

CHAPTER IV

CROPLAND USE

## CHAPTER - IV

### THE CROPLAND USE

#### 4.0' THE CROPPING PATTERN:

The pattern of cropland use in any area is determined by the interaction between the capabilities and drive of human force and the potentialities and endowments of nature. It varies according to the variation in the relationship between man and the nature. But the cropping pattern itself is fashioned by man.

Though, cropping is the most efficient use of the rural arable land in the light of the agro-climatic and edaphic conditions, the cropping pattern hardly remains uniform through time and space. It varies under the changing physical and non-physical circumstances. The cropping pattern may, therefore, be defined as both "time and space sequence in a given area" (Bishnoi and Singh, 1980 p.363).

The study area rolls under the predominant influence of nature. The pattern of cropland use here depends largely on the changing natural conditions and the decision of the farmers. However, rainfall is more or less the governing factor here also as in most parts of the State and the country, in the absence of dependable sources of irrigation. The farming is of extensive type. The fallowing is not a common practice. The area is predominantly kharif crop growing one where sowing starts with the advent of rains and the success or failure of crops depends on its regularity and certainty. It happened in 1974 that due to scanty and sporadic rains, three villages could not use even a decimal part of their cropland, and others did it only on small parts. Thus, the cropping

pattern in that year was totally changed; cotton, the ever dominant crop, was superseded by jowar. On an average every alternate year brings somewhat the conditions of semi-drought. The years 1918, 1948, 1972 and 1974 were the worst years, as the amounts of rain received were 222 mm, 173 mm, 287mm and 257 mm respectively. 1948 is remembered as the year of severest famine.

The village level crop censuses for the two points of time show that there have been eleven crops grown in this area. Variation in the rank order of these crops were quite obvious.

Crops are usually taken in both the seasons - kharif (the rainy season) and rabi (the winter season). Both types of crops in both the seasons depend on the amount of precipitation received during both the seasons. Table 4.1 shows the crops of both the seasons and their percentage G.C.A. share at the two points of time.

Kharif is the main cropping season in which most of the crops are grown. Cotton took the largest percentage in G.C.A. with 48.50 and 74.02 at the two points of time respectively. Among the cereals, jowar is the leading kharif crop followed by rice, bajri and kodara. Among other crops, fodder (Jowar-bantu, Rajko and Sundhiya), pulses (tur, moong etc.), and guinea grass took small shares of G.C.A., while oilseeds and tobacco were insignificant at the first point of time. At the second point of time, the oilseeds strengthened their position while other crops showed a general decrease. Similar decrease is seen in all kharif crops except cotton which increased by 25.52 per cent by the second point of time.

Rabi is not a very important cropping season, as most of the cropland remains engaged in several long duration kharif crops. However, during 1959-60, a substantial percentage (30.14) of G.C.A. was occupied by wheat, which was the second most significant crop. Rabi Jowar-bantu and rabi pulses occupied small percentages of G.C.A. By 1979-80, all rabi crops like the other kharif crops,

Table - 4.1

Percentage G.C.A. Share of Kharif and Rabi Crops  
1959-60 - 1979-80

Seasons	Variety of crops	Name of crops	G.C.A. Percentage		% Difference
			1959-60	1979-80	
A. Kharif	i) Fibre	1. Cotton	48.50	74.02	+ 25.52
	ii) Cereals	2. Jowar	7.44	5.02	- 2.42
		3. Rice	2.32	1.22	- 1.10
		4. Bajri	1.66	1.87	+ 0.21
		5. Kodara	0.48	0.23	- 0.25
	Total cereals (2 - 5)		11.90	8.34	- 3.56
	iii) Fodder	6. Sundhia, Rajka, Jowar-Bantu	4.45	3.64	- 0.85
	iv) Pulses	7. Tur, Moong, Urad, Gram, etc.	2.61	1.57	- 1.00
	v) Grass	8. Guinea grass	1.76	0.37	- 1.39
	vi) Oilseeds	9. Til, Castor	0.60	1.79	+ 1.19
B. Rabi	vii) Others	10. Tobacco	0.04	0.01	- 0.03
	Total (6 - 10)		9.46	7.38	- 2.08
	i) Cereals	11. Wheat	30.14	10.26	-10.88
	Total Kharif + Rabi (1 - 11)		100.00	100.00	0.00
	Double cropped area		1.88	0.28	- 1.60

decreased, but wheat decreased by a substantial percentage (19.88); the least decrease is seen in tur, gram and other associated pulses (0.04%).

The regional level as well as the village crop censuses for the two points of time show that, of the several crops grown, cotton, the foremost kharif crop, has been of overwhelming importance. A regional and villagewise discussion of the crops may now be, in order.

#### 4.1 KHARIF CROPS:

##### 4.1.0 FIBRE CROPS:

##### 4.1.1 COTTON:

Being the segment of the Kanam Vibhag (the region of black cotton soil) cotton has ever been its principal crop. The commercial value of cotton attracted the special attention of the successive governments for its proper cultivation, ever since the mediaeval period. When British traders came, Bharuch was a flourishing trade centre for yarn and hand-woven fabrics prepared out of the indigenous cotton. They gave great impetus to cotton cultivation when they took over the sovereignty of this area after the fall of the Moghul Empire (District Gazetteer, Broach, 1961, 241).

Bharuch has been the leading district of Gujarat and Jambusar its leading taluka in the cultivation of cotton. Of the two segments of Jambusar taluka - the 'Haveli Tappa' and the 'Bara Tappa' - the latter has relatively better requisite conditions for cotton than the former, but both of them grow it as their principal crop. Jambusar and Bharuch talukas together were producing around 31 per cent of the total cotton produced in Bharuch District (Ibid. 241 ).

As stated earlier, cotton dominated the agricultural landscape of the area with 48.50 and 74.02 per cent of its total G C A at the two points of time. In the regional landscape also, it occupied almost 50 per cent of the G C A of the three regions. Region III was leading with 49.26 per cent of its G C A under this crop followed by Region I with 48.91 per cent and Region II with 47.74

per cent in 1959-60. In 1979-80, Region III maintained its top position with 81.62 per cent followed by Region II with 70.86 per cent and Region I with 69.62 per cent. The sequence of regional pattern of distribution has, thus, changed in 1979-80, against 1959-60, when the middle region was holding the lowest position bordered by the eastern and western regions of higher status. The relative significance of cotton has, thus, decreased in gradual order from western and eastern parts to the central part (Fig. 4.1 a & b).

Having a look at its villagewise distribution, it is found that in varying percentages of the village G C As, it has been grown by all the 46 villages of the area. It ranged from less than 10 per cent to more than 70 per cent at the first point of time and from less than 20 per cent to more than 90 per cent at the second point of time. It is seen that cotton, either dominates the field alone (Plate 12) or in association with wheat (in rabi season), castor, tur, etc. (Plates 8, 9, 10).

Table 4.2 shows that in 1959-60 Panchpipla alone devoted less than 10 per cent, and Kaliari more than 70 per cent of their G C A to cotton. The remaining 45 villages (Isanpur inclusive) had it between these two limits. Of the 47 villages, 23 had its share above 50 per cent and 24 below 50 per cent of their G C A. It, therefore, shows that cotton did not lose its glamour in this area even during the period of greater emphasis given to the growing of cereals.

In 1979-80, conditions turned to be much more favourable to cotton than to any other crop. Each village, except Kundhal, greatly raised the cotton's share in its G C A. Even Panchpipla which had only 6.12 per cent share of cotton in its G C A at the first point of time devoted 47.93 per cent to it (Plate 2). Thus, 45 of the 46 villages had cotton in their G C A ranging between more than 40 per cent and above 90 per cent. Only Kundhal went down to below 20 per cent.

TABLE 4.2

VILLAGEWISE DISTRIBUTION AND CHANGE IN PERCENTAGE SEA SHARE OF COTTON 1989-90 &amp; 1979-80

		0-10.00	10.1-20.0	20.1-30.00	30.1-40.00	40.1-50.0	50.1-60.0	60.1-70.0	70.1-80.0	80.1-90.0	ABOVE 90	TOTAL
%												
0.00	-	-	-	-	-	-	-	Isampur (01)	-	-	-	01
0-10.00	-	-	-	-	Kundhal (01)	-	-	-	-	-	-	01
10.1-20.0	-	-	-	-	-	-	-	-	-	-	-	-
20.1-30.0	-	-	-	-	-	-	-	-	-	-	-	-
30.1-40.0	-	-	-	-	-	-	-	-	-	-	-	-
40.1-50.0	-	-	-	-	-	-	-	-	-	-	-	-
Panchpala (01)												
50.1-60.0	-	-	Vad (01)	-	Limaj (01)	-	Sardarpura, Vadala (02)	-	-	-	-	04
60.1-70.0	-	-	Ch.Bera, Pachakda (02)	Dolia, Kiroj Dhar, Kh. Deh (03)	Shaw- bha, Singarna (03)	Jantran, Katak, Kava, Th. Talavdi, Thanava (05)	-	Vanseta (01)	-	-	-	14
70.1-80.0	-	-	-	-	Sindhav (01)	Asarsa, Chhadra, Dehga, Mahapara, Runad, Islapur, S. Sangdi (05)	Nadiad, Tankari (04)	B. Timbi, H. Kantharia, M. Neja, Sigam, Zaadi (05)	Kaliari (01)	-	-	16
80.1-90.0	-	-	Kansagar, Kapuria (02)	-	Revia, Gulai, Madafar, Nada (04)	Malpur (01)	Asanvad (01)	-	-	-	-	08
Above 90.0	-	-	-	-	-	-	Ch. Harva, Bhadkotara (02)	-	-	-	-	02
TOTAL >>>	-	01	-	-	05	13	14	06	01	-	-	47

per cent high level and only 4.35 per cent very high level of change. On the other hand, on the negative side, only 4.35 per cent of the viillages show very low, and 2.17 per cent low levels of change (Fig. 4.1 c)

A glance over the villagewise actual percentage of the G C A under cotton gives the clue to the varying levels of change. The clue is the higher the percentage of the G C A under cotton at the former point of time, the lower is the level of change at the latter point of time. When tested, it is found that the 17.39 per cent of the villages placed in the very low level had already around 60 per cent or more of their G C A under cotton, those in the low level had around 50 to 60 per cent, and those in the medium level had around 40-50 per cent. Similar were the cases of those placed in high and very high levels. These villages devoted between 20 and 40 per cent of their G C A to cotton at the former point of time. Thus, the 'Cotton Wave' swept over the area taking high percentage of G C A share almost in all the villages, and improving the status of those villages that had been placed very low at the former point of time.

In respect of the spatial pattern of change in G C A shares under cotton, all levels of positive change took over the entire area, except in the three small enclaves of very low and low levels of negative change. High and very high levels of change took place in the south-western part near the estuary of river Dhadhar, and in four enclaves in eastern, lower central, and upper central parts. Very low and low levels of change are seen on the eastern, central and upper coastal margins, and in a few enclaves sandwiched between the medium and high level changes in the southern riparian margins, lower central, upper central, and northern parts. The medium level changes have, however, covered most of the area along the northern bank of river Dhadhar, and in the central western and northern parts.

It, therefore, shows that higher levels of monocropping trend took over the south-western and its adjoining parts with medium to low levels in other parts of the area (Fig. 4.1 c).

#### 4.1.2 The Levels of Change:

Cotton is the highly dynamic crop of the area, marking a substantial increase of 25.52 per cent during the study period. Similarly, it registered increase in its share of G C A of each region by 20.71 per cent, 23.12 per cent and 32.36 per cent respectively showing a greater thrust of its cultivation nearer the coast than in the upland parts (Fig. 4.1 a & b).

In case of the villages, it made a positive change in 43 of the 46 villages between six and 57 per cent, and decrease in three villages between two and 14 per cent only. Table 4.3 shows the positive and negative levels of change in its share of G C A of each village.

Table 4.3

Villagewise Levels of G C A Difference under Cotton  
Between 1959-60 and 1979-80

Levels	% Range	Positive		Negative		Total	
		Number of villages	% to total villages	Number of villages	% to total villages	Number of villages	% to total villages
Very Low	0-12	08	17.39	02	4.35	10	21.74
Low	13-24	12	26.09	01	2.17	13	
Medium	25-36	15	32.61	--	--	15	32.61
High	37-48	06	13.04	--	--	06	13.04
V.High	49-60	02	4.35	--	--	02	04.35
Total:		43	93.48	03	6.52	46	100.00

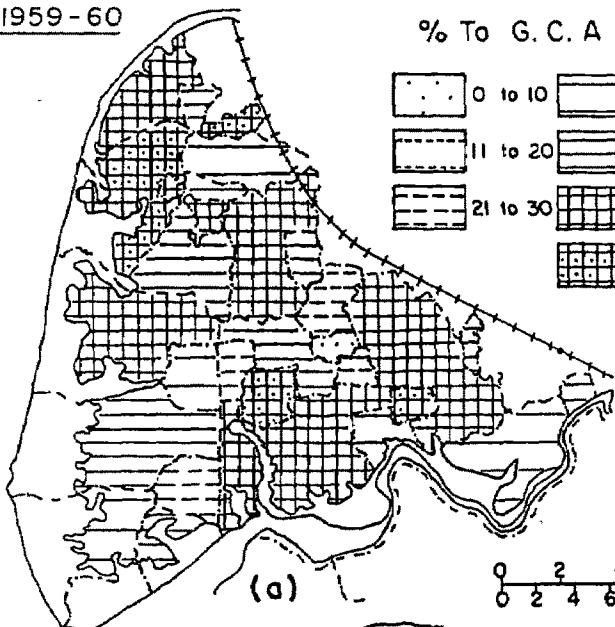
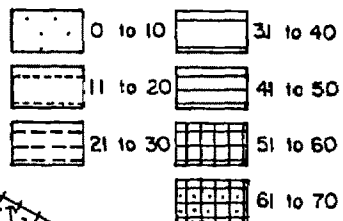
Table 4.3 shows the distribution of villages in the respective levels of change in 1979-80, over 1959-60, 93.48 per cent of the villages have undergone positive change, and only 6.52 per cent have shown negative change. Among those showing positive change only 17.39 per cent have been placed in the very low level, and 26.09 per cent in the low level changes. The largest percentage (32.61) of villages have shown medium level, 13.04

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## Change in Cotton Cultivation

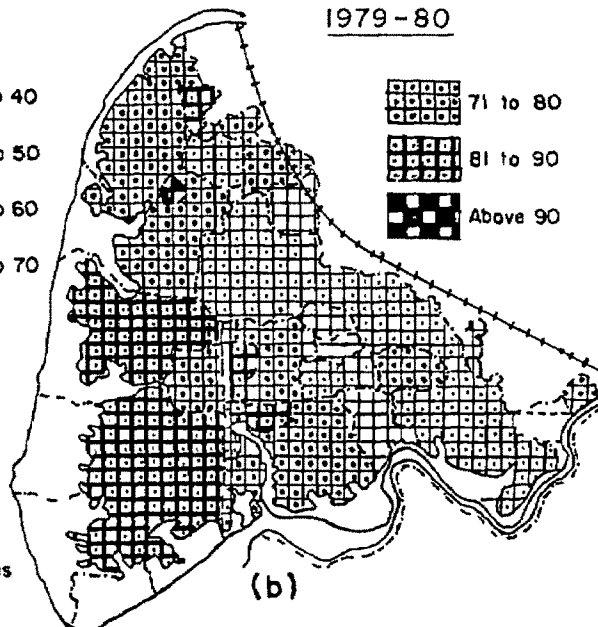
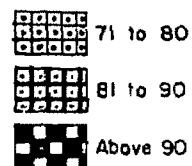
1959-60

% To G. C. A



(a)

1979-80



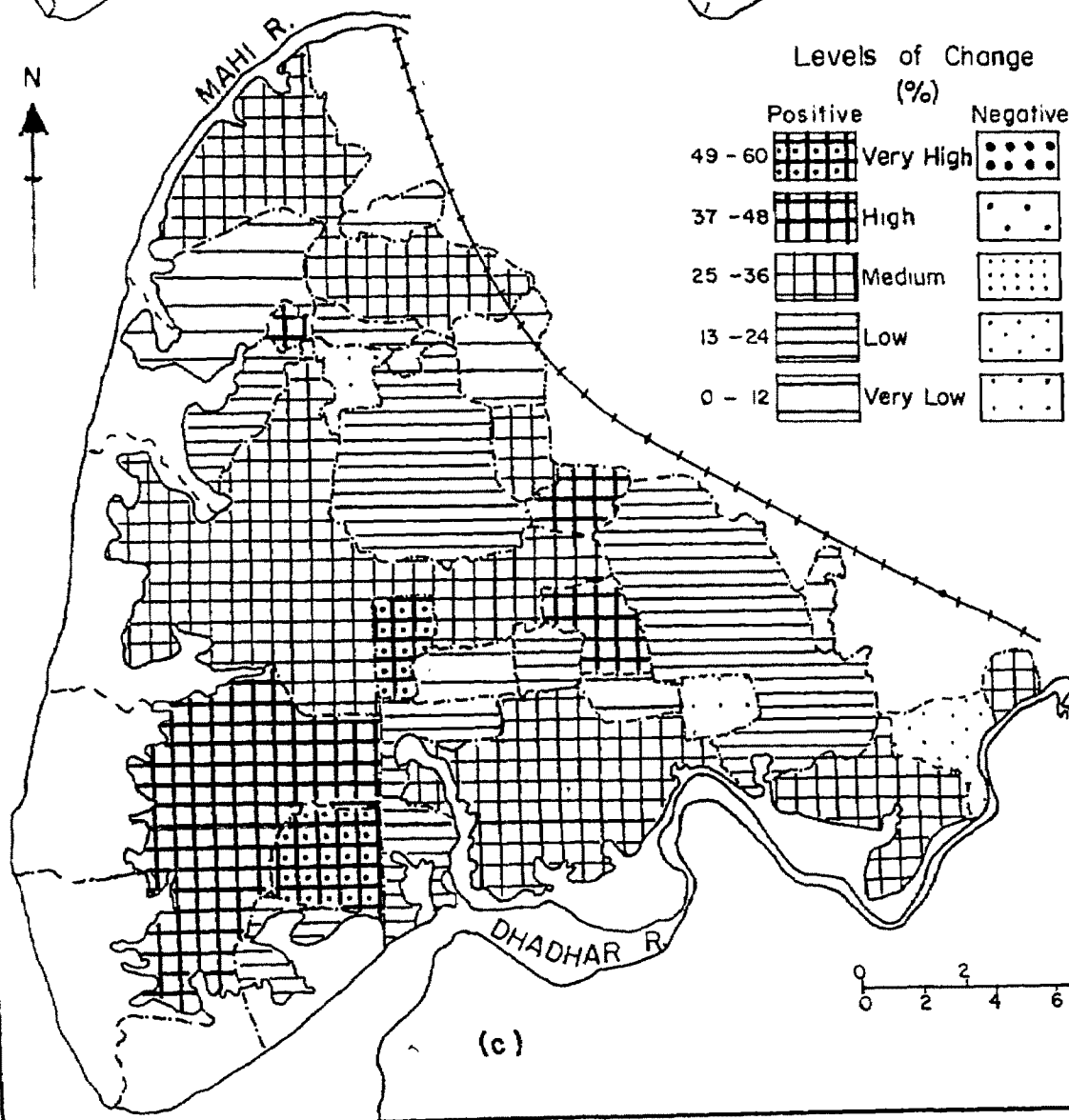
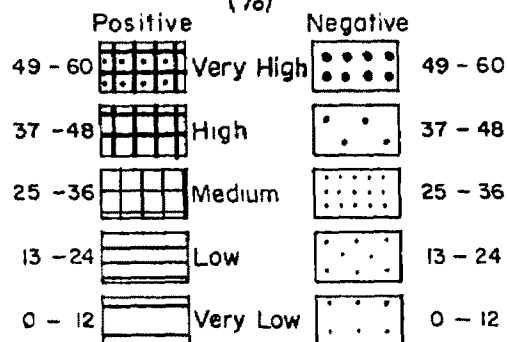
(b)

0 2 4 Miles  
0 2 4 6 Km.



Levels of Change

(%)



(c)

0 2 4 Miles  
0 2 4 6 Km.

Fig. 4.1

Though, cotton has been the principal crop of Bharuch district, and its taluka Jambusar, it could not avert fluctuations in its share of G C A due to changing physical and economic conditions. In 1955-56, it occupied 60 per cent of the total GCA of the taluka. The study area held greater share than its counterpart, 'Haveli Tappa'. The ratio of both segments stood at 60:40. In 1958-59, the share of cotton in the G C A of the taluka slumped by 768.52 ha (2%). However, such fluctuations normally occur in the cropping pattern due to several reasons such as market prices, need for other crops, normal fallowing, etc.

During 1959-60, cotton held only 48.50 per cent of the G C A leaving 51.50 per cent for other crops. But after the formation of Gujarat State in 1960, several developmental policies, programmes, and plans for agricultural development were formulated, export forums were opened, incentives for better production were announced, and several measures for the improvement of seeds were taken up. These situations prompted the farmers to grow as much of this crop as possible. Thus, since 1960, the cotton share in the area's G C A started increasing. Even under the scanty rain condition of 1974, cotton claimed 32.44 per cent of the G C A and was placed next only to jowar in the crop ranking.

In 1979-80, due to favourable rains, hopeful market prices and the drained off water-logged depressions, cotton claimed the all time high percentage (74.02) of the G C A. Since, there had been a bitter experience of the uncertainty of the rains during the preceding years, the wise option for the farmers was to use maximum part of the cropland during kharif season, leaving little area for the rabi crops. Since cotton was the most profitable crop in all respects and more so due to the improved varieties of seeds (Gujarat 11 and Gujarat 14/49 and others - Plate-2), it claimed largest share of the G C A in almost all the villages, leaving only 25.98 per cent for the rest of the kharif and rabi crops, as against 51.50 per cent at the former point of time.

Following determinants have led to the overwhelming domination of cotton in the area's cropping pattern:

1. Prevailing physical conditions most suited to cotton;
2. Traditionally the area's farmers were used to growing it;
3. Introduction of improved and high yielding strains of cotton 'seed' as Gujarat 11, 14/49, Hybrid 4 and 6, Varalaxmi etc.
4. Increasing demand and attractive prices in the home and foreign markets.
5. The erraticity of the rains and the drained off water-logged depressions following the construction of 'kans' (artificial drains).
6. Decreasing cotton cultivation in the adjoining talukas of Amod and Vagra due to biotic menace. (Rizvi and Bhatt, 1982).

#### 4.2 CEREALS:

##### 4.2.1 Jowar:

Traditionally, it is cultivated during the kharif season. Recently, the hybrid varieties have been developed to suit the conditions of both the dry and wet seasons. However, irrigation is needed for the rabi jowar. Lack of irrigation, thus, made rabi jowar unpopular in the area. Even the kharif jowar has not been enjoying a wide popularity all over the area.

Since jowar has the capability to withstand the semi-drought conditions, it is adapted to thrive in the coarse loamy soils (goradu) and is attributed to be the poor man's food. It has traditionally been preferred as a crop next only to wheat in importance among the cereals.

In 1959-60, its share in the total G C A of the area was 7.44 per cent, which, however, decreased to 5.02 per cent in 1979-80, owing to the general trend of decrease in all such crops in favour of cotton.

In varying percentages it had been grown in all the three regions. Table 4.4 gives the regional pattern of its distribution over the two points of time:

Table - 4.4

Pattern of Regional Distribution of Jowar

Regions	1959-60		1979-80		Difference	
	Area(ha)	%	Area(ha)	%	Area(ha)	%
I	1137.65	13.37	535.71	6.25	-601.94	-7.12
II	979.52	6.34	755.01	4.85	-224.51	-1.49
III	490	4.43	493.68	4.32	+ 03.15	-0.11
Total	2607.70	7.44	1784.40	5.02	-823.30	-8.72

In 1959-60, Region I excelled the other two regions in both absolute area and percentage of its G C A under jowar, by a wide margin of 7.03 and 8.94 per cents respectively. It is mainly owing to the edaphic quality of the Ankhi series of this region well suited to this crop. The soils seem to have restricted its westward distribution, as a gradual decrease is seen in Region II and III, where it occupied 6.34 and 4.43 per cents of the G C A respectively. However, a different picture is seen in 1979-80. Region I experienced abrupt decrease from 13.37 per cent to 6.25 per cent, Region II from 6.34 per cent to 4.85 per cent and Region III from 4.43 per cent to 4.32 per cent. In terms of percentages all the three regions have decreased their shares, however, Regions I and II have decreased both in area and percentages while Region III showed increase in area by 3.15 ha. but decrease in percentage share. It is because the total G C A of all the three regions increased in 1979-80. Region II devoted 219.30 ha. more than Region I to this crop.

But in terms of percentages the former hierarchy has been maintained, which gives the pattern of its regional distribution, that it is the popular crop of Region I, less so in Region II and still less in Region III.

Having a view over its villagewise pattern of distribution and change, it appears that 100 per cent villages of Region I, 82 per cent of Region II and 82 per cent of Region III grew jowar at the two points of time (Fig. 4.2 a & b). While the first two regions maintained constancy in respect of the percentage of villages growing it, Region III shows decrease by one per cent only. Table 4.5 shows the villagewise percentage share and change in G.C.A. under this crop.

Table 4.5 shows that in 1959-60, jowar was grown by 40 of the 47 villages (85%) on 20 per cent and more of their G.C.A., while 41 of the 46 villages (89%) grew it at the next point of time. But none devoted more than 20 per cent of G.C.A. to it, indicating a decrease in the very high level of occupance by the crop.

As it thrives best in loamy soils, all the thirteen villages of Region I grew it either alone or mixed with tur and other crops at both points of time (Plate 11) and in these villages its share of G.C.A. ranged between 2.00 per cent (Limaj) and 25.72 per cent (Chandpor Marva) at the first point of time, and 0.78 per cent (the first village) and 11.31 per cent (Limaj) at the second point of time. In Region II, its share of G.C.A. ranged between 0.78 per cent and 14.61 per cent in Bhadkodara and Singarna respectively at the first point of time, and 0.82 per cent and 14.94 per cent in Kaliari and Nadiad respectively at the second point of time. In Region III, it held 2.57 per cent of G.C.A. in Nada and 15.84 per cent in Isanpur at the first point of time and 0.69 per cent and 14.32 per cent at Devla and Asarsa respectively at the second point of time. It appears from the share of G.C.A. under jowar, that, though all thirteen villages of Region I grew it at the two points of time with a substantial

Table - 4.5

Village-wise changing Percentage Share of G.C.A. under Jowar.

1959-60/ 1979-80	0.00	Very low 0.0 - 5.00	Low 5.1 - 10.00	Medium 10.1 - 15.00	High 15.1 - 20.0	Very High Above 20.00	Total
%							
0.00	--	Bhadkodara(01)	B.Timbi, Kaliari, Zamdi(03)	Singarna(01)	Isanpur(01)	--	06
Very Low 0.0-5.00	Sindhav Malpur(02)	Chhidra Janrean,Kansagar Limoj,Nada Th.Talavdi(06)	Devla,Kapuria Mahapura,M.Neja Sigam(05)	Degam, H.Kantha- ria, S,Sangdi Vadadla(04)	Gulal(01)	Ch.Marva Runad(02)	20
Low 5.1-10.00	Asanvad Dhari, Islampur (03)	--	Mudafar,Kava Sardarpura, Tankari(04)	Shambha, Thanava(02)	Pachakda (01)	--	10
Medium	Ch.Bara (01)	Asarsa (01)	Vanseta (01)	Dolia, Kalak Kh.Deher, Kundhal Nadiad, Vad (06)	Kimoj (01)	--	10
High	Panchpipla (01)	--	--	--	--	--	01
Very High Above 20.00	--	--	--	--	--	--	--
Total:	07	08	13	13	04	02	47

Figures in parenthesis indicate the number of villages.

percentage of 25.72 in Chandpor Marva at the first point of time, jowar could not gain that status in that region at the second point of time. The villages of other two regions, devoted relatively larger percentages of G.C.A. to it though all their villages did not grow it at both points of time.

However, it is seen that there were three and one villages of the three respective regions, and eight, three and one villages in the same order at the second point of time devoted greater percentage share of their G.C.A. to jowar than to wheat. Chandpor Marva (25.72%) and Runad (23.21%) of Region I in 1959-60 and Panchpipla (16.21%) and Vanseta (14.94%) of Region II in 1979-80 were the leading growers of this crop. Among the non-growers were Dahri, Sindhav, Panchpipla and Chandpor Bara of Region II at the first point of time, and Bhadkodara, Bakarpor Timbi, Kaliari and Singarna of the same region were their counterpart at the second point of time. Asanvad, Islampur and Malpur of Region III did not have it at the first, and Zamdi alone did not cultivate it at the second point of time.

A mixed trend of negative and positive changes in respect of the shares of G.C.A. is seen in jowar cultivation. Where a marked decrease in ten villages between 0.32 per cent (Khanpur Deh) and 8.94 per cent (Degam) is seen, an increase between 2.02 per cent and 5.59 per cent is seen in Sardarpura and Vanseta respectively. Among the new entrants, Sindhav devoted the lowest share of G.C.A. (1.46%) and Panchpipla the highest (16.21%) in 1979-80. Six villages, Bakarpor Timbi, Bhadkodara, Isanpur, Kaliari and Zamdi, did it in the percentage levels of G.C.A. between 0 - 5.00 and 15.1 - 20.00 in 1959-60; but did not cultivate it in 1979-80. Chandpur Marva and Runad show an abrupt fall from very high to very low level. Eighteen villages show a decline from high level to very low level. Dolia, Kalak, Kava, Madafar, Tankari, Nadiad, Kundhal, Khanpur-Deh and Vad maintained the medium level. Kimoj, Pachakda, Shambha and Thanava descended from high and medium levels to medium and low levels. Dolia, Kalak, Kava, Khanpur Deh, Kundhal, Madafar, Nadiad, Tankari and Vad, however, maintained their former levels.

The change in jowar cultivation, though more towards negative side in respect of the percentage share in G.C.A., has the positive aspect in respect of the coverage of relatively large number of unit areas (41), as against 40 of the former year. Table 4.6 shows the levels of change in the G.C.A. share of jowar:

Table - 4.6

Levels of change in Percentage G.C.A. share of jowar  
between 1959-60 and 1979-80

Levels	% difference of G.C.A.	Positive		Negative		Total	
		No. of villages	%	No. of villages	%	No. of villages	%
Very Low	0 - 1.00	01	2.17	06	13.05	07	15.21
Low	1 - 5.00	07	15.22	09	19.56	16	34.78
Medium	5 -10.00	04	8.70	11	23.91	15	32.61
High	10 -15.00	02	4.35	02	04.35	04	8.70
Very High	Above 15.00	01	2.12	03	06.52	04	8.70

The above table shows that jowar underwent positive changes in 32.61 per cent of the villages in the range of 2.17 per cent to 15.22 per cent. The very low and very high level positive changes are seen in 2.17 per cent of villages each. The largest percentage (15.22) of villages underwent only low level positive change followed by 8.70 per cent of villages with medium level, and 4.35 per cent with high level, while 67.31 per cent of the villages show varying levels of negative change. The very low and very high level negative changes occurred in 13.05 and 6.52 per cent of villages respectively. The low, medium and high levels of negative changes took place in 19.56 per cent, 23.91 per cent and 4.35 per cent of the villages respectively. However, the largest percentage of villages have undergone medium level of negative change followed by the second largest percentage of the villages showing low level of negative change. Thus, barring

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## Change in Jowar Cultivation

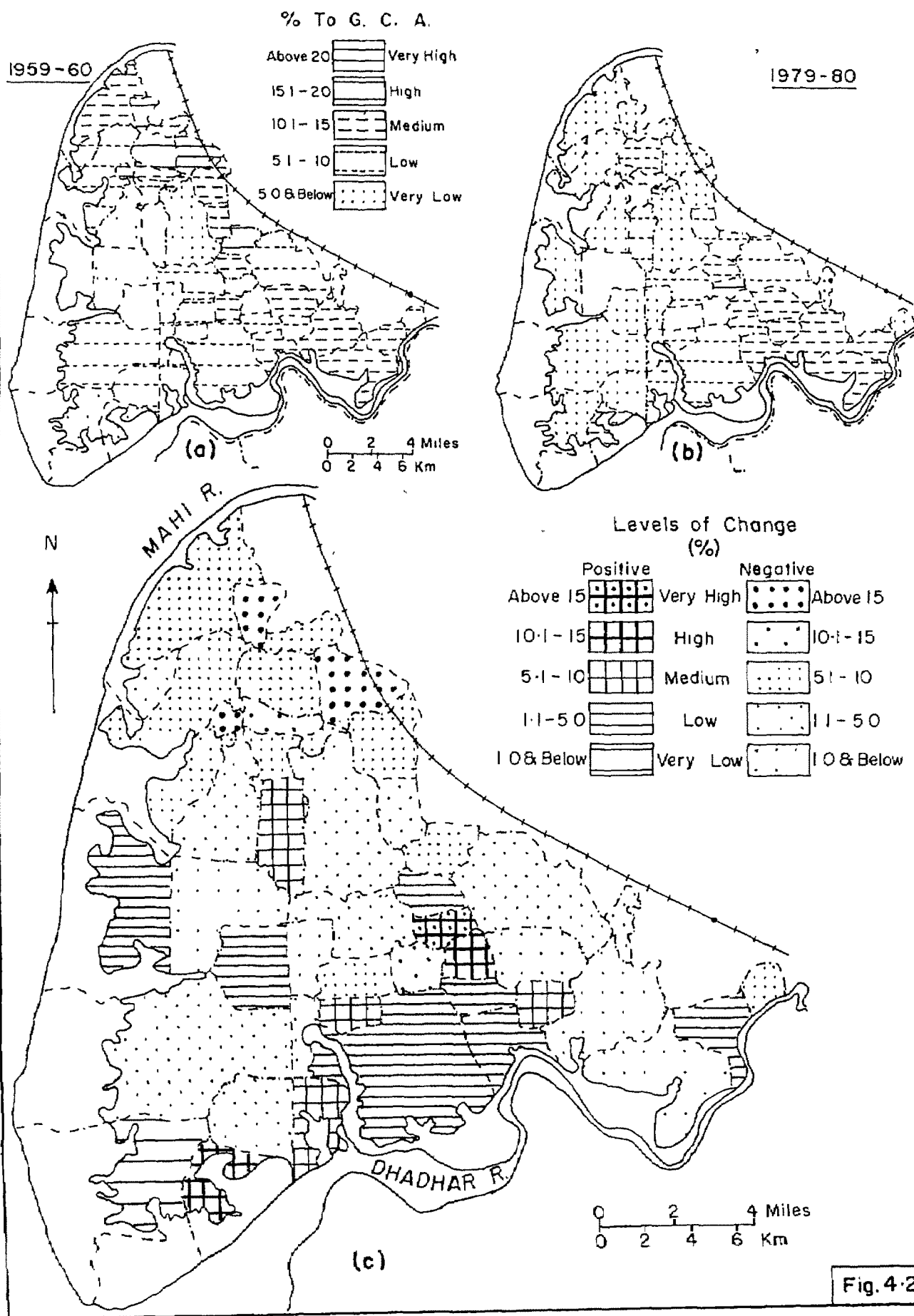


Fig. 4.2

a few southern, western and eastern villages, where the positive change ranged between very low to very high levels, majority of the villages in the northern, central, eastern and even southern parts of the area have undergone negative changes ranging between very low and very high levels (Fig. 4.2 c).

#### 4.2.2 Rice:

During 1959-60, rice seems to have been a significant crop. It enjoyed favourable conditions due to the presence of the depressions that were innundated during monsoon rains. Kalak and Vadadla of Region I and Kundhal of Region II were the leading growers of this crop. In the event of fairly heavy showers during the monsoon season, the water-logged depressions were supplying required water from the sowing to harvesting periods. But the draining-off of such water-logged areas by the artificial drains has the effect of decreasing the hectareage of rice cultivation in the area.

In 1959-60, rice occupied 2.32 per cent of the area's G.C.A. and at the next point of time, it was reduced to only 1.22 per cent.

In the regional scenario, rice occupied the largest percentage of G.C.A. (4.03) in Region I followed by 2.90 in Region II, and only 0.21 in Region III. It shows that rice could thrive well in the Region of the Ankhi-Haldar series, and relatively less in the region of Degam series and least in the region of Balota-Onjal series.

By 1979-80, a drastic change occurred in the physiography of the area. The water-logged depressions were, by and large, drained off with the construction of the artificial drains, thus leaving little area for rice cultivation. Secondly, the cotton wave suppressed all such crops to very little significance (Fig. 4.3 a & b).

Though, in sum, it suffered a total loss of 1.59 per cent in Region I, it remained by far, the second largest kharif cereal of this region; and inspite of the general trend of decrease

Region II stood as the largest grower of this crop among the three regions of the area. Its relative percentage of decrease was lower (39.45) than that of the other two regions (52.07 and 61.90 respectively).

In Region II five of the 22 villages did not grow it at any point of time, and five villages did not grow at the second point of time. Thus, it was grown in 17 villages at the first, and 12 villages at the second point of time. In 1959-60, it occupied 2.90 per cent and in 1979-80, 1.39 per cent of the respective G.C.As. Thus, a negative change of 52.07 per cent in G.C.A. share of rice took place by 1979-80.

Region III has more adverse conditions for rice. The edaphic and climatic factors go more or less against its cultivation. In all, only two villages did grow it at both points of time, and only four villages at the first point of time, others did not grow it at all. Negligible share of G.C.A. (0.21% and 0.08% respectively) were devoted to this crop in this region in both the years, and the relative percentage of decrease at the second point of time was 61.90, higher than the other two regions.

It seems, in terms of decrease of extent (unit areas), Region I decreased by one village (i.e. 7.69%), Region II by five villages (22.72%) and Region III by four villages (36.36%). Thus, in all respects Region I was outstanding in rice cultivation followed by Region II, while Region III was left far behind.

Table 4.7 shows the distribution and change in rice cultivation over the two points of time.

In 1959-60, rice was grown by 36 villages over 2.31 per cent of the G.C.A., but it enjoyed status of some significance only in Kundhal (21.15%), Mahapara (11.36%), Kalak (10.13%), Vanseta (9.61%) and Vadadla (9.20%), rest of the villages devoted their percentage share of G.C.A. ranging only between 0.01 per cent and 8.02 percent (Fig. 4.3 a). By 1979-80, a change took place in the physiography of the area, that most of the water-logged depressions were drained-off by the artificial drainage channels. Thus, the conditions favouring its cultivation went off

Table - 4.7

Village-wise Distribution and Change in G.C.A. Share of Rice

1959-60/ 1979-80	0.00	0.1.00	1.1 - 3.00	3.1 - 6.00	6.1 - 9.00	Above 90	Total
0.00	Asanvad, Asarsa B. Timbi, Bhadkodara, Dolia, Isanpur Islampur Kansagar, Kapuria Madafar Sindhav (11)	Devla, Khanpur Deh, Malpur Nada, Panchpipla Singarna Th. Talavdi (07)	Chandpur Marva (01)	Chandpur Bara (01)	--	Kundhal (01)	21
0-1.00	--	Degam, Pachakda Sardarpura Tankari, Vad (05)	Salehpur- Sigam, Zamdi (03)	Muradpur Neja (01)	--	--	09
1.1-3.00	--	Nadiad (01)	Gulal, Hamadpur Kantharia Kimoj, Shambha (04)	Jantran, Kava, Runad (03)	--	--	08
3.1-6.00	--	--	--	Chhidra, Dhari Kaliari (03)	--	Kalak (01)	04
6.1-9.00	--	--	--	Thanava (01)	--	Vadadla (01)	02
Above 9.00	--	--	--	--	Limoj (01)	Mahapura Vanseta (02)	03
Total:	11	13	08	09	01	05	47

Figures in parenthesis indicate the number of villages.

the scene, which had the effect of a general decrease in both of its occupied share of G.C.A., and extent. Ten villages gave up its cultivation, three villages went down from low to very low level, one village from medium to very low, three from medium to low, one from very high to medium and one from very high to high. Five villages in very low levels, four villages in low, three villages in medium and two villages in very high level show no change. Nadiad, from very low, Thanava from medium and Limaj from high level went up to next higher level respectively (Fig. 4.3 b). This is well exhibited by Table 4.8

Table - 4.8

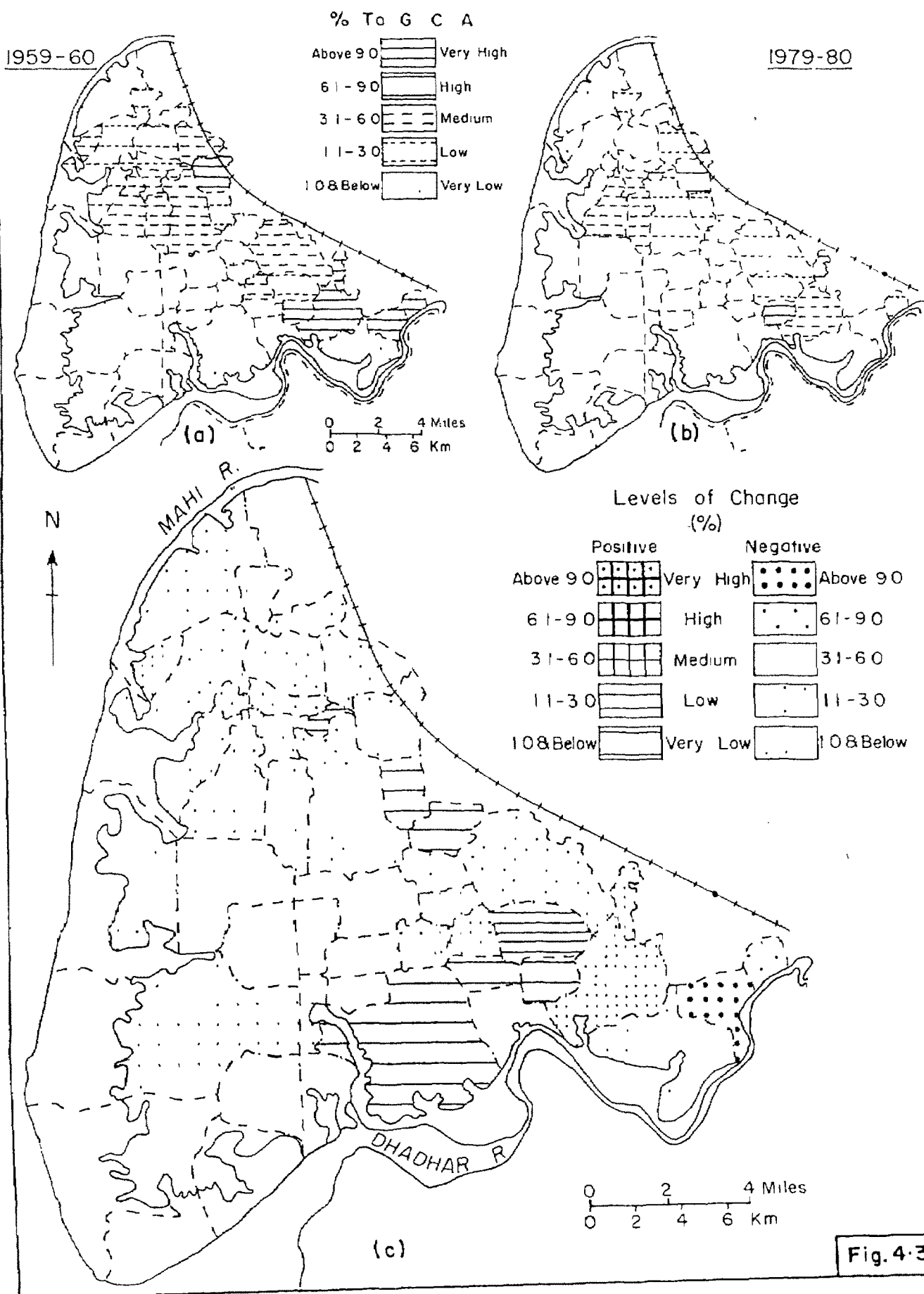
Villagewise Percentage Levels of Change in G.C.A. Share  
under Rice between 1959-60 and 1979-80

Levels of	% Range	Positive		Negative		Total	
		No. of villages	%	No. of villages	%	No. of villages	%
Very Low	0-1.00	05	10.87	12	26.09	17	36.96
Low	1-3.00	02	4.35	11	23.91	13	28.26
Medium	3-6.00	-	-	04	08.70	04	8.70
High	6-9.00	-	-	01	02.17	01	2.17
Very High	Above 90	-	-	01	02.17	01	2.17
No change	-	-	-	-	-	-	-
No cultivation	-	10	21.74	-	-	10	21.74
Total	-	17	36.95	29	63.04	46	100.00

Table 4.8 shows that in cultivation of rice, only 15.22 per cent of villages have shown positive changes at very low and low levels, while 63.04 per cent of villages have shown negative changes at all levels with highest 26.09 per cent in very low followed by the subsequent levels. 21.74 per cent of the villages did not grow this crop at all.

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## Change in Rice Cultivation



In its spatial pattern of change predominant are the negative levels varying between very low and very high. The enclaves of low level positive changes are seen bordered by the blocks of negative change in the upper part of central plain (Kaliari), eastern part (Shambha and Pachakda), south-eastern part (Nadiad, Vanseta) and southern margins of the same plain (Sardarpura and Tankari). However, rice characteristically shows the spatial pattern of negative change (Fig. 4.3 c).

#### 4.2.3 Bajri:

Bajri is a minor kharif crop and a food grain of the poor but also taken by the lower and upper middle class people. It did not gain any notable significance in the cropping pattern of the area. During 1959-60, it could occupy only 1.66 per cent of the G.C.A., however, it went up by an insignificant percentage (0.21) during 1979-80.

Table 4.9 shows the distribution and change in bajri cultivation at the two points of time.

Like jowar, bajri has also been relatively more significant in Region I holding 2.97 per cent and 3.61 per cent of G.C.A. respectively at the two points of time. Region II was next in order with 1.42 per cent and 1.76 per cent while Region III was third with 0.99, and 0.71 per cent. Whereas it has shown increase by 0.64 per cent and 0.34 per cent in Regions I and II respectively, it has decreased in Region III by 0.28 per cent.

It was grown by 36 villages in 1959-60 and by 35 villages in 1979-80. Six villages, Bakarpur Timbi, Chandpur Bara, Islampur, Kansagar, Panchpipla and Thakor Talavdi, did not grow it at any point of time. Devla, Kapuria, Khanpur Deh, and Pachakda did grow at the first, but gave up at the second point of time. Asanvad, Madafar, Sindhav and Singarna entered among the growers with an insignificant G.C.A. percentage (0-1.00%), while Sardarpura, Asarsa, Bhadkodara, Tankari and Vad did not show any change. Dolia, Malpur, Nada, Salehpur Sangdi and Vanseta descended from low to very low level (i.e. 1.00-1-3.00 - 0.1.00%) Chandpur Marva, Kava, Kundhal, Mahapura and Nadiad went up from very low to

Table - 4.9

Distribution and Change in Percentage G.C.A. Share of Bajri

1959-60/ 1979-80	0.00	0 - 1.00	1.1 - 3.00	3.1 - 5.00	5.1 - 7.00	Above Total 7.00
0.00	B.Timbi, Ch.Bara Islampur, Kansagar Panchpipia, Th.Talavdi(06)	Khanpur Deh, Devla (02)	Kapuria, Isanpur(02)	Pachakda (01)	-	11
0-1.00	Asanvad, Madafar Sindhav Singarna(04)	Asarsa, Bhadkodara Tankari, Vad	Dolia, Malpur Nada, S.Sangdi Vanseta (05)	--	--	13
1.1-3.00	Sardarpura (01)	Ch. Marva, Kava Kundhal, Mahapura Nadiad (05)	Jantran, Kalak Limoj, Shambha (04)	--	--	10
3.1-5.00	--	--	Dahri (01)	Chhidra Degam, Gulal, H. Kantharia	--	05
5.1-7.00	--	--	--	Kaliari, Zamdi(02)	M.Neja, Sigam, Thanava (03)	06 Limoj (01)
Above 7.00	--	--	--	Runad(01)	Vadadla(01)	02
Total:	11	11	12	08	04	47

Figures in parenthesis indicate the number of villages.

low level (0-1.00 to 1-3), Kalak, Kimoj, Jantran and Shambha and Chhidra, Dehgam, Gulal and Hamadpur Kantharia stuck to their respective levels. Muradpur Neja, Sigam and Thanava also did so. Dahri, Kaliari, Zamdi went up from their respective levels to next higher, so was the case with Runad and Vadadla. Limaj the leading grower of Bajri descended to next lower level giving place to Runad and Vadadla to be the leading growers of bajri in 1979-80 (Fig. 4.4 a & b).

With a negligible total increase in its G.C.A. share by 0.21 per cent, it does not show that bajri could enjoy any significance in terms of its G.C.A. share. However, it is found to be a crop of some significance in the villages of Regions I and II and much less in the villages of Region III. Thus, bajri could fare better in Ankhi-Haldar series and also in Degam series than in the Balota-Onjal series of soils.

Bajri, among the kharif cereals was the crop enjoying relatively better favour of the environment, and moved inverse to the general trend of decrease in the cereals. Table 4.10 shows the levels of change in its share of G.C.A. during the study period:

Table - 4.10

Villagewise Levels of change in Percentage Share of Bajri  
in G.C.A. between 1959-60 and 1979-80

Levels of	% Range	Negative		Positive		Total	
		No. of villages	%	No. of villages	%	No. of villages	%
Very Low	0-0.5	09	19.57	04	8.70	13	28.26
Low	0.5-1.00	03	6.52	04	8.70	07	15.22
Medium	1.00-2.00	07	15.22	03	6.52	10	21.74
High	2.00-3.00	04	8.70	03	6.52	07	15.22
Very High	Above 3.00	01	2.17	01	2.17	02	4.35
	No change	01	2.17	-	-	01	2.17
	No cultivation	06	13.04	-	-	06	13.04
Total:		31	67.39	15	32.61	46	100.00

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## Change in Bajri Cultivation

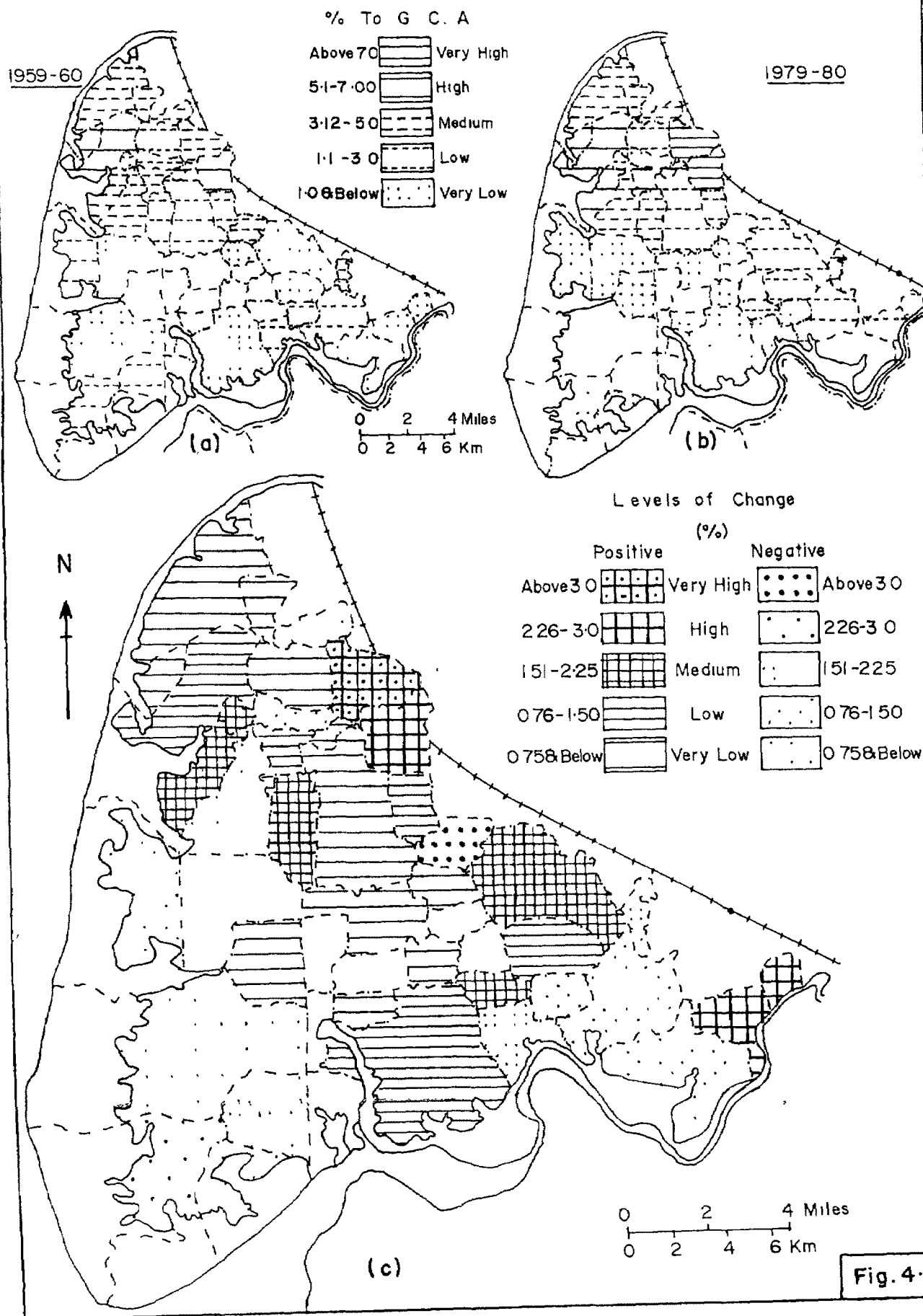


Fig. 4.4

Table 4.10 indicates that bajri has shown positive levels of change in 52.17 per cent of villages, one village (2.17%) did not show any change and 15 villages (32.61%) experienced negative changes at varying levels. The very low level of positive change is seen in very high percentage (19.57) of villages, followed by medium, high, low and very high levels. The levels of negative change make a symmetrical appearance in the percentage of villages. The very low and low levels of negative change took place in 8.70 per cent of villages each, the medium and high level changes took place in 6.52 per cent of villages each. Very high level of negative change is neutralised by the same level of positive changes. Six villages (13.04%) did not grow it at all.

Where larger percentage of villages have drastically cut the share of G.C.A. of other cereal crops, more favour has been bestowed on this crop, owing to its attribute of low demand of inputs, and high quantum of output.

A block of positive change of varying levels extends from north to south flanked by the south-eastern, south-western and western villages with varying negative levels of changes. This gives a clear pattern of negative and positive changes. Only three villages of low and very low negative levels of change are enclaved by the villages with positive changes (Fig. 4.4 c).

#### 4.2.4 Kodara:

It is a minor kharif crop insignificantly grown in a few villages of the area. In 1959-60, it occupied a very insignificant percentage of G.C.A. (0.48%), which decreased to 0.25 per cent by 1979-80.

Region I and Region II were its main growers where 1.01 per cent and 0.41 per cent of their G.C.A. were devoted to it in 1959-60. Region III also did grow it but the share of G.C.A. was only 0.16 per cent. Its position much declined in 1979-80, when a marked decrease took place in all the three regions. Region I however, maintained the top position in its cultivation devoting 0.62 per cent of its G.C.A. Other two regions went down to 0.15 per cent and 0.04 per cent respectively.

Table - 4.11

## Village-wise Distribution and Change in Kodara

1959-60/ 1979-80	0.00	Very low 0 - 0.50	Low 0.51 - 1.00	Medium 1.01 - 1.50	High 1.51 - 2.00	Very High Above 2.00	Total
0.00		Kundhal, Madafar Salehpur Sangdi (03)	--	Panchpippla, Jantran Nada (03)	--	--	06
V. Low 0-0.50	Dolia (01)	Chhidra, Degam Kimoj, Zamdi (04) -	Chandpur Marca, Kalak Kava, Nadiad Sigam (05)	Kaliari (01)	--	--	11
Low 0.51-1.00	--	Gulal(01)	--	Dahri(01)	Muradpor Neja(01)	Limoj(01)	04
Medium 1.01-1.50	--	--	Hamadpur Kantharia. Mahapura(02)	Vadadla (01)	--	Shambha(01)	05
High 1.51-2.00	--	--	--	--	--	--	--
Very High Above 2.00	--	--	--	--	--	Runad Thanava(02)	02
Total:	01	08	07	06	01	04	27

Figures in parenthesis indicate the number of villages.

In all 27 and 22 villages cultivated it at the two points of time respectively. In 1959-60, Thanava (Region II) was the leading grower of Kodara followed by Runad and Limaj (Region I), 19 other villages ranged between 0.07 per cent in Degam and 1.90 per cent in Muradpur Neja. In 1979-80, a general trend of decrease is noted in all the villages except in Gulal, Hamadpur Kantharia, Kimoj, Mahapura and Vadadla, where the G.C.A. percentage share under it increased by 0.12, 0.29, 0.05, 0.51 and 0.24 respectively. However, inspite of the decrease, Thanava remained the leading grower of this crop (2.67%) followed by Runad (2.16%) and Shambha (1.48%). The rest of the villages ranged between 0.03 per cent (Degam) and 1.37 per cent (Vadadla). Thus, the former hierarchy changed with the stepping down of Vadadla, and climbing up of Shambha. But in general, Kodara was an insignificant crop at the base year, and was made still insignificant in 1979-80. Table 4.11 shows the villagewise distribution and change in G.C.A. share of Kodara.

Table 4.11 shows the position of Kodara at both points of time. In 1979-80, six villages went off the scene, Dolia came up, four villages did not change. Runad and Thanava retained their very high level, four villages did show increase and the rest descended from their respective levels.

Table 4.12 shows the range of percentage difference of its G.C.A. share between the two points of time.

Table - 4.12

Levels of Percentage Difference in G.C.A. share under Kodara  
Between 1959-60 and 1979-80

Levels of	% Range	Positive		Negative		Total	
		No. of villages	%	No. of villages	%	No. of villages	%
Low	0-0.5	04	8.70	09	19.57	13	28.26
Medium	0.5-1.00	01	2.17	10	21.74	11	23.91
High	1.00-1.5	-	-	03	6.52	03	6.53
Nil	-	19	41.30	-	-	19	41.30
Total		24	52.17	22	47.83	46	100.00

Very insignificant levels of change can be discerned from the table. It shows a clear pattern of negative change with 47.83 per cent of the villages undergoing between low and high level change and only 10.87 per cent villages showing an insignificant positive change between low and medium levels.

#### 4.3 FODDER:

Fodder being the cattle feed, is as essential as the cereals for men. The principal varieties of fodder crops are 'sundhiya', 'rojko' and 'jowar-bantu'. All are grown during the kharif season.

In 1959-60, they together occupied 4.45 per cent of the G.C.A. and in 1979-80, their share went down to 3.64 per cent.

All the three regions have grown them at both points of time. Region I devoted 2.77 per cent, and 2.93 per cent of their G.C.A. at the two points of time. Region III devoted 4.60, and 3.50 per cents, and Region III did it on 4.45 and 3.64 per cents respectively.

It has, invariably, been grown in all the villages at both points of time, except, for Limaj in 1959-60, and Panchpipla in 1979-80 for reasons not known. Among the leading growers of fodder crop at the first point of time were Panchpipla (22.28%), Chandpor Bara (17.53%), Nada (14.19%), Malpor (12.43%), Khanpur Deh (10.26%), Dahri (10.19%) and Asarsa (9.96%), and those at the second point of time were Thakor Talavdi (12.94%), Bakarpur Timbi (11.14%), Singarna (11.10%), Kaliari (10.16%), and Asarsa (9.56%). In other villages its share of G.C.A. ranged between 0.24 and 8.96 per cent and 0.22 and 8.02 per cent at the two points of time respectively. The villagewise distribution and change in G.C.A. share of fodder is shown in Table 4.13.

Table 4.13 shows that 27 villages (59%) in the very low level and two villages in the low level showed no obvious change. Three villages from very low went up to low and three villages from very low, and one village from low went up to medium level of change. Isanpur went off the map. Panchpipla enjoying the highest level at the first point of time went off the picture at

Table - 4.13

Village-wise Distribution and Change in G.C.A. Share of Fodder Crops

1959-60/ 1979-80	0.00	0 - 5.00	5.1 - 10.00	10.1-15.00	15.1-20.00	Above 20.00	Total
%							
0.00	--	--	Isanpur (01)	--	--	Panchpipla (01)	02
Very Low	Limoj (01)	Bhadkodara, Chandpor Marva, Chhidra, Degam Devla, Gulal, Hamadpur Kantharia, Jantran, Kalak Kansagar, Kava, Kimoj, Madafar, M.Neja, Badiad, Pachakda, Runad S.Sangdi, Sardarpura Shambha, Sigam, Sindhav Singarna, Tankari, Thanava, Vad, Vadadla (27)	Asanva, Islampur Mahapura (03)	Dahri, Khanpur Deh (01)	Chandpor Bara	--	36
Low 5.1-10.00	--	Dolia, Kundhal, Zamdi (03)	Asarsa, Kapuria (02)	--	--	--	05
Medium 10.1-15.00	--	Bakarpur Timbi, Kaliari Vanseta (03)	Thakor Talavdi (01)	--	--	--	04
High 15.1-20.00	--	--	--	--	--	--	--
Very High Above 20.00	--	--	--	--	--	--	--
Total:	01	33	07	04	01	01	47

the second point of time, and three villages from low, four from medium, and one from high experienced very low level of change. One village, Limaj, appeared at the second point of time with a very low percentage of G.C.A. (Fig. 4.5 a & b)

In the spatial pattern of change the position and negative changes show almost clearcut enclaves with a few isolated pockets of each in the other. The very low positive change (0 - 5.00%) is seen in most of the north-eastern, eastern and southern villages and in an isolated village Zamdi on the north-western side. Only three villages viz., Kundhal in the south-east, Singarna in the lower central part and Kaliari in the upper central part, are the isolated enclaves of the low level positive change (6-10.00%). Rest of the villages of the central and northern parts of the area make almost a big enclave of very low to very high level (0-5 to 21-25%) of negative change. Besides, Shambha and Vadadla in the north-east, Khanpur Deh and Mahapara in the south-east, Asarsa and Nada in the south-west and Islampur in the south are the isolated enclaves of very low, low and medium levels of negative change (Fig. 4.5 c). Soils seem to have played no role in this pattern of change in fodder cultivation.

However, against the general assumptions and expectations about the increase in the percentage G.C.A. share of fodder, with the expected increase in cattle population, especially with the emphasis on dairy development in the area, it has in general decreased, owing to the introduction of high yielding hybrid varieties of Sindhiya, Rajko and Jowar-bantu, that give higher yields with higher nutritive values. Thus, it was no longer necessary to devote large hectareage to them. Besides, the stalks of jowar, bajri, paddy, wheat, etc. also serve as animal feed. However, the impact of "cotton wave" may not be ruled out in bringing down the hectareage under fodder crops.

#### 4.4 PULSES:

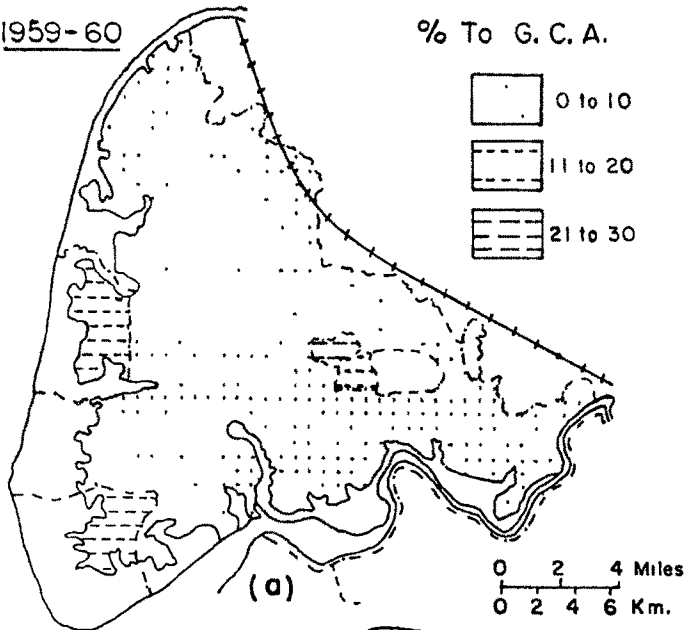
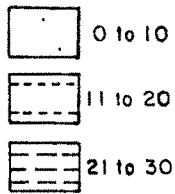
Among the pulses of the kharif season are tur, moong (mag), urad (adad), and gram of rabi season. Of them the principal pulse is tur, the others being quite insignificant. Thus, all the minor

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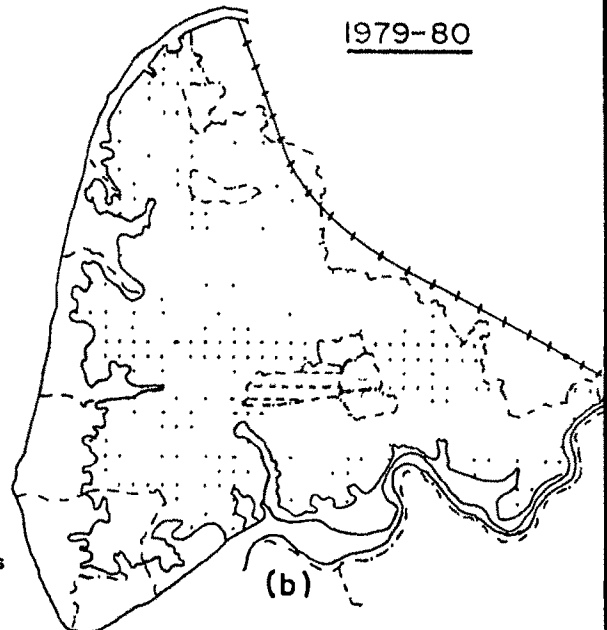
## Change in Fodder Cultivation

1959-60

% To G. C. A.



1979-80



Levels of Change (%)

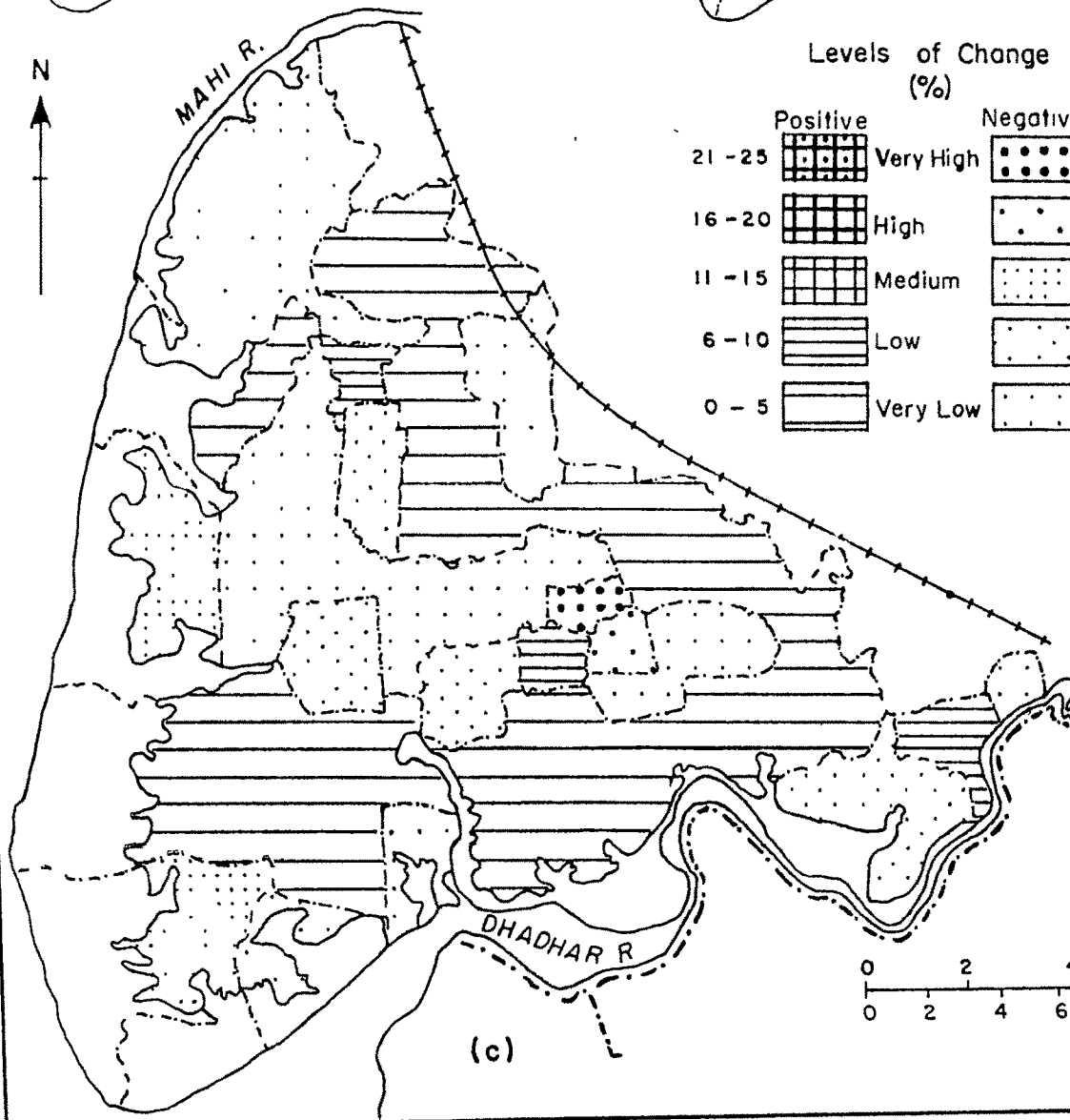
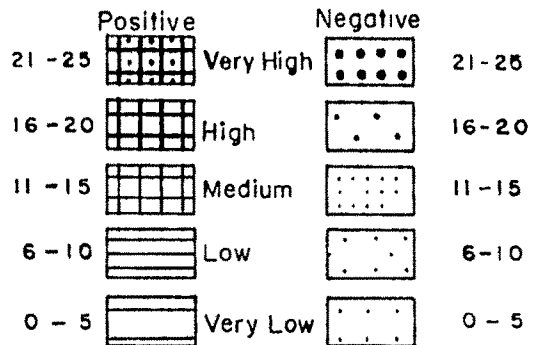


Fig. 4.5

pulses have been assimilated with tur, which held relatively major hectareage and are discussed here under the broad head of 'pulses'.

Pulses seem to have been grown only for domestic use. They never occupied any substantial percentage of G.C.A. in the area. However, their position was relatively better during 1959-60, when they occupied 2.61 per cent of the total G.C.A. But, they declined to 1.58 per cent by 1979-80, alongwith the cereals and other such crops.

In case of their regional distribution, it is found that Region I, with its edaphic qualities has been a relatively bigger grower of pulses devoting 4.20 per cent of its G.C.A. at the first and 2.96 per cent at the second point of time. It maintained its superiority at either of the points of time. Region II devoted 2.75 and 1.67 per cent, and Region III 1.18 and 0.41 per cent respectively at the two points of time. This itself shows the adaptability of the pulses to the local condition and the choice of the farmers.

In its villagewise distribution, the influence of the edaphic conditions is well reflected, as its wider distribution is found mainly confined to the villages of the upland part (central and eastern villages). Khanpur Deh, on the northern bank of Dhadhar, was the leading grower of pulses (mainly tur) devoting 13.99 per cent of its G.C.A. in 1959-60, followed by Limaĵ (10.35%) and Pachakda (9.56%). In other villages its G.C.A. share ranged between 0.02 (Malpur) and 6.81 per cent (Runad). Table 4.14 gives the distribution and change in the percentage G.C.A. share of pulses at the two points of time (Fig. 4.6 a & b).

The table shows that two villages did not grow it at all, ten villages in the range of very low to medium levels at the first point of time stopped growing it at the second point of time. Twenty one villages, inspite of the minor negative or positive changes in the actual hectareage under it maintained their former levels, six villages descended from low to very low level. Khanpur Deh went down precipitiously from very high to very low and

Table - 4.14

Village-wise Distribution and Change in G.C.A. Share of Pulses

1959-60/ 1979-80	0.00	Very Low 0 - 3.000	Low 3.1 - 6.00	Medium 6.1 - 9.00	High 9.1 - 12.00	Very High Above 12.00	Total
%							
0.00	Devla Isanpor	B.Timbi, Ch. Bara, Kansagar Kapuria, Madafar, Nada Sindhav, Singarna(08)	Islampur(01)	Asarsa (01)	-	-	12
Very Low 0-3.00	-	Asanvad, Bhadkodara, Ch. Marva, Chhidra, Degam Jantran, Kalak, Kaliari Malpor, M.Neja, Nadiad Panchpipla, Shambha, Tankari	Dolia, Gulal, Kava, Mahapura Zamdi(06)	-	-	Khanpur Deh (01)	24
Low 3.1-6.00	-	Sigam, Sardarpura(02)	Dahri, S.Sangdi Thanava(03)	-	Limoj Pachakda (02)	-	07
Medium 6.1-9.00	-	-	H.Kantharia Kimoj (02)	Runad(01)	-	-	03
High	-	-	-	-	-	-	-
Very High Above 12.00	-	Kundhal (01)	-	-	-	-	01
Total:	02	28	12	02	02	01	47

Figures in parenthesis indicate number of villages.

two villages from high to low level. On the front of positive change,, two villages, Sardarpura and Sigam, moved up to low from very low, two to medium from low, and one village, Kundhal, moved from very low to very high level inversely to Khanpur Deh.

The over all view shows that four villages each of Region I and II and three villages of Region III have shown positive change, and the rest showed negative change. Only reason for the decline of all these crops was the indefensible 'cotton wave'. It may not be out of place to say that Grow More Pulses Campaign of the Government had not started then.

Table 4.15 shows the levels of change in pulses between the two points of time:

Table -- 4.15

Levels of Percentage Difference in G.C.A. Share of Pulses  
Between 1959-60 and 1979-80

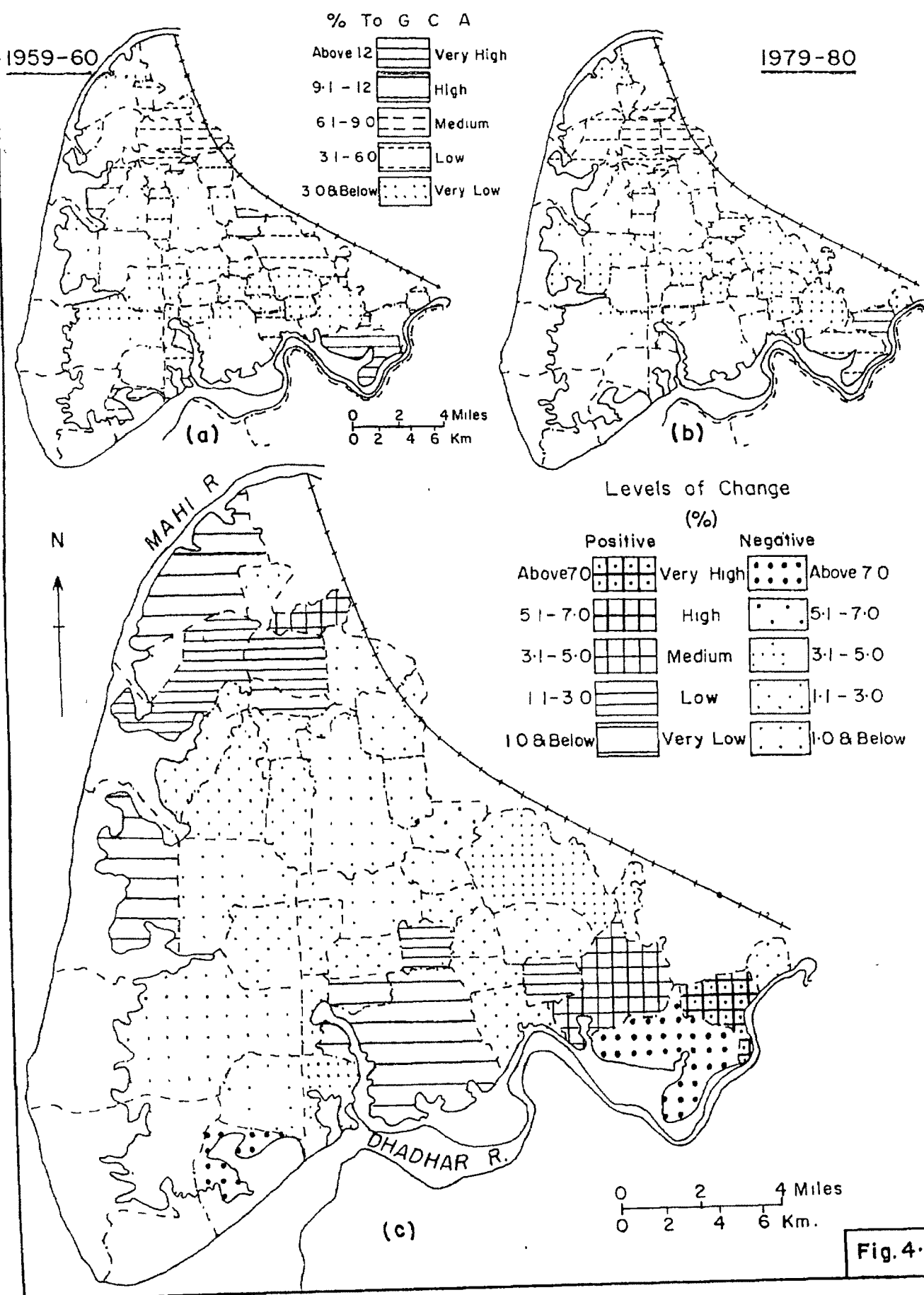
Levels of	% Range	Positive		Negative		Total	
		No. of villages	%	No.of villages	%	No. of villages	%
Very Low	0 - 1.00	04	8.70	12	26.09	16	34.78
Low	1.1 - 3.00	02	4.35	20	43.48	22	47.83
Medium	3.1 - 5.00	01	2.17	03	6.52	04	8.70
High	5.1 - 7.00	-	-	01	2.17	01	2.17
Verh High	Above 7.00	01	2.17	02	4.35	03	6.52
Total:	-	08	17.39	38	82.61	46	100.00

Like the cereal crops pulses also sustained the loss in varying levels in 82.61 per cent of the villages growing it, and could gain in only 17.39 per cent of them between very low and medium, and in 2.17 per cent of the villages up to very high levels.

Viewing the spatial pattern of change (Fig. 4.6 c) we find one major block of negative change covering 82.61 per cent of the villages located in the central, eastern, and western parts. The

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## Change in Pulses' Cultivation



enclaves of positive levels of change are found located in the northern, south-eastern and southern villages. However, one village (2.17%), Malpur, in the western littoral is also included among those with positive change.

#### 4.5 GUINEA GRASS:

Another minor kharif crop of the area has been guinea grass. Formerly, it was a lucrative cash crop. It was a product highly demanded in the urban areas, to feed the draught animals, especially horses. As long as the horse-drawn carriages dominated the urban transport in Bombay and other urban areas, they were the largest consuming centres of this grass. With such carriages going off the urban roads its demand also slumped affecting its cultivation in the area. In 1959-60, it occupied 1.76 per cent of the G.C.A., but in 1979-80, it went down to only 0.37 per cent.

Region I was relatively big grower of this grass devoting 4.02 per cent of its G.C.A. at the first point of time, followed by Region II (1.20%) and Region III (0.82%). This order remained unchanged till the second point of time, but the share of G.C.A. under grass in each Region drastically changed. Region I devoted only 1.23 per cent of the G.C.A., while Regions II and III reduced it to 0.13 and 0.04 per cent respectively.

Whereas in 1959-60, as many as 41 villages cultivated it, in 1979-80, their number came down to only 20, with very insignificant shares of their G.C.A. In 1959-60, Kalak (12.70%) was the largest grower of this grass, and Devla (0.01%) was the smallest, but in 1979-80, the highest limit dropped to 4.16 per cent (Kava) and the lowest limit remained 0.01 per cent in several villages. The other villages ranged between the two respective extremes at both points of time. Table 4.16 shows the distribution and change in G.C.A. share occupied by grass at both points of time.

Thus, grass, due to factors cited above, has been reduced to a very insignificant crop in terms of both areal extent and its G.C.A. share.

Table - 4.16

Village-wise Change in Percentage G.C.A. Share of Grass

1959-60/ 1979-80	0.00	0.01 - 3.00	3.01-5.00	5.01 - 7.00	7.01-9.00	Above 9.00	Total
0.00	B.Timbi Limoj Madafar Malpor	Bhadkodara, Ch.Bara Ch.Marva, Chhidra Dolia, Gulal, Isanpur Kapuria, Kansagar, Mahapura, Nada, Nadiad Pachakda, Panchpipla Sardarpura, Shambha Sindhav, Singarna Tankari, Vad, Vadadla (21)	Asarsa, Salehpor Sangdi (02)	-	-	-	27
Very Low 0.01-3.00	Thakor Talavdi (01)	Asanvad, Devla, Dahri H.Kantharia, Islampur Jantran, Kaliari, Kimoj Khanpur Deh, Kundhal, M.Neja, Sigam, Thanava Vanseta, Zamdi (15)	Degam, Runad (02)	-	-	Kalak (01)	19
Low 3.01-5.00	-	-	Kava (01)	-	-	-	01
5.01 to Above 9.00	-	-	-	-	-	-	-
Total:	05	36	05	-	-	01	47

Figures in parenthesis indicate the number of villages

Table 4.17 shows levels of percentage difference in the G.C.A. share of Guinea grass between 1959-60 and 1979-80:

Table - 4.17

Levels of Percentage Difference in G.C.A. share under Grass  
Between 1959-60 and 1979-80

Levels of change	% Range	Positive		Negative		Total	
		No. of villages	%	No. of villages	%	No. of villages	%
Low	0 -2.5	05	10.87	27	58.70	32	69.57
Medium	2.51-5.00	-	-	9	19.57	09	19.57
High	Above 5.00	-	-	01	2.17	01	2.17
Total		05	10.87	37	80.44	42	91.31
Nil	-	03	6.52	-	-	03	6.52
No change	-	01	2.17	-	-	01	2.17
Grand Total:	-	09	19.56	37	80.44	46	100.00

Grass shows only low level positive change in only 10.87 per cent of villages and all levels of negative change in 80.44 per cent of the villages.

The spatial pattern of change, as such, is expressed in decrease through out. However, the larger percentage of decrease is seen in the villages of Region III, i.e., near the coastal margins, followed by the villages of the upland areas (Region I). However, the five villages (10.87%) of Region II in the middle show low levels of positive change. They are surrounded by negative changes of all levels.

#### 4.6 OILSEEDS:

The principal oilseeds comprise sesamum (til) and castor (divelia). Groundnut (magphali) is also insignificantly grown. The share of G C A under each of them has been so small that they had to be aggregated to bring them under one head - oilseeds.

During 1959-60, the oilseeds were one of the most insignificant crops occupying only 0.60 per cent of the G.C.A. of that year, next in hierarchy to tobacco (0.40%) and kodara (0.48%). But in 1979-80, they gained some significance as their share of G.C.A. went up to 1.79 per cent, and were ranked above rice, kodara, pulses, tobacco and grass.

In 1959-60, the aggregated percentage share of G.C.A. under oilseeds in Region I was only 0.68 even though grown by 12 of its 13 villages. But it went up to 4.08 per cent in 1979-80 and they were grown by all the 13 villages. In Region II, they occupied only 0.68, and 1.57 per cent of the G.C.A., respectively at the two points of time. However, inspite of the general trend of increase, they could occupy only 0.42 and 0.38 per cent of the G.C.A. of Region III at the two points of time. Thus, when the first two regions have increased their share of G.C.A. under them, the third has decreased.

Their villagewise distribution shows that 42 of the 47 villages and 39 of the 46 villages did grow them at the two points of time respectively. The leading growers in 1959-60 were M.Neja (3.56%), Kimoj (2.02%), Jantran (1.87%), Runad (1.37%) and Kaliari (1.38%). Rest of the villages ranged between 0.01 per cent in Madafar, and 1.28 per cent in Vadadla. In 1979-80, the leading growers were mostly belonging to Region I. Limaj (22.58%) emerged as the all-time high grower of oilseeds followed by Salehpur Sangdi (14.55%), Vadadla (11.86%), Kaliari (8.34%), Gulal (6.21%), Thanava (5.75%), and Sigam (5.40%). The rest of them ranged between 0.01 per cent in Nada and 5.02 per cent in Runad.

The changed hierarchy in the cropping pattern<sup>\*</sup> of oilseeds shows that mostly the smaller villages have been the larger grower of oilseeds at both points of time. It is assumed that owing to the competition in cotton growing, the smaller villages might have opted for this course.

Table 4.18 shows the distribution and changing share of G.C.A. under oilseeds at the two points of time.

Table - 4.18

Village-wise Distribution and Changing Share of G.C.A. Under Oilseeds

1959-60/ 1979-80	0.00	0 - 1.00	1.1 - 5.00	5.1 - 10.00	10.1-15.00	Above 15.00	Total
0.00	Asarsa B.Timbi Sangarna (03)	Bhadkodara, Devla, Panchpipla Vad (04)	Isanpur (01)	--	--	--	08
Low 0-1.00	Islampur (01)	Asanvad, Ch.Bara, Ch. Marva Chhidra, Dolia, Kansagar Kava, Kapuria, Kundhal, Madafar, Malpur, Nadiad, Pachakda, Sardarpura, Shambha, Sindhav, Tankari, Th.Talavdi, Vanseta (19)	Khanpur Deh Nada (02)	--	--	--	22
V.Low 1.1-5.00	--	Dahri, H.Kantharia, Kalak Mahapura (04)	Degam, Jantran Kimoj, M.Neja Thanava Zamdi (06)	--	--	--	10
Medium 5.1-10.00	--	Gulal, Sigam (02)	Runad, Kaliari (02)	--	--	--	04
High 10.1-15.00	-	S.Sangdi (01)	Vadadla (01)	--	--	--	02
Very High Above 15.00	LimaJ (01)	--	--	--	--	--	01
-Total:	05	30	12	--	--	--	47

The table shows that three villages did not grow them at either point of time and four villages did not do so at the second point of time. Isanpur went off the map of the area. Islampur and Limaj were the new entrants at the second point of time. Majority of the growing villages (25) with no significant change maintained their former level. Two villages, Khanpur Deh and Nada, descended to next lower, and six villages went up to medium and high levels from their respective low levels. Limaj, the new entrant enjoyed the top place among their growers. However, inspite of the intense 'cotton wave' in the area, the less decrease and more increase in their G.C.A. share has been owing to their higher prices at the second point of time.

The spatial variability (Fig. 4.7 a & b) shows that the villages on the eastern segment of the area (Region I) have shown marked increase followed by those of the central plain (Region II). But most of the littoral villages (Region III) have either remained unchanged or have decreased, thus, decreasing the total share of G.C.A. under oilseeds to 0.38 per cent from the former 0.42 per cent.

Table 4.19 shows the percentage difference of the G.C.A. share of the oilseeds between the two points of time:

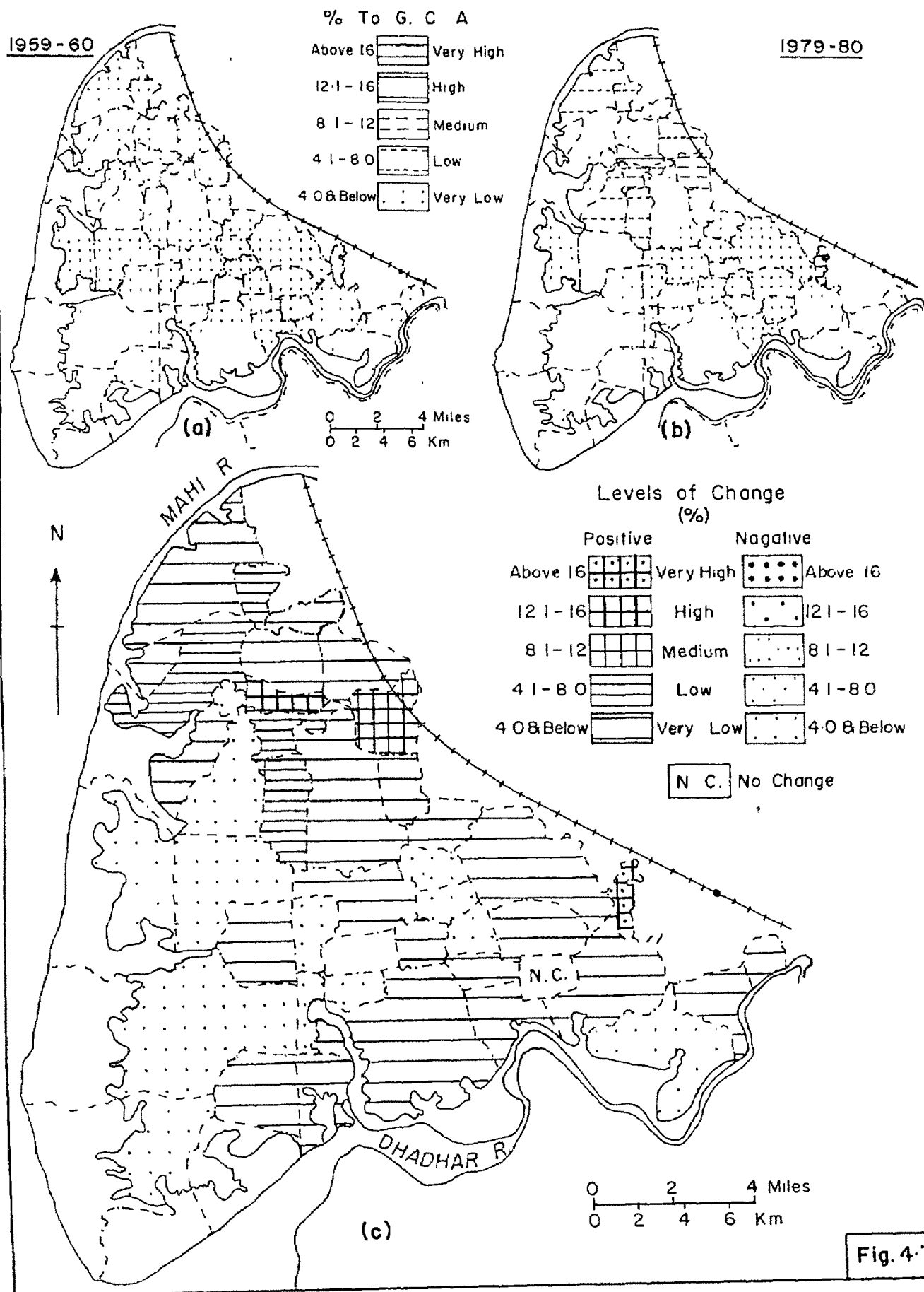
Table - 4.19

Levels of Percentage Difference in G.C.A. share  
under Oilseeds (1959-60 - 1979-80)

Levels of change	% Range	Positive		Negative		Total	
		No. of Villages	%	No. of villages	%	No. of villages	%
Very Low	0-4.00	22	47.83	13	28.26	35	79.09
Low	4.1-8.00	05	10.88	-	-	05	10.87
Medium	8.1-12.00	01	2.17	-	-	01	2.17
High	12.1-16.00	01	2.17	-	-	01	2.17
Very High	Above 16.00	01	2.17	-	-	01	2.17
Total:		30	65.22	13	28.26	43	93.48
Nil	-	02	4.35	-	-	-	-
No change	-	01	2.17	-	-	-	-
Grand Total:		33	71.74	13	28.26	46	100.00

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Majority of the villages (47.83%) have shown very low level of positive change and slightly more than a quarter of them (28.26%) show the same level of negative change. However, 10.88 per cent of the villages have shown low level, while the medium, high and very high levels of positive change each is seen in 2.17 per cent of the villages.

The strip of positive change (all levels) which dominate the scene extends from south-east to north-west. The western coastal villages show negative change (very low and low levels). However, barring a few intervening enclaves of negative change of very low level within the strip of positive change, there is an obvious pattern of very low level of negative change in the west, and low to very high levels of positive changes in the east, south and north-west margin of the area (Fig. 4.7 C).

#### 4.7 TOBACCO:

Tobacco is the most insignificant crop of this area. It is grown for domestic use in 'hookah', bidi, or the country cheroot. It occupied a very insignificant share (0.04 and 0.01 per cent) of the total G.C.A. at the two points of time.

More or less, the same position of tobacco is found in the regions. Region I devoted 0.04 and 0.01 percent, Region II 0.03 and 0.01 per cent and Region III 0.04 and 0.01 per cent respectively, at the two points of time.

In 1959-60 as many as 40 of the 47 villages raised it on a very insignificant percentages of their G.C.As. (between 0.01 and 0.25%), and in 1979-80, it was reduced both in area and extent and was grown by only nine villages - Asarsa, Degam Dolia, Islampur, Nada, Runad, Tankari, Thanava and Zamdi, between 0.01 and 0.09 per cent. It is an obvious fact that tobacco is not the crop of the Kanam Region, but of its counterpart, the Charotar Region in Central Gujarat.

#### 4.8 RABI CROPS:

##### 4.8.1 Wheat:

The most significant cereal crop grown in rabi season and the second most significant crop of the area is wheat. It always stood next to cotton not only in the study area but also in the

whole Jambusar Taluka. In 1955-56, it held 7412 ha. (18315 acres ) against 39938.49 ha. (98688 acres) under cotton. In 1958-59, its share of G.C.A. went up to 8158.24 ha (20159 acres) against 39170 ha. (97789 acres) under cotton. (District Gazetteer Broach pp. 227 to 239).

The trend of increase of area under wheat which set in during the first and second Five Year Plans affected the study area as well. In 1959-60, wheat occupied 10561.31 ha. (30.14%) of the G.C.A. It was a strong competitor of cotton at that time, so much so that eight of the 47 villages of the area devoted much higher percentage of their G.C.A. to it than to cotton. Table 4.20 shows the comparative share of G.C.A. occupied by both the crops:

Table - 4.20

Percentage Share of G.C.A. Under Wheat and Cotton

Villages	1959-60	
	% under wheat	% under cotton
Panchpipla	66.55	06.12
Kansagar	63.06	26.28
Vad	61.67	28.80
Kapuria	57.54	28.05
Sindhav	50.18	38.75
Chandpur Bara	43.65	29.13
Dolia	41.98	36.19
Pachakda	38.48	28.48

Besides, many other villages gave near equal share of their G.C.A. to both the crops. However, the coastal villages are found conspicuous by devoting larger percentage of their G.C.A. to cotton than to wheat or any other crop.

Wheat being the rabi season crop, often suffered from lack of moisture owing to the absence of rains during the late October and early November. Other favouring circumstances,

as suitable clayey loam rich in humus, mild winter conditions and marine moist climate, are present in the area. However, it was probably the force of the 'Grow More Food Drive' that provided the motivation for the cultivation of wheat not only in this area but in other parts of the country as well.

In 1959-60, it occupied around one third of the area's G.C.A. (30.14%) but in 1979-80, its share precipitously dropped to around one-tenth (10.26%) of the G.C.A.

Similar declining trend is seen in the regional frame as well. Region I, though endowed with better natural conditions, does not appear to be the foremost grower of wheat. In 1959-60, it devoted only 18 per cent of its G.C.A., as compared to 31.93 per cent of Region II and 36.97 per cent of Region III. It shows that in Region I there was a greater degree of balanced sharing of G.C.A. by all the crops other than cotton while in the central (Region II) and littoral (Region III) sectors the tendency was for mono or bi-cropping.

During 1979-80, wheat experienced abrupt fall in each region. In Region I it occupied 6.25 per cent, in Region II, 14.11 per cent, and in Region III 8.04 per cent of their respective G.C.A. Region II, therefore, occupied the top position followed by Region III and Region I. However, the change of position took place between Regions II and III. Region II superseded Region III in wheat growing at the second point of time.

Evaluating the negative changes in the percentage share of G.C.A. under wheat in the three regions, it is found that Region I lost by 65 per cent and retained 35 per cent, Region II lost by 56 per cent and could retain 44 per cent; and Region III lost by 78 per cent and could retain only 22 per cent. It, therefore, shows that in terms of the relative negative change Regions I and II have suffered less than Region III.

The villagewise picture of the distribution of wheat shows its varying popularity. In 1959-60, all 47 villages (including Isanpur) had grown wheat on less than 10 per cent to more than 60 per cent of their G.C.A. Eight leading villages devoted more percentage

of G.C.A. to wheat than to cotton (Table 4.20). Besides these, there had been several other villages with substantial percentage of G.C.A. under wheat. Table 4.21 shows the significance of wheat at the two points of time:

Table - 4.21

Percent G.C.A. under wheat in number of Villages

G.C.A. %	1959-60		1979-80	
	No. of villages	%	No. of villages	%
0.1 - 10	08	17.03	21	45.65
10.1- 20	07	14.89	12	26.09
20.1- 30	11	23.40	04	8.70
30.1- 40	13	27.66	01	2.17
40.1- 50	03	6.38	01	2.17
50.1- 60	02	4.26	-	-
Above 60	03	6.38	-	-
Total	47	100.00	39	84.78
Non-growers	-	-	07	15.22
Grand Total:	47	100.00	46	100.00

Whereas in the first four classes the number of villages in 1959-60 ranged between seven and thirteen accounting for 83 per cent of villages. The next three classes had only 2 to 3 villages (17%); the largest number being in the fourth class (30.1 - 40%). On the other hand, in 1979-80, the lowest class (0.1 - 10%) had the largest number of villages (46%) followed by the second class (26.09%), third (8.70%) and the next two classes with 2.17% each. Table 4.22 shows the villagewise percentage share of G.C.A. under wheat and change over time.

Table - 4.22

## Village-wise Percentage Share of G.C.A. Under Wheat

1959-60/ 1979-80	0.00	1 - 10.00	10.1 - 20.00	20.1 - 30.00	30.1-40.00	40.1-50	50.1-60	Above 60	Total
0.00	-	H.Kantharia Isanpur Kaliari, Thanava(04)	Ch.Marva,Gulal Limaj(03)	--	--	--	--	--	07
1-10.00	--	Kalak,M.Neja Vadadla Vanseta(04)	Runad, Sigam Zamdi (03)	Asanvad,Asarsa Bhadkodara, Degam,Kimaj Mahapura, S.Sangdi(07)	Chhidra, Madafar Tankari(04)	Devla(01)	Kapuria(01)	Kansagar (01)	21
1-1-20.00	--	--	B.Timbi(01)	Kava,Kh.Deh Nadiad(03)	Dahri, Islampur, Jantran,Nada Pachakda, Shambha Singarna, Th.Talavdi (08)	Ch.Bara, Dolia(02)	--	--	14
20.1-30.00	--	--	--	--	Sardarpura	Sindhav(01) Vad(01)	--	--	03
30.1-40.00	--	--	--	--	--	--	--	Panchpipala 01 (01)	01
40.1-50.00	--	--	--	Kundhal(01)	--	--	--	--	01
50.0 - Above 60.00	--	--	--	--	--	--	--	--	--
Total:	--	08	07	11	13	04	02	02	47

Table 4.22 shows that seven villages including Isanpur had wheat with G.C.A. percentage between 0.01 and 20.00 at the first point of time, but stopped growing it by the second point of time. Five villages maintained their respective levels, three villages declined from 10.1 - 20 to 0.01 - 10.00 per cent. Other villages went down from their respective levels to low and very low levels. It was only village Kundhal among the 39 wheat growing villages in 1979-80, that had nearly doubled the share of wheat in its G.C.A. and surpassed Panchpipla, the largest wheat growing village of 1959-60. (Fig. 4.8 a & b).

Having a look at the regional pattern of change, it is seen that wheat suffered more in Region I, as four of its villages did not grow it at all at the second point of time, and those that cultivated it limited its G.C.A. share between the lowest 1.37 per cent in Vadadla and 18.41 per cent in Pachakda, as against 5.56 per cent and 38.48 per cent of the former year. Region II shows relatively better position of wheat. Two of its 22 villages did not grow it in 1979-80; and the devoted percentage share ranged between 0.07 per cent (Muradpur Neja) and 43.70 per cent (Kundhal) as against 0.15 per cent and 66.55 per cent of the former year. Thus, it suffered in both G.C.A. share and extent in the villages of Region II, but relatively less than the Region I. In Region III all the eleven villages cultivated it, on reduced share of G.C.A. ranging between 1.36 per cent in Zamdi and 19.35 per cent in Dolia in 1979-80, as against 9.23 per cent and 41.91 per cent in 1959-60.

Looking to the percentage shares of G.C.A. devoted to wheat in the respective regions, it is found that wheat was a more significant crop of Region II and III than of Region I at both points of time. Most of the big wheat growing villages belong to these two regions (Fig. 4.8 a & b).

The pattern of distribution and change in wheat cultivation indicates that most of the big wheat growers remained big and the small remained small. However, a shift of location is noticed in that Panchpipla, the biggest wheat grower of 1959-60, is replaced

by Kundhal in 1979-80. A general wave of decrease set in wheat cultivation by 1979-80, however, Kundhal and Vanseta were the only two villages which showed increase to the next higher range. Table 4.23 shows the levels of change in wheat cultivation:

Table 4.23

Levels of Percentage Difference in G.C.A. Share under Wheat  
Between 1959-60 and 1979-80

Levels of change	% Range	Positive		Negative		Total	
		No. of villages	%	No. of villages	%	No. of villages	%
Very Low	0-11.00	01	2.17	12	26.09	13	28.26
Low	12-22.00	01	2.17	18	39.13	19	41.30
Medium	23-33.00	-	-	10	21.74	10	21.74
High	34-44.00	-	-	02	4.35	02	4.35
Very High	45-55.00	-	-	02	4.35	02	4.35
Total:	--	02	4.34	44	95.66	46	100.00

The table shows that only 4.34 per cent villages show a positive change at very low and low levels. The rest 95.66 per cent of the villages underwent all levels of negative change. The largest percentage of villages (39.13%) show low levels of negative change followed by 26.09 per cent and 21.74 per cent of very low and medium levels respectively; while high and very high levels of negative changes each are represented by 4.35 per cent of villages.

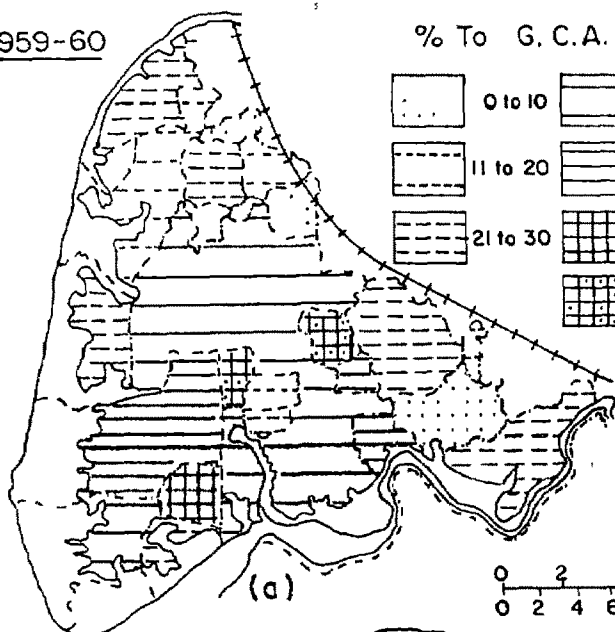
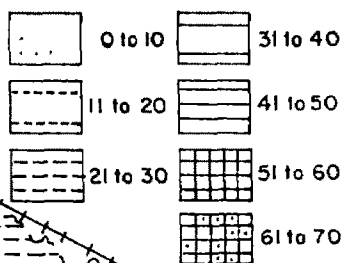
As regards the spatial pattern of change, low level of positive change is seen on the south-east corner on the northern bank of river Dhadhar, whereas very low levels form a small enclave sandwiched between the very low and low levels of negative changes. As regards the negative levels of change, the eastern peripheral villages make an elongated strip of very low and low levels of negative

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## Change in Wheat Cultivation

1959-60

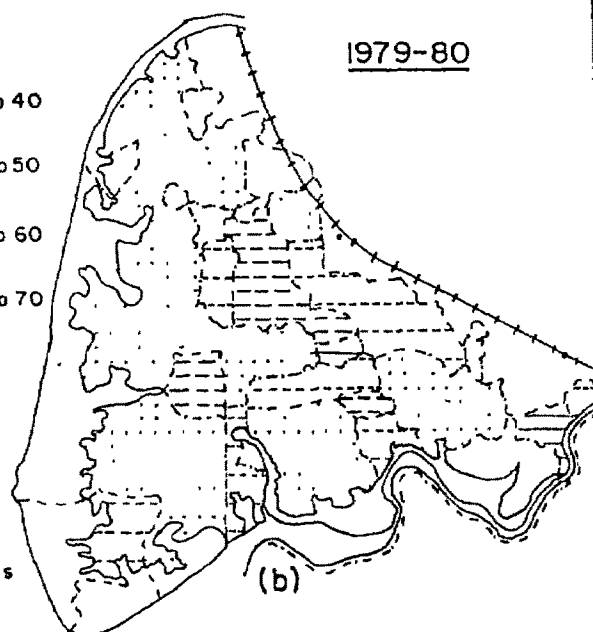
% To G. C. A.



(a)

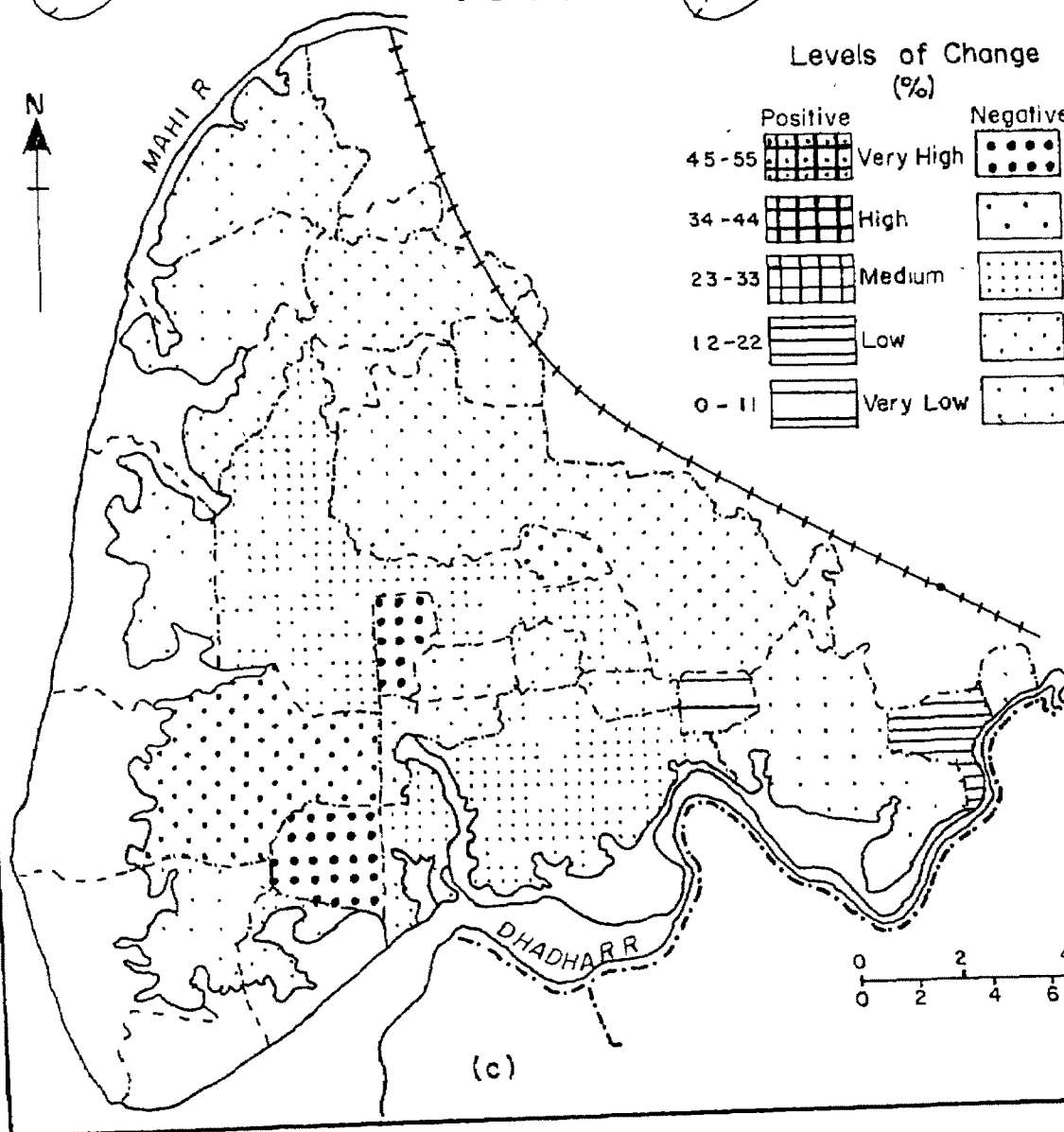
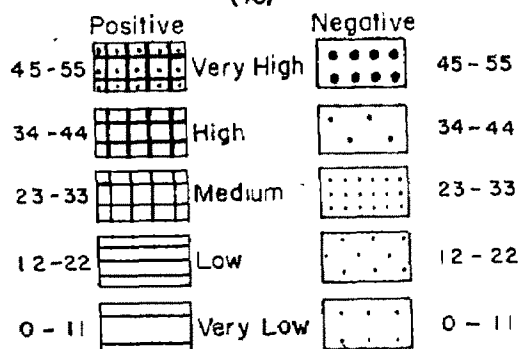
0 2 4 Miles  
0 2 4 6 Km

1979-80



(b)

Levels of Change (%)



(c)

0 2 4 Miles  
0 2 4 6 Km

Fig.4-8

change from Khanpur Deh in the south-east to Degam in the north-west, followed in the immediate western side by a big strip of medium level, enclaving a few small patches of very low, low, high and very high levels; and in the immediate south-west by high and very high levels of negative change. Thus, the overall pattern of change shows that the low and very low levels of changes roughly surround the medium to very high levels from all sides (Fig. 4.8 c).

The overall assessment of the pattern of distribution and change of the cereals and other crops gives the impression that the importance of the commercial crop, cotton, has overwhelmingly increased reducing the formerly significant crop to the lowest significance.

#### 4.9 OVERALL CHANGES IN CROPLAND USE:

The preceding analysis shows that there has been a shift of emphasis in selection of crops throughout, which has, in essence, resulted into the change in the structure of the dynamic mosaic of the cropland use in the study area. This mosaic is composed of the increasing and decreasing crops at the two points of time.

In respect of the total area, three crops - Bajri, oilseeds and cotton - among the eleven identified crops, received the positive push and entered the list of increasing crops. The remaining eight crops - jowar, rice, wheat, kodara, pulses, fodder, grass and tobacco - were among the decreasing crops. As such, each crop experienced either increase or decrease at the village level in 1979-80, over that of 1959-60. It is attempted to compute the average percentage of increase and or decrease of each crop at the village level and diagnose the virtual shift in emphasis.

Table 4.24

Average Gain of the Crops in 1979-80 over 1959-60  
(in per cent)

Crops.	Cotton	Jowar	Oilseeds	Pulses	Fodder	Bajri	Rice	Wheat	Kodara
%	25.32	5.78	5.20	3.81	3.54	1.84	1.47	7.48	0.26
No. of villages.	43	14	17	05	19	12	03	02	06

Cotton received the highest shift of emphasis by gaining 25.32 per cent of G.C.A. in 43 villages. Jowar, oilseeds, pulses, fodder, bajri, rice and kodara also gained in different number of villages in varying percentage. Wheat could gain only in two villages, Kundhal and Vanseta, by 7.48 per cent. In spite of its gain in only two villages, its percentage gain is higher than all other crops, that made it the second ranking crop in most of the villages:

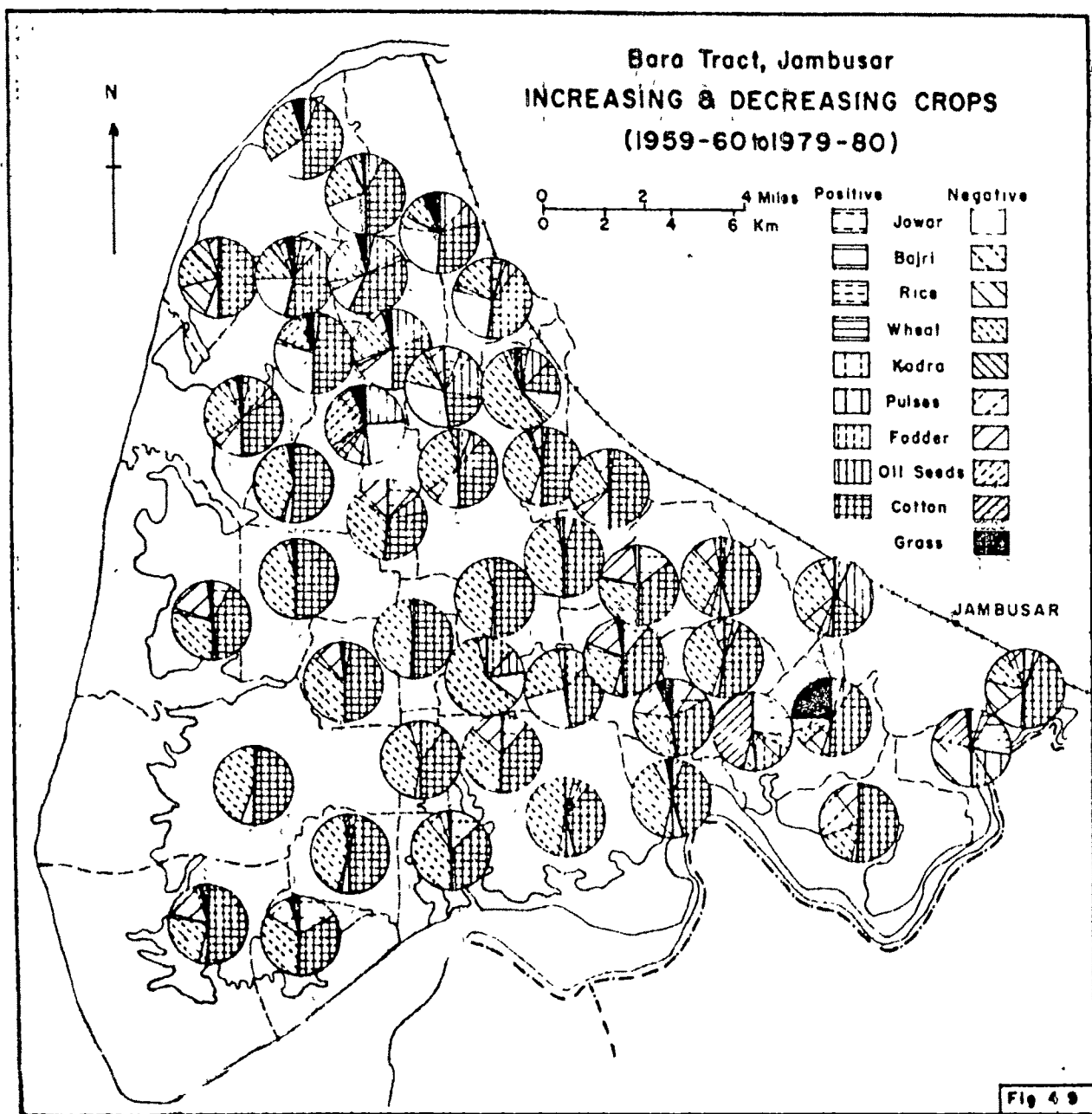
Table - 4.25

Average Loss of Each Crop in 1979-80 over 1959-60  
(In per cent)

Crop	Cotton	Fodder	Oil- seed	Jowar	Bajri	Pulse	Rice	Wheat	Kodara	Grass	Toba- cco.
%	8.30	5.67	2.60	7.29	1.68	2.60	3.93	20.56	1.06	2.21	0.05
No. of villages	03	20	04	20	12	29	17	44	08	24	34

Of the eleven identified crops seven have decreased in their share of G.C.A. But, in fact, each crop has undergone positive and negative changes in different villages. It is only tobacco that has met with absolute decrease both in total share of G.C.A. and in number of villages.

At the lowest level of analysis, it is found that cotton is the only favoured crop having received the greatest advantage of the shift of emphasis. It got increased share of G.C.A. in 43 of the 46 villages, and loss at an average rate of 8.30 per cent in only three villages. Wheat, on the other hand, experienced greatest loss at the average rate of 20.56 per cent in 44 villages, and gain at the average rate of 8.15 per cent in only two villages. Among other crops, fodder, oilseeds, jowar, bajri, pulses, rice, kodara, grass and tobacco, all experienced both increase and decrease at the village level, but Tobacco is the only crop which experienced



decrease both in G.C.A. share and number of villages growing it. But in respect of their share of G.C.A. of the area, only bajri and oilseeds have shown increase, and rest have substantially decreased by the second point of time (Fig. 4.9).

#### 4.10 TOTAL VOLUME OF CHANGE:

The general trend of change indicates that the cropping pattern in the study area moved from diversification of the former point of time to specialization at the latter point of time. In order to compute the total volume of change, when the increased and decreased G.C.A. shares of each crop are worked out the resultant equilibrium is observed, which shows that the shares taken out of the decreasing crops have gone to the increasing crops. For example, the equation of the negative and positive changes in crops at village Asanvad is given below. (After Weaver, 1954).

$$4.9.1 \quad T.V.C. = \frac{C.21.70 + J.5.25 + P.0.20 + B.0.01}{W.19.49 + F.7.21 + T.0.05 + O.0.02 + G.0.39} = \frac{27.16}{27.16} = 27.16$$

Where T.V.C. = Total volume of change, C = cotton, J = Jowar, B = Bajri, W = wheat, F = Fodder, T = Tobacco, O = oilseeds, G = Grass.

All 46 villages show equal values of their numerators, and denominators (percentage of positive and negative changes). The values of numerators are thus taken to indicate the total volume of change, and mapped (Fig. 4.10). Table 4.26 shows the total volume of change of the villages in different percentage categories.

The table gives the relative strength of the villages in terms of their adoptiveness to a total change. The total volume of change in the unit areas (villages) varies between the lowest level (0 - 10 per cent) and the highest level (above 50 per cent). Some villages moderately increased the G.C.A. share under cotton and moderately decreased under other crops, while a few have managed to maintain the balance between cotton and other crops so that they remained at the lower level of the total volume of

change (Fig. 4.10). Some villages like Chandpur Marva and Chandpur Bara have taken the higher side. But the wheat, as observed, remained throughout the second crop, in most of the villages, though somewhere, as in Limaj, oilseeds and cotton surpassed wheat, by a wide margin; such villages made their place in the higher medium level (31-40%). This shows that only four villages (8.70%) were very highly dynamic followed by 6.52 per cent highly dynamic villages. 36.96 per cent had the higher medium level, and 21.74 per cent at the lower medium level; followed by the equal percentage of village in the low level. However, only 4.35 per cent show the lowest level of dynamism. It, therefore, explains the adoptiveness for change in all the villages.

Table - 4.26

Villagewise Values of Total Volume of Change in Cropping Pattern  
Between 1959-60 and 1979-80

% Range	Villages	No. of villages	%
Very Low 0 - 10	Muradpur Neja, Vansets	02	4.35
Low 11-20	Bakarppur Timbi, Hamadpur Kantharia, Jantran, Kaliari, Kava, Nadiad, Sardarpura, Sigam, Thakor Talavdi, Thanava.	10	21.74
Lower Medium 21-30	Asanvad, Dahri, Degam, Dolia, Kalak, Khanpur- Deh, Malpur, Shambha, Vadadla, Zamdi	10	21.74
Higher Medium 31-40	Asarsa, Bhadkodara, Chhidra, Gulal, Islampur Kimoj, Kundhal, Limaj, Madafar, Mahapura Pachakda, Runad, Salehpur Sangdi, Sindhav Singarna, Tankari, Vad.	17	36.95
High 41-50	Chandpur-Marva, Devla, Nada	03	6.52
Very High Above 50	Chandpur-Bara, Kansagar, Kapuria,	04	8.70
Total:	—	46	100

Baratract, Jambusar  
TOTAL VOLUME OF CHANGE  
IN CROPPING PATTERN  
(1959-60, 1979-80)

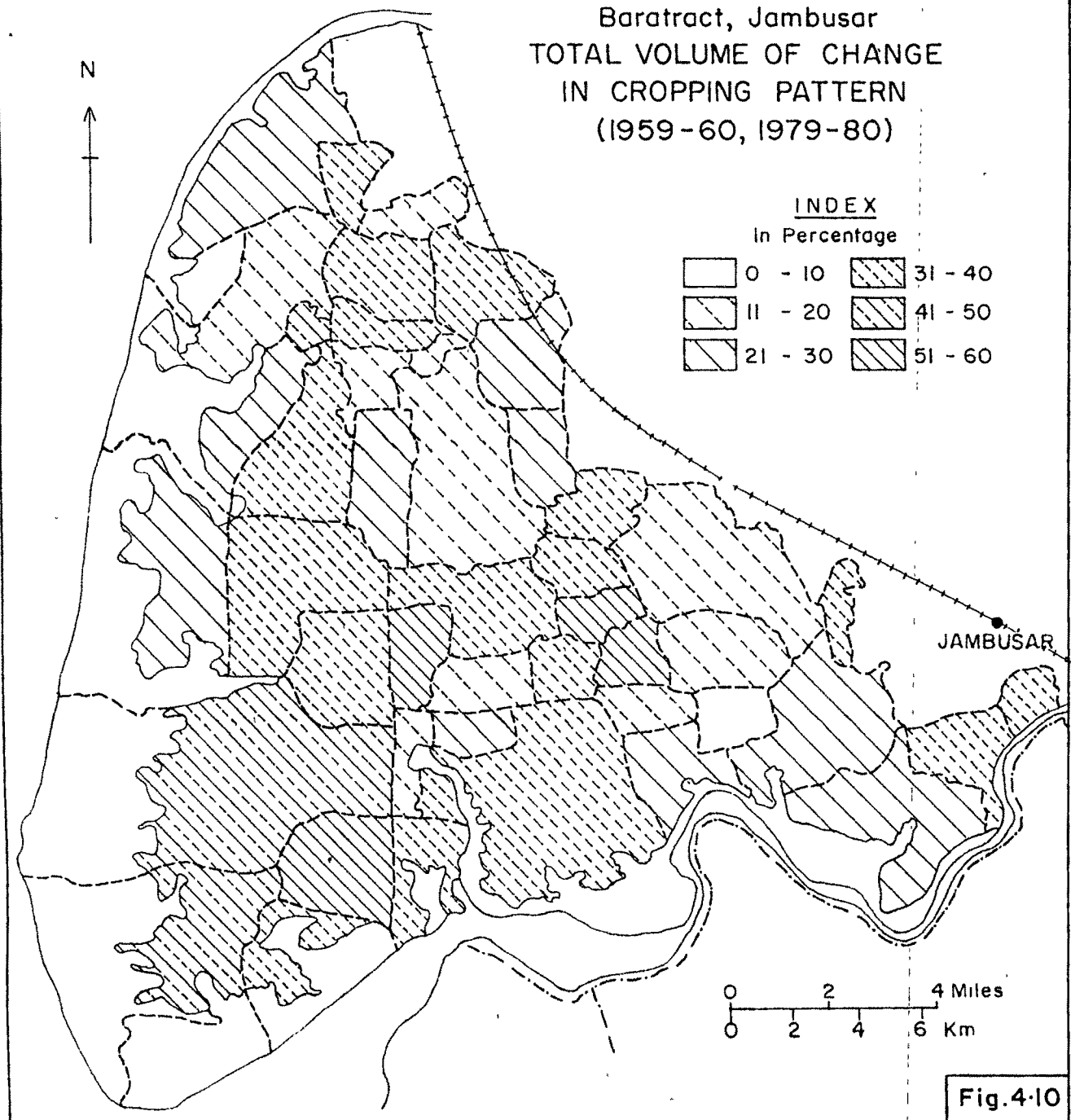


Fig.4-10

However, the overall total volume of change in 1979-80, over 1959-60, was  $\frac{26.92}{26.92}$  per cent which is slightly more than a quarter of the total G.C.A. percentage in which cotton takes a share of 25.52 per cent, leaving 1.40 per cent for other increasing crops. This change, however, may not be taken as a big change in the cropland use of the area. The pattern of increase and decrease of the share of the respective crops in the total percentage of G.C.A. is shown by the following equation:

$$4.9.3 \text{ T.V.C.} = \frac{+ C.25.52 + 0.1.19 + B.0.21}{- J.2.42 + R.1.10 + W.19.88 + K.0.25 + P.1.03 + F.0.81 + T.0.04 + G.1.39} = \frac{26.92}{26.92}$$

Thus, the emerging pattern has been that crops - cotton with the largest share, oilseeds with a minor share, and bajri with insignificant share of G.C.A. have increased in 1979-80, over the previous period under study, while as many as eight crops have lost their percentage shares of G.C.A. in varying degrees as a consequence of the expansion of other crops. Among increasing crops, the major share is gained by cotton while among the decreasing crops the major loss has been experienced by wheat. In short, the total volume of change happened to remain around 27 per cent at the second point of time over that of the first. This may be taken as a normal change in view of the natural constraints faced by the area, increasing demand and attractive prices of cotton.