CHAPTER III

GENERAL LANDUSE

CHAPTER-III

GENERAL LAND USE

3.1 OVERALL VIEW:

"One of the most basic of all geographical problems is how land is allocated among the many human" and also non-human, "activities competing for it". (Conkling & Yeats 1976, p.8). Any aspect of land, moreover, functions as a primary factor of production, revealed in which is the interest of man. In relation to human activities, the land is assigned a host of economic, social and cultural functions, whereas in relation to non-human activities the land is subject to natural phenomena which also serve, or have the potential to serve, the interests of man. The general land use, therefore, comprises occupances both of nature and man. Besides, "change is an ever present feature" in this primary factor of production, for which are responsible, among others, changing population characteristics, technological development, and, sometimes, natural hazards. There ensues a constant competition or conflict between the various uses of land which is the dynamic aspect of land use. Table 3.1 gives an idea of the changing pattern of general land use in the study area:

Table - 3.1

General Land Use

Categories	1959-60		1979-80		Change	
	Area	%	Area	%	Area	%
Land Available for Cultivation:						
1. N.S.A.	34482.37	59.70	35457.76	61.39	+975.39	+1.69
2, The fallow land:						
a. Current fallow	189.57	0.33	201.23	0.35	+ 11.66	+0.02
b. Other fallow	2773.85	4.80	2417.84	4.19	-356.01	-0.62
3. Cultivable waste	165.04	0.29	62.73	0.11	-102.31	-0.18
Land Not Available for Cultivation:						
1. Grazing land	1545.59	2.68	1532.85	2.65	- 12.74	-0.02
2. Mangrove forest	23.71	0.04	23.71	0.04	0.00	0.00
3. Settlement	256.31	0.44	23.71	0.04	+ 23.15	+0.04
4. Transportation Roads & Rlys.	964.25	1.67	942.23	1.63	- 22.02	-0.04
5. Tanks & ponds	565.97	0.98	545.51	0.94	- 20.46	-0.04
6. Kharland & other Wasteland	16552.33	28.66	16054.33	27.80	-498.00	-0.86
7. Other uses	240.31	0.41	241.65	0.42	+ 0.06	+0.01
Total	57759.30	100.00	57759.30	100.00	0.00	0.00

Man's interaction with nature is basically for the economic gains as his livelihood depends on it. It is, therefore, natural, that the largest share of the total land would go for it. Thus, the N.S.A. and current fallow together hold the largest share (59.93% and 61.74% respectively) at both points of time. The increase in its area is natural and linked with the growth of population. The remaining 40.07 per cent and 38.26 per cent respectively were shared by other uses.

The current fallow at both points of time was just insignificant with 0.33 and 0.35 per cent. But the other fallows had occupied 4.80 and 4.19 per cents respectively. The increasing trend is noted in current, and decreasing in the other fallows, which is definitely need based.

Animals have been an integral component of the rural economic activities and thus, they also share the rural land for grazing and other purposes. The total area under grazing land formed 2.68 and 2.65 per cent at both points of time. The negative change is mainly due to certain developmental programme executed in the area and partly due to expansion of the N.S.A. But a meagre 0.03 per cent decrease itself reveals the larger degree of constancy of this use in the rural environment.

The area is devoid of forest cover, as its climatic and soil conditions are not congenial to this type of use. However, a negligible 0.04 per cent of this area (23.71 ha.) under mangrove forests is found near Malpur village where no change has taken place over the two decades.

Human settlements have a tendency to grow. Total area under settlement was 0.44 and 0.48 per cent, showing an increase by 0.04 per cent at the next point of time. However, on an average, each village has extended its area under settlement by approximately 0.50 hectares. All villages except Panchpipla have grown in their population over the study period. Thus the increase in the area under settlement is the natural result of this growth.

Rural transport lines were foot-paths, cart tracks, etc. However, the records show three types : (a) roads, (b) paths leading to fields (Hade Pakdelo Marg), and (c) railways. At the first point of time the total area under this use was 1.67 per cent (including area under railway) in which the share of the field-paths was 1.54 per cent and that of the roads only 0.12 per cent. At the second point of time, the road development programmes led to the decrease of the former by 0.20 per cent and increase in latter by 0.16 per cent, 0.07 per cent under railway remained

unchanged. The railway for obvious reasons is not the popular mode of transport for the area. Roadways are popular and serving almost each village for day-to-day activities. Further, each village is being connected with the main road by an all-weather link road.

Whereas cotton and food grain-growing fertile soils suggest 'why' man lives in this area, the tanks and ponds, especially the tanks, explain 'h ow' man lives in this area. The tanks have been, and are even today, serving as the main source of drinking water supply for men and cattle. They were almost the only source of drinking water for each village for the entire period of study. Thus, they have been one of the most significant features of the humanistic element in the rural landscape. In all, they occupied 0.98 and 0.94 per cent of land at the two points of time respectively. A decrease by 0.04 per cent may not be due to the decrease in the main tanks but in the ponds which were found scattered here and there among the agricultural fields. So far they carry the same significance as they held earlier, as their water is cheap and sweet as compared to tap water.

The struggle between man and nature has been going on since the birth of civilization and would continnue ad infinitum in changing forms. At the first point of time, the dominance of nature, what may be called the deterministic behaviour of nature, was highly pronounnced. As much as 16551.05 ha. (28.65%) of e total area was under the sway of the tidal waves from three sides, north, west and south. This sizeable chunk of land was known as "khar no kharabo" (Kharland). Of late, the land management schemes undertaken by the Kharland Development Board of Government of Gujarat, has put a bar to the spread of the Gulf water by constructing longitudinal dams in north to south, and west to east directions (Fig. 2.7). By this action, the extent of Kharland decreased, by 0.85 per cent (i.e. from 28.65% to 27.80% over two decades). Attempts are on to reclaim more. The reclaimed area is put, or is in the process of being put, to agricultural uses, or, in some cases, to plantations.

Apart from the above stated uses, there are a host of cultural uses of land consolidated under one head and termed as "other uses". The barns, the graveyeards, the cemetries, the garbage dumping grounds, the easing grounds for women (Jajroo)and the schools and playground are among them, Jajroo being a unique element of land use characteristic of this area. In 1959-60, these types of uses collectively occupied an area of 240.31 ha. (0.41%). A slight increase of 0.06 ha. is noted in 1979-80 which is mainly due to the increase of area under schools and playgrounds,which are among the growing phenomena in space under the present days' rural developmental programmes.

An overall view of the change, shows that of the eleven types of uses mentioned, the N.S.A. (1.69%), the current fallow (0.02%) the settlements (0.04%), and the other uses (0.06 ha.) have shown positive changes. The rest have shown negative changes to the level ranging between the lowest 0.03 per cent and the highest 0.85 per cent. This explains the fact that the growing rural population on one hand, and the diversifying occupation on developmental programmes on the other, would have the effect of decreasing the areal extent of most of the uses in future. It is thus, established that each category of the general land use is subject to change over time, some rapid and some sluggish, depending on the prevailing geo-socio-economic factors.

After having an overall view of the changes in the general land use of the area, let us now sharpen our focus and take an intensive look on the changes regionwise and villagewise.

3.2 LAND AVAILABLE FOR CULTIVATION:

3.2.1 Net Sown Area:

The net sown area almost invariably occupies the largest percentage of the land area. Rarely this situation changes as will be evident from the discussion that follows. In 1959-60, all the 46 villages together had 59.70 per cent of the total geographical area under N.S.A.In 1979-80, with an increase of 1.69 per cent it went up to 61.39 per cent, (Fig. 3.1 a & b).

Region I of the study area is located some distance away from the marine influences, and also free from other physical problems. As a result, it had 80.50 per cent of its land area under plough in 1959-60, and 82.22 per cent in 1979-80, which is the largest percentage of all the regions of this area.

Nine of the thirteen villages of this region viz. Chandpur Marva, Gulal, Hamadpor-Kantharia, Kava, Kimoj, Pachakda, Runad, Salehpor-Sangdi and Shambha have shown more than 85 per cent of their N.S.A.under this use at both points of time. The remaining four villages varied in percentage due to their physical problems i.e. wasteland and creek. Thus, Vadadla had around 85 per cent, Kalak, Sigam and Limaj (due to creek and wasteland) ranged between 55 and 70 per cent in 1959-60. The levels of these villages changed at the next point of time in which Limaj and Vadadla with their respective increases of 31.26 per cent and 0.58 per cent joined the rank of the first nine villages. Kalak went up to the range of 70-85 per cent. Sigam, inspite of the increase by 3.89 per cent, remained in its former range. The first nine villages having maintained their levels, have increased their N.S. A. by a minimum of 0.32 and a maximum of 1.96 per cent, except Chandpur-Marva and Salehpor Sangdi, where no dynamism is observed.

Thus, it is the distinctive geographical location of this region (Fig. 2.6) which enabled it to occupy the largest percentage of land area under N.S.A.

Region II, being placed in the middle, has some similar, some dissimilar conditions to that of Region I. It is haunted by the tidal currents of River Mahi in the north and the River Dhadhar in the south. Further, the backwater creeks penetrating deep into this region have taken tolls of the large chunks of area in different villages. This has resulted into lesser percentages of area under N.S.A. In all, in 1959-60, the N.S.A. was only 64.33 per cent which moved up to 65.76 per cent in 1979-80. It showed 20.84 and 20.45 per cent of land under waste and kharland, that resulted into smaller shares available to N.S.A. However, it is not true for all the villages of this region.

An eye on the villagewise position of N.S.A. reveals that twelve villages, viz., Chandpur Bara, Chhidra, Dahri, Jantran, Kaliari, Kansagar, Madafar, Nadiad, Panchpipla, Sindhav, Singarna and Thanava, held upper most level of above 85 per cent at the first pint of time. They were followed by six villages, viz., Bhadkodara, Kundhal, Mahapura, Sardarpura, Vad and Vanseta, in the next range of 70-85 per cent . Two villages, Bakarpur Timbi and Muradpur Neja, were placed in the subsequent range of 55-70 per cent while two villages Dehgam (influenced by tidal ingress through Mahi) and Khanpur Deh (influenced by Dhadhar), were placed in lowest range of below 40 per cent.

In 1979-80, only Vad went up to the highest range, the others with slight increase or decrease, remained confined to their respective levels. So, on the whole, this region showed the least dynamics in its land uses.

Region III being smallest in number of villages, and largest in terms of its geographical area should have the largest percentage under N.S.A. But owing to its geographical location on and near the coastal littoral and riverine margins, a very high percentage of land, 43.92 and 41.38, both in the west and south, remains as kharland leaving smaller share of N.S.A. In 1959-60, of its 23793.72 ha. of land area, 10898.42 (45.80%) could be brought under plough. In 1979-80, an increase of 510.67 ha. (2.15%) could be made to raise it to 47.95 per cent. This shows that the N.S.A. remained confined to less than 50% at both points of time.

But, not all the villages of this region are equally at the disadvantageous position. In 1959-60, those lying in the upper parts, viz., Asanvad and Kapuria, ranged between 70-85 per cent, Dolia and Thakor Talavdi between 55-70 per cent; while Asarsa, Malpur and Nada were listed in the lowest range of below 40 per cent.

By 1979-80, the positive changes took place in a few villages. Kapuria went up to the upper most range by adding 5.48 per cent, Thakor Talavdi with 4.47 per cent joined Asanvad in the adjacent range of 70-85 per cent. The remaining villages maintained their

former level, even though, insignificant negative and positive changes did take place withhin them as Tankari (3.05%), Zamdi (2.20%), Nada (1.34%), Asanvad, Devla, Islampur and Malpur with less than one per cent were on the gaining side while Asarsa (0.02%) and Dolia (0.2-%) were the loosers in their N.S.A. over the base year. The decrease in Asarsa was owing to the increase in its fallow, and in Dolia owing to the extension of field paths (Hade Pakdelo Marg).

The increase in net sown area is linked with the increase in population and diffusion of agricultural innovations, which are seen in the form of improved seeds, fertilizers, the improved means of cultivation and the allocation of land to landless people. However, population pressure is above all the most significant factor.

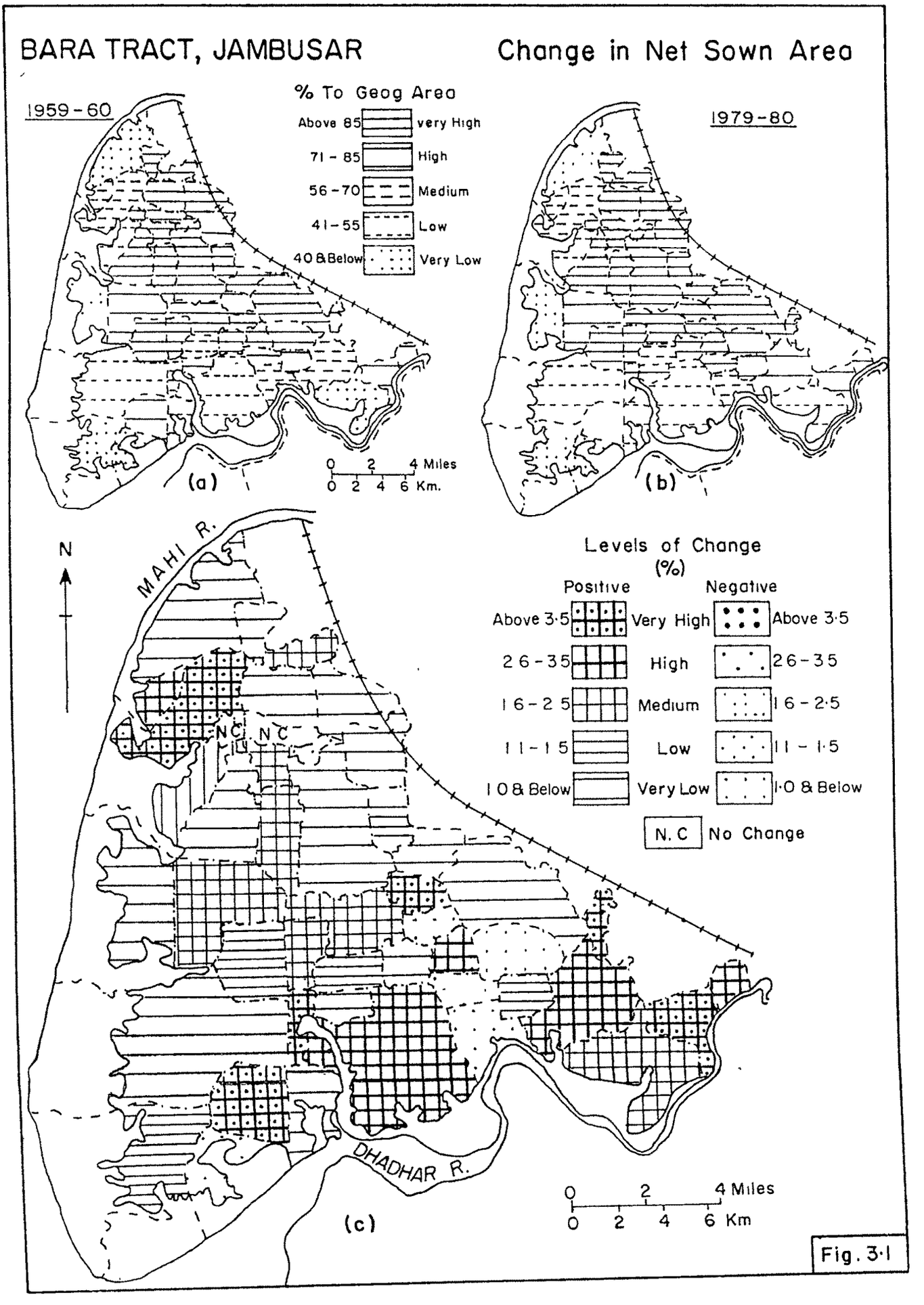
As such, no significant spatial pattern of change emerges (Fig. 3.1 c). All levels are interspersed. However, medium to very high (i.e. from 1.6 to 2.5% to above 3.5%) level changes are seen in Sigam in the north-west, Kapuria in the south, Vad in the middle, Limaj and Kundhal in the south-east, Tankari in the mid-south and Khanpur Deh in the down south-east. Medium to low and very low levels are scattered in patches all over the area.

Barring Nadiad, Vanseta and Dolia, where a negative change between very low and low levels took place, the southern riverine margin gives a pattern of change ranging between very low (below 1.0%) andvery high (above 3.5%). The central low land from Malpur and Zamdi in the west to Kava, Pachakda and Shambha in the east shows the change between very low (Malpur, Zamdi, Chhidra, Jantran, Kava and Shambha) to very high (Bhadkodara, Dahri, Kansagar, Bakarpur Timbi, Madafar, Singarna, Chandpur Bara, Pachakda, Shambha and Vad). In this part only Panchpipla showed a negative change of very low level (below 1.0%). The northern villages show very low to very high level of change, barring two of them viz. Chandpur Marva and Salehpur Sangdi, where no change did take place (Fig. 3.1 c).

Table - 3.2

Villagewise share of N S A (1959-60 and 1979-80)

1959-60	Upto 3.00	30.1 - 50.00	50.1 - 70.00	70.1 - 90.00	Above 90.00	Total
Upto 30.00	Dehgam, Nada(02)	-	-	-	-	02
3.1-50		Asarsa,Khanpur Deh, Malpur Tankari,Zamdi(05)	-	-	-	05
50.1-70		Islampur(01)	Bakarpur Timbi Devla, Dolia, Muradpur Neja Sigam (05)	-	-	06
70.1-9			Kalak, Limaj Thakor Talavdi (03)	Asanvad, Bhadkodara, Chhidra,Jantran,Kapuria Kava,Kundhal,Hamadpur Kanthari,Madafar,Mahapura Nadiad,Pachakda,Sardarpura Thanava,Vadadla,Vanseta (16)	-	19
Above 90				Chandpur Bara,Dahri Gulal, Kaliari,Kansagar Vad, Shambha (07)	Chandpur Marva, Kimaj Runad, Panchpipla, Salehpor Sangdi,Sindhav, Singarna(07)	14
Total:	02	06	08	23	07	46


BARA TRACT, JAMBUSAR
Change in Net Sown Area
1959-60
% To Geog Area
Above 85 very High
71 - 85 High
56 - 70 Medium
41 - 55 Low
40 & Below Very Low
0 2 4 Miles
0 2 4 6 Km.
(a)
1979-80
(b)
N
MAHI R.
N.C
N.C
Levels of Change
(%)
Positive
Negative
Above 3·5 Very High Above 3·5
2 6 - 3 5 High 2 6 - 3 5
1 6 - 2 5 Medium 1 6 - 2·5
1 1 - 1 5 Low 1 1 - 1·5
1 0 & Below Very Low 1·0 & Below
N. C No Change
DHADHAR R.
0 2 4 Miles
0 2 4 6 Km
(c)
Fig. 3·1

The reason for the mixed pattern of negative and positive change in the net sown area over the area may be sought in the amount of fallow land with each village, and the reclamation from the wastelands over the temporal span of two decades.

3.2.2 The Fallow Land:

In the village cadastre two types of fallow lands are usually recorded: (a) Current Fallow, and (b) Other Fallow. The current fallow is more well defined, which is applied to only those left over fields which for some reason, have not been cultivated during the current agricultltural season. But the fallows of five year or more fall into the category of 'other fallow'. Thus, it is time factor that converts the current fallow into other fallow. The following discussion pertains to these two types of fallow lands.

In 1959-60, both current and other fallows amounted to 2963.42 ha. (5.13%) in which the share of curretnt fallow was 189.57 (0.33%) only and that of other fallow 2773.85 (4.80%) which was about fifteen times more than the former. In 1979-80, the total fallow decreased by 344.35 ha. (0.60%) which of course is a healthy sign of growth. The average share of this area per village comes to 7.49 ha (0.01%) whereas the population has increased by 13932 (38.41%) and the average per village increase of population was 303 persons. However, the share of current fallow went up to 201.23 (0.35%) and that of other fallows decreased to 2417.84 (4.19%) which is 0.61 per cent less than the former. (Fig. 3.2 a & b).

(a) Current Fallow:

In the area with extensive type of cultivation, keeping fallow is not a general practice. However, the little percentage of fallow land is seen either due to paucity of rain or to the poverty of the farmer and partly due to rotation.

However, the figures of the other fallow are high in each region. Table 3.3 shows the comparative figures of current fallow and other fallows for each region at the two points of time.

Table - 3.3

Regional Pattern of Change in Fallow Land
(1959-60 and 1979-80)

Regions	1959-60						1979-80					
	CF		OF		Total		C.F.		OF		Total	
	Area(ha)	%	Area(ha)	%	Area(ha)	%	Area(ha)	%	Area(ha)	%	Area(ha)	%
I	29.39	0.28	770.27	7.40	799.66	7.69	22.07	0.21	630.02	6.06	652.09	6.27
II	80.65	0.34	1679.91	7.13	1760.56	7.47	45.73	0.19	1548.26	6.57	1594.24	6.73
III	79.53	0.33	323.67	1.36	403.20	1.69	133.43	0.56	239.56	1.01	372.99	1.57
Total:	189.57	0.33	2773.85	4.80	2963.42	5.13	201.23	0.35	2417.84	4.19	2619.07	4.54

In 1959-60, total area under current fallow was 189.57 ha. (0.33%) only. The average share of fallow land in each village amounted to only 4.03 ha. (0.003%). In 1979-80 the area under it increased by 11.66 ha. (0.02%). Theaverage current fallow in each village was 4.37 ha. (0.003%). The N S A over the two decade period increased by 975.41 ha. (1.69%) and the fallow increased only by 11.66 ha. (0.02%) which is so negligible a figure to reckon with (Fig. 3.2 a & b).

However, the current fallow in its regional and villagewise perspective needs a brief accounting.

In 1959-60, Region I with its relatively better conditions, particularly in terms of its soils (Ankhi Haldar type), had 20.39 ha. (0.28%) fallow with the average of 2.26 ha. per village. Region II mostly with the Degam Series had 80.65 ha (0.34%) having an average of 3.66 ha. per village while Region III with its Balota Onjal series and, at places Degam series, had 79.53 ha (0.33%) giving an average of 7.33 ha. per village. These figures show the position of fallowing in each region under the existing situation.

In the year 1979-80, the decadal increase in population had the effect of decreasing the area under current fallow in Region I and II by 7.39 ha. (0.07%) and 34.93 ha. (0.15%) respectively, but increasing by 53.90 ha. (0.23%) in region III.

Of the 13 villages of Region I, nine villages in 1959-60 and nine villages in 1979-80 did not have current fallow. Among the rest of the four villages, at the first point of time, Kalak (18.59 ha - 1.14%) (plate 5), Sigam (6.60 ha - 0.36%) and Runad (3.82 ha - 0.43%) had higher areas and Gulal had negligible area (0.38 ha - 0.09%). In 1979-80, among the former four, two villages - Gulal and Kalak - showed decrease by 0.05 per cent each. The other two - Runad and Sigam - recultivated them but two other villages - Limaj and Pachakda - emerged with 0.87 ha. (0.41) and 3.41 ha (0.61%) respectively.

In Region II, six villages at the first, and 11 villages at the second point of time had no fallow. In 1959-60, Bakarpur Timbi had 10.23 ha (1.23%) followed by Dahri (8.50 ha - 1.06%), Khanpur

Deh (8.27 - 0.29%), Vanseta (8.11 ha - 2.11%), Kundhal (7.47 ha - 1.09%), and Vad (7.11 ha - 1.41%). Others ranged between 0.36 ha (0.03%) in Chhidra and (5.67 ha (0.67%) in Nadiad.

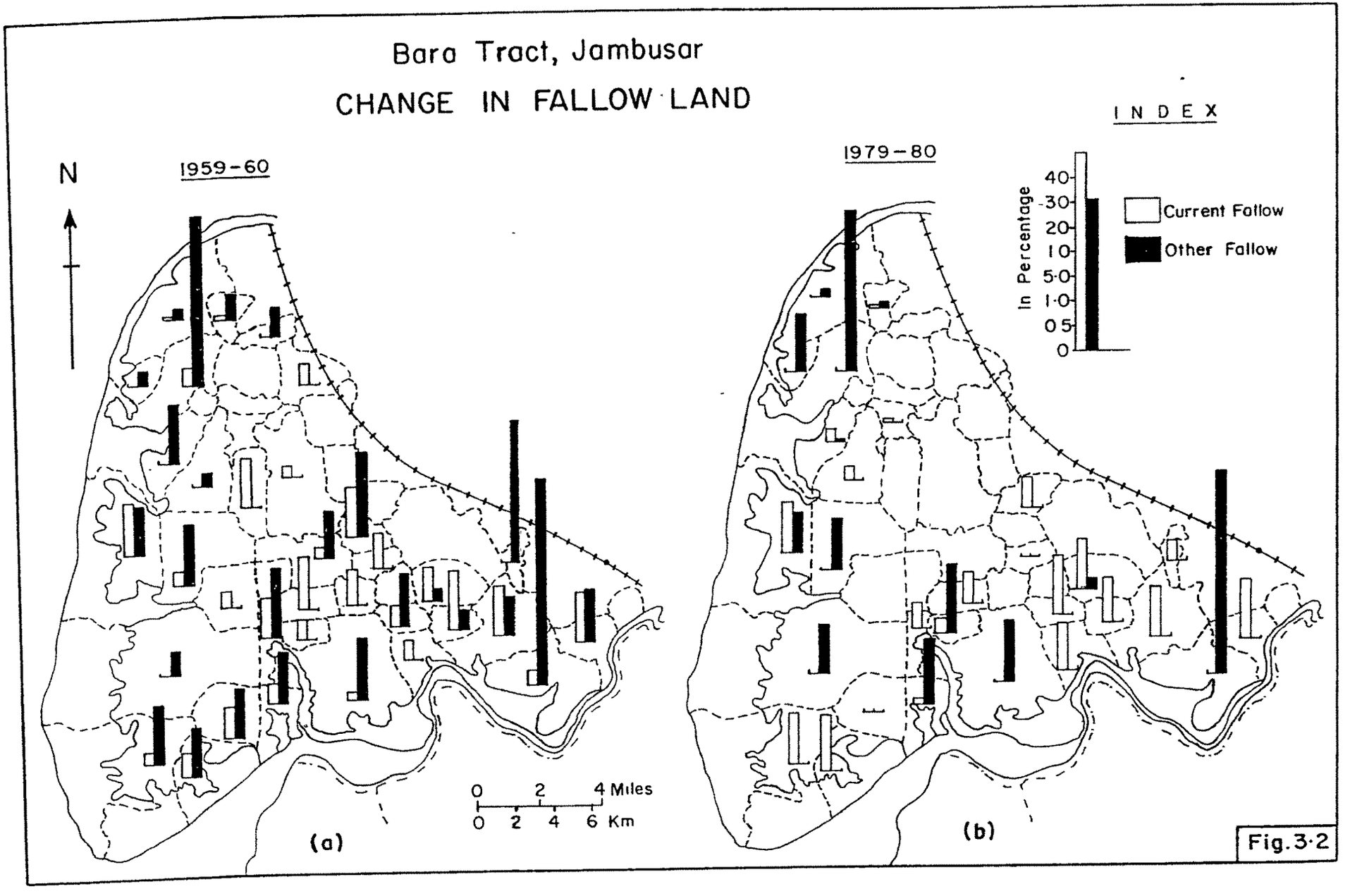
In 1979-80, the total current fallow decreased by 56.70 per cent in area, and 50 per cent in terms of the villages. However, Kundhal showed an increase of 7.93 ha (106.16% of that of former year), Nadiad showed an increase of 94 per cent, and Sardarpura to 345.16 per cent. Chhidra also increased by 3.87 ha. Thus, of the 16 villageshaving current fallow in 1959-60, seven have totally used it up in 1979-80. Of the remaining nine villages, five showed decrease between 1.03 ha. in Degam and 7.88 ha (1.20%) in Bakarpor Timbi, Muradpur Neja (0.05 ha), Kaliari (0.28 ha) and Thanava (0.31 ha) were the new entrants, the rest showing increase in fallow land.

In 1959-60, the eleven villages of Region III had the current fallow varying between 0.02 ha. in Zamdi to the maximum of 38.49 ha. (1.25%) in Malpur. Devla did not have current fallow at all. In 1979-80. Devla remained out of the scene, Asanvad, Islampur, Kapuria and Thakor Talavdi had decreased hectarage verying between the smallest 0.02 per cent (Kapuria) and the biggest 0.52 per cent (Thakor Talavdi), Asarsa, Dolia, Malpur, Nada and Zamdi were in the ascending order, with the lowest of 4.38 ha. (0.27%) in Zamdi and the highest of 52.50 ha (1.43%) in Nada. It is only Tankari that had left no fallow, and entirely used up the former 7.07 ha. (0.15%) of fallow. In all, this region has also shown increase in the current fallow by 0.23 per cent.

A view over the spatial dimension of change in nut shell exhibits that the villages placed on the upland parts have attempted to bring under plough as much land as possible and thus a majority of them have shown decrease of current fallow in varying percentages, while those towards the low lying riverine and coastal littorals have shown increase (Fig. 3.2 b).

(b) Other Fallow:

As defined by the revenue manual, the other fallow is that current fallow which lies uncultivated for five years or more. But


Bara Tract, Jambusar
CHANGE IN FALLOW LAND
N
1959-60
1979-80
INDEX
In Percentage
40
30
20
10
5·0
1·0
0·5
0
Current Fallow
Other Fallow
0 2 4 Miles
0 2 4 6 Km
(a)
(b)
Fig.3·2

loosely, often the wasteland has also found its place in the line of this fallow as in the case of Khanpur Deh.

Region II with its highest figure 1679.91 ha (7.13%) surpasses all, followed by Region I (770.27 ha - 7.40%) and the Region III (323.67 ha - 1.36%) in 1959-60. In 1979-80, it declined in all regions as against the current fallow which increased. With a decrease of 131.65 ha (0.56%) the Region II maintained its highest rank followed, in order, by Region I with a decrease of 64.23 ha. (3.53%) and Region III with 84.11 ha (0.35%).

In the villagewise scenario of Region I, seven villages, viz. Chandpur Marva, Kava, Kimoj, Pachakda, Salehpor Sangdi, Shambha and Vadadla, had no other fallow at any point of time. Among the remaining six, the hectareage varied between the lowest 0.11 ha (0.01%) in Runad and highest 693.76 ha (38.16%) in Sigam. By 1979-80, all villages, save Gulal and Sigam, recultivated this land. Gulal left only 0.49 ha (0.12%) but Sigam could use only 64.23 ha (3.53%) of its 693.76 ha. (38.16%).

In Region II most of the villages have attempted either to eliminate or to reduce it. But some cases of increase are also seen. Of the 22 villages, ten did not have it at any of the two points of time, another seven of the remaining twelve villages joined them at the next point of time. The level of decrease among the villages varies between the lowest 0.14 ha (0.02%) in Nadiad and the highest 45.12 ha (2.33%) in Bhadkodara. Thus, barring Bhadkodara, Degam, Khanpur-Deh, Muradpur-Neja, and Nadiad, all other villages (17) have used this land for crop growing. However, Muradpur-Neja is the only village of this region where this form of land has increased from 1.40 to 9.47 ha. (0.29 - 1.99%). This was owing to the spillover of saline water (tidal ingress) over an area of 9.86 ha. (1.86%). However, of the former area ofthe other fallow, 0.79 ha. seems to have been used for cultivation.

In Region III, four villages (27.27%) - Asarsa, Kapuria, Nada and Thakor Talavdi - have totally used up their other fallow land ranging between 1.06 per cent in Kapuria to 4.15 per cent

in Thakor Talavdi. Another three villages - Malpur, Tankari and Zamdi - have partially used it, which varies between 0.01 per cent in Tankari and 1.81 per cent in Zamdi. But four villages - Asanvad, Devla, Dolia and Islampur - have shown increase in area under this use. Asanvad and Dolia are new entrants with 3.92 per cent and 0.02 per cent respectively. Thereof, Devla's fallow increased to about the double of its previous one, as 58.87 ha. (1.04%) was affected by the tidal spillover likethat of Muradpur-Neja; Devla used almost all of its previous fallow land, leaving only about 57.28 ha (1.01%), Dolia left only 0.13 ha. a negligible figure, but Islampur went up from 13.58 ha. in 1959-60 to 41.75 ha. in 1979-80, in which 22.52 ha (2.03%) was cultivable, while the rest was under the process of being improved for cultivation as it was the reclaimed area.

Inspite of the increase in the other fallow land, the net sown area in Asanvad, Devla and Islampur have increased by 0.36, 0.76 and 0.90 per cent respectively, while in Dolia it decreased by 0.20 per cent, due to its increased current fallow by 0.55 per cent. In most of the villages the area under other fallow is either fully or partially used mainly for cultivation, which is substantiated by the increased N S A of thesevillages.

In all, Region III has also shown decrease in area under other fallow from 323.67 ha. (1.36%) to 239.56 ha. (1.01%) during the period which itself explains the increasing pressure of population.

3.2.3 Culturable Waste:

In 1959-60, the area of land accounted under this sub-category was only 165.04 ha. (0.29%). By the next point of time it remained only 72.73 ha. (0.11%) and the rest was brought under cultivation.

Like other categories, this is also not free from regional variation. Earlier Region II had the largest area of 90.61 ha. (0.38%) followed by 49.33 ha. (0.47%) of Region I, and 25.10 ha. (0.11%) of Region III. By the second point of time, its area was reduced to 13.25 ha. (0.13%) in Region I, 26.08 ha. (0.11%) in Region II and 23.40 ha (0.10%) in Region III.

As compared with other two regions, Region III has reclaimed only 1.70 ha (0.01%) of its culturable waste over a period of two decades.

In 1959-60, the areas under culturable waste in the villages of Region I ranged between 0.02 and 2.17 per cent, which declined to 0.01 and 0.56 per cent by 1979-80.

Similar decreasing trend is seen in the villages of Region II where the Range of the area under this use was reduced from 0.28 and 4.98 per cent in 1959-60 to 0.04 and 3.16 per cent in 1979-80, alongwith the number of villages having this use coming down from 13 to nine. However, Sardarpura and Vanseta are the exceptions where land under this use has increased. Sardarpura emerged with 1.63 ha. (0.41%) in 1979-80, which may be attributed to the severe drought of the year 1974-75, when 49.22 ha. (12.36%) of the N S A was left out uncultivated as a result of which its N S A decreased by 1.39 per cent. In Vanseta, its area increased from 2.89 ha. (0.75%) in 1959-60 to 5.13 ha (1.33%) in 1979-80. The increase of 2.24 ha. (0.58%) seems to have been balanced by the areas reclaimed from other uses.

In Region III, in 1959-60, only Malpur (1.70 ha 0.06%) and Nada (23.40 ha - 0.64%) had cultivable waste. By 1979-80, Malpur absorbed it completely into its N S A while Nada maintained the status quo, inspite of 1.34 per cent increase in its N S A. It shows that this increase was at the cost of the fallow land of the previous year.

The overall trend of decrease in all the regions, excepting the three villages, reveals the declining nature of such ueses. Other things being equal, the increasing population is that forceful factor which compells bringing more area under cultivation than leaving it useless. Thus, the future would bring still more areas under plough and other relevant uses than leaving them in the categories of wastes or unused lands.

3.2.4 Peta and Pot Kharaba:

"Peta Kharaba" is the sub-category of wasteland that lies near the streams, roadside, etc. "Pot Kharaba" is that land which is kept out of any specific use by the farmer, such as the land

around the wells, or around the huts erected by the farmers to keep watch on their crops. Both these sub-types of wasteland are subject to frequent changes depending on the increasing demand of land.

In 1959-60, Region I had only 0.20 per cent of this type of land. It further dropped to 0.08 per cent in 1979-80. It was 11.17 per cent and 1.06 per cent in Region II at the two points of time (plate 6). Region III had only 0.17 per cent at the first and only 0.14 per cent at the second point of time. It can be converted to productive land as and when the farmers need it. The tendency among the farmers is to leave as little land under this category as possible. Hence, the downward trend in all the three regions.

3.3 LAND NOT AVAILABLE FOR CULTIVATION:

All the land area not categorized as cultivated and assigned other functions are included in this broad category. They are put to the following uses:

3.3.1 Grazing Land (Hindi: Gaucher, Gujarati: Dhorcharan):

That piece of land on which the domesticated animals are allowed to graze is called grazing land or "Gaucher". However, the increasing temptation of man to grab more and more land for cultivation is working against this privilage of animals. Though, mechanization of agriculture is gradually reducing the number of farm oxen, the increasing requirement of milk tends to increase the number of milch cattle which require the retention, and perhaps, enlargement of grazing land in the rural areas.

Like other uses of land this is an important feature of the land use system of the study area. All the 46 villages, irrespective of their geographical area, have allotted a sizeable portion of the land, with variation of course, to this use. The grazing land in 1959-60 occupied 1545.59 ha. (2.68%) of the total area which came down to 1532.85 ha. (2.65%) in 1979-80 showing a decrease of only 12.74 ha. (0.03%). (Fig. 3.3 a & b).

The regionwise distribution of the grazing land (Table 3.4) seems quite disproportionate. Region I being the smallest in terms of area (i.e. 18.01% of the total area), had 3.38 and 3.20 per cent of its area under this use at the two points of time. Region II, the second largest in area (i.e. 40.80%) and largest in respect of number of villages (22) had 2.86 and 2.72 per cent of its area; and Region III, the largest in area (41.19%) and smallest in respect of number of villages (11) had 2.19 and 2.31 per cent.

Table - 3.4

Percentage of the land areas of Regions and their uses
1959-60 - 1979-80

Regions/Year	%total area	Av.% of N S A	% of waste land	%of Grazing land to area of the region.	% of grazing land to total area.
I 1959-60	18.01	83.09	3.06	3.38	0.61
1979-80	18.01	86.50	2.82	3.29	0.59
II 1959-60	40.80	79.08	21.15	2.86	1.17
1979-80	40.80	80.79	20.86	2.72	1.11
III 1959-60	41.19	52.75	47.29	2.19	0.90
1979-80	41..19	54.49	45.59	2.31	0.95

The table also shows atleast some relationship between the area under wasteland and the grazing land. Region I has the lowest proportion of area under wasteland and the highest proportion of area under grazing land, while Region III has the highest proportion of area under wasteland going with the lowest proportion of area

given to grazing land and Region III standing in between. But the proportions are not commensurate with the magnitude of variation. In Region I both wasteland and grazing land stand on almost equal footing, in Region II, the wasteland is ten times larger and in Region III it is more than twenty time larger. This is on account of very extensive areas of Kharland (saline waste) in Region II and III.

Another feature discernible from the table is the decreasing trend in the grazing land in Regions I and II, and increasing trend in the case of Region III, even though slightly. This may be attributed to the reclamation of Kharland (saline wasteland) in Region III, as grazing land, before being brought under plough. Besides, the trend in all the three regions, in respect of the wasteland is downward, so is the trend in respect of the grazing land except in Region III where it is upward. This may be attributed to increase in the proportion of land under N S A, which seem to be at the cost of the grazing land.

Looking at the villagewise distribution of and change in grazing land, it is found that in Region I, it ranges between 0.86 per cent in Chandpur-Marva and 6.30 per cent in Limaj. Six villages - Chandpur Marva, Gulal, Hamadpur Kantharia, Kimoj, Runad and Sigam - show no change. The remaining seven villages - Kalak, Kava (plate 15), Limaj, Pachakda, Salehpur-Sangdi, Shambha and Vadadla - show the decrease ranging between 0.01 per cent in Kalak and 0.42 per cent in Vadadla.

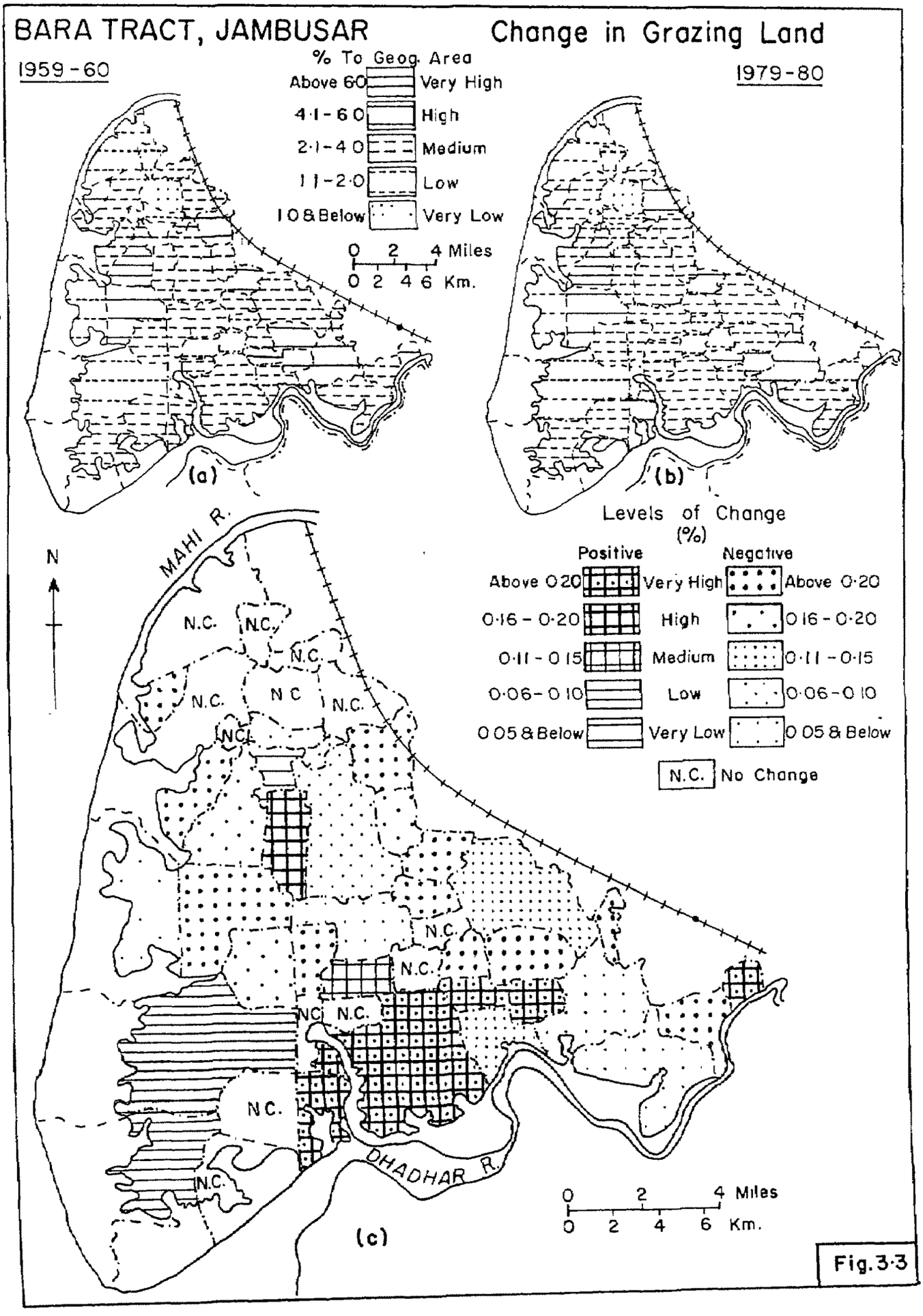
In Region II, the lowest percentage of 1.08 was in Degam, and the highest 8.05 in Thanava in 1959-60, and 1.08 in Degam and 8.00 in Thanava in 1979-80. Degam, Panchpipla and Singarna show no change, the remaining nineteen villages show both increase and decrease in small percentages. Kaliari, Dahri, Bakarpur Timbi, Mahapura, Vanseta and Sardarpura show an increase between the lowest 0.02 per cent in Kaliari and the highest 1.36 per cent in Sardarpura. The remaining nine villages show a negative change between 0.01 per cent in Khanpur Deh and 2.37 per cent in Kundhal.

Table - 3.5

Position of villages in Grazing land in 1959-60 and 1979-80

(in per cent)

1959-60 / 1979-80	0 - 1.00	1.1 - 3.00	3.1-5.00	5.1 - 7.00	Above 7.00	Total
0 - 1.00	Chandpur Marva Kimoj, Thakor Talavdi(03)					03
1.1 - 3.00	—	Bakarpur Timbi,Chand-Bara, Degam, Dahri Gulal, H.Kantharia Kaliari,Kansagar Khanpur Deh,Madafar Panchpipla, Runad S.Sangdi, Sigam, Singarna,Shambha, Devla,Kapuria,Malpur, Nada,Tankari, Sindhav,Vad (23)	Kundhal, Zamdi (02)			25
3.1 - 5.00	—	—	Asanvad,Asarsa, Bhadkodara,Dolia Islampur,Jantra, Kava, Nadiad Pachakda (09)	Vadadla,Muradpur Neja (02)		11
5.1 - 7 .00	—	—	Mahapura,Sardarpura Vanseta (03)	Chhidra, Kalak Kimoj (03)		06
Above 7.00	—	—	—	—	Thanava(01)	01
Total:	03	23	14	05	01	46


BARA TRACT, JAMBUSAR
Change in Grazing Land
1959-60
1979-80
% To Geog. Area
Above 60 Very High
41-60 High
21-40 Medium
11-20 Low
10 & Below Very Low
0 2 4 Miles
0 2 4 6 Km.
(a)
(b)
Levels of Change
(%)
Positive
Negative
Above 0·20 Very High Above 0·20
0·16 - 0·20 High 0·16 - 0·20
0·11 - 0·15 Medium 0·11 - 0·15
0·06 - 0·10 Low 0·06 - 0·10
0·05 & Below Very Low 0·05 & Below
N.C. No Change
N
MAHI R.
DHADHAR R.
N.C.
(c)
0 2 4 Miles
0 2 4 6 Km.
Fig. 3·3

In Region III, Thakor Talavdi with its lowest 0.39 per cent and Islampur with its highest 3.96 per cent set the range of distribution of this use in 1959-60, and with 0.39 per cent and 4.19 per cent for 1979-80. Four villages - Asanvad, Asarsa, Kapuria and Thakor Talavdi kept it unchanged. Devla, Nada, Islampur and Tankari went up by the lowest (0.06%) in Nada and the highest (0.68%) in Tankari. Dolia, Malpur and Zamdi represent the negative change between the lowest (0.04%) in Malpur and the highest (0.96%) in Zamdi.

In grazing land, however, a trend of decrease is discernible. (see Table 3.5). 23 villages (50%) are showing decrease and only ten villages (22%) showing increase, while 13 villages (28%) remained unchanged. With the increasing population, on the one hand, and the cultivation of improved varieties of grass on the other hand may lead to a further decrease in the area under this use in future. The increasing use of farm machinery, especially, tractors, is reducing the number of oxen - as people say that the perpetual cost of maintenance of animals is higher than the hired tractors. Thus, this techno-economic factor is not the least important in assisting to predict a further fall in the area of grazing land (Fig.3.3 c).

3.3.2 Forest:

Being salinity riden this area is deprived of any forest in true sense of the term. Only short statured acacious bush type trees are seen scattered over the area. From its appearance, vegetationally, the area looks like a desert. However, a small piece of land covering 23.71 ha. (0.04%), called as mangrove forest, is seen on the coastal marshes of the village Malpur in Region III. No change is noticed in its areal extent over the temporal span of study.

3.3.3 Settlements:

Patterns of human settlement vary significantly according to complex and inter-related historical, cultural, political, economic, geographic and demographic factors". (Hansen 1978).

In the light of the above statement, if the analysis of the settlements of the study area be made, a clear impact of the geographic factors in their locations is discerned. The northern and upper central parts of the area display nucleated pattern with small villages both in area and population. Degam is an exception. The eastern, western and southern parts, with a few exceptions, show dispersed pattern with villages of bigger extent and larger population. The lower central part again shows the nucleation (Fig. 2.2). The main reason for this concentration and dispersion is the quality of soils and the problem of drinking water.

A glance at the areal extent of the villages of each region shows that, Region I has 13 villages of which only one village - Chandpur Marva - has no settlement site. It had its settlement site prior to 1959-60. But because of the problem of drinking water as a consequence of the drying out of the tank and only source of water supply, the whole village shifted to the nearby village, Sigam. In other villages, the settlements occupied between 0.36 per cent area in Kalak and 1.06 per cent in Vadadla in 1959-60. By 1979-80, all villages barring Gulal, Kalak, Salehpur Sangdi and Sigam, expanded with varying percentages ranging between the 0.02 per cent in Kimoj and Runad and 0.31 per cent in Limaj.

All the 22 villages of Region II show varying percentages of area under their settlements. They ranged between the lowest 0.28 per cent in Nadiad and the highest 1.24 per cent in Thanava in 1959-60. In 1979-80, barring Bakarpur Timbi, Panchpipla, Singarna, Sardarpura, Thanava and Kundhal, the remaining sixteen villages grew in areal extent between the lowest 0.01 per cent in Degam and Nadiad and the highest 0.17 per cent in Muradpor-Neja.

In Region III in 1959-60, all eleven settlements occupied land areas ranging between lowest 0.22 per cent in Nada and the highest 0.98 per cent in Asanvad. In 1979-80, Asanvad, Dolia, Kapuria, Tankari and Thakor Talavdi remained unchanged. The remaining five villages went up by a minimum of 0.02 per cent in Nada and the maximum of 0.11 per cent in Islampur (Fig. 3.4 a & b).

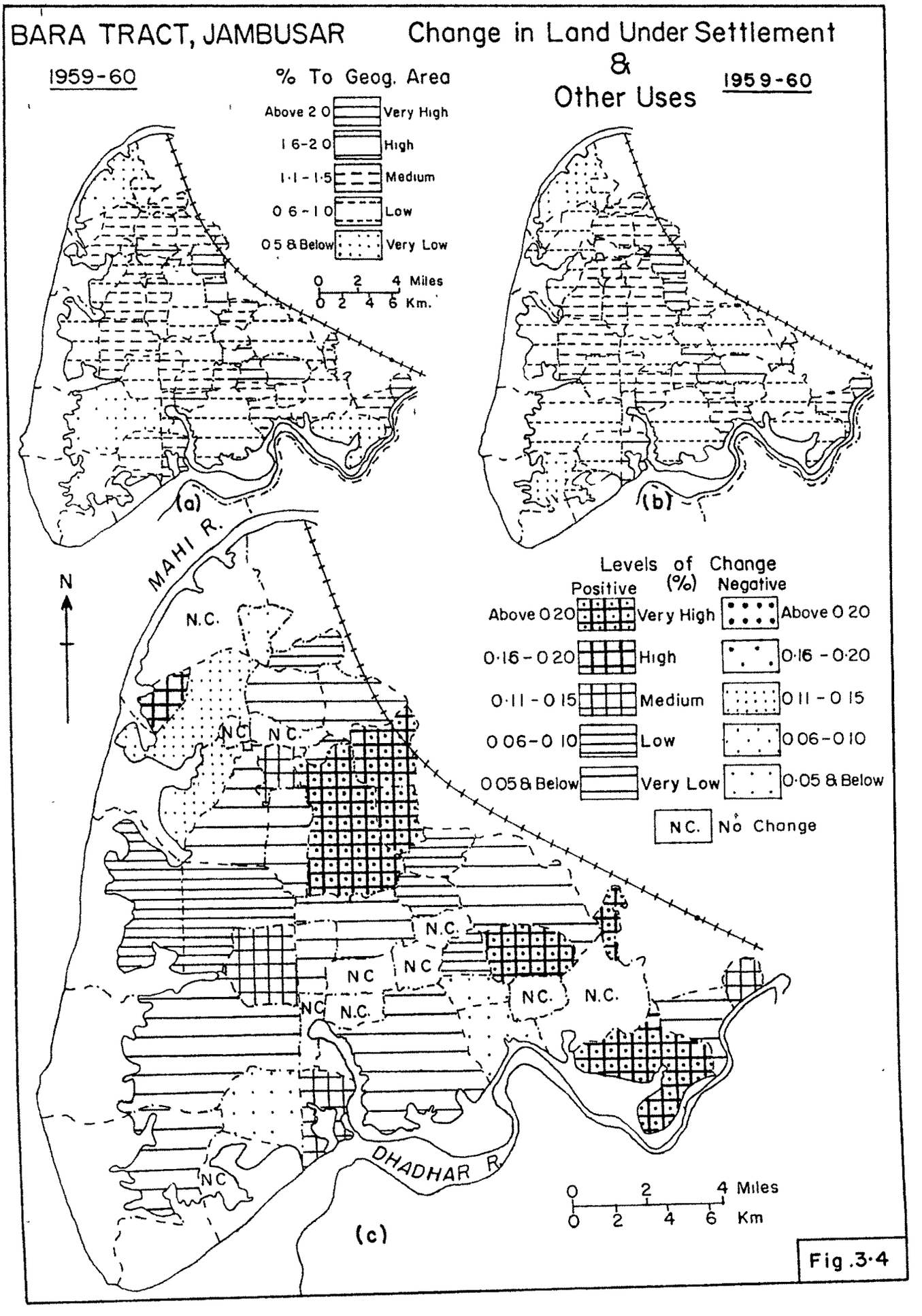

BARA TRACT, JAMBUSAR
Change in Land Under Settlement & Other Uses
1959-60
% To Geog. Area
Above 2 0 Very High
1 6-2 0 High
1·1 - 1·5 Medium
0 6 - 1 0 Low
0 5 8 Below Very Low
0 2 4 Miles
0 2 4 6 Km.
1959-60
(a)
(b)
MAHI R.
N
N.C.
NC
Levels of Change (%)
Positive
Negative
Above 0 20 Very High Above 0 20
0·16 - 0 20 High 0·16 - 0·20
0·11 - 0 15 Medium 0 11 - 0 15
0 06 - 0 10 Low 0 06 - 0 10
0 05 8 Below Very Low 0·05 8 Below
N.C. No Change
DHADHAR R.
0 2 4 Miles
0 2 4 6 Km
(c)

Fig .3·4

The settlement is that human phenomenon which normally undergoes positive changes overtime. It is only under the unforseen natural or manmade calamities that negative change takes place. Among all the 46 villages under study, it is seen that only one village, Chandpur-Marva of Region I, had to abandon its settlement site and shift to the neighbouring village owing to a naturo-cultural calamity (dryig out of the tank). This was a major change but it occured prior to the base year selected for the study. The fortyfour villages have shown positive change of varying percentage or have remained stagnant. Only Zamdi is the typical example of change in which the absolute area increased by 0.64 per cent in 1969-70 due to merger of the village Isanpur, but its percentage decreased by 0.01. In 1959-60, it has 4.18 ha. (0.31%) and in 1979-80, 4.82 ha. (0.30%).

Thus, to sum up , the settlements are those human features which are related with population. However, the population increase may lead to increase in settlement area, but normally its decrease does not necessarily lead to decrease in the area under settlement, as it happened in Panchpipla of Region II.

The pattern of change is slow according to the slow growth of population. It is only in the village Limaj of Region I, that the settlement area has abruptly went up from 0.63 per cent in 1959-60 to 0.94 per cent in 1979-80, due to its precipitous increase in population by 78 per cent over the former year. However, the settlements are like N S A which normally move forward rather than backward (Fig. 3.4 c).

3.3.4 Transport:

(a) Roads (PWD):

Transport develops linkages between the areas and regions and thereby "redresses the regional imbalances" (Hammond, 1985). Development of transportation develops multi-dimensional horizons for socio-economic development of regions. Our rural areas remained for a long time in the state of subsistence inspite of their land resource potentials. The concept of rural development seems impracticable without proper linkages. It is with this

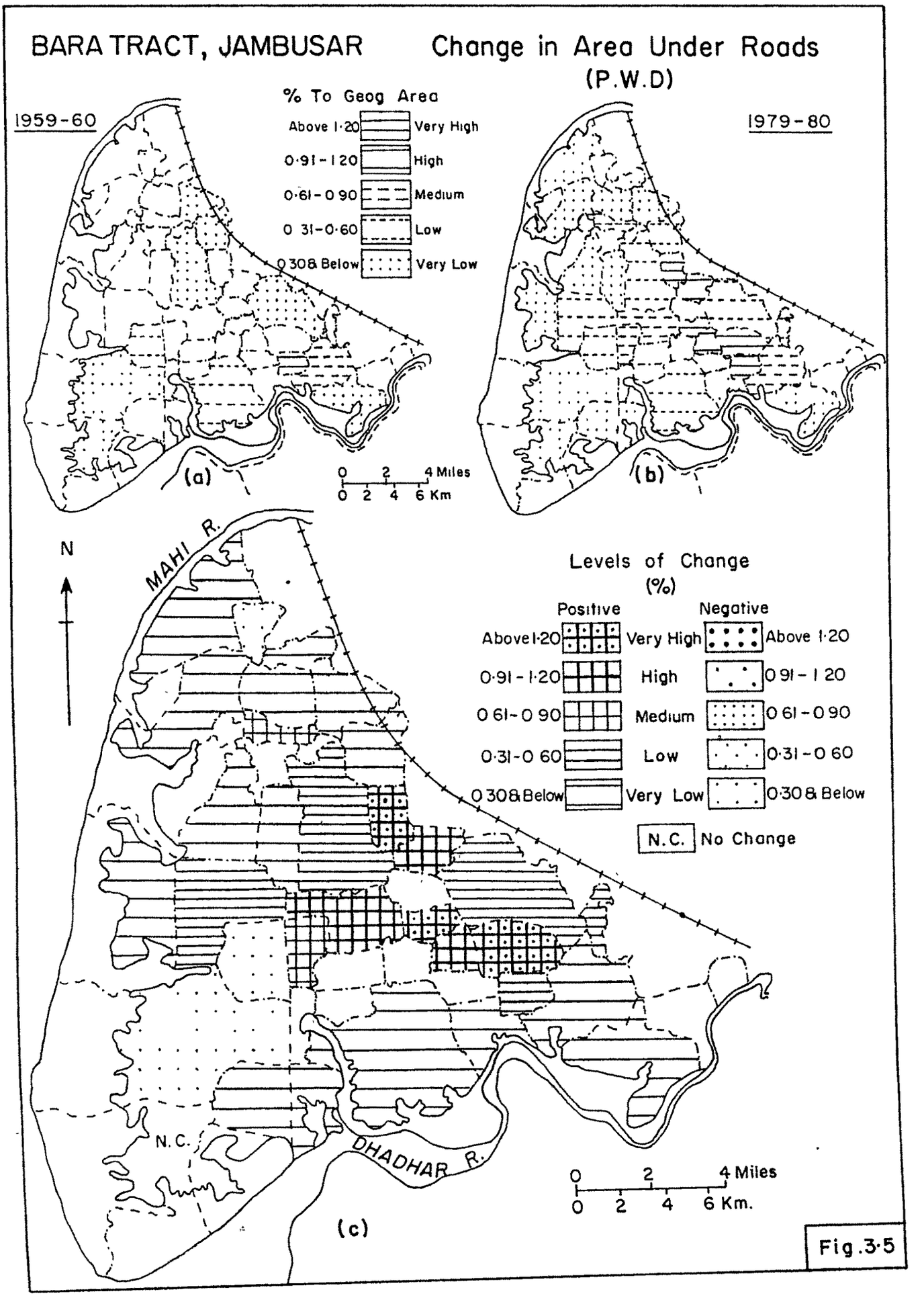
intention that priority has been given to transport development in all Five Year Plans of our country. It is envisaged to link all the villages to the main lines of transport.

The study area, though a prime cotton producer of Bharuch District, was one of the many ignored areas in its long past even after independence. It was served with one all-weather road linking Jambusar with Devla and the villages in between. It seems that the road development in this area gained momentum only around 1979-80 and after. During 1959-60, only eleven villages had 68.32 ha. (0.12%) of the total land under roads. By 1979-80, it went up to 162.34 ha. (o.28%) in 31 villages (Fig. 3.5 a & b).

The regional statistics show that during 1959-60, Region I (with 16.74 ha - 0.16%) and Region II (with 15.94 ha - 0.07%) had a meagre privilege of road provided by the then management (Local Board and P.W.D.), whereas Region III with 35.64 ha - 0.15% of its area under roads - (all kutcha and motorable in dry weather only) was slightly better placed in this respect. The roads in this region were provided for linkage with Tankari Port, situated on a small creek on the right bank of the Dhadhar (now in disuse); and the Dev Jagan Temple, south of Nada village.

In 1979-80, in keeping with other developmental activities, the road hectareage went up in each region. Region I increased by 30.48 ha. (0.29%), Region II by 57.87 ha (0.24%), but Region III only by 4.67 ha (0.02%). Looking villagewise, we see four villages of Region I, viz., Kalak, Kava, Runad and Vadadla, increasing their areas under roads between 0.05 per cent (in Runad) and 0.30 per cent (in Kava) whereas eight villages getting for the first time roads covering their land area from the highest 0.92 per cent in Pachakda to the lowest 0.02 per cent in Gulal. Chandpur Marva is the only village which has no road at all.

In the 22 villages of Region II only four had roads covering between 0.11 per cent in Jantran, and 2.12 per cent in Vanseta at the former point of time. By 1979-80, three of them increased


BARA TRACT, JAMBUSAR
Change in Area Under Roads
(P.W.D)
1959-60
1979-80
% To Geog Area
Above 1·20 Very High
0·91-1 20 High
0·61-0 90 Medium
0 31-0·60 Low
0 30& Below Very Low
(a)
(b)
0 2 4 Miles
0 2 4 6 Km
N
MAHI R.
Levels of Change
(%)
Positive
Negative
Above 1·20 Very High Above 1·20
0·91-1·20 High 0 91-1 20
0 61-0 90 Medium 0 61-0 90
0·31-0 60 Low 0·31-0 60
0 30& Below Very Low 0·30 & Below
N.C. No Change
N.C.
DHADHAR R.
0 2 4 Miles
0 2 4 6 Km.
(c)
Fig.3·5

their area by 0.11 per cent in Khanpur-Deh and 0.52 per cent in Vanseta. Another nine villages got roads for the first time covering 0.06 per cent of the area in Degam and 1.39 per cent in Panchpipla. One village, Sindhav, experienced a decline of area by 0.03 per cent due to straightening of the existing road.

In Region III, the road hectarage was the highest of all regions of the area, due to its composite agricultural and commercial activities. But due to the decline of Tankari Port, the road development was stagnated. Three of the eleven villages viz., Devla, Nada and Tankari, were served with roads at the first point of time. The hectareage under this use varied between 0.07 per cent in Nada and 0.39 per cent in Tannkari. At the second point of time Tankari increased it by 0.18 per cent, Nada remained unchanged, and Devla decreased by 0.12 oper cent. However, another four villages, viz. Dolia, Islampur, Kapuria and Malpur, joined their rank with road facility with 0.01 per cent in Malpur and 0.21 per cent in Dolia (Fig. 3.5 c)

The increasing commercial activity connected with brisk salt extraction and salt trade, in the tidal zones of the area will have the effect of increasing road facility resulting into hectareage increasing under this use in most of the villages of this region. Further, the Government Plan to join even the remotest villages with the main road has been and is being implemented. Thus, the increasing trend is likely to continue till all the villages are covered under the plan and provided all-weather roads.

(b) Field Tracks:

Besides, the roads and the railways, the area shows a typical feature of tracks or paths locally called "Hade Pakdelo Marg". This is used for reaching the fields with the oxen, the agricultural paraphernalia, the carts, etc. It is only Bakarpur Timbi of Region II where it is missing.

In 1959-60, it occupied 888.72 ha (1.54%) of the total area, which declined to 773.68 ha (1.34%) in 1979-80. Its regional distribution in 1959-60 and 1979-80 was as under: (Fig. 3.6 a and b).

Table - 3.6

Regionwise change of Area under Field Tracks

(in Ha.)

Regions	1959-60		1979-80		Difference	
	Area	%age	Area	%age	Area	%age
I	230.52	2.22	199.09	1.91	-31.44	-0.31
II	452.93	1.92	384.16	1.64	-68.77	-0.28
III	205.27	0.86	190.44	0.80	-14.83	-0.06
Total:	888.72	1.54	773.68	1.34	-115.04	-0.20

Since this medium of transport is directly linked with agricultural fields of the area, its proportion is decided by the proportion of the N S A of each region and each village to the total useful area. According to the percentage distribution, it is seen that the smallest region, had the highest percentage 2.22 and 1.91, and largest region, the smallest percentage 0.86 and 0.80 only under this use at both points of time.

Two aspects of the existence of and the areal change in the "Hade Pakdelo Marg" (Field Tracks) emerge from the analysis of the table - 3.6:

(A) (i) : This use is more related with the land available for cultivation than with the geographical area. The regionwise study shows that Region I with smallest geographical extent (only 18%) had 2.22 per cent area under this use, the other two regions bigger in size had 1.92 and 0.86 per cent respectively at the first point of time. At the second point of time also, Region I was at the top with 1.91 per cent followed by the other two Regions with 1.64 and 0.80 per cent respectively.

(ii): More N S A (cultivated land) needs more path ways to negotiate through it. This may be substantiated by the fact that the villages with higher percentage of N S A have higher

percentages of this use. For example, Asarsa, Malpur, Nada, Tankari, Zamdi, etc. of Region III have less than 50 per cent of N S A and have less than one per cent under this use, while Asanvad, Dolia, Kapuria, etc. having more than 60 per cent under N S A have more than one per cent under this use. This is true for other regions also. It explains that less land available for cultivation puts more stress on having more under N S A and more land fit for agriculture allows more area under this use.

(B): As regards the change, an overall trend of decrease is observed in regional as well as villagewise areal extent under this use. In Region I, Chandpur Marva and Sigam reported no change. Other nine villages show decrease between 0.10 per cent in Runad and 1.19 per cent in Shambha; Kalak shows a negligible decrease by 0.06 ha. which did not affect its percentage. It is onnly Gulal where due to increase in its N S A, an increase by 0.01 per cent is seen.

In Region II eighteen villages show decrease in area under this use between 0.04 per cent in Degam and 1.11 per cent in Kaliari. Thanava and Khanpur-Deh show increase by 0.02 ha each, which affected the percentage (by 0.01%) of the former and left unaffected that of the latter. Bakarpur Timbi had no area under this use and Panchpipla showed no change. In case of Thanava the decrease in N S A ledto this minor increase where in case of Khanpur Deh, the increase in N S A affected it.

In Region III, Asanvad, Asarsa, Devla and Malpur showed no change, in Dolia, it increased by 0.22 per cent due to the decrease by nearly the same per centage in its N S A. The others show decrease varying between 0.04 per cent in Kapuria and 0.23 per cent in Tankari. Increase in N S A is the basic reason, however, for the decrease.

It, however, establishes, that both increase and decrease in N S A influenced the increase and decrease in the ratio of landunder this use.

BARA TRACT, JAMBUSAR

Change in Area Under Hade Pakdelo Marg (Roads to Fields)

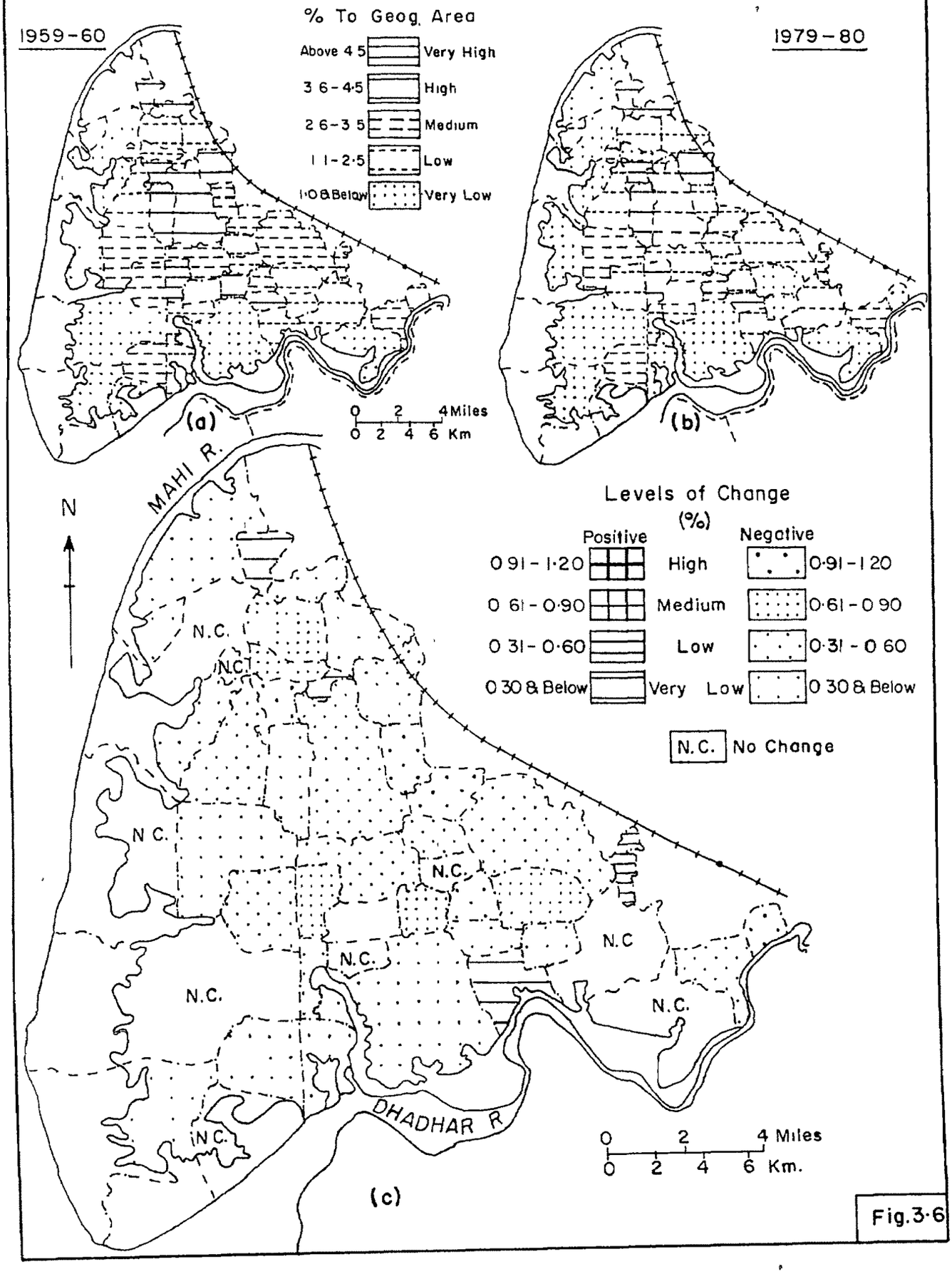


Fig.3·6

It seems that economic bias is fast overpowering the mentality and behavioural aspect of the rural folk. In most cases the land under non-economic use is fast decreasing in favour of the economic uses. This urge impinges on many a type of uses bit by bit. Increasing population and other developmental programmes in operation are also the factors responsible for the decrease in non-economic uses of land (Fig.3.6 a, b and c).

(c) Railways:

Jambusar Taluka is served by a narrow guage railway with its terminus at Kavi on the bank of River Mahi. The track passes through the eastern margin of the study area (Region I), and touches only two villages, Vadadla and Runad. Both are stations. Due to the development of the road network and increasing bus services, the significance of this railway is minimised. It occupied 5.61 ha (0.63%) in Runad and 1.60 ha (0.24%) in Vadadla. Since no development in this mode of transport took place, no change in the occupied area is noticed.

3.3.5 Tanks and Ponds:

Closely associated with rural environment, the tanks and ponds are invariably associated with the rural settlements. Somewhere they remain idle, but at others they play a vital role. However, the varying environmental conditions add varying amount of significance to these features, and make them to fulfil the basic needs of the inhabitants.

Tanks and ponds in the study area have played a vital role since the day man first settled here. Their significance to the people was in no way less than the cultivated fields, as they have been the only source of drinking water to both men and animals.

The tanks are the built up topographic features, constructed in each village for storing the rain water. Since the sub-surface water is brackish and somewhere oily (known as Divelia), the stored water in the tanks remains the only source of potable

water in these tanks. If full to capacity they ensure year round supply till the coming of the next monsoon. In case of the failure or late arrival of rains, short term migration may be inevitable.

Deepening of the tanks to store more water may not be possible in view of the underground structure. Before 1950, in Chandpur Marva, dredging of the tank to store more water, exposed the porous layer, which led to seepage of the entire water of the tank (plate 18). As a result, the people had to abandon the village and seek shelter at Sigam, the neighbouring village. The entire population of the village shifted permanently to Sigam. The tanks had been, and would continue to be, an essential feature of the areas' landscape inspite of the introduction of modern systems of pipe water supply.

There may be several wells in and around a tank (Plate 1 and 13). One well may be dug at the centre and others at the margins of the tank. The natural filtering takes place as the stored tanks' water percolates in the wells, and becomes potable. The village people draw water from the wells for drinking purpose. The central well is used during the dry season when water recedes from all around. After drying up, pot holes are made in the bed of the tanks and covered with stone shutters and sometimes locked by individual owners. The evaporated water from the holes comes down in drops in the vessels kept in it. This is most acute stage of the procurement of drinking water. This situation is to a great extent redressed with the North Bara water supply Scheme launched and completed during Janta Regime (1977-80).

The ponds do not carry that much significance, as of the tanks. They are found scattered through the fields. During rains water accumulates in them. They are used for cattle to drink and wash and also at times for irrigation. A number of field ponds becoming shallow are filled up and merged in the cultivated fields.

In 1959-60, the tanks and ponds together covered 565.97 ha. (0.98%) of the total study area. In 1979-80, it decreased by 20.46 ha. (0.04%). Since the tanks are the source of life giving water, any decrease in their existing area can hardly be imagined under the present situations. However, area under ponds are subject to change by decrease (Fig. 3.7 a & b).

Table 3.7 shows the relative distribution of area under this use in each region:

Table - 3.7

Regionwise Distribution of Area under Tanks and Ponds (Percentage to Total Area)

Regions	% to total area	% area under settle-ments.	% area under tanks	Popula-tion 1961	% area under Settle-ments	% area under Tanks	Popula-tion 1981
I	18.01	0.11	0.32	9207 (25.38%)	0.12	0.30	12432 (24.76%)
II	40.80	0.18	0.36	15406 (42.48%)	0.20	0.35	21569 (42.97%)
III	41.19	0.15	0.12	11657 (32.14%)	0.16	0.12	16201 (32.27%)
Total:	100.00	0.44	0.80	36270	0.48	0.77	50202

Although, tanks are equally important for all regions, as they serve as source of drinking water, their distribution is relatively anomalous. Region I has the smallest percentage of area under settlements (0.11%), but has relatively highest area under tanks (0.32%). The ratio between the settlement area and area under tanks was 1:2.91 in 1959-60, which came down to 1:2.50 in 1979-80. But, at both points of time, it remained highest of all. This may be attributed to the superior quality of Ankhi-Haldar Series of soils and relatively more compact substratal layers having better storage capacity, except at Chandpur-Marva, stated earlier.

Region II is nearer to Region I, having 1:2 settlement and tank area ratio at the first, and 1:1.75 at the other point of time. Being in Degam series of soils, which is slightly inferior to Ankhi Haldar, the tanks occupy next highest ratio.

But in Region III the situation is changed. Its settlement and tank area ratio comes to 1:0. 80 and 1:0.75 at both points oftime respectively. This automatically explains the quality of land and tank relationship. Since, the sub-soil zone is more saline and alkaline as stated earlier (pp. 35,36) and the salinity saturated water table is high due to nearness of the Gulf. The tanks in this region are, therefore, usually elongated and shallow. This may be a reason why the ratio between the settlements and tanks is small.

Since tanks are very closely related to the population, the regionwise tank-man relationship also establishes the superiority of Region I. Table 3.8 gives the population tank ratio:

Table - 3.8

Regionwise Number of People Per ha. of Tank

Regions	1959-60			1979-80		
	Tanks Area (in ha.)	Popula-tion 1961	Popula-tion per Tank ha	Tank Area (in ha.)	Popula-tion 1981	Popula-tion per Tank ha
I	182.99	9207	50.31	173.82	12432	71.52
II	210.90	15406	73.05	201.01	21569	107.30
III	72.08	11657	161.72	70.68	16201	229.22

Region I supercedes all in its tank-man ratio, as each hectare of tank supported slightly more than 50 people in 1961, and more than 71 in 1981. This indicates that in this region the drinking water position has been better than the other two regions

at both points of time. In Region II each hectare of tank area supported 73 and 107 persons respectively at the two points of time. But Region III seems to have been reeling under the problem of drinking water as its each hectare of tank area supported 162 people at the first and around one and a half time more people at the second point of time. Such water problem caused inter-family feuds culminating to the extent of fatal quarrels.

The villagewise distribution of land under tank is given in Table -3.9:

Table - 3.9

Distribution of area under tanks in Region I.

(in per cent)

1959-60 / 1979-80	Above 3.00	1.00 - 3.00	Less than 1.00
Above 3.00	Gulal, Limaj		
1.00 - 3.00		Hamadpur-Kantharia Kalak, Kava, Kimoj Pachakda, Runad, S.Sangdi, Shambha, Vadadla.	
Less than 1.00			Chandpur-Marva, Sigam.

The tank in Chandpur-Marva exists only in name, being dry almost round the year and is of no use. There have been no change at all in area under tank during the two decades in Chandpur-Marva, Hamadpur, Kantharia, Kimoj, Runad, Salehpor-Sangdi and Sigam. However, slight negative percentage change is seen in Gulal (0.42%), Kalak (0.26%), Kava (0.06%), Limaj (0.20%) Pachakda (0.11%), Shambha (0.05) and Vadadla (0.01%). This change has been so negligible that it does not affect the class category of the vilages.

Table - 3.10

Distribution of area under Tanks in Region II
(in per cent)

1959-60 / 1979-80	Above 3.00	1.00 - 3.00	Less than 1.00
Above 3.00	-	-	-
1.00 - 3.00	-	Kaliari, Chhidra, Dahri, Bhadkodara Jantran, Sindhav B.Timbi, Nadiad Vanseta, Thanav, Mahapura.	-
Less than 1.00		-	Degam, M.Neja, Madafar, Vad Panchpipla, Ch. Bara · Singarna, Sardarpura, Kundhal Khanpur Deh.

In Region II (Table 3.10) none of the villages had above three per cent of its area under tanks. All of them ranged between less than one per cent and three per cent and maintained their place, with some negligible negative changes at the next point of time as well. Of them, twelve villages - Bakarpur Timbi (B.Timbi), Bhadkodara, Chandpur-Bara (Ch.Bara), Dahri, Degam, Kundhal, Muradpur Neja (M.Neja), Panchpipla (P.P.), Singarna, Thanava, Vad and Vanseta - experienced no change. Ten villages - Chhidra (0.16%), Jantran (0.06%), Madafar (0.13%), Mahapura (0.44%), Nadiad (0,.04%), Sardarpura (0.01%) and Sindhav (0.12%) - have shown decrease over the previous point of time. However, this negligible decrease did not affect their placement in the respective class category at the second point of time.

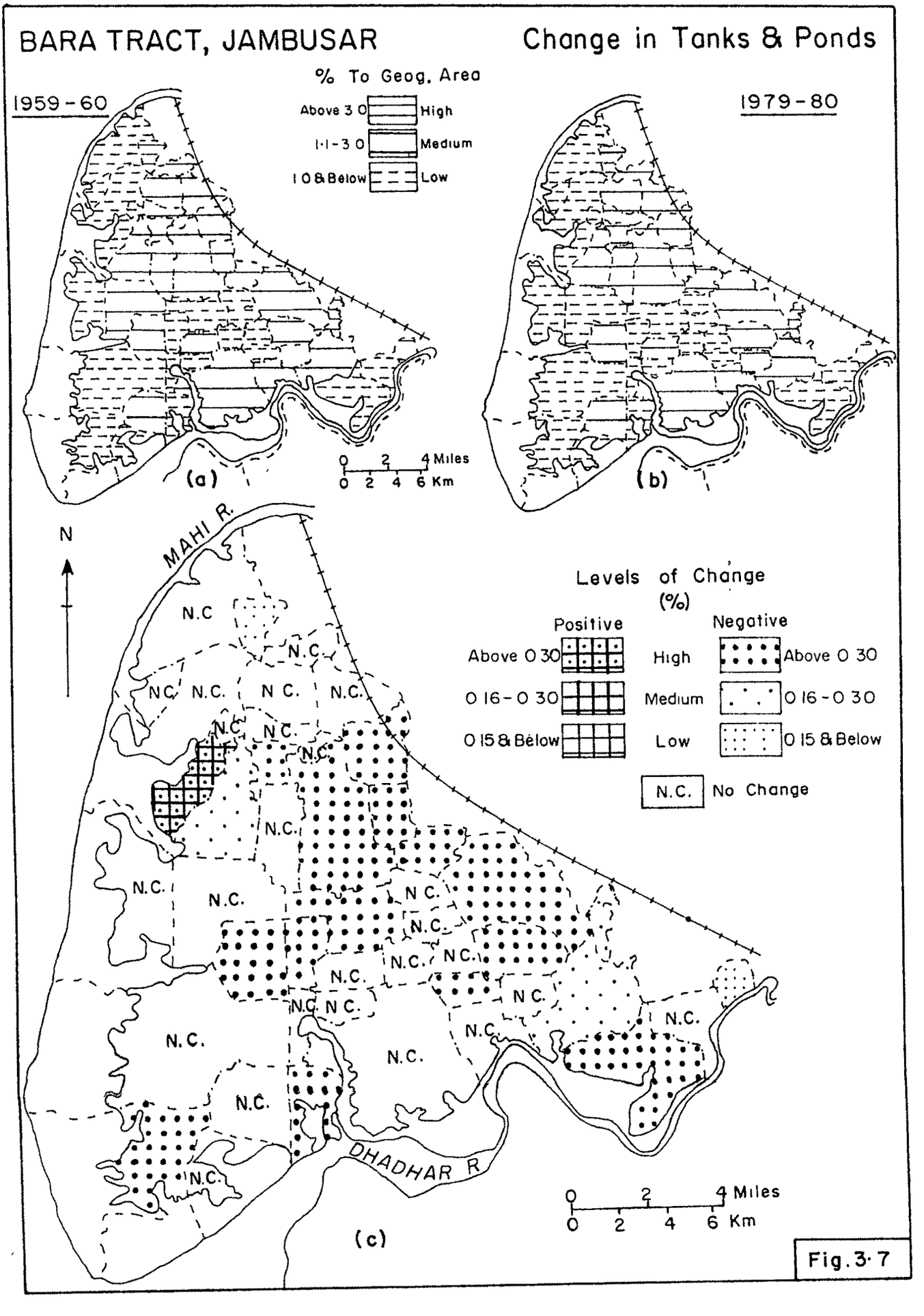

BARA TRACT, JAMBUSAR
Change in Tanks & Ponds
% To Geog. Area
1959-60
Above 3 0 High
1·1-3 0 Medium
1 0 & Below Low
1979-80
0 2 4 Miles
0 2 4 6 Km
(a)
(b)
N
MAHI R.
Levels of Change (%)
Positive
Negative
Above 0 30 High Above 0 30
0 16-0 30 Medium 0 16-0 30
0 15 & Below Low 0 15 & Below
N.C. No Change
DHADHAR R
0 2 4 Miles
0 2 4 6 Km
(c)
Fig. 3·7

Table - 3.11

Distribution of Area under Tanks in Region III
(In per cent)

1959-60 / 1979-80	Above 3.00	1.00 - 3.00	Less than 1.00
Above 3.00	-	-	-
1.00 - 3.00	-	Dolia, Kapuria Tankari.	-
Less than 1.00	-	-	Asanvad, Asarsa Islampur, Malpur, Nada, Thakor Talavdi, Zamdi.

In region III, the distribution of area under tank shows almost the same pattern as in Region II. Only Dolia, Kapuria and Tankari come in the range of one to three per cent, the other eight villages have less than one per cent of their area under this use. Eight villages - Asanvad, Asarsa, Devla, Dolia, Kapuria, Malpur, Tankari and Thakor-Talavdi (Th.Talavdi) - have shown no change. However, Devla shows a decrease of 0.31 ha. (with no change in its percentage). Two villages Islampur and Nada, show a negative change by 0.01 and 0.03 per cent respectively and Zamdi shows a positive change by 0.01 per cent over the next point of time, this increase is owing to the incorporation of Isanpur within this village. However, the tanks are among those land uses that undergo very little change. The overall negative and positive changes are confined to only 0.15 to 0.30 per cent (Fig.3.7 c).

3.3.6 Kharland:

An outcome of the location of the study area is its phenomenon designated as 'kharland'. It spreads over its coastal and riparian margins in the west, north and south. It sprawls

over as many as 20 of the 46 villages of the area. In 1959-60 when Isanpur was a separate entity, it partially covered 21 villages occupying as much as 15010.94 ha. (25.99%). In 1979-80, it encompassed 20 villages (Isanpur merged with Zamdi) and covered 14527.64 ha. (25.15%). An insignificant percentage (0.84%) of this land has, however, been reclaimed by the efforts of Kharland Board (Fig. 3.8 a & b).

The regional distribution of kharland is quite unequal, due to the locational aspect of the villages. Since the creators ofthe kharland are the marine agents, especially, the tidal ingress through the two rivers, and the various backwater creeks. the villages along the coast, the two rivers, and the backwater creeks, have large or small areas as the kharland according to their placement and alignment.

Region I, being away from the coast and riparian margins; but fretted by a small creek in one of its villages, Kalak, had the smallest kharland area of 141.31 ha (1.36%) in 1959-60. It shrank to 113.91 ha. (1.10%) at the other point of time due to the process of reclamation.

Region II, in 1959-60, had 4634.40 ha. (19.67%) owing to its opening to River Mahi in the north and to the backwater creeks from the west and south, its eight of the 22 villages, have small or big areas, according to their location, under this feature. In 1979-80, it was reduced by 65.36 ha. (0.28%) only.

In Region III, all the eleven villages have kharland, as they are just on the coast and the estuary of River Dhadhar. In all there were 10235.23 ha. (43.02%) and 9844.60 ha. (41.38%) of kharland at both points of time, respectively.

The pattern of its distribution in Region II is given in Table 3.12.

Table - 3.12

Villagewise changing pattern of Kharland in Region II.

Sr. No.	Villages	1959-60 Area	%	1979-80 Area	%	Difference Area	%
1.	Degam	4057.87	68.48	4058.45	68.49	+ 0.58	+ 0.01
2.	M.Neja	148.81	31.24	126.60	26.58	-22.21	- 4.66
3.	Bhadkodara	141.47	7.30	141.41	7.30	- 0.06	- 0.00
4.	B.Timbi	137.16	24.51	136.40	24.37	- 0.76	- 0.14
5.	Khanpur Deh	70.85	2.48	42.58	1.49	-28.27	- 0.99
6.	Vanseta	47.04	12.25	27.95	7.28	-19.09	- 4.97
7.	Madafar	26.66	2.67	24.59	2.46	- 2.07	- 0.21
8.	Nadiad	4.54	0.54	11.06	1.39	+ 6.52	+ 0.77
Total:		4634.40	19.67	4569.04	19.39	-65.36	- 0.28

Table 3.12 reveals the area and percentage of kharland in 1959-60, and 1979-80, in each village of Region II. Degam being located on the estuary of River Mahi had the largest area in the region as well as in the study area as a whole during 1959-60. Its kharland area is slightly less than 3/4 of its total geographical area. As a result, it could spare only 31.52 per cent of land for its other uses including the N S A. By 1979-80, the kharland area increased by 0.58 ha (0.01%) which is contrary to the general trend of decrease in the entire study area. Degam's kharland spreads in the north and north-west parts, which come in the zone of tidal spillover at every time of tide.

Adjacent to this village on its south-western periphery is Muradpur-Neja. Situated on the meeting point of the Gulf, and the mouth of Mahi it comes directly under the influence of tidal action, converting 31.24 per cent of its total area into kharland at the first point of time. The dam along the coast protected it by retarding the vast spillover, and reclaiming 4.66 per cent of its total kharland at the second point of time.

Bhadkodara, is a bit away from the coast. Its 7.30 per cent of kharland was due mainly to the creek penetrating into its area from the north-west. Its kharland area remained almost the same at the two points of time, the very insignificant decrease by 0.06 ha did not affect its percentage share.

Khanpur-Deh, located upstream on the right bank of River Dhadhar gets all tidal spillover from it (Plate 7). The kharland embraces the village from south-east and south-west. In 1959-60, the kharland occupied 70.85 ha. (2.48%), but the land reclamation scheme effectively launched around 1979-80, could recover 28.16 ha. (0.99%). Khanpur Deh seems to be the only village which made a major break through in this direction, as compared with other villages with larger percentage of kharland.

Vanseta placed near the Dolia loop, is influenced by the tidal ingress from two sides, one from the south and other from the Nadiad side on the north-west. In 1959-60, it had 47.04 ha. (12.25%) as kharland. By 1979-80, a substantial area of 19.09 ha. (4.97%) was recovered leaving only 27.95 ha.(7.28%) as kharland.

Madafar, though situated inland, is affected by the Madafar creek, which penetrates straight through Islampur, Asanvad and Bakarpur-Timbi. During 1959-60, the tidal ingress being regular had converted around 27 ha. as kharland. But due to the mole (break water) across the creek around 1979-80, has effectively checked the tidal waves. Thus, the kharland is now being improved upon as the sweet land. Of the total area under kharland, 2.07 ha. (0.31%) had already been reclaimed for other purposes, and the brackish water creek is also changed to sweet water channel. This is now used for taking bath, washing clothes and cattle drink its water as long as it retains it after the rains.

Nadiad adjacent to Kalak, had a very small area of 4.54 ha (0.54%) in 1959-60. By 1979-80 the kharland area of this village increased by 6.52 ha (0.77%) which may be attributed to extensive spillover of the tidal water through Vanseta creek adjacent to this village.

It may be seen that the larger the percentage of kharland, the smaller is the percentage of N S A. It is substantiated by the fact that Degam has the largest proportion of kharland and the smallest proportion of N S A in the whole region and also the whole study area. This is a natural result of the land situations, which affect the rural economy.

Table 3.13 gives the change of positions of the villages in respect of the kharland reclamation over the two points of time:

Table - 3.13

Percentage change in kharland area in Region II
1959-60 - 1979-80

1959-60 / 1979-80	0 - 5	5.1-10	10.1 - 15	15.1-20	20.1-25	25.1-30	30.1-35
0 - 5	Nadiad, Khanpur Deh						
5.1-10		Bhadkodara, Vanseta					
10.1-15							
15.1-20							
20.1-25					B. Timbi		
25.1-30							M.Neja
30.1-35							-
60.1-70							Degam

Table 3.13 shows that nothing much was done towards the reclamation of kharland. Degam instead of decreasing it added 0.01 per cent. A substantial hectarage of 22.21 (4.66%) was reclaimed in Muradpur Neja. Vanseta followed it by capturing 19.09 ha (4.97%), and got its shift of place from the quardant of 10.1 - 15 per cent to its lower level in 1979-80. Khanpur Deh, Bakarpur Timbi and Madafar mark a decrease ranging between 0.14 per cent in Bakarpor-Timbi and 0.99 per cent in Khanpur-Deh. Nadiad showed a positive change of 0.77 per cent, keeping its place undisturbed. Bhadkodara remained unchanged in its area,and its place in the quadrant.

Region III being placed on the eastern littoral of the Gulf of Khambhat, and on the riparian low-lands on the northern bank of Dhadhar, a vast area from Zamdi in the north to Nada in the south, and from Nada in the west to Dolia in the east has been covered by the kharland. All eleven villages have varying percentages of kharland, depending upon their distances from either the coast or the River Dhadhar estuary. Table 3.14 shows the hectarage and percentage of the kharlands in all the villages of Region III.

In 1959-60, as much as 43.02 per cent of the total area of this region was occupied by kharland leaving only 56.98 per cent for other use.

To briddle the tidal ingress, check dams all along the coast and the bank of Dhadhar have been constructed. This scheme proved successful, but being an earthen dam, the tidal force caused breaches at several places through which the tidal water enters inland. However, in all, 390.54 hectares (1.64%) have been reclaimed by 1979-80. The rest is yet to be done.

In the villagewise scenario, it is found that the area of kharland is varying in each village. Devla being the largest village (in area) has 45 per cent of its total land as kharland. Tankari is the second largest village, but had only 29.87 per cent, Nada, the third largest in area, had the highest percentage

63.81, Malpur being next to Nada in both total area and the percentage, had 54.97 per cent under kharland. Other villages ranged between the lowest 9.92 per cent in Kapuria and the highest 54.42 per cent in Asarsa.

Table - 3.14

Changing Pattern of Kharland in Region III

Sr. No.	Village	1959-60		1979-80		Difference	
		Area(ha)	% to total area	Area(ha)	% to total area	Area(ha)	% to total area
1.	Devla	2557.41	45.00	2486.89	43.74	-70.52	-1.24
2.	Nada	2337.62	63.81	2321.27	63.37	-16.35	-0.44
3.	Malpur	1697.60	54.97	1670.77	54.10	-26.83	-0.87
4.	Tankari	1385.48	29.87	1220.45	26.32	-165.03	-3.55
5.	Zamdi	628.27	46.34	777.23	47.42	+148.96	+1.08
6.	Asarsa	602.51	54.42	609.56	55.06	+ 7.05	+0.64
7.	Islampur	376.52	33.95	343.06	30.94	-33.46	-3.01
8.	Dolia	171.56	20.47	163.69	19.54	- 7.87	-0.93
9.	T.Talavdi	125.65	25.26	125.65	25.26	0.00	0.00
10.	Kapuria	113.03	9.92	70.38	6.18	-42.65	-3.74
11.	Asanvad	72.01	18.38	55.74	14.23	16.27	-4.15
Total:		10235.23	43.02	9844.69	41.38	-390.54	-1.64

In 1979-80, the kharland area went down in each village except in Zamdi, Asarsa and Thakor-Talavdi. The amount of decrease reflects the nearness or remoteness of the villages from the coast and estuary of Dhadhar. Nada, Malpur and Dolia being nearer, have reclaimed 0.44, 0.87 and 0.93 per cent respectively, while Asanvad, Kapuria, Tankari and Islampur being away could reclaim 4.15, 3.74, 3.55 and 3.01 per cent respectively. Devla could manage only 1.24 per cent. Asarsa, a small village situated on the northern bank of the estuary of River Dhadhar, had shown

an increase by 0.64 per cent due to tidal ingress. Increase in the kharland area of Zamdi (Plate 16) is owing to the merger of the total land of the deserted village Isanpur. Thakor Talavdi showed no change.

Taking up the case of Zamdi, after the merger of Isanpur kharland its new area should have been 795.84 (628.27 + 167.57). But the total kharland area has been found to be 777.23 ha. only, which shows that 18.61 hectares have been reclaimed.

The motive behind reclamation is economic. The reclaimed patches of kharland are put in the natural process of being washed by the seasonal rains. Such washed up patches would be used for agricultural purposes. Some patches in Devla Dolia, etc. have been put to salt extraction. It is now seen the areas once constituting the natural landscape, are now gradually being converted into cultural landscape. It is predicted that by the passage of time, due to increasing human occupance, this phenomenon would remain restricted within the narrow precincts of the Gulf or estuarine margins, and a very large chunk of the area would be brought to serve the various needs of man.

Table 3.15 below gives the positions of the villages of Region III in respect of the increase, decrease, or constancy of their kharland areas over two decades of time:

Table - 3.15

Villagewise changing Pattern of Kharland in Region III

1959-60 / 1979-80	0 - 15	15.1-3-	30.1-45	45.1-60	Above 60
0 - 15	Kapuria	Asanvad	-	-	-
15.1-30	-	Dolia, Tankari T.Talavdi	-	-	-
30.1-45	-	-	Devla, Islampur	-	-
45.1-60	-	-	-	Zamdi, Malpur Asarsa	-
60 & above	-	-	-	-	Nada

Finally, the changes in kharland have been more negative than positive in the kharland bearing villages of the study area. Table 3.16 shows the percentage decrease or increase in all of them:

Table - 3.16

Levels of change in Kharland
1959-60 - 1979-80

%	+ Ve		-Ve		No change	
Below 1.0	Degam, Asarsa	02	Madafa, B.Timbi, Nadiad Kh.Deh, Doila, Malpur Nada	07	Bhadkodara	
1.0-2.0	Zamdi	01	Devla, Kalak	02	Thakor Talavdi	02
2.1-3.0	--		Islampur	01		
3.1 - 4.0	--		Kapuria, Tankari	02		
4.1 and above	--		Asanvad, Muradpur Neja, Vanseta.	03		
		03		15		02

Three of the twenty kharland bearing villages have shown a slight increase between less than one and two per cent. These villages are located very close to the estuaries of River Mahi and River Dhadhar. The other seventeen show decrease between less than one and more than four per cent. Most of such villages are located away from the coast and the estuarine margins. (Fig. 3.4). Thus, it is clear that the villages on the margins of the tidal zone have benefitted themselves by reducing their

Table - 3.17

Position of villages in kharland at 1959-60 and 1979-80

1959-60 / 1979-80 %	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	Total
0 - 10	Bhadkodar , Kalak, Kapuria Khanpur Deh Madafar Nadiad (06)	Vanseta (01)						07
10 - 20		Asanvad Dolia(02)						02
20 - 30			B.Timbi Tankari, Thakor- Talavdi(03)	M.Neja (01)				04
30 - 40				Islampur (01)				01
40 - 50					Devla, Zamdi(02)			02
50 - 60						Asarsa Malpur(02)		02
60 - 70							Dehgam Nada(02)	02
Total:	06	03	03	02	02	02	02	20

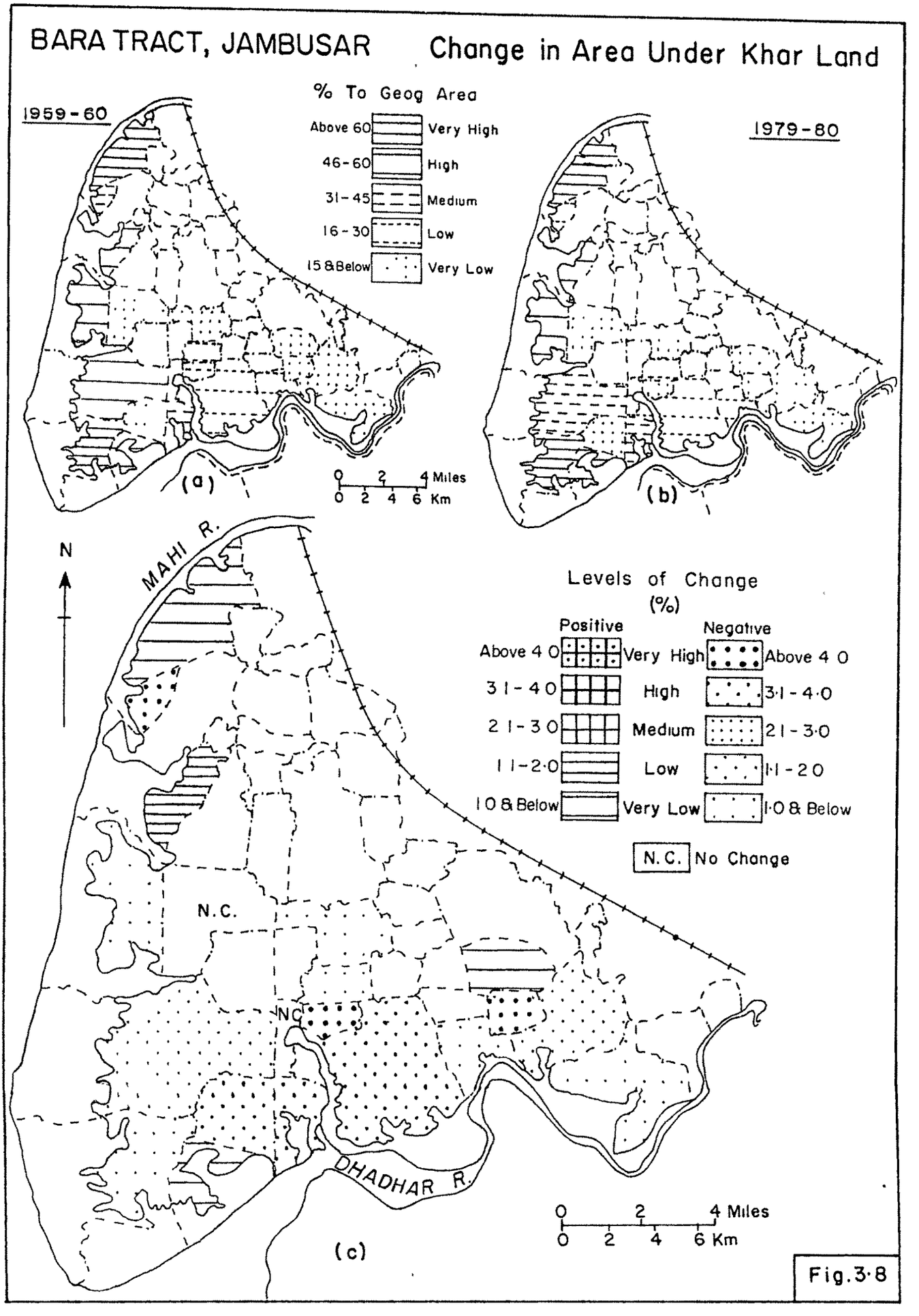

BARA TRACT, JAMBUSAR
Change in Area Under Khar Land
1959-60
% To Geog Area
Above 60 Very High
46-60 High
31-45 Medium
16-30 Low
15 & Below Very Low
0 2 4 Miles
0 2 4 6 Km
(a)
1979-80
(b)
N
MAHI R.
Levels of Change
(%)
Positive
Negative
Above 4 0 Very High Above 4 0
3 1 - 4 0 High 3·1 - 4·0
2 1 - 3 0 Medium 2 1 - 3·0
1 1 - 2·0 Low 1·1 - 2 0
1 0 & Below Very Low 1·0 & Below
N. C. No Change
N.C.
N.C.
DHADHAR R.
0 2 4 Miles
0 2 4 6 Km
(c)

Fig.3·8

kharland area for other purposes. These benefits have accrued due to the construction of the check dam along the coast and along the creeks (Fig. 3.8 c).

3.3.7 Ravines, Creeks and Kans:

The study area has a monotonous topography, mostly flat, subject to innundation during the heavy spells of rains. It is bounded by two conspicuous features - the River Mahi in the north, and River Dhadhar in the south. However, some minor and less conspicuous features are noted in the form of ravines, gullies and streams helping the local draining of water. The only conspicuous features among them are the inland backwater creeks. Recently, the artificial drainage system (kans) has been added to this area to drain off the innundated water from the depressions (Plate 19).

In 1959-60, this category of the land use held as much as 1211.50 ha. (2.10%). By 1979-80, it went up to 1236.56 ha. (2.14%). As many as 37 of the 46 villages show the land under this category (Fig. 3.9 a & b - Plate 5).

In Region I, eleven villages, at the first point of time had 162.64 ha. (1.56%) of the total area of the region under this use. It went up to 170.35 ha. (1.64%) by the second point of time. The artificial drainage channels are the main determinants of this increase.

The villagewise distribution of this category is clearly discernible from Table 3.18.

Of the thirteen villages, Chandpur Marva and Sigam had no such area at any point of time, and Vadadla remained constant. Of the rest five villages show increase and other five show decrease.

Gulal went up from 0.02 per cent to 0.56 per cent because of 'Kans'. Hamadpur Kantharia, reclaimed its ravine land to the extent of 0.48 per cent leaving only 0.18 per cent by the

Table - 3:18

Area under Ravines, Creeks and 'Kans' in Region I
1959-60 - 1979-80

Villages	1959-60		1979-80		Difference	
	Area	%	Area	%	Area	%
Ch.Marva	—	–	–	–	–	–
Gulal	0.07	0.02	2.37	0.56	+2.30	+0.54
H.Kantharia	0.66	0.28	0.18	0.08	-0.48	-0.20
Kalak	119.92	7.39	113.73	7.00	-6.19	-0.39
Kava	19.90	0.95	25.91	1.24	+6.01	+0.29
Kimoj	7.63	0.80	7.32	0.77	-0.31	-0.03
Limaj	2.74	1.28	–	–	-2.74	-1.28
Pachakda	–	–	9.22	1.66	+0.22	+1.66
Runad	2.71	0.31	3.34	0.38	+0.63	+0.07
S.Sangdi	–	–	0.04	0.01	+0.04	+0.01
Shambha	6.71	1.29	5.40	1.13	-0.77	-0.16
Sigam	–	–	–	–	–	–
Vadadla	2.84	0.42	2.84	0.42	0.00	0.00
Total	162.64	1.56	170.35	1.64	+7.71	+0.08

next point of time. Kalak was the only village with the largest hectarage of 119.92 (7.39%) in 1959-60. Parts of the River Dhadhar and the creek together claimed this big area. But the check dam across the creek helped reclaiming 0.39 per cent of the total area. Kava already had 19.90 ha (0.95%) of the ravine land, the kans added another 6.01 ha. (0.29%) in it. Kimoj could reclaim only 0.77 ha. (0.03%) from its existing 7.63 ha (0.80%) of the revine land. Limaj made an effort to wipe out the existing 2.74 ha. (1.28%) at the second point of time. Pachakda came up to the scene at the next point of time giving 9.22 ha (1.66%) to 'kans'. Runad went up from 0.31 per cent to 0.39 per cent. Salehpur Sangdi like Pachakda appeared only at the next point of time with 0.01 per cent given to 'kans'. Shambha took away 0.77 (0.16%) from its 6. 17 ha (1.29%) for other uses.

Like the kharland, this category is also undergoing negative change, except only in case of the kans.

Region II in 1959-60, recorded a relatively small area of 73.00 ha. (0.31%) under these features. It went up to 97.69 ha. (0.41%) at the next point of time. This increase may be attributed to 'kans'. (artificial drains).

Fifteen of the 22 villages of this region have shown varying percentages of area under this sub-category at either of the two points of time. Since the rivers or streams are not a regular physical phenomena of this region, less area has gone to them. Of course, the creeks do hold a significant place in the physical setting of this region, even though it mostly forms the central part of this area. The creeks enter into this region from north, west and south.

The villagewise distribution of land in Region II under this use is shown in Table 3.19.

Table - 3.19

Area under Ravines, Creeks and Kans in Region II
1959-60 - 1979-80

Sr. No.	Village	1959-60 Area	1959-60 %	1979-80 Area	1979-80 %	Difference Area	Difference %
1.	B.Timbi	23.53	4.20	23.53	4.20	0.00	0.00
2.	Bhadkodara	3.37	0.17	3.21	0.17	-0.16	-0.00
3.	Chhidra	0.72	0.05	2.13	0.16	+1.41	+0.11
4.	Ch, Bara	--	--	--	--	--	--
5.	Dahri	3.56	0.44	--	--	-3.56	-0.44
6.	Dehgam	--	--	1.74	0.03	+1.74	+0.03
7.	Jantran	--	--	20.44	0.90	+20.44	+0.90
8.	Kaliari	2.22	0.50	0.78	0.17	-1.44	-0.33
9.	Kansagar	3.53	0.55	1.33	0.21	-2.20	-0.33
10.	Kundhal	0.02	0.01	0.02	0.01	0.00	0.00
11.	Khanpur Deh	--	--	--	--	--	--
12.	Madafar	23.90	2.39	23.90	2.39	0.00	0.00
13.	Mahapura	--	--	--	--	--	--
14.	M.Neja	0.35	0.07	4.76	1.00	+4.41	+0.93
15.	Nadiad	--	--	--	--	--	--
16.	Panchpipla	0.15	0.06	0.15	0.06	0.00	0.00
17.	Sardarpura	11.60	2.91	11.60	2.91	0.00	0.00
18.	Sindhav	--	--	2.78	0.26	+2.78	+0.26
19.	Singarna	--	--	--	--	--	--
20.	Thanava	--	--	--	--	--	--
21.	Vad	0.05	0.01	1.32	0.27	+1.27	+0.26
22.	Vanseta	--	--	--	--	--	--
Total:		73.00	0.31	97.69	0.41	+24.69	+1.10

In 1959-60, seven of the twenty two villages did not have any area under this use at any point of time. Degam, Jantran and Sindhav appeared only at the second point of time. Thus, only twelve villages show area between the lowest 0.05 ha (0.01%) and highest 23.90 ha (2.39%) and in terms of percentage from 0.01 to 4.20. All villages except Bakarpur Timbi, Madafar and

Sardarpura had minor areas under this sub-category. Bakarpur Timbi, Sardarpura and Madafar had 4.20 per cent, 2.91 per cent and 2.39 per cent respectively under creeks and 'kans'. Others ranged between 0. 01 per cent and 0.55 per cent.

In 1979-80, total area went up from 73.00 ha (0.31%) to 97.69 ha. (0.41%). Madafar, Sardarpura and Bakarpur Timbi remained constant, Dahri disappeared from the list, Degam, Jantran and Sindhav entered the list with 0.03, 0.90 and 0.26 per cent due to the construction of 'kans'. Kaliari and Kansagar, decreased from their former area by 0.33 and 0.34 per cent respectively. Chhidra, Muradpur-Neja and Vad had increased area under it by 0.11, 0.93 and 0.26 per cent respectively. Other villages show no change in this category of land use.

The fact that emerges from this observation, is that the increasing need of land is leading to the greater occupance of the hitherto unused lands, lying under the natural state. The 'kans', though itself taking some area is also a means to attain the end of saving the land from innundation. Thus, the various land improvement schemes are active in reclaiming the bad lands & improving upon them.

Region III, which has been reeling under the deterministic behaviour of nature for ever, is still, for the most part, swayed by it. Of its total area, 43.02 and 41.38 per cent and 4.10 and 4.07 per cent were under kharland and ravines etc. at both points of time respectively. Thus, in all 47 and 45 per cent of land lay useless. The land left for economic and other uses remained just above 50 per cent.

Table 3.20 shows the area and percentage of ravines etc. in Region III over two points of time.

As in the case of kharland, this region surpassed the other two. It held as much as 974.58 ha(4.10%) in 1959-60 and 968.55 ha (4.07%) in 1979-80. Just an insignificant piece of the land (6.03 ha - 0.03%) could be reclaimed over a long period of twenty years.

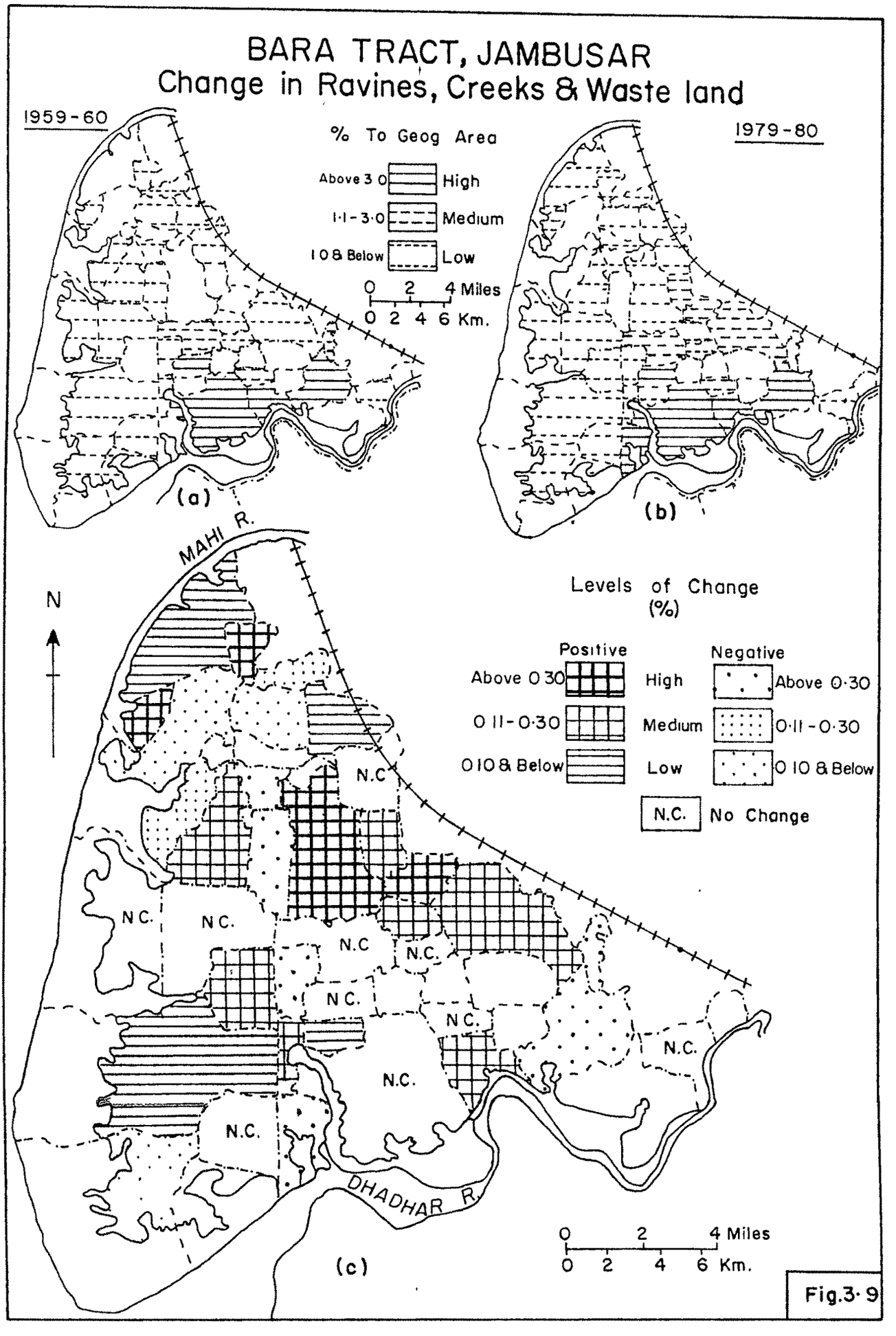
Table - 3.20

Distribution of area under Ravines etc. in Region III
1959-60 - 1979-80

Village	1959-60		1979-80		Difference	
	Area	%	Area	%	Area	%
Asanvad	--	-	0.15	0.04	+0.15	+0.04
Asarsa	0.90	0.08	0.90	0.08	0.00	0.00
Devla	0.54	0.01	1.61	0.03	+1.07	+0.02
Dolia	62.03	7.40	64.36	7.68	+2.33	+0.28
Islampur	82.67	7.46	77.21	6.96	-5.46	-0.50
Kapuria	0.68	0.06	0.68	0.06	0.00	0.00
Malpur	25.50	0.83	25.50	0.83	0.00	0.00
Nada	12.59	0.34	9.70	0.26	-2.89	-0.08
Tankari	787.27	16.97	787.27	16.97	0.00	0.00
T.Talavdi	0.55	0.11	1.06	0.22	+0.51	+0.11
Zamdi	1.85	0.14	0.11	0.01	-1.74	-0.13
Total:	974.58	4.10	968.55	4.07	-6.03	-0.03

The physical location of this region makes it the region of kharlands and creeks. As many as eight villages of this region on the coastal side in the west, and on the estuarine side on the south, are indented by several big and small backwater channels.

In 1959-60, Tankari (16.97%) was the leading village in respect of area under this category, followed by Islampur (7.46%) and Dolia (7.40%). Tankari and Islampur are located on the two sides of the same Islampur creek. Dolia is on Dolia creek. Their major percentage of land has gone to this feature. Other villages ranged between 0.01 per cent in Devla, and 0.83 per cent in Malpur. In 1979-80, the area occupied by this sub-category in Tankari, Malpur, Asarsa and Kapuria remained unchanged. Asanvad appeared on the scene with 0.04 per cent of area under it. Devla


BARA TRACT, JAMBUSAR
Change in Ravines, Creeks & Waste land
1959-60
1979-80
% To Geog Area
Above 3 0 High
1·1-3·0 Medium
1 0 8 Below Low
0 2 4 Miles
0 2 4 6 Km.
(a)
(b)
MAHI R.
N
Levels of Change (%)
Positive
Negative
Above 0 30 High Above 0·30
0 11-0·30 Medium 0·11-0·30
0 10 8 Below Low 0 10 8 Below
N.C. No Change
N.C.
DHADHAR R.
0 2 4 Miles
0 2 4 6 Km.
(c)
Fig.3·9

(0.02%), Thakor Talavdi (0.11%) and Dolia (0.28%) went to positive side, most of this with the addition of 'kans'. Islampur (0.50%), Nada (0.08%) and Zamdi (0.14%) went to negative side, which shows the insignificant reclamation in these villages over two decades.

An attempt towards reducing the area under this use can be seen in Islampur, Nada and Zamdi where 0.50, 0.08 and 0.13 per cent of land under this use have been reclaimed. These percentages of land have been reclaimed from the ravines and portions of the creeks. The positive changes in Devla (0.02%), Dolia (0.28%) and Thakor Talavdi (0.11%) are mainly due to the provision of artificial drainage. Asanvad appeared in 1979-80, due to same reason. Asarsa, Kapuria, Malpur and Tankari did not show any change. However, it shows that further demand on land would curtail the existing area under this category (Fig. 3.9 c).

3.3.8 Land-under-Other-Uses:

Besides the uses mentioned above, the land is being put to some other important uses. They are graveyards, cremation grounds, barns, (khalis), the garbage dumping grounds which though occupying miniscule area are not less significant than the N S A, and the settlements. The first two are essential for the disposal of corpses belonging to people of Islamic faith and Hindu faith respectively, the other two are necessary for thrashing grains, and preparing compost respectively. These are the necessities of the rural population. There is a unique allotment of land in almost all the settlements of this area and that is easing ground for women (Jajroo). It is such a use which is no where heard of. Schools and playgrounds are the obvious elements of land use for meeting the educational and recreational needs of the people.

At the first point of time a sizeable area of 40.31 ha. (0.40%) was accounted under the 'other' uses. By the next point of time, it went down to 241.43 ha, (0.42%) marking an increase of 1.12 ha. (0.01%) in the whole of the study area. Table 3.21 gives a detailed break-up of the land under different uses under this group:

Table - 3.21

Land Under Other Uses

Category	1959-60		1979-80		Difference	
	Area	%	Area	%	Area	%
1. Barn etc. (grouped)	147.06	0.25	143.00	0.25 (appr.)	-4.06	-0.00
2. Graveyard	39.11	0.07	45.82	0.08	+6.71	+0.01
3. Cremation ground	23.63	0.04	21.87	0.04	-1.76	-0.00
4. Schools and playgrounds	30.07	0.05	30.34	0.05	+0.27	0.00
5. Temples etc.	0.44	0.00	0.40	0.00	-0.04	0.00
Total:	240.31	0.41	241.43	0.42	+1.12	+0.01

Land is that basic resource which serves the socio-economic ends of community, it is therefore, assigned different functions to meet their different needs. But over time the phenomenon of change does affect them either in the positive or the negative direction.

The regionwise and villagewise account would bring out the distribution pattern and the incidence of change in these uses.

In 1959-60, total land devoted to these uses categorised as 'other uses' was 240.31 ha (0.41%) and in 1979-80, it went up to 241.65 (0.42%) showing a positive change by 1.12 ha (0.01%) only.

In 1959-60, the area occupied by barns etc. was 147.06 ha (0.25%)followed by grave yards, 39.11 ha (0.07%), cremation grounds 23.63 ha (0.04%), schools etc. 30.07 ha (0.05%) and

temples etc. 0.44 ha. By 1979-80, barns etc. decreased to 143.00 ha. (0.75%), the graveyard area went up to 45.82 ha (0.08%), but the area under cremation ground decreased by 1.76 ha (maintaining its former percentage), schools went up by 0.27 ha. but that under temples etc. decreased by 0.04 ha. Following are the detailed account of these uses:

(i) Barns, Garbage Dumping Ground, etc.

In 1959-60, Region I, comprising 13 villages had 36.25 ha. (0.35%) under barn (khali), garbage dumps (ukardo), and Jajroo, which in 1979-80decreased by 2.13 ha (0.02%).

Among the villages, Chandpur Marva had no area under these uses at any point of time due to absence of population. In Hamadpur Kantharia, Kalak, Kava, Kimoj, Limaj, Runad, Salehpur Sangdi and Shambha, it ranged between 0.14 per cent in Hamadpur Kantharia and 0.78 per cent in Salehpur Sangdi at both points of time showing no change. Gulal, Sigam and Vadadla had 0.10 per cent to 0.50 per cent under these uses at the first point of time. At the next point of time, these were reduced by 0.01 per cent and 0.11 per cent respectively. Pachakda also showed a decrease of 0.04 ha. These declines are mainly in the area of barn, not in others of the group. However, the decrease is quite insignificant to be reckoned with. It shows that these uses generally have greater degree of stability, as they have been assigned a particular function, which they perform, as long as any abnormal situation does not arise.

Region II with its 22 villages had 61.45 (0.26%) at the first and 60.18 ha (0.26%) at the second point of time. Village Vad had no area under this use at any point of time, the other 21 villages had between the lowest 0.04 per cent in Degam, and highest 1.20 per cent in Mahapura. Nineteen villages show no change. Only two villages - Bhadkodara (0.07%) and Sardarpura (0.02%) - have shown negative change. However, with the exception of these two villages, the areas under this use show a state of stability.

In the eleven villages of Region III as a whole, the area under these uses was 49.36 ha. (0.21%) and 48.70 ha (0.20%) at the two points of time. This region also shows a very insignificant decrease by 0.01 per cent over a period of two decades. Its area in the villages ranged between 0.02 per cent and 0.73 per cent at the first and the second points of time. Kapuria, Dolia and Zamdi show a decrease between 0.01 per cent (Kapuria), and 0.08 per cent (Zamdi). Indeed Zamdi retained its previous area, but the computation of percentage due to the increased total area of the village caused the decrease. Thus, only two villages - Kapuria and Dolia - have got the area under this use reduced by negligible percentages.

In case of Region III also, the unchangeability of this use is proved. Normally, these uses are more resistant to change than others unless, of course, any abnormal problem does arise.

(ii) Cremation Grounds and Graveyards:

Cremation ground and graveyards also have, more or less, the higher level of permanency. However, graveyards have the flexibility to increase being linked with the increasing population, while the cremation ground has the tendency to decrease, being pressed from all sides by other uses.

In 1959-60, the total area under cremation ground was 23.63 ha. (0.04%) which decreased, by 1.76 (retaining its percentage) at the next point of time, while the graveyard occupied 39.11 ha. (0.07%), and went up by 7.14 ha (0.01%) by 1979-80.

Region I had 9.76 ha. (0.09%) under cremation ground distributed over its seven of the thirteen villages. It ranged from 0.03 per cent in Kava to 0.70 per cent in Vadadla at the first and 0.02 per cent to 0.65 in the same villages at the next point of time. Except in Runad, where a decrease occured by 0.01 and 0.05 per cent respectively, in other villages it remained unchanged.

In case of the graveyard, the total area of 2.27 ha. (0.02%) remained unchanged. Only Chandpur Marva (0.53%), Pachakda (0.28%) and Sigam (0.83%) are the villages having this use of land. No change took place in any one of them.

Region II in 1959-60, held only 10.00 ha (0.04%) under the cremation ground. By the second point of time, it went up to 10.26 ha. (0.04%) showing an increase of only 0.26 ha. This use is found in only thirteen of the 22 villages of this region. Of them none except Kundhal made a positive change by 0.26 ha. (0.04%). This fact estalishes the stability of such uses.

Equal number of villages of this region show areas under graveyard. In 1959-60, it occupied a total of 23.64 ha. (0.10%) which went up to 28.85 ha. (0.12%) by the next point of time.

Of the thirteen villages, eleven remained stable. Bhadkodara and Khanpur Deh went up by 0.38 ha. (0.02) and 4.83 ha (0.17%) respectivelly. Beyond all reasons, this increase may be attributed to the individual decision making and choice of the people of these villages, in view of the increasing population, and expectation of more deaths.

In Region III only five villages had a total of 3.87 ha (0.02%) under cremation ground at the base year, and showed a decrease by 0.44 ha. (0.01%). The area under this use ranged, in the villages, between 0.01 and 0.07 per cent. Four of the five villages remained stable. A decrease from 0.05 per cent to 0.01 per cent in 1979 -80 is seen in Malpur, for which no reason could be ascertained. Tankari with 0.81 ha. (0.02%) under this use showed no change.

In case of the graveyards, five of the eleven villages of this region had 13.20 ha. (0.05%), and 14.70 ha. (0.06%) at the two points of time. Devla, Islampur and Nada ranged between 0.01 per cent and 0.26 per cent, at both points of time, showing no change at all. Malpur and Tankari had respectively 0.01 per cent, and 0.12 per cent at the first point of time. By the second

point of time, they increased its area by 0.02 and 0.01 per cent respectively. Thus, the total area under graveyards in this region went up by 1.50 ha. (0.01%) in 1979-80, over its 13.20 ha. (0.05%) of 1959-60.

(iii) Schools and Playgrounds:

The changing education policy of the Government of India as well as the State Government has given spurt to the propagation of primary and secondary levels of education not only in the urban but also in rural areas. The policy is to cover all the villages, i.e., each village should get one primary school. But the two decades of the study period have seen a very sluggish growth of schools. It was during the closing days of the Sixth Plan that the policy implementations have been expedited.

During 1959-60, only 15 villages (33%) of the 47 (including the village Isanpur) enjoyed the amenitiies of primary school. In all 30.06 ha (0.05%) in 1959-60, and 30.34 ha. (0.05%) in 1979-80 were occupied by schools and playgrounds. Thus, a very insignificant increase of area by 0.28 ha. is seen. It shows that, inspite of the increase in number of schools by four (from 15 to 19), the area has not increased significantly. It also shows that only a few schools have been allotted separate land, the others have been adjusted within the area of the settlement (gamthan), itself as it has been seen in Thakor Talavdi and other villages.

The schools in 1959-60, occupied only 0.06 per cent of the total area of Region I. Kalak (0.17%), Kava (0.13%), Runad (0.02%) and Sigam (0.02%) were the villages with schools, Kimoj (0.02%) and Shambha (0.01%) joined them in 1979-80. Kalak and Sigam increased the area by 0.02 per cent each , as their schools were upgraded to high school level.

Seven of the twentytwo villages of Region II had together 5.76 ha (0.01%) at the first point of time. Chhidra (0.02%) and Thanava (0.03%) came up with schools at the second point of

time. In addition, Jantran and Sindhav raised their school areas by 0.01 oer cent, bringing the total school area in the region to 5.93 ha. (0.01%).

Inspite of the smaller number of villages than the other two regions, the Region III had 8.26 ha. (0.03%) of its total area under schools and playgrounds at the base year. Only three villages - Devla (0.09%), Malpur (0.09%) and Tankari (0.07%)- had schools in 1959-60. Islampur in 1979-80, appeared with 0.66 ha. (0.06%) raising the total number of villages to four. Malpur and Tankari remained static, while Devla went down from 0.09 to 0.04 per cent marking a substantial decrease of 0.05 per cent. It was mainly because the area of the playground was withdrawn. Thus, a decrease of 1.94 ha took place in the total area under schools.

It is obvious from the figures of the area under schools, that the schools could not become popular institutions even over three decades after independence and over two decades after the formation of Gujarat State (May, 1960). Thus, this aspect of the educational developmental planning in this area seems to have been quite neglected. Education is the sign of development of a villalge, the schools are the media for it. But now stress has been laid on opening at least one primary school in each village by the end of the Seventh Plan period. Thus, more land is expected to go under schools in the near future.

(iv) Temples, Mosques and Dargahs

Region I showed 0.07 ha under temple in Gulal in 1979-80. Region III showed 0.44 ha (0.01%) under mosque in Tankari at the base year and 0.33 ha. (0.01%) at the second point of time. Region II did not have any piece of land under such use at any point of time.

(v) Cattle Shade:

A single patch of land under this use is found in Nadiad village of Region II. At the first point of time it was 11.22 ha. (1.33%) which decreased to 10.01 ha. (1.18%) at the next point of time - mainly roads needed the land. Thus, a decrease by 1.01 ha. (0.15%)took place in this use.

3.4 CONCLUSION:

To sum up, though each category of land use shows mixed trends of change, however, on the basis of greater percentage of dynamism in the different categories, the following three trends have been observed:

(1) Positive change;
(2) Negative change;
(3) Relatively static.

3.4.1 Positive change:

The land under agricultural use, such as N S A, and the land under social and cultural uses such as settlements, road, schools, etc. are found maintaining an upward trend, thus, showing positive change. In case of N S A, 85 per cent of villages showed positive change, 13 per cent showed negative change and 2 per cent remained unchanged, thus, showing greater percentage of positive change. In case of settlements, 61 per cent of the villages showed increase, 37 per cent showed constancy, and two per cent showed no area under this use. This shows higher percentage of positive change, lower percentage of constancy and no negative change.

3.4.2 Negative change:

The uses more vulnerable to negative change have been kharland, culturable waste and wasteland, the field tracks (Hade, Pakdelo Marg), the grazing land etc. A notable negative change took place in the hectarage of kharland over the two decades. In all 483.30 ha. (0.84%) of the total kharland area had been reclaimed. Out of the 20 villages having this land about 2 per cent of them have shown increase, 75 per cent decrease, and only five per cent showed no change. Similarly, in the other wasteland areas, out of 25 villages having this type, 84 per cent showed decrease, eight per cent increase, and eight per cent no change. Thus, in all such uses, the percentage of decrease is much greater establishing the trend of negative change in favour of positive utilization. The Hade Pakdelo Marg (field

tracks) supposed to be essential to approach the fields is decreasing by a fast rate. In all, it decreased by 115.04 ha. (0.20%) in two decades. Of the 46 villages, about nine per cent of them showed a marginal increase, 72 per cent showed decrease and seventeen per cent showed no change, while two per cent showed no area under this use at any point of time.The overwhelmingly larger percentage of villages showing negative change is an indication that such pieces of land would be usurped by other uses considered more rewarding from a socio-economic point of view.

3.4.3 Relatively Static:

The third category includes those uses which have greater degree of stability. It does not mean that they were not affected by either negative or positive changes. Among such uses are the tanks and ponds, the graveyards and cremation grounds, the barns, garbage dumping ground and Jajroos, the mangrove forest at Malpur, the railway etc. In case of the tanks and ponds, the relative constancy is somewhat negated by the decrease in area under ponds; nevertheless, as much as 59 per cent of the villages show constancy, 39 per cent negative change and 2 per cent positive change. The graveyards and cremation grounds maintained highest degree of constancy out of the 21 villages with graveyards, 81 per cent showed no change and 19 per cent went for positive change. Of the 26 villages, with cremation grounds, 81 per cent showed no change, 11 per cent showed decrease and eight per cent showed increase.

The level of constancy is also high in case of the barns and the garbage dumps etc. Of the 46 villages, 79 per cent have maintained constancy. 17 per cent have showed decrease by 3.40 per cent, and four per cent had no such area at any point of time. Thus, it establishes the fact that, other things being equal, such uses are less prone to change. Similar is the case with the railways, and the mangrove forest at Malpur. However, these

two are more vulnerable to both negative and positive changes. The railway may acquire more area if any such developmental programme is implemented, and the forests may disappear giving way to some other economicallly viable use.

Finally, it may be concluded that the general land use undergoes positive, negative and mixed trends of change according to the changing conditions of human and economic environment of the area. But the fact notable here is that the changes are usually sluggish not abrupt as in case of the cropland use. It is, thus, deducted that sluggish is the nature of general land use change in the area. Better economic vistas, more exploration of resources, increased supply of amenities of life to rural people, etc. may bring more changes in the existing rural land use systems in the days to come.

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