CHAPTER III

DEMOGRAPHIC STRUCTURE

1. Introduction :

There is a great variation in population growth by natural increase or migration; from area to area depending upon different infra structural facilities, topography, social environment, land value, people's fascination for place etc and accordingly future trend of population growth follows.

The past, degree of urbanisation, socio-economic conditions of the region and recent rend in urbanisation followed by modernisation have made thin contribution to different aspects of demographic characteristics which are brought out in this chapter in order to know the importance of population studies in the urban growth and development. Comparative studies of population of Anand and other selected district headquarter and urban areas highlight various features and problems of population.*1

An attempt is made here to predict the future population growth of Anand and its impact. Population of Anand is increasing very rapidly. It had a population of 80,000 persons in 1979-80 which today after two decades has gone above 1,30,000 persons with this rate of increase the mobility rates/ in migrants have also increased considerably. Anand possesses about 70% of the taluka's total population within a radius of just 10 km. This is the reason why Anand daily receives an equal number of persons from its periphery and adjoining towns and cities in the form of commuters who use the facilities provided by Anand. No other city adds daily the same number of persons to its population everyday in the form of commuters

e.g. Ahmedabad does not receive daily another 30 lakhs, Calcutta / Mumbai do not receive daily another 1 crore from outside or surrounding region*2.

Anna, which was a class II town in 1989 today qualifies to be a class I-C, City on the basis of population size (1,31,104) in 1991 and possesses all the necessary infrastructure and amenities, as compared to the cities of similar population size.*3

Population is thus one of the most important features in the development of any urban area. Anand has a high concentration of population, which has several reasons as below :

(a) Anand is a railway junction and has several roads and railways lines radiating from it connecting the surrounding rural as well as urban centres and far away places.

(b) Though Anand is just a taluka headquarter, it is a capital of the State's municipalities.

(c) It is a main collecting and distributing centre for an agriculturally rich region.

(d) It has developed as both an educational centre as well as an Industrial and Commercial area.

(e) The early missionaries also developed hospitals and educational institutions.

(f) Under the British Government the Polson Dairy was established in the city as the region was rich in cattle. The dairy was founded in order to supply milk products to the British Army in India. Later on with the establishment of Amul dairy further propulsive waves of development attracted other industries to it.

After careful examination of the demographic structure with the help of demographic data of Anand collected from the census reports, gazetteers, municipality records as well as personal investigation in the field, some significant facts were revealed.

2. Growth of population and variation in population:

During the last century, growth of population has increased considerably in most of the towns and cities of the country.

The earliest records of population show that in 1872 the population of Anand was 8773 and during the next decade (1871-81) there was an increase in population by just 52 persons, with decadal growth rate of just 0.59 %. In the next decade (1881-1891) there was an increase of 389 persons with decadal growth rate of 4.41 %. Over all view of Figure 3.1, suggest that the percentage decadal growth rate remained steady without much variation in the next 3 decades thereafter i.e. till 1931. It was during 1931-41 that the growth rate was tremendous, reaching 47.12%. This might be the result of several migrants from Rajasthan, Kutch and Saurashtra due to famine and drought conditions and partially due to the development of Dairy industry (POLSON) which attracted people along with their cattle for supplying milk and milk products.

The highest percentage increase of 57.01% during the decade 1951-61 is due to Gujarati migrants from East Africa and later due to the bifurcation of Bombay State into Gujarat and Maharashtra States. Finally in 1991 when the population crossed the mark of 1,00,000 by

31.36% decadal growth i.e. during 1981-91, Anand acquired the qualification for recognition as a city. The percentage decadal growth rate has declined since 1961 till 1991 considerably, which could be due to outflow of population to U.K., U.S.A and Australia(Table 1.1. Fig. 3.1)

Table : 1.1

	Growth of population (From 1871 to 1991)		
Year	Persons	Increase	Decadal Growth rate
1871	8,773	0	--
1881	8,825	52	.59
1891	9,214	389	4.41
1901	10,010	796	8.63
1911	10,139	129	1.29
1921	11,054	915	9.02
1931	11,660	606	5.48
1941	17,154	5494	47.12
1951	25,767	8513	50.21
1961	40,458	14691	57.01
1971	59,155	18697	46.21
1981	83,936	24781	41.89
1991	1,31,104	26330	31.36

3. Fertility, mortality, mobility and survival rate :

The calculations of both birth rates and death rates in the city since 1951, shows that the highest and lowest were 67.41% and 41.6% in 1957 and 1952 respectively. The rate had increased gradually from 41.6% (1952) to 67.41% (1957) but by 1959 it had decreased to 46.41% and kept on fluctuating till 1982. However, since then it is steady with no noteworthy variation. (Table : 1.1,Fig : 3.1 & 3.2)

DECADAL VARIATION IN POPULATION

ANAND (1871-1991)

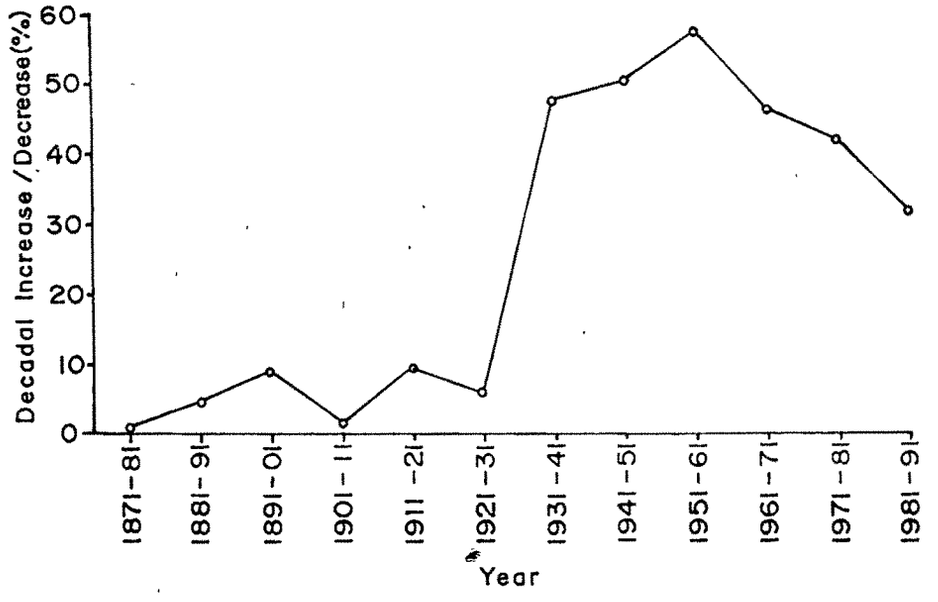


Fig 3·1

GROWTH OF POPULATION & SURVIVAL RATE

ANAND (1951-1997)

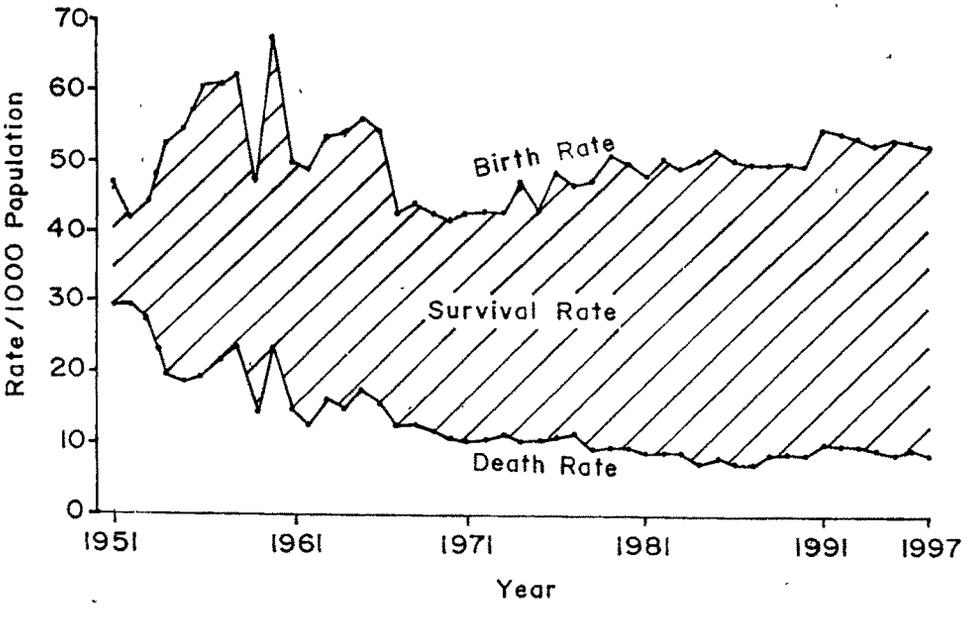


Fig 3·2

SURVIVAL RATE
ANAND (1951-1997)

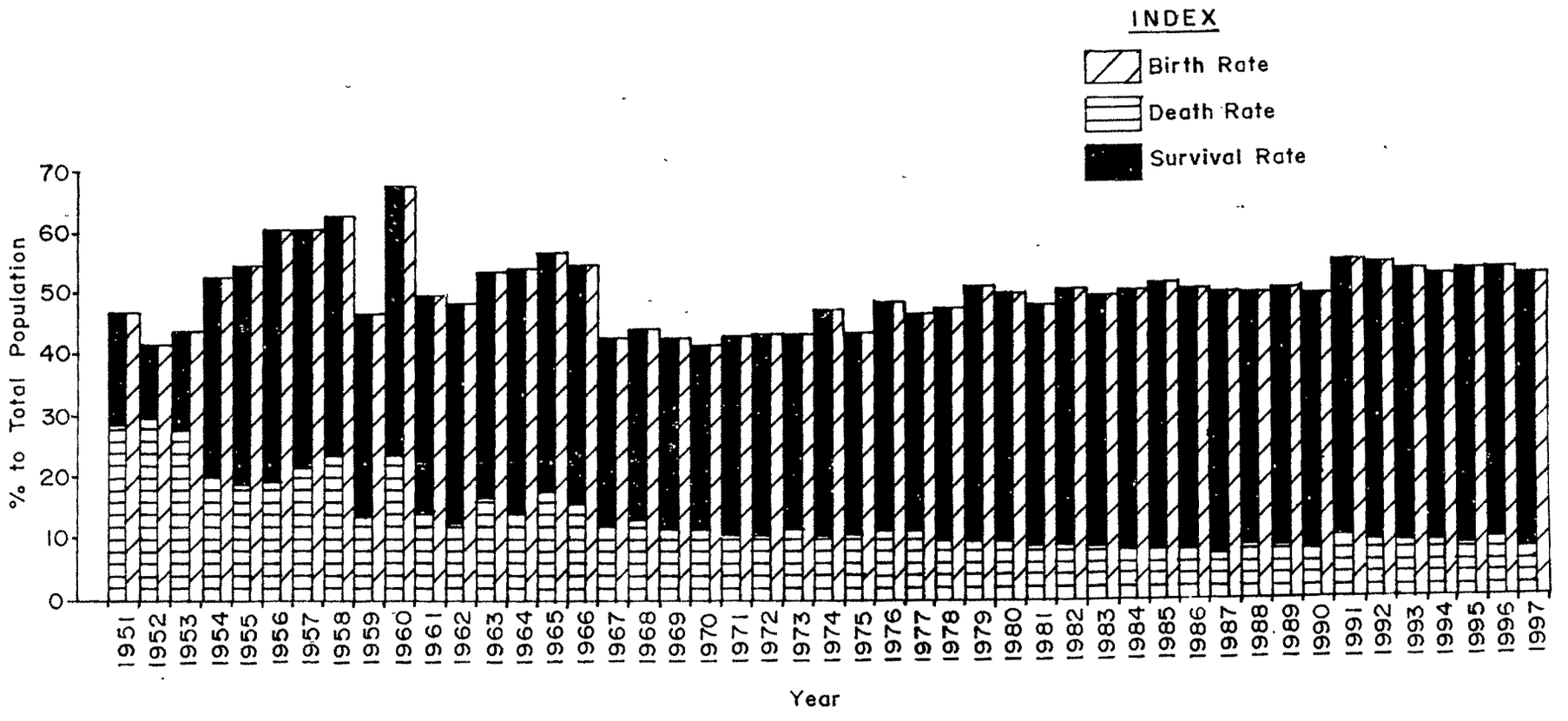


Fig 3.3

Table : 1.2

Year	Birth rate	Death rate	Year	Birth rate	Death rate
1951	47.11	29.14	1975	43.23	10.69
1952	41.06	29.61	1976	48.40	11.10
1953	43.81	27.32	1977	46 43	11 20
1954	52.74	19.94	1978	47.47	9.51
1955	54.68	18.51	1979	51.13	9.97
1956	60.34	19.40	1980	50.24	9.69
1957	60.50	21.65	1981	48.10	8.58
1958	52.28	23.41	1982	50.70	8.80
1959	46.92	13.62	1983	50.27	8.46
1960	67.41	23.79	1984	50.36	7.37
1961	49.72	14.81	1985	50.43	8.04
1962	48.92	12.91	1986	49.51	7.59
1963	53.55	16.45	1987	55.35	7.22
1964	54.00	14.44	1988	50.36	8.80
1965	56.47	17.76	1989	50.43	8.46
1966	54.56	15.55	1990	49.51	8.46
1967	42.73	12.23	1991	55.35	10.16
1968	44.23	13.20	1992	54.90	9.99
1969	42.95	11.49	1993	53.79	9.63
1970	41.74	11.46	1994	52.90	9.34
1971	43.64	10.80	1995	53.58	8.65
1972	43.35	10.81	1996	53.53	9.65
1973	43.13	11.59	1997	52.86	8.63
1974	47.45	10.70			

The death rates on the other hand show a maximum of 27.32% in 1953 and a minimum of 8.63% in 1997 i.e recently. This tells us about the developed medical facilities and improvement in the field of medical science (Fig : 3.1).

The natural increase or the survival rate has improved considerably since 1961 when it was 1411 persons i.e. 34.87%, till 1997 i.e. 45.21% (Table : 1.1 & 1.2), this accelerates the city's overall population growth.

The tabulation of the information obtained from the socio-economic field survey suggest the mobility rates and the calculations on the basis of birth rates, death rates and available population figures it becomes easy to understand the decadal rate of migration.

4. Population Projection :

The projection of future population depends upon the past growth of population. A number of methods so far has been employed by the demographers to estimate the future population which can be grouped as direct and indirect techniques.*4

The direct techniques are based on correlation of population numbers with social and economic indices and are more sophisticated. Their application is difficult if detailed sample survey of key areas has not been made, or if there are too many outside influences. The indirect technique can be grouped under four heads as (a) comparative forecasting (b) ratio and correlation method (c) growth composition analysis and (d) extrapolation.

However the U.N. Demographic year book uses the following formula $\left(t\sqrt{\frac{p_1}{p_o}} - 1 \right) 100$; Where Po is the population at the beginning of the period; P1 is the population at the end of the period, and 't' is the number of years.

Birth rates $r = b \times K$ Where 'b' is the total number of births during the year, 'p' is the total Population; K = 1000.

In the same way, Death rates $r = d \times K$, Where 'd' is the total number of deaths during the year, 'p' is the total population, K = 1000.

(a) and (b) methods i.e. comparative forecasting and ratio and correlation method are preferred respectively for developed and under developed countries while (c) growth composition analysis, needs more accurate figures of migration. So we are left with the option of Interpolation and Extrapolation techniques of population projection.*5

For population projection of Anand the method of Interpolation – Extrapolation and correlation techniques produce fruitful result. The component projection method of population projection and the logistic curve method (as shown below) followed by Dr. K.S. Shah does not fit properly for Anand as is the case with the Logistic curve

$$\hat{Y} = (20.914 + 4.793029)X + 0.568049 \times X^2 \quad \text{.........(I)}$$

Where $\hat{Y}$ = projected population for the year X.

Secondly, Yn = Yn-1 + Bn-Dn ....(II)

Where Yn = population of 'n' year.

Yn-1 = Population of n-1 year (previous year)

Bn = Births in 'n' year.

Dn = Deaths in 'n' year.

Dr. Shah has projected the future population figures using these formulas which are not satisfactory since they are lacking in accuracy as far as the constant value of 0.568049 is concerned. No where, he has mentioned how he has derived this figure of 0.568049 and it also fails to explain the problem of year 2000. { if 'x' is the year in formula (I) }. Table : 1.3 & Table : 1.4 makes it very clear, that the figures calculated are not satisfactory and not in sequence in any formula.

Table : 1.3

Year	Births	Deaths	Estimated population by using formula (I)	Estimated population by using formula (II)
1971	2546	639	59155	59088
1972	2647	660	61062	61198
1973	2719	731	63049	63361
1974	3089	696	65037	65569
1975	2915	721	67427	67823
1976	3370	773	69621	70122
1977	3353	809	72218	72467
1978	3549	711	74762	74857

- Source : Souvenir – Anand municipality – "Shatabdi mahotsav" (1889-1989).

Table : 1.4

Year	Estimated population by Formula I	Year	Estimated population by Formula II
1981	82300	1991	110003
1982	84872	1992	113086
1983	87480	1993	116156
1984	90152	1994	119274
1985	92860	1995	122436
1986	95613	1996	125644
1987	98813	1997	128898
1988	101257	1998	132196
1989	104147	1999	135540
1990	107082	2000	138930

- Source : Souvenir – Anand municipality – "Shatabdi mahotsav" (1889-1989).

Using Regression and correlation :

The use of regression line along with interpolation and extrapolation technique has yielded better results to estimate the future population growth in case of Anand. The values thus obtained are very close to the actual population figures.

Methodology :

The number of births and deaths were correlated simultaneously with the year and their correlation was established in order to obtain the regression line and the equation for estimating number of births and deaths for the future years beyond 2000. (Table : 1.5) (Fig : 3.3.a). The regression coefficient and constants 'a' and 'b' were obtained and thus number of births for year 'x' was calculated as follows :

$$Y = a + bx.$$

$Yb = (-11507.67) + (194.8144 \times X)$ and number of deaths for the year 'x' was calculated by -

$Yd = (-1079.4387) + (23.418803 \times X)$; Where Yb and Yd are the estimated births and deaths in the respective years.

After obtaining the number of births and deaths, it is also necessary to obtain the number of net migrants. So for this the actual census population figures for the census years 1951,1961,1971,1981,1991 were considered and by interpolation and extrapolation method

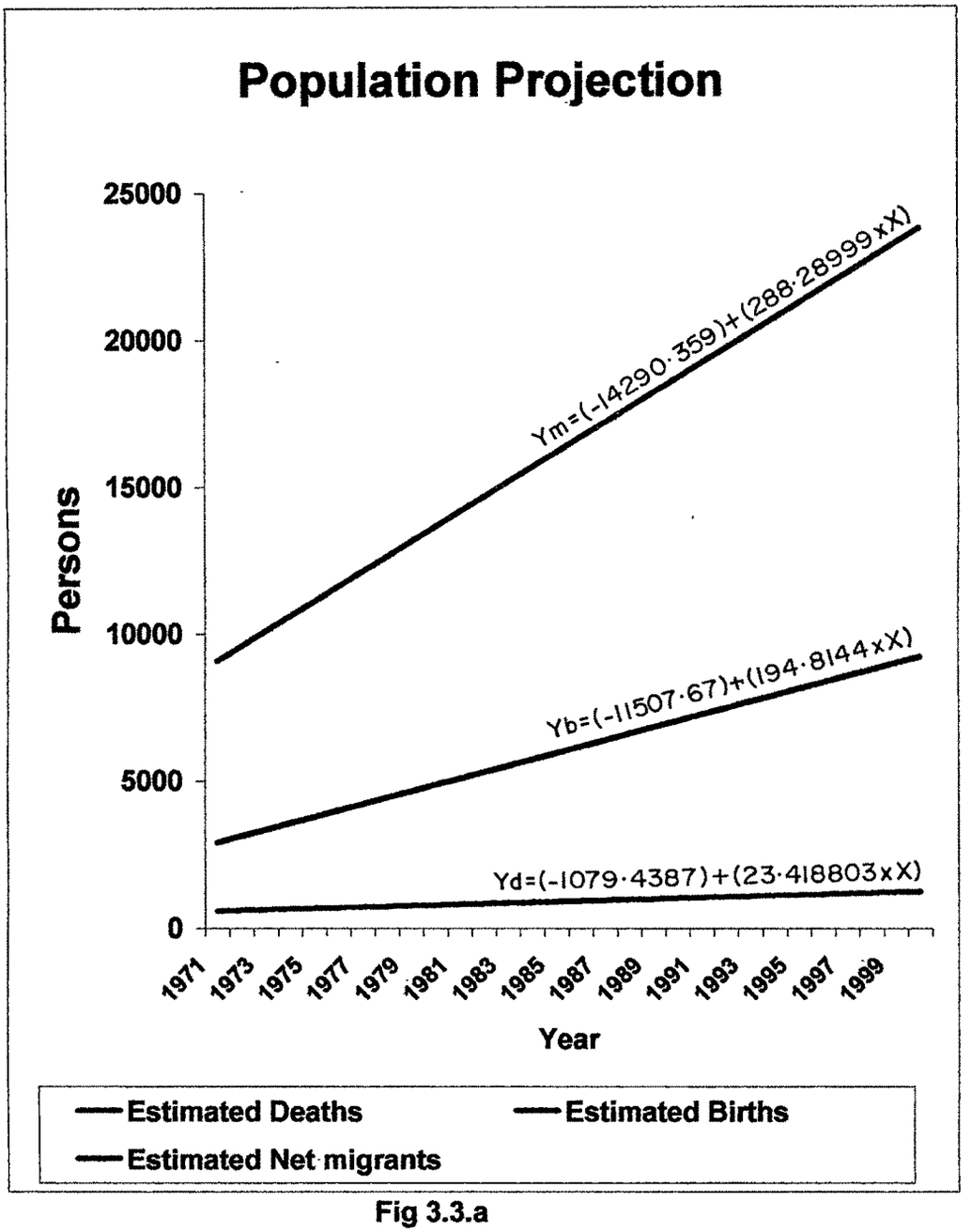

Population Projection
25000
20000
15000
10000
5000
0
Persons
Ym=(-14290·359)+(288·28999xX)
Yb=(-11507·67)+(194·8144xX)
Yd=(-1079·4387)+(23·418803xX)
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
Year
Estimated Deaths
Estimated Births
Estimated Net migrants

Fig 3.3.a

the annual population figures were obtained. From these actual population figures, the natural increase i.e. Bn-Dn = Natural increase formula was applied which gave the net migration figures, and thus again with regression equation the constants :

$$Ym = (-14290.359) + (288.28999 \times X)$$

Where X = year for which the figure of net migrants was obtained for approximate estimating what the net migration would be in the future, while Ym = net migrants for the year X.

Finally by substituting all these parameters in the following formula :

$Yn = (Bn - Dn) + Mn + Yn\text{-}1$; future population figures are obtained which are very near to the actual figures.

Where Yn= population of nth year.

Yn-1=population of (n-1)th year.

Bn= births in nth year.

Dn= deaths in nth year.

Mn= net migrated in nth year.

Thus applying the above formula the population of Anand city in 1991 is 1,34,060, whereas the actual figure according to the census is 1,31,104, which is very close to the estimated figure.(Table : 1.5)

Table : 1.5

Year	Actual Births	Actual Deaths	Estimated Births	Estimated Deaths	Actual Population	Population by Natural increase	Net migrants	Estimated Net migrants	Estimated Population
1971	2546	639	2324	583	59155	51464	7691	6178	59088
1972	2647	660	2519	607	61633	53451	8182	6467	61198
1973	2719	731	2714	630	64111	55439	8672	6755	63361
1974	3086	696	2909	654	66589	57829	8760	7043	65569
1975	2915	721	3103	677	69067	60023	9044	7331	67823
1976	3370	773	3298	700	71546	62620	8926	7620	70122
1977	3353	809	3493	724	74023	65164	8859	7908	72467
1978	3549	711	3688	747	76501	68002	8499	8186	74857
1979	3968	774	3883	771	78979	71196	7783	8485	76628
1980	4059	783	4077	794	81457	74472	6985	8773	80939
1981	4038	721	4272	817	83936	77789	6147	9061	82300
1982	4424	768	4467	841	88653	81445	7208	9349	86415
1983	4510	769	4662	864	93370	85186	8184	9638	90736
1984	4817	702	4857	888	98086	89301	8785	9926	95273
1985	5153	799	5052	911	102803	93655	9148	10214	100037
1986	5255	788	5246	935	107520	98122	9398	10503	105039
1987	5455	783	5441	958	112237	102794	9443	10791	110291
1988	5702	996	5636	981	116954	107500	9454	11079	115806
1989	5960	1000	5831	1005	121670	112460	9210	11367	121596
1990	6102	1043	6026	1028	126387	117519	8868	11656	127676
1991	6104	1121	6220	1052	131104	122502	8602	11944	134060
1992	6332	1152	6415	1075	138446	127682	10764	12232	140763
1993	6478	1160	6610	1099	145787	133000	12787	12521	147801
1994	6652	1175	6805	1122	153129	138477	14652	12809	155191
1995	7031	1135	6999	1145	160471	144373	16098	13097	162951
1996	7341	1324	7195	1169	167813	150390	17423	13385	171099
1997	7566	1236	7389	1192	175155	156720	18435	13674	179654
1998			7584	1216				13962	188637
1999			7779	1239				14250	198069
2000			7974	1262				14539	207972

5. Population density :

The density of population of Anand was 1903 persons per Sq.km. in 1961 which after a decade (in 1971) increased to 12799 followed by 3972 persons/Sq.km. and 5218 in 1991respectively with a present estimated density of 6152 (1998) persons/Sq.km.

The highest density of population is in Ward VIII that is the main core where there are narrow streets and by-lanes, houses are congested and in unhygienic conditions. The other two crowded and more densely populated areas are Ward IX and Ward X (1991) respectively adjacent to the core and railway station and on the main thoroughfare and main roads which traverse through these wards linking them to the adjoining rural and urban areas. The nearness to commercial areas, markets, go-downs, shopping centres, municipal hospital, municipality office etc, located in this area play an important role in determining the density of population in this area.

A comparative idea of the Ward wise density between 1961 & 1991 (Fig : 3.5) (Tables : 1.6 to 1.9) suggest that those wards which are surrounding the nucleus (core) and those which are the most accessible or near the railway station, the main water tanks and water bodies are densely populated. Location of administrative area and educational institutes, hospitals, clinics, play again an important role in increasing population density of these wards like Wards VIII, IX, X.

However, Ward VIII shows a decrease in density. This is because more shopping complex and office premises are replacing residences. Similar is the case of Ward V and Ward IX. On the other hand Wards XII and XIII, which are the outer most, wards away from the core show increase in density from 1981 to 1991. This may be because of the increase of population pressure and also increasing land cost in the core area that people are moving out and thereby giving rise to new extensions. While availability of low cost housing away from the busy 'hub' may have increased population in Wards XII and XIII are showing an

CHANGES IN WARD BOUNDARIES
ANAND (1961-1991)

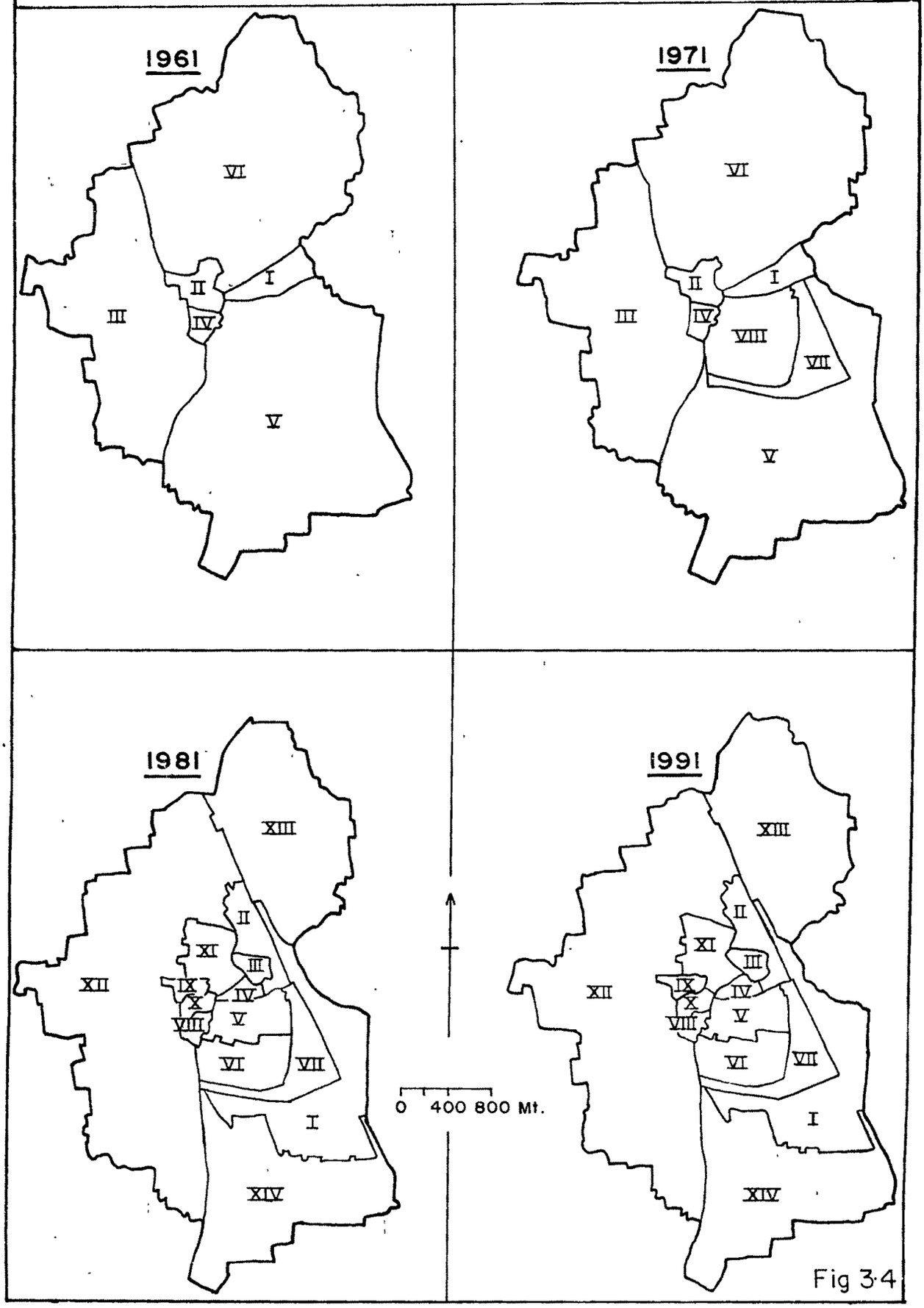


Fig 3·4

WARDWISE POPULATION DENSITY

ANAND

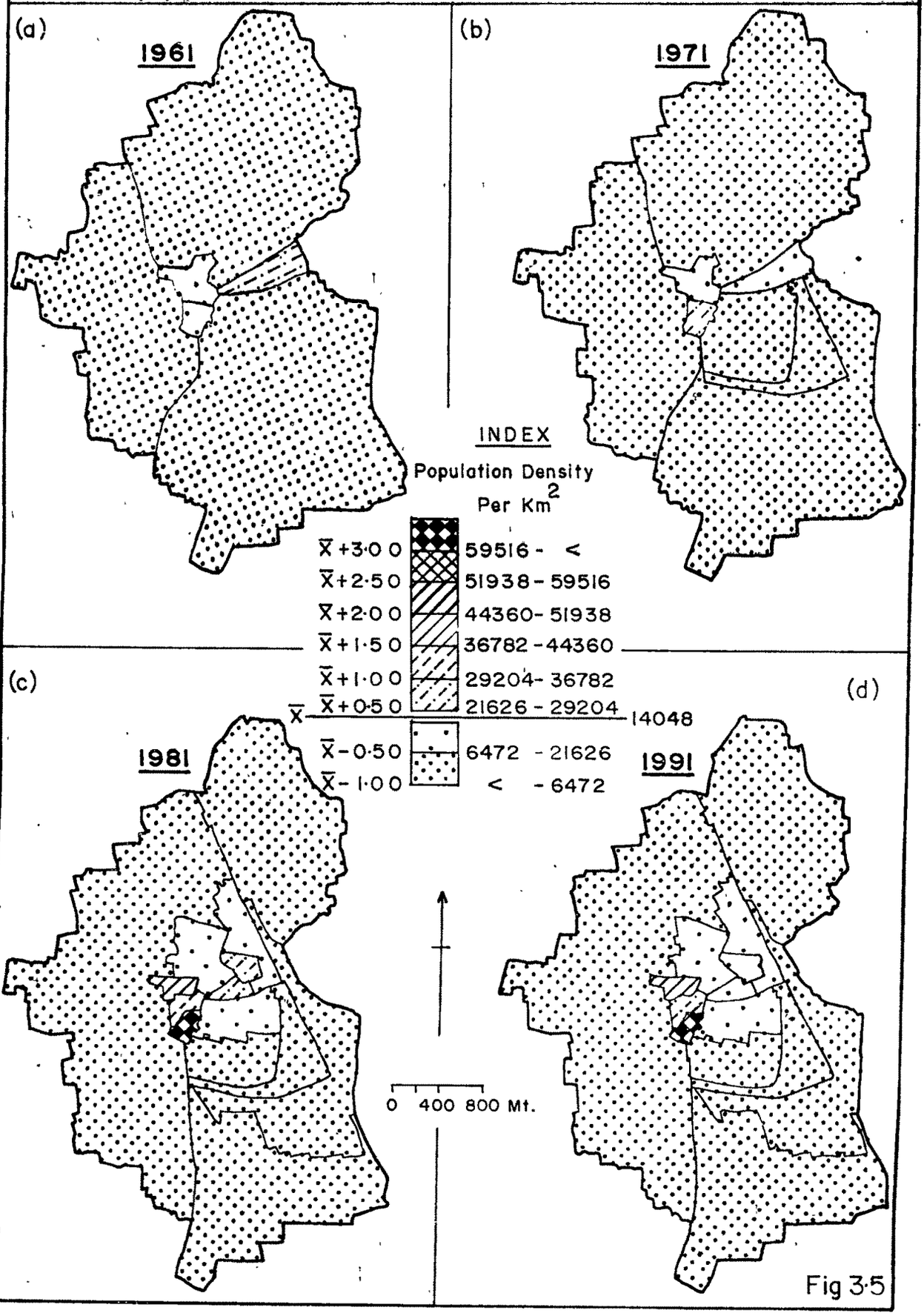


Fig 3·5

increasing trend since 1971 which may be because of penetration of the surrounding urban and rural area population within the municipal limits.

Table : 1.6. Ward wise population Density (1961)

Wards	Population			Area in Sq.km.	Persons per Sq.km.
	Male	Female	Total		
I	5133	4278	9411	0.3908	24081
II	1850	1720	3570	0.2931	12180
III	3044	2734	5778	3.9081	1478
IV	1887	1726	3613	0.2071	17446
V	3431	3034	6465	9.3794	689
VI	7024	4597	11621	7.0815	1641
TOTAL	22369	18089	40458	21.26	1903

Table : 1.7. Ward wise population Density (1971)

Wards	Population			Area in Sq.km	Persons per Sq.km.
	Male	Female	Total		
I	3024	2904	5928	0.3908	15169
II	2570	2359	4929	0.2931	16816
III	5590	4849	10439	3.9086	2671
IV	2881	2663	5544	0.2071	26770
V	7743	5776	13519	6.8987	1960
VI	4575	3780	8355	7.0824	1180
VII	2436	1878	4314	1.0826	3985
VIII	3352	2775	6127	1.2663	4838
TOTAL	32171	26984	59155	21.13	2799

Table : 1.8. Ward wise population Density (1981)

Wards	Population			Area in Sq.km.	Persons per Sq.km.
	Male	Female	Total		
I	4834	4235	9069	2.1536	4211
II	3426	3170	6596	0.4964	13288
III	2404	2238	4642	0.1759	26390
IV	1510	1344	2854	0.1173	24331
V	2819	2069	4888	0.5941	8228
VI	3074	2661	5735	0.9576	5989
VII	1952	1763	3715	0.7192	5165
VIII	3872	3591	7463	0.1094	68218
IX	2818	2611	5429	0.1329	40850
X	2447	2226	4673	0.1485	31468
XI	3422	3169	6591	0.5785	11393
XII	6184	5432	11616	7.9189	1467
XIII	3578	3031	6609	3.7405	1767
XIV	2357	1699	4056	3.2793	1237
TOTAL	44697	39239	83936	21.13	3972

Table : 1.9. Ward wise population Density (1991)

Wards	Population			Area in Sq.km.	Persons per Sq.km.
	Male	Female	Total		
I	6501	6011	12512	2.1536	5810
II	3573	3406	6979	0.4964	14059
III	1881	1830	3711	0.1759	21097
IV	1153	1120	2273	0.1173	19378
V	2295	2052	4347	0.5941	7317
VI	3834	3562	7396	0.9576	7723
VII	1999	2010	4009	0.1792	5574
VIII	3674	3478	7152	0.1094	65375
IX	2587	2590	5177	0.1329	38954
X	1831	1762	3593	0.1485	24195
XI	4938	4471	9409	0.5785	16264
XII	13194	11778	24972	7.9189	3153
XIII	7228	6651	13879	3.7405	3710
XIV	2869	1988	4857	3.2793	1481
TOTAL	57557	52709	110266	21.13	5218

6. Density of houses :

As population density is the indicator of urban growth and development, so is the density of houses, which also shows the movement of residences from time to time and also reflects an idea of the changes in the land use category in the core as well as the periphery.

In 1961 (Fig : 3.6) the highest house density of 3641 houses/Sq.km. was noted in Ward I, which falls just opposite to the railway station on the Juna rasta. However, the density of houses increased in Wards IV and VII (1971) and then in Wards VIII, IX, X, IV, V (1981) followed by Wards VIII, IX, X, IV in 1991.

A comparative study of density of houses in Ward I, for 1961 and 1971 shows a decrease of 40% i.e. from 4309 in 1961 to 2590 in 1971 which could be attributed to replacement of residential units by educational institutes. (Table : 1.10 & 1.11). Similar is the case for Ward III in 1981 to 1991. (Table : 1.12 & 1.13). This may be because people sold their houses to builders who in turn develop it for commercial or other uses.

Table : 1.10. Ward wise Density of houses (1961)

Wards	Area in Sq.km	Number of houses	Houses per Sq.km.
I	0.3908	1684	4309
II	0.2931	592	2019
III	3.9081	1033	264
IV	0.2071	718	3467
V	9.3794	1319	141
VI	7.0815	1880	265
Total	21.26	7226	340

WARDWISE DENSITY OF HOUSES

ANAND

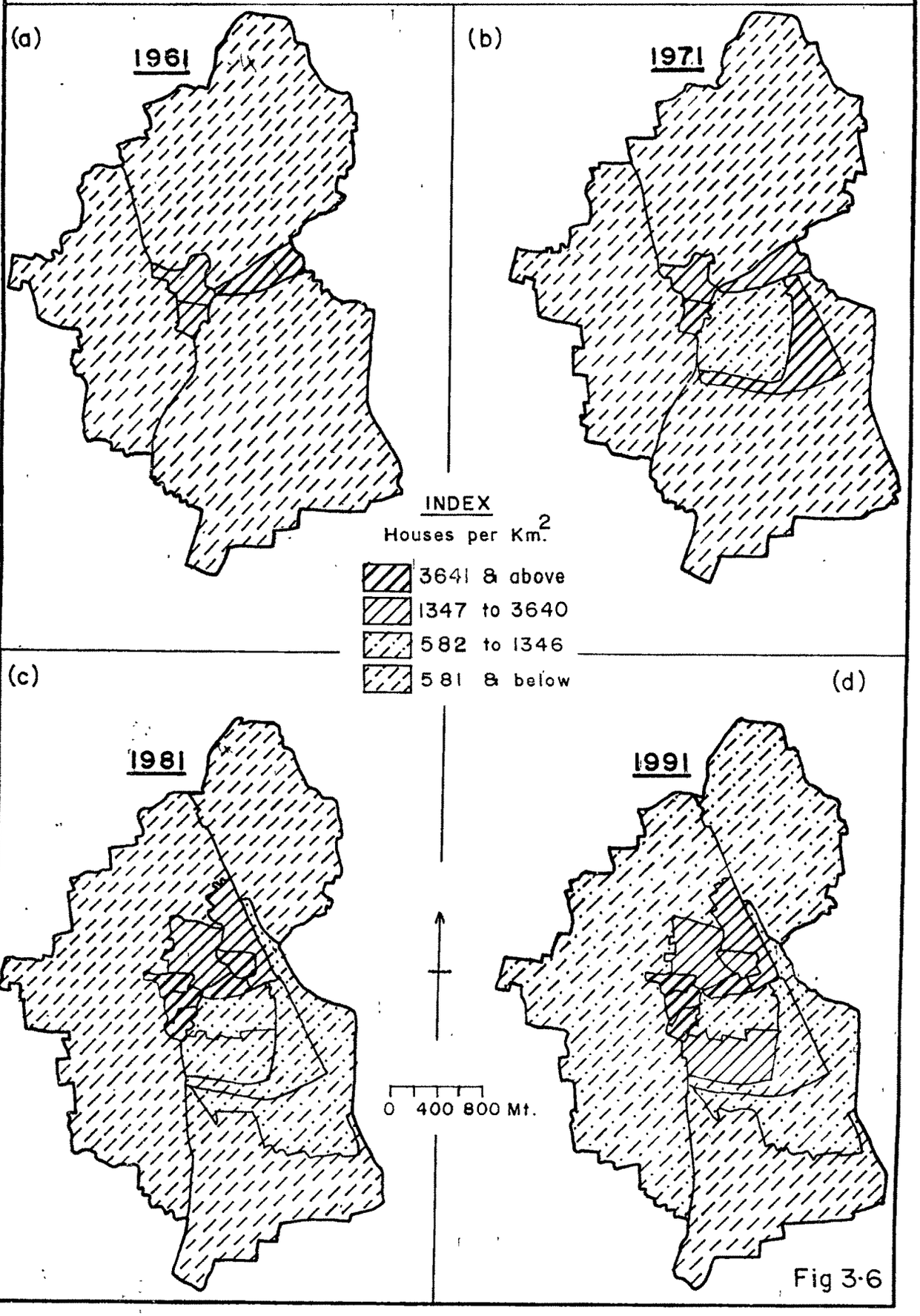


Fig 3·6

Table : 1.11. Ward wise Density of houses (1971)

Wards	Area in Sq.km	Number of houses	Houses per Sq.km.
I	0.3908	1012	2590
II	0.2931	872	2975
III	3.9086	1821	466
IV	0.2071	1031	4978
V	6.8987	2425	352
VI	7.0824	1420	200
VII	1.0826	629	581
VIII	1.2663	1215	959
Total	21.1296	10425	493

Table : 1.12. Ward wise Density of houses (1981)

Wards	Area in Sq.km	Number of houses	Houses per Sq.km.
I	2.1536	1772	823
II	0.4964	1072	2126
III	0.1759	811	4613
IV	0.1173	493	4203
V	0.5941	786	1323
VI	0.9576	1053	1100
VII	0.7192	665	925
VIII	0.1094	1334	12194
IX	0.1329	955	7186
X	0.1485	839	5650
XI	0.5785	1130	1953
XII	7.9189	2104	266
XIII	3.7405	1069	286
XIV	3.2793	724	221
Total	21.1221	14807	701

Table : 1.13. Ward wise Density of houses (1991)

Wards	Area in Sq.km	Number of houses	Houses per Sq.km.
I	2.1536	2458	1141
II	0.4964	1124	2229
III	0.1759	640	3640
IV	0.1173	430	3666
V	0.5941	671	1129
VI	0.9576	1311	1369
VII	0.7192	775	1078
VIII	0.1094	1284	11737
IX	0.1329	942	7088
X	0.1485	666	4485
XI	0.5785	1582	2735
XII	7.9189	4713	595
XIII	3.7405	2448	654
XIV	3.2793	912	278
Total	21.1221	19956	944

Wards XII, XIII and XIV show considerable increase in density of houses suggesting the new construction of residential areas (away from the core), but still within accessible limits as far as services and other amenities are concerned.

7. Male/Female population :

The comparison of male population to that of female population taking percentage to the total ward's population (Fig : 3.7) shows that in all wards since 1961 very negligible change was observed except for Ward VII in 1991 which showed a decrease in male population by 2.68% i.e. from 52.54% in 1981 to 49.86% in 1991, while the female population increased by 2.58% during the same period. Increased number of jobs for women attract them more and more. (Table : 1.14).

WARDWISE MALE / FEMALE POPULATION

ANAND

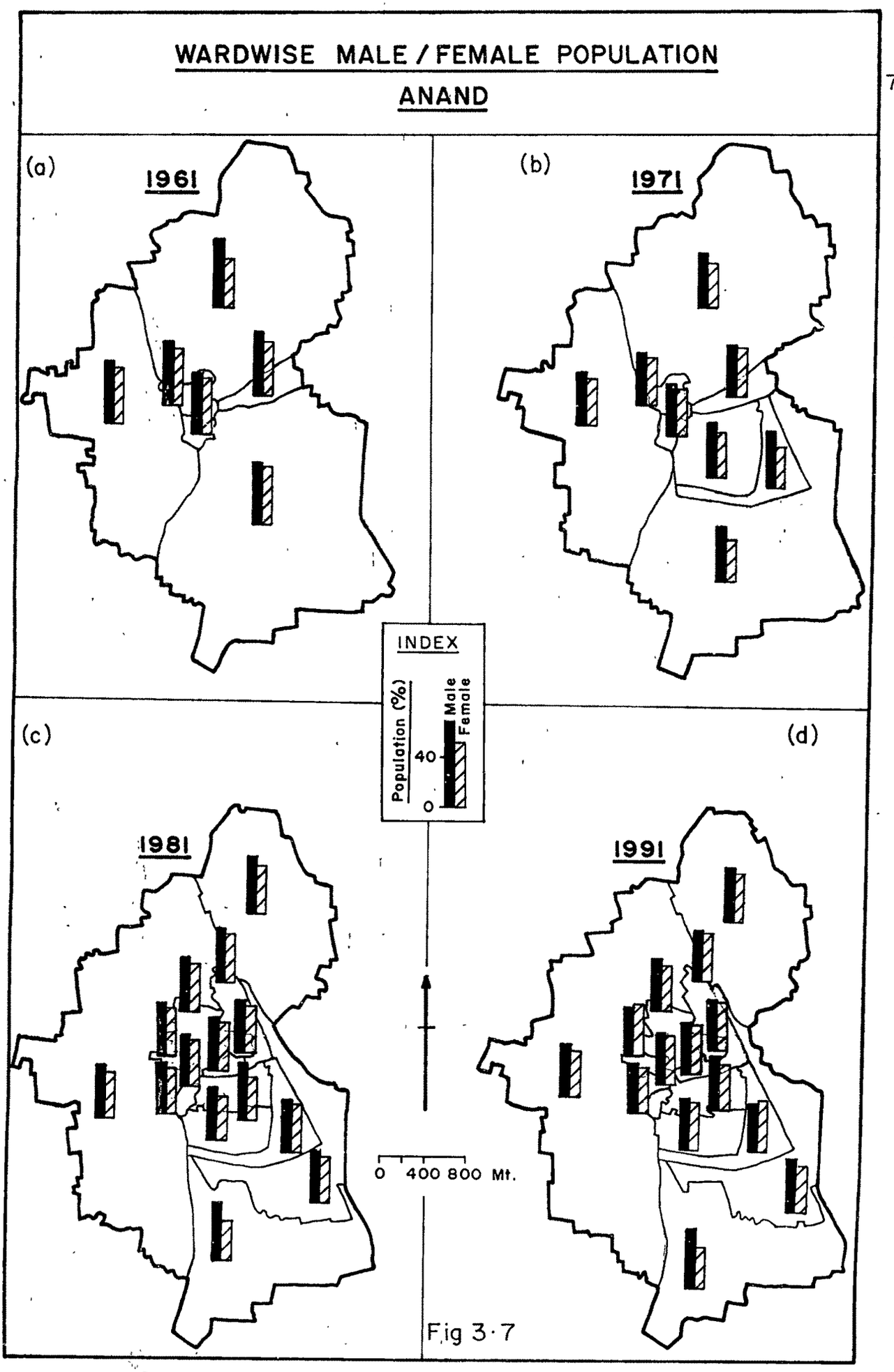


Fig 3·7

Table : 1.14. Decadal Male/Female Population

			Ratio for		Total
Year	Males	Females	Males	Females	Population
1871	4775	3998	1.194	0.830	8773
1881	4899	3926	1.248	0.801	8825
1891	5092	4022	1.266	0.789	9214
1901	5482	4528	1.211	0.826	10010
1911	5595	4544	1.231	0.812	10139
1921	6173	4881	1.266	0.790	11054
1931	6517	5143	1.267	0.789	11660
1941	9260	7894	1.173	0.852	17154
1951	14091	11676	1.207	0.829	25767
1961	22368	18058	1.239	0.807	40458
1971	32171	26984	1.192	0.838	59155
1981	44697	39239	1.139	0.877	83936
1991	57557	52709	1 091	0.915	110266

8. Sex ratio :

The birth of a girl child was detested or not welcomed among the Patel Community, as the parents had to pay a large sum of money as dowry during her marriage. Female infanticide is known to have prevailed in this area.

Table : 1.15. Decadal Sex ratio

Year	Males	Females	Sex ratio	Total Population
1901	5482	4528	826	10010
1911	5595	4544	812	10139
1921	6173	4881	791	11054
1931	6517	5143	789	11660
1941	9260	7894	852	17154
1951	14091	11676	829	25767
1961	22368	18058	809	40458
1971	32171	26984	839	59155
1981	44697	39239	878	83936
1991	57557	52709	916	110266

There were 789 females per thousand males in 1931 which increased to 809 in 1961, 839 in 1971, 878 in 1981 and finally to 916 in 1991 suggesting the influence of female literacy rates which has increased considerably and even the migration of females due to job opportunities may be the reason. The changing job opportunities and demand for female workers in specialized services cannot be neglected too. (Table : 1.15).

Table : 1.16. Ward wise Sex ratio (1961)

Wards	Male	% to total Ward population	Female	% to total Ward Population	Total population	Total percentage
I	5133	54.54	4278	45.46	9411	100
II	1850	51.82	1720	48.18	3570	100
III	3044	52.68	2734	47.32	5778	100
IV	1887	52.23	1726	47.77	3613	100
V	3431	53.07	3034	46.92	6465	100
VI	7024	60.42	4597	39.56	11621	100
Total	22369	55.28	18089	44.71	40458	100

Table : 1.17. Ward wise Sex ratio (1971)

Wards	Male	% to total Ward population	Female	% to total Ward Population	Total population	Total percentage
I	3024	51.01	2904	48.99	5928	100
II	2570	52.14	2359	47.86	4929	100
III	5590	53.55	4849	46.45	10439	100
IV	2881	51.97	2663	48.03	5544	100
V	7743	57.27	5776	42.73	13519	100
VI	4575	54.76	3780	45 24	8355	100
VII	2436	56.47	1878	43.53	4314	100
VIII	3352	54.71	2775	45.29	6127	100
Total	32171	54.38	26984	45.62	59155	100

Table : 1.18. Ward wise Sex ratio (1981)

Wards	Male	% to total Ward population	Female	% to total Ward Population	Total population	Total percentage
I	4834	53.30	4235	46.70	9069	100
II	3426	51.94	3170	48.06	6596	100
III	2404	51.79	2238	48.21	4642	100
IV	1510	52.91	1344	47.09	2854	100
V	2819	57.67	2069	42.33	4888	100
VI	3074	53.60	2661	46 40	5735	100
VII	1952	52.54	1763	47.46	3715	100
VIII	3872	51.88	3591	48.12	7463	100
IX	2818	51.91	2611	48.09	5429	100
X	2447	52.36	2226	47.64	4673	100
XI	3422	51.92	3169	48.08	6591	100
XII	6184	53.24	5432	46.76	11616	100
XIII	3578	54.14	3031	45.86	6609	100
XIV	2357	58.11	1699	41 89	4056	100
Total	44697	53.25	39239	46.75	83936	100

Table : 1.19. Ward wise Sex ratio (1991)

Wards	Male	% to total Ward population	Female	% to total Ward Population	Total population	Total percentage
I	6501	51.96	6011	48.04	12512	100
II	3573	51.20	3406	48.80	6979	100
III	1881	50.69	1830	49.31	3711	100
IV	1153	50.72	1120	49 27	2273	100
V	2295	52.80	2052	47.20	4347	100
VI	3834	51.84	3562	48.16	7396	100
VII	1999	49.86	2010	50.14	4009	100
VIII	3674	51.37	3478	48.63	7152	100
IX	2587	49.97	2590	50.03	5177	100
X	1831	50.96	1762	49.04	3593	100
XI	4938	52.48	4471	47.52	9409	100
XII	13194	52.84	11778	47.16	24972	100
XIII	7228	52.08	6651	47.92	13879	100
XIV	2869	59.07	1988	40.93	4857	100
Total	57557	52.20	52709	47.80	110266	100

9. Literacy :

Literacy in the city seems to have improved considerably, particularly after independence. It has increased from 41.34% of the total population in 1951 to 55.13% in 1961 that is an increase of 13.79% within a decade (Table : 1.20).

In 1971 and 1981 it showed an increase of 6.69% and 4.06% respectively. While in 1991 it was 4.98% so it was only during 1961 to 1971 that literacy rates were the highest (Table : 1.21). This might have been due to be the influence of the educational institutes established by the missionaries viz, I.P. Mission and the Salvation Army and many other schools and colleges, including the establishment of two Universities at the doors of Anand i.e Sardar Patel University of Vidyanagar and Agricultural University of Gujarat. Both played an important role in increasing literacy rates. Ward V, shows the highest literacy rate of 85.39% while the lowest is 64% in Ward XII.

Anand is the only city in Gujarat, where the literacy rates continue to be above 60% since 1971 (Fig : 3.8 & Fig : 3.9).

Table : 1.20. Ward wise Literacy (1961)

Wards	Male Literate	% to total Ward Male	Female Literate	% to total Ward Female	Total Literate in the ward	Total population of the Ward	% to total Ward Population
I	3566	69.47	2394	55.96	5960	9411	63.33
II	1424	76.97	1115	64.83	2639	3570	71.12
III	1910	62.75	1029	37.64	2939	5778	50.87
IV	1360	72.07	846	49.02	2206	3613	61.06
V	1926	56.14	741	24.42	2667	6465	41.25
VI	4476	63 72	1520	33.07	5996	11621	51.60
Total	14662	65.55	7645	42.26	22307	40458	55.14

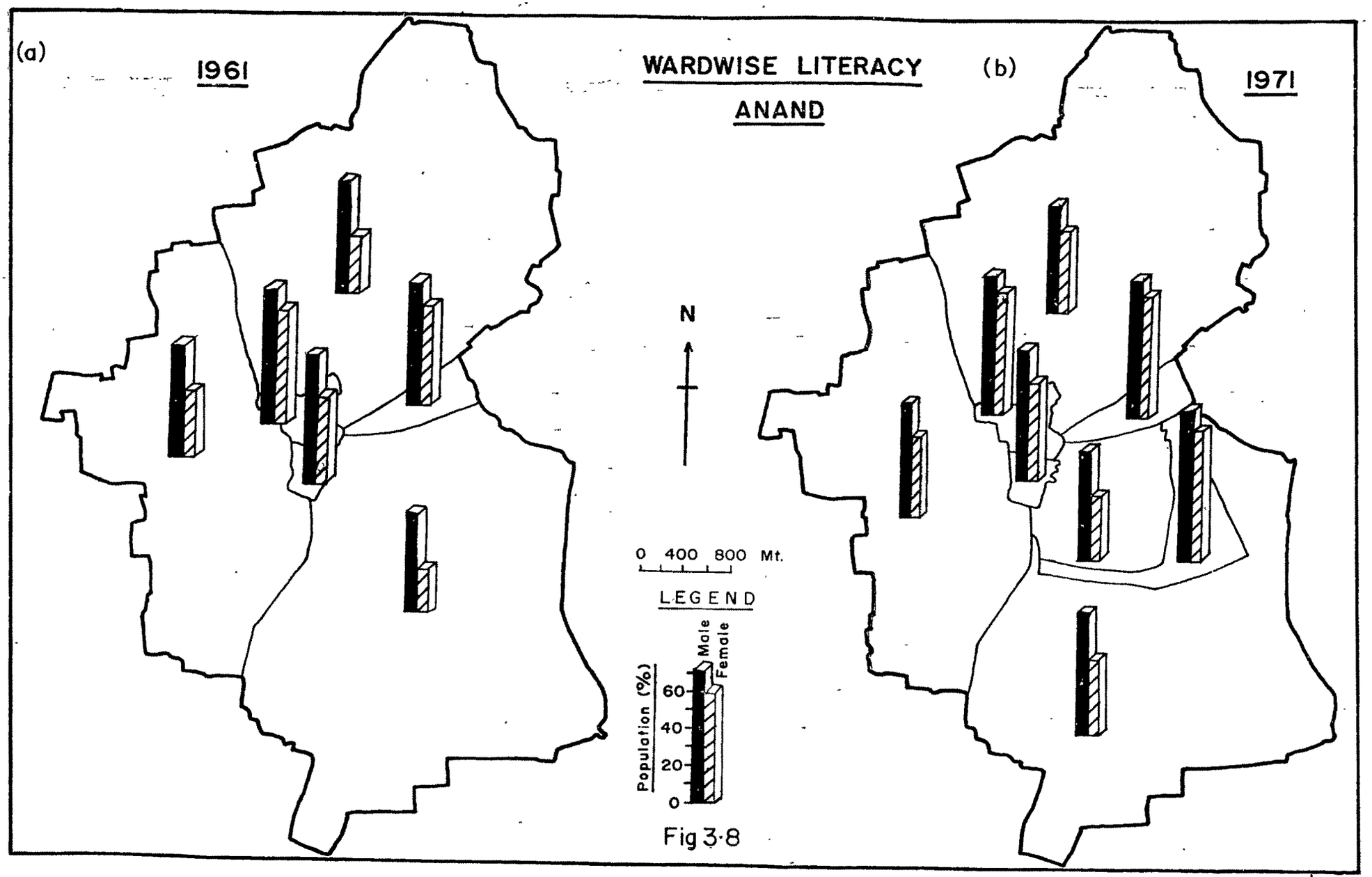

(a)
1961
WARDWISE LITERACY
ANAND
(b)
1971
N
0 400 800 Mt.
LEGEND
Male
Female
Population (%)
60
40
20
0

Fig 3·8

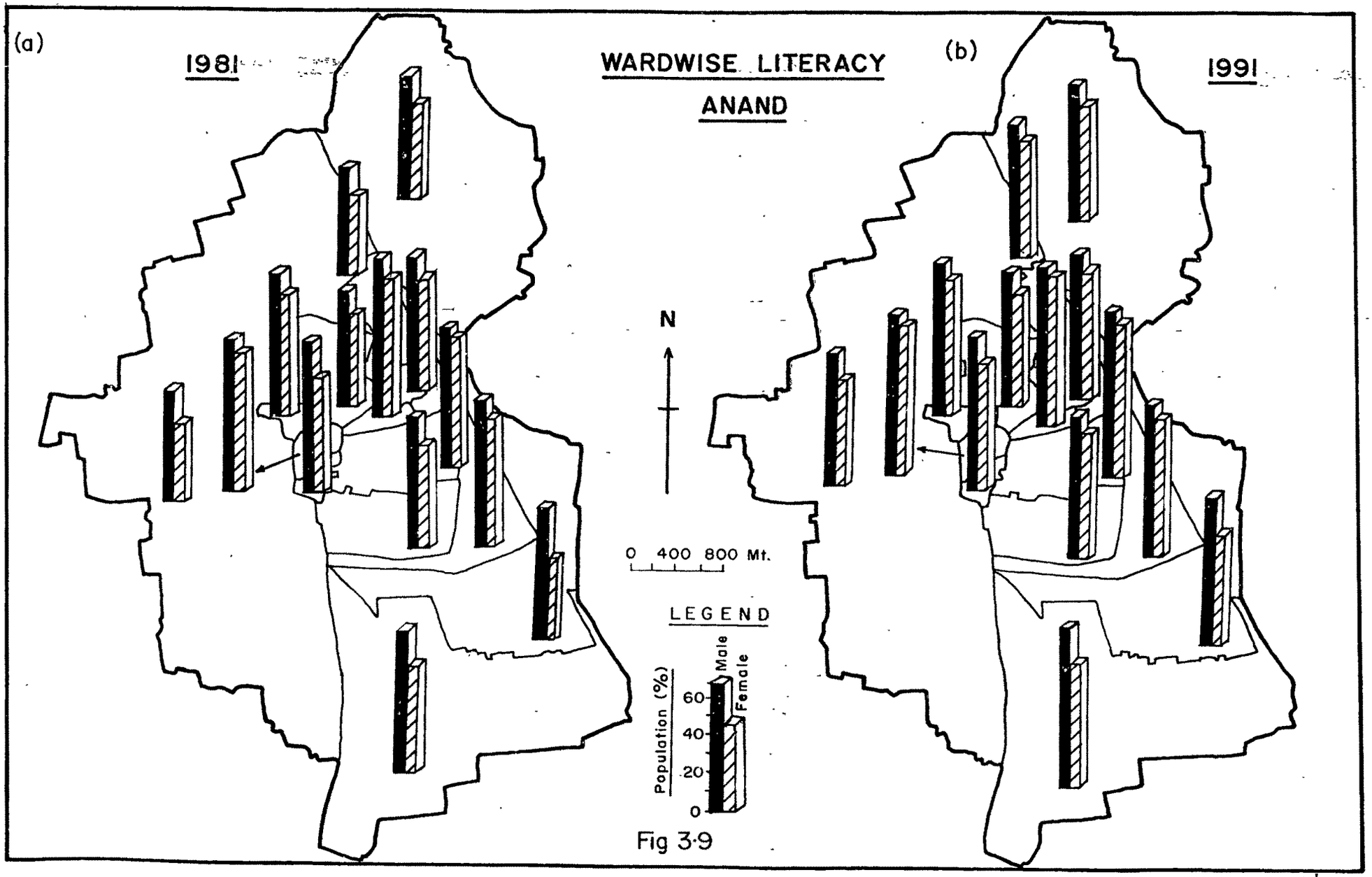

(a)
1981
WARDWISE LITERACY
ANAND
(b)
1991
N
0 400 800 Mt.
LEGEND
Population (%)
Male
Female
60
40
20
0

Fig 3·9

Table : 1.21. Ward wise Literacy (1971)

Wards	Male Literate	% to total Ward Male	Female Literate	% to total Ward Female	Total Literate in the ward	Total population of the Ward	% to total Ward Population
I	2362	78.11	2005	69.04	4367	5928	73.67
II	2057	80.03	1647	69.82	3704	4929	75.15
III	3652	65.33	2248	46.36	5900	10439	56.51
IV	2153	74.73	1492	56.03	3645	5544	65.75
V	5389	69.60	2475	42.85	7864	13519	58.17
VI	2805	61.31	1763	46.64	4568	8355	54.67
VII	2081	85.43	1383	73.64	3464	4314	80.30
VIII	2063	61.54	998	35.96	3061	6127	49.96
Total	22562	70.13	14011	51.92	36573	59155	61.83

Table : 1.22. Ward wise Literacy (1981)

Wards	Male Literate	% to total Ward Male	Female Literate	% to total Ward Female	Total Literate in the ward	Total population of the Ward	% to total Ward Population
I	3506	72.53	1898	44.82	5404	9069	59.58
II	2212	64.57	1640	51.74	3852	6596	58.40
III	1821	75.75	1416	63.27	3237	4642	69.73
IV	1331	88.15	1037	77.16	2368	2854	82.98
V	2191	77.72	1498	72 40	3689	4888	75 47
VI	2234	72.67	1508	56.67	3742	5735	65.25
VII	1588	81.35	1258	71.36	2846	3715	76.61
VIII	3251	83.96	2292	63.83	5543	7463	74.27
IX	2276	80.77	1791	68.59	4067	5429	74.91
X	2080	85.00	1730	77.72	3810	4673	81.53
XI	2068	60.43	1434	45.25	3502	6591	53.13
XII	3839	62.08	2342	43.11	6181	11616	53.21
XIII	2519	70.40	1630	53.78	4149	6609	62.78
XIV	1880	79.76	1033	60.80	2913	4056	71 82
Total	32796	73.37	22507	57.36	55303	83936	65.89

Table : 1.23. Ward wise Literacy (1991)

Wards	Male Literate	% to total Ward Male	Female Literate	% to total Ward Female	Total Literate in the ward	Total population of the Ward	% to total Ward Population
I	5137	79.02	3549	59.04	8686	12512	69.42
II	2602	72.82	2154	63.23	4756	6979	68.15
III	1463	77.77	1265	69.13	2728	3711	73.51
IV	994	86.21	906	80.89	1900	2273	83.59
V	2020	88.02	1692	82.46	3712	4347	85.39
VI	2999	78.22	2385	66.96	5384	7396	72.80
VII	1621	81.09	1478	73.53	3099	4009	77.30
VIII	3027	82.39	2378	68.37	5405	7152	75.57
IX	2113	81.68	1897	73.24	4010	5177	77.46
X	1579	86.24	1418	80.48	2997	3593	83 41
XI	3550	71.89	2721	60.86	6271	9409	66.65
XII	9329	70.71	6655	56.50	15984	24972	64.00
XIII	5304	73.38	4115	61.87	9419	13879	67.87
XIV	2463	85.85	1331	66.95	3794	4857	78.11
Total	44201	76.80	33944	64.40	78145	110266	70.87

10. Work force :

Work force was mapped by putting the marginal workers and workers together, while non-workers were shown separately. Figure : 3.11 shows the comparison of 1961 and 1971 where Ward IV shows a considerable rise in both workers and non-workers while the same declined in Wards I and VI. Figure : 3.12 shows a comparison of 1981 and 1991 where it was observed that there was a considerable rise in both workers and non-workers in Wards XIII, XII and I. These wards are the outermost areas in the transition zone and periphery and thus we can say job opportunities have increased the number of workers and the population too as

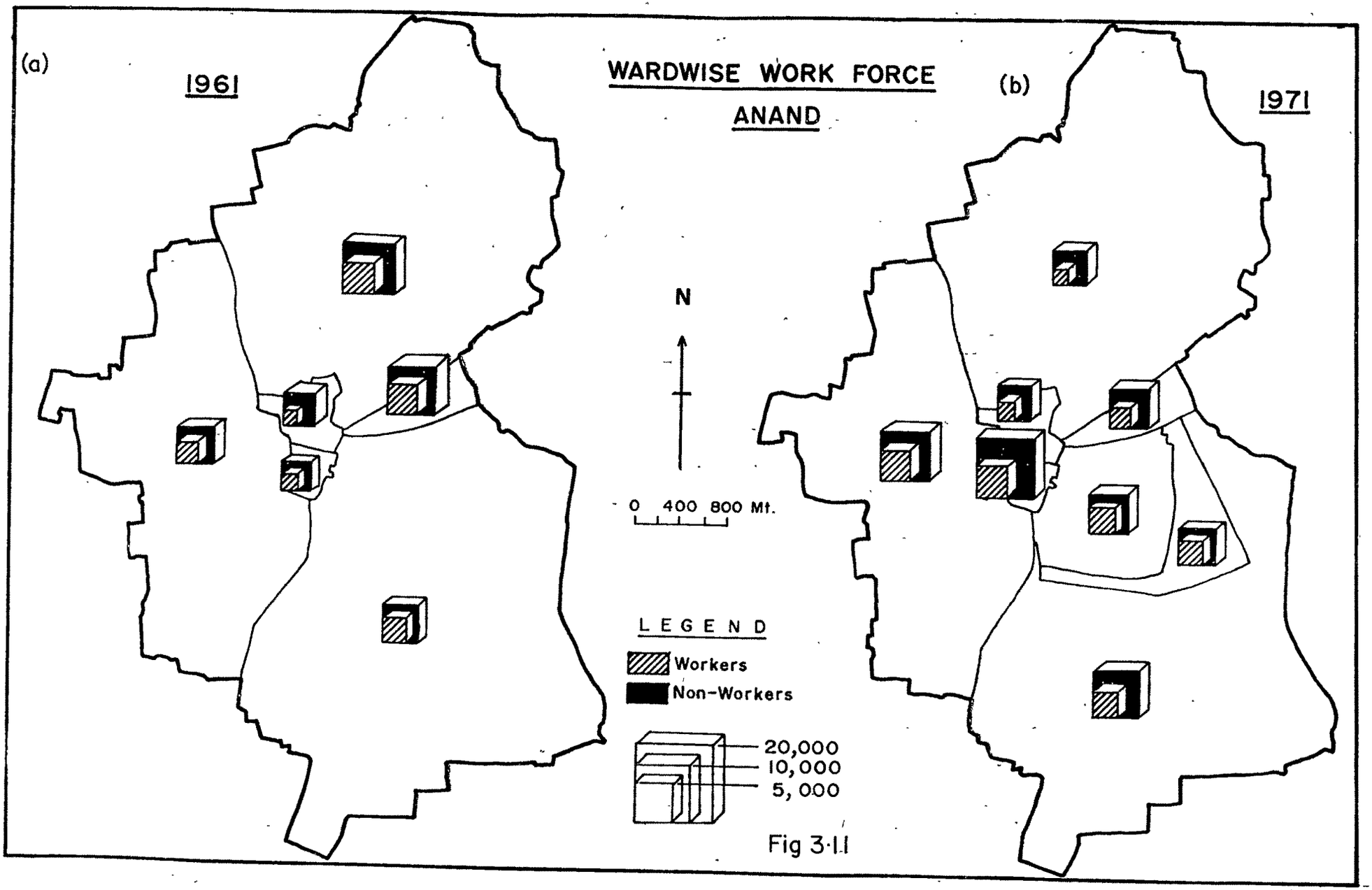

(a)
1961
WARDWISE WORK FORCE
ANAND
(b)
1971
N
0 400 800 Mt.
LEGEND
Workers
Non-Workers
20,000
10,000
5, 000

Fig 3·1.1

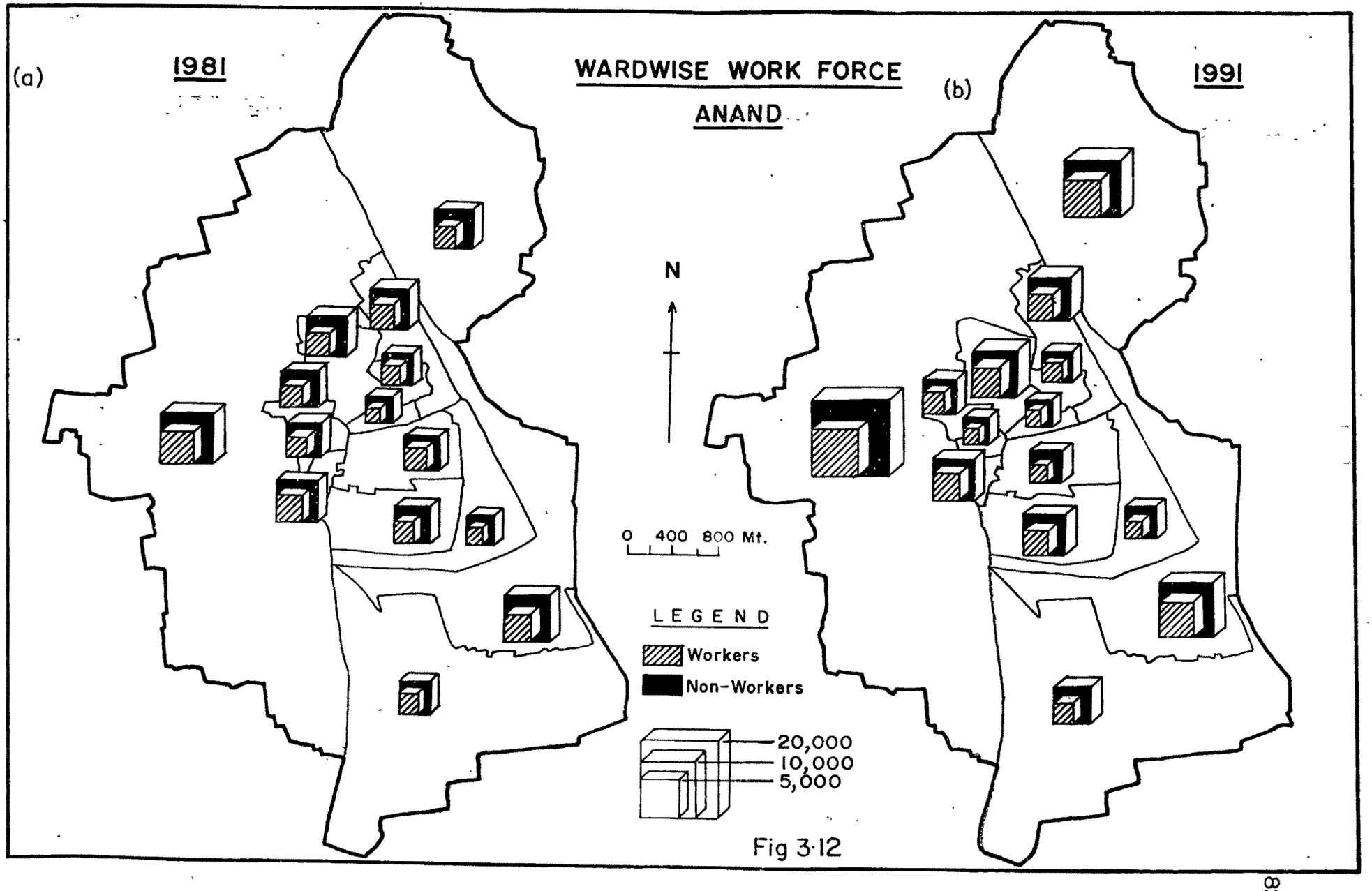

(a)
1981
WARDWISE WORK FORCE
ANAND
(b)
1991
N
0 400 800 Mt.
LEGEND
Workers
Non-Workers
20,000
10,000
5,000

Fig 3·12

a result of attraction or pull factors which in turn again increase the number of non-working population in the same area.

There were about 27.66% workers in 1961, which decreased to 25.39% in 1971 and again increased to 27.69% in 1981 to the total population of Anand. Thus on an average since 1961 to 1981 the non-working population is 73.07%. Although in 1991 the number of workers increased by a mere 0.36% to the total population (Table : 1.25). This is due to a large number of commuters coming to Anand, which proves fatal to the employment of its own people.

Except for Ward VII (30.28%) where the Amul dairy is located and Ward III (30.61%) where the administrative offices are located. All other Wards account for below 30% workers to the total Ward's population (Table : 1.25). Thus there is a wide gap between the working and non-working population in each ward and in Anand as a whole. This has to be narrowed by considerable planning and involvement of local people in the employment sector.

Table : 1.24.

Ward wise work force (1961)				**Ward wise work force (1971)**			
Wards	Workers	Non-workers	Total population	Wards	Workers	Non-workers	Total population
I	2672	6739	9411	I	1401	4527	5928
II	813	2757	3570	II	1131	3798	4929
III	1500	4278	5778	III	2724	7715	10439
IV	953	2660	3613	IV	1427	4117	5544
V	2122	4343	6465	V	3530	9989	13519
VI	3131	8490	11621	VI	2078	6277	8355
Total	11191	29267	40458	VII	916	3398	4314
				VIII	1813	4314	6127
				Total	15020	44135	59155

Table : 1.25.

Ward wise work force (1981)				Ward wise work force (1991)			
Wards	Workers	Non-workers	Total population	Wards	Workers	Non-workers	Total population
I	2521	6548	9069	I	3624	8888	12512
II	1811	4785	6596	II	1961	5018	6979
III	1340	3302	4642	III	1136	2575	3711
IV	745	2109	2854	IV	634	1639	2273
V	1426	3462	4888	V	1126	3221	4347
VI	1567	4168	5735	VI	2069	5327	7396
VII	1012	2703	3715	VII	1214	2795	4009
VIII	2064	5399	7463	VIII	2026	5126	7152
IX	1514	3915	5429	IX	1345	3832	5177
X	1210	3463	4673	X	1031	2562	3593
XI	1789	4802	6591	XI	2587	6822	9409
XII	3276	8340	11616	XII	7124	17848	24972
XIII	1820	4789	6609	XIII	3860	10019	13879
XIV	1152	2904	4056	XIV	1197	3660	4857
Total	23247	60689	83936	Total	30934	79332	110266

11. Occupational structure :

According to 1991 census the population was divided into various occupational categories like. I- Cultivators, II- Agricultural labourers, III- Livestock, fishing and allied activities, IV- Mining and quarrying, V(a)- Manufacturing and processing in household, V (b)- manufacturing and processing in other than household, VI- Construction, VII- Trade and commerce, VIII- Transport, storage and communication, IX- Other services, X- Non-workers, XI- Marginal workers (Fig : 3.13).

The above categories were put together under three broad divisions – I-Primary activities, II-Secondary activities and III- Tertiary activities. (Table : 1.26).

WARDWISE OCCUPATIONAL STRUCTURE

ANAND (1961, 1971 & 1991)

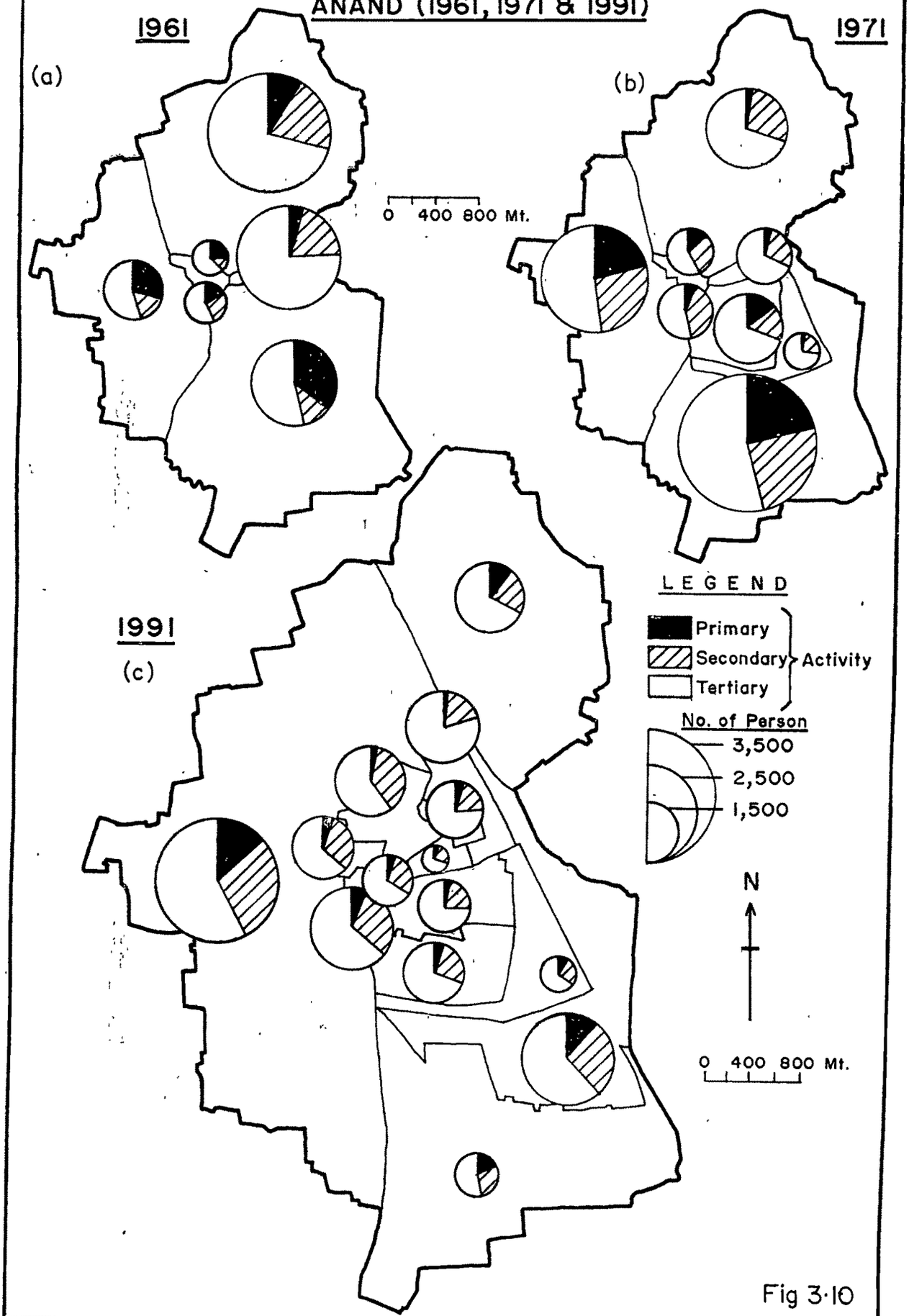


Fig 3·10

Comparison of the given map (Fig : 3.10) and data observations, it was established that since 1961 Anand had 64.86% of its total workers engaged in tertiary activities, followed by 17.80% and 17.32% in secondary activities and primary activities respectively. It was found that in 1981 workers engaged in tertiary activities decreased by 4.41% while that in secondary activities increased by 9.21% (which may be the result of various industrial units which came up during this period – 1971 to 81 in and around Anand), and workers engaged in primary activities dropped by 4.77% during 1971-81, which showed an increase of 8.53% by 1991 (Table : 1.28) due to the demand of agricultural workers in the Agricultural University of Anand and Tobacco Research Centre etc.

Table : 1.26. Ward wise occupational structure (1961)

Wards	Primary activity		Secondary activity		Tertiary activity		Ward wise
	Male	Female	Male	Female	Male	Female	Total workers
I	110	8	511	12	1826	205	2672
II	186	6	115	0	472	34	813
III	400	46	239	9	725	81	1500
IV	121	34	248	4	513	33	953
V	477	276	227	1	1028	113	2122
VI	240	35	584	43	2028	201	3131
Total	1534	405	1924	69	6592	667	11191

Table : 1.27. Ward wise occupational structure (1971)

Wards	Primary activity		Secondary activity		Tertiary activity		Ward wise
	Male	Female	Male	Female	Male	Female	Total workers
I	44	3	390	9	853	103	1402
II	144	8	321	5	624	28	1130
III	500	63	741	13	1328	79	2724
IV	74	12	574	6	725	36	1427
V	561	183	876	12	1766	132	3530
VI	28	3	560	35	1397	55	2078
VII	10	2	214	11	596	83	916
VIII	161	88	286	4	1184	90	1813
Total	1522	362	3962	95	8473	606	15020

Inspite of this on an average Anand's 63.2% of working population is employed in tertiary activities since 1961 (Table : 1.26) . This clears all doubts about the urban character and function of Anand and its development as an important trading and commercial centre in the region. Anand caters to the needs of not only the local urban population, but also for the surrounding urban and rural areas.

In 1981 about 362 female workers were engaged in primary activities and about 606 in tertiary activities which in turn during the decade 1981-91 showed a noteworthy change, as against only 451 females engaged in primary activities 2293 females were engaged in tertiary activities of the city. This shows a rise of 3.43% during 1981-91. (Table : 1.28)

Table : 1.28. Ward wise occupational structure (1991)

Wards	Primary activity		Secondary activity		Tertiary activity		Ward wise
	Male	Female	Male	Female	Male	Female	Total workers
I	283	105	928	57	1941	255	3569
II	28	1	347	15	1411	154	1956
III	34	10	212	6	760	104	1126
IV	23	0	152	6	408	41	630
V	29	0	249	3	726	94	1101
VI	76	5	532	24	1286	143	2066
VII	102	10	282	30	657	133	1214
VIII	79	32	601	20	1159	131	2022
IX	71	1	415	1	799	56	1343
X	53	1	286	9	602	80	1031
XI	62	5	952	9	1424	123	2575
XII	861	88	1921	106	3541	518	7035
XIII	323	110	803	24	2208	381	3849
XIV	145	83	311	35	543	80	1197
Total	2169	451	7991	345	17465	2293	30714

The study of ward wise occupational structure of Anand in 1991, (Fig : 3.13) showed, that majority of workers engaged in livestock rearing were from Ward VII where the famous

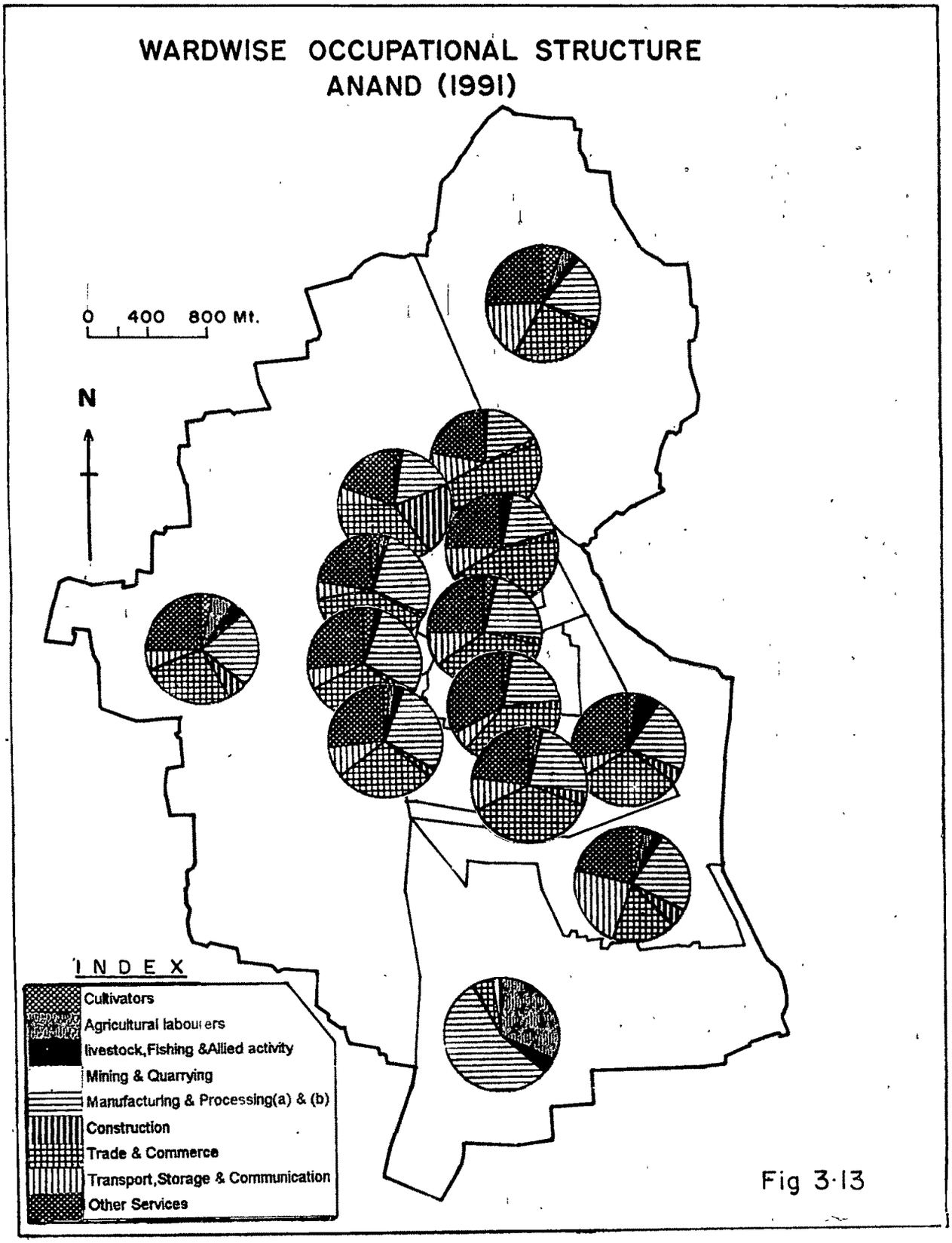

WARDWISE OCCUPATIONAL STRUCTURE
ANAND (1991)
0 400 800 Mt.
N
INDEX
Cultivators
Agricultural labourers
livestock,Fishing &Allied activity
Mining & Quarrying
Manufacturing & Processing(a) & (b)
Construction
Trade & Commerce
Transport,Storage & Communication
Other Services

Fig 3·13

Amul dairy is located, followed by Ward XIV where the Animal husbandry institute and Agriculture University are located. Ward XIV also claims the first position as far as number of workers engaged in manufacturing and processing and agricultural labourers is concerned.

Another observation is that, those wards which have good transport lines in the form of roads and which are near to the railway station show maximum workers are engaged in Trade and commerce. Which accounts to 29.5% followed by 25.08% in other services and 22.12% in manufacturing and processing. This proves that Anand is a major collecting and distributing centre and hence its growth is faster due to more and more people getting attracted for business increasing the rate of immigration leading to urban growth and expansion.

Nearness of Wards XIII and XIV to the main trunk routes to Ahmedabad and Mumbai has increased the number of workers engaged in transport, storage and communication.

Wards I and XII show considerable increase in the number of workers engaged in construction activity, as the demand for new houses increases more and more in the periphery and along the main roads connecting Anand with Vallabh Vidhyanagar and Vithal Udyognagar in West and to National Highway No.8 in the East respectively.

12. Slums :

Slum is the product of modern industrial civilisation One of the distressing manifestations of urbanisation is the sporadic growth of Slums. It is a social evil, which grows along with urbanisation. Poverty and deficit of housing in rapidly growing cities are reasons of emergence of slums.

"The problem of slums in India is cast on an epic scale : no other epithet seems to answer the description in a satisfactory measure."*6

If the world's general rate of growth of population is about 2% a year, towns and cities are growing by 4% a year, some big cities may exceed even 5 to 6% a year. The annual growth rate of population of Anand between 1981 to 1991 is 5.61% whereas growth rate of houses is 34.77%.

Disparity in the distribution of resources, leading to inequalities is one of the reasons for causing migration of people from place to place. In the third world countries exodus from rural areas to urban areas play a major role in the creation of slums.

The result is that "One often comes across multistoried monuments, unrivalled in design and execution, surrounded reproachfully by innumerable "juggies" or "huts". While it is true that newer and newer problems arise as time passes and new slums are born while old ones expand and worsen, a certain awareness of the appalling conditions prevalent in such areas has developed over the years.*6

The 1st five-year plan (1951-56) for slum clearance, says:- "The procedure to be adopted in such cases should be assessed on the basis of the use of which the land was put on the date of the issue of the clearance order. We suggest that no additional compensation on account of the compulsory nature of acquisition should be allowed in case of acquisition of slum areas, because we believe that such compensation ought not think that the owners of slum areas perform any social service by accommodating large number of poorest sections of the community in conditions of squalor and filth and we do not see why such social abuse of property should be compensated for over and above the actual value".*7

However, the government declared that if the slum owners come forward to rebuild and develop their properties within a specified period, on standard plan to be approved by the competent authority there may be no need for acquiring such lands for the purpose of slum clearance.*7

The second five-year plan (1956-61), continued to dwell upon the specific subject of slum clearance and sweepers' housing. It drew attention to the need for two sets of measures:- (1) a strict enforcement of municipal bylaws and the enlisting of support from the enlightened public opinion and, (2) the framing of master plans for every town, beginning with towns which are already large or have expanded much in recent years or are likely to grow rapidly in the next few years.*8

State Governments were asked to undertake social and economic surveys of their worst slum areas in the larger towns and to draw up phased programmes of slum clearance.

However small and medium towns and cities, which were growing rapidly, were neglected, resulting in the growth in them of slums. One of such urban area is Anand.

The third five-year plan (1961-66) envisaged the plight of such families as could not afford to pay even the subsidized rents of "pucca" structure. Schemes were formulated for skeletal housing and open developed plots with a separate washing platform and latrine for each family, leaving it to the slum dwellers to build huts of a prescribed pattern themselves on a self-help basis".*9

However, it was experienced that the implementation of this plan of clearance and improvement of slums was a lengthy and time consuming.

Anand Slums :

Surprisingly the municipal authorities declare that there is no slum area in the city (census 1981 and 1991) though there are 54 slum areas in Anand. These slums are said to be existing since 1940s. 32014 persons populate them, which accounts to 24.4% of the total city population as per the year 1991.

The distribution pattern of these slums characteristically consists of small patches of poor mud huts roofed with anything from straw to mutilated kerosene, oil and biscuit tins. Slums mushroom in low ill-drained areas, pits, drainage-line, level-crossings, cross-roads, industrial areas, wasteland, scrublands and nala or tunnels in contrasts with the surrounding finer residences of the fairly wealthy people.

The physical indicators of slum :

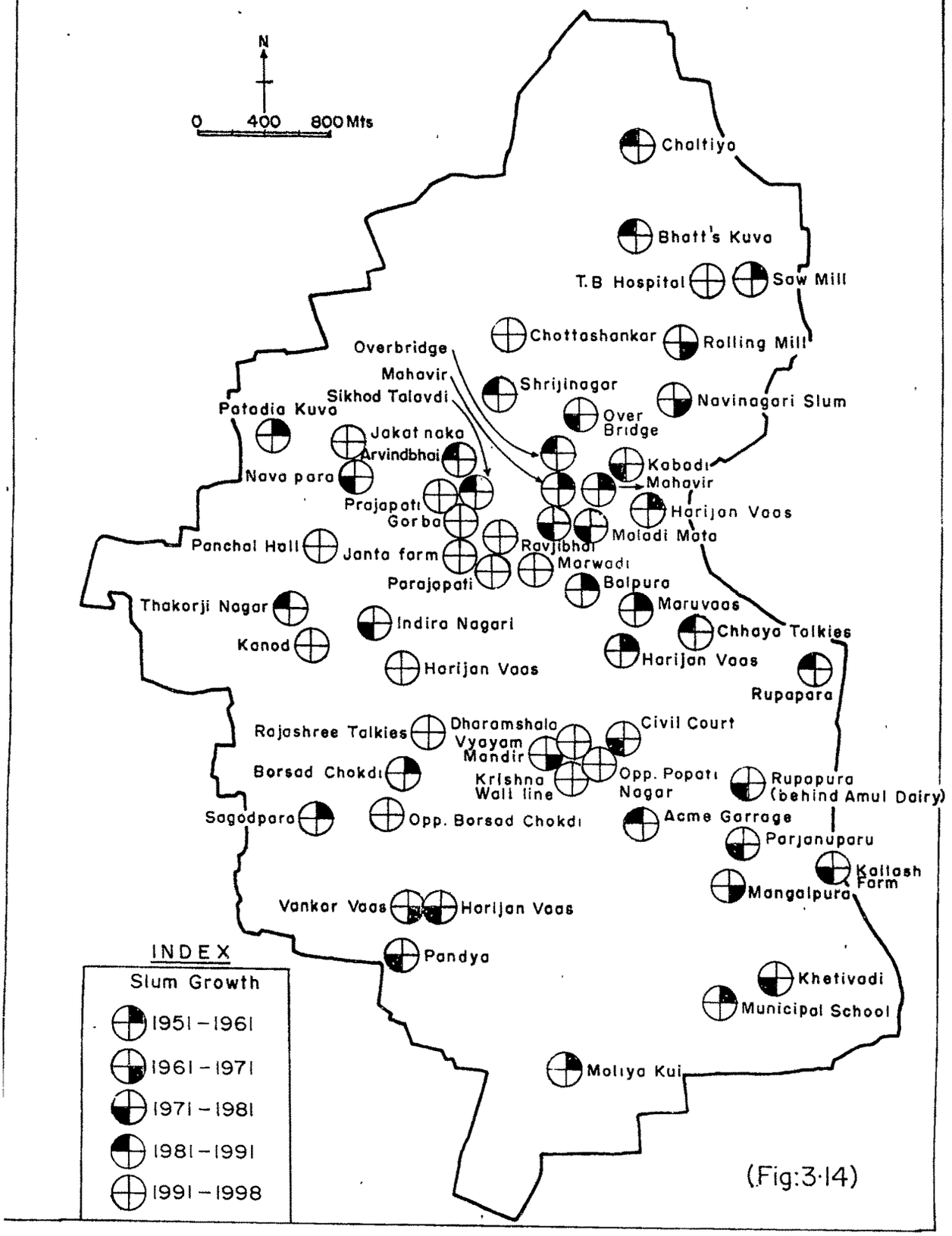
The map showing distribution of slums (Fig : 3.14) may be broadly co-related with the Geographical factors like nearness to wells, nearness to place of work, pit or depressions, water bodies, scrubland, wasteland, over-bridge, tunnels, nala, industrial areas, residential colonies, nearness to railway station and cross-roads etc, are some of the important site and situation for slum occurrence and development.

Most of the slum concentrations are around the water bodies and wells and mainly they occupy those wards, which are away from the core. Slums also develop at sites where the main water supply line is illegally tapped and the areas of least access. Similarly the nearness to railway line and railway crossing or over-bridge also become favourable sites of slum development(Fig : 3.15).

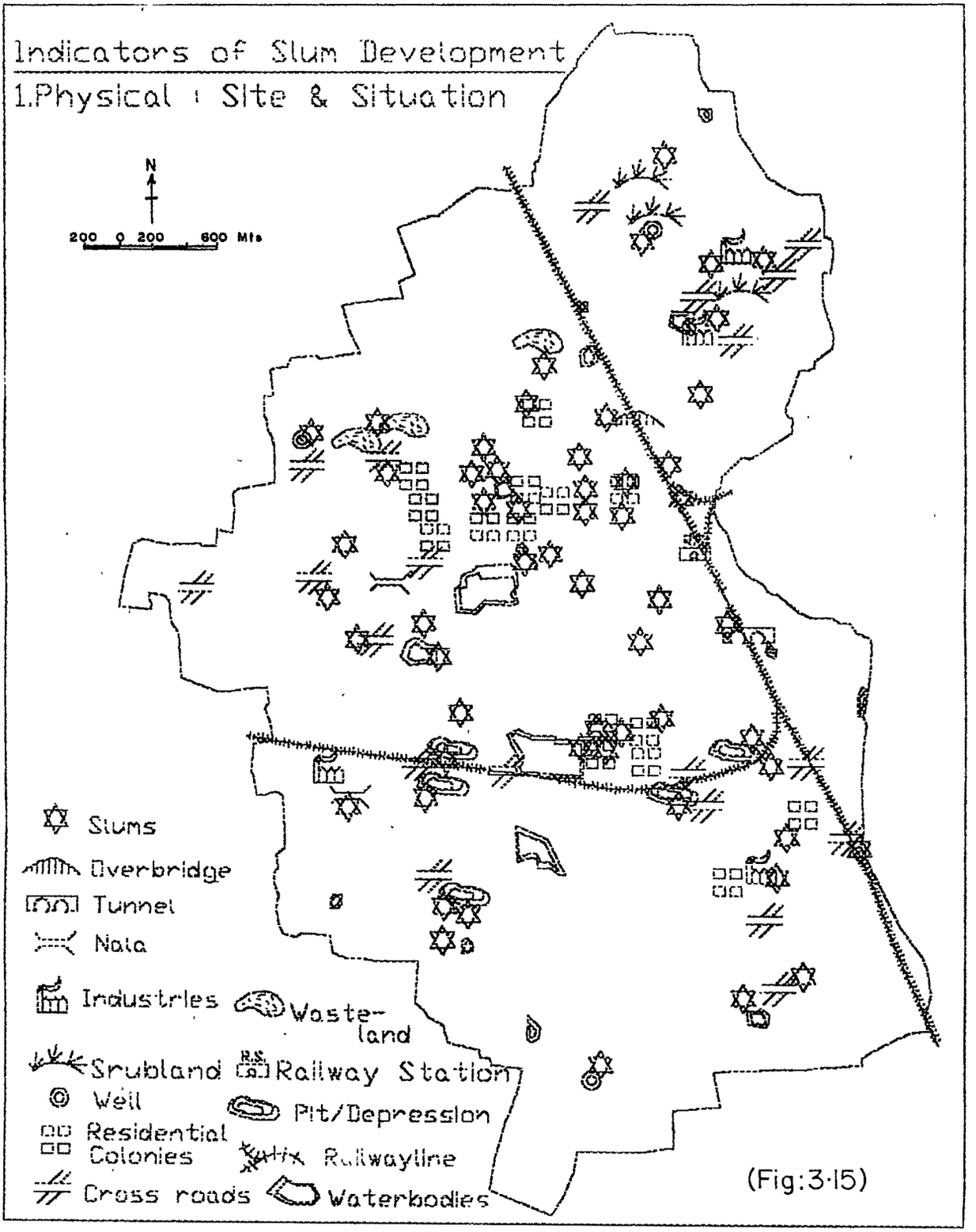
Social indicators of slum development :

Mangalpura (ward 1 – Fig : 3.14) is the biggest slum having 1000 houses and a population of over 7000 persons since 1963 in the ward 1 in southeastern part of the city. The slum near Vyayam mandir, Patadia kuva and Navaparu has the highest density of 10 persons per house (Fig : 3.16).

Slum Distribution & Growth - Anand (1951-1998)



(Fig:3·14)

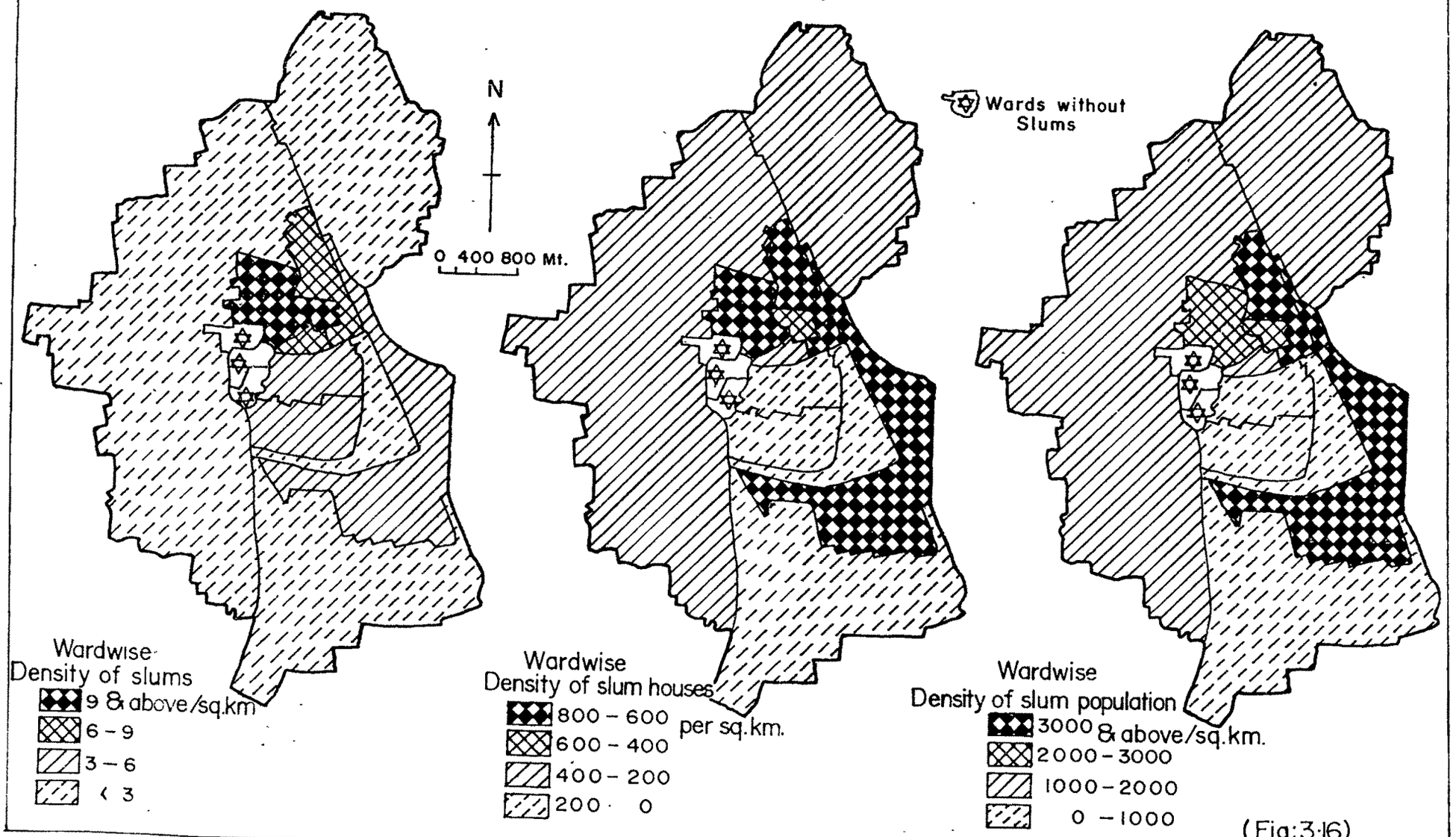

Indicators of Slum Development
1.Physical : Site & Situation
N
200 0 200 600 Mts
Slums
Overbridge
Tunnel
Nala
Industries
Waste-land
Srubland
R.S.
Railway Station
Well
Pit/Depression
Residential Colonies
Railwayline
Cross roads
Waterbodies

(Fig:3·15)

As far as wards are concerned, ward III has the highest slum density i.e. 11.37 slums per Sq.km. while ward II ranks first as far as number of houses per Sq.km. is concerned, which comes to 735, while in case of population density, ward I stands first with about 5033 persons per Sq.km. However, wards VIII (core), ward IX and ward X does not have any slum area (Fig : 3.16).

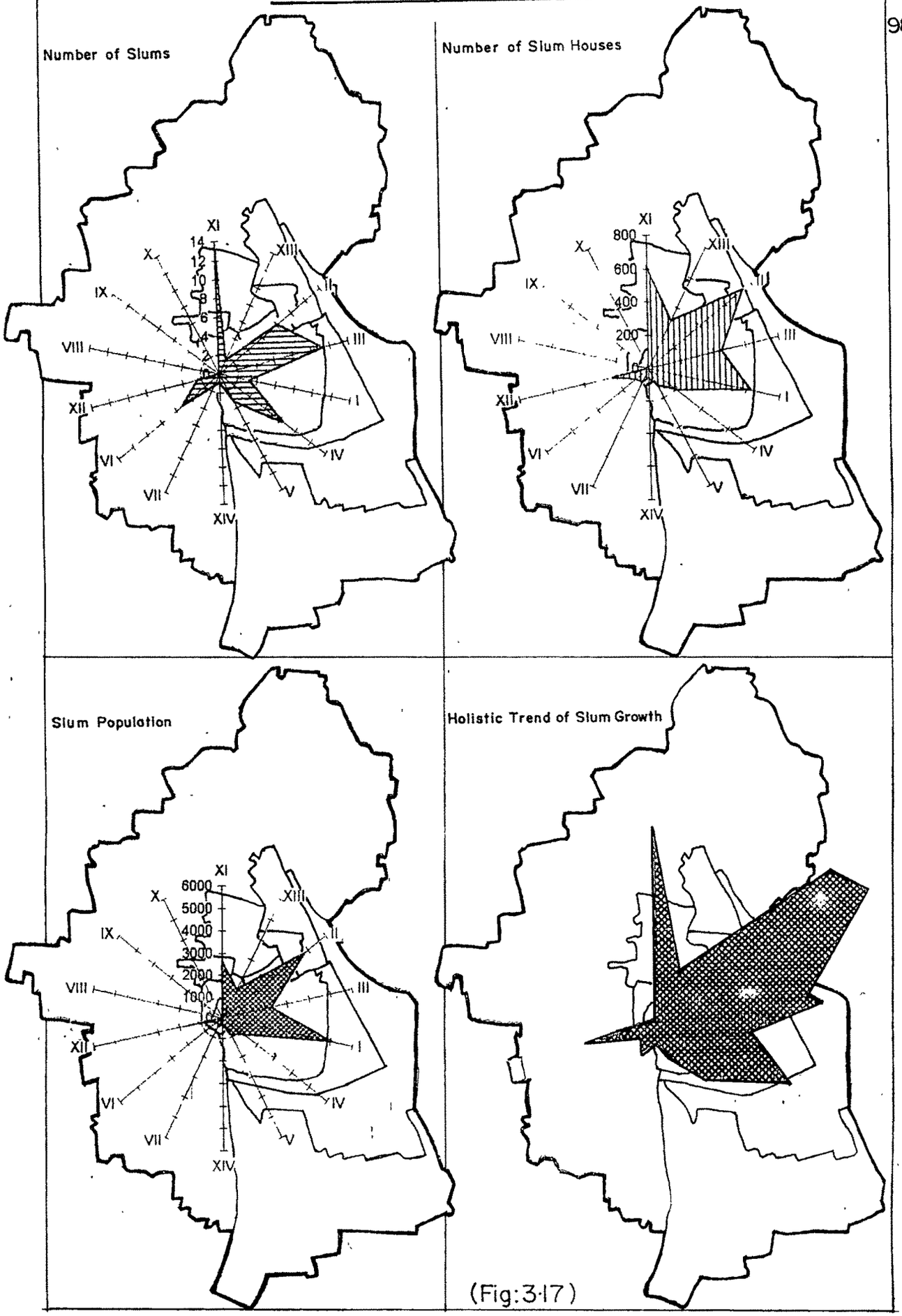
More and more people are attracted to the already existing slum areas as they earn a living in low paid blue collar jobs or in self employment, contrary to what was expected. The over all sample survey revealed that over 80% of these slum households have very low monthly income. Many of the slum dwellers are non-working. The economic condition of only a few families is good as they are engaged in white washing in construction, masonry work, fabricating aluminum doors and window, thermocoal molding and plaster of Paris idols and show pieces, tin making and recycling is the main occupation of slum dwellers residing near the over bridge in ward I. Some of the slum dwellers in ward XII near the Borsad chowkdi and near Vithal Udyognagar are engaged in preparing iron grills, swings and iron fabrication works which has a great demand, as new residential colonies are growing rapidly. A holistic view was obtained on superimposing the various social indicators using the Microsoft Excel '98 and Auto Cad R 14 software in order to get the correct idea about the areas more prone to slum development (Fig : 3.17).

ANAND - SLUMS



(Fig:3·16)

Indicators Of Slum Development :- 2.Social



(Fig:3·17)

Suggestions and conclusion :

Thus the scope of slum clearance should be enlarged to embrace slum improvement by providing them minimum amenities like sanitary-latrines, drainage, uncontaminated water supply, approach roads, paved streets and lighting, in order to prevent them from spoiling both the physical and social environment and also uplifting them from a degraded quality of life.

Slum dwellers are more prone to disease because of the sub-human conditions, which prevail due to unawareness and neglect. In order to solve this, proper efforts to educate them in the direction of health and hygiene should be made.

In computing this shortage, the fundamental assumption was that each household should have a "pucca" dwelling unit, a reasonably permanent structure to provide minimum standards of comfort and safety.

The prevailing ideas of wholesale slum clearance and construction of costly housing must be abandoned and new ideas must be developed to solve the shelter problem and improve physical environments and the slum life. The fact that emergence of slums, is the result of social degeneration and economic poverty cannot be ignored. The approach therefore has to be such that taking into consideration both the physical environments and the social and economic status of the slum dwellers its execution should involve no harassment, no adverse effect on the socio-economic conditions of the slum dwellers.*6

Finally, "what is equally essential, is the need for talking to these people, for making them feel acceptable, for telling the women folk how they can keep their home and children clean, for telling the children what games to play, for telling the men what work awaits them in the world beyond the one".*6

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