

DEMOGRAPHIC SITUATION IN SELECTED STATES

1961-81

A CASE STUDY

OF

**ASSAM, KERALA, ORISSA, RAJASTHAN, TAMIL NADU
AND UTTAR PRADESH**

**Dissertation submitted in partial fulfilment of the requirement for the award of
Degree of Master of Philosophy**

K. GOPINATH

**CENTRE FOR THE STUDY OF REGIONAL DEVELOPMENT
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI - 110067**

1987

SCHOOL OF SOCIAL SCIENCES

CENTER FOR THE STUDY OF REGIONAL
DEVELOPMENT

New Delhi-110 067

CERTIFICATE

It is certified that the dissertation "DEMOGRAPHIC SITUATION IN SIX SELECTED STATES 1961-81: A CASE STUDY OF ASSAM, KERALA, ORISSA, RAJASTHAN, TAMIL NADU AND UTTAR PRADESH" submitted by SHRI K. GOPINATH in fulfilment of six credits out of the total requirements of twenty-four credits for degree of Master of Philosophy of the University, is his original work according to the best of our knowledge and may be placed before the examiners for evaluation.


SUPERVISOR


CHAIRMAN

C O N T E N T S

| | | |
|-------------|--|------|
| | LIST OF TABLES | - i |
| | LIST OF FIGURES | - iv |
| | ACKNOWLEDGEMENTS | - vi |
| CHAPTER I | INTRODUCTION. | |
| | CONCEPTUAL FRAMEWORK | 1 |
| | THE POPULATION OF INDIA - AN OVER VIEW | |
| | SURVEY OF LITERATURE | |
| | RESEARCH DESIGN AND METHODOLOGY | |
| | DATA BASE | |
| | CHAPTERISATION. | |
| CHAPTER II | EVALUATION OF SEX AND AGE DATA | 20 |
| | SEX RATIO | |
| | EVALUATION OF CENSUS AGE DATA | |
| | SINGLE YEARS OF AGE RETURNS | |
| | i) INDEX OF CONCENTRATION | |
| | ii) INDEX OF PREFERENCE | |
| | INDICES FOR 1961, 1971 AND 1981 CENSUSES | |
| | GROUPED AGE DATA | |
| CHAPTER III | TRENDS OF MIGRATION IN SELECTED STATES | 58 |
| CHAPTER IV | TRENDS AND LEVELS OF BIRTH RATES AND DEATH RATES | 91 |
| | BIRTH RATES IN SELECTED STATES | |
| | DEATH RATES | |
| | INFANT MORTALITY RATE | |
| | EXPECTATION OF LIFE AT BIRTH | |
| CHAPTER V | POPULATION PROJECTIONS IN INDIA AND SELECTED STATE | 137 |
| | POPULATION PROJECTIONS | |
| | PROJECTIONS OF BIRTH AND DEATH RATES | |
| | PROJECTED EXPECTATION OF LIFE AT BIRTH. | |
| CHAPTER VI | OVERVIEW AND CONCLUSION | 169 |
| | BIBLIOGRAPHY. | 174 |

LIST OF TABLES

- 1.1. Distribution of population and growth rates in selected States 1961-81.
- 1.2. Decennial State growth rates 1951-1981
- 1.3. India's population and its decennial growth rates 1961- 1981
- 1.4. Adjusted population of selected States 1961-1981
- 2.1. Sex ratio at quinquennial age groups for India and selected States, 1961-1981.
- 2.2. Index of sex ratio at quinquennial age groups for India and selected States, 1961-1981.
- 2.3. Indices of concentration and preference by States and Sex, 1961-1981.
- 2.4. Age ratio score, sex ratio score and joint score, 1961-1981.
- 2.5. Smoothed population by quinquennial age groups, 1961-1981 INDIA
- 2.6. Smoothed population by quinquennial age groups, 1961-1981. ASSAM
- 2.7. Smoothed population by quinquennial age groups, 1961-1981 KERALA
- 2.8. Smoothed population by quinquennial age groups 1961-1981. ORISSA
- 2.9. Smoothed population by quinquennial age groups, 1961-1981 RAJASTHAN
- 2.10. Smoothed population by quinquennial age groups 1961-1981. TAMIL NADU
- 2.11. Smoothed population by quinquennial age groups, 1961-1981. UTTAR PRADESH

....2

- 3.1. (A) Population by place of birth and State of enumeration, 1961.
- 3.1. (B) Population by place of birth and State of enumeration, 1971.
- 3.2. (A) Heavy Streams of out-migration between States, 1961.
- 3.2. (B) Heavy streams of out-migration between States, 1971.
- 3.3. (A) Heavy streams of Immigrations, 1961.
- 3.3. (B) Heavy streams of Immigration, 1971.
- 3.4. (A) Distribution of Immigrants, out-migrants and net migrants, 1961-1981 (Both sexes)
- 3.4. (B) Distribution of Immigrants, out-migrants and net migrants 1961-1981 (Males)
- 3.4. (C) Distribution of Immigrants, out-migrants and net immigrants, 1961-1981 (Females).
- 3.5. Immigrants, out-migrants, net migrants, 1961-1981, and intercensal migration by place of birth.
- 4.1. Crude birth and death rates of India, 1961-1981.
- 4.2. Crude birth rates per 1000 for India and selected States, 1961-1981.
- 4.3. Age-specific fertility rates for India and selected States, 1971, 1976 and 1981.
- 4.4. Crude death rates per 1000 for India and Selected States, 1961-1981.
- 4.5. Infant mortality rates for India and selected States, 1961-1981.
- 4.6. Infant mortality rates and expectation of life at birth for India and selected States, 1961-1981.
- 4.7. Average expectation of life at birth for India and selected States, 1961-1980.

- 4.8. (i), (ii), (iii). Age specific death rates for selected States and India, 1971, 1976 and 1981.
- 5.1. Projected population of India, 1971-2001.
- 5.2. Projected population of India and selected States, 1981-2001.
- 5.3. Projected birth and death rates for India
- 5.4. Projected values of birth rates and death rates for selected States.
- 5.5. Projected expectation of life at birth for India, 1971-2001.
- 5.6. Projected expectation of life at birth for selected States, 1971-2001.
- 5.7. Differences between enumerated and projected population for India and selected States.
- 5.8. Population distribution in broad age groups for India and selected States, 1981 and 2001.

LIST OF FIGURES

| | | | |
|-----|------|--|-----------------|
| MAP | 1.1 | India, its States and Union Territories (1981) | |
| | 1.2 | Distribution of population of selected states | |
| | 1.3 | Population of India | |
| | 1.4 | Decadal variation of Population of India. | |
| | 2.1 | Sex ratio at Quinquennial age groups | - INDIA |
| | 2.2 | Sex ratio at Quinquennial age groups | - ASSAM |
| | 2.3 | Sex ratio at Quinquennial age groups | - KERALA |
| | 2.4 | Sex ratio at Quinquennial age groups | - ORISSA |
| | 2.5 | Sex ratio at Quinquennial age groups | - RAJASTHAN |
| | 2.6 | Sex ratio at Quinquennial age groups | - TAMILNADU |
| | 2.7 | Sex ratio at Quinquennial age groups | - UTTAR PRADESH |
| | 3.1 | Distribution of Immigrants and Outmigrants | - ASSAM |
| | 3.2 | Distribution of Immigrants and Outmigrants | - KERALA |
| | 3.3 | Distribution of Immigrants and Outmigrants | - ORISSA |
| | 3.4 | Distribution of Immigrants and Outmigrants | - RAJASTHAN |
| | 3.5 | Distribution of Immigrants and Outmigrants | - TAMIL NADU |
| | 3.6 | Distribution of Immigrants and Outmigrants | - UTTAR PRADESH |
| | 4.1 | Crude Birth and Death Rates of India | - 1901-1981 |
| | 4.2 | Crude Birth Rates for selected states. | |
| | 4.3 | Crude Death Rates for selected states. | |
| | 4.4 | Infant Mortality Rates - India | |
| | 4.5 | Infant Mortality Rates - ASSAM | |
| | 4.6 | Infant Mortality Rates - KERALA | |
| | 4.7 | Infant Mortality Rates - ORISSA | |
| | 4.8 | Infant Mortality Rates - RAJASTHAN | |
| | 4.9 | Infant Mortality Rates - TAMIL NADU | |
| | 4.10 | Infant Mortality Rates - UTTAR PRADESH | |

- 4.11 Expectation of life at Birth - INDIA
- 4.12 Expectation of life at Birth - ASSAM
- 4.13 Expectation of life at Birth - KERALA
- 4.14 Expectation of life at Birth - ORISSA
- 4.15 Expectation of life at Birth - RAJASTHAN
- 4.16 Expectation of life at Birth - TAMIL NADU
- 4.17 Expectation of life at Birth - UTTAR PRADESH
- 4.18 Expectation of life at Birth for India and Selected States.

- 5.1 Projected population upto 2001 - INDIA
- 5.2 Projected population upto 2001 - ASSAM
- 5.3 Projected population upto 2001 - KERALA
- 5.4 Projected population upto 2001 - ORISSA
- 5.5 Projected population upto 2001 - RAJASTHAN
- 5.6 Projected population upto 2001 - TAMIL NADU
- 5.7 Projected population upto 2001 - UTTAR PRADESH.

ACKNOWLEDGEMENTS

It is my pleasure to mention my indebtedness to my supervisor Prof. M.K. Premi whose critical sense, clear judgement and scholarly discussions have been my unflinching help throughout the period of my work. I take this opportunity to pay a tribute of gratitude for the courtesy, cordiality and encouragement I have been receiving from him.

Thanks are also due to Mr. D. Natarajan for providing me with all the necessary information which helped in completion of the work. I express my thanks and appreciation to Mr. Biswas and Mr. Bawa for their cooperation in the statistical evaluation of the data.

I express my sincere and warm thanks to Mrs. Rita Hemrajani for typing my dissertation with meticulous perfection amidst her busy schedule.

The friendly cooperation from Mr. G.V.R. Murthy, in spite of his busy schedule, for graphics is very much appreciated and acknowledged. Thanks are also due to Mr. Gopal Bansal for his help.



K. GOPINATH

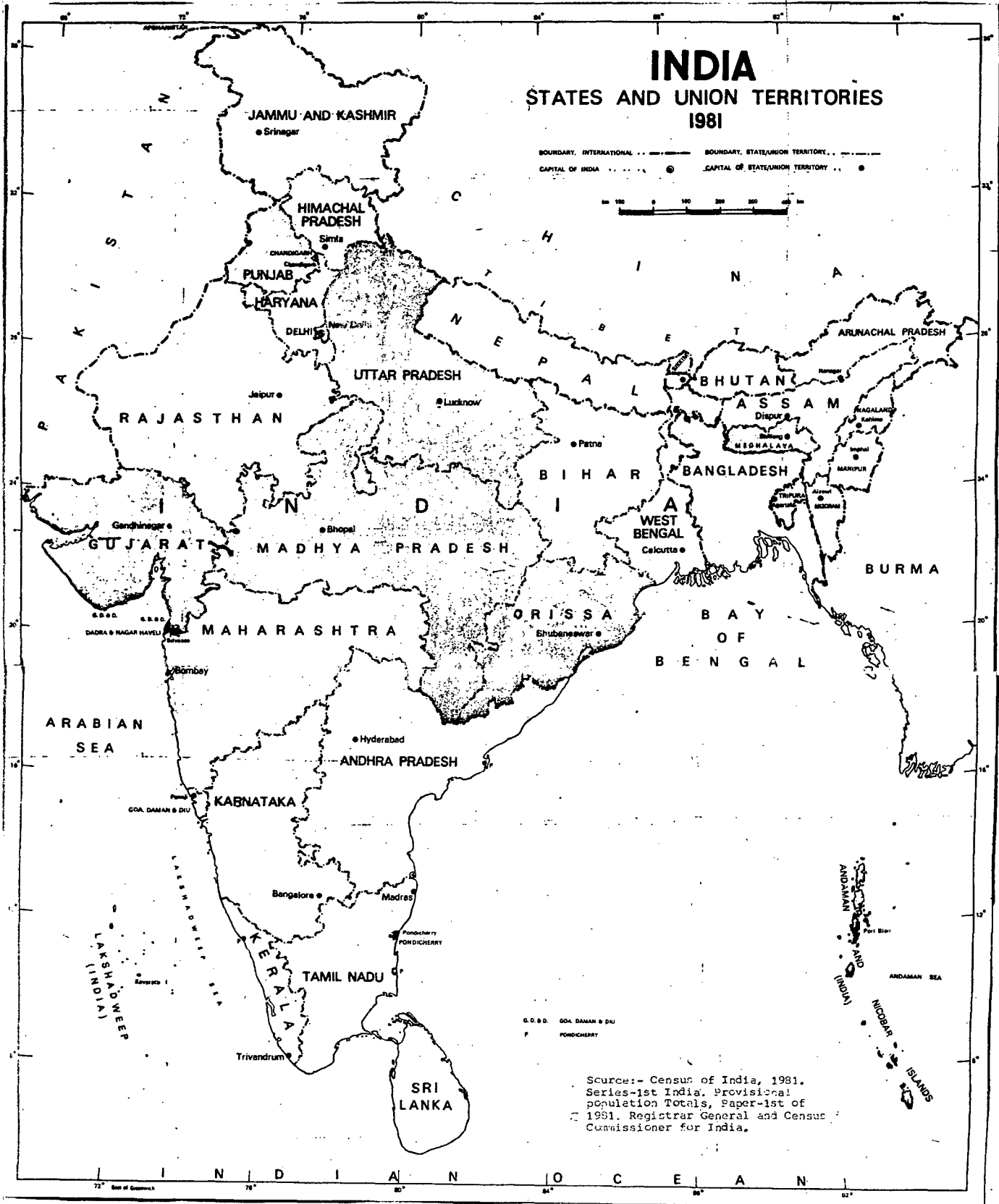
INTRODUCTION

Population data constitute the basic input on which the whole edifice of planning structure is erected (Salas, 1979). These data relate basically to size, composition, distribution of population in the given geographical territory as well as to the factors which cause changes in them namely fertility, mortality and migration. In order to proceed with proper social and economic plan, it is necessary that the base of particular country or area is reliable. In India the basic population data have been obtained from decennial censuses which have been conducted in modern sense on regular basis since 1872. Of recent, data on birth and death rates have been obtained from sample registration scheme of the office of the Registrar General and Census Commissioner, India whose data have been considered fairly reliable by the demographers.

For planning purposes, it is not only necessary to have population data along with the characteristics of the people at the national level but they are required at the sub-national level i.e. states, union territories, districts, tehsils, blocks and even for individual villages and towns. As one proceeds from the national level to sub-national level of lower level the chances of error and the proportionate amount of error also increase for several reasons. At the national level since international migration is very little in India, it plays a negligible role in changing the size and structure of the population and the basic components of the change in population remain only fertility and mortality. At the lower levels migration component becomes more and more important and unless

INDIA

STATES AND UNION TERRITORIES 1981



LAKSHADWEEP (INDIA)

ANDAMAN AND NICOBAR ISLANDS (INDIA)

C.D.D. GOA, DAMAN & DIU
P. PONDICHERY

72° 70° 68° 66° 64° 62°

N D I A N O C E A N

proper estimates are made one may find difficulties in understanding the pattern of growth of population at the state, district or lower levels.

The post enumeration checks conducted in India after the main censuses since 1951 have indicated a net under-count of the population to the order of 1.5 to 1.8 percent. It is quite likely that the data collection agencies in the population censuses worked efficiently in some States/Union territories while the quality of the work was probably indifferent in some other states. Again there is a possibility in a particular area in a particular censuses the undercount may be substantial. In the next census efforts were made to reduce undercount and there is possibility that under that enthusiasm there is a little over count. The undercount of population can take place by missing whole households or by missing a few members who should otherwise be enumerated. The overcount can happen if the area or households have been covered more than once by the same enumerator or different enumerators or temporary visitors who should not have been counted at the place of enumeration have been counted there as well as at their normal place of residence.

The dissertation attempts to study the demographic features of six selected States, - Assam, Kerala, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh. The analysis has been made using the components of fertility, mortality and migration. Apart from these, basic composition of population - Age and sex - and population projection to indicate the possible future growth has been explained. Table 1.1 presents the population of India and States selected with decadal growth rates. The population of Uttar Pradesh has been growing at a fast pace followed

TABLE 1.1

DISTRIBUTION OF POPULATION AND GROWTH RATES IN
SELECTED STATES 1951-81

| | POPULATION | | | | GROWTH RATE | | |
|------------------|-------------|-------------|-------------|-------------|------------------|------------------|----------------|
| | <u>1951</u> | <u>1961</u> | <u>1971</u> | <u>1981</u> | <u>1951-1961</u> | <u>1961-1971</u> | <u>1971-81</u> |
| INDIA | 361088090 | 439234771 | 548159652 | 683810051 | 21.52 | 24.80 | 24.75 |
| ASSAM | 8225058 | 11103392 | 14625152 | 19902826 | 34.99 | 34.71 | 36.09 |
| KERALA | 13549118 | 16903715 | 21347375 | 25403217 | 24.76 | 26.29 | 19.00 |
| ORISSA | 14645946 | 17548846 | 21944615 | 26272054 | 19.82 | 25.05 | 19.72 |
| RAJASTHAN | 15970774 | 20155602 | 25765806 | 34102912 | 26.20 | 27.83 | 32.36 |
| TAMILNADU | 30119047 | 33686953 | 41199168 | 48297456 | 11.85 | 22.30 | 17.23 |
| UTTAR PRADESH | 63219655 | 73754554 | 88341144 | 110858019 | 16.66 | 19.78 | 25.49 |

Source: Censuses of India, 1951 to 1981

DISTRIBUTION OF POPULATION OF OF SELECTED STATES (in millions)

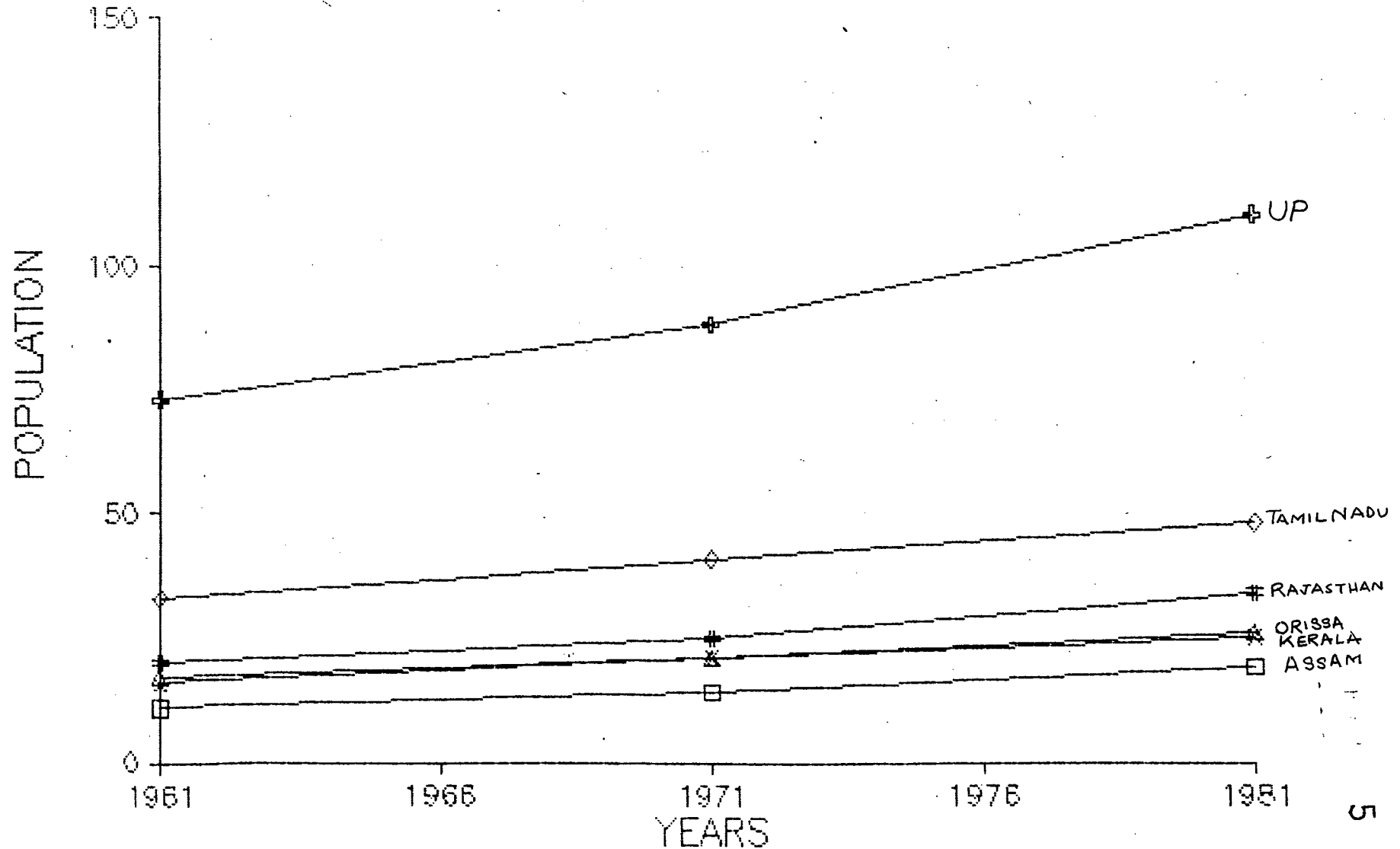


Fig. 1.2

by the population of Rajasthan. Tamil Nadu population increased by about 7 million after 1961 whereas between 1951 and 1961, it was 3 million. Assam, Kerala and Orissa' population grew steadily inspite of fluctuating growth rates.

When one examines the growth rates of different States/Union territories in India over a period of time (Table 1.2) one gets perplexed about the pattern of growth in certain states. This is particularly so in the case of Assam, Kerala, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh. In case of Assam, one finds that the growth rate has always been much higher than the national average. All of which cannot be explained by net migration. It is observed from Table 1.2 the growth rate in Assam and Rajasthan have been much above the national average during the period under study. Therefore one would like to examine if the component of net migration would take care of excess growth rate of over and above the national growth rate in these two states. In contrast the growth rate of Kerala and Tamil Nadu have been much below the national growth rate during the three decades after independence. These States have been regarded as net out-migrating states. One would like to examine whether their growth rates are fully explained by the natural increase rate and net migration. The cases of Orissa and Uttar Pradesh seem to be more complex than these of the above four states. In Orissa the growth rate of population during the 1950s and 1960s had been almost the same as that of India as a whole, the growth rate during 1971-81, however, declined sharply although as will be shown later, Orissa remained a net in-migrating state. In contrast, Uttar Pradesh had generally experienced a much lower growth rate than the national average and this was true for 1951-61 and 1961-71 decades. However, the growth rates during 1971-81 increased

**DECENNIAL STATE GROWTH RATES
1951-1981**

| STATES/UNION TERRITORY | GROWTH RATES | | |
|---------------------------|--------------|---------|---------|
| | 1951-61 | 1961-71 | 1971-81 |
| Andhra Pradesh | 15.65 | 20.60 | 22.76 |
| Assam | 35.06 | 33.51 | 36.09 |
| Bihar | 19.77 | 21.38 | 23.90 |
| Gujarat | 26.88 | 29.21 | 27.21 |
| Haryana | 33.79 | 31.36 | 28.04 |
| Himachal Pradesh | 17.87 | 21.76 | 22.46 |
| Jammu & Kashmir | 9.44 | 29.60 | 29.57 |
| Kerala | 24.76 | 25.89 | 19.00 |
| Madhya Pradesh | 24.17 | 28.04 | 25.15 |
| Maharashtra | 23.60 | 27.16 | 24.36 |
| Mysore | 21.57 | 23.90 | 26.43 |
| Nagaland | 14.07 | 39.64 | 49.73 |
| Orissa | 19.82 | 24.99 | 19.72 |
| Punjab | 21.56 | 21.00 | 23.01 |
| Rajasthan | 26.20 | 27.63 | 32.36 |
| Tamil Nadu | 11.85 | 22.01 | 17.23 |
| Uttar Pradesh | 16.66 | 19.73 | 25.49 |
| West Bengal | 32.80 | 27.24 | 22.96 |
| Sikkim | - | 29.38 | 50.44 |
| Andaman & Nikobar | 105.19 | 81.11 | 63.51 |
| Chandigarh | 394.13 | 114.36 | 74.95 |
| Dadra & Nagar Haveli | 39.56 | 27.95 | 39.78 |
| Delhi | 52.44 | 52.12 | 52.41 |
| Goa, Daman & Diu | 5.14 | 36.78 | 26.15 |
| Lakshdweep | 14.61 | 31.90 | 26.49 |
| Manipur | 35.04 | 37.12 | 33.65 |
| Meghalaya | 25.97 | 32.02 | 31.25 |
| Pondicherry | 16.34 | 27.71 | 28.07 |
| Tipura | 78.71 | 36.32 | 32.37 |
| Arunachal Pradesh | - | 38.91 | 34.34 |

Source: Computed from
Censuses of India 1951 to 1981

sharply and became equal to national average even though Uttar Pradesh remained a net out-migrating state during 1970s.

Further, as will be shown later, the available data on birth and death rates and net migration do not fully explain the growth rates in the above six states. Hence it has become necessary to examine these data again and to discern the factors which might have caused the observed discrepancies in the growth rates as indicated by the census and as are estimated by taking account of birth and death rates and migration rates. This dissertation goes into these questions for the above six states and would try to throw light on the factors that might be responsible for the difference between observed and explained growth rate.

As indicated earlier the size of population of a given geographical area between two time points is affected by its birth rate, death rate and net migration. There is, however, a fourth component which is termed as differential undercount which may also be responsible to certain extent in understanding the pattern of growth rate in different states. Unfortunately the estimates of net under counts generated in post enumeration checks are only for all - India and five census zones. Therefore one has to apply some indirect techniques to evaluate the quality of census data and to understand the observed pattern of growth rates. The present dissertation will make an attempt in this direction.

Before going into above issues this chapter first gives an overview of the population of India. The second section reviews literature dealing with pattern of state-wise growth rate in India and the final section gives the methodology and data base used in this study.

The Population of India - An overview.

The census taking in the Republic of India has completed its centennium in 1971. The growth of population till 1951 was not as alarming as it is today. The population was checked by natural calamities, persistence of high mortality due to inddequate sanitation and health facilities. Thus the balance between fertility and mortality gave only a moderate growth rate. The annual growth rate from 1901 to 1951 was somewhere between 1 to 1.3 percent because of heavy toll of life due to epidemics and natural calamities which struck sporadically.

After the partition of India in 1947, its total land area reduced to 3.29 million square kilometers with a total population of 361 million (as of 1.3.1951) spread over the vast territory which included free states and Princely provinces. Pt. Nehru's remark 'India's population is not one but 400 million problems' (Narayan and Raman 1985), explains the scene of the country after 1951. The birth rate has come down to 41.7 per 1000 whereas the decline in the death rate has been spectacular - to 22.8 per 1000 in 1951.

Table 1.3 provides the population figures with male and female breakup from 1901 to 1981 as also the decadal variations in the total population. India's population which was growing at a slow pace of about one percent per annum from 1901 to 1951 accelerated its growth and reached 439 million in 1961 with a growth rate of 21.51 percent during 1951-61. It increased to 548 million in 1971 with a growth rate of 24.8 percent during 1961-71 and to 685 million with a growth rate of 24.75 percent. The teeming growth of population has become a matter of concern to the policy makers,

* This includes projected population of Assam where the 1981 census could not be conducted.

TABLE 1.3 : INDIA'S POPULATION AND ITS DECADEAL GROWTH RATE
1901 - 1981

| YEAR | TOTAL POPULATION (000) | MAELS (000) | FEMALES (000) | DECADEAL GROWTH RATE |
|------|---------------------------|----------------|------------------|-------------------------|
| 1901 | 2,38,396 | 1,20,791 | 1,17,359 | - |
| 1911 | 2,52,093 | 1,28,385 | 1,23,708 | 5.75 |
| 1921 | 2,51,321 | 1,28,546 | 1,22,775 | (-) 0.31 |
| 1931 | 2,78,977 | 1,42,930 | 1,35,789 | 11.00 |
| 1941 | 3,18,661 | 1,63,685 | 1,54,690 | 14.22 |
| 1951 | 3,61,088 | 1,82,528 | 1,75,560 | 13.31 |
| 1961 | 4,39,235 | 2,26,293 | 2,12,942 | 21.51 |
| 1971 | 5,48,160 | 2,84,049 | 2,64,111 | 24.80 |
| 1981 | 6,83,810 | 3,53,347 | 3,30,462 | 24.75 |

The growth rate is measured by the Formula = $\frac{P_2 - P_1}{P_1} \times 100$

Where : P_1 - Number of people at earlier date.

P_2 - Number of people at later date.

Source : - Padmanabha, Registrar General & Census commissioner for India, 1981.
Series I, India, Paper 1 of 1981 Provisional Population Totals.

- Government of India, Ministry of Health and Family Welfare
"Health Statistics of India - 1984".

Directorate of Health Services, New Delhi.

POPULATION OF INDIA (in millions)

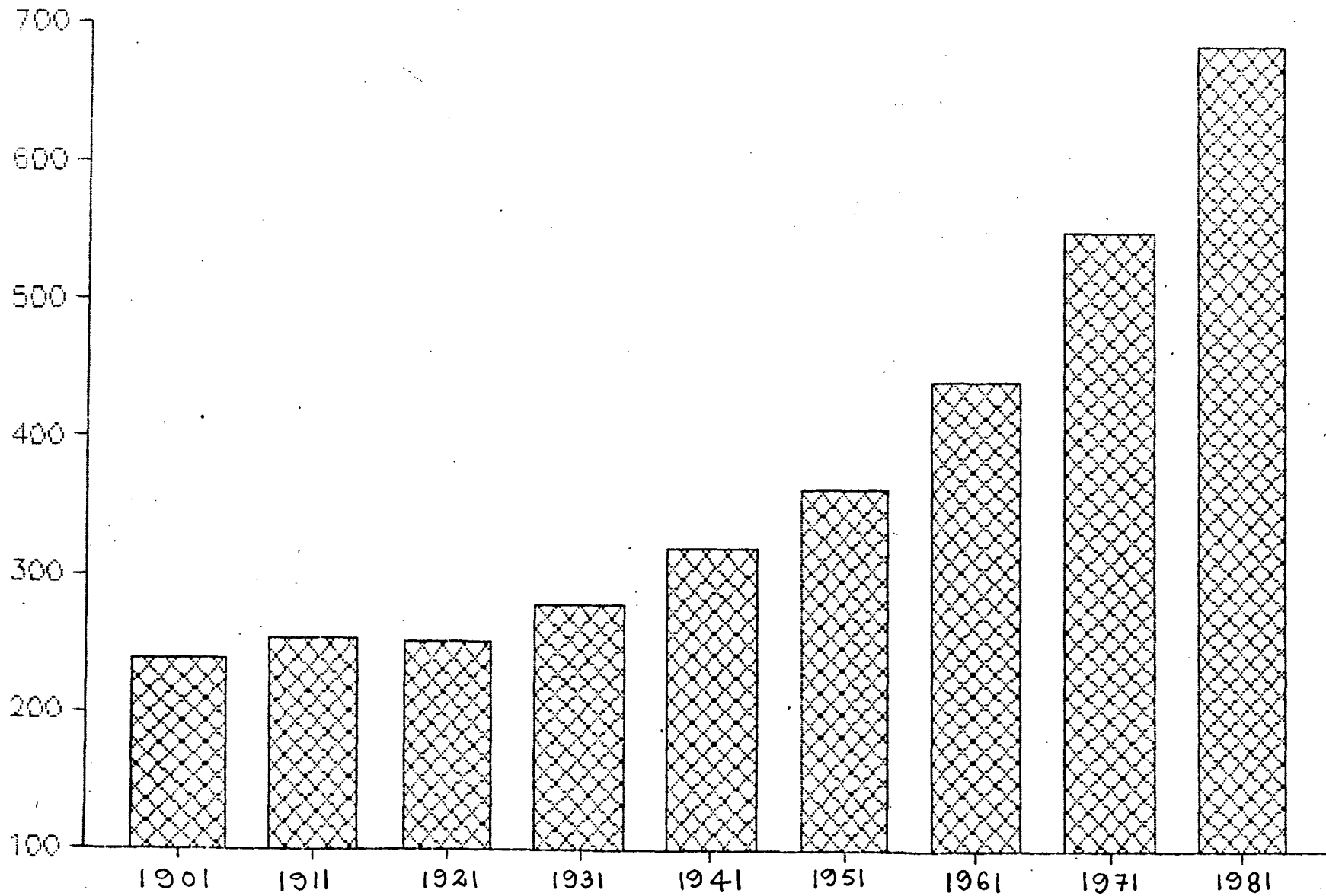


FIG. 1.3

DECADAL VARIATION OF POPULATION OF INDIA (PERCENTAGE)

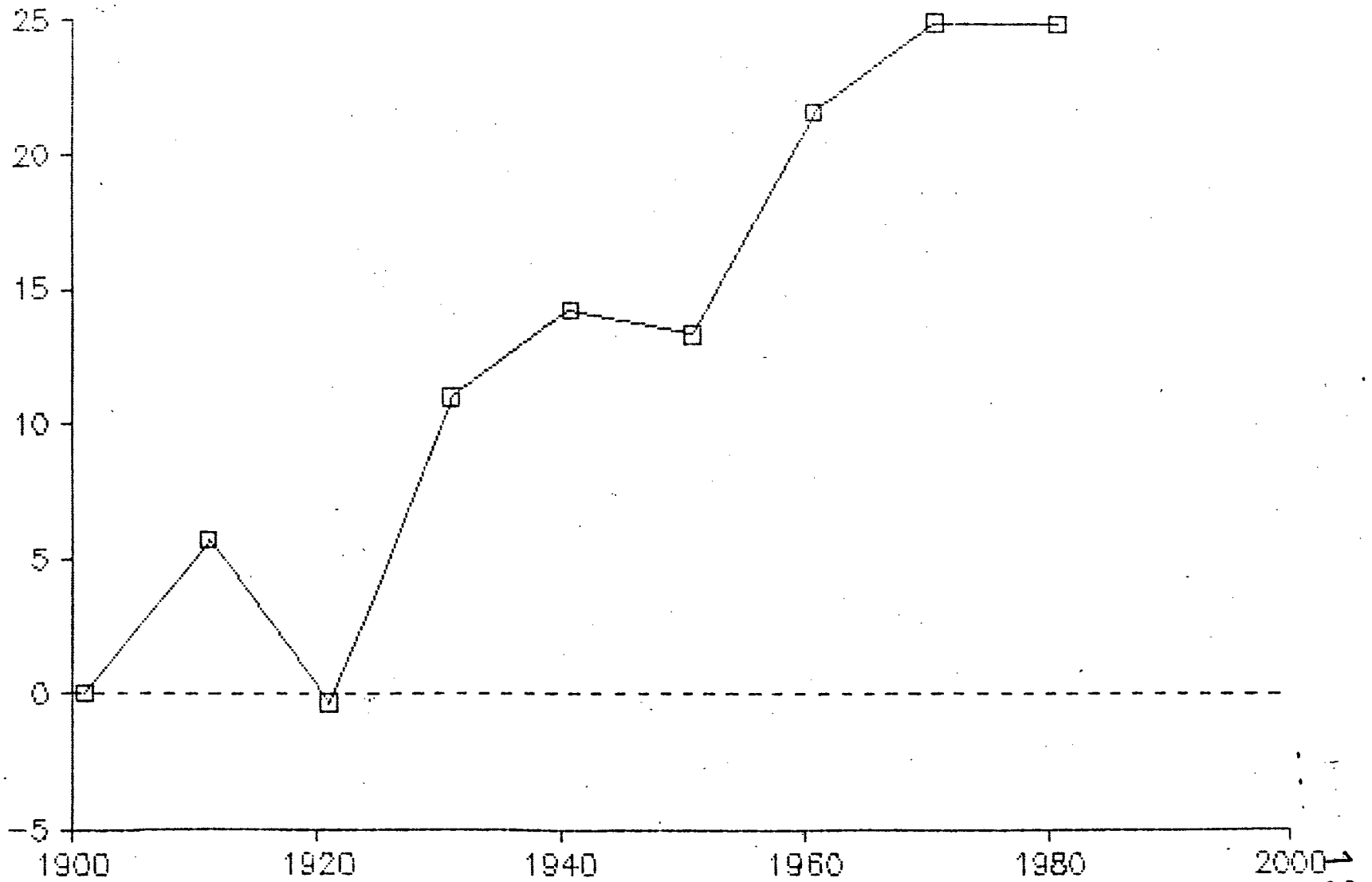


FIG. 1.4

scientists, social scientists, environmentalists and a host of people from all walks of life. They have recognised this over population as a sign of imminent danger to the country's survival since it erodes resources and also creates a food scarcity besides threatening the environment inhabited by people and also adversely effects the employment potential and even totally disrupts the social structure.

The spurt in population is not attributed to any sudden burst in birth rate but to decline in death rate. The death rate declined at a comparatively fast rate while the birth rate remained stationary or lingered (Bhattacharjee and Shastri, 1976). The reasons for the decline in mortality are better control of communicable diseases, better nutritional and sanitational facilities, better obstetrics and post partum facilities and advances made in chemotherapy and antibiotics. (Pask and Park, 1979). The result of decline in mortality at early after resulted in improved life expectancy at birth. The combined life expectancy of males and females just after independence was 32.1 years which has risen to 54.4 years in 1981

Survey of Literature :

Jain (1966) in his study on 'state growth rates and their components' has pointed out that the decennial growth rate of population from 1901-51 was between 11 to 14 percent and the growth rate during 1951-61 was 21.5 percent which was much more than in earlier decades.

The growth rate in Assam was 19 percent since 1921 whereas the growth rates of Kerala, Mysore, Gujrat Rajasthan could not maintain a steady pattern and suffered from fluctuations from one census count to another. The states with long time trend of low growth rates were Jammu and Kashmir, Himachal Pradesh and Uttar Pradesh.

Uttar Pradesh and Bihar had total population of 73 million and 46 million respectively in 1961. Andhra Pradesh, Madhya Pradesh, Maharashtra and West Bengal had populations between 30 and 35 million. The States which recorded exceptionally sharp growth during 1951-61 were Assam, Bihar, Gujrat, Orissa, Madhya Pradesh, Punjab, Rajasthan and West Bengal. Andhra Pradesh and Uttar Pradesh had a low growth rate whereas Jammu and Kashmir and Madras had lowest growth rate.

The decennial migrations have not been much. It was below 0.5 per 1000 though it recorded more sometimes. Assam had highest influx of migrants from 1957 due to immigration of plantation labour. The other in-migrating states were Madhya Pradesh and Maharashtra. The out-migrating States during that period have been Uttar Pradesh, Rajasthan, Bihar and Punjab.

Bhattacharjee and Shastri (1976) point out that the growth of population speeded up after 1951. The increase in population during 1951-61, was 21.6 percent whereas it was 24.8 percent during 1961-71. The growth rates during 1951-61 and 1961-71 were very high when compared to 5.4 percent and 43.7 percent during 1901-21 and 1921-51 period, respectively. During 1951-71 the death rate declined by 42 percent whereas birth rate declined by only 5.5 percent.

Visaria and Visaria (1981) state that the size of the state varies in terms of area and population. The States of North-Eastern region are small in area and have populations between 30,000 and 2.1 million in 1981. The remaining States have populations between 4.3 and 110.9 million. Uttar Pradesh, Bihar, Maharashtra, West Bengal, Andhra Pradesh, Madhya Pradesh and Tamil Nadu account for 66 percent of total population of India. Of all the Union territories, only Delhi has 6.2 million persons.

During 1971-81, the growth rates of Tamil Nadu, Kerala, and Orissa were below 20 percent. Haryana, West Bengal, Madhya Pradesh, Maharashtra and Gujrat had lower growth rates than what they experienced

during 1961-71. Uttar Pradesh, Rajasthan, Bihar, Karnataka, Andhra Pradesh and Punjab have registered an increase in their growth rates during 1971-81 by 5.7, 4.6, 2.6, 2.2, 1.9 and 1.3 percent over the 1961-71 growth rates.

The inter-state variations are due to differences in birth rates, death rates and magnitude of migrations. In India migration has not played a significant role in altering the population size.

Sinha and Zacharia (1984) have observed that the rapid or slow growth of population is a regional problem. Of the fifteen major states in India, Tamil Nadu had lowest growth rate of 17.2 percent and Rajasthan had highest growth rate of 32.4 percent during 1971-81. The growth rates in Assam and Gujrat were always above the national average since 1901 whereas the rest of the states had fluctuating growth rates.

The extent of inter-state variations are very wide and it is increasing in some of the States in which the population pressure is high. In spite of heavy emigration from high pressure states the population growth rate has not reduced.

The study undertaken on 'Population of India' during the World population year (1974) by CICRED points out that the inter-state migration has considerably influenced the growth rates. Of the States being studied only Tamil Nadu and Uttar Pradesh have low growth rates due to different demographic conditions. In case of Tamil Nadu it is due to heavy out-migration and lower birth and death rates whereas in Uttar Pradesh it is due to heavy out-migration and high birth and death rates. Assam and Kerala indicated highest growth rates. Assam has been an in-migrating state. International migration has not influenced the growth rates in any of the States in India.

Research design and Methodology

The returns obtained from census count are susceptible to various errors. The census age returns tend to be defective due to ignorance and illiteracy in the country. The inaccuracy in age returns is an established fact and has been a topic of interest in every census. The techniques adopted to test the age biases are index of concentration (whipples) and index of preference (Myers). Both the methods point out the prominent age heaping. The prevailing discrepancies at national level seems to prevail at the state level.

India, is one of the countries, with a low sex ratio*. The sex ratio has been calculated at each quinquenium from unadjusted population to find out variations. The overall female ratio is low less than 950 but in the age groups of 20-24 and 25-29 years, it is moderately high. Kerala, Orissa and Tamil Nadu have higher sex ratio whereas Assam, Rajasthan and Uttar Pradesh have low sex ratio because of the poor conditions of women.

Migration is one of the vital processes which alters the size of a population. The records of migration do not lend themselves so well to study as those of births and deaths. The population of states being studied are adjusted with migration figures net migration. Assam has been an in-migrating state since long and in 1961 the net gain was by 11.1 percent which is highest not only in States being studied but also in India. In 1971 the migration rate reduced and it was 8.9 percent. Kerala has been a losing State and figures of migration are fluctuating. In 1961 it lost by 2.2 percent and in 1971 the loss has been by 3.1 percent and in 1981 it was 2.9 percent. Orissa has been gaining population since 1971. In 1961, the decadal loss was by 0.6 percent but gained by 0.7 percent during 1961-71 and by 1.3 percent

* Sex ratio is defined here as females per 1000 males.

in 1971-81. Rajasthan has been losing population since long because of the physical terrain and environment. Population of the state reduced by 0.8 percent, 0.08 percent and 0.03 percent in 1961, 1971 and 1981 respectively. Population of Tamil Nadu lost by 1.2 percent in 1961 because of boundary changed and in 1971 and 1981 it gained by 0.07 percent and 0.22 percent respectively. Uttar Pradesh has always been a losing state. It lost highest in 1981 by 2.2 percent whereas it lost its population by 1.37 percent and 1.56 percent in 1961 and 1971 respectively. Adjusted population of selected States are presented in Table 1.4.

The projected population figures have been compared with the actual population figures and the actual differences have been brought out using the following formula.

$$\frac{\text{Enumerated Population} - \text{Projected Population}}{\text{Enumerated population}} \times 100$$

Data base:

Information about the size of a country's population has been sought since ancient times. The information obtained about the people helped in conscription, taxes and by engaging them as slaves. But the information obtained in modern times has changed as the agency of information collector is Government and it is for the planning of economic and social programmes pertaining to the nation as a whole.

For the present study information has been sought from all the available secondary sources for a period of two decades, 1961-1981. The primary source of demographic statistics are the reports published by the Registrar General and Census Commissioner. The reports provide the size of the population and its growth, records of births, deaths and migration. Birth rates and death rates are available from the Bulletins of the sample registration

Table 1.4 ADJUSTED POPULATION OF SELECTED STATES 1961-1981

| STATES | YEAR | POPULATION | ADJUSTED POPULATION AFTER NET-MIGRATION FIGURES. | PERCENTAGE (AFTER ADJUSTMENT) |
|------------------|------|------------|--|-------------------------------------|
| ASSAM | 1961 | 11103392 | 12346499 | 2.81 |
| | 1971 | 14625152 | 15937847 | 2.90 |
| KERALA | 1961 | 16903715 | 16525122 | 3.76 |
| | 1971 | 21347375 | 20682481 | 3.77 |
| | 1981 | 25403217 | 24663763 | 3.60 |
| ORISSA | 1961 | 17548846 | 17435770 | 3.96 |
| | 1971 | 21944615 | 22112202 | 4.03 |
| | 1981 | 26272054 | 26638823 | 3.89 |
| RAJASTHAN | 1961 | 20155602 | 19978036 | 4.54 |
| | 1971 | 25765806 | 25742728 | 4.69 |
| | 1981 | 34102912 | 34091466 | 4.98 |
| TAMIL NADU | 1961 | 33686953 | 33261651 | 7.57 |
| | 1971 | 41199168 | 41229605 | 7.52 |
| | 1981 | 48297456 | 48403968 | 7.07 |
| UTTAR PRADESH | 1961 | 73754554 | 72738549 | 16.56 |
| | 1971 | 88341144 | 86954334 | 15.86 |
| | 1981 | 110858019 | 108324511 | 15.84 |

Source - Censuses of India 1961 to 1981 and Migration Tables of 1961 - 1971 and 5 percent sample Data of Population of India.

scheme which was initiated on pilot basis in 1966 and 1967. But in a decade or so it covered entire nation. Data on population projections have been obtained from expert committee set up by the planning commission and various other private and institutional sources. Migration data of 1981 census is available from 5 percent sample data by Registrar General's office.

Chapterisation:

In using indirect methods lot of assumptions regarding age distribution are needed. Comprehensive study in this regard is done in Chapter II. Chapter II also gives analysis of sex ration in quinquennial age groups to find out variations.

Chapter III deals with migration component. Though migration in India does not play a very important role in altering the total population of many States but in case of a few states like Assam, Uttar Pradesh, Rajasthan, Kerala, the in-migration and out-migration rates are certainly higher when compared to other states in India.

Birth rates and death rates are very important components of a population. The birth rates and death rates available upto 1966 were obtained from civil registration and various other indirect sources but after 1966 with the introduction of sample registration scheme, the quality of data obtained were much better and reliable. Chapter IV also gives the changes in infant mortality rates and expectation of life at birth over the years.

Population projections have assumed a very important role in planning for the future. The planning machinery depends upon the projected population figures to devise a comprehensive programme to meet the future requirements. Though the projected population does not tally with the actual population but the difference is very narrow. Chapter V deals with population projections upto 2000 AD

Chapter VI provides succinct summary and conclusions of the study drawn from the analysis.

CHAPTER II

EVALUATION OF SEX AND AGE DATA

This chapter deals with the analysis of sex and age data. This chapter also attempts to study the reasons for overall lower sex ratio, variations in each age group and inaccuracies in the census, age data. The data obtained on sex ratio in India, except a few States is very low when compared with the ratio of developed countries. The age data is found to be inaccurate because of prevailing illiteracy and ignorance.

Sex ratio:

Sex composition plays a vital role in population analysis as it is directly influenced by births, deaths and migration. Sex composition of a population is measured by sex ratio or femininity ratio. Sex ratio is defined as, "the ratio within a population, of the number of females to the number of males or the ratio of events occurring to males divided by the number occurring to females." (Pressat R, 1985).

The composition of both sexes is not balanced. One finds the population of men more than women and this phenomena is quite evident in developing countries to developed countries. The known causes of the variations in sex ratio are - female infanticide, which was predominantly prevalent prior to independence has come to a point of cessation.

Neglect of female child, the female children are not given due attention and reasons are females being treated as unproductive in the household and most part of income given away/spent during marriage.

The females are married off in their teens to avoid over-expenditure and early marriage leads to premature motherhood endangering their and offsprings' lives. The sex ratio is low in the age groups 10-14 and

DISS
304.60954
K1 De



TH2129

15-19 in India. Apart from the causes mentioned, here are a few other causes viz. differential births, differential migration and differential mortality.

Table 2.2 presents the sex ratio of females per 1000 males and presents the index of the same. The sex ratio presented reveal greater inter-regional imbalance. The sex ratio shows fluctuating tendency. The number of females in the age group 10-14 and over 35 years is less than overall (national) sex ratio of 940, 930 and 935 in 1961, 1971 and 1981 respectively. The mortality in the first 4 years of life is greater in case of males than females. And in 20-29 age group also the females are less vulnerable to mortality because of better doorstep medical facilities. In rest of the age groups, it is little less or more than 950.

The position of women in States selected also does not give a very delightful picture. Assam, Rajasthan and Uttar Pradesh have sex ratio much lower than the national average. In Assam, Rajasthan and Uttar Pradesh the lower sex ratio is due to lower standards of living and low profile of women. A low sex ratio than the national average either points to much higher death rate of females than males or a greater undercount of females. This later aspect is clearly reflected in the sex ratio score for these two States in 1971 and 1981. Kerala has always remained on the top and also over the national average. The excess of females is due to improvement in medical and Public health services. Kerala has lowest maternal deaths. The first nine years of life of females is vulnerable compared to males. Orissa, too, has a better sex ratio and has always had sex ratio over the national average. It has over 1000 and more throughout. Tamil Nadu's position has been fluctuating, but it remained in the first five States with higher sex ratio than other States indicating the status enjoyed by the females there.

TH-2129

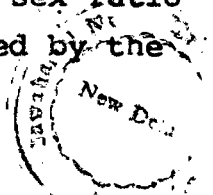


Table 2.1 SEX RATIO AT QUINQUENNIAL AGE GROUPS FOR INDIA AND SELECTED STATES 1961-81

| AGE GROUP | INDIA | | | ASSAM | | KERALA | | | ORISSA | | | RAJASTHAN | | | TAMIL NADU | | | UTTAR PRADESH | | | AGE GROUP |
|-----------|-------|------|------|-------|------|--------|------|------|--------|------|------|-----------|------|------|------------|------|------|---------------|------|------|-----------|
| | 1961 | 1971 | 1981 | 1961 | 1971 | 1961 | 1971 | 1981 | 1961 | 1971 | 1981 | 1961 | 1971 | 1981 | 1961 | 1971 | 1981 | 1961 | 1971 | 1981 | |
| 0-4 | 991 | 979 | 975 | 1035 | 1009 | 976 | 980 | 968 | 1048 | 1030 | 1017 | 971 | 954 | 982 | 995 | 980 | 970 | 970 | 950 | 952 | 0-4 |
| 5-9 | 955 | 933 | 940 | 990 | 996 | 968 | 973 | 968 | 1015 | 1020 | 1012 | 908 | 895 | 923 | 993 | 982 | 966 | 899 | 856 | 860 | 5-9 |
| 10-14 | 876 | 884 | 896 | 849 | 926 | 983 | 980 | 975 | 879 | 916 | 975 | 831 | 853 | 885 | 960 | 972 | 963 | 820 | 791 | 800 | 10-14 |
| 15-19 | 929 | 882 | 889 | 967 | 926 | 1076 | 1073 | 1085 | 1025 | 942 | 980 | 863 | 837 | 830 | 983 | 951 | 1012 | 864 | 806 | 779 | 15-19 |
| 20-24 | 1051 | 997 | 978 | 1012 | 949 | 1106 | 1034 | 1095 | 1095 | 1064 | 964 | 1030 | 1010 | 964 | 1094 | 994 | 1007 | 901 | 1011 | 983 | 20-24 |
| 25-29 | 974 | 1007 | 970 | 857 | 931 | 1137 | 1088 | 1081 | 1001 | 1087 | 976 | 926 | 986 | 917 | 1095 | 1127 | 1056 | 971 | 976 | 958 | 25-29 |
| 30-34 | 929 | 975 | 964 | 786 | 835 | 1246 | 1059 | 1000 | 965 | 1036 | 1028 | 905 | 947 | 919 | 1024 | 1025 | 984 | 932 | 961 | 995 | 30-34 |
| 35-39 | 871 | 909 | 952 | 676 | 776 | 991 | 1069 | 1077 | 908 | 910 | 971 | 884 | 892 | 935 | 948 | 982 | 1056 | 884 | 902 | 961 | 35-39 |
| 40-44 | 891 | 878 | 896 | 692 | 751 | 979 | 997 | 1017 | 988 | 901 | 933 | 914 | 912 | 874 | 911 | 919 | 911 | 874 | 857 | 874 | 40-44 |
| 45-49 | 854 | 835 | 898 | 622 | 659 | 977 | 932 | 1030 | 934 | 875 | 880 | 824 | 884 | 929 | 906 | 876 | 916 | 862 | 852 | 938 | 45-49 |
| 50-54 | 873 | 846 | 839 | 680 | 720 | 1009 | 967 | 984 | 958 | 939 | 859 | 811 | 856 | 729 | 959 | 922 | 915 | 814 | 757 | 736 | 50-54 |
| 55-59 | 860 | 865 | 930 | 625 | 656 | 1011 | 986 | 1008 | 951 | 928 | 923 | 781 | 857 | 969 | 906 | 891 | 885 | 875 | 870 | 971 | 55-59 |
| 60-64 | 968 | 920 | 936 | 767 | 761 | 1071 | 1055 | 1064 | 1128 | 1047 | 1034 | 934 | 909 | 968 | 988 | 950 | 949 | 877 | 805 | 805 | 60-64 |
| 65-69 | 961 | 921 | 990 | 719 | 692 | 1060 | 1109 | 1162 | 1113 | 1035 | 1106 | 892 | 837 | 1040 | 954 | 946 | 937 | 880 | 743 | 919 | 65-69 |
| 70 + | 1063 | 971 | 975 | 737 | 762 | 1128 | 1142 | 1205 | 1372 | 1150 | 1105 | 1023 | 966 | 1034 | 1023 | 1000 | 953 | 959 | 832 | 808 | 70 + |
| ALL AGES | 940 | 930 | 935 | 876 | 896 | 1121 | 1016 | 1034 | 1000 | 987 | 982 | 907 | 910 | 921 | 992 | 978 | 978 | 908 | 878 | 886 | ALL AGES |

SOURCE : COMPUTED FROM AGE TABLES OF 1961, 1971 and 1981.

SEX RATIO AT QUINQUENNIAL AGE GROUPS (INDIA).

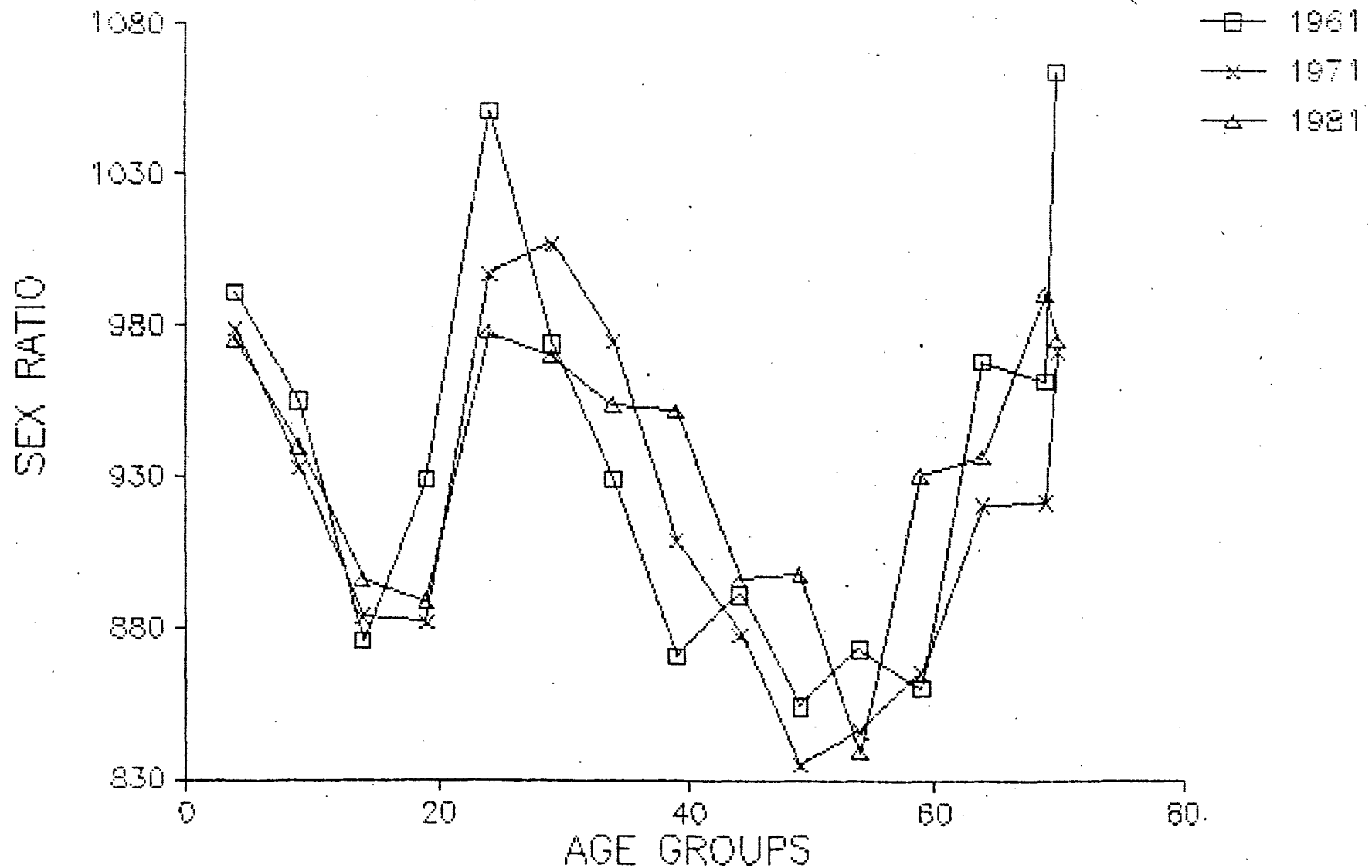


FIG- 2.1

SEX RATIO AT QUINQUENNIAL AGE GROUPS (ASSAM)

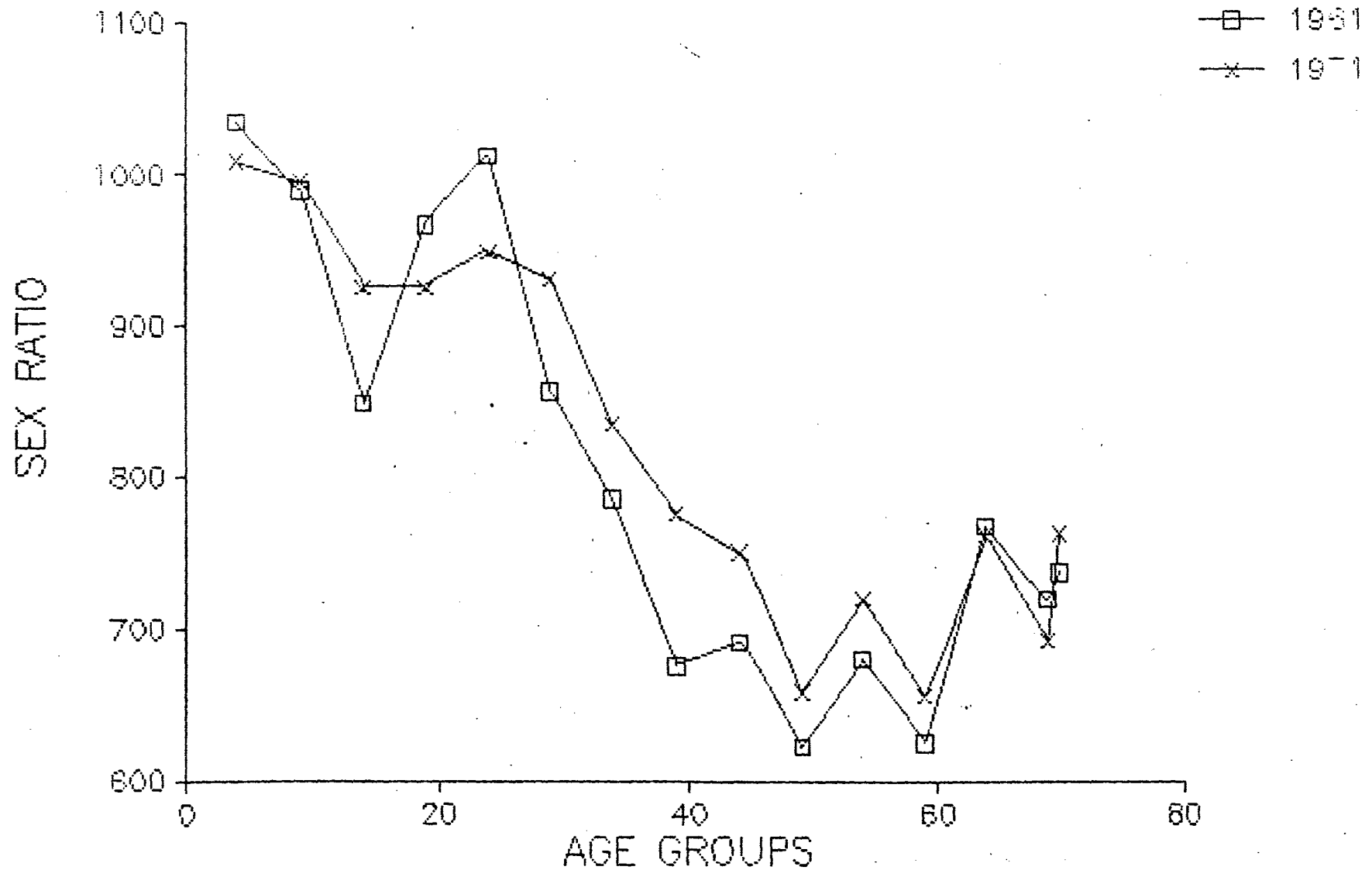


FIG. 2.2

SEX RATIO AT QUINQUENNIAL AGE GROUPS (KERALA)

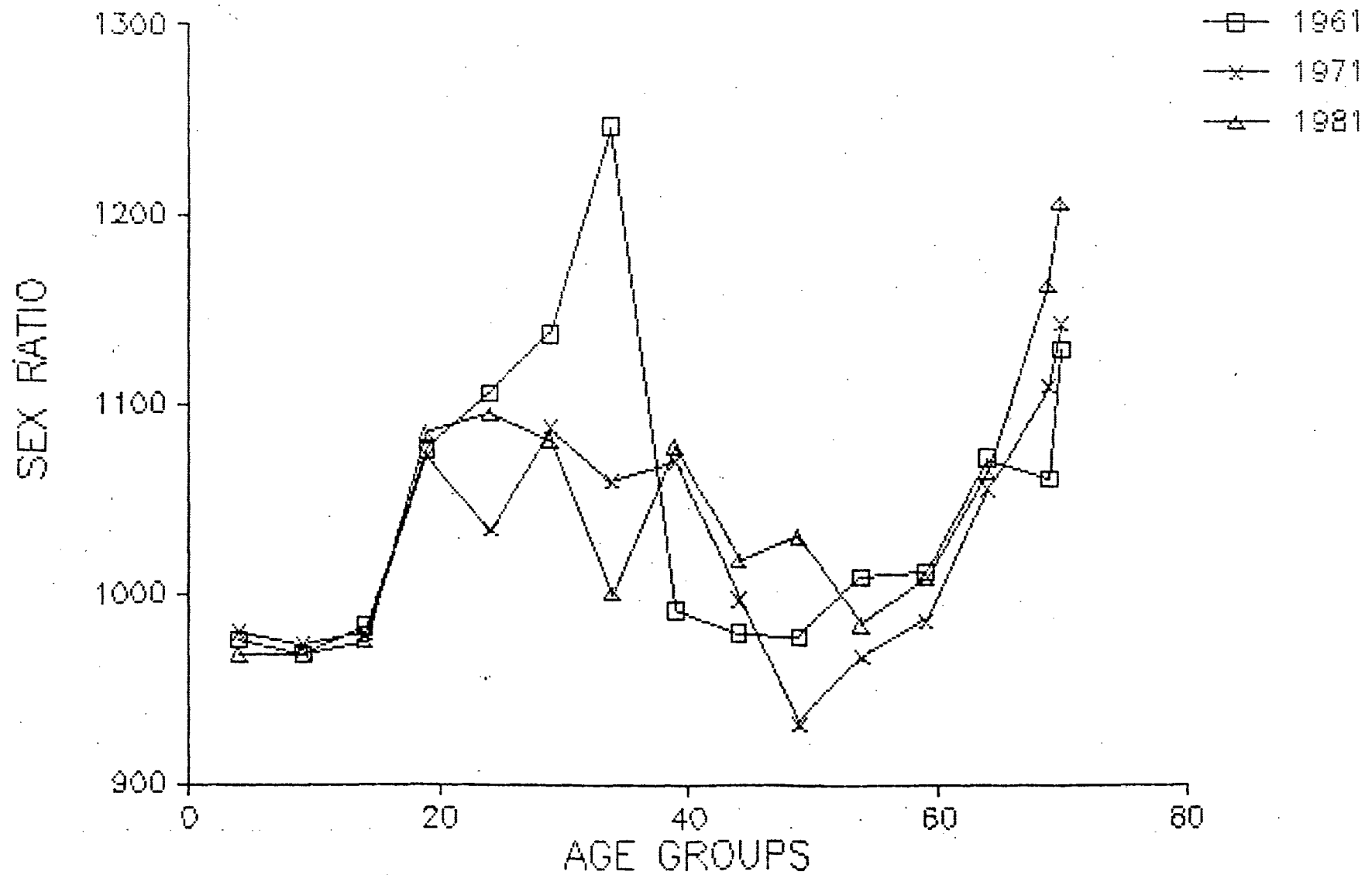


FIG. 2.3

SEX RATIO AT QUINQUENNIAL AGE GROUPS (ORISSA)

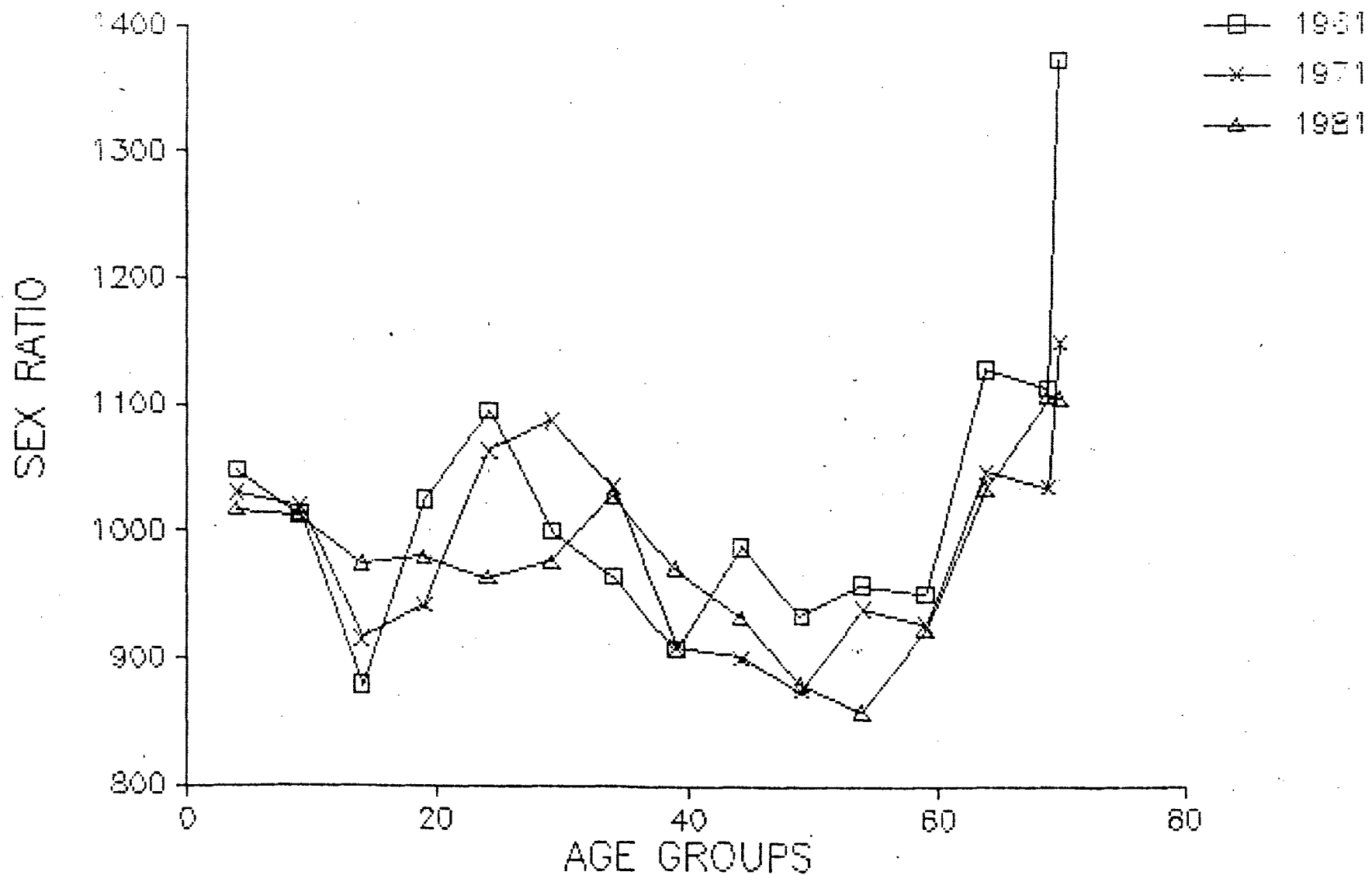


FIG. 2.4

SEX RATIO AT QUINQUENNIAL AGE GROUPS (RAJASTHAN)

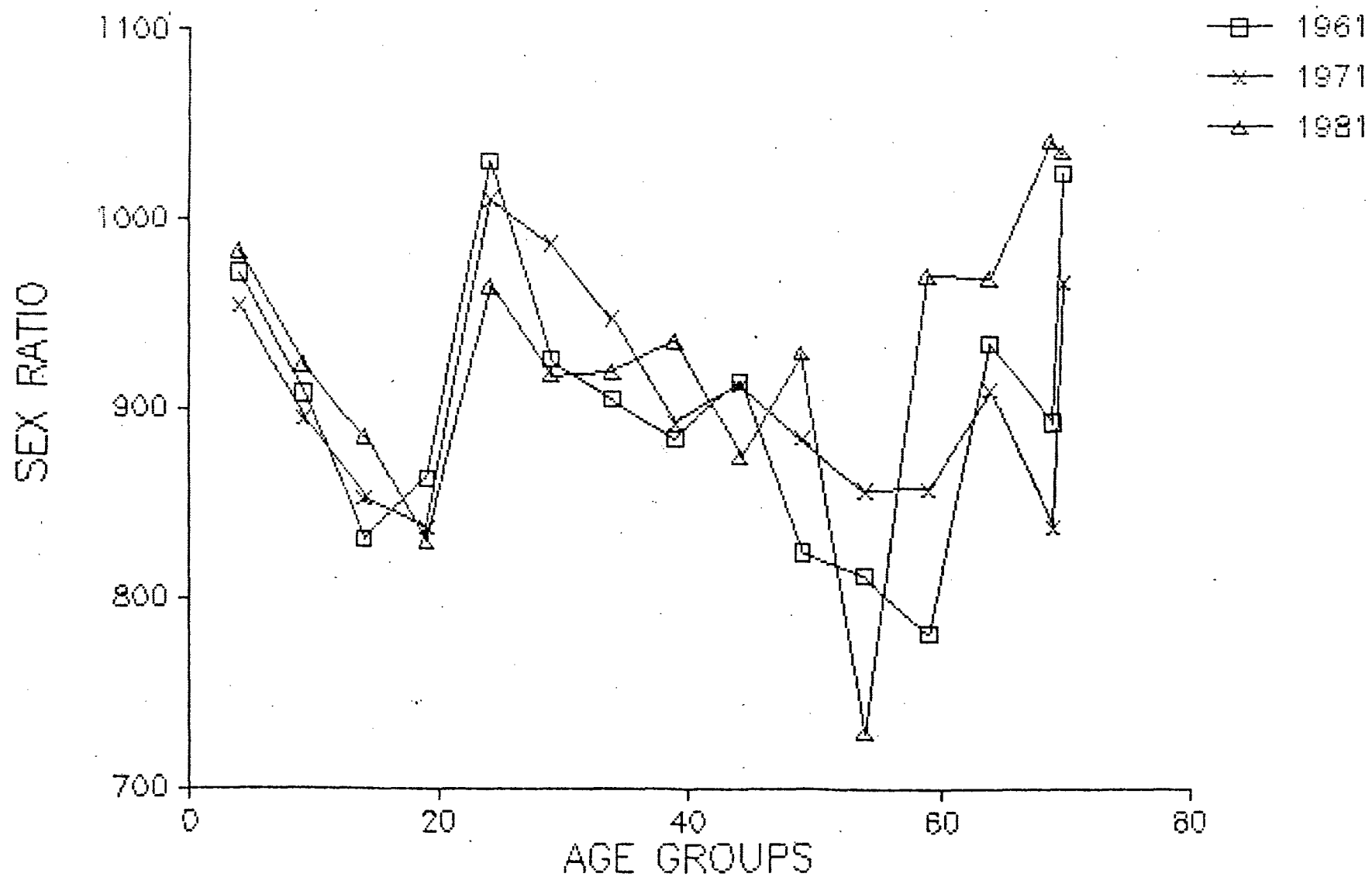


FIG - 2.5

SEX RATIO AT QUINQUENNIAL AGE GROUPS (TAMILNADU)

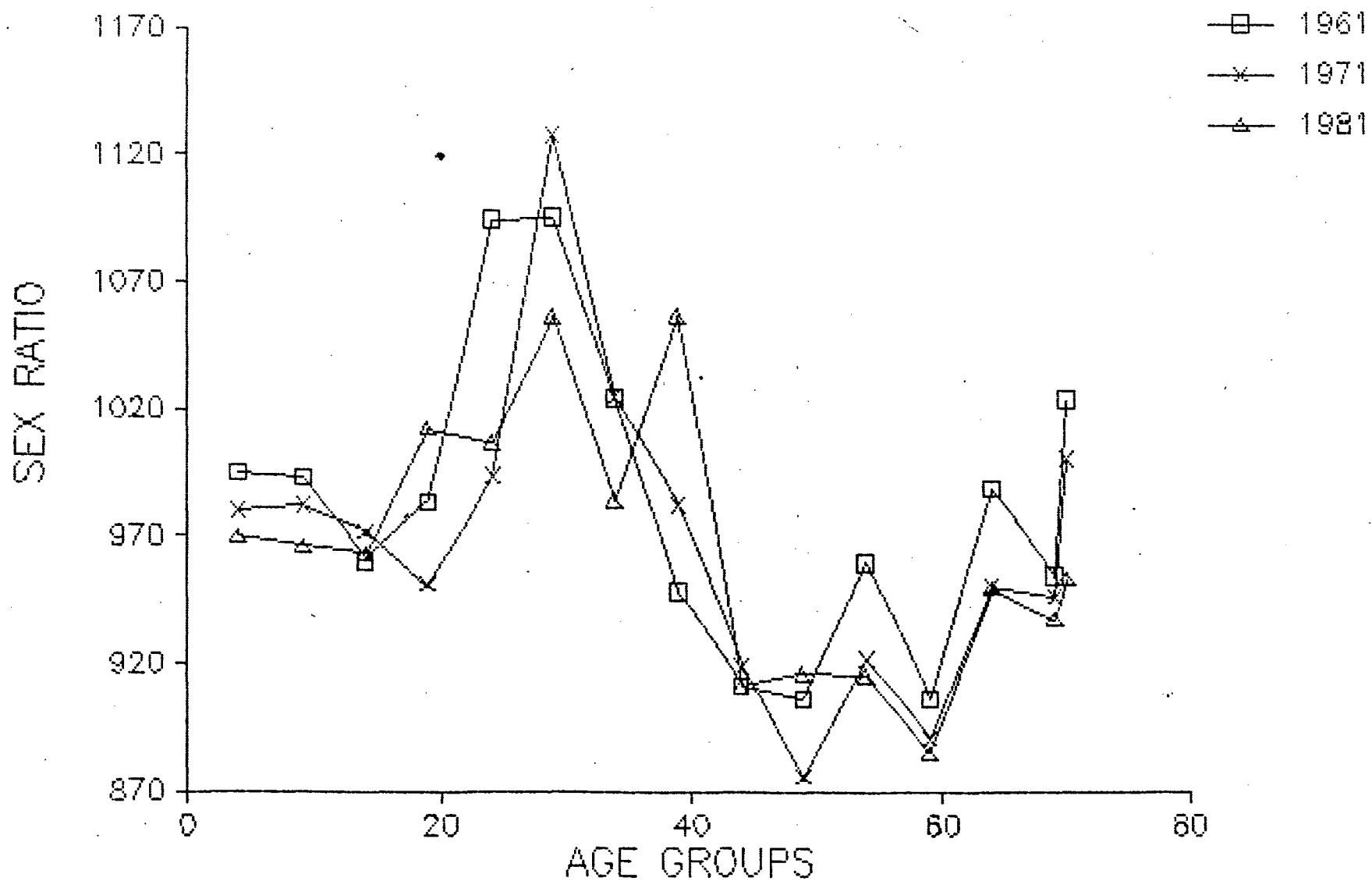


FIG - 2.6

SEX RATIO AT QUINQUENNIAL AGE GROUPS (UTTAR PRADESH)

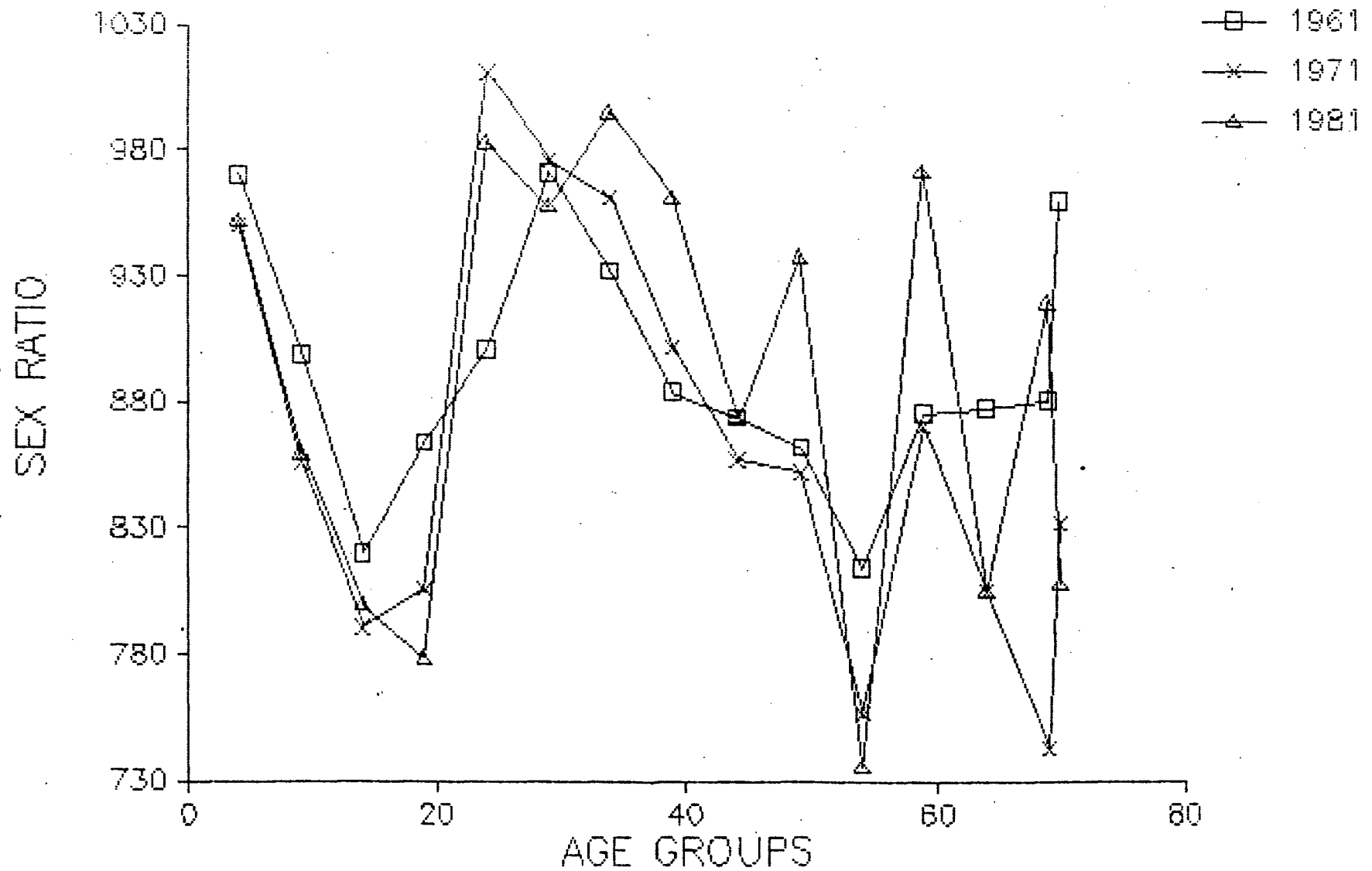


FIG-2.7

TABLE 2.2
INDEX OF SEX RATIO AT QUINQUENNIAL AGE GROUPS FOR INDIA AND SELECTED STATES
- 1961 - 81

| AGE GROUP | INDIA | | | ASSAM | | KERALA | | | ORISSA | | |
|-----------|-------|------|------|-------|------|--------|------|------|--------|------|------|
| | 1961 | 1971 | 1981 | 1961 | 1971 | 1961 | 1971 | 1981 | 1961 | 1971 | 1981 |
| ALL AGES | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 0 - 4 | 105 | 105 | 104 | 118 | 112 | 87 | 96 | 93 | 104 | 104 | 103 |
| 5 - 9 | 101 | 100 | 100 | 113 | 111 | 86 | 95 | 93 | 101 | 103 | 103 |
| 10 - 14 | 93 | 95 | 95 | 96 | 103 | 87 | 96 | 94 | 87 | 92 | 90 |
| 15 - 19 | 98 | 94 | 95 | 110 | 103 | 95 | 105 | 104 | 102 | 95 | 99 |
| 20 - 24 | 111 | 107 | 104 | 115 | 105 | 98 | 108 | 105 | 109 | 107 | 98 |
| 25 - 29 | 103 | 108 | 103 | 97 | 103 | 101 | 107 | 104 | 100 | 110 | 99 |
| 30 - 34 | 98 | 104 | 103 | 89 | 93 | 111 | 111 | 96 | 96 | 104 | 104 |
| 35 - 39 | 92 | 97 | 101 | 77 | 86 | 88 | 105 | 104 | 90 | 92 | 98 |
| 40 - 44 | 94 | 94 | 95 | 78 | 83 | 87 | 98 | 98 | 98 | 91 | 95 |
| 45 - 49 | 90 | 89 | 96 | 71 | 61 | 87 | 91 | 99 | 93 | 88 | 89 |
| 50 - 54 | 92 | 90 | 89 | 77 | 80 | 90 | 95 | 95 | 95 | 95 | 87 |
| 55 - 59 | 91 | 93 | 99 | 71 | 73 | 90 | 97 | 97 | 95 | 94 | 93 |
| 60 - 64 | 102 | 98 | 100 | 87 | 84 | 95 | 103 | 102 | 112 | 106 | 105 |
| 65 - 69 | 102 | 99 | 105 | 82 | 77 | 94 | 109 | 112 | 111 | 104 | 112 |
| 70 + | 113 | 104 | 100 | 84 | 85 | 100 | 112 | 116 | 137 | 116 | 112 |

Source : Computed from Table 2.1

Contd.,

TABLE 2.2 Contd.

| AGE GROUP | RAJASTHAN | | | TAMIL NADU | | | UTTAR PRADESH | | |
|-----------|-----------|------|------|------------|------|------|---------------|------|------|
| | 1961 | 1971 | 1981 | 1961 | 1971 | 1981 | 1961 | 1971 | 1981 |
| ALL AGES | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 0 - 4 | 107 | 104 | 106 | 100 | 100 | 99 | 106 | 108 | 107 |
| 5 - 9 | 100 | 98 | 100 | 100 | 100 | 98 | 99 | 97 | 97 |
| 10 - 14 | 91 | 93 | 96 | 96 | 99 | 98 | 90 | 91 | 90 |
| 15 - 19 | 95 | 91 | 90 | 99 | 97 | 103 | 95 | 88 | 87 |
| 20 - 24 | 113 | 110 | 104 | 110 | 101 | 102 | 99 | 115 | 110 |
| 25 - 29 | 102 | 108 | 99 | 110 | 115 | 107 | 106 | 111 | 108 |
| 30 - 34 | 99 | 104 | 99 | 103 | 104 | 100 | 102 | 109 | 112 |
| 35 - 39 | 97 | 98 | 101 | 95 | 100 | 107 | 97 | 102 | 108 |
| 40 - 44 | 100 | 100 | 94 | 91 | 93 | 93 | 96 | 97 | 98 |
| 45 - 49 | 90 | 79 | 100 | 91 | 89 | 93 | 94 | 97 | 105 |
| 50 - 54 | 89 | 94 | 79 | 96 | 94 | 93 | 89 | 86 | 83 |
| 55 - 59 | 86 | 94 | 105 | 91 | 89 | 90 | 96 | 99 | 109 |
| 60 - 64 | 102 | 99 | 105 | 99 | 97 | 97 | 96 | 91 | 90 |
| 65 - 69 | 98 | 91 | 112 | 96 | 96 | 95 | 96 | 84 | 103 |
| 70 + | 112 | 106 | 112 | 103 | 102 | 97 | 105 | 94 | 91 |

Source : Computed from Table 2.1

The anomalous ratio of women to men is linked to the social status, in economic participation and even in everyday life. But after the family planning programme, a package which disseminates awareness on education, hygiene, nutrition, child care and above all case of self has uplifted the position of women and this is evident in the narrow margin being created in the sex ratios.

EVALUATION OF CENSUS AGE DATA

Age structure represents one of the basic characteristic in census-enquiries. The age structure is directly regulated by the interplay of fertility, mortality and migration (Mukherjee, 1976). The excess of births over deaths increases the population and one witnesses increased levels of population in the younger age groups, with a reduction of death rates due to better and improved medical facilities. Migration is not uniformly distributed over all age groups - very young and very old do not migrate as frequently as the people in the middle age groups do.

Age data obtained from census enquiries occupies a pivotal position in the population composition since it is related to matters like education, occupation, marital status which play an important role in the planning process of the Government. A population composed of very young would be different from superannuated, and naturally entire planning hinges on the age profile. The proportion of population in various age groups determines the investment pattern of the Government. For instance if the population is largely composed of young the resources have to be diverted to establish schools and training institutions, to construct houses, providing employment opportunities, starting of centres to look after child welfare and similar activities but if the population is over sixty

years the requirements would be different and efforts are diverted to plan more medical centres suited to geriatric needs and demands, homes for aged and provision of financial and other supports etc. This is just a broad indication to reflect the diverse role age dictates.

Age appears to be one of the most elementary item in the census-enquiries but it is subject to various kinds of errors in greater or lesser degrees. The reported ages are not accurate and are found to concentrate upon particular digits. The concentration are due to misreporting and it is found more in the developing countries (Kohli, 1977).

The errors commonly connected in responses in age enquiries can be grouped into two broad categories -

- a) Errors of coverage, and
- b) Response errors.

The errors of coverage occurs when a section of population is totally omitted in the course of enumeration i.e. gross underenumeration. Sometimes the individuals are erroneously included in its i.e. double counting. The balance of the two types of coverage error represents net underenumeration (Shryock and Siegal, 1971).

The response errors occur because of -
a) ignorance of age; b) deliberate mis-statement;
c) omission in enumeration and d) failure to recall exact age.

Ignorance is natural among people who are illiterate. It is more common in the rural areas than in the urban areas. The census commissioner of 1921 has pointed out:

"the ordinary educated Indian has very vague ideas about his own age. The uneducated Indian has practically no ideas at all. And a man who does not know his own age is unlikely to

know the ages of other people. The head of the house, who answered the enumerator's questions not only for himself but also for his family, might have some idea of the age of his sons, especially if these attended school or had entered or hoped to enter Government service. He would have less idea of the age of his daughters; very little of that of his wife, which he had never accurately known and practically none of that of the mother-in-law and paternal aunts who happened to be quartered upon him." (Martin, J.T. 1921).

The deliberate mis-statement is usually selective of age and sex. False reporting is commonly found among young ladies who invariably do not give correct/exact age. The 1891 census commissioner has observed:

"...marriageable girls between 10 and 12 are returned in some areas as below 10 owing to the obloquy incurred by Hindu parents who have failed to marry them before puberty in accordance with the injunctions or at least the strong recommendations of the Smritis, whilst those between 12 and 14 are over-stated at 18 or 20 and that there is no doubt habitual over-statement of age amongst the old of both sexes, especially women, whose great age is considered a sort of distinction." (Baines, 1891)

The misstatement of age is a commonly trend in case of male adolescents. The Census Commissioner of 1921 has stated that -

"In the case of males the period of adolescence 15 to 20 years - appears to be avoided, youths being either advanced to the ages of manhood or

setback to childhood. The motive in this is not clear, but may be an instinctive attempt to avoid the awkward category which receives neither the privileges of childhood nor the dignities of maturity." (Martin, J.T. 1921).

The total omission of individuals is prominent more in case of infants. The newly born are omitted for religious or traditional reasons. The reluctance on the part of households to disclose information about their womenfolk is common.

The response error occurs because of the inability or unwillingness of the respondents to give correct information. "Age is estimated on the basis of well remembered local events such as famines and floods" (Saxena P.C., 1982)

The deceptive age reporting is apparently found in all the countries but more in the developing countries. Various demographic techniques have been widely applied to eliminate the distortions. The techniques have their limitations but the major fluctuations have been eliminated.

Several methods - index of concentration, index of preference and age ratio score - have been devised to evaluate the age data. One can never ascertain the magnitude involved in bringing forth the accuracy and genuineness. The measures of accuracy of age data are designed to present the data in most approximate order of reliability. The inaccuracies in age can be studied either from the single year age count or from grouped data. The single year age returns can be studied with respect to -

- a) Individual age;
- b) All ages with same unit digit; and
- c) All ages.

The age ratio score is applicable to ages in quinquennial age groups. The ratios are calculated for both age and sex of the age distribution.

The methods involved to evaluate the age data in the single year returns are:

- a) Index of concentration or Whipple's index which measures the extent of concentration at digits ending in 0 and 5;
- b) Index of preference or Myer's index which provides information about preference for individual digits as well as an overall index (Shryock and Siegal, 1971).

The grouped age data tests include, Age ratio Score ¹, Sex ratio score ² and Joint Score ³ (United Nations, 1955).

The data derived from the census are presented in single year age returns and in quinquennial age groups. In tabulating the age in single years, a concrete shape of age structure is illustrated and for a large number of users it helps a lot. The single year age returns also being out the heaping. The grouping in quinquennial age groups (0-4, 5-9, 10-14, ...60-64, 65-69, 70+) eliminates the irregularities which are visible in single age returns.

-
1. Age ratio score - The ratio of the number enumerated in quinquennial age group per 100 of the mean of the numbers in the two adjacent age groups and calculated for each sex separately.
 2. Sex ratio score - The ratio of number of males enumerated per 100 females for successive age groups.
 3. Joint score - The sum of the age ratio scores for the two sexes and three times the sex ratio score.

A. Single years of age returns:

i) Index of concentration:

The index of concentration has been developed by Whipple, which expresses a total of persons reporting ages ending in 0 and 5 and in the range of 23-62 as one-fifth of the total enumerated population in this range. The value of Whipple's index is 100 when there is no concentration on ages ending in 0 and 5 and when only age ending in 0 and 5 are reported the index would be 500. The index lies between 100 and 500. The high concentration of ages reported on specific digits is attributed to the tendency of respondents or enumerators uncertainty in knowledge of ages. The Whipple's index could be derived using the following equation:

$$\frac{E (P_{25} + P_{30} + P_{35} + \dots + P_{55} + P_{60})}{1/5 E (P_{23} + P_{24} + P_{25} + \dots + P_{61} + P_{62})} \times 100$$

ii) Index of Preference:

Myers has developed a blended population where almost equal sums are expected at each terminal digit for a non-distorted age distribution and the percentage of each digit should be 10.0 percent of the total population. The deviation of any specific digit from 10.0 percent measures the preference or avoidance for that specific digit. Deviations from 10.0 percent irrespective of signs when added up give Myer's index for reflecting preference or dislike for each of the ten unit digits starting from 0 to 9.

The procedures involved in calculating Myer's index are:

Step 1 - The population at ages ending in each digit, starting from 10 years of age and over should be added;

- 2 - The population at ages ending in each digit in the range excluding the first 10 years, eg. 20 years of age and over should be added;
- 3 • Series 1 must be weighted by 1 to 10 in the order of digits 0 through 9 and series 2 by 9 to 0 in the same way as 0 through 9;
- 4 - The distribution of weighted population in Step 3 has to be converted into percentage; and
- 5 - The deviation of each percent in step 4 from 10.0 percent gives the Myer's index. (Myer, R.J. 1950)

The method furnishes an index of preference for each terminal digit representing a deviation from 10.0 percent of the population to the total population. If age heaping is not there then the index would be zero (0). Myer's index range is between 0 and 90. If there is no heaping then it is 0 and 90 if all ages are reported at single digit.

Indices for 1961, 1971 and 1981 census -

Table 2.3 shows the indices of preference (Myer's) and concentration (Whipple's) for 1961, 1971 and 1981 census. The index of preference and index of concentration generally move together. The indices of preference and concentration vary from state to state. The index of concentration was 282 and 294 for males and females in 1961 and it increased to 304 and 305 for males and females in 1981. The index of concentration at digits 0 and 5 has increased considerably. The index of preference for India has increased from 57.4 and 61.4 for males and females in 1961 to 64.5 and 68.0 respectively in 1981. On the basis of table 2.1 it can be said that only Kerala has low values for index at concentration (less than 225) and index of preference (less than 50). The values are higher than the All India average in Rajasthan and Uttar Pradesh followed by Tamil Nadu, Orissa and Assam. The overall

TABLE 2.3
INDICES OF CONCENTRATION AND PREFERENCES BY STATE AND SEX.

1961, 1971

TABLE- 2.3

| STATE | <u>INDEX OF CONCENTRATION</u> | | <u>INDEX OF PREFERENCE</u> | |
|-------------|-------------------------------|----------------|----------------------------|----------------|
| | <u>MALES</u> | <u>FEMALES</u> | <u>MALES</u> | <u>FEMALES</u> |
| INDIA | 282 | 294 | 70.7 | 75.1 |
| ASSAM | 221 | 239 | 47.0 | 53.5 |
| KERALA | 206 | 223 | 46.7 | 52.2 |
| ORISSA | 261 | 276 | 62.5 | 67.7 |
| RAJASTHAN | 336 | 359 | 92.0 | 101.0 |
| TAMIL NADU | 279 | 308 | 70.5 | 81.3 |
| U.P. | 324 | 314 | 86.8 | 82.7 |
| <u>1971</u> | | | | |
| INDIA | 294 | 300 | 61.4 | 63.8 |
| ASSAM | 275 | 294 | 58.3 | 60.3 |
| KERALAL | 195 | 207 | 34.2 | 37.6 |
| ORISSA | 272 | 286 | 55.7 | 60.9 |
| RAJASTHAN | 341 | 359 | 76.6 | 83.8 |
| TAMIL NADU | 265 | 286 | 52.8 | 60.1 |
| U.P. | 333 | 364 | 74.6 | 72.6 |

Contd...

1981 *

| <u>STATE</u> | <u>INDEX OF CONCENTRATION</u> | | <u>INDEX OF PREFERENCE</u> | |
|--------------|-------------------------------|-----------------------|----------------------------|---------|
| | MALES | FEMALES | MALES | FEMALES |
| INDIA | 304 | 305 | 64.5 | 68.0 |
| ASSAM | - | - | - | - |
| KERALA | 178 | 187 | 29.5 | 32.3 |
| ORISSA | 284 | 295 | 61.9 | 64.4 |
| RAJASTHAN | 339 | 342 | 75.0 | 79.2 |
| TAMIL NADU | 278 256 | 278 279 | 57.4 50.0 | 57.4 |
| U.P. | 358 | 320 | 81.0 | 77.7 |

* Census could not be conducted due to disturbances.

SOURCE : India, Census Commissioner, Census of India, 1961 Paper No. 2 of 1963 Age Tables
 India, Census Commissioner, Census of India, 1971 Paper No. 3 of 1977 "
 India, Census Commissioner, Census of India, 1981 Paper No . 5 of 1984 "

position reveals that the age reporting is very poor in all the States. Both the indices are correlated. The bias in age returns has increased from one census count to another. The age table of 1981 mentions that, "the statewide comparison of Whipple's index of concentration at digits 0 and 5 has increased in 1981 as compared to 1971 and 1961." (ORGCC, 1984)

The age data as a whole is relatively poor for females than males except in Uttar Pradesh. With every successive censuses count from 1961 the indices are showing an increasing trend than diminishing.

B. Grouped age data

This method is suitable to the age returns in quinquennial age groups. It helps in computation of age and sex ratios for 5 years age groups upto 70 years. The distortions in the quinquennial age groups can be tested by the age-ratio score, sex ratio score and joint score.

The sex ratio are calculated for each age group and their differences from age group to age group are averaged irrespective of signs. The differences of the sex ratios is regarded as a measure of the accuracy of recorded sex ratios in terms that the smaller the mean, the more accurate the data. This is known as sex ratio score (United Nations, 1955). The sex ratio changes very gradually from one age to another and the changes are due to migration, war, epidemic or other factors. When the sex ratio score is high, it could be due to the existence of errors in sex age data. The sex ratio score would be low when the errors are not selective of sexes.

The age ratio for a particular 5 year age group is obtained by multiplying by 100 the ratio of the population of that age group to the average population

of two adjacent age groups. The sum of absolute deviation of the age ratios from 100 for each group divided by the number of age intervals for which the age ratios have been calculated give age ratio score (United Nations, 1955). The age ratio score is calculated for males and females separately. When there is no distortion in the quinquennial groups then the ratios should be 100. Any variation in the age ratio is largely due to inaccuracy in age reporting or omission in enumeration.

The Joint score combines the sex ratio score and age ratio score, of males and females into a single index. It can be derived using the following equation.

$$\text{Joint score} = 3 \times \text{Sex ratio score} + \text{Male age ratio score} + \text{female age ratio score.}$$

$$(\text{Joint score} = 3 \times \text{SRS} + \text{MARS} + \text{FARS}) \quad (\text{United Nations, 1955})$$

Table 2.4 presents the age ratio score, sex ratio score and joint score, for 1961, 1971 and 1981 for India and the selected states. The sex ratio score is uniformly high in all the states except Kerala and Tamil Nadu. The age ratio score, sex ratio score and joint ratio score are very high in case of the States chosen for the study when compared to the United Nations index of a standard age ratio score of 2.6 and 2.8 for males and females respectively with a sex ratio score of 1.5 and joint score of 9.5. The sex ratio score was high only in Assam and Rajasthan in 1961, Assam, Rajasthan and Uttar Pradesh in 1971, and high in Rajasthan and Uttar Pradesh in 1981. A few characteristics of grouped data which emerge are:

- a) when age ratio score is high the female age ratio score is much higher than that of males.
- b) The variations in the score of females is much wider than that of males.

TABLE - 2.4

AGE RATIO SCORE, SEX RATIO SCORE & JOINT SCORE - 1961

| <u>STATE</u> | <u>AGE RATIO SCORE</u> | | <u>SEX RATIO SCORE</u> | <u>JOINT SCORE</u> |
|---------------|------------------------|---------------|------------------------|--------------------|
| | <u>MALE</u> | <u>FEMALE</u> | | |
| INDIA | 14.6 | 17.9 | 95.9 | 50.2 |
| ASSAM | 15.6 | 20.9 | 13.4 | 76.7 |
| KERALA | 11.1 | 11.4 | 3.1 | 31.8 |
| ORISSA | 16.8 | 21.4 | 7.3 | 60.1 |
| RAJASTHAN | 14.6 | 29.6 | 19.2 | 101.8 |
| TAMIL NADU | 9.1 | 11.8 | 4.6 | 34.7 |
| UTTAR PRADESH | 18.4 | 19.0 | 6.2 | 56.0 |

SOURCE : India Census Commissioner,
Census of India,
Age Tables of 1961, 1971 and 1981.

Contd....

AGE RATIO SCORE, SEX RATIO SCORE & JOINT SCORE

1971

| <u>STATE</u> | <u>AGE RATIO SCORE</u> | | <u>SEX RATIO SCORE</u> | <u>JOINT SCORE</u> |
|---------------|------------------------|---------------|------------------------|--------------------|
| | <u>MALE</u> | <u>FEMALE</u> | | |
| INDIA | 12.1 | 13.2 | 4.7 | 39.4 |
| ASSAM | 12.6 | 16.6 | 8.8 | 55.6 |
| KERALA | 8.5 | 7.9 | 4.0 | 28.4 |
| ORISSA | 15.9 | 16.7 | 6.1 | 50.9 |
| RAJASTHAN | 22.1 | 24.0 | 19.4 | 65.3 |
| TAMIL NADU | 8.6 | 10.6 | 5.1 | 34.5 |
| UTTAR PRADESH | 19.0 | 15.1 | 9.0 | 61.1 |

SOURCE : India Census Commissioner.

Census of India

Age Tables of 1971.

(Contd...)

AGE RATIO SCORE, SEX RATIO SCORE & JOINT SCORE

1981*

| <u>STATE</u> | <u>AGE RATIO SCORE</u> | | <u>SEX RATIO SCORE</u> | <u>JOINT SCORE</u> |
|---------------|------------------------|---------------|------------------------|--------------------|
| | <u>MALE</u> | <u>FEMALE</u> | | |
| INDIA | 12.3 | 10.6 | 4.3 | 35.8 |
| ASSAM | - | - | - | - |
| KERALA | 5.6 | 8.0 | 4.5 | 27.2 |
| ORISSA | 13.1 | 12.4 | 4.8 | 39.9 |
| RAJASTHAN | 18.1 | 14.0 | 8.0 | 56.1 |
| TAMIL NADU | 6.8 | 10.0 | 4.4 | 29.9 |
| UTTAR PRADESH | 18.5 | 9.8 | 13.8 | 69.7 |

* Excludes Population of Assam.

SOURCE : India Census Commissioner.
Census of India,
Age Tables of 1981

The bias in age returns is alike throughout the country. The distortions in age returns are more in case of females and the concentration on digits 0 and 5 too, are high in case of females - for example in 1981, the male age ratio score in Uttar Pradesh and Rajasthan is much higher than that for females which indicates greater errors in male enumeration in these two States.

In Tamil Nadu, the difference between male and female age ratios in 1981 is quite sharp, again indicating the differential undercount in different age groups.

A high sex ratio score is an indicator of differential undercount of males and females which is quite visible in Assam, Rajasthan and Uttar Pradesh.

Smoothing of Age data:

The grouped method by quinquennial age groups does not give accurate picture and it is necessary to modify the group totals by using the smoothing technique. The Census department has already smoothed the population for 1961, 1971 and 1981. The techniques adopted to smooth the age returns are different in each census.

Method of smoothing:

(A) 1961 census -

The steps involved in smoothing the age returns were -

- (1) The enumerated population count by single year of age was first smoothed by the eleven (11) term moving average. It largely removed the wide fluctuations and gave a first approximation to the true distribution but contained some systematic biases. The process was not applied to age above 72 years as the census age record above this age was considered to be of poor reliability.

- (ii) The adjusted individual age population as obtained in Step 1 were grouped in quinquennial ages starting with 3-7.
- (iii) The quinquennial group totals of step 2 were smoothed using the formula.

$$W_0 = \frac{1}{4} (W_{-1} + 2W_0 + W_1)$$

- W_0 = Corrected quinquennial group total
- W_{-1}, W_1 = group totals of preceding and succeeding totals.

- (iv) The adjusted total derived from step 3 were distributed into single year of population by Kozakeiez's oscillatory interpolation formulae. This yielded population between 8-67.
- (v) Special methods were adopted to obtain corrected population at ages 0-7 and 68, 69 and 70+. (ORGCC 1961)

(B) 1971 Census

Five steps were involved in smoothing the age returns of 1971 census-

- (i) The census count at each age was grouped into a set of five quinquennial age groups and a suitable group was determined.
- (ii) From the five year totals single year age of population were estimated by using Grabill's weighted average of Sprague's coefficients.
- (iii) No change was made in the population of the first and last group. Those of the second and last but one quinquennial groups were smoothed by the formula -

$$W_0^1 = (W_{-1} + 2W_0 + W_1)$$

Where, W_{-1}, W_0 and W_1 - group totals in step (i)

(iv) The population in younger ages were obtained by special methods, making use of the results of census evaluation studies.

(v) In adult ages the values were estimated by making use of ten year totals.

Grabills' coefficients were used to estimate values upto age 71 and the groupings were done in five year sets namely 0-4, 1-5, 2-6, 3-7, 4-8 and so on. The Grabills' coefficients have been derived from Spragve's coefficients. (ORGCC, 1971)

(C) 1981 census:

The method of smoothing age returns of 1981 census were -

(i) The population at younger ages 0-4 and 5-9 were obtained by making use of the results of census evaluation studies.

(ii) The census count at each age was grouped into a set of five year age groups starting with different digits. From the five year totals, population by single year age was estimated by using Grabills weighted average of Sprague's coefficients for ages 10 and above. From these values, a suitable grouping was determined, certain criterion like age ratio score deviation of Myer's index from 50 and the deviation of Unadjusted group totals from adjusted group totals.

Grabills' coefficient were used to estimate values upto age 79 (0-4 grouping), age 81 (2-6 grouping), 83 (4-8 grouping) depending on the group chosen. The value at age 10 was smooth but the values over 10 had to be modified to smooth.

The single year values were estimated by the use of Graballs' weighted average-

$$W_0^1 = \frac{1}{4} (W_{-1} + 2W_0 + W_1)$$

Where, W_{-1} , W_0 , W_1 are - quinquennial group totals.

In the smoothing process, care has been taken to ensure that deviation of broad age group 15-44 is minimum. Ages over 80 were not smoothed (IRGCE 1981)

The smoothed population of 1961, 1971 and 1981 for India and selected states are given in Tables 2.5 to 2.11. In 1981 the proportion of population below 15 years is higher than the national average in Orissa, Rajasthan and Uttar Pradesh. Kerala and Tamil Nadu had around 35 percent. In 1971, Assam, and Rajasthan had higher proportion than national average.

Unlike age reportings, which are prone to discrepancies, sex ratio is free from such ambiguities and discrepancies. Comparing the sex ratios of States selected with India, it is found that the overall sex ratios of Kerala, Orissa and Tamil Nadu are well above the national average for years 1961, 1971 and 1981. Assam's sex ratio was below the national average in 1961 and 1971 whereas in Rajasthan and Uttar Pradesh the sex ratio declined from 1961 to 1981. The general trend of decline in sex ratio is observed in age groups of 10-14 years, 40 to 60 years in all the States except Kerala where the decline is in the age groups 0-14 years. The sex ratio in the age group 65+ shows an increase from the overall ratio of the State, except in Uttar Pradesh.

The age returns obtained from census are subject to errors and it is a very difficult task to obtain accurate age from the respondents as many of them are illiterate and ignorant. To remove the distortions in quinquennial/single ages, the age data obtained is

Table - 2.5 INDIA : SMOOTHED POPULATION BY QUINQUENNIAL AGE GROUPS 1961, 1971 AND 1981

| AGE GROUP | 1961 | | 1971 | | 1981 | |
|-----------|---------|---------|-------------|-------------|-------------|-------------|
| | Males | Female | Male | Female | Male | Female |
| 0-4 | 368673 | 358046 | 45,272,985 | 43,359,366 | 47,877,509 | 45,899,437 |
| 5-9 | 294638 | 284668 | 39,867,097 | 37,398,031 | 45,887,452 | 43,293,955 |
| 10-14 | 254905 | 241767 | 33,804,559 | 31,241,043 | 42,086,745 | 38,274,680 |
| 15-19 | 221275 | 208477 | 27,765,100 | 26,052,046 | 35,160,067 | 32,073,388 |
| 20-24 | 194848 | 184693 | 23,528,923 | 22,591,432 | 29,135,120 | 27,587,313 |
| 25-29 | 175822 | 166835 | 20,652,325 | 20,006,884 | 25,172,694 | 24,393,039 |
| 30-34 | 157292 | 145931 | 18,376,646 | 17,545,045 | 21,994,795 | 21,164,625 |
| 35-39 | 136056 | 121252 | 16,385,707 | 15,001,379 | 19,605,536 | 18,454,366 |
| 40-44 | 115502 | 100675 | 14,245,591 | 12,438,319 | 17,575,634 | 16,049,265 |
| 45-49 | 96608 | 83726 | 12,036,745 | 10,196,063 | 15,421,444 | 13,645,045 |
| 50-54 | 78191 | 68009 | 9,703,614 | 8,187,710 | 12,654,646 | 11,083,631 |
| 55-59 | 60417 | 53800 | 7,631,420 | 6,626,265 | 10,053,125 | 9,027,210 |
| 60-64 | 43774 | 40868 | 5,768,382 | 5,156,232 | 7,810,803 | 7,333,946 |
| 65-69 | 29118 | 28097 | 3,918,242 | 3,525,517 | 5,763,252 | 5,518,835 |
| 70 + | 33011 | 37041 | 5,091,940 | 4,785,044 | 7,731,601 | 7,558,691 |
| | 2258130 | 2124585 | 284,049,276 | 264,110,376 | 343,930,423 | 321,357,426 |

*Excludes Assam

SOURCE: India, Census Commissioner, Censuses of India 1961, Paper 2 of 1963 Age Tables
 India, Census Commissioner, Censuses of India 1971, Paper 3 of 1977 Age Tables
 India, Census Commissioner, Censuses of India 1981, Paper 5 of 1984 Age Tables

Table: 2.6 ASSAM: SMOOTHED POPULATION BY QUINQUENNIAL AGE GROUPS 1961, 1971

| Age Group | 1961 | | 1971 | |
|-----------|-------|---------|-----------|-----------|
| | Males | Females | Males | Females |
| 0-4 | 11040 | 11318 | 1,301,292 | 1,308,206 |
| 5-9 | 8703 | 8612 | 1,182,527 | 1,161,314 |
| 10-14 | 7283 | 6963 | 984,769 | 940,505 |
| 15-19 | 6110 | 5729 | 762,902 | 714,747 |
| 20-24 | 5264 | 4721 | 639,121 | 603,501 |
| 25-29 | 4823 | 4030 | 588,741 | 533,852 |
| 30-34 | 4462 | 3437 | 531,706 | 442,744 |
| 35-39 | 3825 | 2701 | 458,300 | 352,781 |
| 40-44 | 3105 | 2064 | 375,033 | 271,211 |
| 45-49 | 2519 | 1631 | 301,225 | 208,723 |
| 50-54 | 1997 | 1294 | 235,366 | 162,152 |
| 55-59 | 1511 | 1006 | 179,469 | 125,123 |
| 60-64 | 1064 | 744 | 131,293 | 93,492 |
| 65-69 | 677 | 490 | 89,379 | 64,161 |
| 70 + | 898 | 707 | 123,941 | 89,966 |
| | 63281 | 55447 | 7,885,064 | 7,072,478 |

SOURCE: India, Census Commissioner, Censuses of India 1961, Paper 2 of 1963 Age Tables
 India, Census Commissioner, Census of India 1971, Paper 3 of 1977 Age Tables

Table 2.7 KERALA : SMOOTHED POPULATION BY QUINQUENNIAL AGE GROUPS 1961, 1971 and 1981

| AGE GROUP | 1961 | | 1971 | | 1981 | |
|-----------|-------|---------|-----------|-----------|-----------|-----------|
| | Males | Females | Males | Females | Males | Females |
| 0-4 | 13561 | 13142 | 1,598845 | 1,552059 | 1,518811 | 1,468576 |
| 5-9 | 11442 | 11254 | 1,433193 | 1,403339 | 1,514774 | 1,486591 |
| 10-14 | 9882 | 10077 | 1,322849 | 1,325087 | 1,471890 | 1,498373 |
| 15-19 | 8422 | 8951 | 1,150117 | 1,194759 | 1,414254 | 1,388070 |
| 20-24 | 7283 | 7822 | 940725 | 989469 | 1,247868 | 1,269417 |
| 25-29 | 6268 | 6734 | 782967 | 825460 | 1,007996 | 1,111722 |
| 30-34 | 5437 | 5757 | 656515 | 695426 | 814733 | 910910 |
| 35-39 | 4756 | 4811 | 560099 | 588095 | 675751 | 715643 |
| 40-44 | 4022 | 3950 | 493713 | 503468 | 594616 | 628437 |
| 45-49 | 3352 | 3290 | 436403 | 430045 | 533878 | 553256 |
| 50-54 | 2754 | 2763 | 353491 | 343678 | 458073 | 469513 |
| 55-59 | 2198 | 2254 | 279198 | 279388 | 378976 | 398812 |
| 60-64 | 1676 | 1761 | 214012 | 223540 | 314541 | 334783 |
| 65-69 | 1185 | 1338 | 152726 | 165080 | 238025 | 267775 |
| 70 + | 1461 | 1514 | 212998 | 240631 | 343580 | 424035 |
| | 83619 | 85418 | 10,587851 | 10,759524 | 12,527767 | 12,925913 |

SOURCE: India, Census Commissioner, Census of India 1961, Paper 2 of 1963 Age Tables
 India, Census Commissioner, Census of India 1971, Paper 3 of 1977 Age Tables
 India, Census Commissioner, Census of India 1981, Paper 5 of 1984 Age Tables

Table: 2.0 ORISSA: SMOOTHED POPULATION BY QUINQUENNIAL AGE GROUPS 1961, 1971 AND 1981

| Age Group | 1961 | | 1971 | | 1981 | |
|-----------|--------|--------|------------|------------|------------|------------|
| | Males | Female | Males | Female | Males | Female |
| 0-4 | 135,84 | 13951 | 1,687,920 | 1,669,806 | 1,804,393 | 1,305,140 |
| 5-9 | 111,60 | 11606 | 1,557,776 | 1,508,662 | 1,840,114 | 1,049,559 |
| 10-14 | 98,19 | 9921 | 1,357,661 | 1,308,111 | 1,601,217 | 1,000,237 |
| 15-19 | 85,35 | 8362 | 1,109,903 | 1,113,125 | 1,359,664 | 1,223,985 |
| 20-24 | 74,35 | 7232 | 904,529 | 937,411 | 1,120,452 | 1,097,185 |
| 25-29 | 68,30 | 6679 | 814,030 | 834,554 | 959,165 | 941,464 |
| 30-34 | 63,58 | 6169 | 717,015 | 726,383 | 849,156 | 836,501 |
| 35-39 | 55,46 | 5252 | 648,069 | 634,744 | 768,483 | 747,796 |
| 40-44 | 46,82 | 4437 | 573,099 | 526,227 | 695,221 | 695,436 |
| 45-49 | 39,76 | 3762 | 474,005 | 431,909 | 609,695 | 553,793 |
| 50-54 | 32,66 | 3148 | 376,499 | 357,050 | 505,530 | 452,604 |
| 55-59 | 24,93 | 2488 | 293,478 | 295,443 | 394,957 | 355,508 |
| 60-64 | 17,31 | 1846 | 222,676 | 228,090 | 296,160 | 293,141 |
| 65-69 | 10,85 | 1241 | 143,456 | 152,568 | 214,833 | 233,523 |
| 70+ | 12,06 | 1676 | 158,164 | 179,049 | 286,756 | 316,575 |
| | 877,06 | 87782 | 11,041,033 | 10,903,532 | 13,309,786 | 13,050,485 |

SOURCE: India, Census Commissioner, Census of India 1961, Paper 2 of 1963 Age Tables
 India, Census Commissioner, Census of India 1971, Paper 3 of 1977 Age Tables
 India, Census Commissioner, Census of India 1981, Paper 5 of 1984 Age Tables

Table: 2.9 RAJASTHAN: SMOOTHED POPULATION BY QUINQUENNIAL AGE GROUPS 1961, 1971 AND 1981

| Age Group | 1961 | | 1971 | | 1981 | |
|-----------|---------|--------|-----------|------------|-----------|-----------|
| | Male | Female | Male | Female | Male | Female |
| 0-4 | 179,17 | 169,95 | 2,260,064 | 2,129,001 | 2,798,710 | 2,641,358 |
| 5-9 | 145,08 | 136,45 | 2,054,312 | 1,838,150 | 2,559,098 | 2,393,460 |
| 10-14 | 123,83 | 114,93 | 1,658,959 | 1,494,059 | 2,214,512 | 2,039,626 |
| 15-19 | 106,77 | 95,60 | 1,353,726 | 1,199,129 | 1,865,931 | 1,692,721 |
| 20-24 | 92,68 | 80,93 | 1,135,124 | 1,038,507 | 1,520,482 | 1,382,187 |
| 25-29 | 80,78 | 72,28 | 961,060 | 931,209 | 1,287,098 | 1,156,208 |
| 30-34 | 70,43 | 64,20 | 849,999 | 801,714 | 1,092,944 | 985,186 |
| 35-39 | 59,46 | 52,93 | 738,579 | 668,859 | 944,189 | 854,380 |
| 40-44 | 49,97 | 43,62 | 618,844 | 549,687 | 830,143 | 749,881 |
| 45-49 | 42,59 | 35,83 | 516,825 | 453,245 | 707,675 | 645,366 |
| 50-54 | 34,72 | 28,51 | 423,653 | 366,775 | 592,141 | 538,474 |
| 55-59 | 26,38 | 22,09 | 339,055 | 294,661 | 499,716 | 440,069 |
| 60-64 | 18,59 | 16,41 | 251,995 | 220,821 | 382,596 | 337,471 |
| 65-69 | 11,97 | 10,86 | 152,006 | 132,491 | 256,610 | 241,970 |
| 70 + | 13,99 | 14,56 | 170,182 | 163,115 | 302,309 | 309,351 |
| | 1056,41 | 959,15 | 13484,383 | 12,281,423 | 17854,154 | 16407,708 |

SOURCE: India, Census Commissioner, Census of India 1961, Paper 2 of 1963 Age Tables
 India, Census Commissioner, Census of India 1971, Paper 3 of 1977 Age Tables
 India, Census Commissioner, Census of India 1981, Paper 5 of 1984 Age Tables

Table: 2.10 TAMIL NADU: SMOOTHED POPULATION BY QUINQUENNIAL AGE GROUPS 1961, 1971, 1981

| Age Group | 1961 | | 1971 | | 1981 | |
|-----------|---------|---------|------------|------------|------------|------------|
| | Male | Female | Male | Female | Male | Female |
| 0-4 | 246,62 | 244,61 | 3,124,607 | 2,986,291 | 2,902,272 | 2,802,867 |
| 5-9 | 200,56 | 197,87 | 2,711,680 | 2,687,385 | 2,875,624 | 2,794,468 |
| 10-14 | 180,68 | 183,50 | 2,294,192 | 2,262,508 | 2,759,068 | 2,697,376 |
| 15-19 | 165,87 | 172,05 | 1,961,560 | 1,984,685 | 2,473,180 | 2,462,505 |
| 20-24 | 152,01 | 157,65 | 1,768,467 | 1,816,588 | 2,156,977 | 2,197,412 |
| 25-29 | 137,64 | 141,53 | 1,623,939 | 1,674,081 | 1,886,587 | 1,932,654 |
| 30-34 | 123,43 | 124,13 | 1,465,200 | 1,497,498 | 1,675,286 | 1,714,045 |
| 35-39 | 109,59 | 104,65 | 1,321,072 | 1,275,524 | 1,540,023 | 1,539,203 |
| 40-44 | 95,37 | 88,23 | 1,160,746 | 1,072,290 | 1,434,939 | 1,371,994 |
| 45-49 | 80,35 | 74,09 | 982,461 | 889,798 | 1,274,273 | 1,168,664 |
| 50-54 | 65,02 | 60,47 | 787,349 | 713,177 | 1,053,353 | 958,467 |
| 55-59 | 50,20 | 47,13 | 605,626 | 553,372 | 822,347 | 754,908 |
| 60-64 | 36,24 | 34,39 | 436,036 | 403,517 | 631,726 | 584,396 |
| 65-69 | 23,42 | 22,54 | 277,137 | 257,394 | 440,450 | 415,472 |
| 70+ | 24,10 | 24,76 | 307,949 | 297,039 | 554,519 | 526,022 |
| | 1691,10 | 1677,60 | 20,828,021 | 20,371,147 | 24,487,624 | 23,920,453 |

SOURCE: India, Census Commissioner, Census of India 1961, Paper 2 of 1963 Age Tables
 India, Census Commissioner, Census of India 1971, Paper 3 of 1977 Age Tables
 India, Census Commissioner, Census of India 1981, Paper 5 of 1984 Age Tables

Table: 2.11 UTTAR PRADESH: SMOOTHED POPULATION BY QUINQUENNIAL AGE GROUPS 1961, 1971, AND 1981

| Age Group | 1961 | | 1971 | | 1981 | |
|-----------|---------|---------|------------|------------|------------|------------|
| | Male | Female | Male | Female | Male | Female |
| 0-4 | 630,78 | 585,92 | 7,470,700 | 6,844,072 | 9,189,059 | 8,376,403 |
| 5-9 | 482,95 | 458,80 | 6,734,093 | 5,654,766 | 8,613,342 | 7,528,429 |
| 10-14 | 430,72 | 396,21 | 5,599,261 | 4,749,559 | 7,104,318 | 6,024,742 |
| 15-19 | 382,79 | 336,82 | 4,324,183 | 3,992,590 | 5,758,063 | 4,749,078 |
| 20-24 | 335,26 | 291,68 | 3,686,516 | 3,480,375 | 4,538,561 | 4,033,191 |
| 25-29 | 296,24 | 267,65 | 3,223,487 | 3,087,941 | 3,807,769 | 3,675,683 |
| 30-34 | 263,06 | 244,32 | 2,904,192 | 2,711,100 | 3,409,160 | 3,302,849 |
| 35-39 | 230,51 | 206,29 | 2,657,894 | 2,346,998 | 3,109,059 | 2,963,509 |
| 40-44 | 198,88 | 173,54 | 2,347,242 | 1,986,233 | 2,853,634 | 2,612,041 |
| 45-49 | 169,90 | 145,92 | 2,047,186 | 1,658,891 | 2,576,064 | 2,230,785 |
| 50-54 | 140,13 | 119,58 | 1,695,056 | 1,343,285 | 2,168,245 | 1,807,254 |
| 55-59 | 110,70 | 95,33 | 1,380,123 | 1,102,674 | 1,760,749 | 1,469,588 |
| 60-64 | 82,76 | 72,58 | 1,099,766 | 881,260 | 1,375,454 | 1,181,221 |
| 65-69 | 55,90 | 49,47 | 785,903 | 621,682 | 1,045,517 | 875,562 |
| 70+ | 52,84 | 67,11 | 1,060,819 | 863,297 | 1,508,280 | 1,212,401 |
| | 3863,42 | 3511,22 | 47,016,421 | 41,324,723 | 58,819,276 | 52,042,737 |

SOURCE: India Census Commissioner, Census of India 1961, Paper 2 of 1963 Age Tables
 India Census Commissioner, Census of India 1971, Paper 3 of 1971 Age Tables
 India Census Commissioner, Census of India 1981, Paper 5 of 1984 Age Tables

smoothed, Methods like Myer's index and Whipple's index are applied to find out concentration and preferences for a particular digit. The distortions are higher for females than males in Kerala and in rest of the States the males misreporting is higher.

The indices of concentration and preference move together. The index of preference for all India in 1961 was 70.7 for males and 75.1 for females and corresponding figures in 1981 were 64.5 and 68.0 for males and females respectively and index of concentration was 282 and 294 for males and females respectively in 1961 and 1981, it increased to 304 for males and 305 for females. Of all the States, selected only Kerala has lowest figures of concentration and preferences because of higher rate of literacy (69.17 percent in 1981) followed by Tamil Nadu, Uttar Pradesh and Rajasthan having high concentration and preference. In 1961, for Uttar Pradesh, the index of concentration was 324 (males) and 314 (females) and for Rajasthan, it was 336 (males) and 359 (females) and in 1981 the figures of concentration increased to 350 (males) and 320 (females) in Uttar Pradesh and in Rajasthan, 339 for males and 342 for females and similarly the index of preferences are distinctly higher (vide table 2.3). The position of Assam and Orissa indicate a distinctly higher index of concentration and preference.

The distortions can also be removed to some extent by applying grouped age data. The age ratio score is less than national average only in Kerala and Tamil Nadu whereas in rest of the States, the age ratio score is higher than national average.

CHAPTER III

TRENDS OF MIGRATION IN SELECTED STATES

The phenomenon of Interstate migration in India is of considerable interest in view of significant regional variations in socio-economic conditions, cultural practices and linguistic differences etc. Though the volume of migration in India is not very large but it is of considerable importance in the present context to ascertain the intercensal migration levels. The present chapter also attempts to find out inter-state net-migration during 1961-81. For this purpose, the 1961 and 1971 migration tables and for 1981 the 5 percent sample data published by the Registrar General's census office are utilised.

Geographical movement of population has been in vogue since time immemorial. The movements have been from place to place over long and short distances, in search of improvements in the individual circumstances and environmental conditions. With the invention of agriculture, individuals were forced to leave the place in order to increase the extent of land because of increasing numbers and increasing needs. (White and Woods, 1980).

As men settled at one place, migrations took place in a systematic manner. Scientists, scholars, academicians etc. migrated to distant lands in order to advance knowledge of various disciplines. Migrations which took place were limited as the transportation was slow and dangerous. The volume of migrations increased with the development of technology and urbanization. The influence of economic development stimulated migration. (Ravenstein E.G., 1885). The flight from rural areas to urban areas was excessive after industrial revolution. The process of migration lasted for a long time in England and it spread to other parts of the world.

Migration was been defined by United Nations as a 'form of geographical mobility or spatial mobility between one geographical unit and another, generally involving a change of residence from the place of origin or place of departure to the place of destination or place of arrival'. (United Nations, 1958).

Unlike fertility and mortality which are biological variables, migration tends to characterize a limited segment of a population who make frequent and repeated moves rather than the entire population (Lind, 1969). Migration is 'age-selective' - young adults between twenties and thirties are most mobile as they are prepared to take risk involved in migration. Migration is socio-economic and ethnic selective. It is also 'sex-selective' (Lewis, 1982) as females migrate more frequently in actively taking part in the labour force. In India it is the other way round from economic view point, although, among total migrants, female migrants are more.

International migration is relatively insignificant in comparison to internal migration. Internal migration assumes special importance in any country in the process of development. (Rele, 1969). It also helps in population redistribution. The abnormal pressure of population on land forces people to migrate to other places in search of jobs. Internal migration keeps balance between the available natural resources and the population.

Internal migration, in India, takes place in four streams-

- (a) Rural to rural migration,
- (b) Rural to urban migration,
- (c) Urban to urban migration, and
- (d) Urban to rural migration

Asok Mitra has added one more stream to the existing streams - step migration: rural to large town or city through small towns (Mitra A, 1968)

Data on migration is available from census reports. The place of birth question has traditionally been asked to enquire about migration. In 1961 census the following questions were asked to enquire the details of migration:

- (1) Place of birth, rural-urban classification of birth, places of enumeration.
- (2) Duration of residence in the place of enumeration along with the characteristics of migrants - duration of residence - (a) less than 1 year, (b) 1-5 years, (c) 6-10 years (d) 11-15 years (e) 16 and over year and (f) period not stated.

In 1971 the following questions were asked to gather information on migration. For the first time data were collected on the basis of last residence in addition to the questions on birth place.

- (1) Birth place
 - (a) Place of birth
 - (b) Rural/urban
 - (c) District
 - (d) State/country.
- (2) Last residence (A)
 - (a) Place of last residence
 - (b) Rural/urban
 - (c) District
 - (d) State country
 - (B) Duration of residence at a village or town of enumeration classified into
 - (a) less than 1 year; (b) 1-4 years;
 - (c) 5-9 years; (d) 10-19 years;
 - (e) 20 and over and (f) Period not stated.

The questions asked to collect information on migration in 1981 census were same as those in 1971 except for one question.

(1) Reasons for migration from place of last residence-

(a) Employment; (b) Education; (c) Family moved; (d) marriage; and (e) Others.

Table 3.1 (A) and 3.1 (B) gives data on interstate migration by place of birth and state of enumeration of the six states - Assam, Kerala, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh - for 1961 and 1971 censuses. The outmigration from the State of Assam are very less in comparison to Uttar Pradesh which shows employment opportunities available in Assam and as Uttar Pradesh is economically backward people out-migration to nearby states in search of employment. After Uttar Pradesh, Rajasthan and Tamil Nadu are most out-migrating States. Kerala and Orissa in 1961 were not heavily outmigrating States. In 1971, Uttar Pradesh followed by Rajasthan and Tamil Nadu lost in sizeable population to neighbouring states. The out-migrating population of Orissa in 1971 was not much when compared to 1961 whereas in Kerala, the number of out-migration increased. Assam showed no change in out-migration rate.

In-migration into Assam has been taking place since 1900. Most of the immigrants were and are from Bihar, followed by West Bengal and Orissa. Uttar Pradesh and Rajasthan too lost their population to Assam. The in-migrants to Kerala are from the neighbouring States of Tamil Nadu and Karnataka. Orissa has been receiving immigrants from Andhra Pradesh, Bihar, Madhya Pradesh and West Bengal. Rajasthan has immigrants from Gujrat, Madhya Pradesh, Punjab and Uttar Pradesh. Tamil Nadu has

TABLE 3.1 (A)

POPULATION BY PLACE OF BIRTH AND STATE OF ENUMERATION, 1961

| PLACE OF BIRTH | ANDHRA PRADESH | ASSAM | BIHAR | GUJRAT | JAMMU & KASHMIR | KERALA | MADHYA PRADESH | MADRAS (TAMIL NADU) |
|----------------|----------------|----------|--------|--------|-----------------|----------|----------------|---------------------|
| ASSAM | 943 | 10519191 | 8960 | 272 | 58 | 114 | 10497 | 269 |
| KERALA | 24849 | 2169 | 7213 | 7841 | 194 | 16644010 | 18213 | 276306 |
| ORISSA | 42657 | 51117 | 60463 | 777 | 62 | 157 | 114894 | 780 |
| RAJASTHAN | 12107 | 22154 | 30330 | 151516 | 585 | 225 | 280300 | 116378 |
| TAMIL NADU | 171552 | 7617 | 11161 | 11758 | 542 | 191628 | 19630 | 32995393 |
| U.P. | 11136 | 40672 | 303015 | 83260 | 3803 | 1024 | 478458 | 4073 |

| PLACE OF BIRTH | MAHARASTRA | MYSORE | ORISSA | PUNJAB | RAJASTHAN | U.P. |
|----------------|------------|--------|----------|--------|-----------|----------|
| ASSAM | 2616 | 266 | 5509 | 2957 | 1319 | 7462 |
| KERALA | 97872 | 137009 | 4259 | 5643 | 1994 | 5656 |
| ORISSA | 4352 | 332 | 17166977 | 1552 | 421 | 2591 |
| RAJASTHAN | 116378 | 12887 | 5231 | 203896 | 19168052 | 124064 |
| TAMIL NADU | 120904 | 395903 | 8552 | 7387 | 3864 | 10673 |
| U.P. | 420686 | 4857 | 10256 | 286581 | 144914 | 72094847 |

TABLE 3.1 (A) Contd.

| <u>PLACE OF BIRTH</u> | <u>WEST BENGAL</u> | <u>ANDAMAN & NICOBAR ISLANDS</u> | <u>DELHI</u> | <u>HIMANCHAL PRADESH</u> | <u>MINICOY & AMINDIVE</u> | <u>MANIPUR</u> |
|-----------------------|--------------------|--------------------------------------|--------------|--------------------------|-------------------------------|----------------|
| ASSAM | 47809 | 72 | 1136 | 78 | - | 6418 |
| KERALA | 12410 | 3775 | 10165 | 118 | 383 | 34 |
| ORISSA | 187113 | 231 | 1219 | 33 | - | 13 |
| RAJASTHAN | 63782 | 12 | 94450 | 181 | - | 329 |
| TAMILNADU | 38821 | 4453 | 19014 | 68 | 57 | 21 |
| U.P. | 346920 | 1121 | 418991 | 8670 | - | 273 |

| | TRIPURA | DADAR & NAGAR HAVALI | GOA DAMAN & DIV | PCNDICHERY | NORTH EAST FRONITER | NAGALAND | SIKKIM | TOTAL OUT-MIGRAM |
|------------|---------|----------------------------|-----------------------|------------|---------------------------|----------|--------|---------------------|
| | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| ASSAM | 10119 | 1 | - | 54 | 5183 | 3396 | 121 | 109367 |
| KERALA | 39 | 2 | - | 5809 | 685 | 883 | 51 | 623504 |
| ORISSA | 1955 | - | - | 12 | 240 | 82 | 2 | 471055 |
| RAJASTHAN | 249 | 35 | - | 53 | 280 | 342 | 221 | 1129851 |
| TAMIL NADU | 65 | 6 | - | 68401 | 525 | 120 | 23 | 1092735 |
| U.P. | 2064 | 28 | - | 72 | 3662 | 2126 | 191 | 2576953 |

SOURCE : Census of India, 1961, Vol I, India

Part II-C (iii) Migration Tables.

Contd....,

| | ANDMAN & NICOBAR ISLAND | ARUNCHAL PRADESH | CHANDIGARH | DADAR & NAGAR HAVALI | DELHI | GOA DAMAN DIV | LACCA- DIV MINI- COY & AMINDIV | PANDI CHARY | TOTAL OUT- MIGRAN |
|------------|-------------------------------|---------------------|------------|----------------------------|--------|---------------------|---|----------------|-------------------------|
| ASSAM | 95 | 25325 | 147 | - | 1632 | 172 | 2 | 21 | 184521 |
| KERALA | 7244 | 1693 | 903 | 18 | 18046 | 5200 | 1589 | 7188 | 942639 |
| ORISSA | 462 | 798 | 170 | 2 | 2428 | 199 | - | 142 | 439501 |
| RAJASTHAN | 59 | 782 | 4142 | 53 | 133333 | 805 | 5 | 249 | 1366082 |
| TAMIL NADU | 10460 | 439 | 1123 | 14 | 27133 | 2607 | 111 | 86034 | 1083434 |
| U.P. | 1904 | 4643 | 26931 | 122 | 665707 | 5316 | 19 | 265 | 3460923 |

Source : Census of India 1971, Series I - India

Part II-D (i) Migration Tables (Table D-I to D-IV)

TABLE 3.1 (B)

POPULATION BY PLACE OF BIRTH AND PLACE OF ENUMERATION - 1971

| PLACE OF BIRTH | PLACE OF ENUMERATION | | | | | | | |
|----------------|----------------------|--------------|---------|-----------|---------|-------------------|-----------------|----------|
| | ANDHRA PRADESH | ASSAM | BIHAR | GUJRAT | HARYANA | MIMANCHAL PRADESH | JAMMU & KASHMIR | KERALA |
| ASSAM | 1590 | 13435081 | 9914 | 590 | 780 | 404 | 250 | 305 |
| KERALA | 36076 | 4335 | 10390 | 16495 | 1600 | 1338 | 1441 | 21076720 |
| ORISSA | 53960 | 28930 | 69265 | 2095 | 2095 | 225 | 546 | 615 |
| RAJASTHAN | 17350 | 26407 | 25886 | 208501 | 208177 | 1881 | 2465 | 810 |
| TAMILNADU | 176146 | 2970 | 9520 | 3075 | 2055 | 619 | 817 | 187170 |
| U.P. | 16760 | 61423 | 318567 | 114522 | 254528 | 21291 | 9384 | 2650 |
| | MADHYA PRADESH | MAHARA SHTRA | MANIPUR | MEGHALAYA | MYSORE | NAGALAND | ORISSA | PUNJAB |
| ASSAM | 8645 | 2995 | 12790 | 33785 | 645 | 10084 | 3270 | 2110 |
| KERALA | 38167 | 165146 | 747 | 888 | 176594 | 2145 | 8295 | 1960 |
| ORISSA | 140330 | 9165 | 71 | 155 | 725 | 410 | 21357828 | 10805 |
| RAJASTHAN | 259718 | 156056 | 513 | 705 | 22765 | 1305 | 8475 | 57925 |
| TAMILNADU | 18797 | 149227 | 204 | 212 | 341139 | 413 | 6030 | 2995 |
| U.P. | 609904 | 599652 | 2563 | 1808 | 8710 | 8646 | 16810 | 139745 |

| | RAJASTHAN ----- | SIKKIM ----- | TAMIL NADU ----- | TRIPURA ----- | UTTAR PRADESH ----- | WEST BENGAL ----- |
|------------|--------------------|-----------------|------------------------|------------------|---------------------------|-------------------------|
| ASSAM | 2172 | 38 | 590 | 11523 | 6287 | 47764 |
| KERALA | 7705 | 124 | 379717 | 257 | 15739 | 10596 |
| ORISSA | 905 | 13 | 1135 | 1223 | 4041 | 141320 |
| RAJASTHAN | 24647604 | 68 | 15970 | 397 | 134663 | 43948 |
| TAMIL NADU | 4222 | 141 | 38229866 | 76 | 11829 | 17790 |
| U.P. | 203011 | 690 | 5890 | 2460 | 86592506 | 278115 |

Table: 3.2 (A) HEAVY STREAMS OF OUT MIGRATION BETWEEN STATES 1961

| <u>From:</u> | <u>To:</u> | |
|------------------------|----------------|--------|
| ASSAM | Bihar | 8960 |
| | Madhya Pradesh | 10497 |
| | West Bengal | 47809 |
| KERALA | Andhra Pradesh | 24849 |
| | Madras | 276306 |
| | Maharashtra | 97872 |
| | Mysore | 137009 |
| ORISSA | Assam | 51117 |
| | Bihar | 60463 |
| | Madhya Pradesh | 114894 |
| | West Bengal | 187113 |
| RAJASTHAN | Gujrat | 151516 |
| | Madhya Pradesh | 280300 |
| | Maharashtra | 116370 |
| | Punjab | 203896 |
| | Utter Pradesh | 124064 |
| | West Bengal | 346920 |
| | Delhi | 418991 |
| MADRAS (Tamil Nadu) | Andhra Pradesh | 171552 |
| | Kerala | 191628 |
| | Maharashtra | 120904 |
| | Mysore | 395903 |
| UTTAR PRADESH: | Bihar | 303115 |
| | Gujrat | 83260 |
| | Madhya Pradesh | 478458 |
| | Maharashtra | 420686 |
| | Punjab | 286581 |
| | Rajasthan | 144914 |
| | West Bengal | 346920 |
| Delhi | 418991 | |

SOURCE: Census of India 1961, Vol. I India Part II-C (iii)
Migration Tables

Table 3.2(B) HEAVY STREAMS OF OUT MIGRATION BETWEEN STATES, 1971

| <u>FROM.</u> | <u>TO</u> | |
|---------------|-------------------|----------|
| ASSAM | Meghalaya | 33785 |
| | West Bengal | 47764 |
| | Arunachal Pradesh | 25325 |
| KERALA | Andhra Pradesh | 36,076 |
| | Madhya Pradesh | 38,167 |
| | Mydore | 1,76,594 |
| | Tamil Nado | 3,79,717 |
| ORISSA | Andhra Pradesh | 53950 |
| | Assam | 28930 |
| | Bihar | 69265 |
| | Madhya Pradesh | 140330 |
| | West Bengal | 141320 |
| RAJASTHAN | Assam | 26407 |
| | Bihar | 25886 |
| | Gujrat | 208801 |
| | Haryana | 208177 |
| | Madhya Pradesh | 259718 |
| | Maharashtra | 156056 |
| | Punjab | 57925 |
| | Uttar Pradesh | 134663 |
| West Bengal | 43948 | |
| TAMIL MADU | Andhra Pradesh | 176146 |
| | Kerala | 187170 |
| | Maharashtra | 149227 |
| | Mysoore | 341139 |
| | Pondicherry | 86034 |
| UTTAR PRADESH | Bihar | 318567 |
| | Gujrat | 114522 |
| | Haryana | 254528 |
| | Madhya Pradesh | 609904 |
| | Maharashtra | 599652 |
| | Punjab | 139754 |
| | Rajasthan | 203011 |
| | West Bengal | 278115 |
| Delhi | 665707 | |

SOURCE: Census of India 1971, Series 1-India Part-II-D(i) Migration Tables (Tables D-I-D-IV)

Table 3.3(A) HEAVY STREAMS OF IMMIGRATION 1961

| <u>FROM</u> | | <u>TO:</u> |
|----------------|--------|------------------------|
| Bihar | 257288 | <u>/ASSAM/</u> |
| Orissa | 51117 | |
| Utter Pradesh | 40672 | |
| West Bengal | 54844 | |
| Madras | 191628 | <u>/KERALA/</u> |
| Mysore | 21230 | |
| Andhra Pradesh | 125432 | <u>/MADRAS/</u> |
| Kerala | 276306 | |
| Mysore | 88580 | |
| Andhra Pradesh | 53064 | <u>/ORISSA/</u> |
| Bihar | 95343 | |
| Madhya Pradesh | 56096 | |
| West Bengal | 72643 | |
| Gujrat | 29886 | <u>/RAJASTHAN/</u> |
| Madhya Pradesh | 128202 | |
| Punjab | 295104 | |
| Utter Pradesh | 144914 | |
| Bihar | 226879 | <u>/UTTAR PRADESH/</u> |
| Madhya Pradesh | 223077 | |
| Punjab | 322173 | |
| Rajasthan | 124064 | |
| West Bengal | 60103 | |
| Delhi | 57825 | |

SOURCE: Census of India Vol. I India Part-II-C(iii)
Migration Table.

Table 3.3 (B) HEAVY STREAMS OF IN-MIGRATIONS, 1971.

| <u>FROM</u> | | <u>TO</u> |
|----------------|--------|---------------|
| Bihar | 231798 | ASSAM |
| Meghalaya | 25988 | |
| Orissa | 28930 | |
| Rajasthan | 26407 | |
| Uttar Pradesh | 61423 | |
| West Bengal | 63926 | |
| Mysore | 25220 | KERALA |
| Tamil Nadu | 187170 | |
| Andhra Pradesh | 114056 | ORISSA |
| Bihar | 130686 | |
| Madhya Pradesh | 72319 | |
| West Bengal | 104335 | |
| Gujrat | 60577 | RAJASTHAN |
| Haryana | 175552 | |
| Madhya Pradesh | 175630 | |
| Punjab | 150967 | |
| Uttar Pradesh | 203011 | |
| Andhra Pradesh | 146631 | TAMILNADU |
| Kerala | 379717 | |
| Mysore | 123447 | |
| Pndicherry | 74759 | |
| Bihar | 292692 | UTTAR PRADESH |
| Haryana | 109732 | |
| Madhya Pradesh | 236110 | |
| Punjab | 195146 | |
| West Bengal | 57902 | |
| Delhi | 83297 | |

SOURCE: Census of India 1971 Series 1-India Part II-D (i)
Migration Tables (D-I + D IV)

been receiving immigrants from Andhra Pradesh and Kerala. Uttar Pradesh has immigrants from Bihar, Madhya Pradesh, Punjab, Rajasthan, West Bengal and Delhi.

Tables 3.2 and 3.3 give an account of heavy streams of in-migrations and out-migrations between states in 1961 and 1971. An important feature of heavy streams of migrations from one particular state to another has been the distance. Most of the migrants preferred to move to the neighbouring States in search of employment and a counter-stream of migrations took place between states.

Table 3.4 shows the distribution of immigrants, out-migrants and net-migrants for males and females. Influx of migrants into Assam has been taking place since 1874. The migrations which took place prior to independence has been highest due to employment in tea-estates. During the decade 1961-71, the immigrants to Assam were only 10.18 percent. It gained by about 1.2 million and 1.3 million in 1961 and 1971 respectively. In 1961, Assam was the only State which had gained population through migration among the States selected for the study. The immigration into Assam was dominated by males. Assam's in-migrants were labourers who worked in the plantations. Refugees from East Pakistan after independence and after 1971 into-pak was contributed to the increase in State's population.

Kerala has been out-migrating State since long. Males have dominated females in out-migration. One of the reasons for this could be the role of mothers in upbringing their children - matrilineal society. Apart from it being a matrilineal, the high literacy rate has helped the males not only in taking up jobs elsewhere in India but also abroad.

Migration plays an insignificant role in Orissa's population. Whatever migrations took place, they were

TABLE 3.4 (A)

DISTRIBUTION OF IN-Migrants, Out-migrants and Net - migrants
(Both Sexes)
1961

| <u>STATE</u> | <u>IN-MIGRANTS</u> | <u>OUT-MIGRANTS</u> | <u>NET-MIGRANTS</u> |
|---------------|--------------------|---------------------|---------------------|
| ASSAM | 1352474 | 109367 | 1243107 |
| KERALA | 244911 | 623504 | (-) 378593 |
| ORISSA | 357979 | 471055 | (-) 113076 |
| RAJASTHAN | 952285 | 1129851 | (-) 177566 |
| TAMIL NADU | 667433 | 1092735 | (-) 425302 |
| UTTAR PRADESH | 1560948 | 2576953 | (-) 1016005 |

Contd.....

1971

| <u>STATES</u> | <u>IN-MIGRANTS</u> | <u>OUT-MIGRANTS</u> | | <u>NET-MIGRANTS</u> |
|---------------|--------------------|---------------------|----------------|---------------------|
| ASAM | 14,97,216 | 1,84,521 | | 13,12,695 |
| KERALA | 2,77,745 | 9,42,639 | (-) | 6,64,894 |
| ORISSA | 6,61,088 | 4,93,501 | (X) | 1,67,587 |
| RAJASTHAN | 13,68,004 | 13,66,082 | (-) | 23,078 |
| TAMIL NADU | 11,13,871 | 10,83,434 | | 30,437 |
| UTTARPRADESH | 20,74,113 | 34,60,923 | (-) | 13,86,810 |

Contd....

1981

| <u>STATES</u> | <u>IN-MIGRANTS</u> | <u>OUT-MIGRANTS</u> | <u>NET-MIGRANTS</u> |
|---------------|--------------------|---------------------|---------------------|
| ASSAM | - | - | - |
| KERALA | 3,72,271 | 11,11,725 | (-) 7,39,454 |
| ORISSA | 8,95,113 | 5,28,344 | 3,66,769 |
| RAJASTHAN | 16,71,307 | 16,82,753 | (-) 11,446 |
| TAMIL NADU | 15,15,752 | 14,09,240 | 1,06,512 |
| UTTAR PRADESH | 23,22,552 | 48,56,060 | (-) 25,33,508 |

Contd...

TABLE 3.4 (B)
 DISTRIBUTION OF IN-MIGRANTS, OUT-MIGRANTS & NET-MIGRANTS
 1961, 1971, and 1981
 (MALES)

| <u>STATE</u> | <u>IN-MIGRANTS</u> | <u>1961</u> | <u>OUT-MIGRANTS</u> | <u>NET-MIGRANTS</u> |
|---------------|--------------------|-------------|---------------------|---------------------|
| ASSAM | 8,34,036 | | 66,433 | 767603 |
| KERALA | 1,29,448 | | 4,04,488 | (-) 275040 |
| ORISSA | 167022 | | 2,71,131 | (-) 1,04,109 |
| RAJASTHAN | 4,11,655 | | 5,34,648 | (-) 1,22,953 |
| TAMIL NADU | 3,45,405 | | 5,75,434 | (-) 2,30,029 |
| UTTAR PRADESH | 6,60,921 | | 15,60,383 | (-) 8,99,462 |
| | | <u>1971</u> | | |
| ASSAM | 8,81,158 | | 1,03,212 | 7,77,946 |
| KERALA | 1,45,445 | | 5,68,314 | (-) 4,40,869 |
| ORISSA | 3,20,134 | | 2,55,854 | 64,280 |
| RAJASTHAN | 5,63,097 | | 6,47,957 | (-) 84,860 |
| TAMIL NADU | 5,53,321 | | 5,66,098 | (-) 12,777 |
| UTTAR PRADESH | 8,84,648 | | 20,29,759 | (-) 11,45,111 |

Contd....)

1981

| <u>STATE</u> | IN-MIGRANTS | OUT-MIGRANTS | NET-MIGRANTS |
|---------------|-------------|--------------|-------------------------|
| ASSAM | - | - | - |
| KERALA | 1,83,771 | 6,31,659 | (-) 4,47,888 |
| ORISSA | 4,16,096 | 2,54,284 | (X) 1,61,812 |
| RAJASTHAN | 6,57,325 | 7,20,915 | (-) 63,590 |
| TAMIL NADU | 7,07,933 | 7,10,957 | (-) 3,024 |
| UTTAR PRADESH | 8,46,411 | 27m25,582 | (-) 18,79,171 |

Contd....,

TABLE 3.4 (C)

DISTRIBUTION OF IN-MIGRANTS, OUT-MIGRANTS, & NET-MIGRANTS
1961, 1971
(FEMALES)

| STATE | IN-MIGRANTS | OUT-MIGRANTS | NET-MIGRANTS |
|---------------|-------------|--------------|--------------|
| ASSAM | 5,18,438 | 42,934 | 4,75,504 |
| KERALA | 1,15,463 | 2,19,016 | (-) 1,03,553 |
| ORISSA | 1,90,957 | 1,99,924 | (-) 8,967 |
| RAJASTHAN | 5,40,630 | 5,95,203 | (-) 54,573 |
| TAMIL NADU | 3,22,028 | 5,17,301 | (-) 1,95,273 |
| UTTAR PRADESH | 9,00,027 | 10,16,570 | (-) 1,16,543 |

1971

| | | | |
|---------------|-----------|-----------|--------------|
| ASSAM | 6,16,058 | 81,309 | 5,34,749 |
| KERALA | 1,32,300 | 3,56,325 | (-) 2,24,025 |
| ORISSA | 3,40,954 | 2,37,647 | 1,03,307 |
| RAJASTHAN | 7,79,907 | 7,18,125 | 61,782 |
| TAMIL NADU | 5,60,550 | 5,17,336 | 43,214 |
| UTTAR PRADESH | 11,89,465 | 14,31,164 | (-) 2,41,699 |

Contd....)

1981*

| <u>STATE</u> | <u>IN-MIGRANTS</u> | <u>OUT-MIGRANTS</u> | <u>NET-MIGRANTS</u> |
|--------------|--------------------|---------------------|---------------------|
| ASSAM | - | - | - |
| KERALA | 1,88,500 | 4,80,066 | (-) 2,91,566 |
| ORISSA | 4,79,017 | 2,74,060 | 2,04,957 |
| RAJASTHAN | 10,13,982 | 9,61,838 | 52,144 |
| TAMIL NADU | 8,07,819 | 6,98,283 | 1,09,536 |
| U.P. | 14,74,141 | 21,30,478 | (-) 6,54,337 |

* Census could not be conducted in Assam due to disturbances in 1981.

SOURCE : Census of India 1961 Vol I India Part II-C (iii) Migration Tables.

Census of India 1971 Series I India Part II - D (i) Migration (D I to D IV)

Census of India 1981 Series I India Part 2 of 1983 key population statistics based on 5 percent sample data.

DISTRIBUTION OF INMIGRANTS & OUTMIGRANTS—

ASSAM

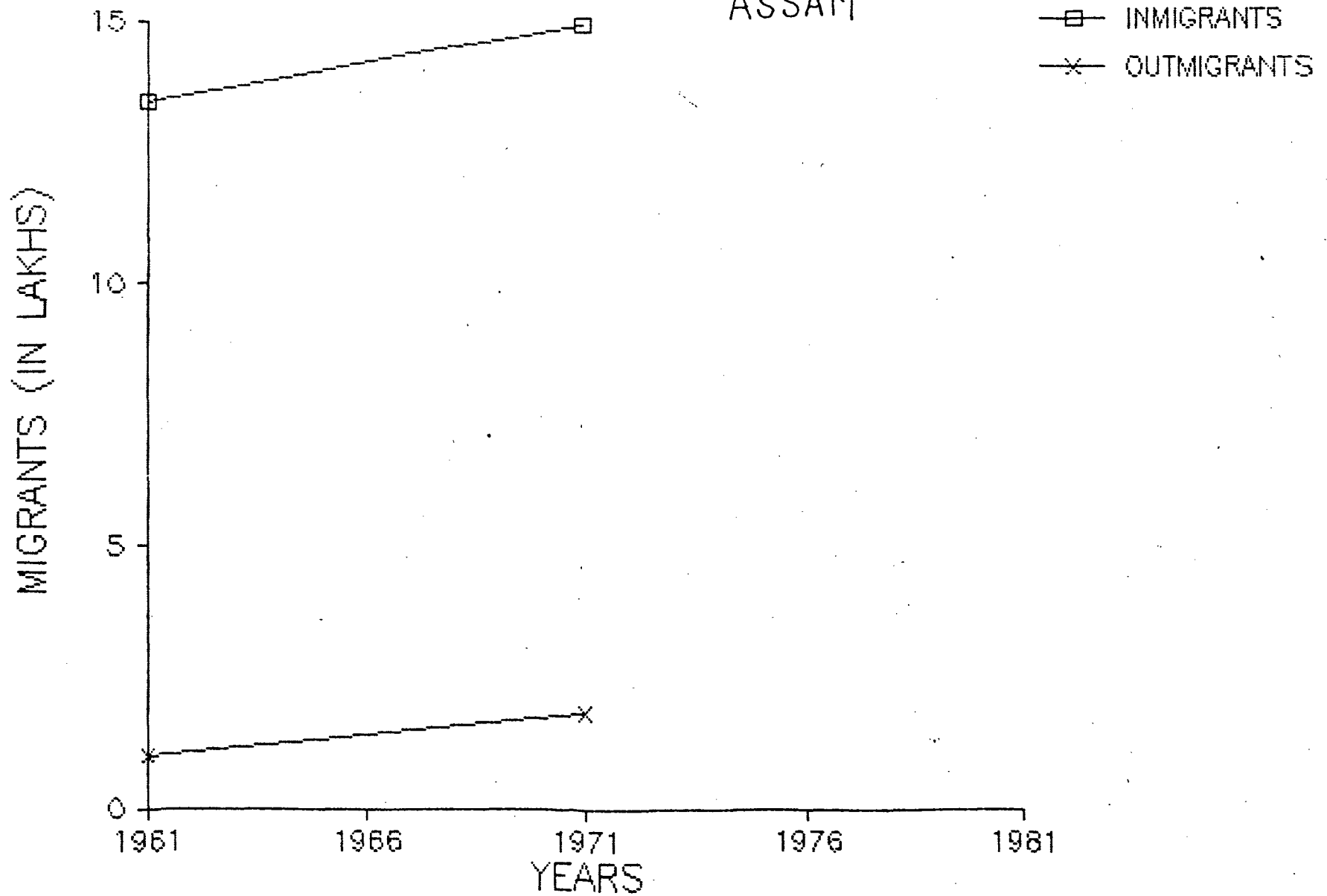


FIG - 3.1

DISTRIBUTION OF INMIGRANTS & OUTMIGRANTS—

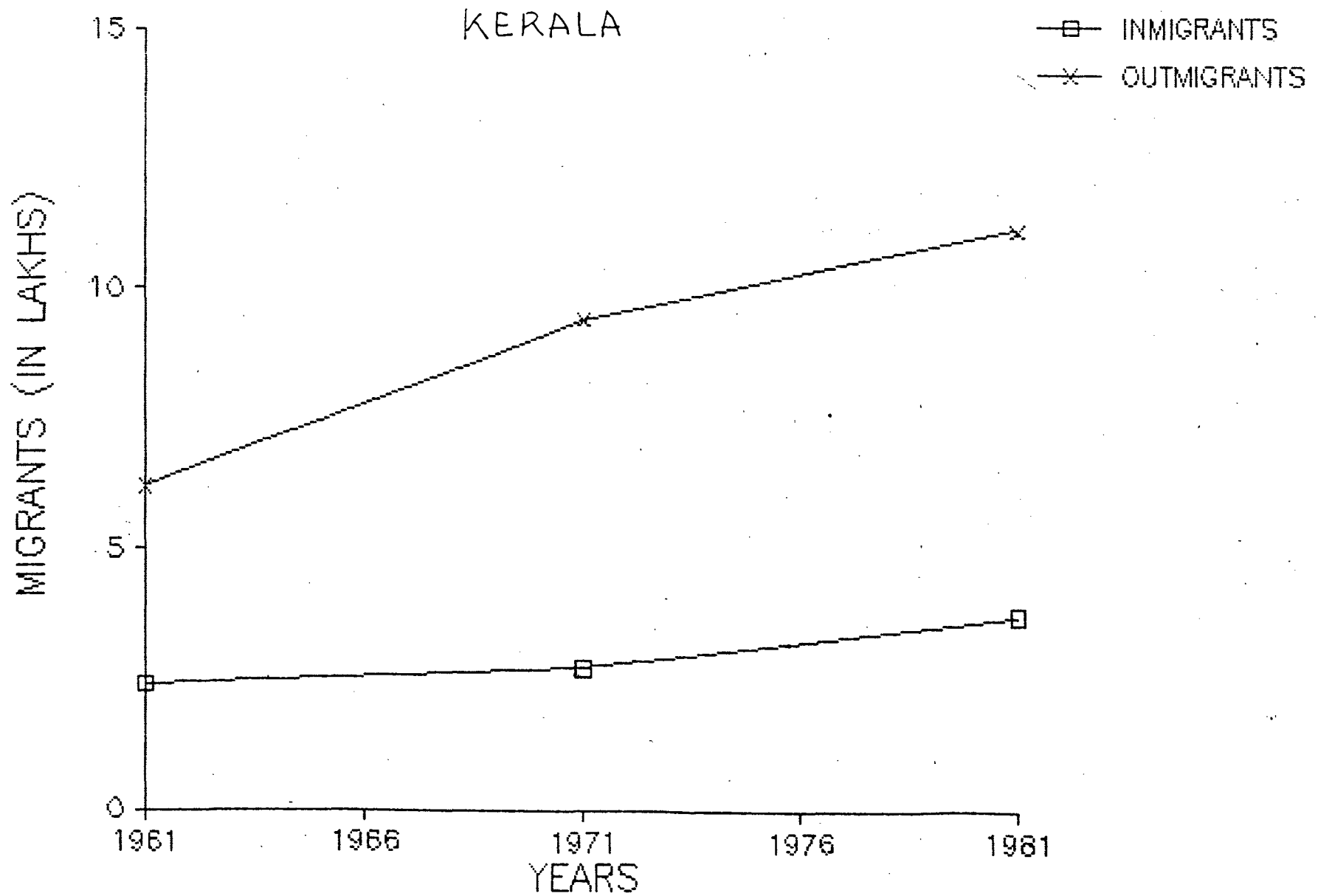


FIG-3.2

DISTRIBUTION OF INMIGRANTS & OUTMIGRANTS—

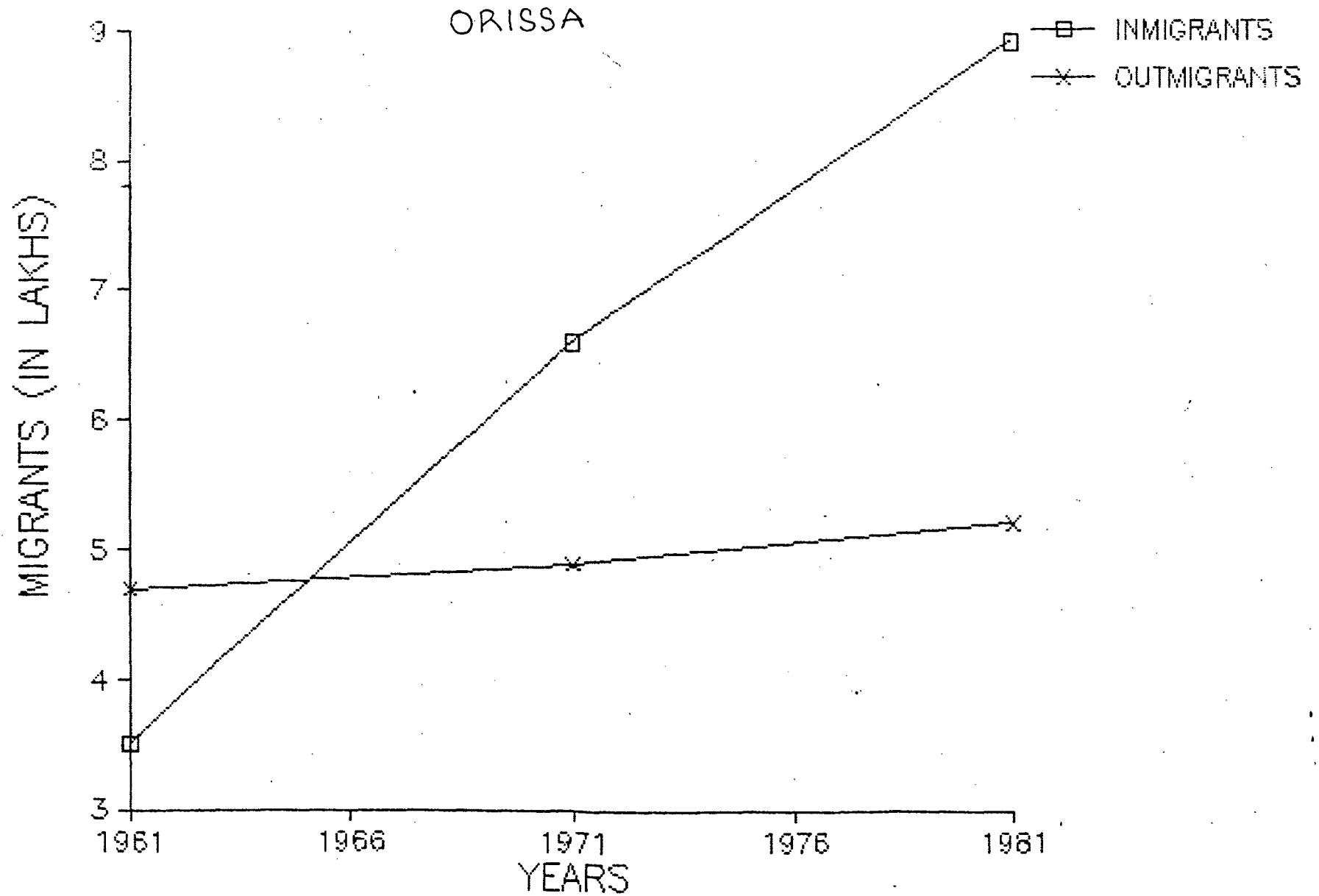


FIG-3.3

DISTRIBUTION OF INMIGRANTS & OUTMIGRANTS—

UTTAR PRADESH

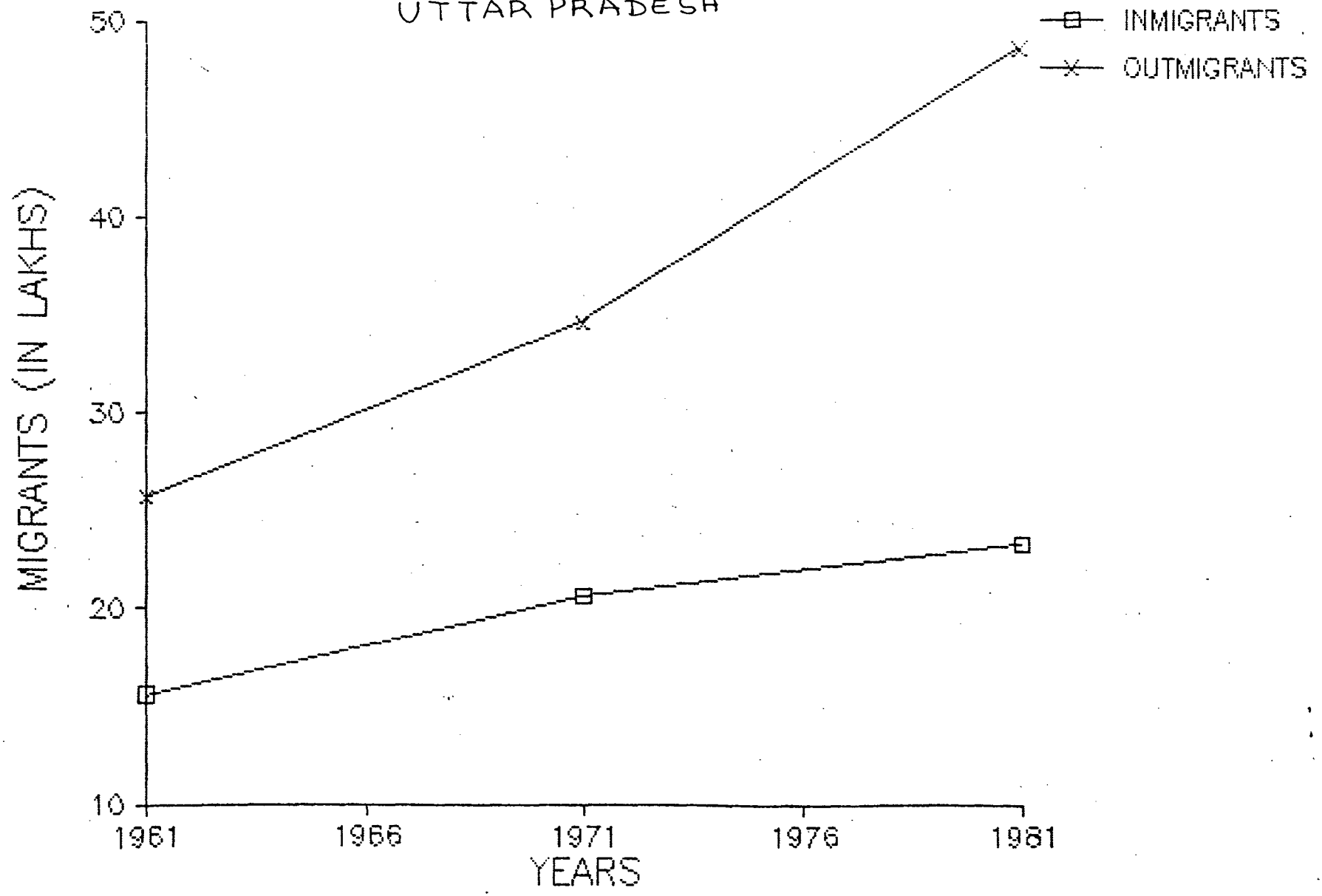


FIG-3.4

DISTRIBUTION OF INMIGRANTS & OUTMIGRANTS—

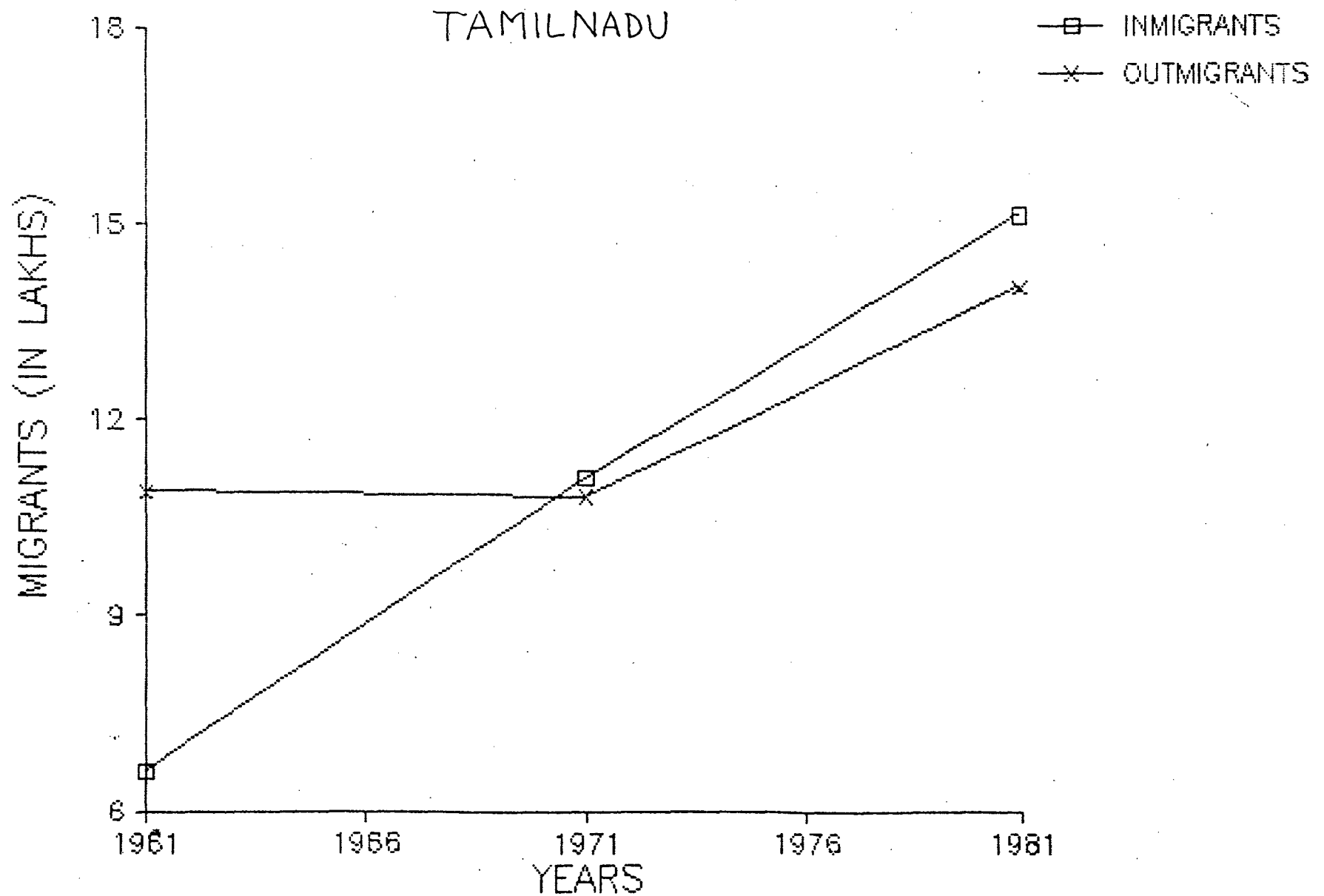


FIG-3.5

DISTRIBUTION OF INMIGRANTS & OUTMIGRANTS—

RAJASTHAN

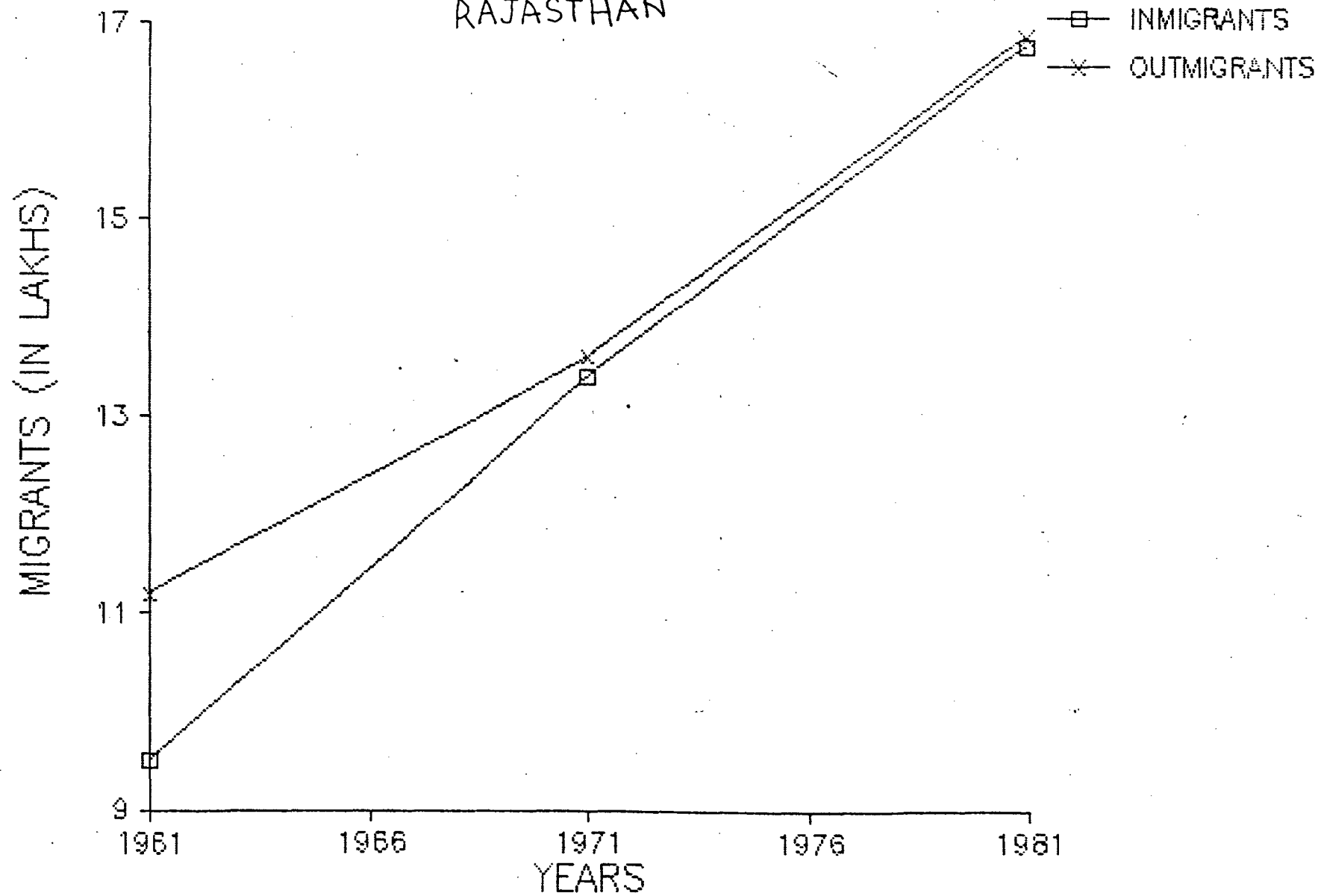


FIG-3.6

restricted to inter-district and only to the adjoining states. Orissa has gained population by 2.1 percent and 2.9 percent in 1971 and 1981 respectively (Table 3.5)

A large area of Rajasthan is covered by desert which makes the life of people miserable. Both Punjab and Uttar Pradesh because of highly fertile land attract people of Rajasthan. Rajasthan has lost its population by 6.7 percent in 1971.

Tamil Nadu has been a losing State till 1961. In 1961, it lost by 2.0 percent and in 1971 by 2.9 percent in 1981 by 0.35 percent.

Uttar Pradesh has never been an immigrating state except in 1947 when migrants from Pakistan added to the total population. The State has lost 1.53 percent, 1.56 percent and 1.78 percent respectively in 1961, 1971 and 1981. As pointed by Saxena, G.B. - 'The dearth of arable land, overpressurised agricultural holdings and lack of employment opportunities in non-agricultural sections have pushed the labour force to seek better economic opportunities beyond the State. It should not be ignored that a considerable proportion of interstate migration consists of marriage and birth migration'. (Saxena G.B., 1971).

Table 3.5 presents the intercensal migration statistics on the basis of place of birth. The intercensal migration of Assam has been very high in comparison to other states. The net in-migration rate of Assam was 11.29 percent in 1961 and it reduced to 6.11 percent in 1971. Assam attracted population from neighbouring state due to availability of gainful employment opportunities in tea plantation. Kerala showed a negative rate of migration. Migration to other States from Kerala are comparatively less as most of them emigrated to Gulf countries. Orissa showed a very negligible out-migrate rate. Rajasthan

TABLE 3.5

IN-MIGRANTS, OUT-MIGRANTS, NET-MIGRANTS, 1961, 1971, 1981 AND INTERCENSAL MIGRATION
BY PLACE OF BIRTH

| <u>STATE</u> | <u>IN-MIGRANTS</u> | <u>OUT-MIGRANTS</u> | <u>NET-MIGRANTS</u> | <u>NET INTER-CENSAL MIGRATION</u> | <u>INTER CENSAL RATE OF MIGRATION (PERCENT)</u> |
|--------------|--------------------|---------------------|---------------------|---------------------------------------|---|
| ASSAM | 13,52,474 | 1,09,367 | 12,43,107 | 9,96,000 | 11.29 |
| KERALA | 2,44,911 | 6,23,504 | (-) 3,78,593 | (-) 1,61,000 | (-) 1.18 |
| ORISSA | 3,57,979 | 4,71,055 | (-) 1,13,076 | 3,20,000 | 2.19 |
| RAJASTHAN | 9,52,285 | 11,29,851 | (-) 1,77,566 | 69,00 | 0.43 |
| TAMIL NADU | 6,67,433 | 10,92,735 | (-) 4,25,302 | (-) 6,33,000 | (-) 2.09 |
| U.P. | 15,06,948 | 25,76,953 | (-) 10,16,005 | (-) 9,72,000 | (-) 1.53 |
| | | <u>1971</u> | | | |
| ASSAM | 14,97,216 | 1,84,521 | 13,12,695 | 1,18,277 | 6.11 |
| KERALA | 2,77,745 | 9,42,639 | (-) 6,64,894 | (-) 2,98,148 | (-) 13.41 |
| ORISSA | 6,61,088 | 4,93,501 | 1,67,587 | 63,516 | 2.93 |
| RAJASTHAN | 13,43,004 | 15,66,082 | (-) 23,078 | (-) 1,90,393 | (-) 6.71 |
| TAMIL NADU | 11,13,871 | 10,83,434 | 30,437 | (-) 1,11,128 | (-) 2.94 |
| U.P. | 20,74,113 | 34,60,923 | (-) 13,86,810 | (-) 10,35,312 | (-) 13.64 |

1981

| STATE | IN-MIGRANTS | OUT-MIGRANTS | NET-MIGRANTS | NET INTER-CENSAL MIGRATION | INTER CENSAL RATE OF MIGRATION (Percent) |
|------------|-------------|--------------|--------------|-------------------------------|---|
| | ----- | ----- | ----- | ----- | ----- |
| KERALA | 3,72,271 | 11,11,725 | (-) 7,39,454 | (-) 51,574 | (-) 0.49 |
| ORISSA | 8,95,113 | 5,28,344 | 3,66,769 | 97,273 | 0.88 |
| RAJASTHAN | 16,71,307 | 16,82,753 | (-) 11,446 | 19,277 | 0.14 |
| TAMIL NADU | 15,15,752 | 14,09,240 | 1,06,512 | (-) 72,114 | (-) 0.35 |
| U.P. | 23,22,552 | 48,56,060 | (-)25,33,508 | (-)8,35,908 | (-) 1.78 |

SOURCE : Census of India - 1961 - Migration Tables Part II-C (iii) New Delhi Registrar General & Census Commissioner, India.

1 - 1971 - -do- II-D (i) New Delhi Registrar General & Census Commissioner, India.

- 1981 - Paper 2-fo-1983, Key Population statistics based on 5 per cent sample data - New Delhi Registrar General and Census Commissioner for India.

had been losing its population because of rash physical terrain which hinders the people in engaging themselves in agricultural section and even other sectors. The rate of migration in Tamil Nadu was less than 3.0 percent in 1961 and 1971 but in 1981 the rate dropped considerably to 0.35. Uttar Pradesh throughout has been net out-migrating state. According to the 5 percent sample data the loss has been maximum in Uttar Pradesh (-1.78 percent). In the earlier periods also Uttar Pradesh outstripped all other States with a wide margin.

In the case of Assam high in-migration may be due to more employment opportunities in the tea plantations which contribute to a large portion of state income. Kerala which is densely populated has less agricultural land and less industrialisation but better educated population and high levels of educated unemployed records substantial out-migration. Orissa shows only a small magnitude of net positive balance of migrants and the volumes (inflow and outflow) show low migrating area. This is due to low level of socio-economic development. Rajasthan, too has less agricultural land as a large part of the area is covered by desert thus forcing the people to eke out for living. Tamil Nadu's case is not different from Kerala but to a lesser extent. Uttar Pradesh is highly outmigrating state. The State is over-populated, has less industrialization and a very low per capita domestic product which indicates low level of socio-economic development.

Internal migration in India does not take place in large volumes and it does not make great differences in the rate of growth for any State. According to 1961 census 3.3 percent of the total population of India was enumerated as inter-state

life time migrants while 30.7 percent of the total population was enumerated outside the place of birth. In 1971, the corresponding figures were 3.4 percent and 30.4 percent respectively. In 1981, according to 5 percent sample data (Provisional figures) it was 3.5 percent and 30.7 percent respectively of the population. Immobility is dominant characteristic of Indian population. The volume of migration does not accelerate or retard the population growth of the States being studied..

CHAPTER IVTRENDS OF BIRTH RATES AND DEATH RATES
IN SELECTED STATES

Fertility and mortality are vital components of population growth. The data available on fertility and mortality were not reliable and accurate. The data till 1966 were either obtained from civil registration system or by indirect methods. In the present study the trends and differentials of fertility and mortality are observed, and comparison is made between the States with past and present trends and levels. Infant mortality and expectation of life and birth also feature as a part of the study.

The population of a country or an area increases by births and immigration and decreases by deaths and emigration. These vital events affect the growth of population of these birth is most important factor as the replacement for the biological maintenance of society. Mortality, too, is an important component in determining the growth of population.

The demographic transition is a historical process and it began with the decline in mortality. The birth rates with the passage of time will be relatively low and stable, but sufficiently above mortality. The explanation for the demographic transition is given by McCutcheon-

"The high birth rate has been seen as the result of both the parent's recognition of the high infant death rate and of the need to produce children as an insurance policy. High birth and death rates were the characteristic of life in the now developed world, at least since the development of agriculture, until the 17th and 18th centuries. The increase in population growth rate which took place during the 18th century was primarily caused by a fall in death rate.

This fall in death rate has been variously attributed to the increase in effectiveness of medicine, the diffusion of public health measures, improved nutrition (through new methods of agriculture and distribution) and the higher standard of living which is given by the industrial way of life. It might be said that it followed from a combination of all four factors but at one time or another, each has been seen as the major cause of the decrease in death rate and increase in population growth. However, the impact of better organisation and improved medical knowledge and care is most frequently seen as the major cause." (McCuteheou R, 197

Sometime after the fall in death rates, the birth rates too declined significantly. The decline is closely linked to the fall in infant deaths and also overall death rate coupled with rising educational levels, improvement in the social status of women, changes in occupational structure and raised higher standard of living. Of late the decline is also attributed to the population programmes undertaken along with socio-economic development policies by various international bodies namely United Nations Fund for Population activities (UNFPA), Ford and Rockefeller foundations, Agency for International Development (AID), World Health Organisation (WHO), (Bergman E, 1973) besides National Family Welfare programmes which also envisage maternity and infant care programmes. The international fund is devoted to policy development, population dynamics, population education and training and population communication and information activities (Ravenhoff, 1973).

Information on births and deaths is an important aspect of population which is essential for planning. The census, the civil registration system and the sample registration system have been a source of vital statistics. The census provides indirect estimates of birth and death rates. Once in ten years. The civil registration system

a century old in India, is another source of vital statistics, but even today, the estimates of birth and death rates obtained from this source cannot be used because of large under-registration of the events.

The sample registration system (SRS) was initiated in 1964 to provide reliable data on births and deaths at state and all-India levels for rural and urban areas. Initially this system was started on a pilot basis in few selected states but todate this system covers the entire nation.

Deficiencies in births and deaths procured from various sources are inevitable but to some extent the results from sample registration system can be considered fairly an accurate indicator of birth/death profile.

BIRTH RATES IN SEEBECTED STATES

"Data on fertility, that is, the frequency of births in a population, form an almost indispensable basis for studying the prospects of population growth in country, the probably development of its age structure and the possible effects on population growth of economic and social changes, public health measures and other factors. Knowledge of the fertility of different groups of population, such as religious or ethnic groups, makes it possible to predict changes in the composition of the population." (United Nations 1952)

Table 4.1 gives the crude birth rates and death rates of India from 1901 to 1981. The birth rates are quite high in India and the reasons for High fertility rates are - universal marriage system, emphasis on having sons for the performance of certain rites, rural based economy and the lack of planning in determining the size of family (Mauldin, 1967) upto 1921 both birth and death rates were high and growth rate was low.

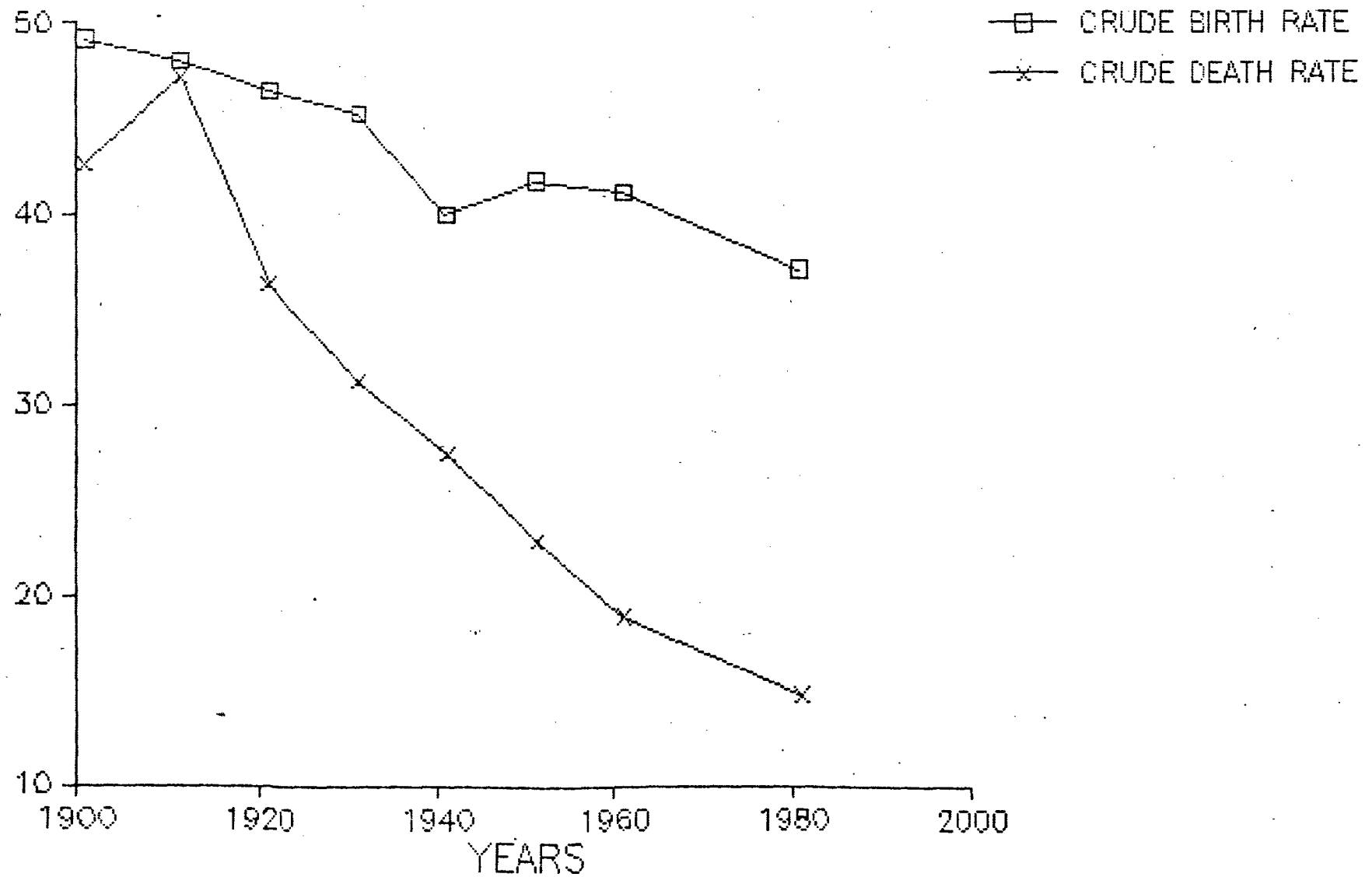
Table 4.1

CRUDE BIRTH AND DEATH RATES OF INDIA - 1901-1981

| <u>PERIOD</u> | <u>CRUDE BIRTH RATE</u> | <u>CRUDE DEATH RATE</u> | <u>NATURAL GROWTH RATE</u> |
|---------------|-------------------------|-------------------------|----------------------------|
| 1901-11 | 49.2 | 42.6 | 6.6 |
| 1911-21 | 48.1 | 47.2 | 0.9 |
| 1921-31 | 46.4 | 36.3 | 10.0 |
| 1931-41 | 45.2 | 31.2 | 14.0 |
| 1941-51 | 39.9 | 27.4 | 12.5 |
| 1951-61 | 41.7 | 22.8 | 18.9 |
| 1961-71 | 41.1 | 18.9 | 22.2 |
| 1971-81 | 37.1 | 14.8 | 22.3 |

- SOURCES :
- For the period 1901-1941 - Davis K. Population of India and Pakistan, Princeton University Press P. 85
 - For the period 1941-1981 - Health Statistics of India 1984, Directorate General of Health Services New Delhi PP - 32-33.

CRUDE BIRTH AND DEATH RATES - INDIA (1901-1981)



The crude birth rate was between 49 and 46 and death rate was between 41 and 36 per 1000. The persistence of high death rates were due to epidemics of plague, cholera, famines and influenza. Between 1921 and 1951 both birth and death rates declined. Birth rates declined from 46.4 to 39.9 per 1000, a decrease of 17 percent whereas death rate decreased by 42 percent from 36.3 to 27.4 per 1000. This could be achieved because of various measures taken in preventing the epidemics. Various public health measures which included preventive and eradication of various diseases which took heavy toll of life were taken which helped in reducing the mortality. The birth rate has come down to 37 per 1000 and death rate to 14 per 1000 in 1981 and as Rele (1974) points out-

"...the initial stage of the onset of declining fertility seems well on its way. This is normally the crucial stage. Once this is achieved the next stage of more rapid decline in fertility may be expected, provided it is supported by proper programme inputs, as well as simultaneously social and economic development."
(Rele, 1974).

Table 4.2 presents the birth rates of India and States selected from 1961 to 1981. The birth rate in Assam during the decade 1961-71 was highest among all the States, as pointed out by Srikantan. In Assam, the sample registration system was introduced and it began its operation since 1967 and 1968 in rural and urban areas respectively. (Sample registration Bulletin, 1973). The birth rate for rural areas was 39.9 in 1967 and for urban areas the data is available from 1969 - inspite of its inception in 1968 - was 31.1. The birth rates have considerably declined by about 6.1 points in rural areas during 1967 and 1981 whereas it declined by 7.9 points in urban areas during 1969 and 1981.

TABLE 4.2
CRUDE BIRTH RATES PER 1000 FOR INDIA AND SELECTED 1961 - 1981

| Source/Period | I N D I A | | | A S S A M | | | K E R A L A | | | O R I S S A | | |
|---------------|-----------|------|------|-----------|------|------|-------------|------|------|-------------|------|------|
| | R | U | C | R | U | C | R | U | C | R | U | C |
| SRIKANTAN | | | | | | | | | | | | |
| 1961 - 66 | UA | UA | 42.2 | UA | UA | 50.9 | UA | UA | 38.0 | UA | UA | 43.2 |
| 1966 - 71 | UA | UA | 40.3 | UA | UA | 43.3 | UA | UA | 35.9 | UA | UA | 37.6 |
| 1961 - 71 | UA | UA | 41.3 | UA | UA | 46.9 | UA | UA | 37.0 | UA | UA | 40.3 |
| SRS | | | | | | | | | | | | |
| 1967 | UA | UA | UA | 39.9 | UA | UA | 35.3 | UA | UA | 36.2 | UA | UA |
| 1968 | 39.0 | UA | UA | 45.5 | UA | UA | 32.2 | UA | UA | 39.2 | UA | UA |
| 1969 | 38.8 | 32.6 | 37.6 | 40.8 | 31.1 | UA | 31.8 | UA | UA | 38.8 | 32.5 | UA |
| 1970 | 38.9 | 29.7 | 36.8 | 39.5 | 32.0 | 38.8 | 32.0 | 30.1 | 31.6 | 38.5 | 34.2 | 38.1 |
| 1971 | 38.9 | 30.1 | 36.9 | 39.3 | 31.0 | 38.5 | 31.3 | 29.6 | 31.1 | 34-7 | 33.0 | 34.6 |
| 1972 | 38.9 | 30.5 | 36.6 | 37.3 | 27.7 | 36.4 | 31.5 | 29.5 | 31.2 | 34.7 | 31.7 | 34.5 |
| 1973 | 35.9 | 28.9 | 34.6 | 31.8 | 27.6 | 33.3 | 29.4 | 28.5 | 29.2 | 35.0 | 32.7 | 34.8 |
| 1974 | 35.9 | 28.4 | 34.5 | 33.6 | 24.8 | 32.8 | 26.7 | 26.9 | 26.8 | 33.9 | 30.5 | 33.6 |
| 1975 | 36.7 | 28.5 | 35.2 | 30.7 | 23.9 | 31.1 | 28.1 | 27.5 | 28.0 | 33.8 | 30.7 | 33.6 |
| 1976 | 35.8 | 28.4 | 34.4 | 33.7 | 24.0 | 32.8 | 28.1 | 26.5 | 27.8 | 35.3 | 29.1 | 34.8 |
| 1977 | 34.3 | 27.8 | 33.0 | 30.6 | 24.7 | 30.1 | 26.1 | 24.1 | 25.8 | 30.2 | 26.0 | 29.9 |
| 1978 | 34.7 | 27.8 | 33.3 | 31.6 | 23.0 | 30.8 | 25.3 | 24.1 | 25.2 | 32.3 | 28.9 | 32.9 |
| 1979 | 34.3 | 28.3 | 33.1 | 34.7 | 24.0 | 33.8 | 26.3 | 23.9 | 25.8 | 31.0 | 30.5 | 31.0 |
| 1980 | 34.6 | 28.1 | 33.3 | 32.7 | 22.5 | 31.9 | 27.0 | 25.5 | 26.8 | 31.9 | 29.0 | 31.6 |
| 1981 | 35.6 | 27.0 | 33.9 | 33.8 | 23.2 | 33.0 | 26.0 | 23.5 | 25.6 | 33.4 | 29.3 | 33.1 |

| | RAJASTHAN | | | TAMIL NADU | | | UTTAR PRADESH | | |
|-----------|-----------|------|------|------------|------|------|---------------|------|------|
| | R | U | C | R | U | C | R | U | C |
| 1961 . 66 | UA | UA | 44.7 | UA | UA | 36.4 | UA | UA | 45.1 |
| 1966 - 71 | UA | UA | 41.8 | UA | UA | 36.1 | UA | UA | 42.6 |
| 1961 - 71 | UA | UA | 43.2 | UA | UA | 36.3 | UA | UA | 43.8 |
| 1967 | 36.3 | UA | UA | UA | UA | UA | 45.7 | UA | UA |
| 1968 | 46.0 | UA | UA | UA | UA | UA | 45.4 | UA | UA |
| 1969 | 44.0 | 37.7 | UA | 33.8 | UA | UA | 45.6 | 35.9 | UA |
| 1970 | 39.7 | 33.3 | 38.5 | 32.6 | 23.8 | 30.1 | 46.9 | 34.7 | 45.4 |
| 1971 | 44.4 | 33.4 | 42.4 | 32.9 | 27.8 | 31.4 | 46.3 | 34.7 | 44.9 |
| 1972 | 43.5 | 37.2 | 42.4 | 35.2 | 25.9 | 32.4 | 44.4 | 34.2 | 43.2 |
| 1973 | 39.4 | 32.5 | 38.1 | 32.2 | 24.9 | 30.4 | 43.4 | 32.9 | 41.7 |
| 1974 | 37.8 | 29.8 | 36.3 | 31.3 | 24.3 | 29.2 | 43.5 | 32.0 | 42.1 |
| 1975 | 38.1 | 31.4 | 36.9 | 32.7 | 25.9 | 30.7 | 44.5 | 33.9 | 43.1 |
| 1976 | 34.7 | 27.3 | 33.4 | 32.2 | 27.2 | 30.7 | 41.02 | 32.5 | 40.0 |
| 1977 | 35.0 | 28.1 | 33.8 | 30.7 | 27.5 | 29.8 | 41.5 | 32.3 | 40.3 |
| 1978 | 36.7 | 29.7 | 35.5 | 29.8 | 26.4 | 28.8 | 41.6 | 32.0 | 40.4 |
| 1979 | 36.0 | 32.8 | 35.5 | 29.7 | 27.2 | 28.9 | 40.7 | 32.1 | 39.6 |
| 1980 | 39.7 | 34.0 | 30.7 | 29.4 | 24.4 | 27.9 | 40.3 | 33.0 | 39.4 |
| 1981 | 38.3 | 31.2 | 37.1 | 29.7 | 23.9 | 28.0 | 40.8 | 31.5 | 39.6 |

UA - Un-avoidable

Crude birth rate: Total live birth registered during the cal. year X10
Total estimated population at mid year

Source : Premi, M.K., Demographic situation in India, 1982, East West Centre University of Hawaii P-36.
Various Sample Registration Bulletins.

CRUDE BIRTH RATES - FOR SELECTED STATES (1961-1981)

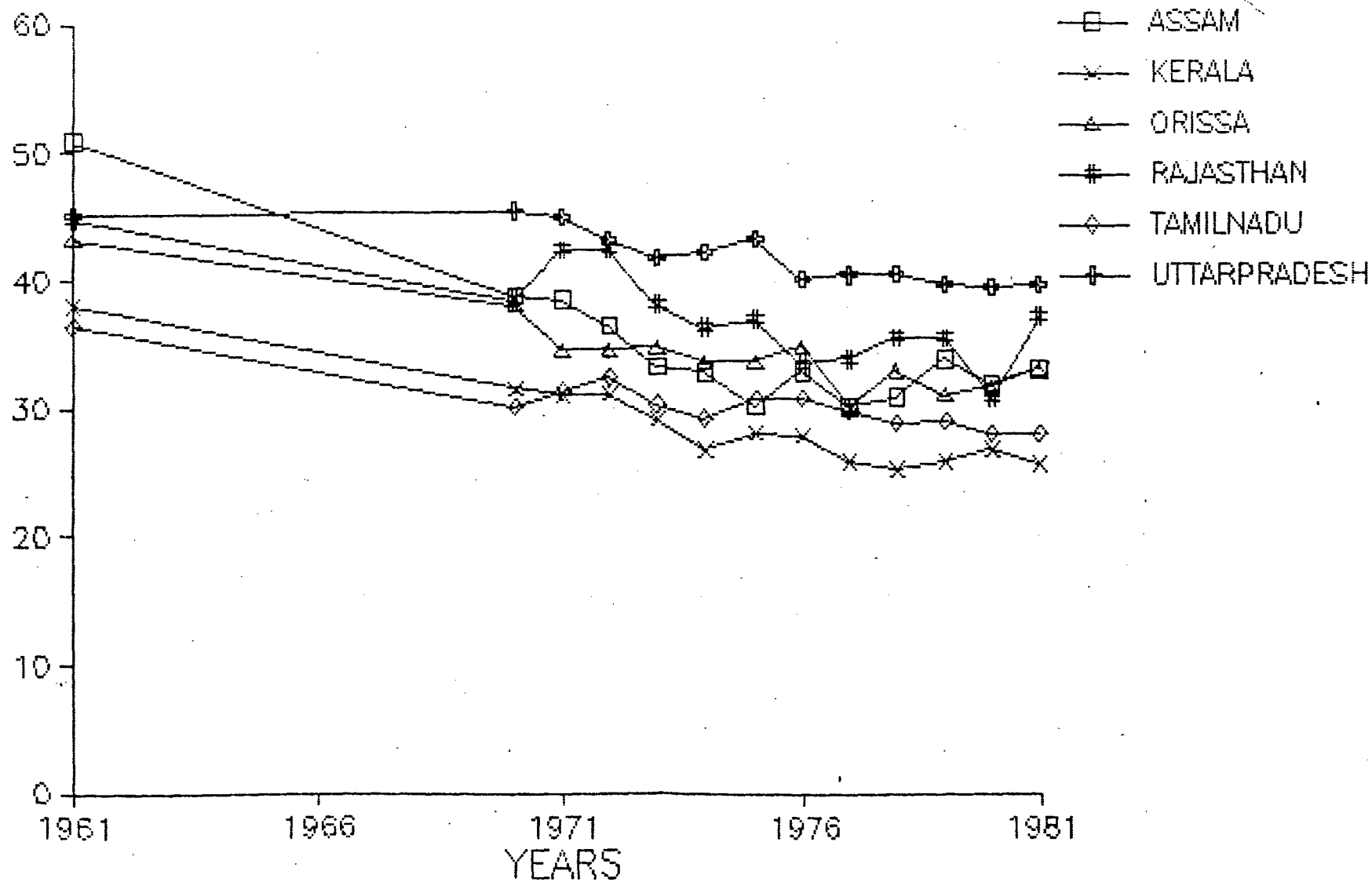


FIG-4.2

The birth rate in Kerala is fluctuating but there is tendency for declining though not very appreciably. In 1961, it was 38.0 and declined to 31.6 in 1971 and further dropped to 25.6. The rural and urban birth rates do not give a very disproportionate picture. The reasons for the decline are universal primary education (Nair, 1974) and higher medium age at marriage (Census of India, 1961).

Orissa's birth rate in 1961-36 was 43.2 which is close to the birth rates of Uttar Pradesh and Rajasthan. In the next ten years with fluctuations it reached 34.6 in 1971. In 1981, though the birth rate of Orissa was below the national average but the decline from 1971 to 1981 was only by 1.5 points.

Rajasthan's birth rate has been high throughout the period. In 1961, it was 44.7 and after twenty years in 1981 it was 37.1 (decline by only 7.6 points). The reasons for high birth rate in Rajasthan are low literacy levels and early marriage ages for both males and females.

The birth rate was 36.4 in 1961 in Tamil Nadu and it declined to 28.0 in 1981. Tamil Nadu's birth rate has progressively come down in two decades. The reasons are higher mean age at marriage and highest number of couples protected by family planning programme. Nearly 27.6 percent of the couples are protected by all methods of family planning. (Year Book, 1984)

Uttar Pradesh's birth rate is highest in the country. The State's birth rate has always been above the national average. In two decades, 1961 to 1981, the birth rate has come down from 45.1 to 39.6 which means it declined by only 5.5 points. One of the reasons for the persistence of high birth rates are the differences in the urban and rural birth rates. According to 1981 reports the urban

TABLE 4.3 AGE SPECIFIC FERTILITY RATES FOR INDIA AND SELECTED STATES 1971, 1976 AND 1981

| | <u>AGE GROUP</u> | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 |
|---------------|------------------|-------|-------|-------|-------|-------|-------|-------|
| <u>STATE</u> | <u>YEAR</u> | | | | | | | |
| ASSAM | 1971 | 126.5 | 273.6 | 292.1 | 235.5 | 146.0 | 49.8 | 14.2 |
| | 1976 | 90.1 | 209.7 | 261.8 | 179.1 | 105.3 | 41.5 | 6.8 |
| | 1981 | 81.6 | 198.9 | 225.8 | 164.9 | 96.3 | 36.0 | 8.1 |
| KERALA | 1971 | 51.8 | 213.1 | 224.5 | 171.8 | 113.6 | 40.6 | 6.7 |
| | 1976 | 45.2 | 192.4 | 196.6 | 132.1 | 76.7 | 23.9 | 5.8 |
| | 1981 | 42.9 | 183.4 | 168.4 | 99.5 | 48.7 | 18.7 | 4.0 |
| ORISSA | 1971 | 118.4 | 222.7 | 242.4 | 171.4 | 107.2 | 46.6 | 39.2 |
| | 1976 | 106.0 | 256.4 | 245.7 | 182.1 | 99.0 | 35.5 | 12.8 |
| | 1981 | 71.5 | 259.9 | 234.8 | 161.5 | 82.0 | 33.3 | 11.0 |
| RAJASTHAN | 1972 | 128.5 | 313.0 | 286.4 | 245.0 | 166.9 | 79.6 | 38.8 |
| | 1976 | 88.3 | 241.3 | 242.9 | 191.4 | 136.8 | 60.7 | 16.4 |
| | 1981 | 88.6 | 271.5 | 253.2 | 197.6 | 143.2 | 68.5 | 27.7 |
| TAMIL NADU | 1971 | 70.7 | 217.5 | 222.4 | 160.0 | 87.9 | 25.0 | 6.7 |
| | 1976 | 73.1 | 224.6 | 215.3 | 135.7 | 77.6 | 25.2 | 5.9 |
| | 1981 | 71.0 | 207.7 | 193.8 | 124.6 | 55.1 | 19.5 | 5.3 |
| UTTAR PRADESH | 1971 | 116.2 | 293.0 | 306.3 | 261.2 | 204.1 | 106.4 | 46.1 |
| | 1976 | 105.1 | 274.5 | 264.3 | 239.5 | 173.0 | 102.4 | 24.9 |
| | 1981 | 91.5 | 277.6 | 281.9 | 230.7 | 159.7 | 74.4 | 40.5 |
| INDIA | 1971 | 100.8 | 250.8 | 254.8 | 202.2 | 137.8 | 62.2 | 24.4 |
| | 1976 | 83.0 | 249.5 | 238.8 | 179.7 | 116.1 | 53.3 | 15.7 |
| | 1981 | 90.4 | 246.9 | 232.1 | 167.7 | 102.5 | 44.0 | 19.6 |

SOURCE : Various sample registration bulletins.

birth rate was 31.5 and the corresponding figure for rural area was 40.8 which leaves a difference of 9.3 points.

The age pattern of fertility is indicated by the age specific fertility rates. Age-specific fertility is ratio of births in a year to females of a given age group and the number of females of the same age group in the mid year. Table 4.3 gives the age-specific fertility rates for selected states and India. The table shows that the fertility in the age groups 20-24 years and 25-29 years. Kerala and Tamil Nadu have the lowest age specific fertility rates in most of the age groups and they even have lower than the national average. The reasons for this could be higher age at marriage in both the States. Uttar Pradesh and Rajasthan have high age-specific fertility rate even in the age group 45-49 years whereas other States have lower fertility rates.

The reasons for high age-specific fertility in the age groups 20-24 and 25-29 is as pointed out by Srinivas and Ramaswamy, "marriage is an arrangement between families not individuals, and the purpose of marriage at least in the early years is not companionship but procreation." (Srinivas and Ramaswamy, 1977).

DEATH RATES, INFANT MORTALITY RATES AND EXPECTATION OF LIFE AT BIRTH

Death rate is an index of the well being of a nation. In the developed countries because of higher living standards, better medical facilities, accessible to majority of the population have a lower death rate whereas the nations which are developing still have higher death rates. India, being a developing nation, has a death rate of 14.8 in 1981. The figure of 14.8 in India could be achieved after many years of independence. As pointed out

by Kingsley Davis, "Throughout its history the lulls and spurts in India's population growth have been governed not by fluctuations in the birth rate but wide variations in death rate. In those years when the population remained fixed or even declined the reason lay in great catastrophe - a famine, an epidemic, a war or combination of these - which took millions of lives. In the so-called normal years when numbers increased, the reason lay in the relative absence of such catastrophe." (Davis K. 1951).

Death has been defined by United Nations as, "Death is a permanent disappearance of all the evidence of life at any time after live birth has taken place (post-natal cessation of vital functions without capability of resuscitation). (United Nations 1973).

One of the measures of mortality is crude death rate which is calculated as - "The number of deaths which occurred in a population in one calendar year by the size of the population at the middle of that year. The mid year population is taken as an estimate of the average population during the whole calendar year." (Barclay, 1958).

The data available on death rates in India are deficient. In spite of the importance of death rates to formulate plans for the well being of the people there is gross under reporting (Gopaldaswamy 1954) as the level of literacy is low in the rural areas. For reliable and accurate statistics on deaths, model registration scheme was started in 1965 in few States and in 1966 it extended to other States and in 1968 the work started in all the States except Nagaland. Its objective is to investigate and analyse the incidence of the fatal diseases in the country through the use of non-medical personnel and prepare the ground material for specific investigations into the matter by the public health and medical experts. (ORGCC 1969).

Table 4.4 presents the crude death rates for India and selected States. Prior to 1966, there was no reliable method to give the vital rates but with the introduction of sample registration system, the vital rates obtained were somewhat more accurate than those obtained from the civil registration system. Death rate in Assam (20.0) during 1961-71 was above the national average. In 1981, the death rate was 12.6 which mean a decline of 7.4 points. Kerala has had a below national figure from 1961 onwards and it is half of the national figure in 1981 which points to a very remarkable decline in death rate. In Orissa, the decline in death rate has been slow. In twenty years - from 1961 to 1981 - the death rate declined by 6.7 points only. Tamil Nadu is yet another State after Kerala, where the death rate has been lower than the national average from 1961 onwards. Rajasthan and Uttar Pradesh are two States with a death rate above the national average from 1961. The reason could be lack of trained medical personnel in rural areas where people live in abject poverty, illiteracy and ignorance.

INFANT MORTALITY RATE

Infant mortality rate is a most sensitive index of health and level of living of people. Infant means a child who has not completed one year. Infant mortality rate is defined as "the number of infant deaths per 1000 live births in one year."

Table 4.5 shows the trend of infant mortality in India and States selected. Only Kerala has achieved lowest infant mortality rate of 37 per 1000 in 1981 and right from 1961 onwards not only was it below the national figure but also was half of what national figure had. Followed by Kerala is Tamil Nadu where the figure in 1981 was 91 per 1000. Tamil Nadu has always been just below the national figure by a few points (Between 10-15 points). The rest of the States have infant mortality

TABLE : 4.4

CRUDE DEATH RATES PER 1000 FOR INDIA AND STATES SELECTED: 1961-81

| Source/Period | India | | | Assam | | | Kerala | | | Orissa | | |
|-------------------------------|-------|------|------|-------|------|------|--------|-----|------|--------|------|------|
| | R | U | C | R | U | C | R | U | C | R | U | C |
| Death Rate, 1961-71 | | | 18.5 | | | 20.0 | | | 17.0 | | | 19.8 |
| Quasi State Method 1961-71 | | | 17.2 | | | 18.5 | | | 16.6 | | | 19.3 |
| S R S 1966-67 | | | 16.8 | | | 15.7 | | | 10.2 | | | 15.8 |
| 1967-68 | | | 16.8 | | | 18.9 | | | 9.9 | | | |
| 1968 | | | 16.8 | | | 20.0 | | | 10.0 | | | 15.3 |
| 1970 | 17.3 | 10.2 | 15.7 | 16.8 | 10.2 | 16.2 | | | | 16.8 | 11.4 | 16.4 |
| 1971 | 16.4 | 9.7 | 14.9 | 18.7 | 9.5 | 17.8 | 9.1 | 8.4 | 9.0 | 15.9 | 10.0 | 15.5 |
| 1972 | 18.9 | 10.3 | 16.9 | 18.6 | 10.0 | 17.9 | 9.4 | 7.8 | 9.2 | 20.6 | 12.1 | 20.0 |
| 1973 | 17.0 | 9.6 | 15.5 | 17.0 | 9.8 | 16.4 | 8.7 | 7.2 | 8.5 | 18.8 | 10.6 | 18.2 |
| 1974 | 15.9 | 9.2 | 14.5 | 17.5 | 9.5 | 16.8 | 8.0 | 7.0 | 7.8 | 16.3 | 9.9 | 15.8 |
| 1975 | 17.3 | 10.2 | 15.9 | 17.6 | 9.6 | 16.9 | 8.5 | 7.8 | 8.4 | 18.1 | 12.7 | 17.7 |
| 1976 | 16.3 | 9.5 | 15.0 | 15.4 | 9.7 | 14.9 | 8.2 | 7.6 | 8.1 | 16.3 | 9.9 | 15.8 |
| 1977 | 16.0 | 9.4 | 14.7 | 13.4 | 7.6 | 12.9 | 7.4 | 6.8 | 7.3 | 17.2 | 9.6 | 16.6 |
| 1978 | 15.3 | 9.4 | 14.2 | 13.7 | 8.0 | 13.2 | 7.1 | 6.7 | 7.0 | 14.5 | 9.8 | 14.1 |

| | | | | | | | | | | | | |
|------|------|-----|------|------|-----|------|-----|-----|-----|------|------|------|
| 1979 | 13.9 | 8.4 | 12.8 | 11.6 | 6.6 | 11.2 | 6.9 | 6.6 | 6.9 | 15.2 | 10.1 | 14.8 |
| 1980 | 13.5 | 8.0 | 12.4 | 11.0 | 6.9 | 10.7 | 7.1 | 6.5 | 7.0 | 14.9 | 7.8 | 13.3 |
| 1981 | 13.7 | 7.8 | 12.5 | 13.0 | 8.0 | 12.6 | 6.7 | 5.8 | 6.6 | 13.5 | 7.9 | 13.1 |

| | Rajasthan | | | Tamil Nadu | | | Uttar Pradesh | | |
|-------------------------------|-----------|------|------|------------|------|------|---------------|------|------|
| | R | U | C | R | U | C | R | U | C |
| Death Rate, 1961-71 | | | 16.7 | | | 16.7 | | | 22.1 |
| Quasi State Method 1961-71 | | | 16.8 | | | 16.0 | | | 21.0 |
| SRS 1966-67 | | | 19.1 | | | 16.0 | | | 23.6 |
| 1967-68 | | | 17.6 | | | | | | 24.2 |
| 1968 | | | 18.4 | | | | | | 23.5 |
| 1970 | | | | 18.1 | 9.4 | 15.6 | 22.7 | 13.7 | 21.6 |
| 1971 | | | | 16.5 | 9.3 | 14.4 | 21.1 | 13.1 | 20.1 |
| 1972 | 18.3 | 10.1 | 16.8 | 17.8 | 8.9 | 15.1 | 27.1 | 14.8 | 25.6 |
| 1973 | 17.6 | 9.3 | 16.1 | 16.5 | 8.4 | 14.1 | 20.4 | 12.6 | 19.4 |
| 1974 | 15.8 | 7.7 | 14.3 | 16.1 | 8.7 | 13.9 | 20.8 | 12.0 | 19.7 |
| 1975 | 17.4 | 9.3 | 15.9 | 17.5 | 9.0 | 15.0 | 23.7 | 14.8 | 22.6 |
| 1976 | 16.2 | 7.9 | 14.7 | 16.7 | 9.8 | 14.6 | 21.7 | 12.9 | 20.5 |
| 1977 | 16.0 | 9.2 | 14.8 | 15.2 | 10.1 | 13.7 | 20.1 | 11.9 | 19.1 |
| 1978 | 16.7 | 10.3 | 15.6 | 14.4 | 9.1 | 12.8 | 21.2 | 13.4 | 20.2 |

| | | | | | | | | | |
|------|------|-----|------|------|-----|------|------|------|------|
| 1979 | 13.6 | 8.7 | 12.8 | 13.4 | 8.8 | 12.1 | 17.1 | 10.1 | 16.2 |
| 1980 | 14.4 | 8.7 | 13.4 | 12.4 | 8.3 | 11.2 | 17.6 | 10.3 | 16.6 |
| 1981 | 15.8 | 7.6 | 14.3 | 13.5 | 7.9 | 11.8 | 17.3 | 9.9 | 16.3 |

Source: Census of India 1971 Series 1 INDIA Paper 1 of LIFE TABLES, New Delhi, Office of the Registrar Secured and Census Commissioner P-38 Various Samples Registration Bulletions.

CRUDE DEATH RATES - FOR SELECTED STATES (1961-1981)

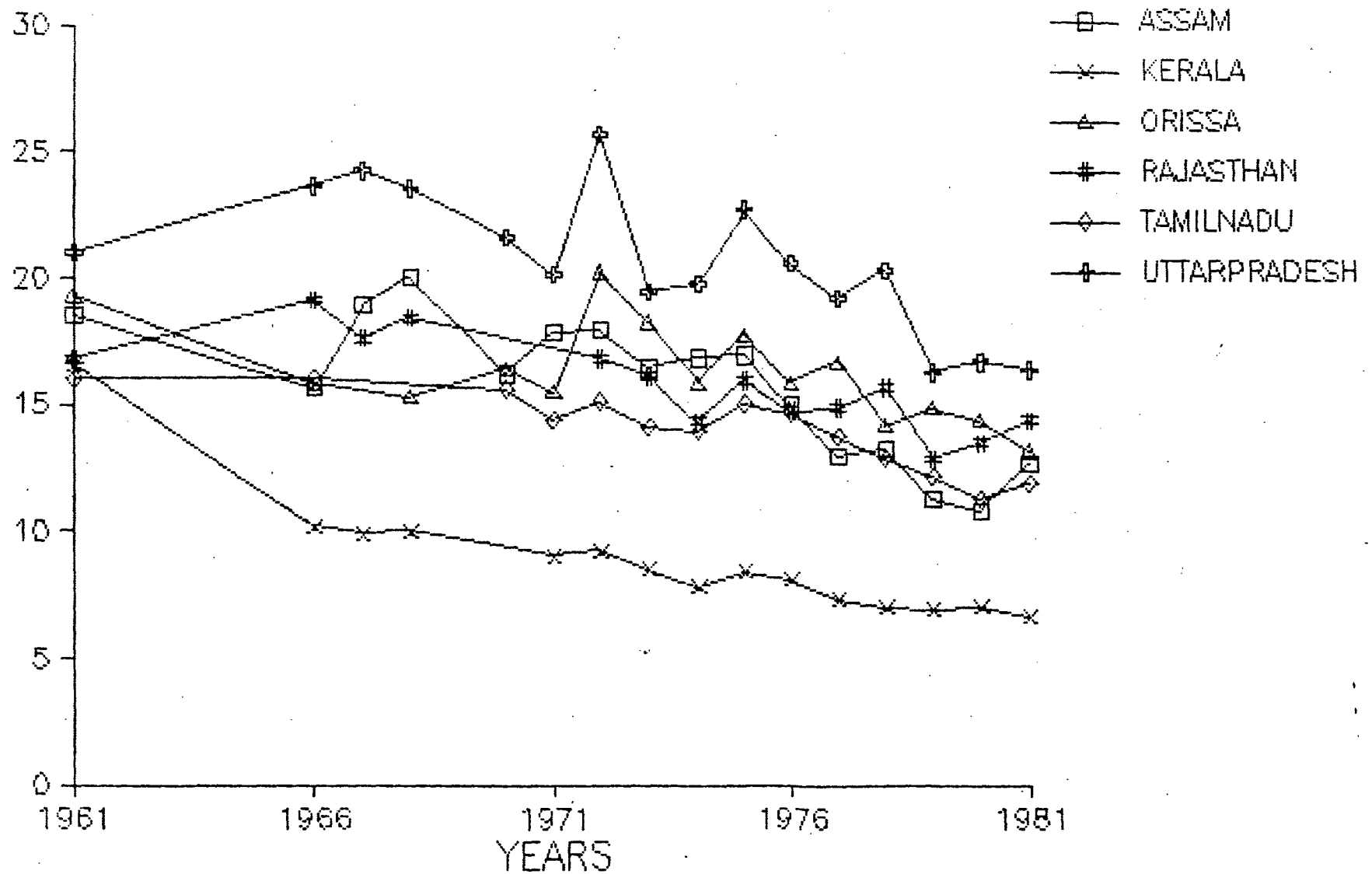


TABLE : 4.5

INFANT MORTALITY RATES FOR INDIA AND SELECTED STATES 1961 - 1981

| Source/Period | India | | | Assam | | | Kerala | | | Orissa | | |
|---------------|-------|----|-----|-------|-----|-----|--------|----|----|--------|-----|-----|
| | R | U | C | R | U | C | R | U | C | R | U | C |
| NSS 1961-62 | 118 | 82 | | 76 | 65 | | 70 | 63 | | 118 | 119 | |
| 19 1963-64 | 127 | 89 | | 85 | 43 | | 70 | 50 | | 102 | 99 | |
| 1964-65 | 114 | 79 | | 81 | 58 | | 55 | 46 | | 120 | 111 | |
| SRS 1961-71 | | | 114 | | | 146 | | | 66 | | | - |
| 1970 | 136 | 90 | 129 | 138 | 78 | 126 | | | | 140 | 103 | 133 |
| 1971 | 138 | 82 | 129 | 144 | 73 | 129 | 60 | 48 | 58 | 131 | 84 | 127 |
| 1972 | 150 | 85 | 139 | 140 | 95 | 136 | 66 | 43 | 63 | 136 | 73 | 131 |
| 1973 | 143 | 89 | 134 | 140 | 83 | 136 | 57 | 47 | 54 | 151 | 78 | 145 |
| 1974 | 136 | 74 | 126 | 138 | 113 | 136 | 56 | 44 | 54 | 155 | 75 | 150 |
| 1975 | 151 | 84 | 140 | 147 | 96 | 144 | 57 | 36 | 54 | 153 | 98 | 149 |
| 1976 | 139 | 80 | 129 | 126 | 100 | 124 | 58 | 47 | 56 | 130 | 81 | 127 |
| 1977 | 140 | 81 | 130 | 116 | 95 | 115 | 49 | 37 | 47 | 151 | 85 | 147 |
| 1978 | 137 | 74 | 127 | 120 | 86 | 118 | 45 | 29 | 42 | 137 | 80 | 133 |
| 1979 | 130 | 72 | 120 | 106 | 60 | 104 | 45 | 30 | 43 | 154 | 86 | 149 |
| 1980 | 124 | 65 | 114 | 105 | 64 | 103 | 41 | 34 | 40 | 150 | 61 | 143 |
| 1981 | 119 | 62 | 110 | 107 | 76 | 106 | 40 | 24 | 37 | 139 | 68 | 135 |

| Source/Period | Rajasthan | | | Tamilnadu | | | Uttar Pradesh | | |
|---------------|-----------|-----|-----|-----------|----|-----|---------------|-----|-----|
| | R | U | C | R | U | C | R | U | C |
| NSS 1961-62 | 129 | 100 | | 96 | 94 | | 173 | 131 | |
| 1963-64 | 140 | 133 | | 102 | 82 | | 209 | 136 | |
| 1964-65 | 120 | 111 | | 86 | 77 | | 160 | 138 | |
| SRS 1961-71 | | | 168 | | | 110 | | | 179 |
| 1970 | | | | 134 | 90 | 125 | 165 | 110 | 154 |
| 1971 | | | | 127 | 77 | 113 | 173 | 119 | 167 |
| 1972 | 132 | 76 | 123 | 133 | 85 | 121 | 213 | 120 | 202 |
| 1973 | 145 | 92 | 137 | 122 | 67 | 108 | 182 | 132 | 176 |
| 1974 | 142 | 78 | 133 | 118 | 71 | 106 | 179 | 110 | 172 |
| 1975 | 169 | 72 | 155 | 129 | 65 | 112 | 205 | 128 | 198 |
| 1976 | 152 | 73 | 142 | 121 | 81 | 110 | 184 | 121 | 178 |
| 1977 | 150 | 92 | 142 | 114 | 79 | 103 | 174 | 119 | 160 |
| 1978 | 153 | 66 | 140 | 120 | 63 | 105 | 184 | 114 | 177 |
| 1979 | 118 | 55 | 108 | 113 | 63 | 99 | 168 | 104 | 161 |
| 1980 | 114 | 49 | 104 | 102 | 63 | 93 | 167 | 99 | 159 |
| 1981 | 118 | 52 | 108 | 103 | 55 | 91 | 167 | 97 | 150 |

Infant Mortality Rate: $\frac{\text{Deaths in the first year of life} \times 1000}{\text{Total live births in the year}}$

Source: NSS Reports
Various SRS

INFANT MORTALITY RATE - INDIA

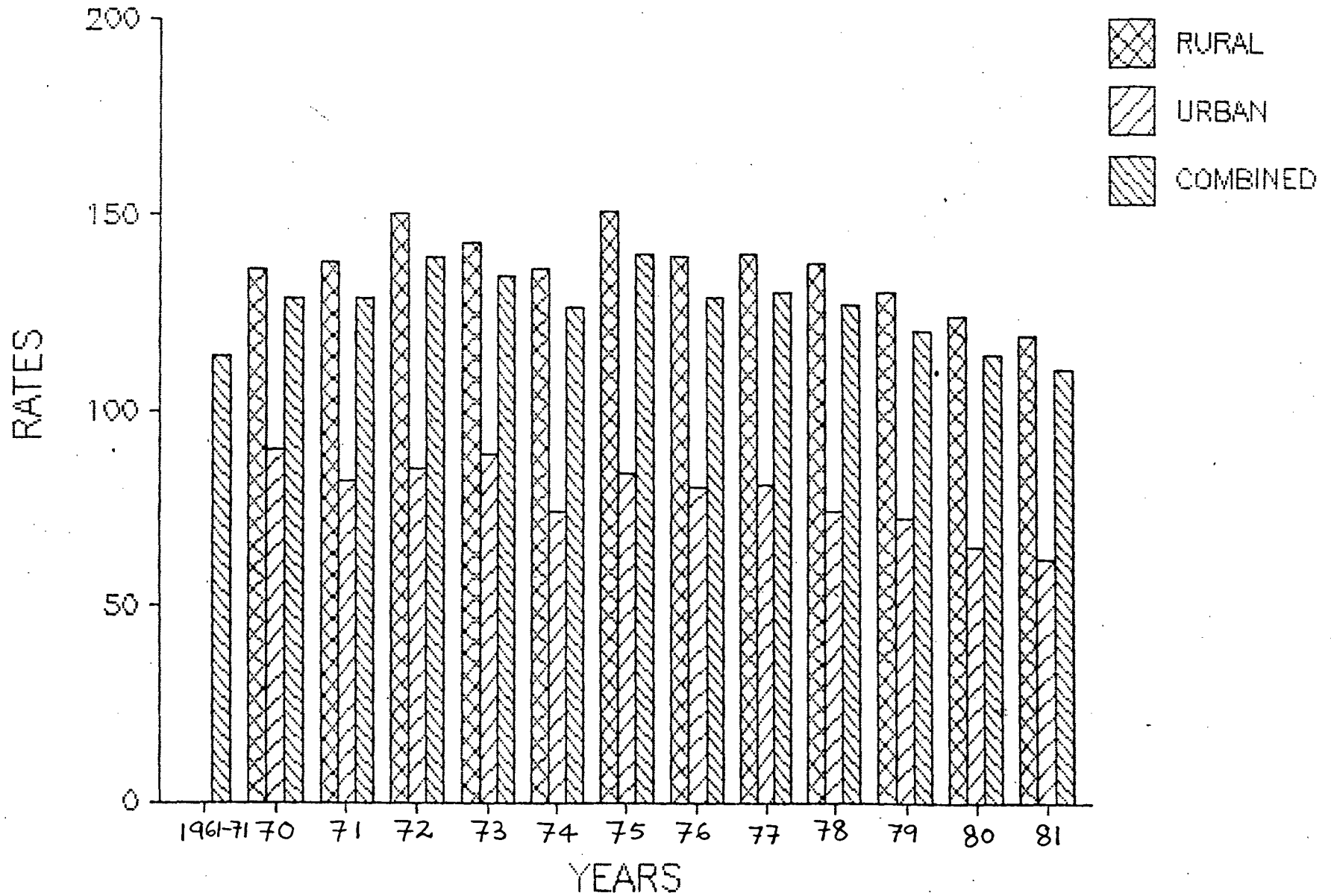


FIG-4.4

INFANT MORTALITY RATE - ASSAM

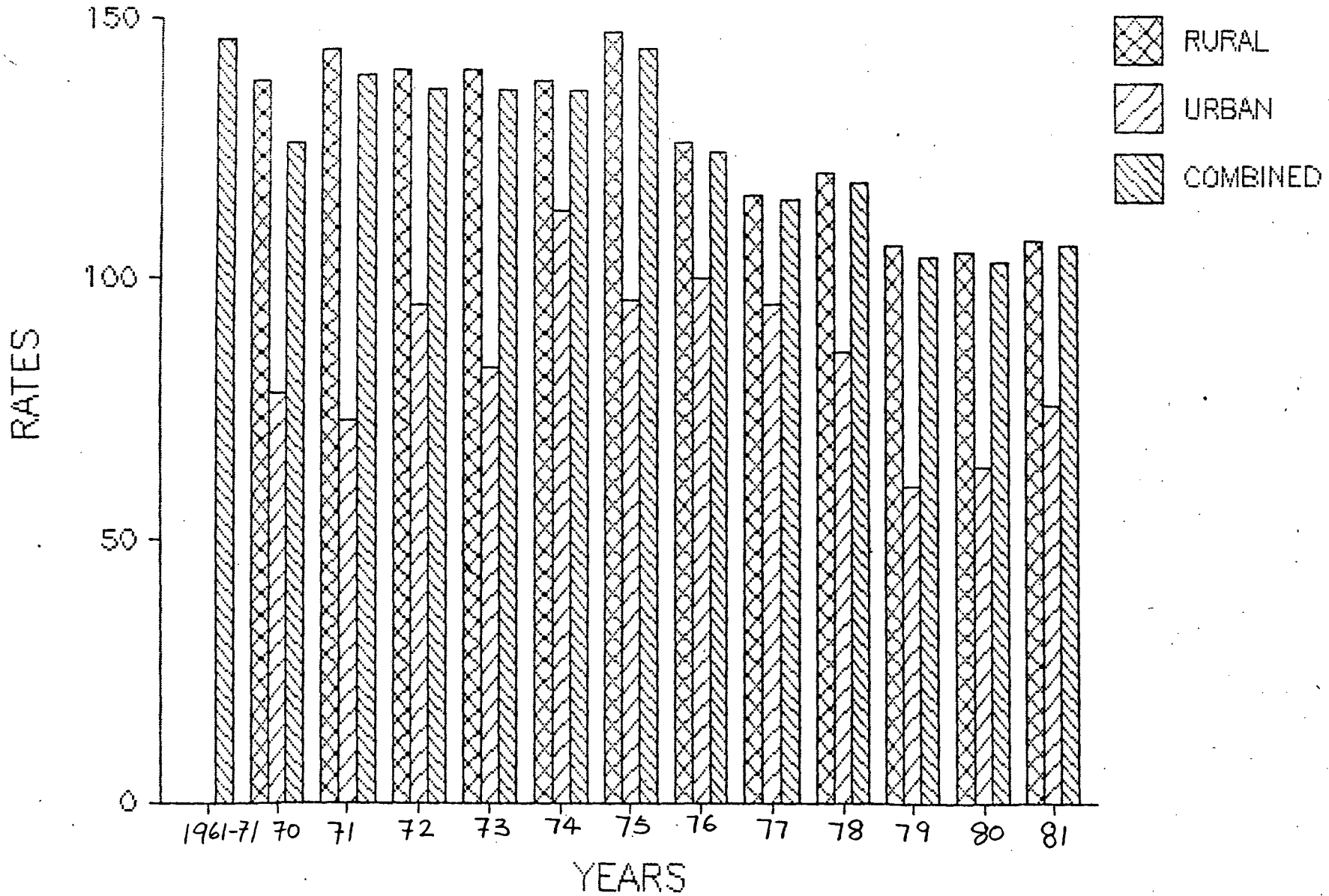


FIG - 4.5

INFANT MORTALITY RATE - KERALA

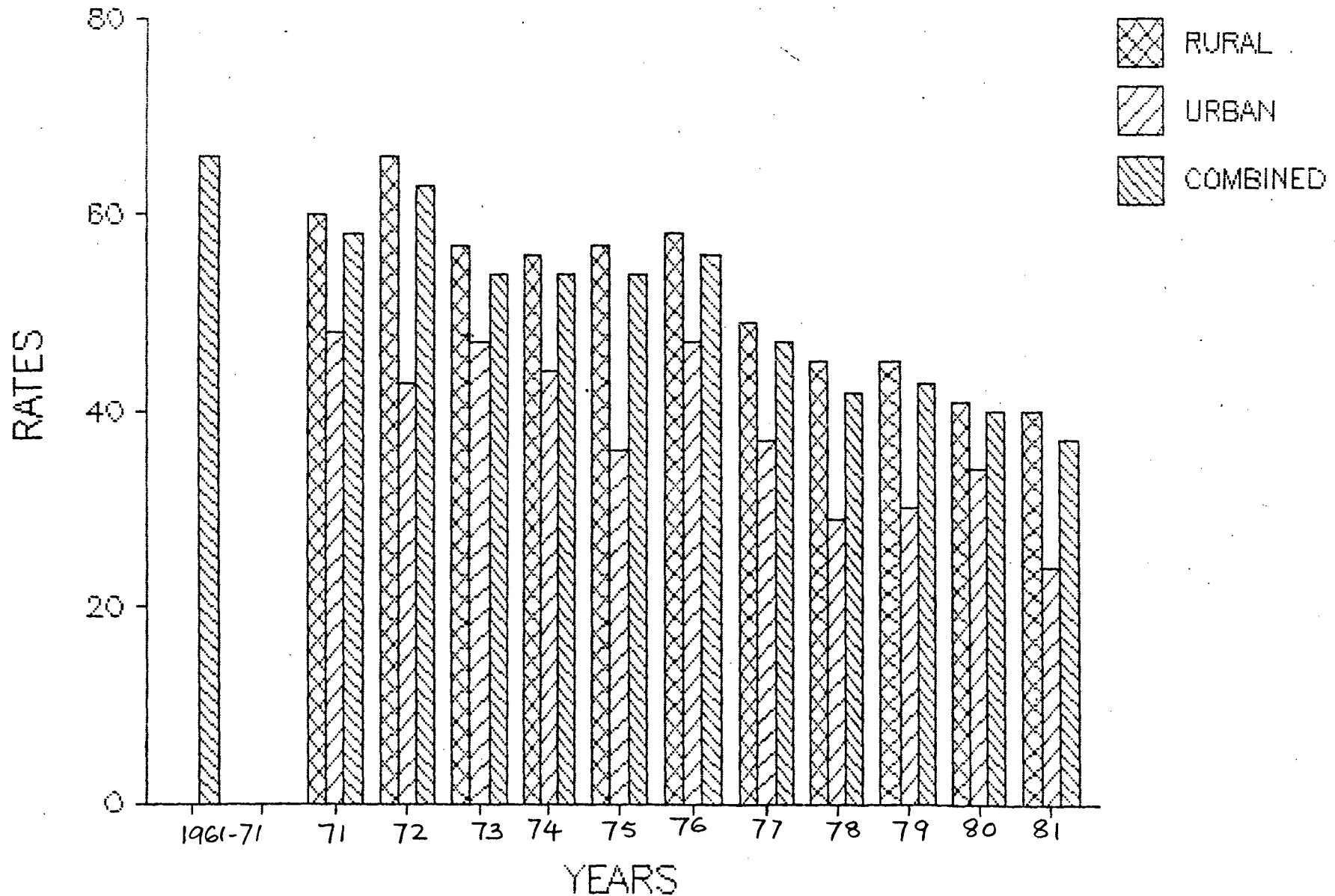


FIG- 4.6

INFANT MORTALITY RATE - ORISSA

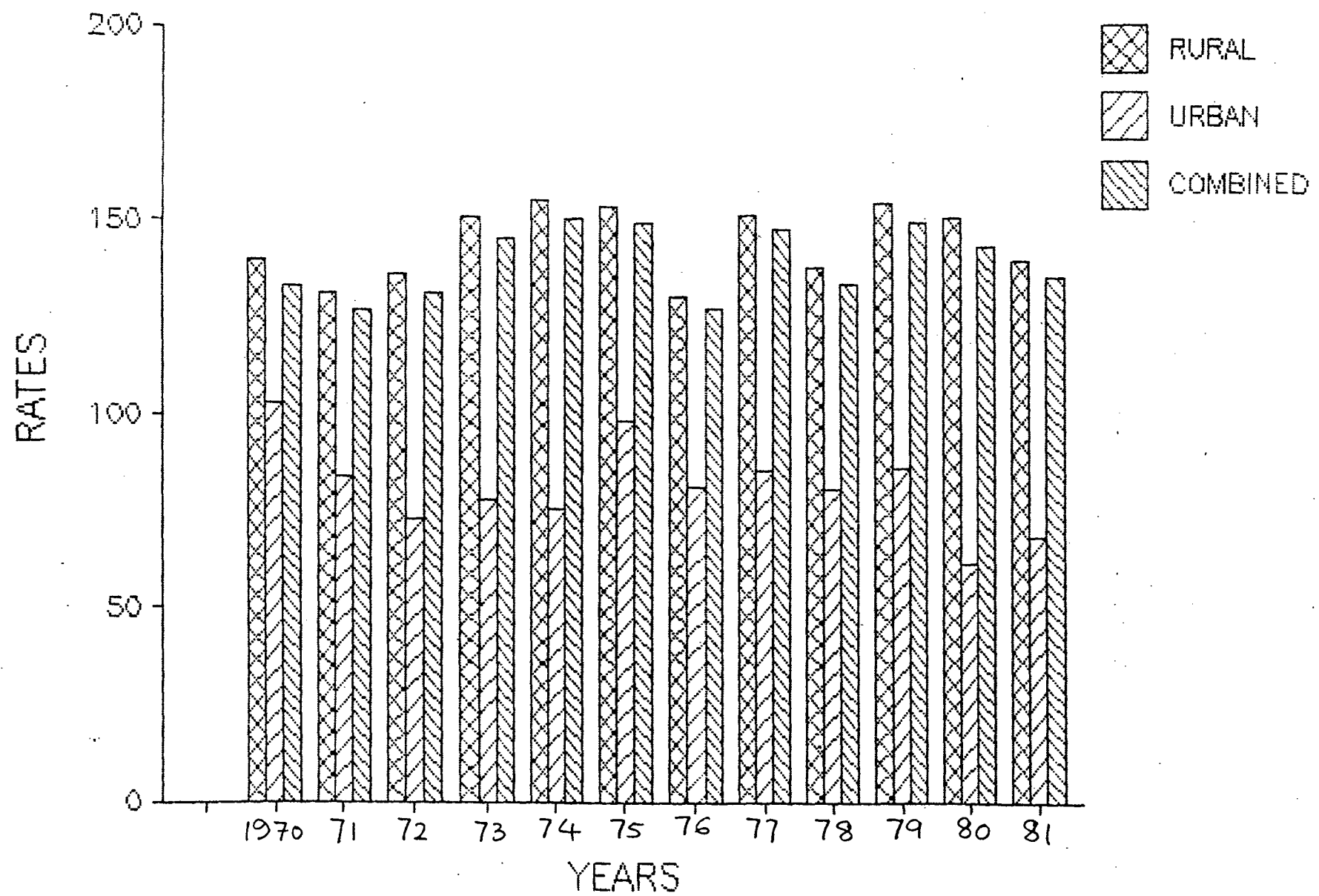


FIG- 4.7

INFANT MORTALITY RATE - RAJASTHAN

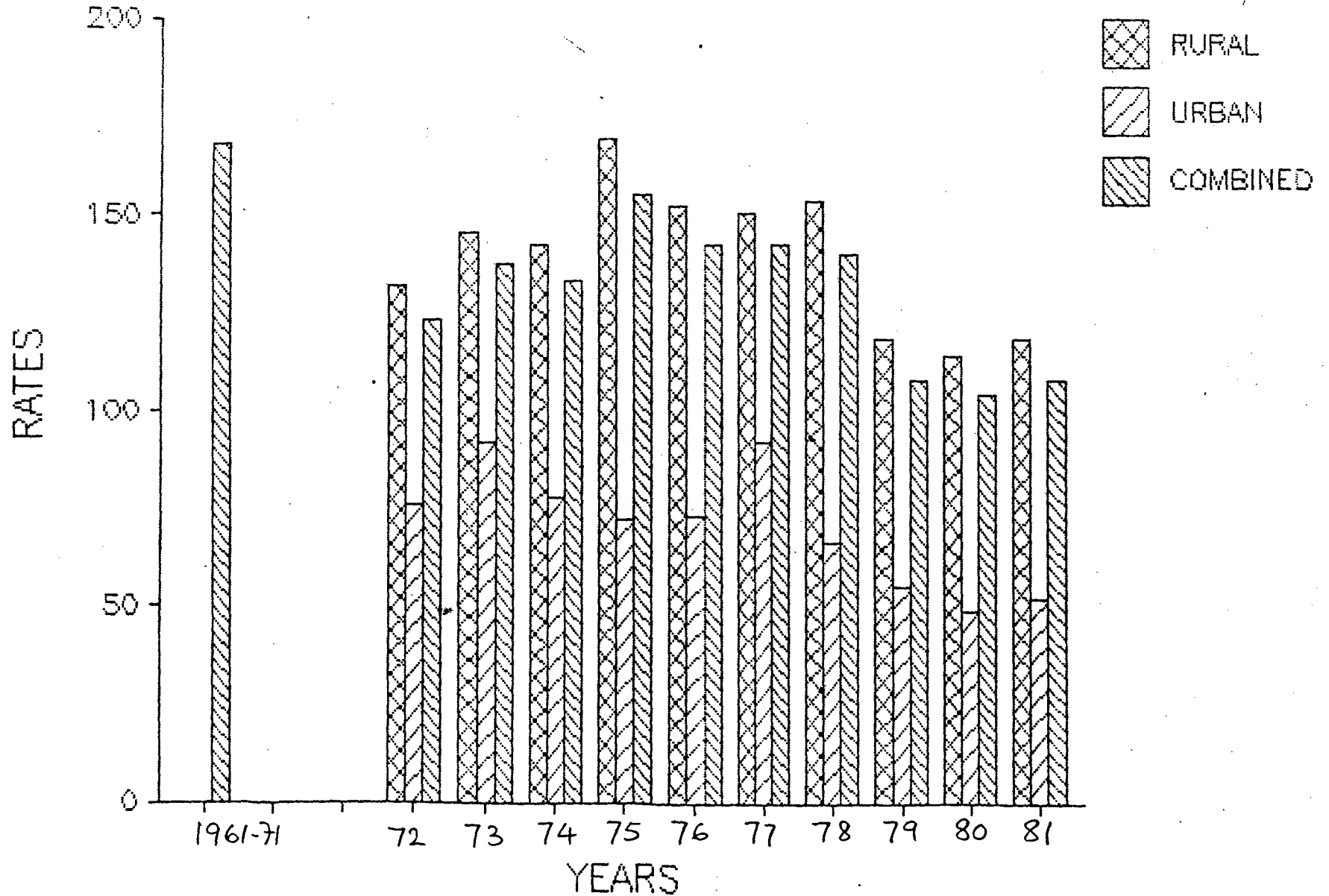


FIG-4.8

INFANT MORTALITY RATE - TAMILNADU

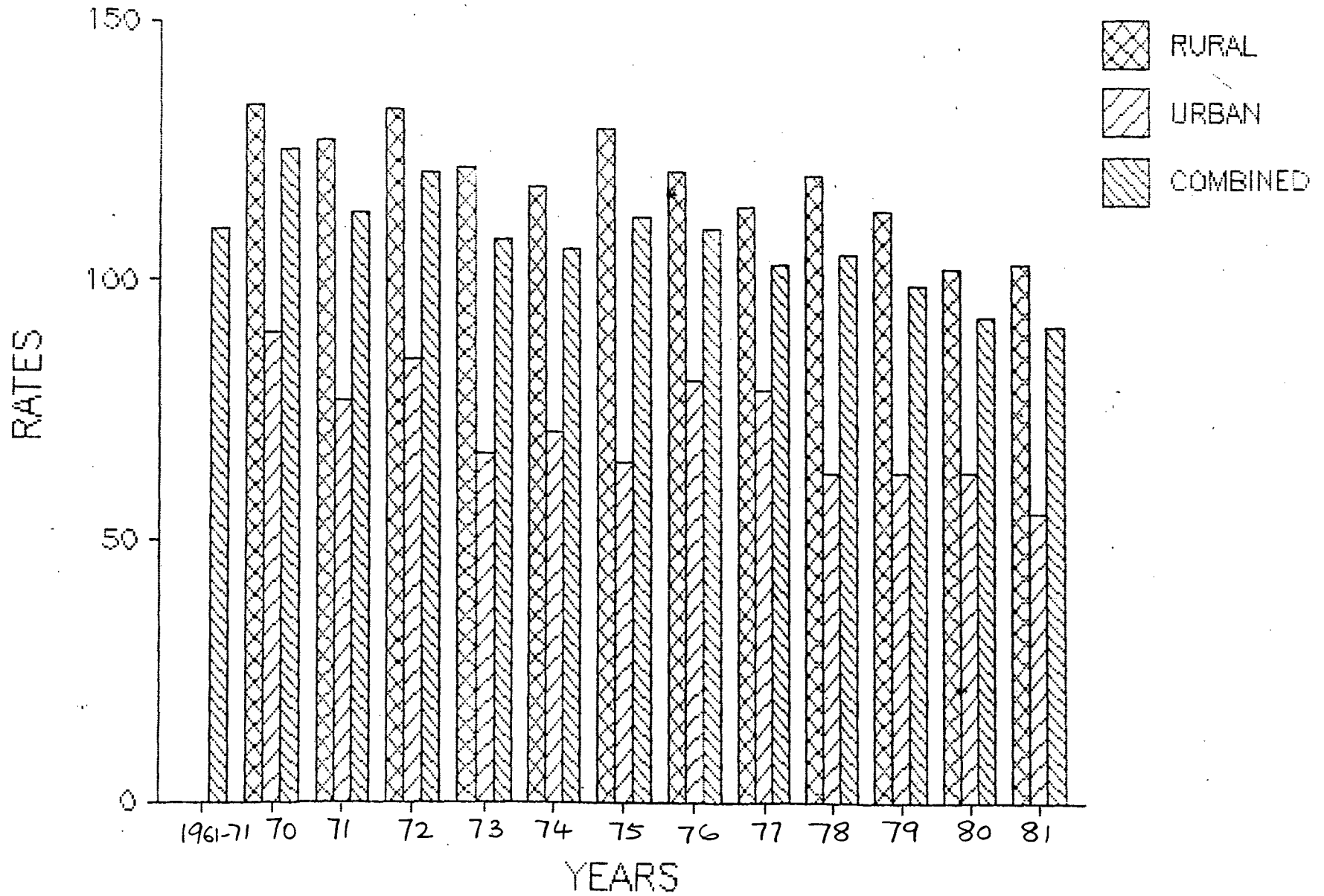
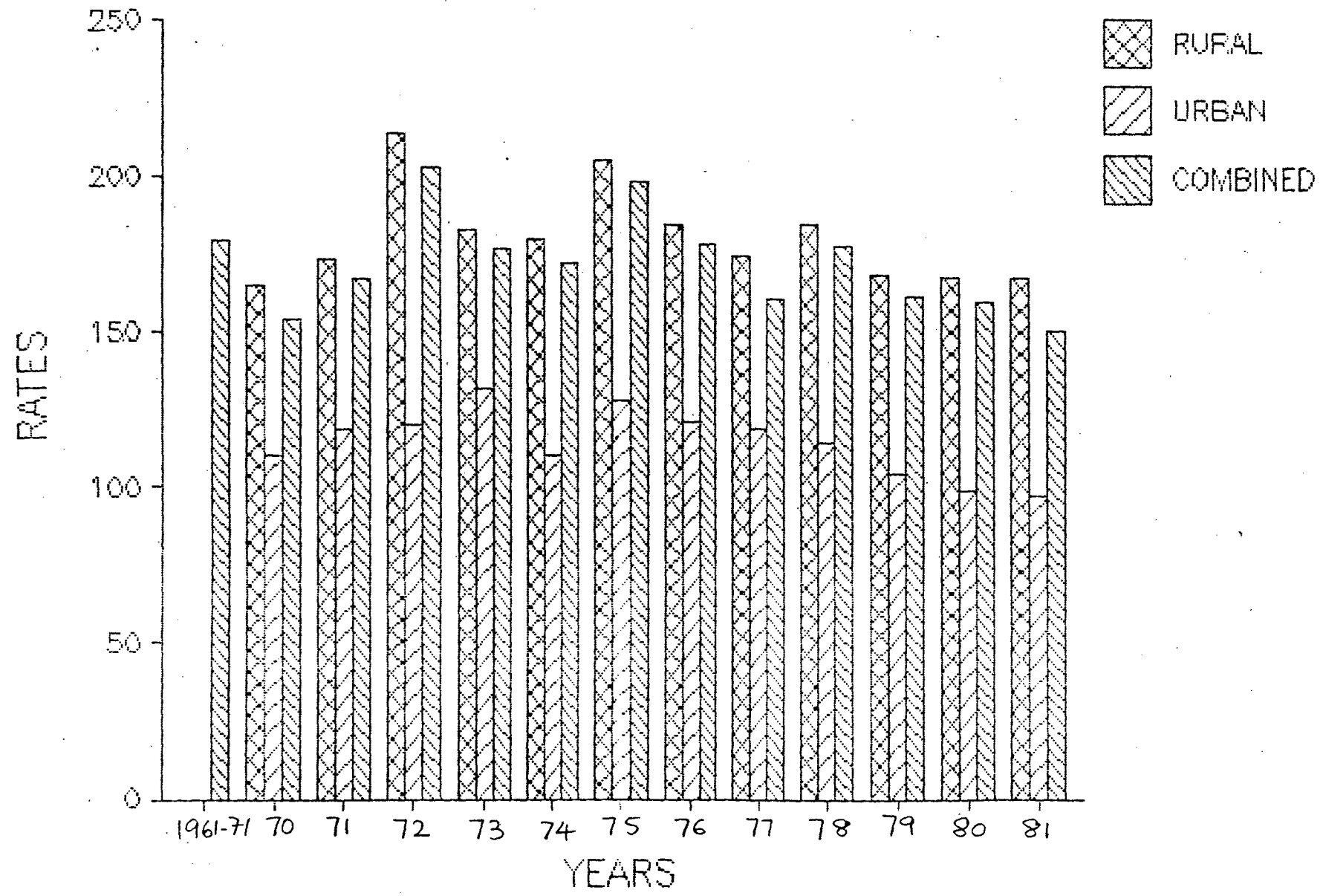


FIG-4.9

INFANT MORTALITY RATE - UTTAR PRADESH



rates over 100. Orissa and Uttar Pradesh have infant mortality rates over 125 since 1961. Rajasthan's and Assam's rates declined gradually and in 1981 they had infant mortality rate of 108 and 106 respectively. The rural infant death rates are much higher than urban infant mortality rates and the reasons are lack of adequate facilities to prevent the death of an infant in the early part of the life. In the urban areas, hospitals, trained mid-wives and other health care services are available and accessible.

EXPECTATION OF LIFE AT BIRTH

The expectation of life at a particular age is a good index of the next result of the incidence of mortality at all subsequent ages. (Natarajan D, 1971). Table 4.6 presents infant mortality rate and expectation of life at birth for India and States selected. The expectation of life at birth is related to the infant mortality. With a decline in infant mortality, the expectation of life at birth is increasing. Only Kerala could achieve a low infant mortality and high expectation of life. During 1976-80 period only Orissa and Uttar Pradesh had infant mortality over 140 and expectation of life below 50 years whereas the rest of the States have infant mortality below 125 and expectation of life over 50 years.

Table 4.7 shows the average expectation of life at birth for India and selected States. Kerala is the only state where female expectation of life is higher than males and in rest of the States the trend is alike i.e. males living longer than females. Highest expectancy of life at birth was recorded by Kerala (65.5 in 1981) and lowest by Orissa (46.2 in 1981). Due to regional disparities the life expectancy is not consistent throughout the country and there are differences in the longevity between males and females.

TABLE: 4.0

Infant mortality rates and Expectations of Life at birth for
India and selected States 1961-1980

| <u>STATE</u> | <u>1961-71</u> | | <u>1971-75</u> | | <u>1976-80</u> | |
|---------------|----------------|------|----------------|------|----------------|------|
| | IMR | Co° | IMR | Co° | IMR | Co° |
| India | 114 | 47.7 | 140 | 49.7 | 114 | 52.3 |
| Assam | 146 | 45.9 | 144 | 45.5 | 103 | 51.1 |
| Kerala | 66 | 48.8 | 54 | 62.0 | 40 | 65.5 |
| Orissa | 133 | 44.0 | 149 | 45.7 | 143 | 49.1 |
| Rajasthan | 168 | 49.0 | 155 | 48.4 | 104 | 51.9 |
| Tamilnadu | 110 | 49.0 | 112 | 49.6 | 93 | 53.4 |
| Uttar Pradesh | 179 | 42.0 | 198 | 43.0 | 159 | 46.2 |

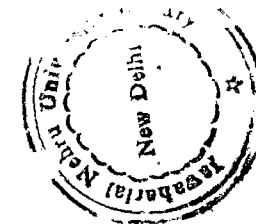
IMR: Infant Mortality Rate

Co° Expectation of life at birth

Source: Various sample Registration Bulletins

TABLE: 4.7**Average Expectation of Life at Birth for India and
Selected States 1961-1980**

| <u>State</u> | <u>Sex</u> | <u>1961-71</u> | <u>1970-75</u> | <u>1976-80</u> |
|---------------|------------|----------------|----------------|----------------|
| India | M | | 50.5 | 52.5 |
| | F | | 49.0 | 52.1 |
| | C | 47.72 | 49.7 | 52.3 |
| Assam | M | | 46.2 | 51.6 |
| | F | | 44.8 | 50.4 |
| | C | 45.96 | 45.5 | 51.1 |
| Kerala | M | | 60.8 | 63.5 |
| | F | | 63.3 | 67.6 |
| | C | 48.80 | 62.0 | 65.5 |
| Orissa | M | | 46.0 | 50.0 |
| | F | | 45.3 | 48.4 |
| | C | 44.70 | 45.7 | 49.1 |
| Rajastha n | M | | 49.2 | 51.0 |
| | F | | 47.5 | 53.0 |
| | C | 49.40 | 48.4 | 51.9 |
| Tamilnadu | M | | 49.6 | 53.5 |
| | F | | 49.5 | 53.4 |
| | C | 49.57 | 49.6 | 53.4 |
| Uttar Pradesh | M | | 45.4 | 48.5 |
| | F | | 40.5 | 43.8 |
| | C | 42.97 | 43.0 | 46.2 |



Source: Census of India 1971, Paper 1 of 1977, LIFE TABLES, Office of Registrar (General) Sample Registration Bulletins.

EXPECTATION OF LIFE AT BIRTH - INDIA

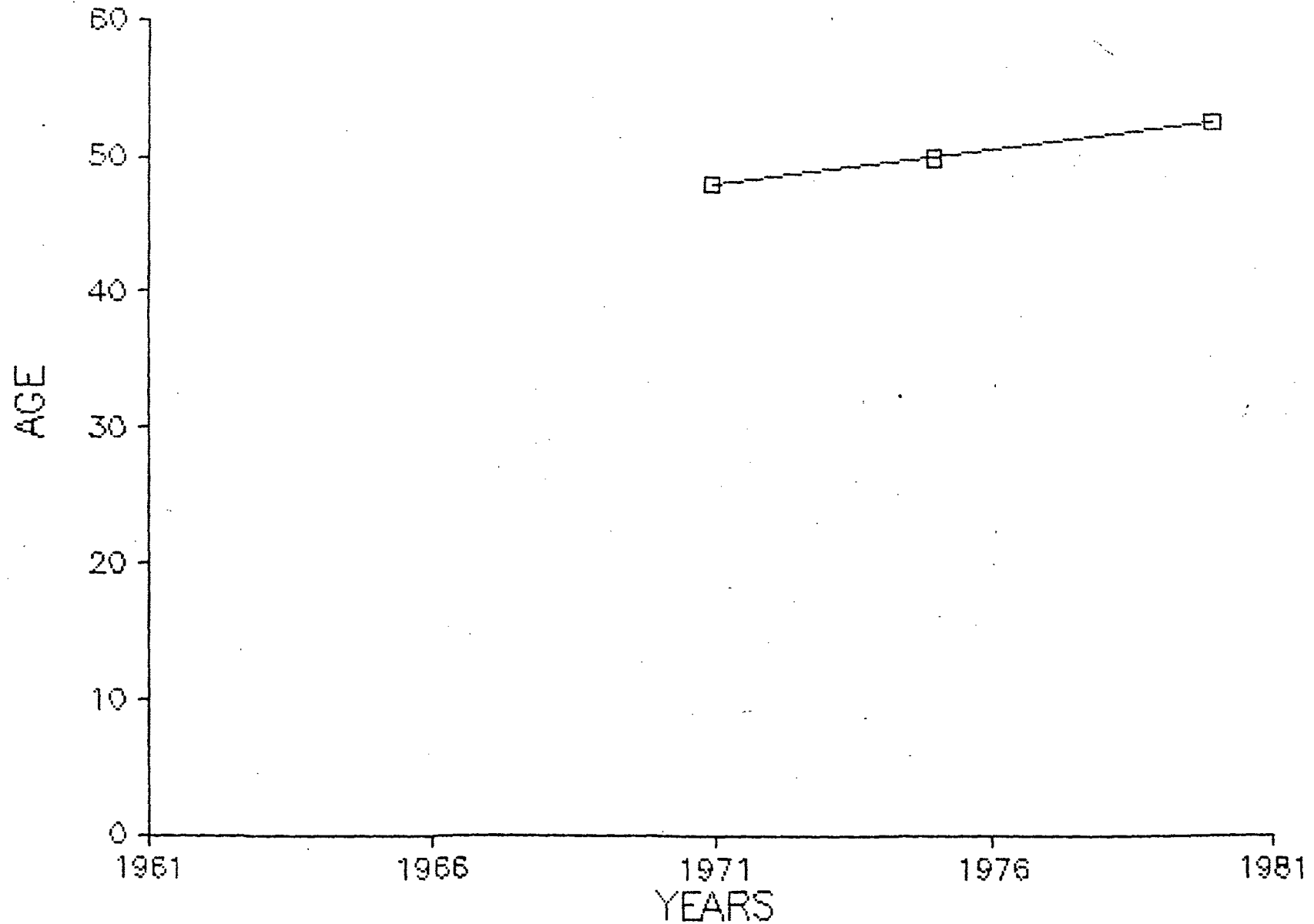
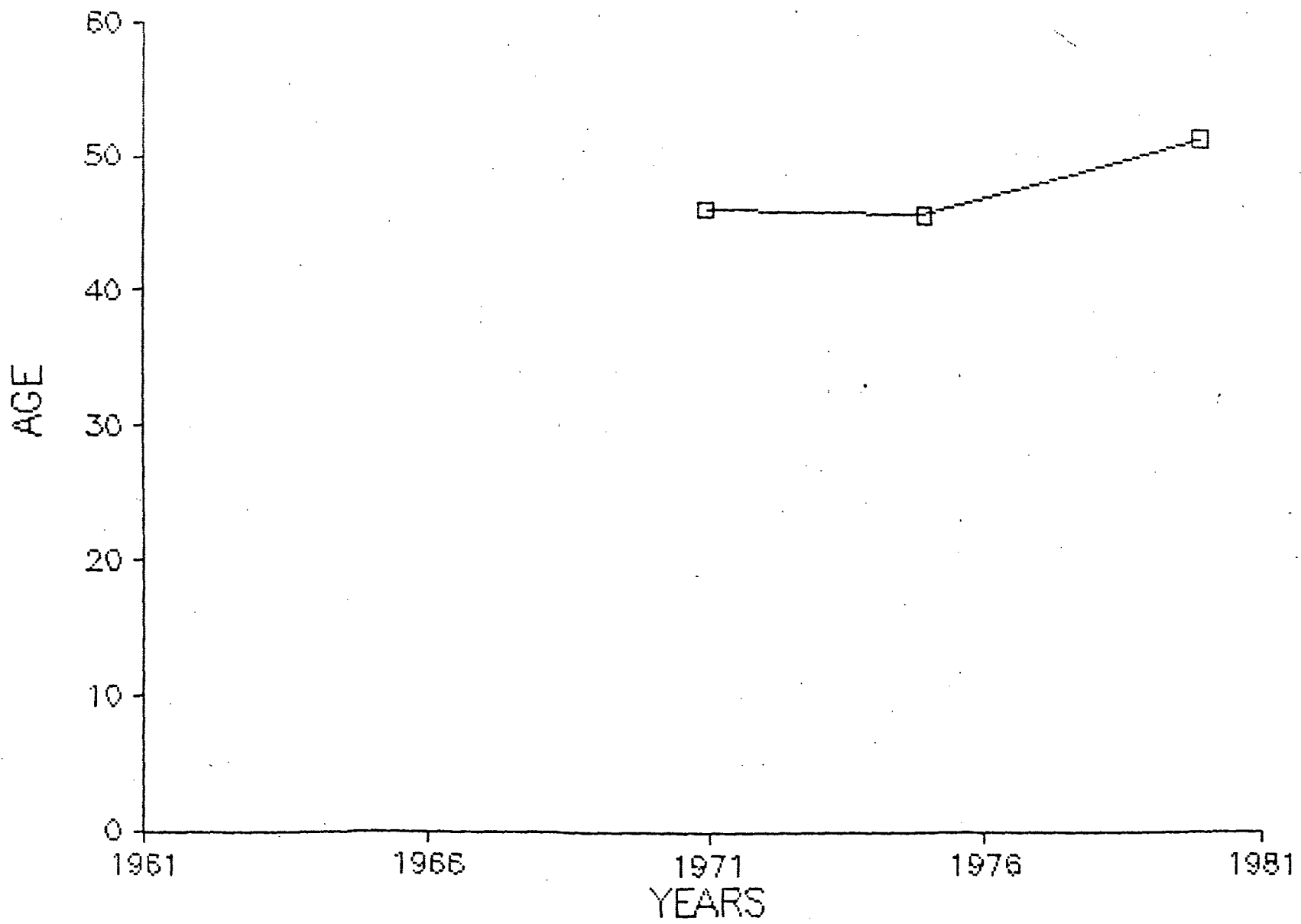


FIG - 4.11

EXPECTATION OF LIFE AT BIRTH - ASSAM



EXPECTATION OF LIFE AT BIRTH - KERALA

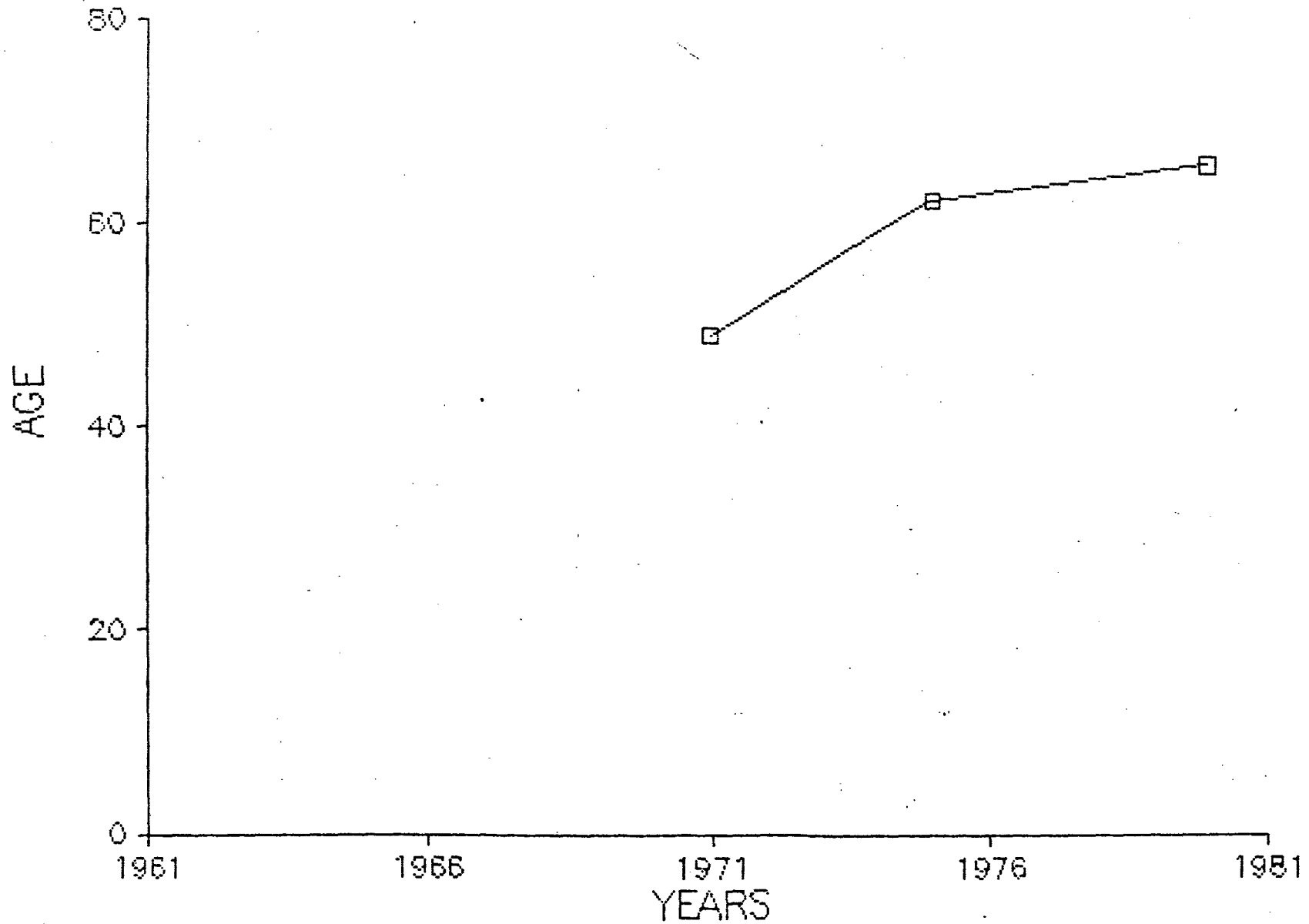


FIG = 4.13

EXPECTATION OF LIFE AT BIRTH - ORISSA

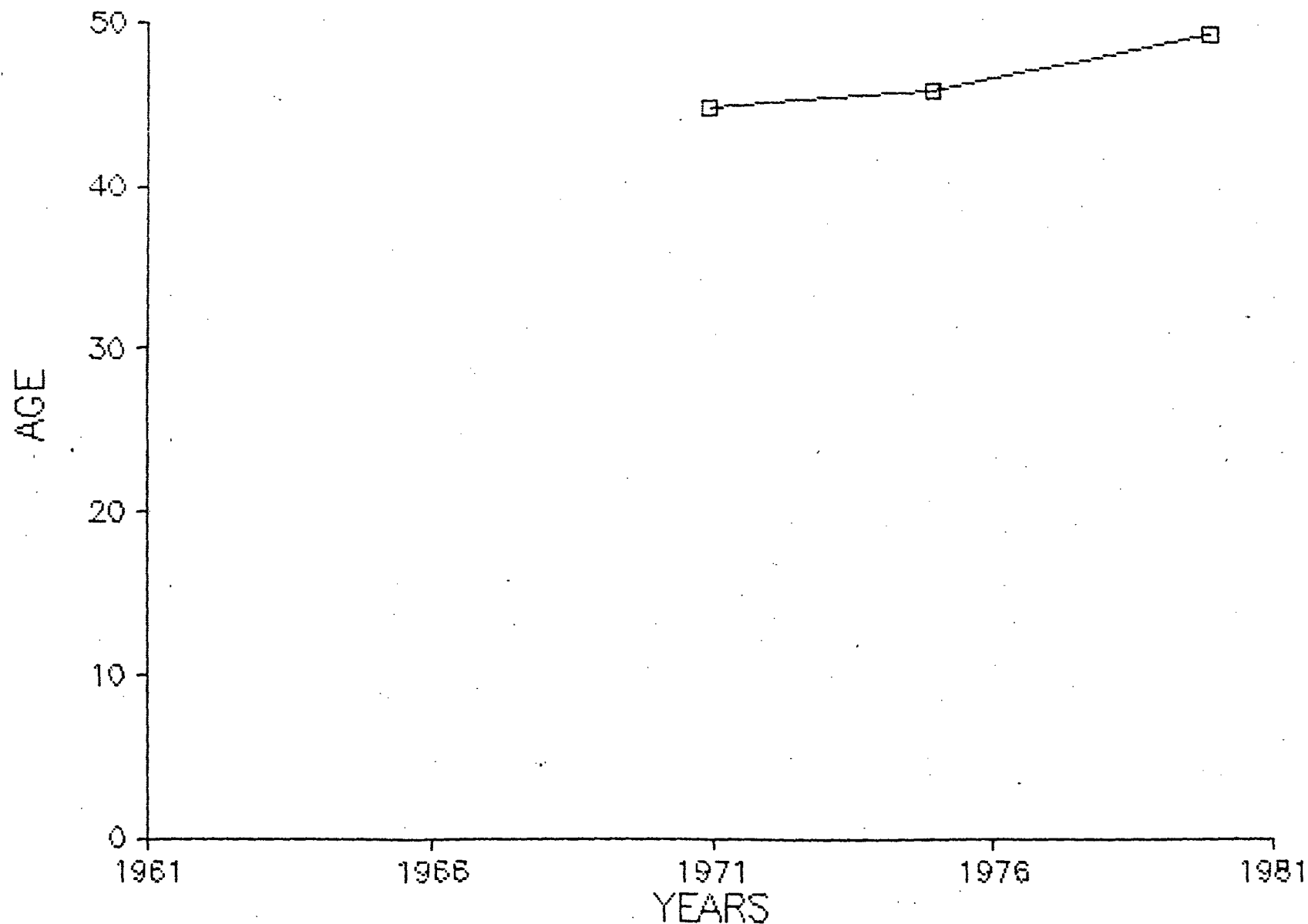


FIG- 4.14

EXPECTATION OF LIFE AT BIRTH - RAJASTHAN

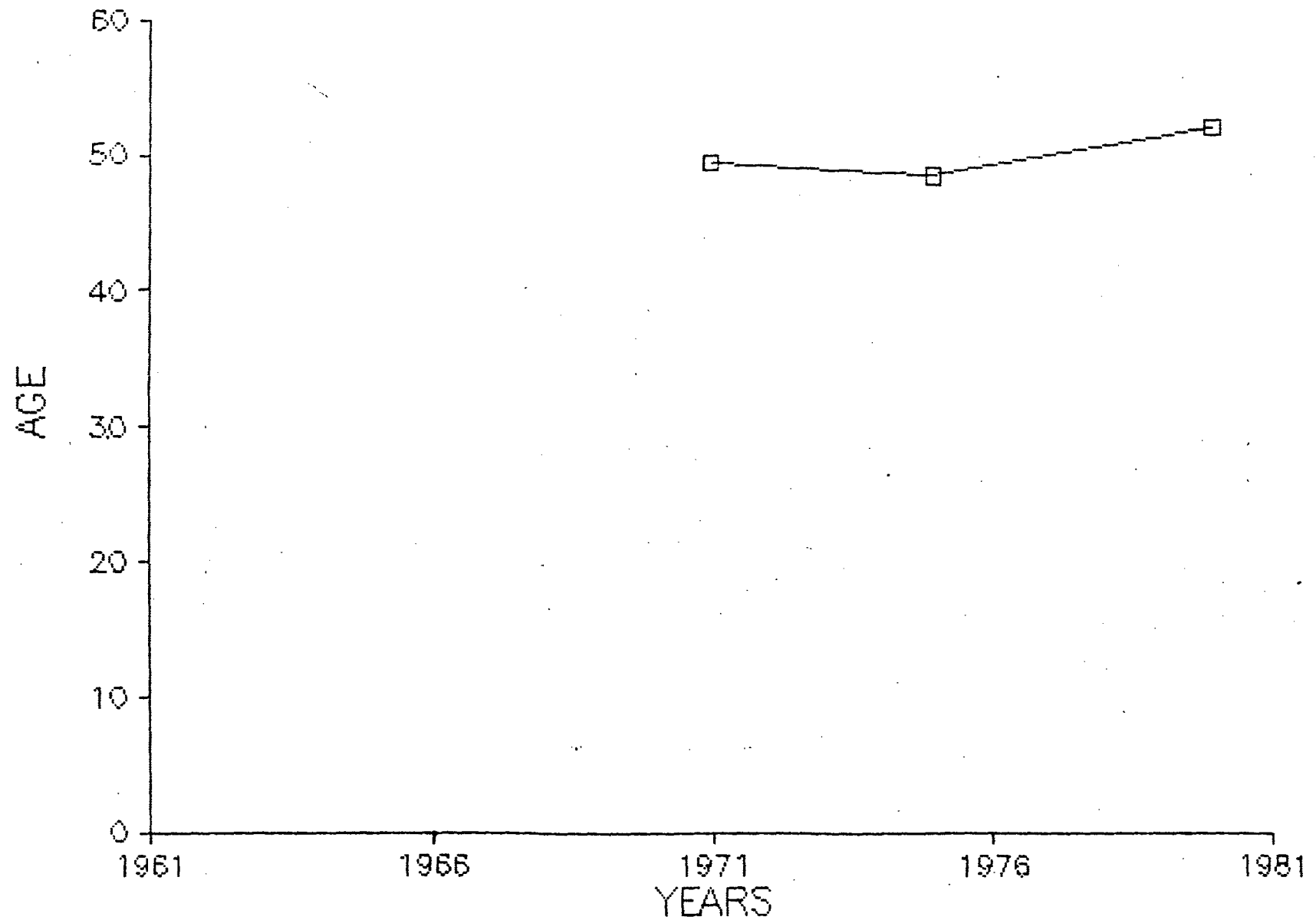


FIG-4.15

EXPECTATION OF LIFE AT BIRTH - TAMILNADU

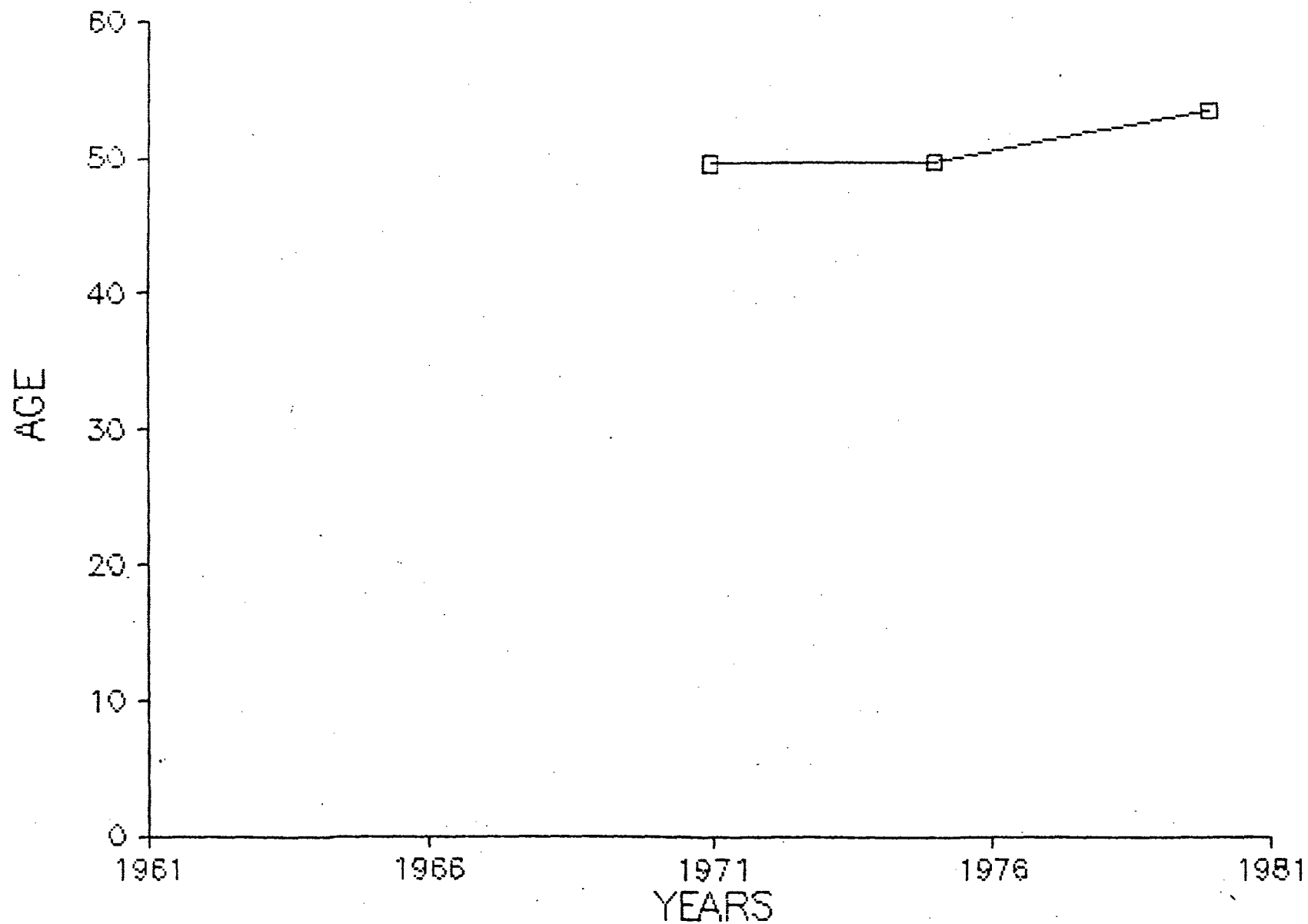


FIG-4.16

EXPECTATION OF LIFE AT BIRTH - UTTAR PRADESH

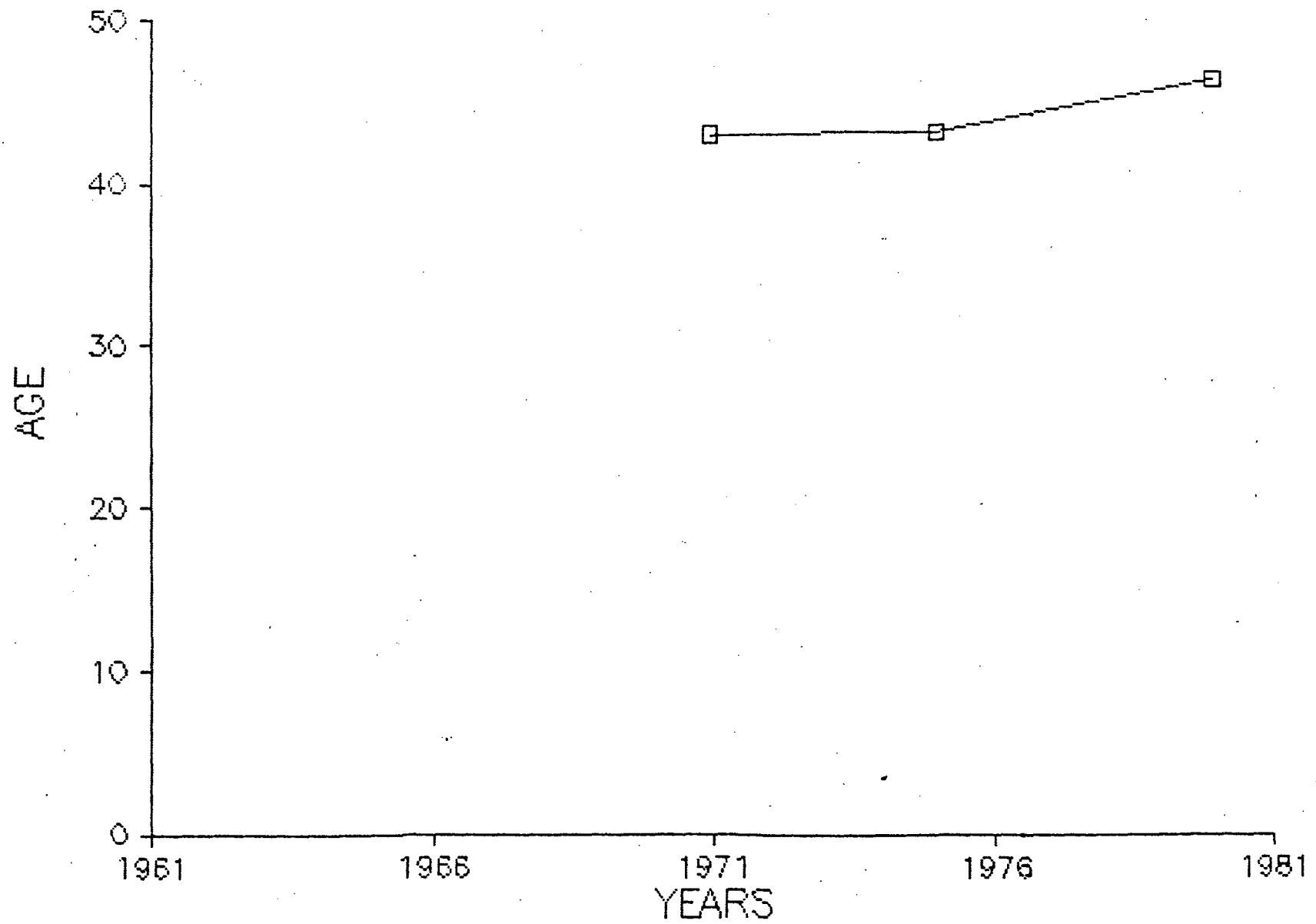


FIG-4.17

EXPECTATION OF LIFE AT BIRTH - INDIA & SELECTED STATES

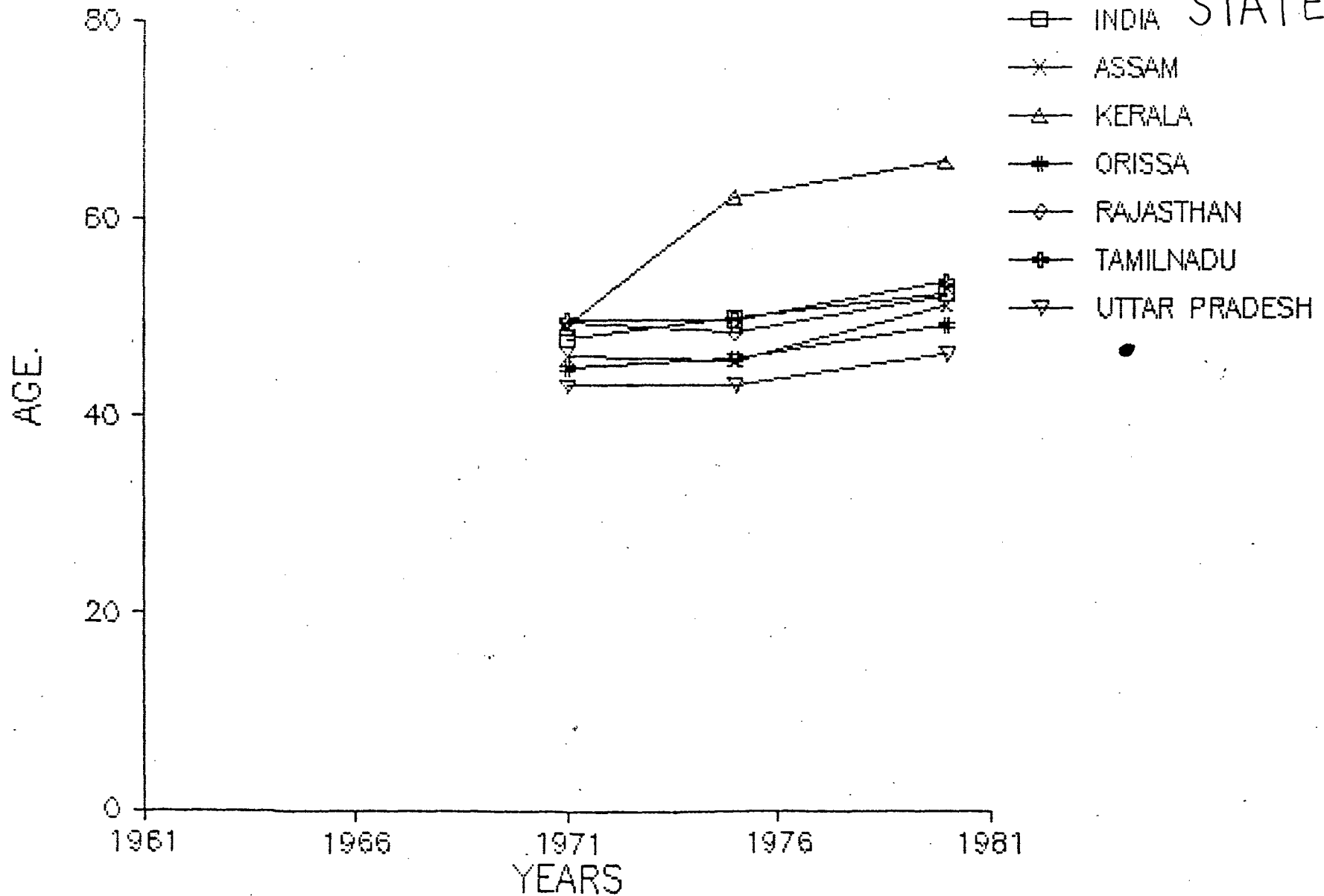


Table 4.8 presents the age specific death rates for India and selected States. The death rate is higher in the early part of an individual as it is most vulnerable. As age increases the death rate also falls. Females are more susceptible till age 44. Males have higher death rate once they cross 44 years. Kerala has lowest age specific death rate throughout the life span. The reverse prevails in other selected states except Tamil Nadu.

Death rates in urban areas is lower than in rural areas. The reason for this is attributed to the age structure of urban population where people in the working age group dominate and mortality is comparatively lower. Apart from this cause it is partly due to better sanitary conditions, availability of pure drinking water, better sewage disposal and better medical facilities and health care at door step in urban areas. The rural areas are deprived of the facilities mentioned for urban areas.

The level of fertility in India is high when compared with the developed and a few developing countries. The decline in the fertility over the years is remarkable. It was 41.7 in 1951 and in 1981 it declined to 33.9. The variations in the regions are due to geographic, economic and cultural dissimilarities. At present, Uttar Pradesh is the only State which has highest level of fertility (39.6 in 1981) and Kerala has lowest fertility level (25.6 in 1981). The rest of the States have fertility between 39.6 and 25.6. Rural fertility is higher than urban fertility all over India. Various factors, viz. higher age at marriage, higher literacy levels, more economic opportunities etc. when operate together can curb the fertility rate.

Mortality in India had started to decline after 1921 epidemic. Various measures like Public health system,

TABLE: 4.8 (1)

A GE SPECIFIC DEATH RATES FOR STATES SELECTED AND INDIA 1971

By - SEX

| STATES | SEX | G R O U P S | | | | | | | | | | | | | | | All A |
|--------------------------|-----|-------------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70+ | |
| ASSAM | M | 49.7 | 6.1 | 1.4 | 1.1 | 2.2 | 3.2 | 5.0 | 9.1 | 11.8 | 16.2 | 17.9 | 35.7 | 47.6 | 71.5 | 139.5 | 18.1 |
| | F | 41.8 | 8.3 | 4.0 | 4.7 | 7.0 | 6.7 | 10.9 | 5.7 | 8.8 | 17.2 | 21.1 | 21.0 | 41.9 | 84.2 | 120.5 | 16.7 |
| | C | 45.7 | 7.2 | 2.7 | 2.9 | 4.7 | 7.8 | 7.8 | 7.6 | 10.5 | 16.6 | 19.3 | 29.5 | 45.1 | 77.1 | 131.4 | 17.8 |
| KERALA | M | 24.5 | 2.2 | 1.2 | 1.6 | 1.9 | 1.9 | 4.4 | 3.9 | 6.0 | 7.6 | 10.8 | 20.8 | 24.4 | 42.1 | 106.7 | 8.8 |
| | F | 24.4 | 2.4 | 0.9 | 1.2 | 2.4 | 1.4 | 2.7 | 3.5 | 4.6 | 7.1 | 6.7 | 11.6 | 22.8 | 44.8 | 101.1 | 9.2 |
| | C | 24.5 | 2.3 | 1.1 | 1.4 | 2.2 | 1.6 | 3.5 | 3.7 | 5.3 | 7.3 | 8.8 | 6.3 | 23.6 | 43.5 | 103.8 | 9.0 |
| ORISSA | M | 50.7 | 6.7 | 1.8 | 2.7 | 2.3 | 1.3 | 3.4 | 9.3 | 8.8 | 12.7 | 18.8 | 21.2 | 40.6 | 65.6 | 135.6 | 15.1 |
| | F | 54.2 | 5.7 | 2.6 | 3.2 | 3.8 | 3.4 | 5.4 | 5.4 | 10.2 | 7.8 | 17.7 | 27.8 | 47.8 | 65.7 | 134.9 | 16.4 |
| | C | 54.2 | 5.4 | 2.3 | 3.0 | 3.2 | 2.5 | 4.6 | 7.7 | 9.8 | 11.9 | 19.2 | 25.5 | 46.2 | 69.3 | 140.6 | 15.5 |
| RAJAS- THAN (1972) | M | 52.8 | 4.6 | 1.8 | 0.9 | 2.9 | 3.0 | 3.8 | 5.5 | 10.6 | 11.6 | 18.9 | 30.3 | 55.8 | 65.0 | 136.6 | 16.7 |
| | F | 68.3 | 8.1 | 3.1 | 2.4 | 5.5 | 4.7 | 5.2 | 5.6 | 5.6 | 10.1 | 16.9 | 23.1 | 37.6 | 40.2 | 99.0 | 16.9 |
| | C | 60.2 | 6.3 | 2.4 | 1.6 | 4.2 | 3.8 | 4.5 | 4.6 | 8.2 | 10.8 | 18.0 | 26.9 | 46.8 | 52.9 | 116.6 | 16.8 |
| TAMIL NADU | M | 41.7 | 4.5 | 2.1 | 2.5 | 3.7 | 5.1 | 5.0 | 6.1 | 8.7 | 11.5 | 20.0 | 25.8 | 50.2 | 54.2 | 122.8 | 14.9 |
| | F | 39.7 | 4.6 | 1.9 | 4.0 | 3.6 | 5.4 | 5.2 | 5.9 | 6.1 | 9.4 | 17.3 | 25.4 | 42.4 | 49.3 | 109.2 | 13.9 |
| | C | 40.7 | 4.6 | 2.0 | 3.3 | 3.6 | 5.3 | 5.1 | 6.0 | 7.4 | 10.6 | 18.7 | 25.6 | 46.2 | 51.8 | 115.8 | 14.4 |
| UTTAR PRADESH | M | 72.9 | 4.6 | 1.8 | 1.8 | 2.8 | 2.4 | 3.2 | 4.8 | 7.1 | 10.9 | 21.6 | 21.8 | 35.7 | 55.7 | 92.7 | 16.8 |
| | F | 95.7 | 6.3 | 2.9 | 3.2 | 5.1 | 5.2 | 5.0 | 4.9 | 4.7 | 8.4 | 13.5 | 15.4 | 37.7 | 40.5 | 95.7 | 19.6 |
| | C | 83.7 | 5.4 | 2.3 | 2.4 | 3.9 | 3.7 | 4.1 | 4.8 | 6.0 | 9.8 | 17.9 | 18.7 | 36.7 | 48.1 | 94.1 | 18.1 |
| INDIA | M | 49.2 | 4.5 | 2.1 | 1.9 | 3.0 | 3.0 | 3.9 | 5.5 | 7.4 | 10.5 | 19.0 | 23.6 | 37.0 | 53.8 | 110.3 | 14.7 |
| | F | 54.8 | 4.9 | 2.1 | 3.0 | 4.3 | 4.3 | 5.2 | 6.0 | 6.0 | 8.5 | 14.3 | 17.5 | 32.7 | 42.9 | 108.5 | 15.4 |
| | C | 51.9 | 4.7 | 2.0 | 2.4 | 3.6 | 3.7 | 4.6 | 5.7 | 6.7 | 9.5 | 16.8 | 21.2 | 34.9 | 48.4 | 109.3 | 14.9 |

TABLE 4.8 (ii)

AGE SPECIFIC DEATH RATES FOR STATES SELECTED AND INDIA BY SEX

1976

| STATE | SEX | <u>0-4</u> | <u>5-9</u> | <u>10-14</u> | <u>15-19</u> | <u>20-24</u> | <u>25-29</u> | <u>30-34</u> | <u>35-39</u> |
|------------------|-----|----------------------|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| ASSAM | M | 42.9 | 7.1 | 3.8 | 2.5 | 4.0 | 3.0 | 3.7 | 5.4 |
| | F | 44.6 | 5.1 | 3.1 | 3.9 | 5.1 | 11.4 | 10.0 | 7.3 |
| | C | 44.0 | 6.1 | 3.5 | 3.2 | 4.6 | 7.2 | 6.8 | 6.2 |
| KERALA | M | 19.1 | 1.4 | 0.9 | 0.9 | 1.6 | 2.6 | 3.0 | 3.8 |
| | F | 19.3 | 1.6 | 1.0 | 1.1 | 1.3 | 1.9 | 2.8 | 2.1 |
| | C | 19.2 | 1.5 | 0.9 | 1.0 | 1.5 | 2.3 | 2.9 | 2.9 |
| ORISSA | M | 46.9 | 3.1 | 4.1 | 4.8 | 3.5 | 2.3 | 5.0 | 4.6 |
| | F | 54.3 | 8.2 | 2.2 | 3.8 | 5.6 | 8.1 | 6.6 | 6.5 |
| | C | 50.5 | 5.6 | 2.0 | 4.3 | 4.5 | 5.1 | 5.8 | 5.6 |
| RAJASTHAN | M | 51.6 | 4.1 | 2.9 | 1.3 | 4.8 | 2.5 | 4.1 | 6.8 |
| | F | 60.8 | 6.6 | 2.5 | 5.1 | 6.0 | 4.2 | 3.8 | 3.9 |
| | C | 55.9 | 5.3 | 2.7 | 3.0 | 5.3 | 3.3 | 3.9 | 5.4 |
| TAMILNADU | M | 45.9 | 4.3 | 1.7 | 3.2 | 5.0 | 3.2 | 4.8 | 5.3 |
| | F | 46.0 | 4.4 | 2.4 | 2.8 | 4.8 | 3.2 | 4.0 | 5.1 |
| | C | 46.0 | 4.3 | 2.0 | 3.0 | 4.9 | 3.2 | 4.4 | 5.2 |
| UTTAR PRADESH | M | 64.3 64.3 | 5.0 | 2.5 | 2.2 | 1.6 | 4.7 | 3.0 | 2.8 |
| | F | 97.2 | 8.1 | 3.7 | 4.4 | 6.4 | 5.6 | 7.6 | 7.7 |
| | C | 79.7 | 6.4 6.4 | 3.0 | 3.2 | 3.8 | 5.2 | 5.2 | 5.2 |
| INDIA | M | 49.6 | 4.3 | 2.4 | 2.5 | 2.7 | 3.1 | 4.2 | 4.5 |
| | F | 51.9 | 5.1 | 2.5 | 2.9 | 4.1 | 4.6 | 4.8 | 5.0 |
| | C | 51.0 | 4.8 | 2.4 | 2.7 | 3.4 | 3.9 | 4.5 | 4.8 |

| <u>STATE</u> | <u>SEX</u> | <u>40-44</u> | <u>45-49</u> | <u>50-54</u> | <u>55-59</u> | <u>60-64</u> | <u>65-69</u> | <u>70+</u> | <u>All ages</u> |
|------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|-----------------|
| ASSAM | M | 18.6 | 25.3 | 22.8 | 35.2 | 48.6 | 104.7 | 105.0 | 15.6 |
| | F | 9.2 | 9.8 | 27.9 | 25.1 | 54.3 | 64.5 | 130.9 | 14.7 |
| | C | 14.3 | 18.7 | 25.0 | 30.9 | 51.0 | 87.0 | 115.7 | 13.9 |
| KERALA | M | 6.4 | 7.8 | 14.2 | 23.6 | 28.0 | 39.8 | 103.9 | 7.8 |
| | F | 3.5 | 5.3 | 8.1 | 11.0 | 22.8 | 29.3 | 91.2 | 8.3 |
| | C | 4.9 | 6.5 | 11.2 | 17.3 | 25.3 | 34.3 | 97.0 | 8.1 |
| ORISSA | M | 7.2 | 15.2 | 25.9 | 41.2 | 55.4 | 62.1 | 140.1 | 16.1 |
| | F | 5.6 | 11.6 | 10.7 | 29.2 | 84.9 | 69.3 | 99.9 | 15.7 |
| | C | 6.4 | 13.5 | 18.9 | 35.2 | 45.0 | 65.7 | 118.9 | 15.4 |
| RAJASTHAN | M | 4.7 | 9.5 | 20.1 | 26.6 | 39.3 | 57.5 | 120.2 | 14.5 |
| | F | 4.3 | 6.6 | 15.3 | 14.2 | 26.5 | 48.1 | 70.0 | 14.9 |
| | C | 4.5 | 8.1 | 17.7 | 20.8 | 32.9 | 52.4 | 93.0 | 14.7 |
| TAMILNADU | M | 6.9 | 14.4 | 18.7 | 25.2 | 44.2 | 60.9 | 116.4 | 14.7 |
| | F | 8.1 | 10.3 | 18.0 | 30.4 | 37.3 | 62.5 | 106.7 | 14.4 |
| | C | 7.5 | 12.4 | 18.4 | 27.7 | 40.9 | 61.7 | 111.3 | 14.6 |
| UTTAR PRADESH | M | 13.6 | 11.6 | 19.5 | 37.5 | 37.4 | 54.3 | 114.9 | 17.9 |
| | F | 5.2 | 10.5 | 12.2 | 22.5 | 48.6 | 57.8 | 78.3 | 23.5 |
| | C | 9.6 | 11.1 | 16.1 | 30.5 | 42.9 | 56.0 | 95.4 | 20.5 |
| INDIA | M | 9.5 | 12.1 | 19.5 | 28.6 | 48.4 | 57.6 | 114.6 | 14.7 |
| | F | 4.7 | 8.0 | 12.6 | 18.5 | 33.4 | 46.4 | 85.5 | 15.3 |
| | C | 7.2 | 9.5 | 16.2 | 23.6 | 40.3 | 51.4 | 99.5 | 15.0 |

TABLE 4.8 (iii)

AGE SPECIFIC DEATH RATES FOR STATES SELECTED AND INDIA

1981

| STATE | SEX | AGE GROUP | | | | | | | |
|------------------|-----|-----------|-----|-------|-------|-------|-------|-------|-------|
| | | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 |
| ASSAM | M | 36.7 | 3.4 | 3.2 | 2.2 | 3.4 | 5.3 | 3.8 | 3.5 |
| | F | 42.3 | 5.0 | 2.8 | 2.6 | 4.6 | 5.2 | 11.4 | 5.9 |
| | C | 39.5 | 4.2 | 3.0 | 2.4 | 4.0 | 5.3 | 7.5 | 4.6 |
| KERALA | M | 13.3 | 1.6 | 0.7 | 1.4 | 1.8 | 2.1 | 2.4 | 1.9 |
| | F | 11.0 | 0.7 | 0.5 | 1.3 | 1.5 | 1.4 | 1.5 | 2.4 |
| | C | 12.2 | 1.2 | 0.6 | 1.4 | 1.6 | 1.7 | 1.9 | 2.2 |
| ORISSA | M | 42.2 | 2.8 | 1.8 | 2.4 | 2.1 | 3.6 | 6.1 | 7.8 |
| | F | 42.1 | 3.9 | 2.5 | 2.9 | 4.3 | 4.3 | 3.7 | 5.8 |
| | C | 42.2 | 3.4 | 2.1 | 2.7 | 3.2 | 3.9 | 4.9 | 6.8 |
| RAJASTHAN | M | 46.8 | 5.1 | 2.6 | 1.2 | 2.8 | 3.2 | 4.9 | 5.2 |
| | F | 54.1 | 5.0 | 2.2 | 4.0 | 4.0 | 3.4 | 2.7 | 3.1 |
| | C | 50.3 | 5.0 | 2.4 | 2.5 | 3.4 | 3.3 | 3.8 | 4.1 |
| TAMILNADU | M | 35.1 | 3.0 | 1.9 | 2.2 | 3.1 | 3.1 | 3.2 | 5.0 |
| | F | 35.2 | 2.9 | 1.9 | 2.7 | 4.1 | 4.6 | 3.9 | 4.2 |
| | C | 35.1 | 3.0 | 1.9 | 2.4 | 3.6 | 3.8 | 3.5 | 4.6 |
| UTTAR PRADESH | M | 53.1 | 5.2 | 2.6 | 2.1 | 2.9 | 2.3 | 3.6 | 5.6 |
| | F | 68.5 | 6.7 | 1.6 | 3.3 | 4.4 | 5.0 | 5.7 | 5.1 |
| | C | 60.3 | 5.9 | 2.2 | 2.7 | 3.6 | 3.6 | 4.7 | 5.4 |
| INDIA | M | 39.2 | 3.7 | 1.8 | 1.9 | 2.4 | 2.5 | 3.7 | 4.6 |
| | F | 43.3 | 4.4 | 1.7 | 3.0 | 3.8 | 4.0 | 4.2 | 4.3 |
| | C | 41.2 | 4.0 | 1.7 | 2.4 | 3.1 | 3.2 | 4.0 | 4.4 |

| STATE | SEX | AGE GROUP | | | | | | | All ages |
|------------------|-----|-----------|-------|-------|-------|-------|-------|-------|----------|
| | | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70 + | |
| ASSAM | M | 7.7 | 10.3 | 29.0 | 30.7 | 43.7 | 62.4 | 107.0 | 12.5 |
| | F | 9.8 | 11.1 | 17.7 | 47.8 | 45.3 | 67.1 | 77.6 | 12.7 |
| | C | 8.6 | 10.7 | 24.2 | 25.0 | 44.5 | 64.6 | 94.9 | 12.6 |
| KERALA | M | 5.7 | 7.6 | 14.3 | 20.1 | 24.1 | 38.9 | 93.3 | 7.8 |
| | F | 1.7 | 2.6 | 6.9 | 5.9 | 13.5 | 27.2 | 81.0 | 5.5 |
| | C | 3.6 | 4.9 | 10.5 | 13.1 | 18.6 | 32.9 | 86.7 | 6.6 |
| ORISSA | M | 7.8 | 4.9 | 14.3 | 23.0 | 45.1 | 53.6 | 88.2 | 13.1 |
| | F | 6.8 | 8.8 | 8.7 | 20.0 | 43.4 | 37.5 | 106.8 | 13.0 |
| | C | 7.2 | 6.8 | 11.6 | 21.5 | 44.2 | 45.4 | 97.4 | 13.1 |
| RAJASTHAN | M | 6.1 | 11.9 | 22.0 | 22.0 | 44.4 | 60.7 | 114.4 | 14.1 |
| | F | 5.2 | 9.8 | 13.4 | 18.2 | 22.7 | 44.8 | 94.1 | 14.6 |
| | C | 5.7 | 10.9 | 17.7 | 30.2 | 33.8 | 52.5 | 103.0 | 14.3 |
| TAMILNADU | M | 6.7 | 9.7 | 16.5 | 22.1 | 38.6 | 54.9 | 95.8 | 12.1 |
| | F | 8.9 | 8.7 | 11.9 | 19.6 | 29.7 | 47.9 | 101.8 | 11.6 |
| | C | 6.3 | 9.2 | 14.2 | 20.9 | 34.3 | 51.4 | 98.9 | 11.8 |
| UTTAR PRADESH | M | 7.0 | 8.7 | 16.0 | 27.3 | 30.3 | 58.2 | 97.9 | 15.4 |
| | F | 8.1 | 6.3 | 8.1 | 19.5 | 25.2 | 41.8 | 81.1 | 17.3 |
| | C | 5.1 | 7.6 | 12.2 | 23.7 | 27.9 | 49.9 | 89.1 | 16.3 |
| INDIA | M | 6.5 | 9.5 | 15.3 | 23.8 | 36.3 | 51.7 | 102.6 | 12.4 |
| | F | 5.2 | 7.5 | 10.9 | 17.0 | 29.6 | 41.3 | 92.8 | 12.7 |
| | C | 5.8 | 8.5 | 13.2 | 20.6 | 33.0 | 46.4 | 97.4 | 12.5 |

M Male F Female C Combined

Source: Sample Registration Bulletins

community participation, health care at the doorstep etc. have helped in bringing the mortality level to 11.0 in 1981 which is a goal indicator of well being. Low mortality can be achieved only when infant mortality is low and expectation of life at birth is high. Infant mortality rate, at present, is 114 which is quite high when compared to developed countries. The levels of mortality are low in urban areas whereas in rural areas, it is very high. This gap is wide that the overall mortality is found very high. Kerala is the only State which has low crude death rate (6.6), low infant mortality rate (37), and high expectation of life at birth (65.5 years) according to 1981 SRS reports and Uttar Pradesh has highest mortality levels, crude death rate being (16.3), infant mortality rate (150) and low expectation of life at birth (46.2 years). The regional variations are due to lower literacy levels, low age at marriage, rigid socio-cultural system.

The control of diseases and its prevention through the health Programme and accessibility and availability of medical facilities to every citizen at a very nominal or no charges have brought down the fertility and mortality levels.

CHAPTER VPOPULATION PROJECTIONS IN INDIA AND
SELECTED STATES

The need for population projections have been felt after independence as the growth rate was alarming and the needs of the rapidly increasing population was felt in all sectors of the economy. The Government felt need to assess the overall performance in the country and hence five-year plans were formulated and implemented in the early 1950's. Projections of population were necessary to plan the future course of the economy. Projections were prepared based on fertility and mortality assumptions.

In this chapter, the different projections made by expert committee and other individuals were analysed for India and selected States. The birth rates and death rates were taken on the basis of high, medium and low fertility assumptions. Attempt has been made to find out the differences between observed and projected population for 1981 census.

Population projections are numerical consequences of a specified set of assumptions regarding the future course of fertility, mortality and migration. They are conditional forecasts which indicate the effect on an existing population base of changes in the various components under carefully stated assumption over the projection periods. The accuracy largely depends on the accuracy of the assumptions regarding the future course of the various components of population growth (Rajbanshi and Gubhaju, 1980). The projections are calculations of future

demographic quantities and trends obtained by using substantive knowledge and methodology.

United Nations defines the 'projections' and distinguishes it, from the 'forecast' -

"Population projections are calculations which show the future development of population when certain assumptions are made about the future course of fertility, mortality, and migration. They are in general purely formal calculations, developing the implications of the assumption that are made. A population forecast is a projection in which the assumption are considered to yield a realistic picture of the probable future development of population. Generally speaking, these are short-term forecasts as the margin of error to which they are subject increases considerably with the space of the forecast. (United Nations, 1955)."

Cox has also delineated between 'estimate' and 'projection'. Estimate, according to him, is an assessment of current number or numbers in immediate past or future taking into account the results of the latest available census and any figures that are available of subsequent births, deaths and migratory movements. A projection ranges into the further future, it depicts what would happen if certain assumptions as to mortality, fertility and migration were borne out; as little or no claim is made that these assumptions will in fact be borne out in practice. (Cox, 1979).

Population projections have assumed an important position in recent years. The reason could be due to changes in demographic processes. The changes are observed in overall growth of population. The population is growing at an unprecedented growth. Information obtained through population projections helps the planners, politicians, sociologists, economists, environmentalists, scientists and a host of others to formulate plans for an irradient future. The projections have paramount effect on social and economic demands of any country. The projection helps in planning for the production of food crops, for setting employment targets, manpower planning, opening schools/colleges, constructing houses etc. The requirements of the future needs can be known only by projecting the demographic profile of the country and region on the basis of the past trends of birth rates and death rates. The projections are basic ingredients for social and economic planning.

The accuracy of population projections are ambiguous but they serve in numerous ways in formulating the national planning. They provide beforehand the data needed for estimating future requirements of several categories of goods and services.

POPULATION PROJECTIONS

Population projections for India have been made since 1958 as the need was felt at different levels for use by the official agencies both at centre and the states on the eve of the formulation of the Third Five Year Plan with emphasis on planning the inter-relationship of population growth and economic development received tremendous attention with economic

development on one hand, Government felt need to check fertility and control mortality on the other hand. The projections differ not only in their assumptions about the future course of fertility and mortality but also in their base population figures (Preni, 1982).

Projections for India have been calculated upto 2001 and are presented in Table 5.1. The differences in population projections are due to different estimates of the base line assumption and different time profiles of demographic variables. The projections made by Ambannuar, Frejka, IBRD, and Natarajan are close to the total enumerated population of 1981 census. The medium and high projected population calculated by various sources, either touch the billion mark or would be short by few millions in 2001. The projections high reveal a net gain of population by 52.27 percent (Ambannuar); 64.57 percent (Frejka); 88.58 percent (IBRD); 44.66 percent (Natarajan); 42.46 percent (ORG); 51.10 percent (Raghavachari) and 54.03 percent (ORGCC). According to the projections made by IBRDs, the population of India will double in two decades (1981-2001). Nearly 441 million people will be added to India's population in 2001 by the projections made by Frejka. The projection made by others add over 300 million persons by 2001.

Statewise projections help in planning the economic and social needs of a region. Each State has different economic and social problems/needs. For a more coordinated action between the centre and the States the expert committee calculated population projections for all the States and Union Territories.

TABLE 5.1

PROJECTED POPULATION OF INDIA - 1971 - 2001

| SOURCE | YEAR | ASSUMPTION | 1971 | 1976 | 1981 | 1986 | 1991 | 1996 | 2001 |
|----------|------|-----------------|------|------|------|------|------|------|------|
| MBANNUAR | 1975 | Low | 548 | 611 | 678 | 747 | 814 | 875 | 928 |
| | | Medium | 548 | 612 | 683 | 759 | 839 | 921 | 1003 |
| | | High | 548 | 612 | 683 | 762 | 849 | 942 | 1040 |
| REJKA | 1973 | NRR=1 2040-2045 | 547 | - | 697 | 789 | - | - | 1124 |
| | | NRR=1 2020-2025 | 547 | - | 692 | 776 | - | - | 1069 |
| | | NRR=1 2000-2005 | 546 | - | 680 | 753 | - | - | 959 |
| | | NRR=1 1980-1985 | 545 | - | 642 | 676 | - | - | 799 |
| | | NRR=1 1970-1975 | 539 | - | 590 | 626 | - | - | 728 |
| BRD | 1973 | Series C | 550 | - | 713 | 823 | - | - | 1288 |
| | | Series B | 550 | - | 696 | 782 | - | - | 1108 |
| | | Series A | 550 | - | 681 | 748 | - | - | 871 |

....2

141

| SOURCE | YEAR | ASSUMPTION | 1971 | 1976 | 1981 | 1986 | 1991 | 1996 | 2001 |
|----------------------------------|------|-------------------------------|------|------|------|------|------|------|------|
| NATARAJAN | | High | 547 | 609 | 676 | 747 | 822 | 901 | 988 |
| | | Medium | 547 | 609 | 672 | 735 | 799 | 865 | 936 |
| | | Low | 547 | 609 | 668 | 724 | 778 | 831 | 886 |
| ORG | 1974 | High | 585 | - | 709 | - | 842 | - | 973 |
| | | Medium | 585 | - | 702 | - | 822 | - | 942 |
| | | Low | 585 | - | 695 | - | 803 | - | 917 |
| ORGHAUACH- ARI | 1974 | High - 2 | 547 | 609 | 677 | 754 | 838 | 931 | 1032 |
| | | High - 1 | 547 | 606 | 668 | 740 | 818 | 904 | 996 |
| | | Medium - 2 | 547 | 606 | 668 | 734 | 801 | 873 | 945 |
| | | Medium - 1 | 547 | 606 | 663 | 724 | 786 | 854 | 924 |
| | | Low - 2 | 547 | 600 | 649 | 700 | 751 | 800 | 946 |
| | | Low - 1 | 547 | 600 | 644 | 690 | 736 | 784 | 831 |
| EXPERT COMMITTEE | 1968 | | 564 | 634 | 698 | | | | |
| -do- | 1979 | Fast Fertility Decline (I) | 547 | 606 | 663 | 713 | 754 | | |
| Medium Fertility Decline (II) | | 547 | 609 | 671 | 729 | 778 | | | |
| Slow Fertility Decline (III) | | 547 | 609 | 672 | 735 | 799 | | | |

| SOURCE | YEAR | ASSUMPTION | 1971 | 1976 | 1981 | 1986 | 1991 | 1996 | 2001 |
|--------|------|------------|------|------|------|------|------|------|------|
| ORGCC | 1984 | High | | | 685 | 758 | 843 | 941 | 1052 |
| | | Medium | | | 685 | 758 | 836 | 915 | 991 |
| | | Low | | | 685 | 758 | 832 | 900 | 959 |

SOURCES :

POPULATION

1. Ambannavar, J.P., 1975 Bombay Ford foundation, Second India Studies.
2. Frejka - T, From Cassens(R.H.) 1978, India : Population, economy, Society, London, Basingstoke.
The Macmillan Press Ltd.
3. The International Bank for Reconstruction and development (IBRD) from Cassen.
4. Natarajan, K.S. From Premi's (M.K.) 1982 The Demographic situation in India. Honolulu, East - West population Institute, East-West Centre.
5. Raghavachari, S. 1974, Population Projection - 1976 - 2001 in Population in India's Development 1947-2000 (eds) Bose, A (et.al) Delhi, Vikas Publishing House Pvt. Ltd. 1
4
4
6. Office of the Registrar General India, 1968, Report on the population Projections worked out under the Guidance of the expert committee set up by the planning commission under the Chairmanship of the Registrar General, India, Min. of Home Affairs India.
7. Census of India 1981, Series - I India Paper 1 of 1984. Population projection for India 1981-2001, India. Registrar General and Census Commissioner.

Table 5.2 gives the projections made by the Expert Committee. According to the projections made by the Demography Division (Table 5.2) the population of India will grow by 71 percent in next thirty years (1981-2011). Variations in growth among the States are large. Rajasthan will experience fast growth because of declining death rate (8.4 per 1000) and show decline in birth rate (30.1 per 1000). Tamil Nadu's population will decline because of low birth rate (19.6 per 1000) and death rate (8.5 per 1000). Assam is to have fast population growth. Kerala and Orissa's population will increase at a moderate growth while Uttar Pradesh's population will increase by 49.4 percent.

PROJECTIONS OF BIRTH AND DEATH RATES

Projections of birth rates and death rates have been made by Cassen (1978), Raghavachari (1974), Expert Committee (1968) and United Nations (1973). These are presented in Table 5.3. The projections are made upto 1996. The birth rate is going to come down to 20/1000 by 1996 which is fairly good when compared to the actual figures of 1981 which is 33.9/1000, and in 1971 the corresponding actual figure was 36.9/1000. The reduction will be by 13.9 points. Though there are variations in the projected birth rates by individuals/organizations but all of them point towards a much lower values compared to that of 1971 or even 1981 figures. The death rate is an indicator of well-being of a nation. The death rates are directly governed by the birth rates. Prior to independence, India was always in the grip of epidemics and other natural calamities which took heavy toll of human lives. After independence, efforts were made to reduce the death rate. The death rate declined to

TABLE 5.2

PROJECT D POPULATION OF INDIA & SELECTED STATES
1981-2001

(Figures in '00)

| <u>STATE</u> | <u>1981</u> | <u>1986</u> | <u>1991</u> | <u>1996</u> | <u>2001</u> |
|---------------|-------------|-------------|-------------|-------------|-------------|
| INDIA | 60,51,590 | 76,10,701 | 83,72,494 | 91,32,455 | 98,60,986 |
| ASSAM | 1,98,969 | 2,23,338 | 2,50,140 | 2,78,789 | 3,05,175 |
| KERALA | 2,54,537 | 2,78,514 | 3,00,993 | 3,21,757 | 3,41,890 |
| ORISSA | 2,63,703 | 2,88,609 | 3,14,445 | 3,40,151 | 3,63,014 |
| RAJASTHAN | 3,42,619 | 3,91,975 | 4,45,925 | 5,03,607 | 5,59,830 |
| TAMIL NADU | 4,84,881 | 5,25,784 | 5,64,076 | 5,98,402 | 6,30,695 |
| UTTAR PRADESH | 11,08,620 | 12,30,838 | 13,64,720 | 15,08,757 | 16,56,239 |

SOURCES :

Census of India 1981, India.

Report of the expert committee on
population projection (1985) New Delhi.
Demography Division office of the Registrar
General India.

PROJECTED POPULATION OF INDIA UPTO 2001

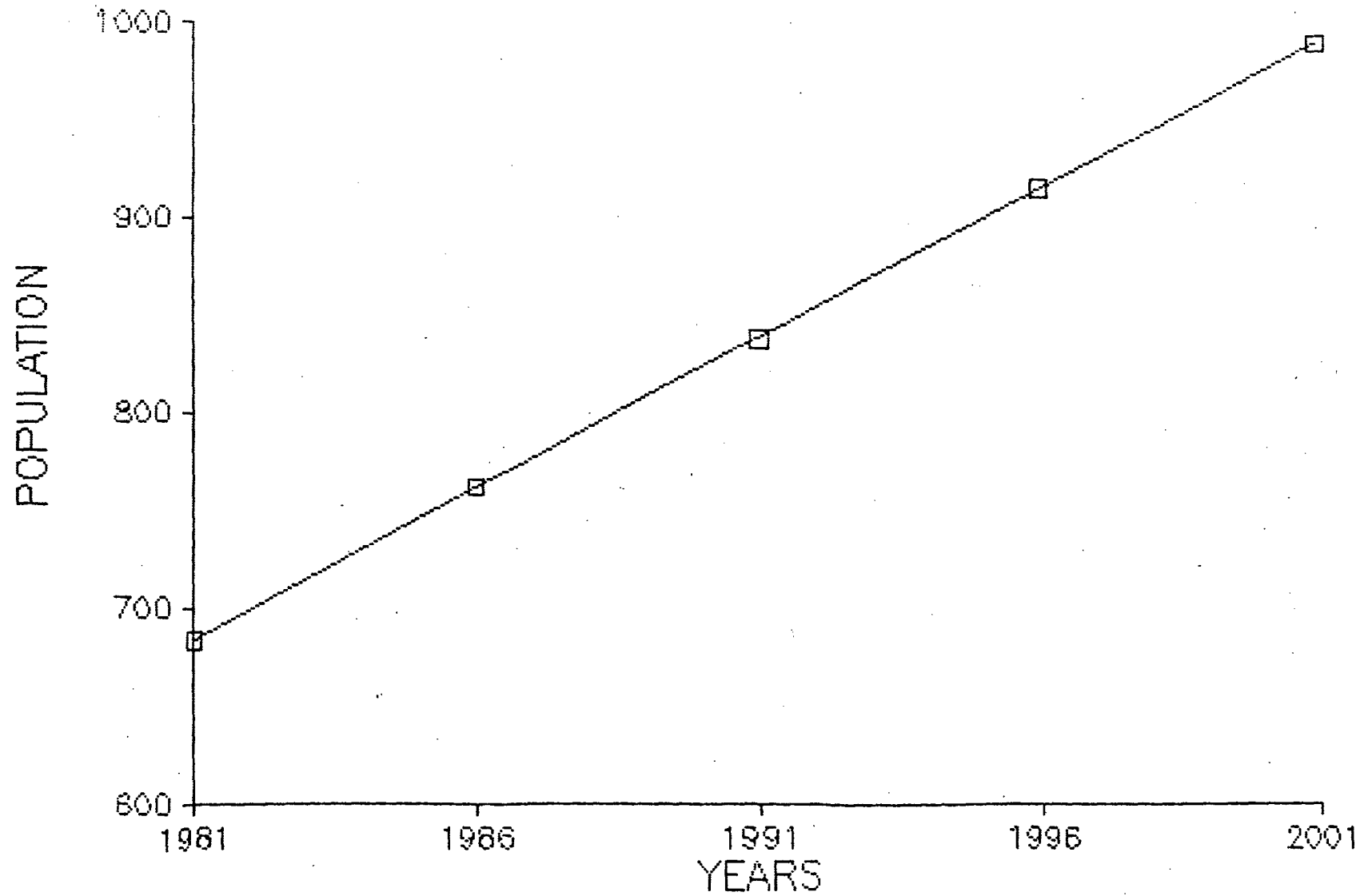


FIG- 5.1

PROJECTED POPULATION OF ASSAM UPTO 2001

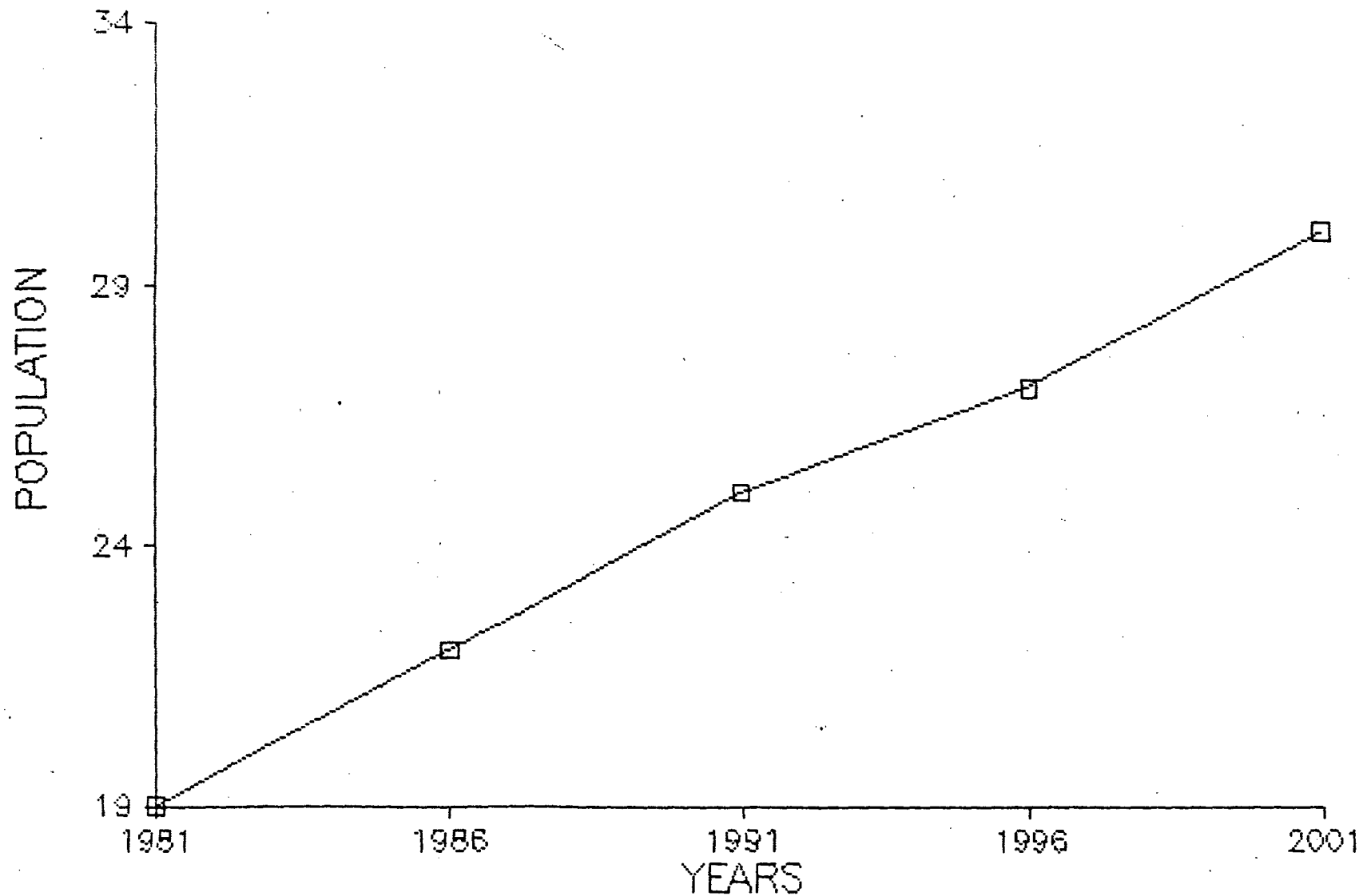


FIG-5.2

PROJECTED POPULATION OF KERALA UPTO 2001

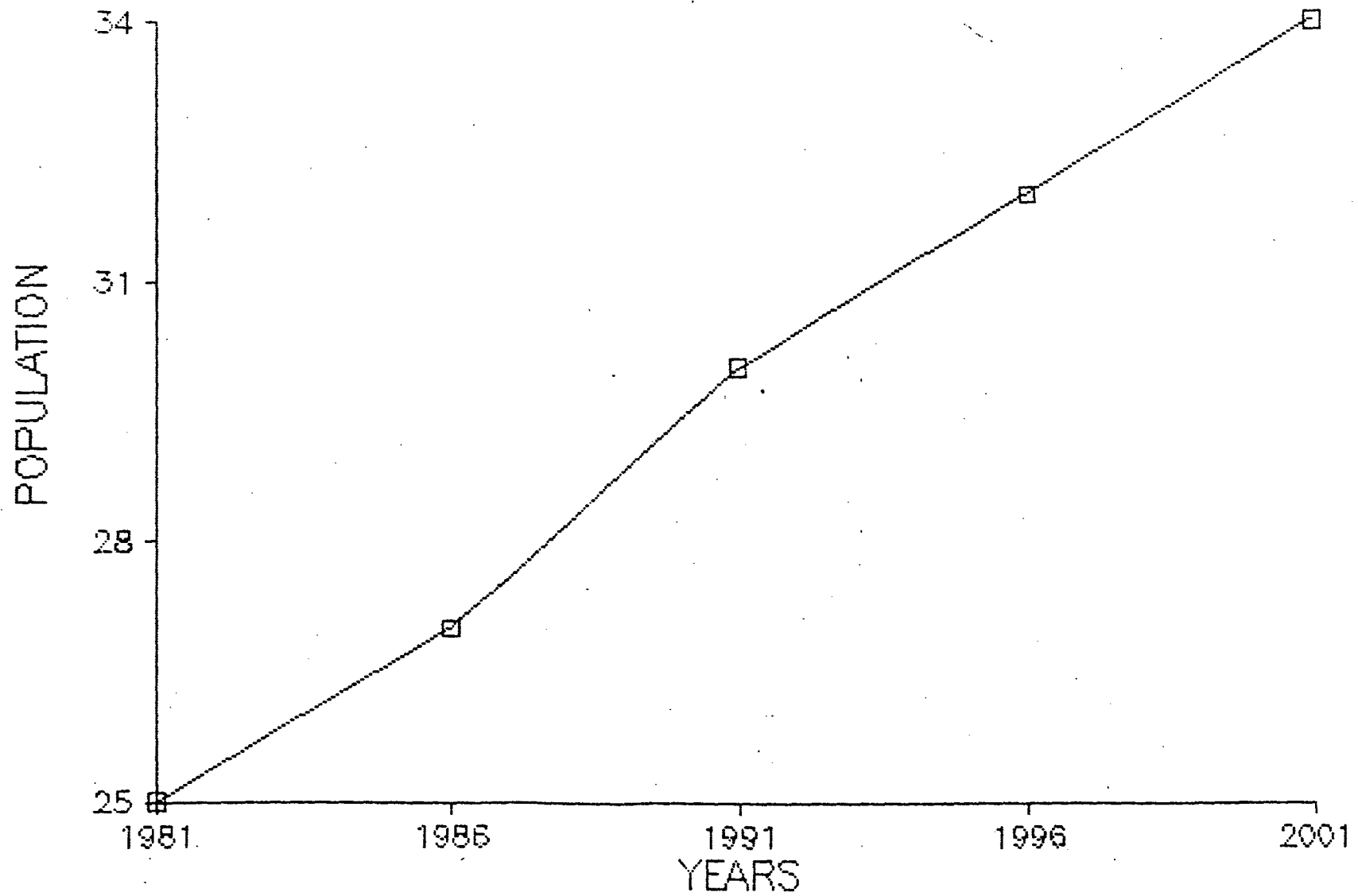


FIG - 5.3

PROJECTED POPULATION OF ORISSA UPTO 2001

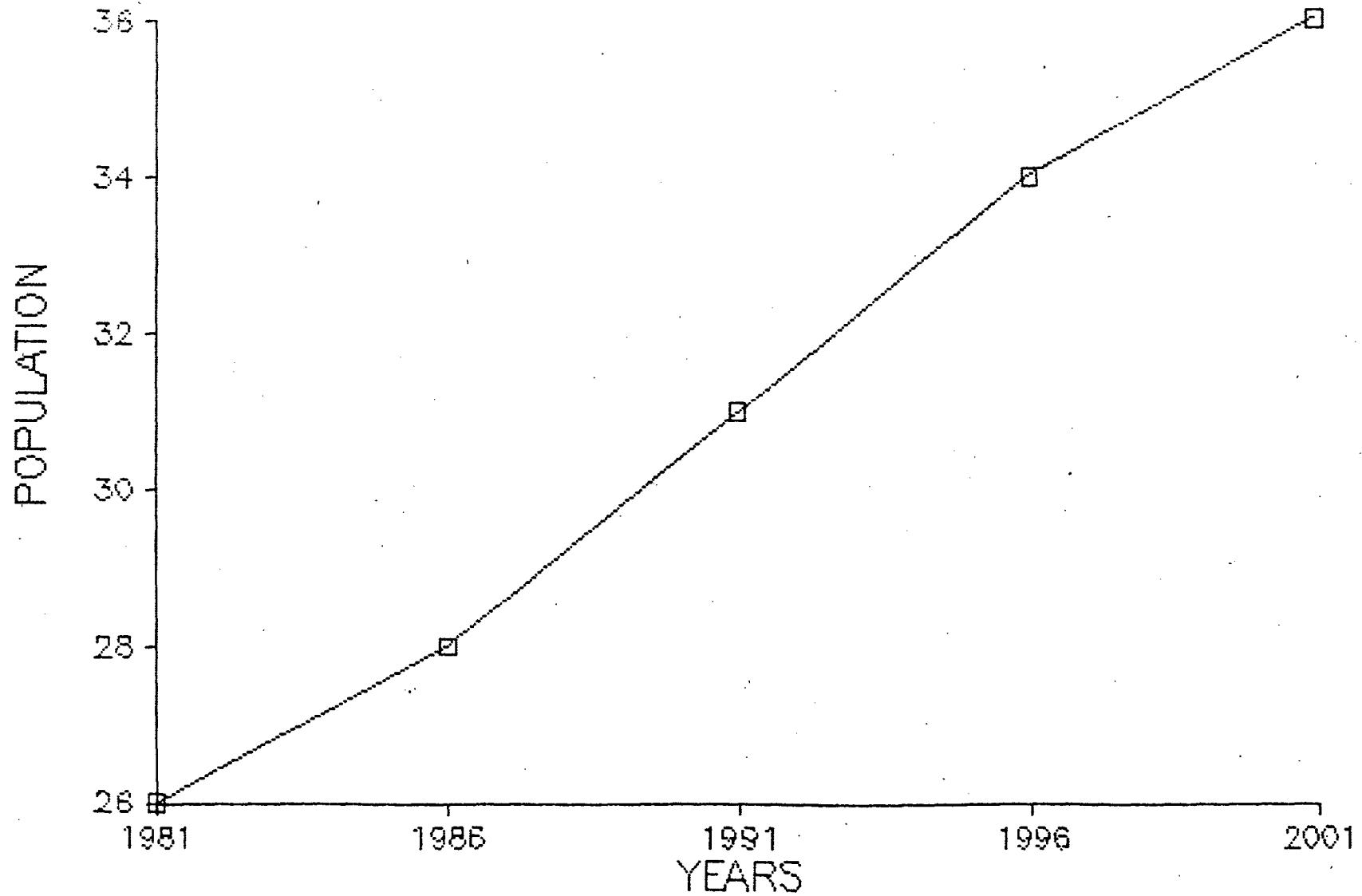


FIG-5.4

PROJECTED POPULATION OF RAJASTHAN UPTO 2001

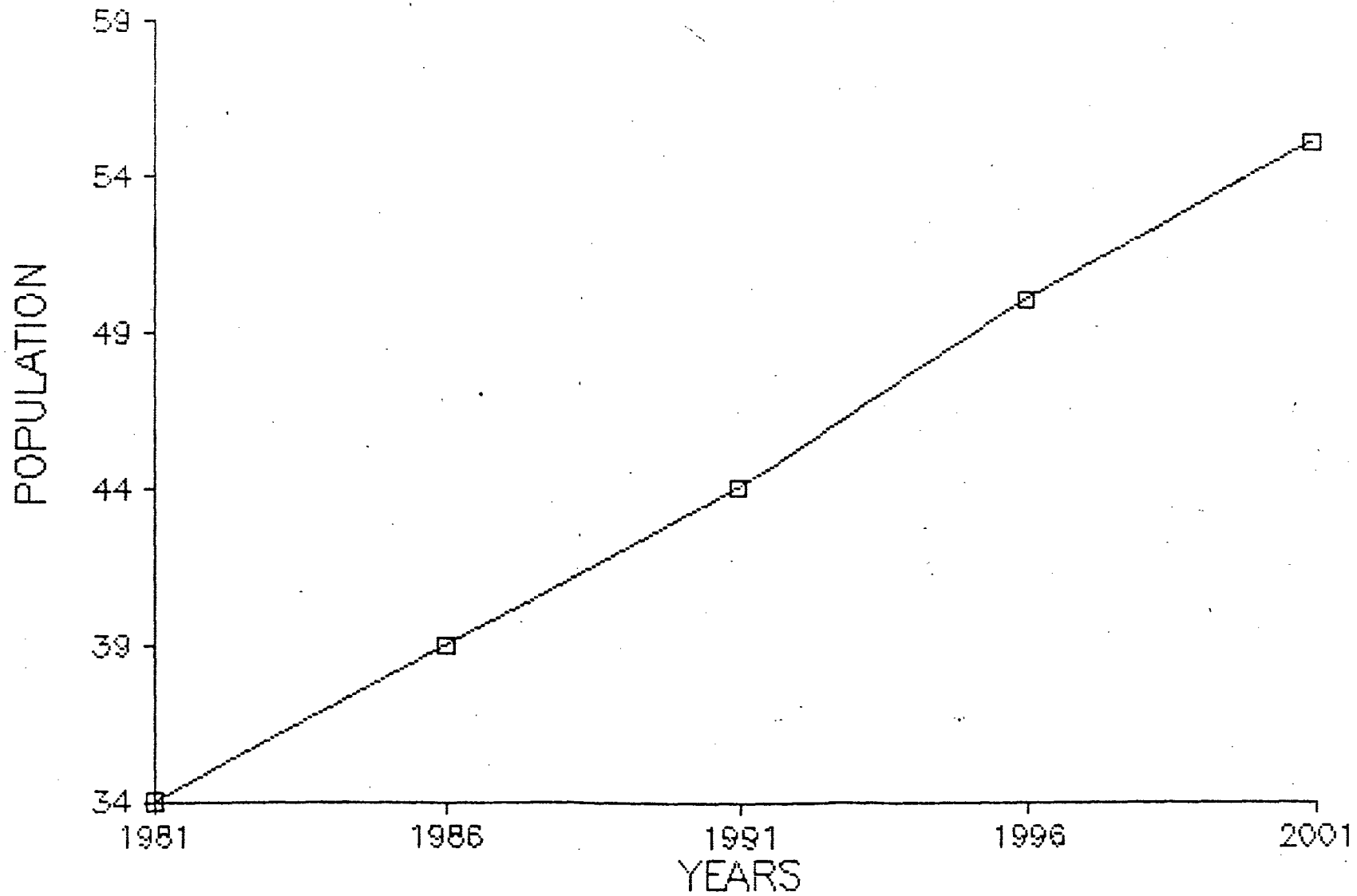


FIG - 5.5

PROJECTED POPULATION OF TAMILNADU UPTO 2001

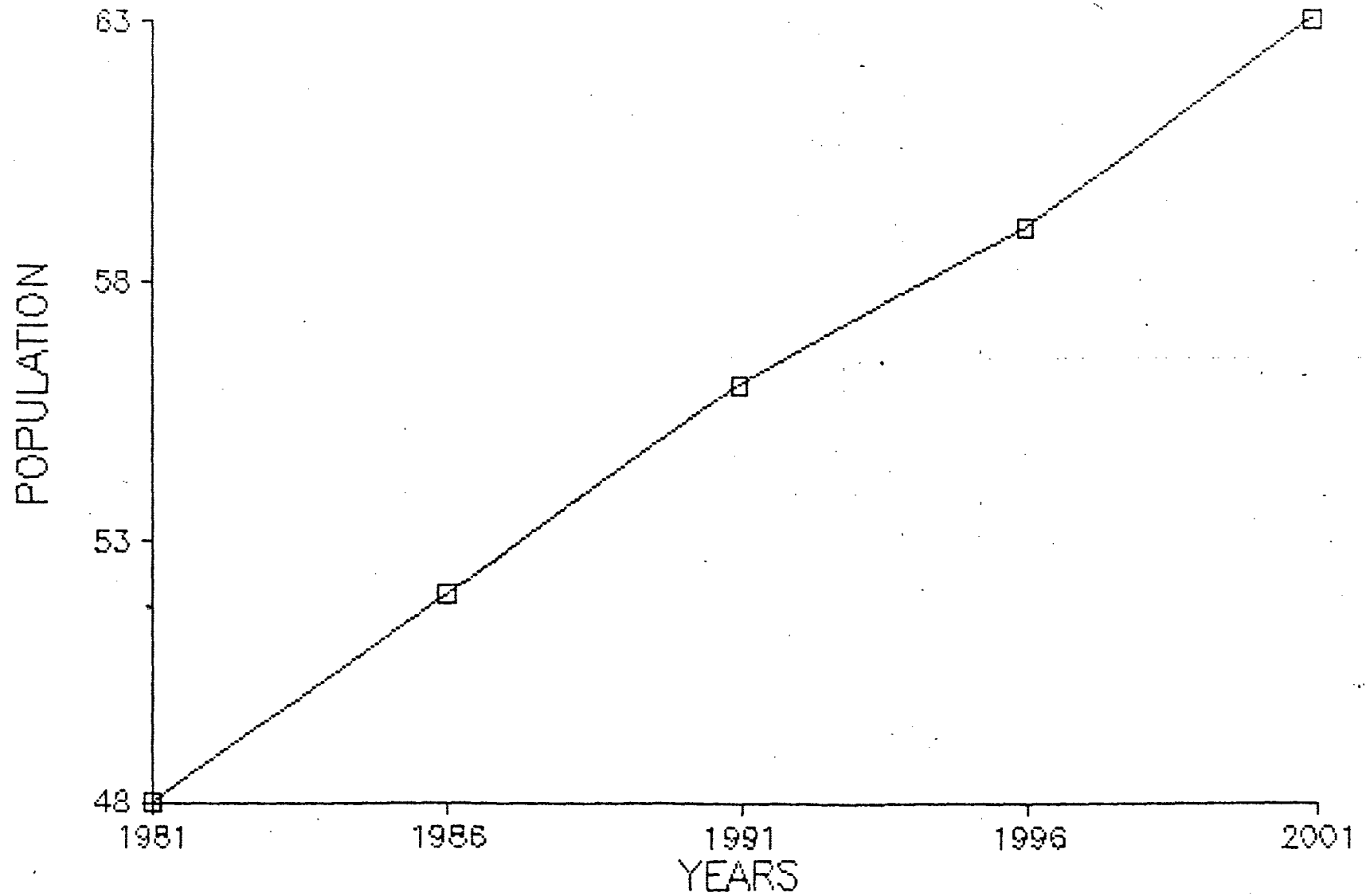


FIG-5.6

PROJECTED POPULATION OF UTTAR PRADESH UPTO 2001

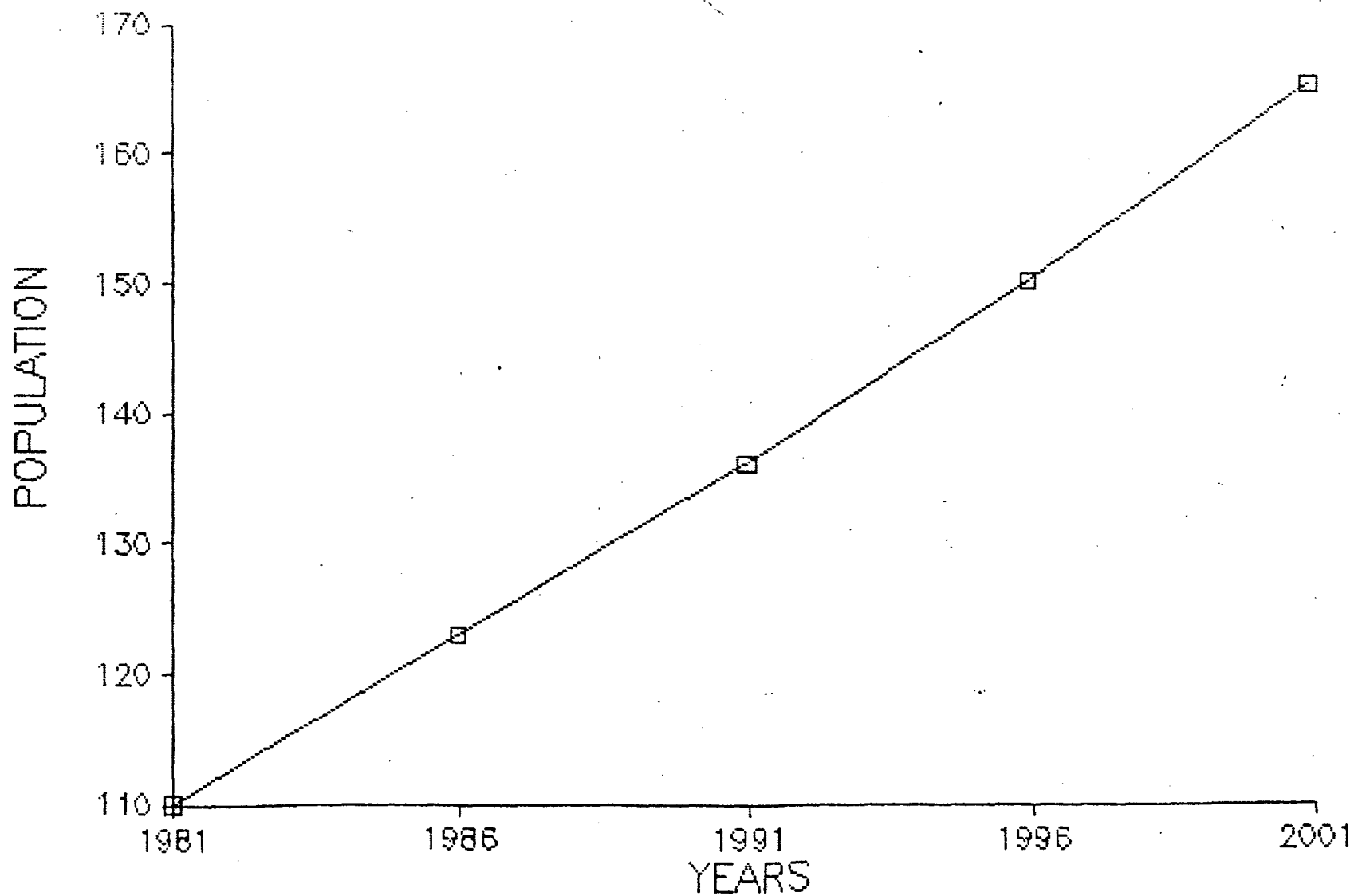


FIG - 5-7

TABLE 5.3

PROJECTED BIRTH & DEATH RATES FOR INDIA

| <u>SOURCE</u> | <u>YEAR</u> | <u>ASSUMPTION</u> | <u>1971</u> | <u>1976</u> | <u>1981</u> | <u>1986</u> | <u>1991</u> | <u>1996</u> | <u>2001</u> |
|-------------------|-------------|-----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| CASSEN | 1978 | Fast Fertility Decline CBR | 36.8 | 30.0 | 25.1 | 21.1 | 21.8 | - | - |
| | | Fast Mortality Decline CDR | 15.8 | 13.4 | 11.6 | 10.4 | 9.5 | - | - |
| | | Medium Fert. Decline CBR | 38.1 | 35.8 | 33.0 | 30.7 | 26.5 | - | - |
| | | Slow Mort. Decline CDR | 17.1 | 16.0 | 15.2 | 14.5 | 13.4 | - | - |
| | | Medium Fast Fertility Decline CBR | 36.8 | 33.0 | 30.0 | 27.2 | 22.4 | - | - |
| | | Mort. Decline. CDR | 16.3 | 14.7 | 13.5 | 12.5 | 11.2 | - | - |
| RAGHAVA- CHARI | 1974 | High - 2 CBR | 37.3 | 34.2 | 33.2 | 32.0 | 31.2 | 30.4 | - |
| | | CDR | 15.5 | 13.3 | 11.9 | 10.9 | 10.2 | 9.7 | - |
| | | High - 1 CBR | 35.6 | 32.9 | 32.2 | 30.9 | 30.2 | 29.3 | - |
| | | CDR | 15.2 | 13.2 | 11.9 | 10.9 | 10.2 | 9.8 | - |
| | | Medium-2 CBR | 35.6 | 32.9 | 30.5 | 28.1 | 27.1 | 25.7 | - |
| | | CDR | 15.2 | 13.2 | 11.7 | 10.6 | 10.0 | 9.7 | - |
| | | Medium-1 CBR | 35.6 | 31.2 | 29.2 | 17.0 | 26.5 | 25.7 | - |
| | | CDR | 15.2 | 13.0 | 11.6 | 10.6 | 10.1 | 9.8 | - |

| SOURCE | YEAR | ASSUMPTION | 1971 | 1976 | 1981 | 1986 | 1991 | 1996 | 2001 |
|------------------|------|------------|------|------|------|------|------|------|------|
| | | Low - 2 | CBR | 33.6 | 28.1 | 26.5 | 24.8 | 22.5 | 21.1 |
| | | | CDR | 15.0 | 12.6 | 11.4 | 10.6 | 10.0 | 9.8 |
| | | Low - 1 | CBR | 33.6 | 26.5 | 25.1 | 23.4 | 22.3 | 20.9 |
| | | | CDR | 15.0 | 12.5 | 11.2 | 10.5 | 9.8 | 9.4 |
| EXPERT COMMITTEE | 1968 | | CBR | 35.1 | 28.7 | 22.7 | | | |
| | | | CDR | 11.3 | 9.2 | 8.2 | | | |
| UNITED NATIONS | 1973 | High | CBR | 14.2 | 39.5 | 38.6 | 35.6 | 33.1 | 29.7 |
| | | | CDR | 15.7 | 14.0 | 12.5 | 10.9 | 9.7 | 8.7 |
| | | Medium | CBR | 39.9 | 38.7 | 36.2 | 33.3 | 29.9 | 26.3 |
| | | | CDR | 15.7 | 13.9 | 12.2 | 10.8 | 9.6 | 8.7 |
| | | Low | CBR | 39.7 | 37.4 | 33.8 | 31.4 | 27.1 | 24.1 |
| | | | CDR | 16.4 | 14.8 | 13.3 | 12.1 | 11.0 | 10.2 |

155

SOURCES :

1. Cassen, R.H. 1978. India : Population, Economy, Society, London & Basingstoke, the Macmillan Press Ltd
2. Raghavachari , S. 1974. Population Project in Population in India's development 1947-2000 (ed) Bose, Ashisb et al, New Delhi, Vikas Publishing House Pvt. Ltd.
3. Office of the Registrar : Report on the Population Projection worked out under Guidance of the expert committee set up by the Planning Commission under the Chairmanship of the Registrar General, India, Ministry of Home Affairs, Govt. of India N.Delhi.
4. World Population Prospects 1973.: United Nations Publication, Sales No. E. 76 X 111.4

14.9/1000 in 1971 from 28.7 in 1951. The projected death rates by individuals/organisations point out to a more decent figure of less than 10.0/1000. Though the developed nations of today have managed to achieve this figures, India will achieve it by 1996.

The Expert Committee which met twice (in 1968 and 1979) have projected the birth rates and death rates for the states of India. Table 5.4 gives the projected birth rates and death rates for selected States. The birth rates for the selected States show a sharp decline by 2001 AD. The birth rate is going to come down by 13 points in thirty years span for all the States. by 2001 AD. The actual figures for the year 1971 of the birth rates are 38.5, 31.1, 34.6, 42.4, 31.4 and 44.9 for Assam, Kerala, Orissa, Rajasthan, Tamil Nadu, and Uttar Pradesh respectively. The difference between the 1971 and 2001 figures show a reduction of 11.6, 12.0, 12.0, 12.3, 11.8 and 12.7 respectively for Assam, Kerala, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh. By 1981 the reduction was by 5.5 points in case of Assam, Kerala, Rajasthan and Uttar Pradesh and the goal to achieve the reduced birth rate seems to be difficult if not impossible. Similarly the death rate also will be less than the national average of 9.0/1000, except in Uttar Pradesh (11.0/1000). The death rates will be reduced between 5.0 points (In Tamil Nadu) to 9.5 points in Assam by AD 2001. Only Kerala's death rate will reduce by 2.6 points. The actual death rate in 1971 is more than 14 and less than 20/1000 in all the States except Kerala which had 9.0/1000 in 1971.

To achieve birth of 32.2 (Uttar Pradesh) and 19.1 (Kerala) and in between the rest of the States fall and a death rate of less than 11, it is not only pressing

TABLE 5.4

PROJECTED VALUES OF BIRTH RATES & DEATH RATES
FOR SELECTED STATES.

| STATE | | <u>1971-76</u> | <u>1976-81</u> | <u>1981-86</u> | <u>1986-91</u> | <u>1991-96</u> | <u>1996-200</u> |
|---------------|------|----------------|----------------|----------------|----------------|----------------|-----------------|
| ASSAM | B.R. | 43.9 | 36.5 | 35.9 | 34.0 | 31.6 | 26.9 |
| | D.R. | 13.3 | 10.5 | 12.9 | 11.0 | 9.5 | 8.3 |
| KERALA | B.R. | 32.8 | 26.5 | 25.2 | 22.8 | 20.4 | 19.1 |
| | D.R. | 9.2 | 7.7 | 7.3 | 6.9 | 6.6 | 6.4 |
| ORISSA | B.R. | 34.2 | 28.0 | 31.6 | 29.2 | 26.3 | 22.6 |
| | D.R. | 12.0 | 10.0 | 13.6 | 11.7 | 10.1 | 9.1 |
| RAJASTHAN | B.R. | 36.2 | 29.9 | 39.7 | 37.2 | 34.4 | 30.1 |
| | D.R. | 9.5 | 7.9 | 12.9 | 11.1 | 9.6 | 8.4 |
| TAMIL NADU | B.R. | 29.2 | 23.5 | 27.4 | 24.1 | 21.3 | 19.6 |
| | D.R. | 12.3 | 10.6 | 10.1 | 9.7 | 9.0 | 8.5 |
| UTTAR PRADESH | B.R. | 35.1 | 29.1 | 40.2 | 37.9 | 35.8 | 32.2 |
| | D.R. | 13.0 | 10.8 | 17.5 | 15.2 | 13.1 | 11.0 |

SOURCE : Office of the Registrar General, India. 'Report on the population projections worked out under the guidance of the Expert committee set up by the planning commissioner under the Chairmanship of the Registrar General, India Ministry of Home Affairs, India, 1968 & 1979.

but a must that these big States (Uttar Pradesh, Rajasthan, Assam) should improve considerably failing which it will be difficult to achieve the goals set by for AD 2000.

PROJECTED EXPECTATION OF LIFE AT BIRTH

Expectation of life at birth is an appropriate index of well-being of a nation. Higher life at birth can be achieved not by medical advancement alone but by economic development and social change. India had a very low expectation of life at birth at the time of independence. (Males 32.4 years and females 31.6 years). Over the years there has definitely been an increase in the expectation of life at birth. The projected expectation of life at birth for India is presented in Table 5.5. The projected expectation of life at birth by various individuals and organisations point out an increase of 12 to 14 years over 1971's expectation of life at birth. In 1971 and 1981 the expectation of life at birth was 46.40 for males and 44.70 for females and 54.1 for males and 54.7 for females respectively. The actual and projected figures show a margin of 10.9 and 11.3 for males and females in 1971 and 1.5 and 1.7 years for males and females in 1981.

The projected figures of female expectation of life at birth by Raghavachari (1974) and Expert Committee (1979) portrays a longer life over males. (Ambannuar (1975) and ORG (1974) show a balanced expectation of life at birth for both the sexes.

Table 5.6 presents the expectation of life at birth for selected States. The expectation of life at birth for Kerala points out an increase of 7.4 years for males and 10.3 years for females, in 2001 over 1971's figures of 60.8 years for males and 63.3 years for females. The difference between female and male expectation of life at birth is 5.4 years which is more in comparison to other States. Rajasthan and Tamil

TABLE 2.2

PROJECTED EXPECTATION OF LIFE AT BIRTH FOR INDIA. 1971-2001.

| <u>SOURCE</u> | <u>YEAR</u> | <u>ASSUMPTION</u> | <u>SEX</u> | <u>1971-76</u> | <u>1976-81</u> | <u>1981-86</u> | <u>1986-91</u> | <u>1991-96</u> | <u>1996-200</u> |
|---------------------|-------------|-------------------|------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| AMBANNAVAR | 1975 | Male | Male | 49.90 | 52.90 | 55.90 | 58.40 | 60.90 | 62.90 |
| | | | Female | 47.55 | 50.55 | 53.55 | 56.45 | 59.35 | 61.75 |
| ORG | 1974 | Alternative-I | Male | 60.4 | 63.2 | 65.8 | 68.3 | 70.2 | 71.7 |
| | | | Female | 57.6 | 61.8 | 64.5 | 67.0 | 69.0 | 71.0 |
| | | -do- -II | Male | 55.0 | 57.6 | 50.4 | 63.2 | 65.8 | 68.3 |
| | | | Female | 52.5 | 55.0 | 57.6 | 60.4 | 63.2 | 67.0 |
| TAGHAVA- CHARI | 1974 | | Male | 51.27 | 53.77 | 56.02 | 58.02 | 59.52 | 60.52 |
| | | | F. | 49.55 | 52.55 | 55.30 | 57.80 | 59.80 | 61.30 |
| EXPERT COMMITTEE | 1968 | | M. | 57.3 | 61.1 | 63.1 | | | |
| | | | F. | 56.0 | 59.8 | 61.8 | | | |
| -do- | 1979 | | M. | - | - | 55.6 | 58.1 | 60.6 | 62.8 |
| | | | F. | - | - | 56.4 | 59.1 | 61.7 | 64.2 |

| <u>STATE</u> | <u>YEAR</u> | <u>SEX</u> | <u>1971-76</u> | <u>1976-81</u> | <u>1981-86</u> | <u>1986-91</u> | <u>1991-96</u> | <u>1996-2001</u> |
|------------------|-------------|------------|----------------|----------------|----------------|----------------|----------------|------------------|
| TAMIL NADU | 1968 | M. | 56.1 | 59.9 | 60.9 | - | - | - |
| | | F. | 54.2 | 58.0 | 59.0 | - | - | - |
| | 1979 | M. | - | - | 58.2 | 60.8 | 62.8 | 64.8 |
| | | F. | - | - | 57.8 | 60.8 | 63.0 | 65.2 |
| UTTAR PRADESH | 1968 | M. | 54.8 | 58.6 | 59.6 | - | - | - |
| | | F. | 53.7 | 57.5 | 58.5 | - | - | - |
| | 1979 | M. | - | - | 54.1 | 54.1 | 57.1 | 60.0 |
| | | F. | - | - | 46.8 | 49.6 | 52.8 | 56.0 |

TABLE 5.6

PROJECTED EXPECTATION OF LIFE AT BIRTH FOR SELECTED STATES - 1971-2001

| <u>STATE</u> | <u>YEAR</u> | <u>SEX</u> | <u>1971-76</u> | <u>1976-81</u> | <u>1981-86</u> | <u>1986-91</u> | <u>1991-96</u> | <u>1996-2001</u> |
|--------------|-------------|------------|----------------|----------------|----------------|----------------|----------------|------------------|
| ASSAM | 1958 | M. | 53.7 | 58.0 | 60.0 | - | - | - |
| | | F. | 54.1 | 58.4 | 60.4 | - | - | - |
| | 1979 | M. | - | - | 52.7 | 55.7 | 58.7 | 61.1 |
| | | F. | - | - | 51.9 | 55.2 | 58.4 | 61.1 |
| KERALA | 1960 | M. | 63.1 | 66.4 | 66.9 | - | - | - |
| | | F. | 60.7 | 64.0 | 64.5 | - | - | - |
| | 1979 | M. | - | - | 65.2 | 66.2 | 67.2 | 68.2 |
| | | F. | - | - | 69.8 | 71.1 | 72.3 | 73.6 |
| ORISSA | 1968 | M. | 56.1 | 59.9 | 60.9 | - | - | - |
| | | F. | 56.5 | 60.3 | 61.3 | - | - | - |
| | 1979 | M. | - | - | 54.1 | 57.1 | 60.1 | 62.1 |
| | | F. | - | - | 51.9 | 55.1 | 58.4 | 61.1 |
| RAJASTHAN | 1968 | M. | 62.8 | 66.1 | 66.6 | - | - | - |
| | | F. | 57.9 | 61.2 | 61.7 | - | - | - |
| | 1979 | M. | - | - | 54.8 | 57.8 | 60.5 | 62.5 |
| | | F. | - | - | 55.4 | 58.6 | 61.3 | 63.5 |

.....2

Nadu's female expectation of life at birth is going to 0.5 to 1 years over males. In Assam and Orissa the expectation of life at birth for both the sexes is going to be equal whereas in Uttar Pradesh the female expectation of life at birth falls short by 4 years.

Table 5.7 gives difference between enumerated population and projected population for India and selected states. The projected population has always been close to enumerated population. The differences in most of the cases is in negative. Only Tamil Nadu's enumerated population was higher than that of projected population in 1971 and 1981. Assam's enumerated population has been much lower than projected population in 1961 and 1971. The rest of the States and India have a little lower enumerated population. The most important reason for this negative difference between the enumerated and projected population is governed by misreporting, ignoring the trends of migration and above all the tendency of people in accepting or the lukeworm attitude towards the policy of family planning which plays a very significant role in determining the fertility behaviour of the people. Hence it can be stated that the enumerated population is dependent on correct returns of age, a steady flow of migration and fertility behaviour (positive/negative).

The provisional population totals of 1981 census indicated an increase of 12 million according to the Expert Committee under the high fertility assumptions, for India. The population of India will increase over 60 percent by AD 2000, projected by various organisations and individuals. The regional distribution of population is going to increase tremendously of all the States selected. Rajasthan's population is going to increase by 54.2 percent and Tamil Nadu's population will increase

TABLE 5.7

DIFFERENCE BETWEEN ENUMERATED & PROJECTED POPULATIONS FOR INDIA AND
SELECTED STATES.

| YEAR | INDIA | | | ASSAM | | | KERALA | | |
|------|--------|--------|-------------|-------|-------|-------------|--------|-------|-------------|
| | E | P | (E-P/E)'100 | E | P | (E-P/E)'100 | E | P | (E-P/E)'100 |
| 1951 | 361088 | 361383 | - | 8225 | 8831 | - | 13549 | 13549 | - |
| 1961 | 439234 | 439235 | - .00022 | 11103 | 11873 | - 6.93 | 16903 | 16904 | - .0059 |
| 1971 | 548159 | 559622 | -2.09 | 14625 | 15994 | - 9.36 | 21347 | 21701 | -1.65 |
| 1981 | 683810 | 694896 | -1.69 | 19902 | 21220 | - 6.62 | 25403 | 26829 | -5.61 |

Contd.....P/2

| YEAR | KARNATAKA | | | RAJASTHAN | | | TAMILNADU | | |
|------|-----------|-------|------------|-----------|-------|-------------|-----------|-------|-------------|
| | E | P | (E-P/E)100 | E | P | (E-P/E)/100 | E | P | (E-P/E)/100 |
| 1951 | 14645 | 14646 | - | 15990 | 15991 | - | 30119 | 30119 | - |
| 1961 | 17548 | 17549 | - .0056 | 20155 | 20156 | - .0049 | 33686 | 33687 | -0.0029 |
| 1971 | 21944 | 21992 | - 0.21 | 25765 | 26822 | -4.10 | 41199 | 40034 | 2.82 |
| 1981 | 26272 | 26879 | - 2.31 | 34102 | 34219 | -0.34 | 48297 | 46467 | 3.78 |

UTTAR PRADESH

| | | | |
|------|----------------------------|--------|-------|
| 1951 | 63219 | 63216 | - |
| 1961 | 73754 | 73745 | -.012 |
| 1971 | 88341 | 92378 | -4.56 |
| 1981 | 10010 110858 | 113087 | -2.01 |

E- Enumerated Population.

P- Projected Population.

$\frac{(E-P)}{E} \times 100$ - Difference between enumerated & projected Population.

by 30.6 percent. In between these two States, Assam's population will increase by 53.3 percent, Uttar Pradesh by 49.4 percent, Orissa's by 38.2 percent and Kerala's by 34.6 percent.

The population of India and States selected show marked variations in the broad age groups (0-14 years, 15-59 years and 60+ years) by 2001 over the observed broad age group in 1981. According to 1981 census, the population of India and States selected had a higher proportion over the projected population in the age group 0-14 years. Population (0-14 years) is going to decrease by 11 to 7 percent. India's population will decrease by about 8 percent. Maximum decrease is going to be in Assam (11.1 percent) and minimum in Uttar Pradesh (4.7 percent). In contrast to 0-14 years, the population in age group 15-59 years is going to increase by 6.8 percent for India. In Assam population in age group (15-59 years) is going to increase by 9.4 percent (children's population (0-14 years) will decrease by 11.1 percent) and in Rajasthan and Uttar Pradesh it is going to increase by 4.1 and 4.5 percent respectively. Population is also going to increase over 60+ years in India and States selected. Kerala and Tamil Nadu will have population over 9 percent, followed by Orissa (7.8 percent). Rajasthan and Uttar Pradesh, too are going to have more than 6.0 percent and a very small increase in Assam (5.4 percent) by 2000. Population in three age groups, shows an increase or decrease in two years of time. Population in age group 0-14 years which was higher in 1981 is going to be lower in 2001 indicating the need to raise literacy levels in States like Rajasthan, Uttar Pradesh, Orissa and Assam. In States like Kerala and Tamil Nadu where it is higher, the need is to raise the standard of literacy. Population in the employment

age group is going to increase which means more employment by 2000. Planning should start now to provide employment, if not to all, at least a majority of people. Female participation too is also going to increase. Population over 60+ years' needs are much more different than the needs of children or adults. The requirements is for social security, hospitals and old age care centres. The increase or decrease in the population in different age groups are due to lower infant mortality rate, proper immunisation, higher status of females, female participation in employment, higher expectation of life at birth etc. (Table 5.9).

Birth and death rates in India are quite high. By 2000 the decline in birth rates and death rates are going to decline by 30.0 and 9.0 respectively. Kerala and Tamil Nadu will have birth and death rates less than 20.0 and 8.0 respectively. Rajasthan and Uttar Pradesh are going to have a little over 30.0 and 12.0 birth and death rates respectively. Assam and Orissa are going to have a moderate decline in birth and death rates.

Expectation of life at birth is an index of well being of any nation. India is one of the few countries in world with a low expectation of life at birth. Kerala and Tamil Nadu will achieve a descent figure of 64.0 years and above for males and females. Rest of the States will have expectation of life at birth around 60 years by 2000. The female expectation of life at birth is going to be 56.0 years by 2000 in Uttar Pradesh indicating a very low status now. The female status can bring change in birth rates, death rates and even in the expectation of life at birth. This can be possible only with literacy.

Table 5.8 : POPULATION DISTRIBUTION IN BROAD AGE GROUPS FOR INDIA AND SELECTED STATES 1981 and 2001

| Age group: | 1981 (In percentage) | | | 2001 (In percentage) | | |
|-----------------|----------------------|-------|-----|----------------------|-------|------|
| | 0-14 | 15-59 | 60+ | 0-14 | 15-59 | 60+ |
| <u>State:</u> | | | | | | |
| INDIA | 39.5 | 54.3 | 6.2 | 31.4 | 61.1 | 7.78 |
| ASSAM (1971) | 45.9 | 50.2 | 3.9 | 34.8 | 59.6 | 5.4 |
| KERALA | 35.1 | 57.4 | 7.5 | 26.5 | 64.0 | 9.4 |
| ORISSA | 39.7 | 54.1 | 6.2 | 30.2 | 61.9 | 7.8 |
| RAJASTHAN | 42.7 | 52.0 | 5.3 | 37.6 | 56.1 | 6.1 |
| TAMIL NADU | 34.7 | 58.8 | 6.5 | 26.6 | 63.4 | 9.9 |
| UTTAR PRADESH | 42.2 | 51.4 | 6.4 | 37.5 | 55.9 | 6.5 |

Population projections are just a reflection of future figures for planning the country's needs. Though the differences between observed and projected are certain but the differences are minor. They help a lot to planners, administrators, social scientists, scientists and a host of other in planning for a better future.

CHAPTER VI

OVERVIEW AND CONCLUSION

The population of India in a span of three decades (1951-1981) doubled with a staggering growth rate of 2.5 percent per year. The major causes of this unprecedented growth are - a steep decline in mortality (especially Infant) due to tremendous progress in medical science and health sector. Fertility declined at a much slower pace inspite of dynamic role played by family planning movement. The gap between fertility and mortality was very wide (by 9 to 10 points), according to sample registration scheme reports of 1981. The family planning movement initiated to reduce fertility rate failed as 'education' a vital component in making decisions was totally neglected. The levels of fertility and literacy were more or less same. The total literate population of India, according to 1981 census, was 36.0 percent whereas the fertility rate was 33.3 percent.

The situation of States selected for the study provide a dismal picture. Kerala is the only state which could bring down the rates of fertility and mortality. The factors which helped in reducing the overall growth rate were - low birth rate, high literacy rate, higher age at marriage and better medical and health facilities. The decadal growth rate in 1981 was 24.7 percent compared to previous growth rates of 24.8 and 21.5 in 1971 and 1961 respectively.

Assam's growth rate has always been over the national average, nearly 34.0. The reasons for higher growth rate is because of in-migration. The population of Assam in 1961 was 11 millions with a growth rate of 34.9 and in 1971 the population increased by 3 million

and growth rate was 34.7. The estimated population of Assam in 1981 was as census could not be conducted due to disturbances.

Orissa's growth rate has been over national average upto 1971 census, 25.0 but in 1981 it was 19.7. Orissa's population is marked by high death rate and low birth rate.

Tamil Nadu's population grew at a steady pace and the growth rate in 1981 was 7.5 points less than the national average of 24.7 and 4.8 points less than that of 1971's growth rate of 24.8.

Rajasthan and Uttar Pradesh have a very unusual demographic profile. In spite of heavy out-migration and lower growth rate, Uttar Pradesh has remained on the top position throughout the census years. It accounted for 16.7 percent of nation's population in 1981. The growth rate was less than 20.0 percent but in 1981 it increased to 25.4. Rajasthan's growth rate in 1981 was highest of all the States in India and throughout the census years it had growth rate over national average. Rajasthan's growth rate in 1961 was 26.2 and the same in 1981 was 32.3 which shows an increase by 6.1 points.

Census is the most authentic source of age returns. But throughout the census counts, since inception, errors have been prominent. The discrepancies have been from 1 to 1.5 percent every census. Apart from under and over enumeration, preference for digits like 0 and 5 are conspicuously found. The concentrations at ages ending in digits 0 and 5 is high in Rajasthan and Uttar Pradesh and around 55 percent of population is judged from Myer's index followed by the States of Orissa and Tamil Nadu with a range of 40 percent to 50 percent. Kerala has low concentrations on these digits

in 1981. On the contrary, in 1971, the concentrations were 50 percent on digits 0 and 5 in Rajasthan and Uttar Pradesh and in rest of the States the concentration was low. The age data may be considered as relatively better in Kerala followed by in Tamil Nadu. The poorest age data are found in Rajasthan, Uttar Pradesh whereas in Assam and Orissa the returns are slightly better.

The overall sex ratio of India tilts in favour of males. Higher female mortality in the early years of life is a cause for low sex ratio in India. Maternal mortality rate is also higher due to very little gap in child deliveries. The sex ratios shows large inter-regional variations. The position of women in southern zone is much better than other zones. Kerala is the only exceptional state which has more number of females than males. The sex ratio in Tamil Nadu has been increasing consistently. In Assam the sex ratio showed decline whereas Orissa had sex ratio a little over the national average. Rajasthan and Uttar Pradesh had sex ratio below national average in all the census years.

The system of registering birth and death statistics through civil registration system is quite old, but the results obtained by this source were not accurate and reliable. Without a reliable system the statistics were obtained by indirect methods. Introduction of sample registration system in 1966 helped in achieving a correct picture of vital events. The birth rate gradually declined due to rise in age at marriage, education, participation of women in non-domestic activities and above all the family planning campaign. Kerala showed tremendous decline in birth rate. It was 38.9 in 1951-61 and in 1981 it was 25.6. Tamil Nadu had birth rate lower than Kerala - 34.9 in 1951 - but the figure shows an increase by 2.4 points. (BR 28.0 in 1981). Rajasthan and Uttar Pradesh showed slight changes in birth over three decades.

(Rajasthan 1951-42.7; 1981-37.1 and Uttar Pradesh 1951-41.5; 1981-39.6). Assam experienced a slight rise in birth rates whereas in Orissa the birth rate declined faster. Urban fertility is lower than rural fertility.

Mortality differentials can be found in the States of India inspite of the progress made in medical science. Kerala had lowest death rate of 6.6 and Uttar Pradesh had highest of 16.3. The rest of the States fall in between. Like fertility differentials, mortality in urban areas was less than in rural areas.

Infant mortality rate is directly linked with birth rates. The highest the birth rates, the higher the infant mortality rates. Uttar Pradesh and Rajasthan are notable examples. Kerala and Tamil Nadu have low birth rates and low infant mortality rates.

Migration is an important component after fertility and mortality. Assam experienced heavy in-migrants into the State due to employment opportunities in plantations. Kerala, Rajasthan, Tamil Nadu and Uttar Pradesh experienced net out-migration.

Projections of India's population began in 1950's under the auspices of planning commission. The differences between the census figures and projected figures exist because of changes in fertility and mortality and also in their baseline populations. India's population is going to touch the billion mark by the turn of the century according to various projected figures. The difference between actual census figures and projected figures have been 16 million and 15 million in 1971 and 1981 respectively. The regional distribution of population shows marked increase in 2001. Uttar Pradesh's population is going to increase by 41 million, Rajasthan's by 17 million followed by Orissa's and Kerala's by

9 million and Tamil Nadu's and Assam's by 8 million by 2001 over 1981 census count.

India's population has reached third stage of demographic transition and it must make planned programmes in reducing the fertility with more vigorous efforts, in the next few years for a low growth rate.

BIBLIOGRAPHY

- Agarwal S.N.
1966
India's Population Problems
Vora and Co. (Pvt.) Ltd., Bombay
and Allahabad.
- Baines, J.A.
1893
General Report on census of
India, 1891.
Her Majesty's Stationary Office,
London.
- Barclay, G.W.
1958
Techniques of population Analysis
John Wiley and Sons Inc. New York.
- Bergman, E.
1973
Hopes, expectations and realities -
the record of bilateral population
assistance. In International Journal
of Health Services (Editors)
Navarro V. Taylor C.E. Hall, M.F.
- Bhattacharjee and
Shastri
1976
Population in India, Vikas Publishing
House Pvt. Ltd., New Delhi.
- Bhore J.
1946
Report of the Health Survey and
Development Committee
Volume II, Recommendations,
Manager of Publications, New Delhi.
- Census of India, 1961
1963
AGE tables, Paper 2 of 1963, Controller
of Publications, Delhi
1966
Migration Tables Part II-C(iii),
Controller of Publications, Delhi
1970
Vol. VII, Kerala, Part I-B, Report
on vital statistics of the decade
and fertility survey; Controller
of Publications, Delhi.
- Census of India, 1971
1972
Civil Registration system in India -
a perspective, Controller of
Publications, Delhi.
1973
A portrait of population - Orissa.
Controller of Publications, Delhi.
1973
A portrait of population - Uttar Pradesh
Controller of Publications, Delhi.
1974
A portrait of population - Kerala.
Controller of Publications, Delhi.

- 1977 Age tables, Paper 3 of 1977
Controller of Publications, Delhi
- 1977 Migration Tables, Part II D (1),
Table (D-I to D-IV)
Controller of Publications, Delhi.
- Census of India, 1981
- 1983 Key population statistics based
on 5 percent sample data,
Controller of Publications, Delhi.
- 1984 Age Tables, Paper 5 of 1984
Controller of Publications, Delhi.
- Cox P. 1976 Demography, Vikas Publishing Pvt. Ltd.
New Delhi.
- Davis K.
1951 The Population of India and Pakistan,
Princeton University Press, Princeton.
- Gopaldaswamy R.A.
1954 A Scheme for improvement of population
data.
Office of the Registrar General,
Ministry of Home Affairs, India,
New Delhi.
- Jain S.P.
1966 State Growth rates and their component
In (ed) Bose, Ashish et al
Patterns of Population growth
Allied Publishers, Delhi.
- Kohli, K.L.
1977 Mortality in India - A statewise study
Sterling Publishing Pvt. Ltd.,
New Delhi.
- Lewis, G.J.
1982 Human Migration - A geographical
perspective.
Croom Helm, London, Canberra.
- Lind, H.
1969 Internal migration in Britain
In (ed) Jackson, J.A.
Migration - sociological studies, 2
Cambridge University Press, Cambridge.
- Martin J.T.
1924 General report on census of India 1921
Vol. I, Part I, Calcutta
Superintendent Govt. Printing Press,
Calcutta.
- Mauldin W.P.
1967 The Population of India In The
Population of the World.
Voice of America Lecturers
Higginbothams (P) Ltd., Madras

- McCutcheou R.
1979 Limits of a modern world - A survey of the limits to growth debate. Butterworths, London Boston.
- Mitra A.
1968 Problems of Internal migration and urbanisation in India. In Indian Demographic Bulletin Vol. I No.1.
- Mukherjee S.B.
1976 The age distribution of Indian Population: A Reconstruction for the States and territories 1881-1961, East-West Population Institute, East West Centre, Honolulu.
- Myer's R.J.
1940 Errors and bias in the reporting of Ages in census data. Transactions of the acturial society of America. Part 2, Vol.104, Oct,-Nov.
- Nair, G.P.R.
1974 Decline in birth rate in Kerala: A Hypothesis about Inter-relationship between demographic variables, health services and education. Economic and Political weekly Vol. 9, Nos. 6-8 (Annual)
- Narayan A and Raman S. 1985 Population: Its various dimensions, New Delhi. Career and Competition times Vol. 6 No.8 (Times of India Publication), New Delhi.
- Natarajan D.
1971 Intercensal growth of Population, Manager of Publications, Delhi.
- Office of the Registrar General and Census Commissioner
1970 Report on survey of causes of death 1966 and 1967. Vital Statistics Division.
1973 Sample Registration of Births and Deaths in Assam - 1973. Sample Registration Unit.
1974, 1978 Sample Registration Bulletin, Vital statistics division.
1981 and 1984.
- Park E. and Park K.
1979 Text Book of Preventive and Social Medicine. Messrs Banarasidas Bhanot, Jabalpur.

- Pollard A.H.
Yusuf F,
Pollard G.N.
1974
- Demographic Techniques, Australia
Pergamon Press.
- Premi M.K.
1974
- Some aspects of Population distribution
and Regional planning in (ed) Bose,
Ashish et al. Population in India's
development, Vikas Publishing House
(Pvt.) Ltd., New Delhi.
- 1982
- The Demographic situation in India.
East-West Population Institute,
East West Centre, Honolulu.
- Pressat, R.
1985
- The Dictionary of Demography,
Blackwell Reference, England, New York.
- Rajbanshi B.S. and
Gubhaju B.B.
1980
- The population of Nepal. Monograph No.6.
United Nations, New York.
- Ravenholt, R.E.
1973
- United States agency for International
development contribution In Inter-
national Journal of Health Services
(editors) Navarro V.; Taylor C.E.
and Hall M.F.
- Ravenstein E.G.
1885
- The laws of migration. Journal of
Statistical Society No.48
- Rele J.R.
1969
- Trends and significance of internal
migration in India. Sankhya series
B. Vol.31 parts 3 and 4.
- 1974
- Trends in fertility and family planning
In (Ed) Bose, Ashish et al. Population
in India's development 1947-2000.
Vikas Publishing House (Pvt.) Ltd.,
New Delhi.
- Salas R.M.
1979
- Population and the new International
development strategy.
UNGPA, New York
- Saxena, B.C.
1982
- Basic composition of the population
In Population of India (Monograph No.10)
United Nations, New York.
- Shryock H.S. and
Seigal J.S.
1971
- The methods and materials of Demography
United States, Department of Commerce.

- Sinha V.C. and Sacharia E.
1984
Elements of Demography, Allied Publishers Delhi.
- Srinivas M.N. and Ramaswamy E.A.
1977
Cultural and Human fertility in India, Oxford University Press, Delhi.
- Ueda K.
1983
Recent trends of mortality in Asian countries, South East Asian Medical Information Centre, Japan.
- United Nations
1952
Methods of Estimating total population for current dates. Annual I. Department of Social Affairs, Population division, New York.
- 1955
Methods of Appraisal of Quality of Basic data for population estimates Manual II. Department of Economic and Social Affairs, New York
- 1958
Multi-lingual Demographic Dictionary (English section). Population studies No.29, New York.
- 1973
Principles for vital statistics system, New York.
Handbook of population census methods Vol.III, New York.
- Visaria and Visaria L.
1981
Indian Population scene after 1981 Census - A perspective, Economic and Political Weekly Vol.XVI Nos. 44-46 (Annual)
- White P and Woods R.
1980
The geographical impact of migration, London and New York, Longman, New York.
- Year Book
1984
Ministry of Health and Family Welfare, Government of India, New Delhi