, rice and wheat. The non-food crops account for 5.91% of the gross cropped area. The food crops account for 94.09% of the total area irrigated. Where cotton, groundnuts and tobacco are the important crops. The spatio-temporal analysis of area under different irrigated crops are as follows :-

1) Wheat : Wheat is a rabi crop, sown after the monsoon. It can be grown in areas where rainfall is less than 500 mm. with the help of irrigation. As such, in the state the monsoon or post monsoon rainfall by itself is not sufficient for optimum production. Ultimately therefore, it is the extent of irrigation which determines its areal extent and yield capacity.

Regional distribution (1980-83) : Wheat occupies about 5,397 hectares i.e. 26.13% of the gross irrigated area in the year of 1981-83. Wheat ranks first among the irrigated crops (Fig.3.1). It establishes strong relationship with irrigated area in the state. Relatively high irrigated area (above 45%) under wheat is observed in the districts of Akola, Wardha, Buldhana, Yeotmal. While the moderate percentage (30 to 45%) is noted in Nasik, Dhulia, Jalgaon, Aurangabad, Jalna, Parbhani, Nanded, Amravati and Nagpur districts whereas low percentage (15 to 30%) is noted at Thane, Ahmednagar, Bhir, Osmanabad, Latur districts and very insignificant (below 15%) area under this crop is confined to the south western and eastern parts of the state (Fig.3.2-A).

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IRRIGATED AREA UNDER WHEAT
1980-83



VOLUME OF CHANGE
1950-53 TO 80-83

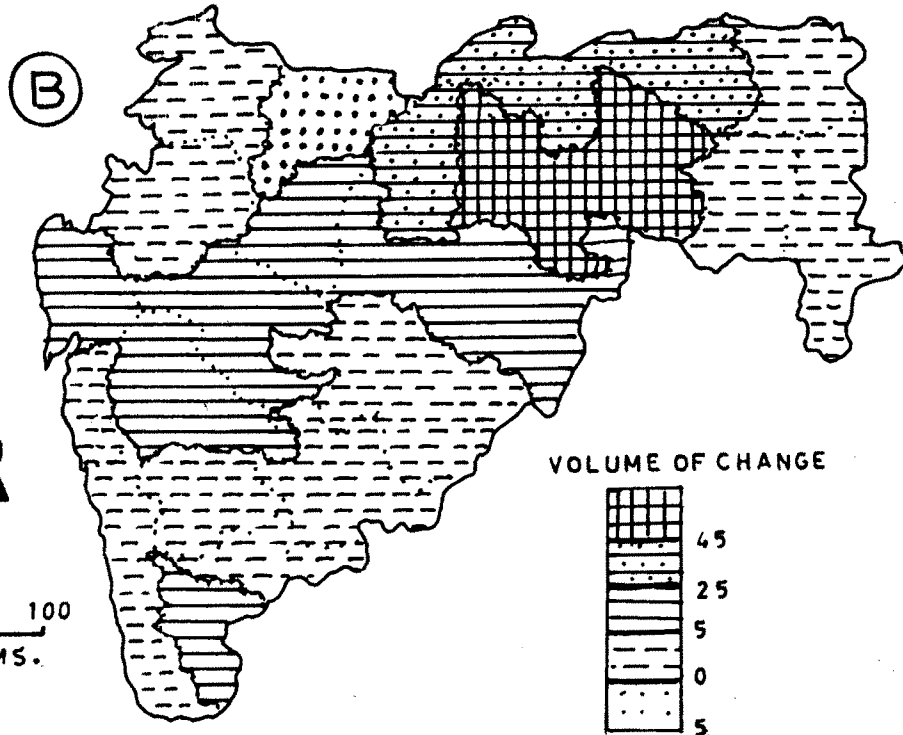


FIG. 3.2

Volume of change (1950-53 to 1980-83) : The irrigated hectarage under wheat has increased from 345,000 to 539,000 during the last 30 years (Table 3.1). Significant increase (25 to 45%) is noted in Vidarbha Region (Fig.3.2-B). The moderate increase (5 to 25%) is observed in Kolhapur, Thane, Pune, Ahmednagar, Aurangabad, Jalna, Parbhani, Nanded districts whereas the low increase (below 5%) is noted in the district of Nasik, Dhule, Bhandara, Chandrapur, Gadchiroli, Bhir, Osmahabad, Latur, Solapur, Satara, Sangli, Raigad, Ratnagiri, Sindudurg. The negative trend is seen in Jalgaon (- 3.03%) district only.

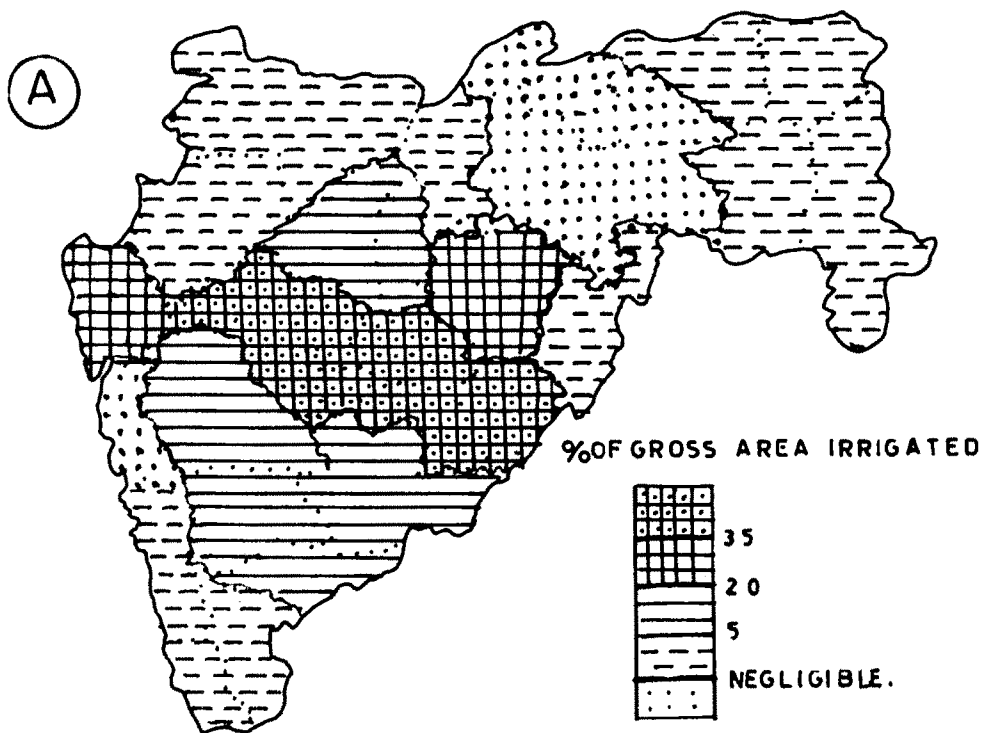
2) Jowar : Jowar shares about 22 to 26% of the gross irrigated area in the year of 1980 to 83. It is largely grown as a rainfed crop (Fig.3.1) and seems to establish the strong relationship with irrigated area in the state.

Regional distribution (1980-83) : Very high (above 35%) and high (20 to 35%) percentage of the total irrigated area under jowar are confined to the central Deccan Plateau of Maharashtra (Fig.3.3-A), where black fertile soil and other environmental conditions are favourable. The moderate proportion of irrigated cropping (5 to 20%) is observed in Thane and Parbhani districts. Elsewhere the irrigated hectarage under jowar is very insignificant.

Volume of change (1950-53 to 1980-83) :

The irrigated hectarage under jowar has increased from 68,300 (20.02%) to 45,990 hectares (22.26%) during the last 30 years. It has witnessed positive change (2.24%) in the state as a

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IRRIGATED AREA UNDER JOWAR
1980 - 83



VOLUME OF CHANGE
1950-53 TO 80-83

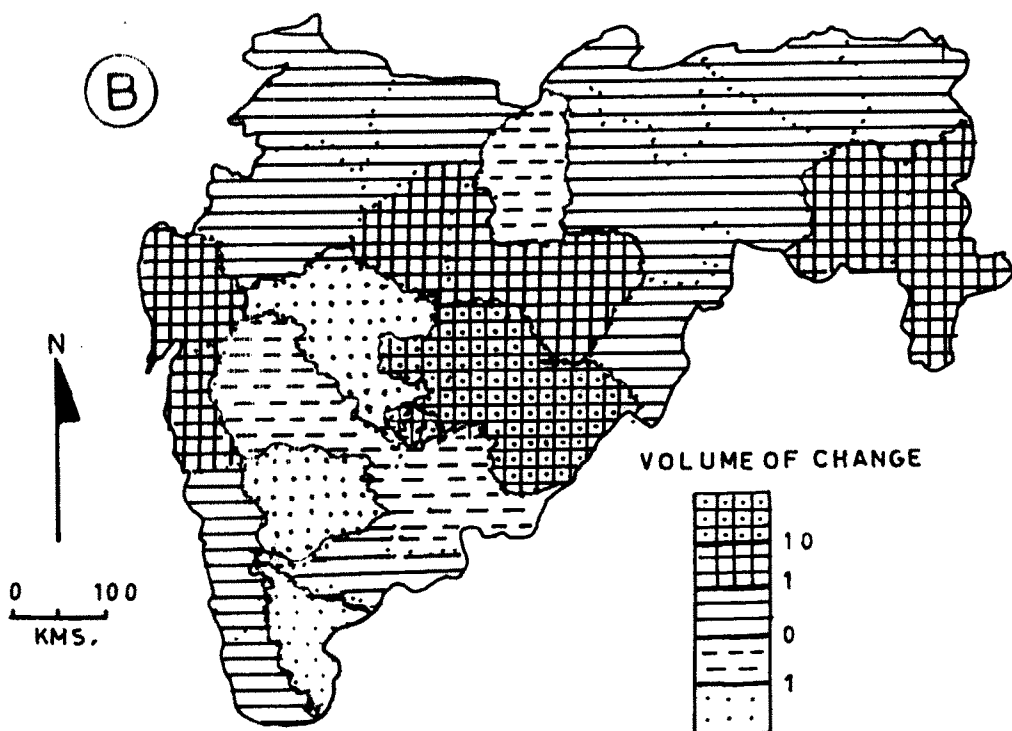


FIG. 3.3

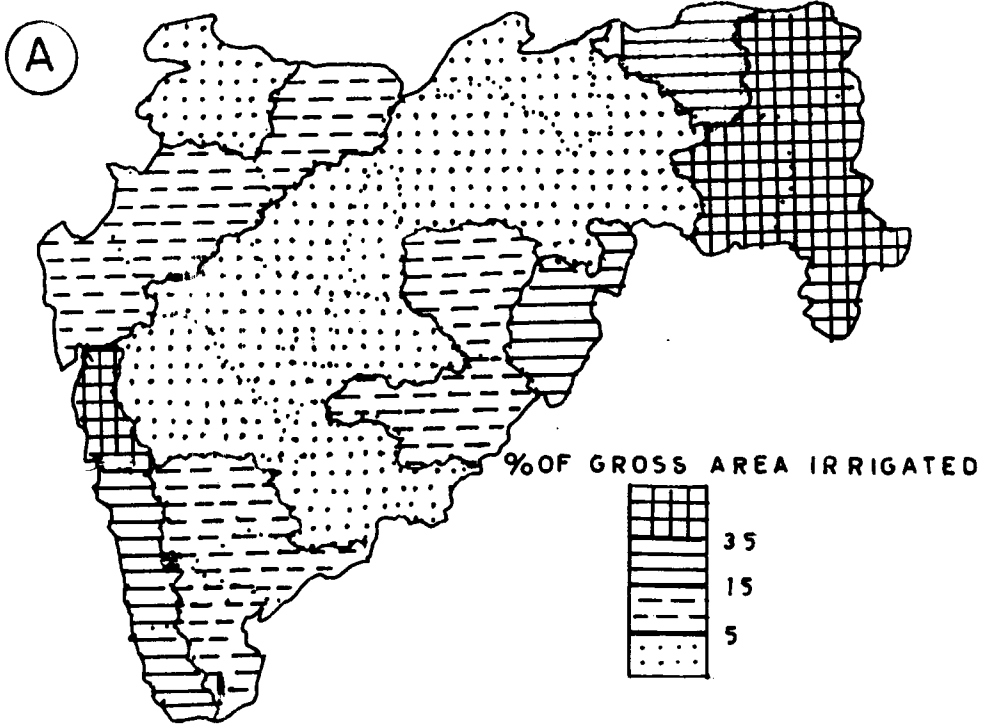
whole. The area has increased by 10% is noted in Bhir, Latur, Osmanabad districts. Whereas moderate positive change (upto 10%) is noted in the districts of Aurangabad, Jalna, Parbhani, Thane, Kulaba, Chandrapur, Gadchiroli. The low positive change (below 1%) in Nasik, Dhule, Jalgaon, Amravati, Nagpur, Buldhana, Vardha, Parbhani, Sangli, Ratnagiri, Sindudurg districts.

The negative change is noted (Fig.3.3-B) in a few districts like Kolhapur, Ahmednagar, Pune, Solapur, Satara, where increased irrigation facilities are diverted for sugarcane cultivation. In general an introduction of hybrid varieties, use of pesticides and development of irrigation facilities seem to have stimulated jowar cultivation.

3) Rice : Rice is a tropical monsoon crop requiring high temperature and high rainfall. It occupies about 8.24% of total cropped area and 18.52% of irrigated area.

Regional distribution (1980-83) : More than 70% of the irrigated rice area is found in the Chandrapur, Bhandara, Gadchiroli districts in the east and Raigad district in the west (Fig.3⁴A). The western part of the state has moderate percentage (20 to 35%) in Ratnagiri, Sindudurg, districts along with Nagpur and Nanded districts. And Satara, Sangli, Kolhapur, Thane, Nasik, Jalgaon, Bhir, Osmanabad and Latur districts have recorded low percentage (5 to 20%) while elsewhere it is very insignificant.

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IRRIGATED AREA UNDER RICE
1980-83



VOLUME OF CHANGE
1950-53 TO 80-83

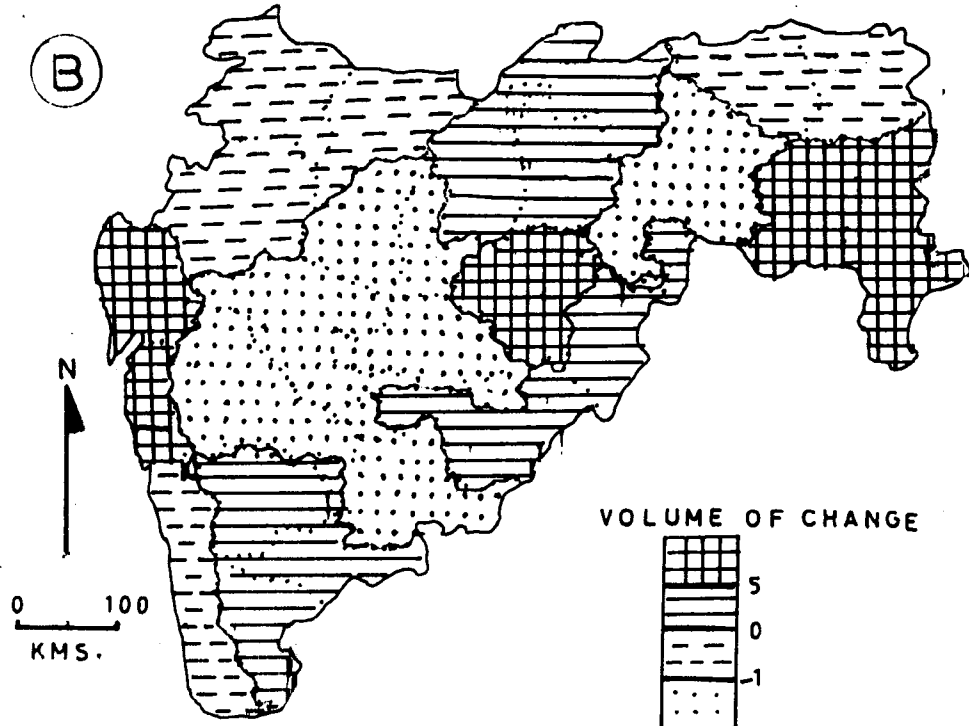


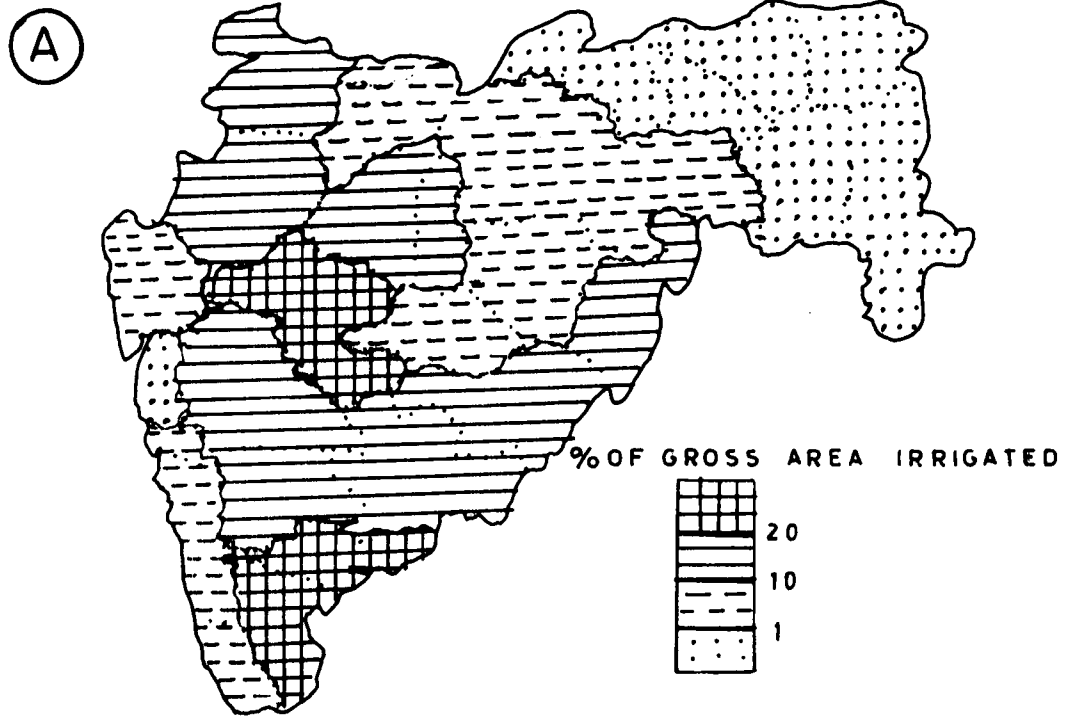
FIG. 3.4

Volume of change (1950-53 to 1980-83) : Area under rice cultivation has increased from 7.15 to 8.24% during the 30 years. It has significantly increased as compared to other crops (Table 3.1). The districts of Raigad, Thane, Chandrapur, Gadchiroli, have significant increases, whereas the districts of Sangli, Kolhapur, Osmahabad, Latur, Parbhani, Nanded, Akola, Buldhana, Amravati, have recorded moderate increase (below 5%) in the area under rice. Introduction of high yielding varieties increasing irrigation facilities and attractive prices seem to have encouraged rice cultivation. The districts of Ratnagiri, Sindudurg, Nasik, Dhule, Jalgaon, Nagpur, Bhandara have shown decline by 5% (Fig.3.4-B). Elsewhere it is very insignificant.

4) Sugarcane : Sugarcane comprises about 357,700 hectares which comes to 17.32% of gross irrigated area in the year of 1980 to 83. However its uneven spatial distribution in Maharashtra state is related to the spatial distribution of irrigation facilities, agro-climatic condition and the soil fertility.

Regional distribution (1980-83) : Fig.3.5-A, reveals that sugarcane cultivation is largely confined to the western upland districts of the state. The districts of Ahmednagar, Kolhapur and Sangli have a relatively higher proportion (above 20%) under this crops. The moderate percentage under this crop is observed adjacent to the above districts. It can be attributed to better irrigation facilities developed in this part of the state. The pedological

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IRRIGATED AREA UNDER SUGARCANE
1980 - 83



VOLUME OF CHANGE
1950_53 TO 80_83

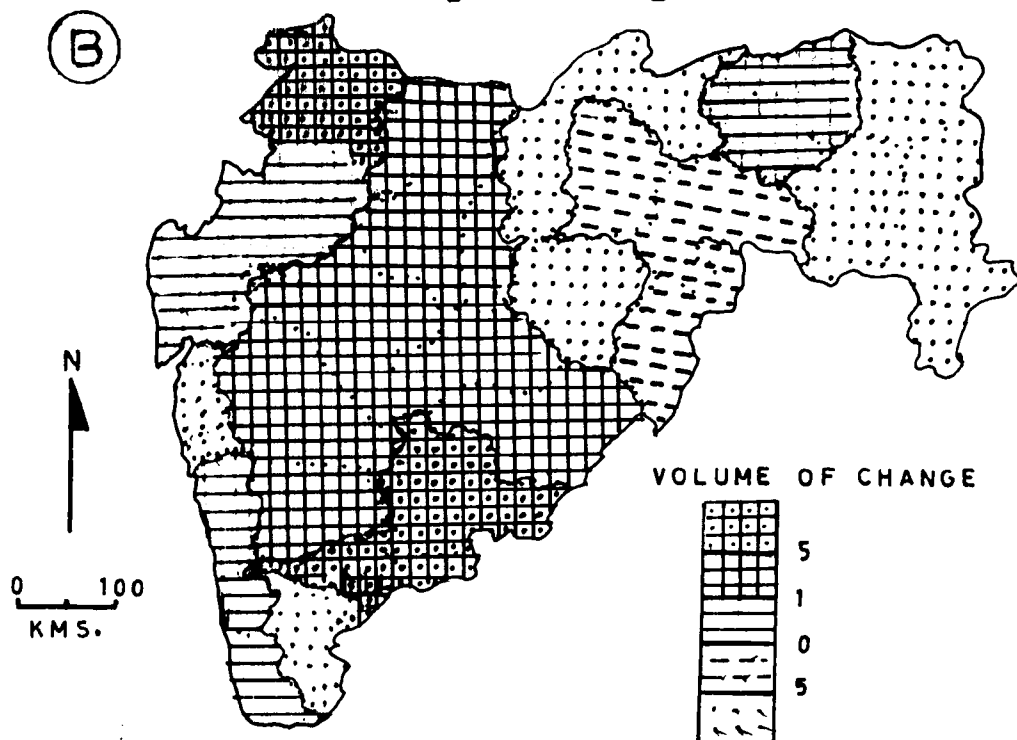


FIG. 3.5

and other agro-climatic conditions are also partly responsible for concentration of cane cultivation in this part of the state. In remaining parts of the state the cane cultivation is very insignificant. This can be related to the low development of irrigation facilities and adverse agro-climatic conditions for cane cultivation.

Volume of change (1950-53 to 1980-83) : The period under investigation has witnessed phenomenal growth in the area under cane, which rose from 16.99% (58,000 hectares) in 1950-53 to 17.32% (357,700 hect.) in 1980-83. The significant increases is confined to the lower part of main river basins, where new irrigated projects have brought additional land under cane cultivation. Whereas insignificant increase in the area under cane is confined to the eastern and western parts of the state (Fig.3.5-B). In general, the increase in the cane area is proportionate to the increases in the irrigated area.

The negative change in area under cane is noted (below 5%) in the districts of Kolhapur, Buldhana, Parbhani, Amravati, Bhandara, Chandrapur, Gadchiroli, Raigad and above 5% in Akola, Yeotmal, Nanded, districts. It may be due to the shift of farmers from sugarcane cultivation to other crops like rice, groundnuts, wheat and cotton.

5) Bajara : Bajara accounts for about 8.56% of the total cropped area. It is mainly a kharif crop. It replaces jowar in the drier tracts on the immediate leewardside of the Ghats, where the rainfall

is less than 75 cms. and the soil is red, shallow, black and lighter.

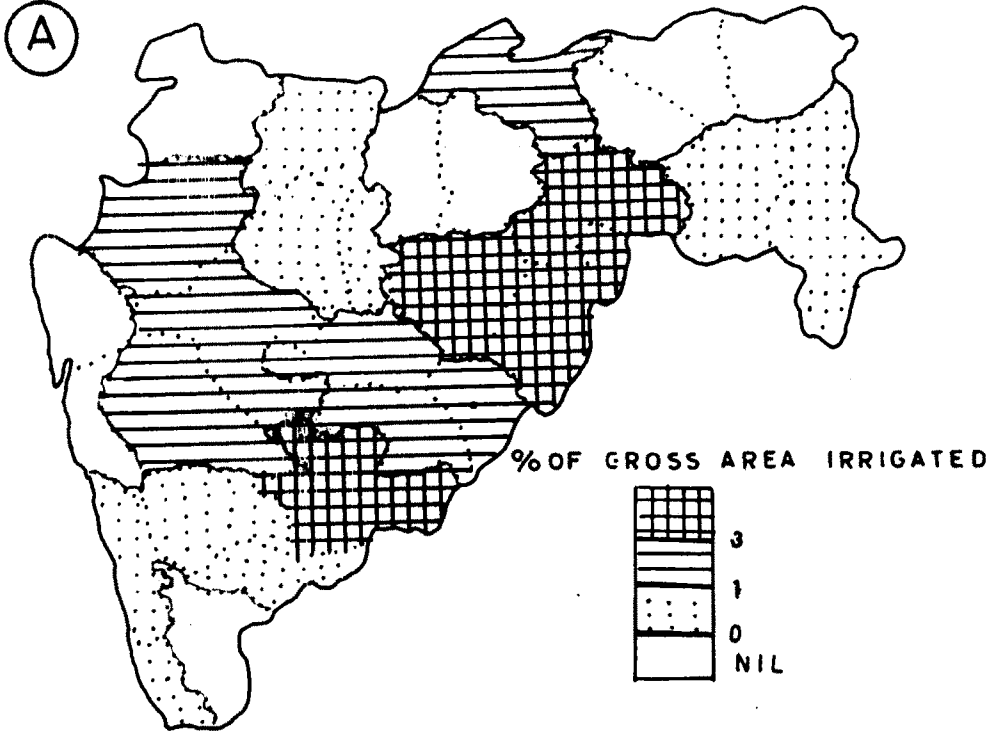
Regional distribution (1980-83) : Bajara shares about 3.36% of the total irrigated area in the state, about 69,600 hectares of cultivated area is noted under bajara in the year of 1980 to 83. The high percentage (above 5%) of irrigated area under bajara is in the districts of Satara, Pune, Bhir, Ahamednagar, Nasik. The moderate percentage (1 to 5%) is noted in Sangli, Solapur, Aurangabad, Jalna districts. And low percentage (below 1%) in Dhule, Amravati, Osmanabad, Latur, districts. The negligible area irrigated under bajara is in the eastern and western part of the state.

Volume of change (1950-53 to 1980-83) : The last 30 years have witnessed the positive change in area under bajara (5.18%) in the state. Above (2%) increase of irrigated area under bajara is noted in the districts of Nasik, Aurangabad, Jalna, and the low positive increase (below 2%) of irrigated area in the districts of Satara, Solapur, Osmanabad, Latur, Dhule, Amravati. The negative change of irrigated area under bajara cultivation is noted in the districts of Bhir (5.79%), Pune, Sangli, Ahmednagar. The bajara has been replaced by jowar in most of the districts.

6) Groundnut : Groundnut is the most important oilseed in Maharashtra. The red, yellow and black soils are suitable for its cultivation. It is cultivated in the kharif and rabi season. The area under groundnut has declined from 6.56% (946,200 hect.)



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IRRIGATED AREA UNDER GROUNDNUT
1980 - 83



VOLUME OF CHANGE
1950-53 TO 80-83

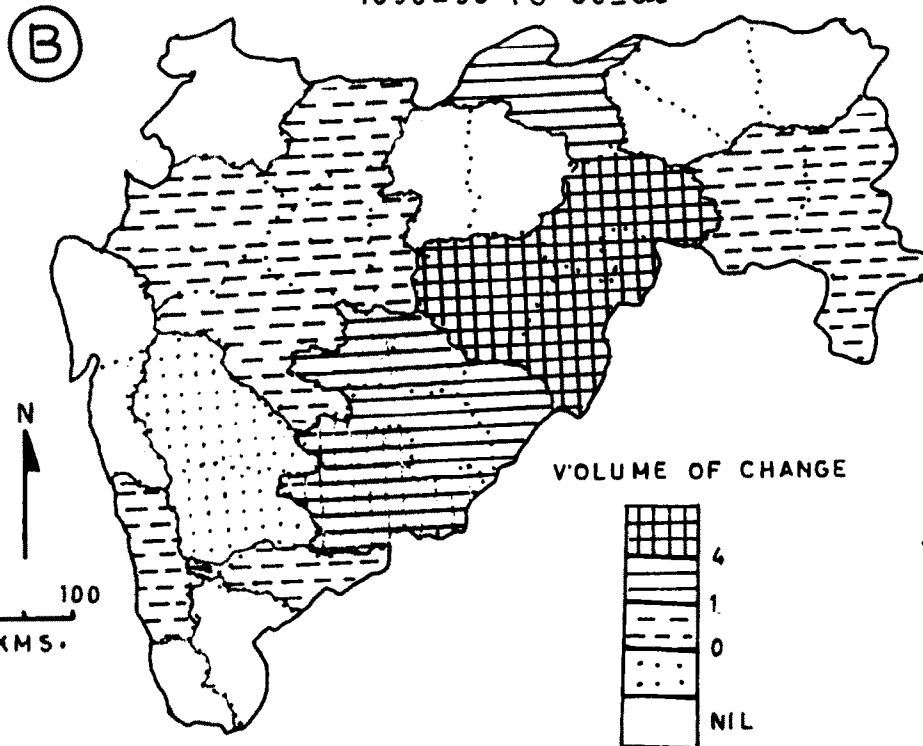


FIG. 3.6

to 3.86% (703,600 hect.) during the period under review. But irrigated area under groundnut has increased from 2.20% (75,000 hect.) to 2.24% (463,000 hect.) in the years of 1950-53 to 1980-83 (Table 3.1).

Regional distribution (1980-83) : At present groundnut share about 2.24% of the total irrigated area in the state. The hectareage under groundnut increased from 75,000 hect. (1950-53) to 463,000 hectares (1980-83).

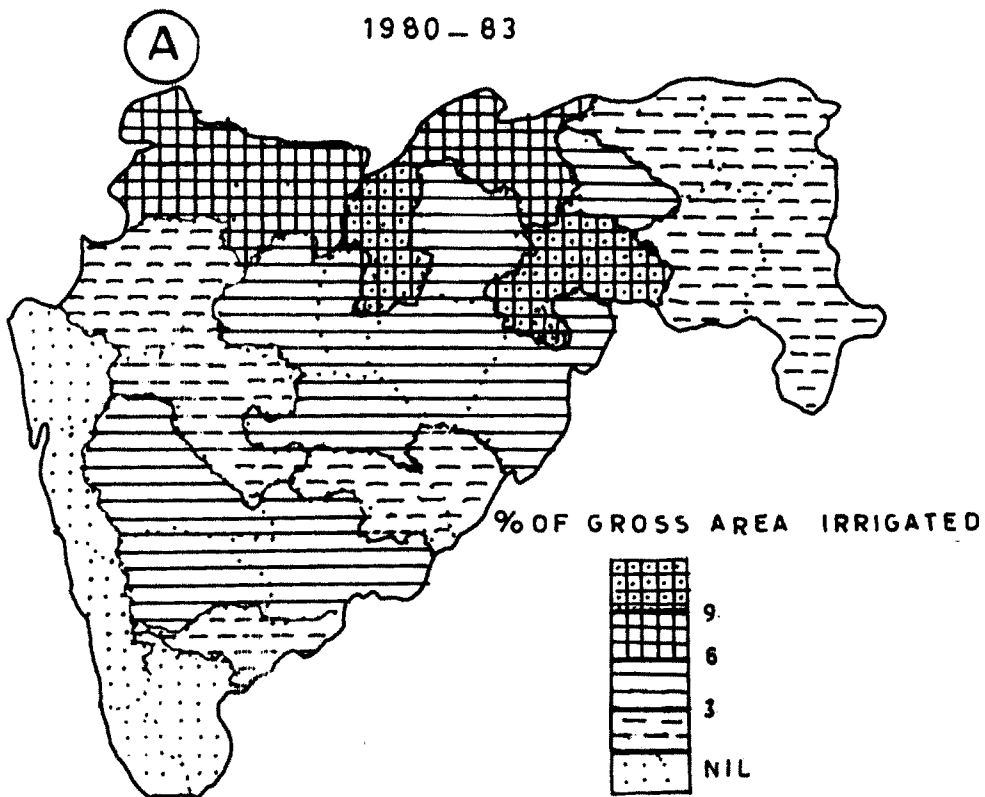
The relatively high percentage (above 3%) is observed in the districts of Yeotmal (9.27%), Nanded, Parbhani, Solapur. The moderate percentage (1 to 3%) is noted in Nasik, Pune, Ahmdnagar, Bhir, Osmanabad, Latur, Amravati districts. The low percentage (below 1%) are noted in Sangli, Satara, Ratnagiri, Aurangabad, Jalna, Jalgaon, Chandrapur and Gadchiroli districts. Other districts have no irrigated area under the groundnut cultivation (Fig.3.6-A).

Volume of change (1950-53 to 1980-83) : The positive change (above 4%) is noted in Yeotmal (9.27%), Nanded, Parbhani, districts while moderate positive change (1 to 4%) is noted in Solapur, Bhir, Osmahabad, Latur, Amravati districts and the low percentage (below 1%) in Nagpur, Ahmednagar, Aurangabad, Jalna, Jalgaon, Sangli, Chandrapur and Gadchiroli districts. The negative change is noted (- 1%) in Pune, Satara, Ratnagiri districts (Fig.3.6-B).

7) Cotton : Cotton is most important commercial irrigated crop in Maharashtra. This crop is closely related to the 'regur soil' or 'black cotton soil'. 14.57% (2,654,800 hectares) of land is under cotton cultivation.

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IRRIGATED AREA UNDER COTTON

1980-83



VOLUME OF CHANGE

1950-53 TO 1980-83

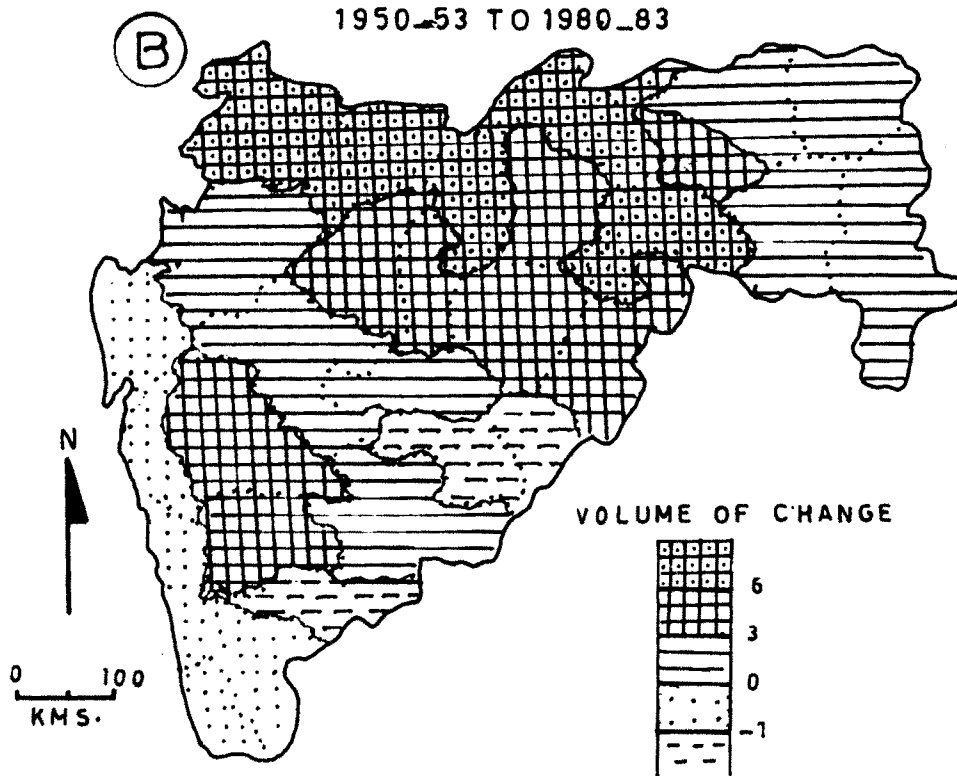


FIG. 3.7

Regional distribution (1980-83) : Relatively very high percentage (above 9%) area is observed under irrigated cotton cultivation in the districts of Buldhana and Yeotmal. The high percentage (6 to 9%) is noted in Dhule, Jalgaon, Amravati districts. The moderate percentage of land is noted (3 to 6%) in the Pune, Satara, Solapur, Aurangabad, Jalgaon, Bhir, Parbhani, Akola, Wardha and Nanded districts. The low percentage (below 3%) in the Sangli, Osmanabad, Latur, Ahmednagar, Nasik, Nagpur, Bhandara, Chandrapur and Gadchiroli districts. The cotton is not cultivated in the district of Thane, Raigad, Ratnagiri, Sindudurg and Kolhapur districts (Fig.3.7-A). Soil and climatic conditions of these districts are not favourable.

Volume of change (1950-53 to 1980-83) : During the last 3 decades irrigated hectarage under cotton has increased from 3,400 hect. to 656,000 hect. The percentage share has increased from 1% (1950-53) to 3.18% (1980-83). The notable positive change (above 6%) is observed in northern Maharashtra and Vidarbha regions only (Fig. 3.7-B). It is due to the fact that increased irrigated hectarage are brought largely under this crop. Elsewhere insignificant increase under this crop is noted.

The negative change of irrigated area under cotton cultivation is observed in the districts of Sangli, Osmanabad, and Latur. In those districts other irrigated crop like gram, groundnut are taken.

3.3 INTENSITY OF CROPPING (1980-83) :

The intensity of cropping is defined as 'the extent to which the net area sown is cropped or resown'. The total cropped area as a percentage of the net area sown gives a measure of landuse efficiency which really means the intensity of cropping. The intensity of cropping refers to that numbers of crops raised on a field during an agricultural year.

The higher the index of the intensity of cropping, the higher the landuse efficiency and the lower the index, the lower the landuse efficiency and less utilised or under utilised the net area sown (Jasbir, Singh 1976).

In the study region the intensity of cropping in generally is 109.14, which is less than the national average of 122.53. However the spatial analysis reveals large variation in the intensity of cropping throughout the state.

High intensity of cropping :

The intensity of cropping is relatively high (above 110) in the western upland districts of Pune, Satara, along with central parts of the Dhule, Jalgaon, Aurangabad and Latur districts. These are the districts were irrigation facilities are relatively developed. The fertile soils, use of modern agricultural technology are also partly responsible for high intensity in these districts of the region (Fig.3.8).

INTENSITY OF CROPPING

1981-83

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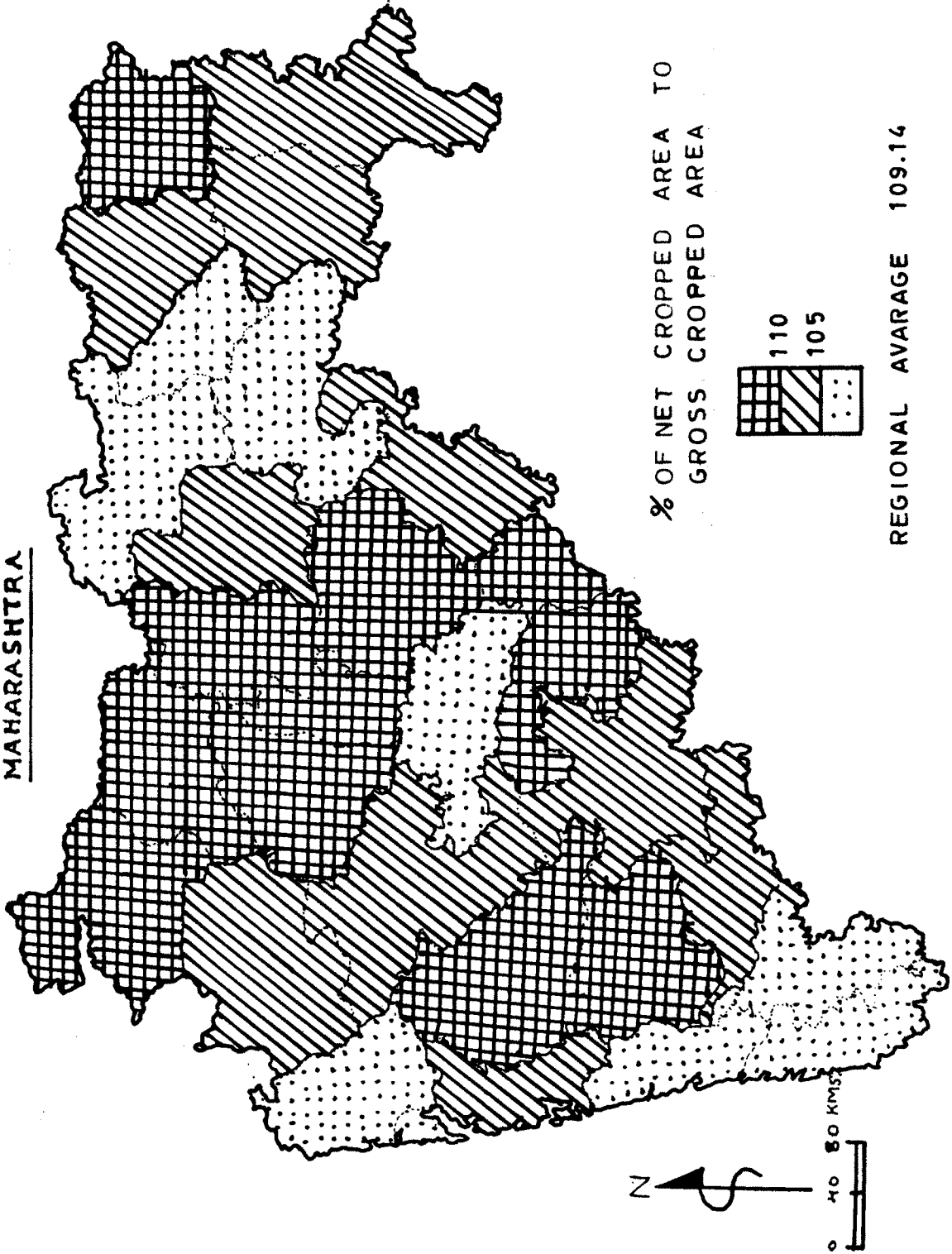


FIG. 3.8

Moderate intensity of cropping :

The moderate intensity of cropping (105 to 110) prevails in the districts of central zone of the Maharashtra viz. Nasik, Ahamednagar, Solapur, Sangli, along with the western districts of Akola, Nanded, Wardha, Amravati, Chandrapur and Gadchiroli. These are the districts where intensity of irrigation is also moderate (Fig.2.6). Some of these districts are situated in the drought-prone area of the Maharashtra.

Low intensity of cropping :

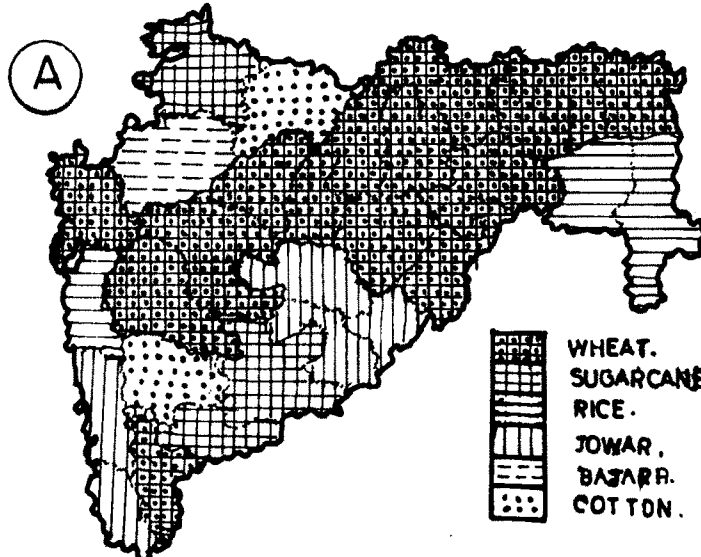
The low intensity of cropping (below 1.5) is noted in the districts of Thane, Ratnagiri, Sindudurg and Kolhapur in the western parts of the state, along with Amravati, Wardha, Nanded districts of eastern part of the state. These are the districts where mostly rainfed crops are practised except Kolhapur where twelve monthly crops like sugarcane is practised . The rugged topography and shallow coarse soils are also partly responsible for low intensity of cropping in these parts.

3.4 IRRIGATED CROPS OF LEADING INCREASES AND DECREASES :

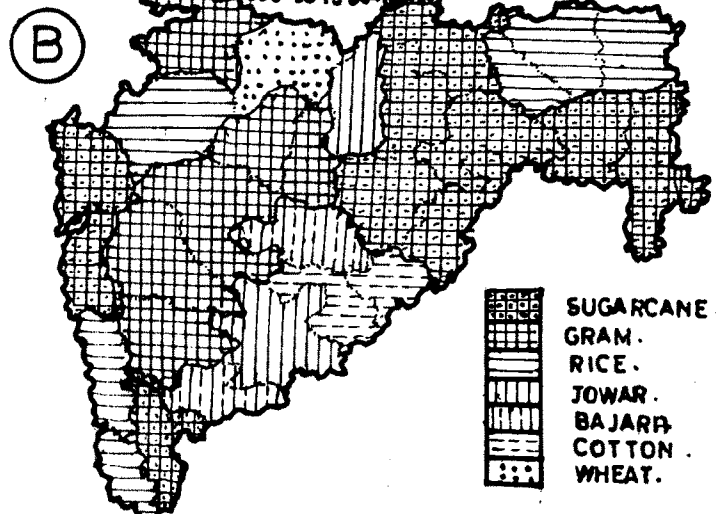
a) Irrigated crops of leading increases : The important irrigated crops of leading increases are wheat, sugarcane, jowar, rice and bajri. The very high percentage of area has increased under 'wheat' cultivation, particularly in the districts of Aurangabad, Ahmednagar, Jalna, Buldhana, Akola, Parbhani, Nanded, Amravati, Yeotmal, Wardha, Nagpur, Bhandara, Thane, Pune and Kolhapur. Sugarcane is observed

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IRRIGATED CROPS OF LEADING INCREASE
1950-53 TO 80-83



IRRIGATED CROPS OF LEADING DECREASE
1950-53 TO 80-83



OVERALL CHANGE IN IRRIGATED CROPS [1950-53 TO 1980-83]

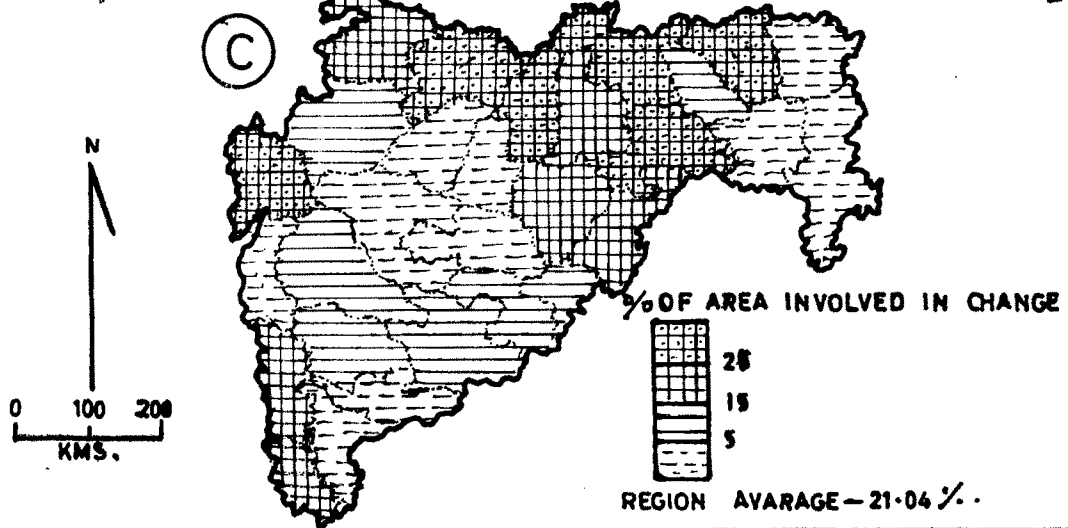


FIG - 3-9

as a increasing crop in the districts of Dhule, Solapur and Sangli. 'Jowar' is observed in Bhir, Osmanabad, Latur, Ratnagiri, Sindudurg districts and 'rice' in the eastern and western parts of Maharashtra, especially Chandrapur, Gadchiroli, Raigad districts. 'Cotton' is observed in the districts of Jalgaon, Satara and the 'bajri' is noted only in Nasik. The shift from fruits and vegetables, condiments, and spices and wheat is observed all over the Maharashtra. Amravati, Nagpur, Wardha, Yeotmal, Nasik, Dhule, Jalgaon districts are more significant for orange, bananas, chicu, grapes and some other fruits (Fig.3.9-A).

b) Irrigated crops of leading decreases : The important irrigated crops of leading decreases are sugarcane, grams, rice, jowar, wheat and cotton in the region. Relatively high proportion of irrigated area decreased under sugarcane is noted in the districts of Kolhapur, Sangli, Ahmednagar, Satara, Pune, Nasik. It is due to the increased competition among irrigated crops. In these districts the increased irrigation facilities are utilised for wheat cultivation only (Fig. 3.9-A & B). The groundnut are reported as decreasing crop in the districts of Solapur, Nanded, Parbhani and Yeotmal, where cotton and wheat have replaced the groundnuts. The percentage of leading decrease under 'rice' cultivation is noted in the districts of Nasik, Ratnagiri, Sindudurg, Vardha, Nagpur, Bhandara and 'jowar' in the Solapur, Buldhana districts. The low percentage of decrease in area under 'bajara' cultivation is observed in the districts of Sangli, Bhir and 'cotton' in Osmanabad, Latur, and 'wheat' in Jalgaon district only (Fig.3.9-B).

3.5 OVERALL CHANGE IN THE IRRIGATED CROPS (1950-53 to 1980-83) :

The change in irrigated cropping is also studied in collaboration with the changes in the irrigational and technological factors. The percentage of irrigated area involved in changes is compiled for each component area and mapped in Fig.3.9-C. This maps has provided overall comparative picture of areas where the irrigated cropping pattern has been relatively dynamic and where by contrast, it has been relatively stable.

The high percentage (above 25%) of overall change is noted in the districts of Thane, Jalgaon, Buldhana, Amravati, Nagpur and Yeotmal. The moderate percentage (15 to 25%) of overall change is observed in Dhule, Parbhani, Akola, Nanded, Ratnagiri, and Sindudurg districts. The low percentage (5 to 15%) of overall change is noted in the districts of Nasik, Pune, Satara, Solapur, Osmanabad, Wardha, Latur and very low percentage (below 5%) of overall change in the Raigad, Sangli, Kolhapur, Ahmednagar, Bhir, Aurangabad, Jalna, Bhandara, Chandrapur and Gadchiroli districts.

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