

**NATIONAL FERTILITY AND
MORTALITY SURVEY MAHARASHTRA 1980**

VOLUME I

**K. SIVASWAMY SRIKANTAN
VAIJAYANTI BHATE**

**GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
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Preliminary

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NATIONAL FERTILITY AND MORTALITY SURVEY

MAHARASHTRA 1980

VOLUME I

(Chapters 1 To 5)

K. SIVASWAMY SRIKANTAN

VAIJAYANTI BHATE

Population Research Centre
GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
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PREFACE

The National Fertility and Mortality Survey (NFMS) was originally planned to be conducted as a series of comparable demographic surveys in all the States of India. In the first phase six States were to be covered. However, the survey has been conducted so far only in Bihar, Maharashtra and Rajasthan. Moreover, in Bihar and Rajasthan the objective has been changed to conducting bench-mark surveys in selected districts for evaluating special population projects. Thus Maharashtra is the only State for which the National Fertility and Mortality Survey has been conducted as envisaged by the Population Research Advisory Council.

The major objectives of NFMS, Maharashtra were to estimate the fertility levels and differentials among the three rural regions and two urban zones of the State; to examine the linkages between fertility and its proximate variables such as age at marriage and contraception; to identify and assess the importance of socio-economic factors affecting fertility; to find the attitudes towards family planning and its prevalence by methods; and to estimate mortality levels and differentials by rural regions and urban zones giving special attention to infant and child mortality. The report is addressed towards these objectives and presents relevant findings.

The Population Research Centre of the Gokhale Institute of Politics and Economics undertook to conduct the survey, analyse the data and prepare a report for the State of Maharashtra. The Ministry of Health and Family Welfare of the Government of India provided a grant-in-aid for this survey. This grant was used for field work, data preparation and computer tabulations. The survey design, questionnaire construction, recruitment, training and supervision of the field staff,

preparation of code-books and the tabulation plan, analysis of data and the preparation of this report were done by the staff of the Population Research Centre in addition to their normal duties.

In the National Fertility and Mortality Survey, Maharashtra, data were collected from about 7,500 families spread over 100 villages and 44 urban blocks of the State. The field work was conducted during June to December 1980. The conduct and analysis of this large-scale survey required the cooperation and skills of many people to be completed successfully. The Director of the Gokhale Institute and the administration extended their support in all stages of the survey. Professor Kumudini Dandekar developed the questionnaires and shouldered the onerous responsibility of organizing and supervising the field work. My co-author, Smt. Vaijayanti Bhate was associated with all stages of the work from sample design to analysis. Smt. Sanjeevane Mulay assisted in developing the scrutiny and consistency checks. Smt's Surekha Nikam and Smita Bhawe contributed greatly to scrutiny, coding and analysis of the data. Shri Damodar Sardesai and his colleagues generated the computer tables needed for the analysis. Kumari Vidya Athale coordinated the computer output while Kumari Swati Saxena summarized the computer tables and also prepared mortality estimates by indirect methods. Our thanks are especially due to the rural and urban respondents who patiently and courteously gave the information that was sought.

There have been many local demographic surveys in Maharashtra. The Gokhale Institute was the first to initiate demographic surveys in India. It is, therefore, fitting that it should have again taken the lead in conducting a state-wide fertility and mortality survey. It is hoped that this report would encourage other States to undertake comparable demographic surveys that would reveal regional differences within their States.

Regional demography is important for many reasons. There

are socio-cultural variations within a State that lead to differentials in fertility levels, in contraceptive use, in age at marriage, in family size values and other associated factors. The health and social infrastructure might vary from one region of the State to another aiding or hindering the implementation of health and family planning programmes. Unless the relevant facts are established and analysed to reveal such regional differences, it may not be possible to achieve the aggregate goals of a population or health policy formulated for the State.

Social demography has a crucial role to play in evolving a population policy and in setting up long-term demographic goals since such goals depend not only on the programme infrastructure and performance but also on social values and institutions. For instance, it is social change that generates a demand for family planning and promotes the utilization of health and other social services. A socio-demographic survey, such as NFMS, is an essential instrument for the study of social demography.

It is not possible to cover all aspects of social and regional demography in one report. This report is intended to summarize the main findings from the survey. It is, no doubt, necessary to examine some of these findings in greater depth. It is also necessary to explore the implications of these findings for the population policy and programmes. These special studies are to be taken up by the Population Research Centre later.

Deccan Gymkhana
Pune

31st December 1982

K. Sivaswamy Srikantan
Professor-in-Charge
Population Research Centre
of the Gokhale Institute
of Politics and Economics

NATIONAL FERTILITY AND MORTALITY SURVEY,
MAHARASHTRA, 1980

Main Report

CONTENTS

CHAPTER 1. DESIGN OF THE SURVEY

Introduction; major objectives; domains of study; size and scope of the survey; concepts, definitions and the questionnaires; recruitment and training of investigators and field organization; scrutiny, editing and coding of data and preparation of punch cards; tabulation plan for the electronic computer; analysis and preparation of the report; time schedule of survey operations, analysis and preparation of report; survey expenditure.

CHAPTER 2. SAMPLING DESIGN ESTIMATION AND NON-RESPONSE

Sampling Design - information available for sampling; sampling skills of interviewers; unit of sampling; sample size; type of sampling design; rural design; urban design. Estimation and Weighting - rural sample; urban sample; sampling error and design efficiency - sampling error according to NFMS design; sampling error according to simple random sampling (SRS); design effect and efficiency of the sampling design. Non-Response - non-response of families; non-response of eligible women.

CHAPTER 3. DEMOGRAPHIC PROFILE OF MAHARASHTRA

Introduction; age structure and sex-ratio; marital status by age and age at marriage; Scheduled Castes and Tribes and Muslims; educational level; summary of findings.

CHAPTER 4. DEMOGRAPHIC, SOCIAL, ECONOMIC AND HEALTH BACKGROUND CHARACTERISTICS

Introduction; demographic characteristics; social characteristics; economic characteristics; health environment; indicators of modernization; summary of findings.

CHAPTER 5. CURRENT FERTILITY AND MORTALITY RATES AND DIFFERENTIALS

Introduction; differentials by domains; socio-economic differentials in vital rates; patterns of age-specific fertility rates; patterns of age-specific mortality; summary of findings.

CHAPTER 6. FAMILY FORMATION AND CUMULATIVE FERTILITY

Introduction; differentials by background variables; measures of cumulative fertility; family formation and cumulative fertility; cumulative fertility

differentials by concomitant characteristics; ideals about age at marriage, family size and educational aspirations for children; summary of findings.

CHAPTER 7. FAMILY PLANNING: KNOWLEDGE AND USE

Introduction; knowledge and use of methods; source of supply and after effects of oral pill, condom and IUD; age and parity at sterilization and after effects; mean parity and mean number of living children by family planning knowledge and use in relation to educational level and community type; summary of findings.

CHAPTER 8. INDIRECT ESTIMATES OF FERTILITY AND MORTALITY LEVELS

Introduction; indirect methods of mortality estimation; the Brass method and its variants; the Preston method; corrected death rates for ages 10 and over and comparison with SRS rates; indirect estimation of infant mortality rate from NFMS data on birth histories of women; male and female life tables for Maharashtra, 1980; comparison of NFMS 1980 mortality rates with SRS rates; adjustment of the birth and death rates for response errors; summary of findings.

CHAPTER 9. QUALITY OF DATA AND RESPONSE ERRORS

Introduction; quality of age returns; response errors; summary of findings.

APPENDIX A TO CHAPTER 1

The questionnaires used in the survey.

APPENDIX B TO CHAPTER 6

Indirect estimation of mean parity to ever married women.

APPENDIX C TO CHAPTER 8

Brass and Preston methods for indirect estimation of the death rate.

GLOSSARY OF DEMOGRAPHIC CONCEPTS AND DEFINITIONS

LIST OF TABLES : NFMS MAHARASHTRA 1980

<u>Table Number</u>	<u>Title</u>
1.1	Time Schedule by Completion of Survey Operations, Analysis and Preparation of Report
1.2	Expenditure by Major Heads
2.1	List of Villages and Urban Centres Selected in the Sample
2.2	Comparison of Unweighted and Weighted CBR, CDR and Mean Family Size from the Rural Sub-Sample
2.3	Weights for Estimation by Urban Sample Blocks (wards)
2.4	Unweighted and Weighted CBR, CDR and Mean Family Size Estimated for (1) Urban Centres Excluding Greater Bombay and (2) Greater Bombay Using 20 Blocks Each
2.5	Number of Sample Families Selected, Substitutes Not Utilized, Families Outside the Universe of Study' and Percentage Non-response
2.6	Percentage Distribution of Non-response by Reason
3.1	Percentage Distribution of Persons by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980
3.2	Percentage Distribution of Males by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980
3.3	Percentage Distribution of Females by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980
3.4	Percentage Distribution of Males 10 Years and Above by Age Groups: 1971 Census and NFMS Maharashtra, 1980
3.5	Percentage Distribution of Females 10 Years and Above by Age Groups: 1971 Census and NFMS Maharashtra, 1980
3.6	Females Per 1,000 Males by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980
3.7	Percentage of Ever Married to Total by Sex by Age Group: 1971 Census and NFMS Maharashtra, 1980
3.8	Percentage of Currently Married Women to Total Women by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980
3.9	Singulate Mean Age at Marriage by Sex: NFMS Maharashtra, 1980, Compared to 1971 Census
3.10	Percentage of Scheduled Castes, Scheduled Tribes and Muslims to Total Population by Sex: 1971 Census and NFMS Maharashtra, 1980

<u>Table Number</u>	<u>Title</u>
3.11	Percentage Distribution of Males by Educational Level in Broad Age Groups: 1971 Census and NFMS Maharashtra, 1980
3.12	Percentage Distribution of Females by Educational Level in Broad Age Groups: 1971 Census and NFMS Maharashtra, 1980
4.1	Percentage Distribution of Heads of the Families according to Age, Sex and Marital Status
4.2	Percentage Distribution of Families according to Migration Status and Duration of Stay at Current Place of Residence
4.3	Family Size, Male and Female Adults and Non-Adults Per Family
4.4	Changes in Average Family Size in the Last Two Years
4.5	Percentage Distribution of Males by Birth, Non-migrants and Immigration by Reason During Last Two Years
4.6	Percentage Distribution of Females by Births, Non-migrants and Immigration by Reason During Last Two Years
4.7	Percentage of Ever Married to All Women in Selected Age Groups by Caste Cum Religion
4.8	Percentage of Ever Married to All Women in Selected Age Groups by Literacy/Educational Attainment
4.9	Percentage Distribution of Families by Caste-Cum-Religion
4.10	Enrolment Rates (ER) by Levels and Age Ratios (AR) for Males, Females and Persons
4.11	Percentage Distribution of Families by Main Occupation
4.12	Percentage Distribution for Males and Females by Their Main Occupation
4.13	Average Family Size, Earners by Sex Per Family and Average Unemployed Males
4.14	Percentage Distribution of Families by Annual Family Income
4.15	Percentage Distribution of Families by Annual Per Capita Income
4.16	Percentage Distribution of Rural Families by Land Owned, Cultivated and Irrigated
4.17	Percentage Distribution of Rural Families by Income from Agriculture as Percentage of Total Income
4.18	Percentage Distribution of Families by Type of Housing

<u>Table Number</u>	<u>Title</u>
4.19	Percentage Distribution of Families by Source of Drinking Water
4.20	Percentage Distribution of Families by Access to Latrine
4.21	Prevalence Rate of Disability and of Illness Per 1,000 Persons by Age Group
4.22	Percentage Distribution of Families by Lighting Facility
4.23	Percentage Distribution of Families by Household Durables
5.1	Percentage Distribution of Families by Caste-Cum-Religion
5.2	Percentage Distribution by Main Family Occupation
5.3	Percentage Distribution by Annual Family Income
5.4	Births Per 1,000 Population by Caste-Cum-Religion
5.5	Births Per 1,000 Population by Main Family Occupation
5.6	Births Per 1,000 Population by Annual Family Income
5.7	Deaths Per 1,000 Population by Caste-Cum-Religion
5.8	Deaths Per 1,000 Population by Main Family Occupation
5.9	Deaths Per 1,000 Population by Annual Family Income
5.10	Percentage Rate of Natural Increase by Caste-Cum-Religion
5.11	Percentage Rate of Natural Increase by Main Family Occupation
5.12	Percentage Rate of Natural Increase by Annual Family Income
5.13	Age Specific Fertility Rate for Married Women
5.14	Age Specific Fertility Rate for All Women
5.15	Age Specific Fertility Rates for All Women and for Married Women for Rural Regions
5.16	Comparison of Age Specific Fertility Rates for All Women: SRS 1972 and NFMS Maharashtra, 1982
5.17	Urban as Percentages of Rural ASFR and ASMFR
5.18	ASMFR of Married Women and Non-Contracepting Married Women and Per Cent Family Planning Impact
5.19	Age Specific Mortality Rates for Males

<u>Table Number</u>	<u>Title</u>
5.20	Age Specific Mortality Rates for Females
5.21	Crude Death Rate (Unweighted) and Standardized to Maharashtra Age Distribution by Sex
6.1	Percentage Distribution of Currently Married Women 15-50 Years by Age Group
6.2	Percentage Distribution of Currently Married Women by Years Since First Marriage
6.3	Percentage Distribution of Currently Married Women by Age at First Marriage
6.4	Average Age at Marriage of Currently Married Women by Age Group
6.5	Percentage Distribution of Currently Married Women by Educational Attainment
6.6	Percentage Distribution of Currently Married Women by Educational Attainment of Husband
6.7	Average Number of Live Births Per Currently Married Woman by Sex and Whether Living or Dead; Average Age of Woman; and Sex-ratio of Children at Birth and of Living Children
6.8	Average Number, Per Currently Married Woman, of Live Births, Still-births, Miscarriages and Conceptions; Still-birth Rate and Miscarriage Rate
6.9	Percentage Distribution of Currently Married Women by Number of Conceptions
6.10	Percentage Distribution of Currently Married Women by the Number of Children Ever Borne
6.11	Percentage Distribution of Currently Married Women by Number of Living Children
6.12	Average Number of Children Ever Borne Per Currently Married Woman by Age Group and Age-Standardized Average
6.13	Mean Parity for Currently Married Women, Ever Married Women and All Women
6.14	Average Number of Living Children Per Currently Married Woman by Age Group and Age-Standardized Average
6.15	Average Number of Living Sons Per Currently Married Woman by Age Group and Age-Standardized Average
6.16	Average Number of Living Daughters Per Currently Married Woman by Age Group and Age-Standardized Average
6.17	Average Number of Children Ever Born Per Currently Married Woman by Duration of Marriage and Duration-Standardized Average

<u>Table Number</u>	<u>Title</u>
6.18	Average Number of Living Children Per Currently Married Woman by Duration of Marriage and Duration-Standardized Average
6.19	Mean Parity and Age Standardized Mean Parity Per Currently Married Woman by Caste-Cum-Religion
6.20	Mean Parity and Duration Standardized Mean Parity Per Currently Married Woman by Caste-Cum-Religion
6.21	Mean Parity and Age Standardized Mean Parity Per Currently Married Woman by Educational Level of Woman
6.22	Mean Parity and Duration Standardized Mean Parity Per Currently Married Woman by Educational Level of Woman
6.23	Mean Parity and Age Standardized Mean Parity Per Currently Married Woman by Educational Level of Husband
6.24	Mean Parity Per Currently Married Woman by Age at First Marriage
6.25	Mean Parity Per Currently Married Woman by Age at First Delivery
6.26	Mean Parity and Standardized Mean Parity Per Currently Married Woman by Caste-Cum-Religion by Age at First Marriage for Maharashtra
6.27	Mean Parity Per Currently Married Woman by Age at First Marriage by Duration of Marriage
6.28	Percentage Distribution of Currently Married Women by Ideal Number of Children
6.29	Average, Per Currently Married Woman, of Ideal Number of Children by Sex and Ideal Age at Marriage for Males and Females
6.30	Average Ideal Age at Marriage for Women by Caste-Cum-Religion
6.31	Percentage Distribution of Currently Married Women by Children Ever Borne Compared to Children Wanted
6.32	Percentage Distribution of Currently Married Women by Level of Education Desired for Daughters
6.33	Percentage Distribution of Currently Married Women by Level of Education Desired for Sons
7.1	Percentage Distribution of Currently Married Women by Knowledge of Modern Contraceptive Methods
7.2	Percentage Distribution of Currently Married Women by Number of Contraceptive Methods Known
7.3	Percentage Distribution of Currently Married Women by Number of Contraceptive Methods ever-used

<u>Table Number</u>	<u>Title</u>
7.4	Percentage Distribution of Currently Married Women by Contraceptive Method Ever-Used
7.5	Percentage Distribution of Currently Married Women by Contraceptive Method Currently Used
7.6	Current and Ever User Rates Per Thousand Married Couples (With Wife Aged 15 to 50) by Method of Contraception
7.7	Rate of Non-Users of Contraception Per 1,000 Married Couples (With Wife Aged 15 to 50) by Duration of Marriage
7.8	Percentage Distribution of Currently Married Women by Specific Age Groups, by Contraceptive Method Currently Used, by Additional Children Wanted or Not Wanted
7.9	Percentage Distribution of Currently Married Women, by Specific Age Groups, by Knowledge of Modern Contraceptive Methods by Additional Children Wanted and Not Wanted
7.10	Percentage Distribution of Currently Married Women by Source of Condom and Oral Pill
7.11	Percentage Distribution of Ever Users of the Pill by Reported Inconvenience
7.12	Percentage Distribution of Ever Users of IUD by Source of Device
7.13	Percentage Distribution of Ever Users of IUD by Inconvenience
7.14	Percentage Distribution of Ever Users of IUD by Age at Start of IUD Use
7.15	Percentage Distribution of Ever Users of IUD by Number of Children at Start of IUD Use
7.16	Percentage Distribution of Ever Users of IUD by Shift from IUD to Other Methods
7.17	Percentage Distribution of Sterilized Couples by Years Since Sterilization
7.18	Percentage Distribution of Sterilized Couples by Age of Wife at Sterilization
7.19	Percentage Distribution of Sterilized Couples by Age of Husband at Sterilization
7.20	Percentage Distribution of Sterilized Couples by Place of Sterilization
7.21	Percentage Distribution of Sterilized Couples by Number of Children Living at Sterilization
7.22	Percentage Distribution of Sterilized Couples by Number of Sons Living at Sterilization

<u>Table Number</u>	<u>Title</u>
7.23	Percentage Distribution of Vasectomies and Tubectomies by Post-operative Troubles
7.24	Percentage Distribution, Mean Parity and Mean Number of Children Living Per Currently Married Woman by Age Group by Knowledge of Contraceptive Methods
7.25	Percentage Distribution, Mean Parity and Mean Number of Children Living Per Currently Married Woman by Age Group by Contraceptive Currently Used
7.26	Percentage Distribution and Mean Parity Per Currently Married Woman by Education by Knowledge of Contraceptive Methods
7.27	Percentage Distribution, Mean Parity and Mean Number of Living Children Per Currently Married Woman by Educational Level by Contraceptive Currently Used
7.28	Percentage Distribution and Mean Parity of Currently Married Women by Caste-Cum-Religion by Contraceptive Currently Used
8.1	Partial Birth and Death Rates for the Application of Brass Method
8.2	Partial Birth Rate Adjusted for Changing Growth Rate by Sex for Applying the Modified Brass Method
8.3	Correction Factor for Each Cumulated Age Group by Sex by Preston and Brass Methods of Indirect Estimation of Underestimation of Deaths
8.4	Comparison of Correction Factors for Males and Females by Several Indirect Methods
8.5	Comparison of Uncorrected and Corrected NFMS Death Rate with SRS Rate for Ages 10 and Over by Sex
8.6	Comparison of Corrected and Uncorrected Death Rates by Sex by Cumulated Age Groups from NFMS, 1980 with Those from SRS, 1975
8.7	Male Life Table for Maharashtra State: NFMS, Maharashtra, 1980
8.8	Female Life Table for Maharashtra State: NFMS, Maharashtra, 1980
8.9	Life Table Parameters from Census and NFMS Maharashtra, 1980 by Sex for Rural and Urban Areas
8.10	Comparison of Indirectly Estimated Death Rates from NFMS with SRS Rates for Ages upto 10, for Ages 10 and Over and for All Ages by Sex
8.11	Estimation of CBR and CDR, Unweighted for Individual and Family Cards, Weighted for Family Cards and Adjusted for Events Reported in Individual Cards

<u>Table Number</u>	<u>Title</u>
8.12	Correction Term from Reinterview by Difference Method and Vital Rates Corrected for Response Error
8.13	Comparison of NFMS Rates Corrected for Response Error with SRS Rates for Relevant Years
9.1	Age Ratios at Selected Months for Those Under 2 Years and Selected Age for Those Above 2 Years of Age by Sex
9.2	Digit Preferences in Age Reporting as Measured by Myer's and Whipple's Indices
9.3	Births to Usual Members of Families during Two Years Period as Reported at Interview by the Number as reported at Reinterview
9.4	Deaths to Usual Members of Families during Two Years Period as Reported at Interview by the Number as Reported at Reinterview
9.5	Average Number of Male Adults, Female Adults, Male Non-adults, Female Non-adults in the Family and Average Family Size at Interview and Reinterview
9.6	Measure of Association, Response Error and Off-diagonal Proportion for Specific Variables

LIST OF MAP AND GRAPHS

<u>Map/Graph Number</u>	<u>Title</u>
Map 1.1	Distribution of Sample Villages and Urban Centres over Maharashtra State: NFMS Maharashtra, 1980
Graph 7.1	Cumulative Percentage of Couples Sterilized by Calendar Years: NFMS Maharashtra, 1980
Graph 8.1	Regression of Partial Birth Rate on Partial Death Rate for Males: NFMS Maharashtra, 1980
Graph 8.2	Regression of Partial Birth Rate on Partial Death Rate for Females: NFMS Maharashtra, 1980
Graph 8.3	Regression of Partial Birth Rate Less Growth Rate on Partial Death Rate for males: NFMS Maharashtra, 1980
Graph 8.4	Regression of Partial Birth Rate Less Growth Rate on Partial Death Rate for Females: NFMS Maharashtra, 1980

CHAPTER 1

DESIGN OF SURVEY

Introduction

The Population Research Advisory Council of the Government of India in its meeting held in October 1978 recommended the conduct of a fertility and mortality survey in seven selected States of India on lines similar to the World Fertility Survey. The states to be included in the first stage were, Bihar, Kerala, Maharashtra, Madhya Pradesh, Rajasthan, Tamil Nadu and Uttar Pradesh. However, the survey has been so far conducted only in the three States of Maharashtra, Bihar and Rajasthan. The Population Research Centre of the Gokhale Institute of Politics and Economics undertook to conduct this survey, analyse the data and prepare a report for the State of Maharashtra. The Ministry of Health and Family Welfare of the Government of India provided a grant-in-aid towards conducting the National Fertility and Mortality Survey (NFMS) in Maharashtra.

Major Objectives

There were five principal objectives behind the NFMS conducted in Maharashtra during 1980.

1) The fertility levels and differentials among major rural regions and urban zones and for Maharashtra State were to be estimated.

2) The relationships with fertility of variables proximate to it such as age at marriage and family planning practice were to be examined.

3) Fertility differentials by socio-economic factors were to be identified and assessed.

4) The practice of family planning methods and attitudes towards them were to be ascertained.

5) The mortality level and mortality differentials among major rural regions and urban zones and for Maharashtra

State were to be estimated, giving particular attention to infant and child mortality.

The NFMS has two rather distinctive objectives compared to other demographic surveys such as those sponsored by the World Fertility Survey. Not only fertility differentials but also current fertility levels including the crude birth rate are to be estimated in NFMS. Moreover, in NFMS mortality data are also to be collected and analysed for levels and differentials.

Empirical study of these major aspects of fertility and mortality is expected to yield important findings of relevance to the national health and family welfare programme and the country's population policy. *A separate paper is to be prepared on these issues.* The final chapter of this report is addressed to these issues.

Domains of Study

To study the differentials among the geographical divisions three rural regions and two urban zones were demarcated, taking into account broad ecological demographic, social, cultural, historical and economic features. The rural area of the State of Maharashtra was divided into the three regions of Aurangabad Division, Nagpur Division and Western Maharashtra. Aurangabad Division consisted of the rural areas of the five districts of Aurangabad, Bhir, Nanded, Parbhani and Osmanabad. Nagpur Division consisted of the rural areas of the eight districts of Akola, Amravati, Buldhana, Chandrapur, Bhandara, Nagpur, Wardha and Yeotmal. Western Maharashtra consisted of the rural areas of twelve districts of Ahmednagar, Dhule, Jalgaon, Kolaba, Kolhapur, Nasik, Pune, Ratnagiri, Sangli, Satara, Solapur and Thane. The cities and towns included in the sample from the urban areas other than Greater Bombay were Alore, Aurangabad, Badnera, Dombivali, Ichalkaranji, Nagpur, Pauni, Pune City and Cantonment, Satara, Shirgaon, and Solapur. Greater Bombay was preferentially included in the sample. These rural and urban divisions are characterised by rather distinct ecological, social, demographic and economic features.

Size and Scope of the Survey

The survey was conducted in a sample of 100 villages by interviewing 50 families in each selected village in rural Maharashtra and in 104 urban blocks by interviewing 25 families in each selected block in the chosen urban centres of the State. Map 1.1 shows the distribution of the sample villages and urban centres over Maharashtra State.

The details of the sampling design are given in Chapter 2. In this survey, 4,993 rural families and 2,661 urban families were interviewed giving a total of 7,654 sample families from which data were collected and are analysed in this report. Data were obtained by the direct interview method, on socio-economic characteristics of families and/or individuals enumerated in them. Information was collected regarding births and deaths occurring in the interviewed families during a period of two years preceding the date of the interview. More detailed information for all married women aged 15 to 50, regarding their age at marriage, maternity history, knowledge and practice of family planning, as well as their attitudes and ideals on such matters as family size, education of children and age at marriage was also obtained.

From the data collected in the survey, estimates are given for the crude birth and death rates, age specific fertility and mortality rates, and contraceptive acceptance and prevalence rates including sterilization. Fertility and mortality differentials specific to geographical divisions and socio-economic classes are also examined.

Concepts, Definitions and the Questionnaires

In this survey the family was defined on a de jure basis as the usually resident members related by blood or marriage. However, all families in the chosen dwelling unit using a common kitchen were to be interviewed even if such families were not related to each other by blood or marriage. For instance, the

family of a servant staying in the dwelling unit should also be interviewed, if that family had not made separate cooking arrangements.

Every member who was normally residing with the family was included in it even if he/she was absent temporarily on the date of the interview. For example, if a daughter-in-law was visiting her parents' home and had delivered a baby there, she and her new born baby were listed as members of her husband's family. On the other hand, a married daughter visiting her parents' home was not included as a usual member there. Similarly, a son or daughter studying away from home was not counted as a usual member of his/her family if he/she was away for a year or more.

Since fertility and mortality rates were to be estimated from the survey data on the basis of the population and women distributed by specific characteristics such as age, the de jure (usual) family appears to be the more appropriate unit of enumeration.

Two questionnaires were used in this survey. The family questionnaire consisted of seven pages arranged in three blocks. In Blocks I and II, information was obtained on the general characteristics of the family such as caste and religion, principal and subsidiary family occupation, approximate annual income, migration status, condition of the house, household amenities and possession of modern objects. In Block III, data regarding social and demographic characteristics and the migration status of individuals in the family were collected. Detailed information regarding births and deaths that occurred during a period of two years preceding the date of interview was also collected in Block III. Births to usual residents and to visitors were to be noted separately as also the deaths of usual residents and visitors.

The second questionnaire was complementary to the family questionnaire and information was to be filled in for all

currently married women aged 15 to 50 in the sample families. If there were more than one eligible woman in the family, a separate questionnaire was to be filled in for each eligible woman. On the average, 1.2 complementary woman questionnaires were filled in per family.

This questionnaire was comprehensive containing 16 pages divided into 8 blocks from IV to XI. Block IV was an identification block for the eligible woman and Block V obtained data regarding age, age at marriage, literacy and educational attainment of the woman and her husband. In Block VI details of the woman's maternity history and summary figures on children ever borne were recorded.

In Block VII data were obtained on knowledge, attitude and practice of family planning, and contraceptive history including sterilization. More detailed information was obtained for sterilized couples and for IUD acceptors such as side effects, complaints, treatment and user satisfaction.

In Blocks VIII and IX information was collected on the last two deliveries for the eligible woman if she had the last delivery within the five years preceding the date of interview. Information regarding place of delivery (home or hospital), lactation, post partum amenorrhoea and immunization was obtained for the last two deliveries.

Attitude towards contraception was asked in Block X and ideals for family size, age at marriage, education of children were ascertained in Block XI. In the same block, information regarding physical disabilities among the members of the family and illnesses during the year preceding the date of interview was collected. English versions of the main and complementary questionnaires are given in Appendix A. The questionnaires were actually administered in Marathi.

Before finalising the questionnaires, they were pretested in a sample of about 50 families in rural Maharashtra and

necessary changes were made in the light of the problems encountered.

Recruitment and Training of Investigators and Field Organization

This large-scale survey required ad hoc recruitment of 41 investigators. As a substantial part of the data to be collected related to maternity and contraceptive history, it was decided to recruit women investigators since they could establish better rapport with women respondents than men investigators.

Several problems were faced in the recruitment of women investigators. As the major part of the interviewing was to be done in rural areas, the investigators had to be prepared to work in villages. If they were residents of other villages or towns, making special arrangements for their stay in each of the sample villages for about a week proved a difficult task. Hence recruitment of local women or residents of nearby villages was preferred as they would be able to make their own arrangements for staying in the sample village during the investigation. Strenuous attempts were made to locate suitable women investigators in or around the sample villages by contacting schools and social service agencies in the chosen talukas. Married and educated women were preferred to others. In these circumstances, the minimum educational requirement was relaxed from graduate level to S.S.C. level, provided that the woman had some experience in social or survey work.

As most of the women recruited for this survey had no prior experience in interviewing, a short-term training programme was arranged for them. Before the training began, detailed instructions were prepared in Marathi for filling in the two questionnaires and were supplied to the investigators. Full time training was conducted for a period of one week at the Population Research Centre of the Gokhale Institute in Pune. The training was given to three batches of investigators during the following periods:

1.7

1. From 17-5-1980 to 23-5-1980 (12 Investigators),
2. From 2-6-1980 to 7-6-1980 (13 Investigators) and
3. From 11-8-1980 to 16-8-1980 (16 Investigators).

During the training, the objectives of the survey and the concepts and definitions of the items included in the questionnaire were explained in order to avoid ambiguities and to maintain uniformity in data collection. The PRC staff participated in the training, shared their experience in field work and gave instructions on how to approach the respondents in general and the rural families in particular to ensure their cooperation.

To gain practical experience, each trainee was asked to visit the nearby slum areas and to fill in two questionnaires under the guidance of the PRC staff. The mistakes made in these interviews were scrutinized and explained.

In this survey, sample families for investigation were identified by selecting voters from the electoral rolls for the village and the urban block. The procedure of tracing and locating the sample families for interview was explained during the training. In all, forty-one investigators were trained of whom five were discontinued for unsatisfactory performance.

The survey questionnaires were rather long, containing 22 pages, and an investigator was expected to fill in five to six questionnaires a day. For field supervision of the investigators, men supervisors with previous experience in survey field work were recruited and given training in filling the socio-demographic questionnaires used in this survey. For this task, men were preferred to women because of their superior mobility and easy access to other men in the interviewed families.

About two weeks after the field work started, the supervisor took a round of the sample areas under his control, met the investigators, checked their work, clarified their doubts and corrected their errors. The ability and understanding

of the investigators were checked in the first supervisory visit. This was crucial because mistakes had to be corrected at the first opportunity.

The supervisor, in the later visits, was required to check, on the spot, ten per cent of the questionnaires in order to ensure that the proper sample families had been identified and interviewed and that the information obtained was reliable. Besides this, the supervisor had to check all the forms filled in by the investigators for internal consistency and to correct the mistakes detected. All these procedures were followed to improve the quality of the data collected. In a later chapter an assessment is made of the data quality in terms of indirect estimates of vital rates and in terms of response errors. The completed schedules were brought to PRC, Pune by the supervisors.

Hundred villages, with 50 families from each, and 104 urban blocks, with 25 families from each, were interviewed by the investigators during the period June 1980 to December 1980. The numbers of villages and blocks completed by each investigator varied according to her availability and efficiency as shown by the following frequency distribution:

Rural		Urban	
No. of villages covered by the investigator	No. of investigators*	No. of blocks covered by the investigator	No. of investigators*
1	2	2	1
2	10	4	14
3	4	6	4
4	1	18	1
5	1		
6	1		
7	1		
8	1		
14	1		
16	1		
<u>Total</u>	<u>23</u>	<u>Total</u>	<u>20</u>

* Of the 41 trained investigators, hired on ad hoc basis, only 36 were continued as 5 were discharged for poor performance. Among these 36, 7 investigators worked both in rural and urban areas. 94 villages and 100 blocks were covered by them. The remaining 6 villages and 4 blocks were completed by a regular investigator from PRC, Pune. These figures should help to reconcile the numbers given above.

The investigators were paid on piece-rate basis. Taking into account the difficulties of a woman investigator in residing in the sample village during the period of enquiry, the travelling charges to and from the village to her nearby place of residence were allowed up to a specified limit unless she was a local woman who could arrange for her own stay.

After taking various steps outlined above to get reliable data, it was felt that, none the less, response errors were bound to arise in some items of information for several reasons. It was particularly suspected that data on such items as the number of deaths occurring during the two years preceding the date of interview might be under-reported. Hence, to assess the response errors in such items, all the families interviewed in a sub-sample of 44 villages and 33 blocks were reinterviewed by the supervisors with regard to these and related items. The extent of response errors is assessed later in this report by comparing the original with the reinterview response.

Scrutiny, Editing and Coding of Data and Preparation of Punch Cards

The scrutiny, consistency checks and editing of the completed questionnaires were started immediately after the investigation was over in the first few villages so that the coding and the punching of the data could proceed concurrently with the field work. Before coding the information in the questionnaires, the data were first scrutinized for errors and for internal consistency. Ten new temporary appointments were made for coding the data. The purpose, design and questionnaires of the survey were explained to the coders and they were instructed in coding procedures and consistency checks. Work norms were prescribed for coding operations. The quality and output of the coders were controlled by the PRC staff.

Seven sub-cards were designed to code the survey data. Sub-card 1 contained family characteristics and summary totals for the family of the number of married women aged 15 to 50

and adult and non-adult earners, the vital events of births and deaths, and maternity and disability data. Sub-card 2 was devised for coding socio-demographic information of individual members of the family. Sub-card 3 contained information on births and deaths during the two years preceding the date of interview. Sub-cards 4, 5 and 6 were used for coding the information on age, age at marriage, fertility, contraception including sterilization and data on attitudes to family size and family planning, complaints regarding contraceptives, etc., for married woman aged 15 to 50. Sub-card 7 provided data for matched families from the original interview and the reinterview for the sub-sample. Care was taken to include in the sub-cards all variables that would be needed in the analysis since the tabulations were to be done by an electronic computer using the punched cards as data inputs.

Over 60,000 cards were punched in all from the seven sub-cards as shown below:

Sub-card	Number of cards punched		
	Rural	Urban	Maharashtra
1	4,993	2,661	7,654
2	12,945	6,472	19,417
3	2,195	922	3,117
4	6,067	2,807	8,874
5	6,067	2,807	8,874
6*	6,425	3,087	9,512
7	2,192	856	3,048
Total	40,884	19,612	60,496

* The number of cases for sub-card 6 was more than for sub-cards 4 and 5 because the attitude questions were asked of all adult married women, including those aged over 50.

The punched cards were subject to cent per cent verification. These cards provided the input to the electronic computer for generating the basic tables required in the analysis.

Tabulation Plan for the Electronic Computer

A detailed tabulation plan was drawn up on the basis of the seven sub-cards to generate the tables essential for the analysis. Five different units of tabulation were used. The family tables from sub-card 1 were based on 54 original and 19 recoded variables. There were 67 marginal tables and 41 cross tables relating to the background characteristics and the averages of the family size and the numbers of births and deaths per family. The total number of families tabulated was 7,654.

The second unit of tabulation was the individual family member. These tabulations were generated to provide the distribution of persons and eligible women by age and other characteristics as given in sub-card 2. Fourteen original, eight recoded and five transferred variables were used in these tabulations to obtain 21 marginal tables and 20 cross tables. The number of individuals tabulated was 48,054.

The third set of tabulations used vital events - either births or deaths - as the units of tabulation. These tabulations were needed in the analysis to calculate current birth and death rates, specific for age and other socio-demographic characteristics. There were 2,871 births and 752 deaths reported in the survey. The variables used in this set came from sub-card 3. Eighteen original, six recoded and five transferred variables were used to obtain 19 marginal and 21 cross tables.

The fourth unit of tabulation was the eligible woman who was married and aged 15 to 50. These tabulations provided, specific to age groups, fertility rates, children ever born, contraceptives used and other relevant characteristics of the woman. Hence these tabulations relate to the most important aspect of the report namely, fertility differentials by

demographic and social characteristics. Sub-cards 4 to 6 provided the required data. The numbers of original, recoded and transferred variables used and the numbers of marginal and cross tables generated in this set of tables for eligible women are shown below:

Sub-card	Number of variables				Number of tables	
	Original	Re-coded	Transferred	All	Marginal	Cross
4	32	15	8	55	43	46
5	18	1	0	19	18	26
6	10	0	0	10	10	12
Other recodes	0	11	0	11	11	20
Total	60	27	8	95	82	104

The number of eligible women used in this set of tables was 8,874.

The fifth and final set of tables was obtained for comparing the original with the reinterview response. The unit of tabulation was the family and the total number of units was 3,042. Sub-card 7 provided the needed data. Twenty-five original and 13 recoded variables were used to generate 23 marginal and 30 cross tables.

Separate tabulations were made for the following domains of study:

Rural regions

- 1) Aurangabad Division,
- 2) Nagpur Division and
- 3) Western Maharashtra;

Urban zones

- 4) Urban centres other than Greater Bombay and
- 5) Greater Bombay.

As mentioned earlier, these domains have distinctive ecological, social, demographic and economic features that are relevant to

the study of fertility and mortality in Maharashtra.

The sampling design utilized the electoral rolls for the selection of families but failed to ensure self-weightage in the tabulation of the families. As described in Chapter 2, suitable weights were used to obtain unbiased estimates of the vital rates. However, in the study of fertility and mortality differentials by other characteristics, an unweighted tabulation was used since it produced results which were not much different from the weighted tabulations.

The electronic computer system at the Poona University, International Computers Limited 1904 Scientific on operating system George 3, was used to prepare the five sets of tables from over 60,000 punched cards. Test runs were first made to check the computer programmes before the actual data were tabulated. The computer print out was scrutinized and collated for the analysis.

Analysis and Preparation of the Report

The analysis initially involved the examination of the marginal and cross tables for consistency. The results were compared over the domains of study and interpreted. The current vital rates were directly calculated from the tables. Age specific rates and differentials by socio-economic characteristics were next obtained. Some indirect methods for independently estimating the vital rates from incomplete and inaccurate data were also used. The demographic and socio-economic determinants of fertility and mortality were examined.

The analysis was directed towards the following major topics: comparison of the demographic profile of Maharashtra from the NFMS with the Census profile; background family characteristics; current birth, death and growth rates; age distribution, age at marriage and fertility differentials of currently married women; family planning attitudes and practice; indirect estimation of fertility and mortality;

infant and child mortality and life tables; response errors and the assessment of the quality of survey data. The differentials among the three rural regions and among the rural areas, urban centres other than Greater Bombay and Greater Bombay were examined under each topic. Other differentials by social and demographic characteristics were also examined.

The substantive part of the report is arranged by the topics mentioned in the preceding paragraph. Two chapters have been added at the beginning of the report to describe the objectives and the methodology of the survey, one on the design of the survey and the other on the design of the sample, estimation and non-response. ^{separate paper is to be written} A final chapter has been added summarizing the findings, drawing up the conclusions and discussing their implications for the family planning programme and for the population policy as far as Maharashtra State is concerned.

Time Schedule of Survey Operations,
Analysis and Preparation of Report

Planning for the statewide NFMS survey began late in 1979. However, the actual questionnaires were prepared and pretested during January-February 1980. The sampling design was developed and the sample drawn concurrently. The training of the first batch of investigators was completed in May. Field interviews were carried out from June to December, 1980. Scrutiny and editing was done concurrently. The code-book was ready by June 1980. Coding and checking was done from July 1980 to January 1981. The data were transferred to punch cards from October 1980 to January 1981. The tabulation plan for the computer was prepared in January-February, 1981. Computer runs were tested during February-May 1981. The data were transferred from cards to the disc and files were created during May-August 1981. The various sets of computer tables were produced during August 1981-February 1982. The computer runs were scrutinized by March 1982 and analysis of these tables was completed by May 1982. The draft tables for inclusion in the

report were prepared by June 1982. The report was drafted during July-September, 1982. Table 1 presents the time schedule of completion of operations by items of work.

Advanced planning and the carrying out of operations concurrently, if feasible, reduced potential bottlenecks in field operations, processing and computer tabulations to a large extent. This enabled us to prepare the NFMS Report in a relatively short time. The entire analysis and the preparation of the report was done by the regular staff of the PRC, in addition to their normal duties.

Survey Expenditure

A grant-in-aid of Rs. 2.94 lakhs was sanctioned by the Ministry of Health and Family Welfare to PRC, Pune for conducting a National Fertility and Mortality Survey in Maharashtra. The grant was used in meeting the expenditure connected with field-work, data preparation and computer tabulations. Since the original budget allocation for data preparation and computer tabulations was found insufficient, the Ministry's approval was sought and obtained for revised allocations within the original ceiling for the total expenditure. The total expenditure on field work, data preparation and computer tabulations, and office establishment came to Rs. 2.81 lakhs. The analysis and the preparation of the report was done entirely by the PRC staff in addition to their regular work. Hence these items of work were not charged to the grant-in-aid.

Table 1.2 summarizes the major components of expenditure. About Rs. 96 thousand was spent on field work in payments to the interviewers, their travelling and daily allowances and in supervisory expenditure. Office expenditure on stationery, printing, typist and peon amounted to another Rs. 43 thousand. Expenditure on data preparation - editing, coding, punching, verification, transfer to computer disc and preparation of files - and data processing by the computer came to Rs. 129

thousand. A five per cent overhead charge of Rs. 13 thousand was paid to the Gokhale Institute for administering the survey and for providing the supporting services.

As with all other projects undertaken by the Institute, the survey was administered with prudence and frugality, while the quality of the data collected was maintained by advance planning and adequate training and supervision of the interviewers.

Map 1.1 : Map of Maharashtra State Showing Distribution of Sample Villages and Urban Centres: NFMS Maharashtra, 1980

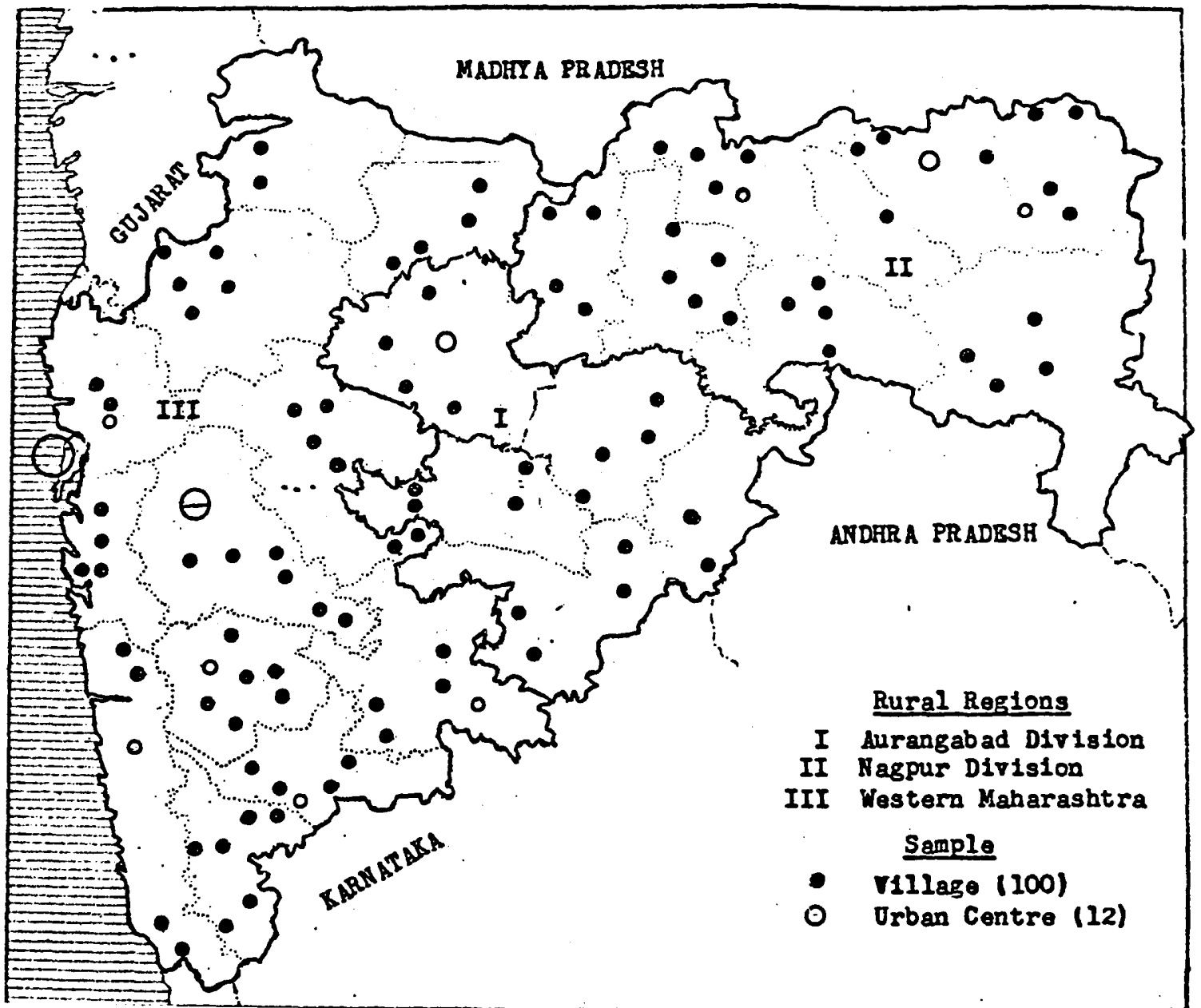


Table 1.1: Time Schedule by Completion of Survey Operations,
Analysis and Preparation of Report : NFMS
Maharashtra 1980

Item of Work	Period of Completion
1. Planning and designing the survey	Late 1979
2. Preparation of questionnaires and pretest	Jan. - Feb. 1980
3. Sampling design and selection	Jan. - Feb. 1980
4. Recruitment and training:	
I Batch	17.5.1980 to 23.5.1980
II Batch	2.6.1980 to 7.6.1980
III Batch	11.8.1980 to 16.8.1980
5. Field work : Interviewing and supervision	June - Dec. 1980
6. Scrutiny and editing	July 1980 - Jan. 1981 (Concurrent with field work)
7. Preparation of code books	May - June 1980
8. Coding and checking	July 1980 - Jan. 1981 (Concurrent with field work)
9. Punching	Oct. 1980 - Jan. 1981
10. Preparation of tabulation plans	Jan. - Feb. 1981
11. Testing computer runs	February - May 1981
12. Transfer of data from cards to disc	May - August 1981
13. Tabulation :	
Families	Aug. - Sept. 1981
Persons	Sept. - Oct. 1981
Births & Deaths	November 1981
Married women	Dec. 1981 - Feb. 1982
14. Scrutiny of computer tables	Oct. 1981 - March 1982
15. Analysis of computer runs	March - May 1982
16. Preparation of draft tables	May - June 1982
17. Preparation of report	July - Sept. ^{Dec} . 1982

Table 1.2: Expenditure by Major Heads : NFMS
Maharashtra, 1980

(Rs. '000)	
Expenditure item	Amount
Field work	96
Data preparation* and computer tabulations	129
Stationery	6
Printing of schedules	14
Typist and peon	23
Overheads at 5%	13
Total	281
Original budget ceiling	294

* Editing, coding, punching, verification, transfer from cards to computer disc and creation of files.

Block II - Information about the standard of living of the household

201 Number of rooms in the house

202 Type of residence

1. Independent house
2. Independent block in an apartment house
3. Multiple households living in an irregular house
4. Chawl
5. Hut
6. Slum
7. Other (Specify)

Does the house have a plinth? Yes/No

203 Source of lighting

1. Electric light
2. Kerosene lamp (protected flame)
3. Kerosene lamp (unprotected flame)
4. Others (Specify)

204 Source of drinking water

1. Running tap -
 - A. Independent tap
 - B. Common tap
 - C. Public tap
2. Well -
 - A. Owned well
 - B. Public well
 - C. Other's private well
3. Tube well -
 - A. Owned tubewell
 - B. Public tubewell
4. Tank
5. River
6. Others (Specify)

204-A Is the water supply adequate? If not, for how many months is it adequate?

205 Latrine facility

1. Independent latrine
2. Common latrine (Among how many households?)
3. Public latrine
4. No latrine facility

206 Total land owned

207 Total land cultivated

208 A - Size of cultivated land (irrigated)

B - Size of cultivated land (unirrigated)

A.3

209 Annual agricultural income

210 Do you own any of the following equipment?

	<u>No.</u>	<u>No.</u>
1. Bullock cart		8. Harvesting machine
2. Plough		9. Threshing machine
3. Tractor		10. Flour mill
4. Oil engine		11. Gobar gas plant
5. Electric pump		12. Hay cutter
6. Tube well		14. Others (Specify)

211 Do you own any of the following animals:

	<u>No.</u>	<u>No.</u>
1. Bullocks		6. Hens
2. Cows		7. Ducks
3. She-buffaloes		8. Donkeys
4. Goats		10. Others (Specify)
5. Sheep		

212 Do you have any of the following items?

	<u>No.</u>	<u>No.</u>
1. Cot		11. Bicycle
2. Table		12. Motor-cycle
3. Chair		13. Scooter
4. Wooden cupboard		14. Car or jeep
5. Steel cupboard		15. Radio/transistor
6. Clock/Watch		16. T.V.
7. Sewing machine		17. Refrigerator
8. Electric fan		18. Mixer

Block III-A - Information about the usual residents of the household - Total Adults Males Females
 Nonadults Boys Girls

Sr. No.	Name of the person	Sex M/F	Age in completed years	Relation to the head of the household	Marital status	If at school, standard in which studying	If not at school, literate/illiterate. If literate, level of education last attained	Occupation Main Sub-	Whether earning yes/no	Last year's income	If not residing in the household two years ago	Previous place of residence	Reason for moving in	Month and year of moving in
---------	--------------------	---------	------------------------	---------------------------------------	----------------	--	--	----------------------	------------------------	--------------------	--	-----------------------------	----------------------	-----------------------------

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Block III-B - Information about those who were usual residents of this household two years ago but are no more living in this household

Sr. No.	Name of the person	Sex M/F	Age	Relation to the head of the household	Marital status	Reason for not living in the household at present	If moved out			Reason for moving out	When moved out	
							Village/ Town/ City	Tahsil	District		Month	Year
1.												
2.												
3.												
4.												
5.												
6.												

326 - In addition to what you have already mentioned, are there any other persons who are not included in the list of members such as infants, small children, other relatives, domestic servants, friends or lodgers who usually stay here? Yes/No. If yes, fill the information in the relevant table.

Block III-C - Information about births that took place in the household during last two years

327. During the past two years did any live or still-birth occur here to any woman who is a normal resident or a visitor to the household? - Yes/No
328. During the past two years did any live or still-birth occur to any woman of this household outside this village (or town) - Yes/No

 Information about the birth Births to residents Births to visitors

329. Name of the mother and her serial number as in block III-A
330. Relationship of the mother to the head of the household
331. Sex of the baby born
 M/F
332. Date of birth
333. If live birth, baby alive or not?
334. If alive, present age in months
335. If dead, age at death
336. Town/village of delivery
337. Place of delivery -
 Home/Institution
338. If home, type of attendance -
 Doctor/Trained/
 untrained dai/
 Midwife/Relatives/
 Friends
-

Block III-D - Information about deaths occurring in the household during the past two years

339 Did any normal resident of this household or visitor to the household die during past two years? Yes/No
If yes, number of deaths

Information about deaths	Death of the resident		Death of the visitor	
	1	2	1	2

340. Name of the deceased

341.- Relationship of the deceased to the head of the household

342. Sex - M/F

343. Age at death -

1. If more than two years, write in complete years

2. If less than two years, write in months

344. Date of death

Date - Month - Year

345. Village/Town of death
Tahsil
District

346. Place of death
Home/Institution

347. Period of medical treatment

348. Type of medical care
- Doctor/Vaidya/Hakim/
Others (Specify)

349. Expenses of medical treatment

350. Cause of death

Block VI - Birth history

- 601 Number of your sons staying with you
- 602 Number of your sons not staying with you
- 603 Number of daughters staying with you
- 604 Number of daughters not staying with you due to marriage or other reasons
- 605 Are all your sons alive? Yes/No
If not, how many are dead?
- 606 Are all your daughters alive? Yes/No
If not, how many are dead?
- 607 Total no. of live births
- A - All =
- B - Sons =
- C - Daughters =
- 608 Were there any still-births? Yes/No
If yes, how many?
- 609 Did you ever have any abortion? Yes/No
If yes, how many?
- 610 From the above, it seems that you have had a total of _____ deliveries and out of them _____ were still-births. Is it correct? Now we have to enquire in detail about each of these deliveries in right sequence and note the information in the table given on next page.

Information about all deliveries and abortions

Sr. No.	Birth/Still-birth/Abortion	Age of mother at the time of the event	Sex of the baby M/F	Name of the baby	Date of birth	Living or dead	If living, age	Place of residence	Whether married	If dead		
										Age at death	No. of years passed since death	Cause of death
	612	613	614	615	616	617	618	619	620	621	622	623
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												

- 624 Are you pregnant now? Yes/No
If not -
- 625 What was the date of your last monthly period?
- 626 Are you suspecting pregnancy?
- 627 Have you reached menopause?
If pregnant or suspecting pregnancy
- 628 Month of pregnancy
- 629 What would you like to have?
 Boy/Girl/Neither/Don't care/Can't tell
- 630 Do you want to have more children sometime in addition
 to the one you are now expecting? Yes/No
 If yes, how many more? _____ Boys _____ Girls
- 631 1. Since the onset of present pregnancy have you registered
 your name in a Primary Health Centre/Sub-Centre/Govt.
 or non-Govt. Hospital/Maternity home? Yes/No
 2. If yes, how many visits have you paid?
- 632 If 'No' to 631
 1) Why have you not registered?
 2) Will you be registering later?
 3) Where and when?
 4) If you are not going to register, do you propose
 to have your delivery at home?
- 633 During this pregnancy, did any of the following persons
 visit you at home? If yes, how many times?
 1. Nurse 2. Midwife 3. Community Health Worker
 4. Someone from Maternity & Child Health Centre
 5. Others (Specify)
- 634 Since your current pregnancy, have you received any
 advice regarding family planning either for spacing
 children or limiting births? If yes, from whom? What
 advice did you receive?

Block VII - Contraception

- 701 There are various ways by which a couple can delay or avoid
 the next pregnancy. Do you know of or have heard of any
 methods or ways? Yes/No
- 702 State the methods you know of or have heard of.

For each method ask the question separately and enter the replies
 in the columns in the following table

Family planning method	Source of knowledge	Ever use
703. Pill		
704. Loop		
705. Other contraceptive methods for women		
1. Diaphragm		
2. Contraceptive jelly		
3. Foam tablets		
4. Contraceptive cream		
706. Condom		
707. Female sterilization		
708. Male sterilization		
709. Safe period method		
710. Withdrawal		
711. Abstinence		
712. Other methods (Specify)		
713	Have you practised any of the contraceptive methods including sterilization? Yes/No.	
714	If you have never practised contraception, or have temporarily stopped practising, what are the reasons?	
715	Do you propose to practise contraception in future? Yes/No	
	If yes, 1. At what age? 2. After how many children? 3. Which method?	
716	If you are currently practising contraception (including sterilization)	
	1. Which method?	
	2. For how many months have you/your husband been using this method?	
	3. Are you practising regularly?	

Fill in the following columns for those who have ever practised contraception (including sterilization). (If there is a break in the use of the same method, give one column each to different periods of use.)

	(1)	(2)	(3)
717. Method used			
718. Period of use			
719. After how many deliveries? and after how many days after the delivery?			
720. Did you use it regularly? Regular/Irregular/Most of the times			
721. From where did you bring the devices?			
722. Reason for practising contraception, limiting births/Spacing births			
723. Who took the initiative to use this method?			
724. Reason for changing the method or for having a break in the use of the same method			
725. Break (in months) in use of contraceptive device			
726. Name of the method used after the break			

For sterilized couples

- 727. Who got sterilized? Husband/Wife/Both
- 728. Age at sterilization Husband _____ Wife _____
- 729. Date of sterilization
- 730. Place of sterilization
- 731. Why did you get sterilized?
- 732. Who motivated you for undergoing sterilization?
- 733. Did you get sterilized voluntarily or otherwise?
- 734. Was the sterilization successful?
- 735. Did you have any physical trouble after the sterilization?
- 736. Type of trouble and duration of trouble
- 737. Did you take any medical treatment for the same? Yes/No

- 738 If yes, where?
Govt. Hospital/Private Hospital/Primary Health Centre/
Indigenous medicines/Others (Specify)
- 739 Was the treatment useful?
- 740 What were the expenses?
- 741 How would you rate the after-care facilities offered by
the Government or the concerned authorities?
Excellent/Very good/All right/Not so good/Very bad/
Too much neglect
- 742 What is the reason for the above in your view?
- 743 How far are you satisfied with the sterilization? Very
much satisfied/Somewhat satisfied/Not much satisfied
- 744 Give reason for your answer
- 745 How many living children did you have at the time of
sterilization?
_____ Sons _____ Daughters
- 746 What was the age of your youngest child when you or
your husband got sterilized?
- 747 How many of your children are living at present?
- For those women, who have ever used a loop or a copper-T
- 748 When was the loop/copper-T fitted? Month/Year
- 749 Are you still using it? Yes/No
- 750 If no,
1. For how many days, the loop was in position?
 2. Was it removed or expelled?
 3. Reason for removal, if removed
- 751 Did the doctor/health worker inform you about the
probable side effects of loop before loop-insertion?
- 752 Did you suffer from any discomfort or experience any
side-effects after loop-insertion? Yes/No
Type of trouble _____ Duration of trouble _____
- 753 Did you take any treatment for the trouble? Yes/No
- 754 If yes, where? If no, why?
- 755 Was the treatment useful to you?
- 756 What were the expenses?
- 737 After loop-insertion, did you go to the clinic for
check up? Yes/No
- 758 After loop insertion did any family planning/health
worker visit you for check-up?

759 Do you ever get the feeling that you should not have accepted the loop? Yes/No If yes, give reason

Block VIII - For those women, who had their last delivery during the last five years

801 Date of last delivery

Present age of the child

If dead, age at death

802 Had you registered for confinement your name at the time of your last delivery? Yes/No

If yes, where? If not, give reason for the same

803 During this pregnancy, did any doctor/nurse or health worker visit you? Yes/No

If yes, in which month of pregnancy? and how many times?

804 Did the health worker ever advise you about family planning? Yes/No

805 If yes, was the advice given before delivery or was it given after delivery?

806 Did you visit the health centre/private hospital/dispensary for your check-up after the delivery? Yes/No

807 If yes, where? If no, why?

808 Did any health worker from the health-centre visit you after this delivery? Yes/No, If yes, how many times during the first two months after delivery?

809 How many months after the birth of this child did you resume menses?

_____ months/Not yet got/Currently pregnant without having the onset of period after the last child birth

810 To which of the following categories does this woman belong?

1. Sterilized

2. Currently practising contraception

3. Not practising at present but has practised in the past

4. Never practised any method of contraception

811 Were you pregnant after your last delivery? Are you pregnant now?

812 Was there any abortion during this period? After how many months of pregnancy?

If the last child is living -

813 Do you still breastfeed this child?

Yes/No/Never breastfed

814 Age of the child when you started giving it supplementary food in addition to the breastfeeding

_____ months/Not yet started, completely breastfed

815 Does the child get any supplementary food from any public programme?

If yes, name the centre

What sort of food does the child receive?

816 Age of the child when you completely stopped breastfeeding it? _____ months

817 Has the child received the following immunizations?

	Whether immunised Yes/No	When
--	-----------------------------	------

1. Small-pox

2. BCG

3. Triple Antigen

4. How many injections or Triple Antigen?

Reason for not having all the three injections of Triple Antigen

818 Was the 'Polio'-dose administered to the child? When?

819 Was the vitamin 'A' dose administered to the child? When? How many times?

If the child is dead (information before the death of the child)

820 Did the child receive the following immunizations?

1. Small-pox Yes/No

2. B.C.G. Yes/No

3. Triple Antigen - No. of injections

821 Was the 'Polio' dose administered to the child?

822 Was the 'A' vitamin dose administered to the child?

823 How many months did you breastfeed the child?

_____ months/Till death/Never breastfed

824 Did you give any supplementary food to the child in addition to breastfeeding?

Block IX - About the last but one child born to the respondents of Block VIII

901 Name of the child

Date of birth

Age of the child

If dead, age at death

- 902 For how many months did you breastfeed this child?
_____ months/Never breastfed
- 903 How old was the child when you started giving it supplementary food?
- 904 When did you get your menses after the birth of this child? _____ months/Next pregnancy without the onset of the menses
- 905 Did you have any abortions during the interval between the last and last but one birth? Yes/No
- If yes, how many? and after how many weeks/months after the last but one birth?

Block X - Abortion(Ask these questions to all currently married women)

- 1001 Some women do something or have something done either by a midwife or by a doctor or in some other way to end a pregnancy that they do not want. They have an abortion. Do you approve of this?
- Approve/Approve only if done with proper medical approach/Do not approve/Cannot say.
- 1002 Would you approve of a women having an abortion if she has to face any of the following situations?
- Use the symbols ✓ and X for approval and disapproval for each of the following:
1. Life in danger due to pregnancy ()
 2. Possibility of giving birth to a mentally/physically disabled child ()
 3. Cannot afford financially the extra burden to the family ()
 4. The woman has been raped ()
 5. Pregnant though unmarried/widow ()
- 1003 Are you aware that in our country, induced abortion has been legalised and that women can have induced abortion free of cost in government hospitals? Yes/No
- 1004 Have you ever had any abortions yourself? Yes/No
- If yes, how many spontaneous? How many induced?

Block XI - Perception and opinion

- 1101 Do you/your husband earn enough to support your family? Yes/No/Somewhat sufficient
- 1102 In the present condition, one cannot have even enough food to eat. What is your experience?
- Enough to eat/Somewhat enough/Not enough

1103 Thinking of a family like your own, at what age would you say, sons start earning?

1104 Do you feel that for a family with meagre earnings, it would be better to have a limited family-size? Yes/No

About disability and illness in the family during the last year

1105 Is there any physically/mentally disabled person in your family? Yes/No

If yes,

Name of the person and type of disability

1.

2.

3.

1106 Was anybody ill in your family during last year? Yes/No

If yes,

Name	Age	Duration of illness	Cause of illness	Treatment taken	Work days lost due to illness
------	-----	---------------------	------------------	-----------------	-------------------------------

1.

2.

3.

4.

5.

Perception about the concept of large and small family and advantages and disadvantages of large and small families

1107 With how many children will you call a family 'large'?
 _____ or more children/Cannot tell

1108 With how many children will you call a family 'small'?
 _____ or less children/Cannot tell

1109 Advantages of a large family
 Disadvantages of a large family

- 1110 Advantages of a small family
Disadvantages of a small family
- 1111 If you had two more children, would your condition have been better or worse?
Cannot tell/Worse/No harm/No change/Better
- 1112 Why do you say so?
- 1113 How many sons and daughters make an ideal family in your view?
_____ Sons _____ Daughters
- 1114 If you think that it is necessary to have at least one (or two) son(s), give reason.
- 1115 If you think it important to have daughter, give reason.
- 1116 If Government decides to give pension to all old disabled persons, how many sons and daughters should a couple have?
_____ Sons _____ Daughters/Cannot tell.

Attitude towards age at marriage

- 1117 At what age in your view should the boys and girls get married?
Boys _____ Girls _____
- 1118 Do you have any idea about the legal minimum age at marriage for boys and girls?
Yes/No, If yes, Boys _____ Girls _____
(After getting the answer to this question, the investigator should tell the respondent that the legal minimum age at marriage for a boy is 21 and for a girl is 18.)
Do you think the legal minimum age to be a proper one?
Legal min.age higher/Proper/Lower/Cannot tell
- 1119 In your opinion what should be the minimum level of education up to which a boy or girl should be educated?
Boys _____ Girls _____

Investigator's comments about the information

1. How was the response?

Given readily and with clear understanding/Readily
 but the respondent's capacity was low/Reluctantly/
 Total refusal to answer some questions

2. Total time taken for the interview.

1)	Serial no. of visit	1	2	3
2)	Date of investigation			
3)	Time at commencing the interview			
4)	Was the interview completed?			
5)	If yes, total time taken for the interview.			
6)	If the interview was not over in the 1st visit mention the time period spent in each visit			
7)	Reason for an incomplete interview			
	A) The head of the household present but the married woman in the family could not be contacted			
	B) Refusal to give information			
	C) Address changed			
	D) Left the village/town/city			
	E) Could not trace the house			

CHAPTER 2

SAMPLING DESIGN, ESTIMATION AND NON-RESPONSE

SAMPLING DESIGN

In designing the sample for NFMS Maharashtra, 1980 two basic constraints were kept in view - the pattern of information available at the stage of drawing the sample and the capacity of the interviewers for making random selections of families in the field according to the design.

Information Available for Sampling

At the time of planning the survey, the published data from the 1971 Census and the District Census Handbooks were available, but the house listing operations for the 1981 Population Census had yet to be completed. The electoral rolls, listing registered voters 21 years and over, were available at the District Collector's Office. These were prepared in 1977 or later. The 1971 Census data and the electoral rolls were, therefore, used in designing the sample and for selecting the sample families.

Sampling Skills of the Interviewer

For conducting a fertility and mortality survey, two alternative types of field organization appeared feasible - either the recruitment of ad hoc interviewers, based in Pune, on regular salary for the duration of the field work; or the recruitment of local interviewers working on a regular or piece-rate basis. Only married women were considered suitable as interviewers since one of the main topics of study was reproductive and contraceptive behaviour of women. To ensure that the field interviews were conducted properly, it was decided that the women interviewers should have at least attained SSC level of education.

Accessibility of the sample village or town, availability of transport and travel costs, logistical support and arrangements for overnight stay of women would be the major problems encountered in sending a central pool of interviewers to the sample places. Local availability of persons with the requisite qualifications and their training and supervision would be the major problems in recruiting local interviewers. The local interviewers, because of their limited education, would have little or no skills in the preparation of a sampling frame or in drawing a random sample. Such interviewers would require close supervision to sustain the quality of their work. Outside interviewers would need close supervision to maintain a reasonable number of interviews per day. Also transport arrangements would have to be made and sufficient travel time would have to be allowed for them to reach the sample centre from the base.

In view of the meagre budget provided for the survey and the logistical problems involved in arranging for the transport and overnight stay of women interviewers, it was decided to recruit women interviewers only from the neighbourhood of the sample village or town and these women were given intensive training in Pune, prior to the field work.

Since the sampling design was to be tailored to interviewers lacking sampling skills, the selection of the rural and urban centres was made by the staff of the Population Research Centre, Gokhale Institute of Politics and Economics, Pune, and the selection of the sample families from each chosen centre was made by the supervisor from the electoral rolls of registered voters kept at the District Collector's Office. A list of the chosen families, with names and addresses, was prepared and given to the interviewer. This list included an adequate number of substitutes to be used if any selected family could not be traced or had moved out. Certain rules of substitution were enforced to avoid any bias, on the part

of the interviewer, in taking up the sample families for interview.

Unit of Sampling

The de jure members of the family usually living and eating together were defined to be the family unit. This usual family was the unit of analysis for the survey of fertility and mortality rates and differentials. For instance, a woman visiting her parents' home for delivering her baby was to be included in her husband's family, if it fell in the sample. However, if her parents' family fell in the sample, then she was to be regarded as an "outsider" and information about her delivery was to be obtained separately as a visitor but not as a usual member. If two or more families in a dwelling unit had common eating arrangements, all were to be interviewed. The usual family of the registered voter selected from the electoral rolls was, therefore, used as the unit of sampling also.

Sample Size

For comparable State estimates in the National Fertility and Mortality Survey, the Population Research Advisory Committee of the Government of India recommended that about 1,200 families should be interviewed for every 11 million population. On this scale, the Maharashtra Survey was expected to obtain about 6,000 interviews. Moreover, for each domain of study, the sample should be large enough to provide a separate estimate. The present survey was expected to yield estimates for the three rural regions of Aurangabad and Nagpur Divisions and Western Maharashtra and for urban centres other than Greater Bombay and for Greater Bombay. Hence 900, 1,450 and 2,643 family interviews were conducted in rural areas of Aurangabad and Nagpur Divisions and Western Maharashtra respectively; 1,561 family interviews were conducted in urban centres other than Greater Bombay and 1,100 family interviews were conducted in Greater Bombay. Thus for this survey, totally 7,654 family

interviews were conducted over Maharashtra State. The distribution of the interviews by domains was roughly in proportion to their populations. In the selected families, all married women in the reproductive ages of 15 to 50 were interviewed using a separate questionnaire. This resulted in 8,874 interviews of eligible women.

Type of Sampling Design

A three stage sampling design was used to select rural families, with the taluka as the first stage, the village as the second stage and the registered voter from the electoral rolls as the third stage. The families of the selected voters constituted the sample. Urban families were selected in four stages using the urban centre as the first stage, the electoral ward as the second stage, the page of the electoral rolls as the third stage and a cluster of families as the final stage.

Rural Design

The rural sample families were chosen in three stages, first selecting 50 talukas out of a total of 232, then selecting 2 villages within each chosen taluka and finally interviewing 50 families from each village. This number was determined mainly on the basis of a projected duration of a week's stay in the village which appeared to be optimal in relation to travel costs and arrangements for stay.

A list of talukas was prepared by districts and arranged alphabetically within each district. From this frame, 50 talukas were selected with probability proportional to their 1971 Census population. The list of talukas thus selected are shown in Table 2.1. Inspection of this list shows a satisfactory geographical spread of the talukas over the 25 rural districts of Maharashtra. This spread is also evident from Map 1.1 of Chapter 1.

From each of the 50 sample talukas, 2 villages were selected, again with probability proportional to the 1971 Census

population from an alphabetically ordered list. The frame for selection of villages in each taluka was available from the District Census Handbook. Of the 100 chosen villages, 10 were dropped because they had fewer than 80 households and 5 were dropped as they were inaccessible or because the village population was mainly tribal or largely Kannada speaking. These 15 villages were substituted by other villages chosen by the same procedure. The sample villages used for this survey are listed in Table 2.1.

From each chosen village, a sample of about 65 families was selected to allow for substitution. The larger villages were divided into a few distinct segments on the basis of the electoral rolls of registered voters and the sample size of 65 voters was then allocated proportionately to the segments. The names of voters were selected systematically, from each village, with a random start, from the voters list. The families of the 65 voters so selected constituted the sample for the village.

Of the 65 chosen families, 50 were to be interviewed. The extra 15 selected families served as substitutes when sample families did not exist, could not be traced or had moved out. Strict instructions were issued to the interviewers to spread the sampling units over all portions of the sample list of families and not to interview contiguously from any one segment of the list. Moreover, to avoid bias, the interviewers were instructed not to leave out large families from the sample.

The electoral rolls were kept at the District Collector's Office. The selection of families was done there by the supervisor, the sample list of families with their addresses was copied by him for each village and then given to the interviewer for conducting the survey interviews.

As this was a family survey, the institutional population, such as lepers in their colony, was excluded at its location. However, if such a person did belong to a usual

2.6

family which was selected in the sample, then (s)he was to be enumerated in that family as a usual member.

Urban Design

In the urban area, families were chosen in four stages, using urban centres, wards and pages of the electoral rolls as intermediate stages. Fifty-two urban centres were chosen with probability proportional to their 1971 Census population with replacement. Selected centres were retained according to their multiplicity of selection. For instance, Greater Bombay was selected 22 times, Pune City 6 times, and Nagpur and Aurangabad 4 times each. For each selection of the urban centre, two blocks were to be chosen. Thus 44 blocks were to be chosen from Bombay, 12 from Pune City, 8 each from Nagpur and Aurangabad, etc. The staff of the Population Research Centre, Gokhale Institute of Politics and Economics, selected the urban centres. Their list and the number of blocks chosen from each centre are given in Table 2.1.

Electoral wards in the selected urban centres were used as blocks and the requisite number was chosen systematically with a random start. In each chosen ward, seven pages from the electoral rolls were again selected systematically with a random start. One voter was selected from each page and his family address identified. One cluster of six families consisting of the chosen family and the five following ones constituted the sample from the chosen page. For the sample block, this provided 42 families including substitutes, of which 25 families were to be interviewed.

The selection of the required number of blocks and clusters of families was done by the supervisor at the District Collector's Office where the electoral rolls are kept. He copied the list of names and addresses in the selected clusters of families which was then given to the interviewer. As for the rural sample, in the urban sample persons residing in

institutions were enumerated only if they belonged to a usual family that was interviewed in the survey.

Twenty-five families were to be interviewed out of the sample of 42 families. The twenty-five interviews were determined on the basis of four or five days stay in the town which seemed optimal in relation to the travel cost. The seventeen additional families served as substitutes for families which were not traceable or had moved out. As it was feared that there might be more sample losses in Greater Bombay than in other urban centres, clusters of ten, instead of six, families were formed in Greater Bombay. Again seven clusters were chosen from each block. This provided a list of 70 families out of which 25 were to be interviewed.

To ensure an adequate spread of the families over the selected block, interviewers were instructed to obtain interviews from all the seven clusters and to get not more than five interviews from any one cluster. In order to avoid any bias in the sample, interviewers were warned against leaving out large families from the interview.

ESTIMATION AND WEIGHTING

The procedure of estimation is completely defined by the sampling design. For unbiased estimation in general, the value for each sample unit has to be weighted inversely in proportion to its probability of selection. If the weights are equal for all sample units, the design is termed "self-weighting". Then a simple average provides an unbiased estimate for the population parameter.

Rural Sample

For the National Fertility and Mortality Survey, as described earlier, the rural sample was chosen in three stages by selecting talukas, villages and families. An unbiased estimate of the rural aggregate is given by $\sum x(i,j,k) \cdot w(i,j,k)$

summed over the sample units,

where (i,j,k) = the index for the selected family (k) within the selected village (j) within the selected taluka (i);

x is the value of the characteristic and

w the weight for the selected family.

For the rural design,

$$\begin{aligned} 1/w(i,j,k) &= \text{expected number of times that the family} \\ &\quad (i,j,k) \text{ was selected in the sample} \\ &= (50P(i)/P) \cdot (2P(i,j)/P(i)) \cdot (50V(i,j,k)/V(i,j)); \end{aligned}$$

where P stands for the population and V for the number of voters and the indices i, j and k have the same meaning as before.

On the assumption that the proportion of voters to the population varies little from village to village, the inverse of the weight becomes roughly proportional to the number of voters in the family. Thus, according to the rural design, any family characteristic should be reweighted inversely by the number of voters in the family to obtain an unbiased estimate of the population aggregate.

As the number of voters was not readily available from the voters list, the number of adults 21 years and over in the family, as gathered in the survey, was used as its estimate. In fact, the families in the rural sample were reweighted by $96/A(i,j,k)$, rounded to the nearest integer, where A is the number of adults 21 years and over in the family (i,j,k). This gave a two digit weight for the family.

For a sub-sample of 20 villages, in two sets of 10 each, Table 2.2 compares the CBR, CDR and mean family size obtained by the appropriate weighted formula given above, with the corresponding unweighted estimate. These calculations were carried out by hand to assess the effect of the weighting and to estimate the sampling error, which is discussed in a later section.

The CBR was estimated as the ratio of the mean number of births per family to the mean family size and the CDR as the ratio of the mean number of deaths per family to the mean family size. The comparison of the weighted and unweighted estimates is summarized below.

	Mean family size		CBR		CDR	
	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted
First sub-sample of ten villages	5.60	6.52	32.2	32.4	9.8	8.1
Second sub-sample of ten villages	5.52	6.78	30.4	31.7	10.2	8.6
Combined sub-sample of twenty villages	5.56	6.65	31.3	32.0	10.0	8.4

First, it is seen that because of the selection of families from the voters' list, the larger families were over-represented in the sample, the unweighted mean family size being 6.65 against a weighted mean of only 5.56. Second, the CBR was slightly but systematically over-estimated in the unweighted compared to the weighted calculations while the CDR was systematically and moderately under-estimated in the unweighted calculations.

On the basis of these important findings, it was decided to use the weighted estimate for obtaining the CBR and CDR for different segments of the rural sample. However, as the weighting procedure added substantially to the computer work load, it was also decided to use the unweighted cross-tabulations for comparing differentials by other characteristics such as children ever born, living children and contraceptive use since the slight systematic biases introduced thereby, would cancel out in the differentials.

Urban Sample

As described previously, the urban families were chosen in four stages selecting successively urban centres, wards,

2.10

pages of electoral rolls and a cluster of families from each selected page. An unbiased estimate of the urban aggregate is $\sum x(i,j,k,l) \cdot w(i,j,k,l)$ summed over the sample units, where (i,j,k,l) = the index for the selected cluster of families (l) in the selected page (k) in the selected ward (j) in the selected urban centre (i);

x is the value of the characteristic and w the weight for the selected cluster of families. For the urban sample design,

$$\begin{aligned} 1/w(i,j,k,l) &= \text{expected number of times that the cluster} \\ &\quad \text{of families was selected in the sample} \\ &= (P(i)/P) \cdot (n(i)/N(i)) \cdot (1/N(i,j)) \cdot (n(i,j,k)/N(i,j,k)) \end{aligned}$$

where P stands for the population, n(i) and N(i), the sample and total number of wards in the ith urban centre, N(i,j) the number of pages in the voters list for the ward (i,j), and n(i,j,k) and N(i,j,k) are the number of voters in the selected sample cluster and in the selected page (i,j,k) of the voters list. Since Greater Bombay formed a separate stratum for the analysis, the formula was simplified for this domain.

As a cluster of 6 consecutive families (10 families in Greater Bombay) constituted the sample from the selected page of the voters list, the number of voters in the cluster was assumed to have a constant ratio to the total number of voters in that page of the list. Hence the last factor in the above formula was disregarded and the weighting factor therefore depended only on the urban centre and the ward. On this basis the weights for the wards were calculated and are shown by their identification codes in Table 2.3 for the chosen urban centres.

For a sub-sample of 20 sample blocks, in two sets of ten each from urban centres other than Greater Bombay, and an equal sample from Greater Bombay, the unweighted and weighted CBR, CDR and mean family size were calculated by hand in order to assess the effect of the weighting and to calculate the sampling

error which is discussed later. The means are shown in Table 2.4. Since the families were selected with roughly equal chance within the page of the voters list the weighting was applied only for the ward estimate. The CBR was calculated as the ratio of the mean number of births per family to the mean family size and the CDR as the ratio of the mean number of deaths to the mean family size. The results are summarized below.

	Mean family size		CBR		CDR	
	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted

Other Urban						
I sample of 10 blocks	6.45	6.37	29.6	30.4	7.8	7.8
II sample of 10 blocks	6.15	6.24	32.2	32.3	7.3	7.7
Combined sample of 20 blocks	6.25	6.30	31.3	31.4	7.5	7.8
Greater Bombay						
I sample of 10 blocks	6.28	6.39	22.8	23.8	3.7	3.8
II sample of 10 blocks	6.30	6.07	19.2	19.4	5.2	4.9
Combined sample of 20 blocks	6.17	6.23	21.2	21.7	4.4	4.3

The biases in the unweighted estimates, revealed by the above figures, are neither large nor systematic when compared to the weighted estimates. However, to maintain uniformity, the procedure decided for the rural areas was used for the urban areas also. The CBR and CDR were estimated using weighted means whereas differentials in the fertility measures, such as the children ever born, were estimated using unweighted cross-tabulations. As explained earlier, this was done to ensure that the vital rates are free from any bias in estimation while the differentials, which remain unaffected by systematic biases,

are cross-tabulated easily using simple counts or averages.

In combining the rural and urban vital rates to obtain the rates for the State as a whole, the proportions of the rural and urban populations from the provisional population totals of 1981 Census were used. These proportions of rural and urban populations were 0.65 and 0.35 respectively. Nearly the same proportions of rural and urban families were observed in the NFMS sample population.

SAMPLING ERROR AND DESIGN EFFICIENCY

The sampling error is a measure of the variation of the sample estimate from the population value which it estimates. Since all units of the universe are not completely enumerated in the survey, it is essential to provide the sampling error in order that valid inferences about the population parameters might be drawn from the sample. Also the estimation of the sampling error in key characteristics permits the comparison of the efficiency of different sampling designs.

From a properly designed and chosen probability sample, the sampling error can be estimated. However, like the formula for the estimation of a parameter, the formula for its sampling error has to be developed precisely according to the sampling design.

The sampling error is defined here as the standard deviation of an estimate arising from random variations due to the probability selection of a sample of units from the universe of study.

Sampling Error According to the NFMS Design

The sampling errors for rural areas, Greater Bombay and other urban areas are estimated in this section for three key parameters, CBR, CDR and mean family size.

As described in the section on Estimation and Weighting, in the rural sample, for obtaining the village estimates, families were weighted inversely in proportion to the number of adults aged 21 years and over and the villages carried

approximately equal weightage. Hence the sampling error was calculated from the weighted village estimates for a sub-sample of twenty villages given in Table 2.2, by the formula for equal probability selection of villages.

The sub-sample estimate of CBR (from births occurring in two years) was 31.14 with a sampling error of 1.8587. For a sample of 100 villages, the sampling error, reduced by the factor $\sqrt{20/100}$, was 0.8313. Thus a 95 per cent confidence interval for CBR would be 29.5 to 32.8, for the estimate based on the rural sample.

Using the same procedure for CDR, the estimate (from deaths occurring in two years), based on a sub-sample of 20 villages, was 9.81 with a sampling error of 1.0470. For a sample of 100 villages, the sampling error was calculated as

$$1.0470 \cdot \sqrt{20/100} = 0.4683$$

Hence a 95 per cent confidence interval for this estimate would be 8.9 to 10.8.

Calculations based on the sub-sample of 20 villages show that, for the actual sample design, the mean and sampling error for family size are respectively 5.62 and 0.1328. For 100 villages the sampling error would be 0.0594 and a 95 per cent confidence interval for the mean family size would be 5.5 to 5.7 members.

These estimates provide an indication of the errors due to sampling the rural families and are summarized below:

<u>Parameter</u>	<u>Estimate \pm s.e.</u>	<u>95% confidence interval</u>
CBR	31.14 \pm 0.8313	29.5 to 32.8
CDR	9.81 \pm 0.4683	8.9 to 10.8
MFS	5.62 \pm 0.0594	5.5 to 5.7

Since births and deaths in a two year period are comparatively rare events, the sampling error for CBR and CDR are proportionately larger than for the mean family size. In drawing inferences about all rural families from the sample, due allowance should be made for the sampling fluctuations in terms of

the sampling error.

Similar calculations were made for Greater Bombay and other urban areas. As given in Table 2.4, a sub-sample of 20 blocks was used in each of the two urban zones for estimating the sampling error in CBR and CDR. Since families within blocks were chosen with roughly equal chance, unweighted averages provided estimates for blocks. The block level estimates were weighted according to the sampling design. The unweighted standard deviation of the family size was calculated for a sub-sample of 100 families from each zone. The results are summarized below.

<u>Parameters</u>	<u>Estimate \pm s.e.</u>	<u>95% confidence interval</u>
<u>Other Urban Areas</u>		
CBR	31.33 \pm 1.2712	28.8 to 33.9
CDR	7.48 \pm 0.6310	6.2 to 8.7
MFS	6.25 \pm 0.1157	6.0 to 6.5
<u>Greater Bombay</u>		
CBR	21.20 \pm 1.2703	18.7 to 23.7
CDR	4.39 \pm 0.6598	3.1 to 5.7
MFS	6.17 \pm 0.0918	6.0 to 6.4

Both CBR and CDR are less but the mean family size is larger for urban compared to rural areas. However, since the sample sizes were smaller for the two urban zones and since the zones were more heterogeneous, their sampling errors are generally larger than for rural areas.

Sampling Error According to Simple Random Sampling (SRS)

It is useful to calculate and compare the sampling error according to the sampling design with that according to SRS in order to ascertain the loss or gain in efficiency due to the actual design that was adopted to suit the available pattern of information and the needs of the field organization. The SRS estimates were made for a sub-sample of 20 villages from the rural areas and of 20 blocks from each of the two urban zones.

The rural birth rate was estimated from the 20 village sub-sample as 31.14. The proportion of birth to the total population in the two year survey reference period was, thus, .062. Treating this as a binomial distribution, the sampling error of the annual crude birth rate for SRS would be

$$(1/2) \sqrt{(.062)(.938)/n} = 0.0014816$$

where n, the number of persons in the sub-sample, was 6623:

Similarly the estimated CDR from the sub-sample of 6623 persons from 20 villages was 9.81. Treating this as a binomial distribution, the SRS sampling error of CDR would be

$$(1/2) \sqrt{(.020)(.980)/6623} = 0.0008601.$$

Based on a sub-sample of 250 families from 5 villages, the weighted mean and variance of family size were calculated as 5.64 and 5.82. Thus family size appears to approximate the Poisson distribution. For a sub-sample of 1000 families from 20 villages the SRS sampling error of the estimated mean family size would be 0.0763.

Similarly SRS sampling errors in CBR and CDR were estimated from a sub-sample of 20 blocks each from Greater Bombay and other urban areas, using the calculations made earlier, from Table 2.4 for the actual sampling design. The unweighted standard deviation of the family size calculated earlier for a sub-sample of 100 families from each zone was used for obtaining the SRS sampling error in the mean family size for a sub-sample of 20 blocks from that zone.

The SRS estimates of sampling error in the three key parameters are summarized below for sub-samples of 20 villages/blocks.

	<u>CBR</u>	<u>CDR</u>	<u>MFS</u>
Rural	1.4816	0.8601	0.0763
Urban (Other)	2.1563	1.0801	0.1501
Greater Bombay	1.8049	0.8356	0.1449

The sample size being the same, the SRS sampling error for an estimate may differ from its sampling error for the

actual design because the variability of the characteristic in the whole "universe" may be different from its variabilities between and within villages. However, the cost of interviewing the same number of families in SRS would be much higher than in the actual multi-stage design since SRS sampling would require the preparation of a master frame of families and since the travel cost to such a randomly selected sample of families spread over the entire State would be enormous. Both these aspects, sampling variability and cost of field work, have to be considered in comparing sampling designs. As discussed in the next section, comparison of any design with SRS provides a suitable yardstick for this purpose.

Design Effect and Efficiency of the Sampling Design

The sampling error according to the design may be compared with that from SRS, in order to ascertain the loss or gain in efficiency resulting from the actual design adopted. The loss in efficiency arises from the clustered selection of families by stages such as talukas/towns and villages/blocks and gains are made by using ancillary information by such procedures as stratification and probability selection. However, it has to be recognized that the cost of interviewing an equal sized SRS sample would be much higher than the actual cost in a clustered multi-stage design.

The comparisons were made in terms of the design effect (Deff) which is the ratio of the sampling error of an estimate from the actual sample to that from SRS. They are based on subsamples of 20 villages/blocks from rural Maharashtra, urban areas other than Greater Bombay and Greater Bombay. The sampling errors of the actual design and SRS, calculated in the preceding two sections, were used. Deff for the three key characteristics are summarized below.

	<u>CBR</u>	<u>CDR</u>	<u>MFS</u>
Rural	1.25	1.22	1.74
Urban (Other)	1.02	1.01	1.34
Greater Bombay	1.04	1.17	0.94

Deff for the rural design shows that, for both CBR and CDR, the actual sampling error was not more than 25 per cent above that of SRS, in spite of the three-stage clustered selection of rural families. The rather large sample of 50 families from each chosen village had effectively controlled the sampling error in the vital rates since births and deaths per family were more variable within rather than between villages.

Deff for the mean family size is much larger, being 1.74. The large sample size of 50 families chosen from each village had reduced the efficiency of this estimate since the ratio of the between to within village variation in this character was larger than for the number of births or deaths per family.

Except for the estimate of mean family size in other urban areas, the urban Deff's are close enough to unity, showing that the design adopted was about as efficient as SRS. The mean family size in other urban areas had a Deff of 1.34, arising from a larger ratio of between to within village variation.

The actual sampling design used appears to be more efficient for the estimation of vital rates than for differentials in mean family size and similar demographic averages. Such divergent results are not unusual in survey research. As the main purpose of this survey is to estimate vital rates, the choice of the multi-stage design and the determination of the number of villages/blocks and families within villages/blocks to be chosen appear, by and large, to be reasonable, if not precisely optimal.

NON-RESPONSE

For various reasons, it was not possible to interview in the survey all the selected families and eligible women in them. It was, therefore, necessary to ascertain the extent and reasons for non-response.

It is not always valid to assume that the non-respondents have characteristics similar to the respondents and, hence,

could be represented by them. In fact, it might be suspected that in this survey non-respondent families tended to be selected by such characteristics as family size, mobility, and whether the woman was working outside her home. Some of these characteristics might be correlated to the number of births and deaths in the family. Therefore, omission of the non-respondents from the analysis might bias the results. However, the magnitude of the bias in the overall estimate would depend on how different the non-respondents were from the respondents and how large the percentage of non-response was. If the percentage non-response were not large, then the bias in the overall estimate would be negligible even if the non-respondents were highly self-selective. For this reason, it is essential to ensure that the non-response is kept within reasonable limits in the survey interview.

Non-response of Families

Table 2.5 shows the non-response by reasons for the three rural regions and the two urban zones. For instance, the third row of the table shows that in Western Maharashtra, on the basis of information for 38 sample villages, 2,538 families were selected for interview, including substitutes. Of these, 188 substitute families were not used so that the effective sample was 2,350. On further investigation, 65 families were not traceable, 84 had left the village and 9 had been transferred. Therefore, these 158 families fell outside the universe of study which was defined as the set of families currently resident in the village. Thus only 2,192 sample families were eligible for interview. Among these, 1,896 were interviewed and 296 were not interviewed. Hence the percentage response was 86.5 and non-response, 13.5.

The reason for non-response was also ascertained in Western Maharashtra for the 296 non-respondent families and are shown in table 2.6. Percentagewise, refusals accounted for 3.4, inability to contact the family during the interviewer's

stay at the village for 70.3, deaths for 3.0, living on farm for 2.7, living alone for 9.8 and other reasons for 10.8.

Similar results are given in table 2.6 for Nagpur and Aurangabad Divisions, all rural regions, for the two urban zones and both zones together. The non-response rate and percentage non-response due to the two principal reasons, refusal and inability to contact, are given below.

Domain	Non-response as % of eligible sample	% of non-response due to	
		Refusals	Inability to contact
Western Maharashtra	13.5	3.4	70.3
Nagpur Division	11.4	0.0	59.4
Aurangabad Division	8.8	9.4	66.0
Rural	12.1	2.8	66.2
Urban excluding Greater Bombay	12.9	11.7	79.4
Greater Bombay	22.5	21.3	71.7

Percentage non-response in rural regions and the urban centres excluding Bombay was well under control, being around 12 per cent. This compares favourably with non-response in other socio-demographic surveys. As anticipated, the percentage non-response in Greater Bombay was about twice as large (22 per cent) as that in the rural regions and urban centres excluding Greater Bombay.

Two of the principal reasons for non-response were refusals and inability to contact. As in other surveys, in rural regions, refusals as a percentage to non-response was negligible, except for Aurangabad Division which could be accounted for in terms of possible misclassification of reasons and a lower non-response rate. In urban centres excluding Greater Bombay, the percentage of refusals rose to 11.7 and in Greater Bombay it was as high as 21.3. This again is in

conformity with general survey experience that urban and metropolitan respondents are less cooperative than rural respondents. On account of cost considerations, the interviewer stayed only for a limited duration in the sample village/block and it was not possible to make repeated call-backs to the family, that was not contacted during her stay. Hence inability to contact the family was another major reason for non-response in both the rural regions and the urban zones. In fact, this reason accounted for anywhere between 60 and 80 per cent of the non-response.

Since refusals depend on the socio-cultural milieu and inability to contact on the actual procedure and duration of the field visits, it was not possible to reduce further the non-response in this survey. It appears that non-response was well under control in the three rural regions and in the urban centres excluding Greater Bombay and, hence, the bias arising from the self-selection of the non-respondents cannot be large in the estimate made from the data for the respondents only. However, the estimate for Greater Bombay may carry a larger bias on account of the self-selection of non-respondents.

Non-response of Eligible Women

From the interviewed families, all married women aged 15 to 50 were to be further interviewed using the questionnaire on fertility and family planning. As shown in Table 2.7, there were 6,067 such eligible women in the rural regions of whom, for 5,673 women, the questionnaire was completed. Thus, at the second stage of interview, there was 6.5 per cent non-response for rural women. Nagpur Division had a lower percentage of non-response of 3.2 while Aurangabad had a higher percentage of 10.5, although this Division had the lowest non-response rate for families.

As a percentage to the number of non-respondent eligible women, the major reasons for non-response in the rural area were "newly married" and "have no child", although interviews

2.21

for such women should have been taken. Clearly this omission arose out of a misunderstanding on the part of the interviewer and could have been avoided if more attention had been paid to this contingency during the training. However, the error arising from this omission would not be serious since newly married women and women without children neither contributed to births nor practised family planning.

From table 2.7, it is also seen that for the two urban zones, urban centres other than Greater Bombay and Greater Bombay, the percentages of non-response among eligible women were only 0.5 and 2.6 respectively. Hence the bias due to non-response at the second stage of the interview should be negligible in the overall estimate for either urban zone. It is not necessary to consider in detail the reasons for non-response of eligible women as the response rate was high in urban areas for this group.

Table 2.1 : List of Villages and Urban Centres Selected in the Sample : NFMS Maharashtra, 1980

RURAL SAMPLE

District	Taluka	Name of village	1971 Census count	
			Population (4)	Households (5)
(1)	(2)	(3)	(4)	(5)
<u>Aurangabad Division</u>				
Aurangabad	Kannad	Aurala	1216	250
		Karanjkheda Jagir	4359	775
	Paithan	Bihamandwa	4113	740
	Gangapur	Maliwadgaon	1316	220
Bhir	Patoda	Gomalwada	1479	304
		Suppa	1138	198
	Majalgaon	Savargaon	1647	293
Sultanpur		861	131	
Nanded	Kandhar	Shiwani Jamga	1112	203
		Katkalamba	1848	335
Parbhani	Jintur	Asegaon	2670	414
		Deosadi	537	104
	Pathri	Ambegaon Chaharum Vita Bk.	1083 1686	177 266
Osmanabad	Ahmedpur	Ujani	1796	311
	Osmanabad	Gothala	627	105
		Kolhegaon Takwiki	829 1625	135 274
Total: 18 villages				
<u>Nagpur Division</u>				
Akola	Akola	Ghota	1089	210
		Kanheri	1915	413
	Mangrulpir	Dapura Bk.	1129	210
		Falegaon	739	145
	Washim	Tarodi	762	142
Amravati	Amravati	Bhatkuli	4640	929
		Yavli	2934	520
	Daryapur	Jawardi Mahimapur	473 413	96 82
Buldhana	Chikhali	Gangalgaon	1591	278
		Karatwadi	443	86
	Malkapur	Chandur Biswa Dharangaon	4368 2975	791 529
Chandrapur	Gadchiroli	Gadchiroli	7884	1474
		Vihirgaon	1379	244
	Warora	Dongargaon	1384	326
		Pirli	936	187
Bhandara	Gondia	Bihiriya	1121	216
		Chhipiya	2785	490
	Sakoli	Arjuni Bortola	4743 658	897 109

Table 2.1 : (continued)

(1)	(2)	(3)	(4)	(5)
Nagpur	Katol	Savargaon	4325	884
		Pimpalgaon Raut	763	158
	Ramtek	Khat	2491	522
Wardha	Wardha	Palasgaon	1136	228
Yeotmal	Kelapur	Chikhalwardha	1137	243
		Karmana	475	86
	Yeotmal	Nandura Kh.	503	94
		Parwa	783	141
Total : 29 villages				
<u>Western Maharashtra</u>				
Thane	Bhiwandi	Paygaon	1529	248
		Narpoli	10262	2291
Kolaba	Shrivardhan	Ranavali	1021	214
		Shirvane	389	93
	Mangaon	Degaon	796	158
		Wawe-Diwali	942	154
Ratnagiri	Khed	Musad	1641	295
		Shirgaon	1774	329
	Sawantwadi	Madure	1546	308
		Nemale	2058	398
Pune	Dhond	Dapodi	1055	172
		Ravangaon	2042	305
	Indapur	Lasurne	9783	1670
		Tawashi	1880	335
	Haveli	Katraj	2696	411
		Kondhava Bk.	2754	482
Ahmednagar	Jamkhed	Nandnaji	5960	996
		Shiur	1971	319
	Nagar	Kapurwadi	3222	585
		Nandgaon	1165	210
	Shrirampur	Belapur Kh.	3557	655
	Nipani Wadgaon	8788	1824	
Satara	Khatav	Katarkhatav	4074	654
		Rajapur	2206	368
	Koregaon	Naygaon	893	155
		Rui	1545	271
	Satara	Kumthe	1359	241
	Sonapur	974	181	
Sangli	Kavathe-Mahankal	Alkud (M)	815	134
		Dhalgaon	3657	633
	Walwa	Walwa	9164	1529
		Navkhed	1810	315
Solapur	Malshiras	Purandwade	5501	1234
		Ekshiv	3916	685
	Mohol	Bhoire	1337	226
		Mohol	12248	2154

(continued)

Table 2.1 : (continued)

(1)	(2)	(3)	(4)	(5)
Kolhapur	Ajra	Chimane	2576	453
		Parpoli	561	114
	Bavda	Umbarde	2407	472
		Tithavali	1558	276
	Hatkangale	Male	1359	236
Alte		7378	1272	
Nasik	Dindori	Ahiwantwadi	1052	172
		Ambegaon	1096	179
	Kalvan	Saraledigar	628	88
		Umbarthan	1148	220
	Surgana	Mani	433	86
Dhulia	Sakri	Degaon	1914	289
		Pangaon	999	172
Jalgaon	Pachora	Galan Kh.	1512	246
		Nagar Deole Bk.	9469	1645
	Jamner	Garkhede Kh.	1035	219
		Palaskhede Bk.	1342	240

Total: 53 villages

Total Rural: 100 villages

URBAN SAMPLE

Name of Urban Centre	Number of blocks selected	1971 Census Population
Greater Bombay	44	5970575
Alore (Dist. Ratnagiri)	2	3369
Aurangabad	8	150483
Badnera (Dist. Amravati)	4	27477
Dombivali	4	51108
Ichalkaranji (Dist. Kolhapur)	4	87731
Nagpur	8	866076
Fauni (Dist. Bhandara)	4	17781
Pune City	12	856105
Pune Cantt.	4	77774
Satara	4	66433
Shirgaon (Dist. Ratnagiri)	2	3172
Sholapur	4	398361
Total	104	

Table 2.2 : Comparison of Unweighted and Weighted CBR, CDR and Mean Family Size from the Rural Sub-sample: NFMS Maharashtra, 1980

Sub-sample village	District	Sample population	CBR		CDR		MFS	
			Un-weighted	Wei-ghted	Un-weighted	Wei-ghted	Un-weighted	Wei-ghted
1. Ghotia	Akola	305	27.9	25.1	18.0	18.9	6.1	5.6
2. Vita Bk.	Parbhani	368	36.7	33.3	9.5	7.1	7.4	6.1
3. Dharangaon	Buldhana	310	41.9	45.0	4.8	4.7	6.2	5.7
4. Katarkhatav	Satara	326	29.1	29.9	7.7	9.3	6.5	5.2
5. Garkhede Kh.	Jalgaon	338	44.4	44.4	1.5	1.6	6.8	6.3
6. Asegaon	Parbhani	346	36.1	33.8	5.8	5.3	6.9	5.7
7. Nemale	Ratnagiri	320	34.4	32.5	7.8	9.7	6.4	5.8
8. Bihamandwa	Aurangabad	314	23.9	26.7	8.0	10.6	6.3	5.4
9. Ranavali	Kolaba	274	32.8	38.8	10.9	16.1	5.5	4.7
10. Paygaon	Thana	360	16.7	13.1	8.3	10.5	7.2	5.9
Ten villages		3261	32.3	32.2	8.1	9.8	6.5	5.6
11. Parpoli	Kolhapur	277	34.3	34.0	10.8	10.4	5.5	4.6
12. Degaon	Dhulia	426	38.7	32.5	5.9	5.1	8.5	6.9
13. Ahiwantwadi	Nasik	421	28.5	23.6	11.9	15.7	8.4	6.8
14. Lasurne	Pune	300	26.7	24.3	6.7	9.5	6.5	5.4
15. Nandnaj	Ahmednagar	339	31.0	25.4	10.3	7.9	6.8	5.3
16. Nandura	Yeotmal	279	44.8	47.3	5.4	5.3	5.6	5.0
17. Rui	Satara	355	25.3	27.0	5.6	11.2	7.1	5.5
18. Galan	Jalgaon	321	35.8	35.5	9.3	7.5	6.4	5.6
19. Alte	Kolhapur	343	30.6	29.8	7.3	9.6	6.9	5.9
20. Suppa	Bhir	301	21.6	20.6	13.3	20.1	6.0	5.0
Ten villages		3362	31.7	30.4	8.6	10.2	6.8	5.5
Twenty villages		6623	32.0	31.3	8.4	10.0	6.6	5.6

Based on a sample of 50 families per village drawn from the voters' list except for Lasurne which had a sample of 46 families.

CBR - Births per 1,000 population; CDR - Deaths per 1,000 population; MFS - Mean family size.

The formula used for calculating the mean is $\frac{\sum Wx}{\sum W}$, where

W = 1 for the unweighted mean

= 96/(number of family members aged 21+) rounded to the nearest integer for the weighted mean.

The CBR is calculated as the ratio of the mean number of births per family to the mean family size and the CDR as the ratio of the mean number of deaths per family to the mean family size.

Table 2.3 : Weights for Estimation by Urban Sample Blocks
(Wards): NFMS Maharashtra, 1980

Centre/Sample block number	Weight	Centre/Sample block number	Weight
URBAN OTHER THAN GREATER BOMBAY			
<u>Alore</u>		<u>Nagpur</u>	
Dist.: Ratnagiri Code 03		Dist.: Nagpur Code 17	
Tal.: Chiplun Code 4		Tal.: Nagpur Code 3	
43	30	41	10
44	30	42	8
		43	9
		44	9
		45	9
		46	10
		47	5
		48	13
<u>Aurangabad</u>		<u>Pauni</u>	
Dist.: Aurangabad Code 22		Dist.: Bhandara Code 20	
Tal.: Aurangabad Code 4		Tal.: Bhandara Code 3	
41	12	41	20
42	13	42	20
43	12	43	20
44	12	44	20
45	9		
46	13		
47	10		
48	12		
<u>Badnera</u>		<u>Pune Cantonment</u>	
Dist.: Amravati Code 15		Dist.: Pune Code 13	
Tal.: Amravati Code 1		Tal.: Pune City Code 4	
41	13	53	19
42	17	54	16
43	13		
44	19		
<u>Dombivali</u>		<u>Pune City</u>	
Dist.: Thana Code 04		Dist.: Pune Code 13	
Tal.: Kalyan Code 2		Tal.: Pune City Code 4	
41	59	41	6
42	59	42	2
43	65	43	9
44	59	44	4
		45	6
		46	4
		47	11
		48	7
		49	5
		50	10
		51	6
		52	5
<u>Ichalkaranji</u>			
Dist.: Kolhapur Code 05			
Tal.: Hatkanangale Code 3			
41	13		
42	19		
43	32		
44	20		

Table 2.3 : (continued)

Centre/Sample block number	Weight	Centre/Sample block number	Weight
<u>Satara</u>		<u>Sholapur</u>	
Dist.: Satara Code 07		Dist.: Sholapur Code 08	
Tal. : Satara Code 3		Tal. : Sholapur Code 3	
41	15	41	22
42	15	42	16
43	15	43	13
44	18	44	20
<u>Shirgaon</u>			
Dist.: Ratnagiri Code 03			
Tal. : Chiplun Code 4			
41	29		
42	28		
GREATER BOMBAY			
Dist.: Greater Bombay Code 01			
41	33	63	37
42	21	64	41
43	26	65	33
44	37	66	38
45	26	67	36
46	29	68	38
47	29	69	50
48	35	70	60
49	30	71	42
50	34	72	39
51	35	73	51
52	34	74	65
53	27	75	30
54	27	76	61
55	25	77	41
56	37	78	35
57	33	79	76
58	38	80	41
59	30	81	44
60	44	82	88
61	30	83	48
62	34	84	48

Table 2.4 : Unweighted and Weighted CBR, CDR and Mean Family Size Estimated for (1) Urban Centres Excluding Greater Bombay and (2) Greater Bombay Using 20 Blocks Each: NFMS Maharashtra, 1980

Urban Centre/Block		Sample Population	CBR	CDR	MFS	Weight
Urban Excluding Greater Bombay						
Nagpur	1	151	9.93	0.0	6.04	10
	4	184	29.89	10.87	7.36	8
	8	160	25.00	6.25	6.40	13
Aurangabad	3	169	35.50	2.96	6.76	12
	6	230	54.35	8.70	9.20	13
	8	138	36.23	14.49	5.52	12
Pune	3	124	28.23	20.16	4.96	9
	7	116	30.17	12.93	4.64	11
	10	146	23.97	3.42	5.84	10
	14	175	20.00	2.86	7.00	16
10 Blocks	Unweighted	1593	30.45	7.85	6.37	
	Weighted	1593	29.62	7.85	6.45	
Shirgaon	1	169	35.50	0.00	6.50	29
Alore	1	154	19.48	9.74	6.16	30
Sholapur	2	181	19.34	8.29	7.24	16
	4	128	35.16	3.91	5.12	20
Pauni	1	153	32.68	6.54	6.12	20
	4	146	20.55	10.27	5.84	20
Ichalkaranji	2	158	44.30	3.16	6.32	19
	3	137	40.15	10.95	5.48	32
Badnera	1	180	38.89	16.67	7.20	13
	2	159	37.74	6.29	6.36	17
10 Blocks	Unweighted	1565	32.27	7.67	6.24	
	Weighted	1565	32.24	7.28	6.15	
20 Blocks	Unweighted	3158	31.35	7.76	6.30	
		3158	31.33	7.48	6.25	

(continued)

Table 2.4 : (continued)

Urban Centre/Block		Sample Population	CBR	CDR	MFS	Weight
Greater Bombay						
Greater Bombay	4	191	36.65	2.62	7.64	37
	8	158	34.81	6.33	6.32	35
	12	168	17.86	0.00	6.72	34
	16	177	16.95	2.82	7.08	37
	20	173	31.79	0.00	6.92	44
	24	165	18.18	0.00	6.60	41
	28	137	21.90	3.65	5.48	68
	32	143	17.48	17.48	5.72	39
	36	140	14.29	0.00	5.60	61
	40	146	23.97	6.85	5.84	41
10 Blocks	Unweighted	1598	23.78	3.75	6.39	
	Weighted	1598	22.83	3.74	6.28	
	1	129	23.26	7.75	5.16	33
	5	171	35.09	5.85	6.84	26
	9	161	31.06	6.21	6.44	30
	13	140	14.29	0.00	5.60	27
	17	165	21.21	3.03	6.60	33
	21	158	3.16	6.33	6.32	30
	25	154	9.74	3.25	6.16	33
	29	149	13.42	0.00	5.96	50
	33	145	27.59	10.34	5.80	57
	37	146	13.70	6.85	5.84	41
10 Blocks	Unweighted	1518	19.43	4.94	6.07	
	Weighted	1518	19.22	5.17	6.03	
20 Blocks	Unweighted	3116	21.66	4.33	6.23	
	Weighted	3116	21.20	4.39	6.17	

CBR - Births per year per 1,000 population.
 CDR - Deaths per year per 1,000 population.
 MFS - Mean family size.

Weights are from table 3 according to the sampling design.

Twenty-five families within each block were selected in clusters with roughly equal chance within the chosen page of the voters' list.

Table 2.5 : Number of Sample Families Selected, Substitutes Not Utilized, Families Outside the Universe of Study and Percentage Non-response: NFMS Maharashtra, 1980

	Selected (including substitutes)	Substitutes not utilized	Effective sample	Outside the universe of study			Sample eligible for	Non-response	
				Family not trace- able	Left the place	Trans- ferred		Number	%
Aurangabad Division (11 villages)	740	60	680	18	45	14	603	53	8.8
Nagpur Division (28 villages)	1868	168	1700	42	75	3	1580	180	11.4
Western Maharashtra (38 villages)	2538	188	2350	65	84	9	2192	296	13.5
Rural (77 villages)	5146	416	4730	125	204	26	4375	529	12.1
Other Urban (46 blocks)	2004	276	1728	183	134	20	1391	180	12.9
Greater Bombay (35 blocks)	2899	1407*	1492	263	91	9	1129	254	22.6
Urban (81 blocks)	4903	1683	3220	446	225	29	2520	434	17.2

* This consists of 523 substitutes not used and 884 non-family residents living in dormitories and institutions. Numbers of villages and blocks from which the non-response rates were calculated are shown in parentheses in the first column.

The necessary information was not available for 7 sample villages in Aurangabad Division; for one village in Nagpur Division and for 15 villages in Western Maharashtra; for 14 sample blocks in other urban areas and 9 blocks in Greater Bombay.

Table 2.6 : Percentage Distribution of Non-response by Reason:
NFMS Maharashtra, 1980

	Reasons for non-response							All reasons
	Refusal	Could not be contacted	Dead	Living on farm	Living alone	Other		
Aurangabad Division (11 villages)	9.4	66.0	5.7	7.5	5.7	5.7	100.0 = 53	
Nagpur Division (28 villages)	0.0	59.4	5.0	7.2	7.8	20.6	100.0 = 180	
Western Maharashtra (38 villages)	3.4	70.3	3.0	2.7	9.8	10.8	100.0 = 296	
Rural (77 villages)	2.8	66.2	4.0	4.7	8.7	13.6	100.0 = 529	
Other Urban (46 blocks)	11.7	79.4	0.0	NA	8.3	0.6	100.0 = 180	
Greater Bombay (35 blocks)	21.3	71.7	0.0	NA	1.6	5.5	100.0 = 254	
Urban (81 blocks)	17.3	74.8	0.0	NA	4.4	3.5	100.0 = 434	

NA : Not applicable.

See foot-notes to table 2.5.

Table 2.7 : Numbers of Eligible Women Interviewed and Not Interviewed, Percentage Non-response and Percentage Distribution of Non-response by Reason : NFMS Maharashtra, 1980

	No. of eligible women	No. of women interviewed	Per cent non-response	No. of women not interviewed	Reason for non-interview						
					Reason not given	Newly married	No child	Gone out	Living on farm	Could not be contacted	Refused
Aurangabad Division Per cent	1127	1009	10.5	118 100.0	27.2	16.9	22.9	19.5	0.8	4.2	8.5
Nagpur Division Per cent	1686	1632	3.2	54 100.0	25.9	18.5	29.6	24.1	0.0	1.9	0.0
Western Maharashtra Per cent	3254	3032	6.8	222 100.0	11.3	27.5	28.3	23.9	3.2	4.0	1.8
Rural Per cent	6067	5673	6.5	394 100.0	18.0	23.1	26.9	22.6	2.0	3.8	3.6
Other Urban Per cent	1635	1593	2.6	42 100.0	28.4	21.5	14.3	26.2	0.0	4.8	4.8
Greater Bombay Per cent	1172	1166	0.5	6 100.0	66.6	0.0	16.7	16.7	0.0	0.0	0.0
Urban Per cent	2807	2759	1.7	48 100.0	33.3	18.7	14.6	25.0	0.0	4.2	4.2

CHAPTER 3
DEMOGRAPHIC PROFILE OF MAHARASHTRA

Introduction

In this chapter the demographic profile of Maharashtra from NFMS, 1980 is presented. The main characteristics examined are age structure, proportion married by age and sex, age at marriage, proportions of Scheduled Castes and Tribes and Muslims in the population and educational level in broad age groups by sex. The distributions are given separately for the three rural regions, for rural Maharashtra, for urban areas excluding Greater Bombay, for Greater Bombay, for urban Maharashtra and for all-Maharashtra.

The distributions for these characteristics are compared with those from 1971 Census. The 1971 Census data have been used since the 1981 Census tabulations have not yet been published for these characteristics. The similarity between the distributions from the two sources would establish the representativeness of the NFMS sample. The differences found between the 1971 Census and NFMS 1980 should be accountable in terms of changes over the decade 1971-80, sampling errors in NFMS and definitional differences between the two data sources.

For instance, there has been a decline in fertility over the last decade in Maharashtra that should lead to a decrease in the percentage of population in age groups 0-4 and 5-9. The distortion due to age selective net inter-State migration to Maharashtra on its age distribution would, however, be negligible. Hence, the percentages of persons, males and females in age groups 0-4 and 5-9 according to NFMS, 1980 should be expected to be less than the corresponding percentages in 1971 Census. This comparison should, therefore, confirm or contradict the fertility decline in this decade.

Differences between the figures for the 1971 Census and NFMS 1980 could also arise from sampling fluctuations or from

definitional differences in the educational classification or from differences in the identification of Scheduled Castes and Tribes in the Census and the Survey.

Systematic comparison of the demographic profile from NFMS with the 1971 Census profile should serve to establish the representativeness of the sample, to test anticipated trends in the last decade and to reveal definitional differences between the two sources.

Age Structure and Sex-Ratio

The age structures, by five year age groups, from the 1971 Census and NFMS, for the eight domains of study, are shown in Table 3.1 for persons, in Table 3.2 for males and in Table 3.3 for females. According to the definitions used, the NFMS distribution covers strictly the household population while the Census distribution includes, in addition, persons living in institutions or those without fixed abode who were not affiliated to any family. The difference, between the two sources, due to this reason would be negligible except for Greater Bombay. For Greater Bombay the difference would be more pronounced in the sex-ratio than in the age distribution.

While the age profile for Maharashtra is broadly similar for the Census and NFMS in Table 3.1 for the intermediate age groups, for the youngest age groups 0-4 the NFMS percentage is 11.8 against the Census percentage of 14.4, and for the next age group 5-9 the NFMS percentage is 12.4 against 14.8 for the Census. As mentioned earlier, since the distortion in these age groups due to net inter-State age selective migration is negligible, the difference between NFMS and Census may be ascribed to a decline in fertility in this decade. Similar differences are noticed for both males and females in Tables 3.2 and 3.3.

The NFMS percentages in age groups 0-4 and 5-9 are less

than the corresponding percentages for the Census in each of the three rural regions and the urban zone excluding Greater Bombay. The rural differences are larger than the urban differences. Only Greater Bombay fails to follow this pattern strictly. These results are in conformity with the combined effect of the decline in fertility on the one hand and, on the other hand, net urbanward migration in adult ages, especially to Greater Bombay.

In all the three tables, it is found that the percentages in age groups 50-54, 55-59 and 60 and above, for all the eight domains of study, from the NFMS are larger than the corresponding percentages from the Census. This can be attributed to a decline in mortality in this decade and, as-observed earlier, also to the reduction in the percentage of population below age 10 consequent to the decline in fertility. To eliminate the effect of fertility decline in this decade on the age structure, the age distribution has been compiled for ages 10 and above in Table 3.4 for males and in Table 3.5 for females. In these two tables, it is found that the NFMS, 1980 percentages in age groups 55-59 and 60 and above are generally higher than the 1971 Census percentages. This provides some evidence on the decadal decline in mortality at higher ages.

The percentage distribution of males 10 years and above in Table 3.4 from NFMS is similar to that from the Census, if ages 55 and above are excluded. The NFMS shows, for Maharashtra, a more gradual progression in the percentages by age group than the Census, suggesting somewhat better age reporting in the survey. The sharp fall in the percentage from 17.3 for ages 10-14 to 12.5 for ages 15-19 for the Census is especially noticeable and may be ascribed to errors in age reporting. The corresponding fall for NFMS from 16.9 per cent to 13.3 per cent appears more reasonable. Comparison of NFMS and Census percentage for females aged 10 and above reveals similar features.

The child/married-woman ratio in Table 3.3 (the number of children per 1000 married women aged 15 to 44) for NFMS is consistently lower than the Census, for all eight domains of study. With declining infant and child mortality, this ratio should increase, but with declining fertility it should decrease. These figures, therefore, confirm that there was a decline in fertility within marriage which more than offset the decline in infant and child mortality in this decade.

Similarly, the child/woman ratio (the number of children per 1000 women aged 15 to 44) shows that the fertility of all women declined between 1971 and 1980 (Table 3.6). Moreover, the decline for all women was larger than for married women, indicating that other changes such as an increasing trend in the age at marriage and a decreasing percentage of married women in younger ages also contributed to the fertility decline. In fact, tables 3.7, 3.8 and 3.9 clearly show an increasing trend in the age at marriage as will be discussed later.

The sex-ratio (number of females per 1000 males) for Maharashtra throws some light on the quality of the data from the two sources. The ratio at birth would be around 960 and might be expected to decline in Indian conditions due to the excess of female over male mortality. Extreme variations, from one group to the next, indicate age transfer errors for either or both sexes. For instance, for ages 15 to 19, the Census sex-ratio is 832 against the survey ratio of 932, which shows a more gradual fall with increasing age. One plausible explanation is that, in the Census, more women transferred their ages upwards from this groups than men did although other explanations are also possible. But, generally, the NFMS sex-ratios by age group fluctuate less than the Census ratios. Age groups 50-54 and 55-59 are exceptions to this observation. The fact that an additional lengthy questionnaire was to be completed for women aged 50 or less could have prompted the marginal group of women

with ages around 50 to return ages over 50 in the survey. On the other hand, it is found that, in the Census, many women had exaggerated their ages to 70 or over.

The rural differences in the sex-ratios from the two sources show a pattern similar to that for Maharashtra State since the rural population forms 65 per cent of the State population and the effect of age and sex selective migration is less severe on the larger rural population. But the sex-ratios from the two sources are totally different for Greater-Bombay. The Census ratios are far below the survey ratios for age-groups 20-24 and above. This could be attributed partly to the inclusion of the non-household population in the Census that would be selective for males in working ages. The sex-ratios for Greater Bombay show larger fluctuations by age-group for the survey than for the Census. The higher non-response rate for this city (23 per cent) and the definition of usual family used in the survey would account mostly for this result.

Marital Status by Age and Age at Marriage

According to NFMS, 1980, 4.7 per cent of the females in ages 10 to 14, 37.2 per cent in ages 15 to 19, 83.4 per cent in ages 20 to 24 and 96.1 per cent in ages 25 to 29 were ever married (Table 3.7). The corresponding percentages from the 1971 Census are 7.0, 54.2, 90.1 and 97.6. Thus, in the intervening ten years, the proportion of ever married females in the younger age groups had declined while marriage had remained almost universal by ages 25 to 29. Naturally the proportion of males ever married in any age group was less than that for females but the decline in this proportion during 1971-80 is evident for males also.

In any group, the proportion ever married for each sex shows a gradient pattern over the rural-urban continuum. It is highest in rural regions, inter-mediate in urban areas other than Greater Bombay and lowest in Greater Bombay.

The percentage of females ever married in ages 10 to 14 is a sensitive indicator of social backwardness and social change. Among the rural regions, Aurangabad Division had the largest percentage of ever married females in ages 10 to 14. It declined little from 18.6 per cent in 1971 Census to 16.2 per cent in NFMS, 1980.

The decline in the proportion married between 1971 and 1980 is observed for all the domains of study. Thus there is consistent evidence on the decline in the age at marriage, and on its sex differentials and a rural-to-urban gradient in the proportion ever married.

The percentage of currently married women tends to confirm these results in Table 3.8. In younger ages the percentage currently married is not much lower than the percentage ever married because the dissolution of marriage due to divorce or separation or husband's demise should be negligible. The difference between the percentages of ever and currently married women, is small upto age group 25-29. For NFMS, for instance, the percentage of women in ages 25 to 29 ever married was 96.1 against 92.4 per cent women currently married.

In older ages, the effect of divorce and separation and especially husband's mortality should be larger and hence the difference between the percentages of ever and currently married women should also be larger. In fact, for NFMS, the percentages of ever and currently married women in ages 40-44 were 99.5 and 90.7, and for ages 45-49 the corresponding percentages were 99.7 and 87.6.

Comparison of the 1971 Census and NFMS 1980 percentages of currently married women by age groups, given in Table 3.8, reveals both the increase in the age at marriage and the improvement in couple survival. For Maharashtra, upto ages 25 to 29, this percentage from the 1971 Census was above the corresponding percentage from NFMS 1980, indicating a rise in

the age at marriage in this period. In fact, the largest difference occurs in ages 15 to 19, between 53.1 per cent in the Census and 36.1 per cent in the survey. These figures confirm the earlier findings.

From age group 35-39 onwards, the Census percentages are below the survey percentages. For ages 40-44, the percentage of currently married women was 84.2 from the Census against 90.7 in the survey and for ages 45-49 the corresponding figures were 76.3 and 87.6. This difference between the Census and the survey percentages could be attributed mainly, to the reduction in mortality and the consequent improvement in husband's survival rates in this period. Similar differences are found for each of the eight domains of study. However, these differences are about the same magnitude for both rural regions and urban zones since greater reduction in urban mortality might be offset by an increase in the proportion of divorces and separations occurring in urban areas.

The mean age at marriage in the recent period is summarized in Table 3.9 by the singulate mean age at marriage (SMAM) from the two sources. This mean is calculated from the percentage never married in each age-group. Since marriage is almost universal by age 25 to 29 for women and 30 to 34 for men, SMAM refers to the average experience in the preceding 15 years for women and 20 years for men.

For females in rural Maharashtra, SMAM was 17.8 years according to NFMS 1980 and 16.6 years according to the 1971 Census. Thus there has been an increase of 1.2 years in the female mean age at marriage in the past 15 years or so. For males, SMAM has increased from 22.5 years for the 1971 Census to 23.4 years for NFMS 1980, an increase of 0.9 years. SMAM for urban zones is larger than for rural areas. For females, between the Census and the survey, it had increased by 2.2 years in other urban areas and by 1.8 years in Greater Bombay.

The difference in SMAM between males and females is about 6 years and between rural and urban areas about 3 years. There is a decreasing gradient in the age at marriage from Greater Bombay to other urban to rural areas. Among rural regions, Aurangabad Division had the least age at marriage for females, 15.2 years in 1971 and 16.0 in 1980. SMAM, the summary measure of the recent levels and trends in age at marriage given in Table 3.9, generally confirms the observations made earlier on the percentage married by age group.

Scheduled Castes and Tribes, and Muslims

The percentages of Scheduled Castes and Tribes and Muslims in the total male and female populations are presented from the 1971 Census and NFMS in Table 3.10 for all the eight domains of study. Differences between the Census and NFMS could arise from definitional differences, changes over time and sampling variations. Since these population groups are residentially clustered, the sampling errors in their proportions are likely to be larger than for other characteristics. Normally the changes in the period 1971-80 should not be large in these proportions. However, since the weaker sections of society are currently receiving special attention in terms of protective social legislation and programmes, it is possible that in 1980 there was a greater consciousness in reporting such castes groups.

As for the definitions used in NFMS, religion was coded during the interview and the caste name was obtained. The caste was coded later as Scheduled Caste or Tribe or other Hindu castes using the list of Scheduled Castes and Tribes from the 1971 Census. Those recently converted to Buddhism (Navaboudhas) were included in Scheduled Castes. In the 1971 Census, the enumerator obtained, in the individual slip, the religion, coded whether the respondent belonged to a Scheduled

Caste or Tribe and wrote down the name of the caste or tribe. Navaboudhas were classified only if they returned a caste or tribe.

For Maharashtra, NFMS classified 13.5 per cent of the males as Scheduled Castes, 8.0 per cent as Scheduled Tribes and 9.4 per cent as Muslims, while the Census percentages for these three groups were uniformly lower, 12.3, 5.7 and 8.6, respectively (Table 3.10). The larger NFMS percentages might be due mostly to sensitivity and differential perception of these groups by 1980 for reasons mentioned above.

Naturally the largest differences between NFMS and Census percentages in Scheduled Castes occurs in other urban areas and Greater Bombay where these groups should be most aware of the special provisions made for their social uplift. In the rural regions, the difference between the two sources is not large except for Scheduled Tribes in Western Maharashtra.

The distribution of Scheduled Castes and Tribes and Muslims among the three rural regions and two urban zones is of interest. Both according to the Census and NFMS, the Scheduled Castes were more evenly distributed than the Scheduled Tribes as seen from Table 3.10. NFMS data for males show that the Scheduled Castes formed 17.2 per cent of the rural population of Nagpur Division and 10.1 per cent of Greater Bombay's population while other domains had percentages varying within this range. By contrast, Scheduled Tribes formed 15.3 per cent and 9.3 per cent of the rural population of Western Maharashtra and Nagpur Division respectively and less than 4 per cent of the population of the other rural region and urban zones. This is not surprising since normally permanent residence in the tribal village is a necessary condition for being classified as belonging to a Scheduled Tribe.

The urban zones had the highest percentage of Muslims in their male population, 18.6 per cent of Greater Bombay's

population and 14.3 per cent of the males in other urban areas. Among the rural regions, Aurangabad Division had the highest percentage of Muslims in its population, 9.9 and only 0.8 per cent belonging to Scheduled Tribes.

The percentage of females belonging to Scheduled Castes and Tribes, and Muslims displays a similar pattern, essentially confirming the observations made for males in the preceding paragraphs.

Educational Level

In NFMS, the educational level was obtained for those at school. For those not at school, their literacy status and educational attainment were obtained. In the Census, there were two questions in the individual slip on literacy status and educational attainment. Thus there was a slight difference in the questions asked in the Census and the survey.

Apart from the difference in the questions asked, the percentage literate in Maharashtra rose from 51.0 in the 1971 Census to 58.9 in the 1981 Census for males and for females the percentage rose from 26.4 to 35.1. School enrolment of boys and girls also increased substantially between 1971 and 1980. Thus there is considerable evidence on the improvement in literacy and education level between the 1971 Census and NFMS 1980.

Educational level by the broad age groups 5-14, 15-19 and 20 and above from NFMS 1980 and the 1971 Census are compared in Table 3.11 for males and in Table 3.12 for females. The classification combined literacy status with education level into the following classes : 1. illiterate, 2. literate, without formal education, 3. primary or below, 4. middle but above primary and 5. matriculation and above.

In Maharashtra State, in ages 5 and over, between the Census 1971 and NFMS 1980, there was a reduction of illiteracy

from 40.7 per cent to 26.9 per cent and a significant increase in the percentage of males having middle-school education from 14.3 to 36.7 per cent.

In rural areas, in school going ages 5 to 14, the percentage males with any formal schooling, primary or below, was as high as 49.3 in NFMS 1980 whereas it was only 18.9 in the 1971 Census. But in the Census 26.9 per cent of males in this age-group claimed to be literate without any formal education whereas in NFMS this percentage was negligible. By age-group 15-19, NFMS showed 54.6 per cent of males with middle school education compared to 36.3 per cent for the Census. Among adult males, 20 years and over, the percentage receiving middle school education was 30.2 for NFMS and only 9.8 for the Census. Finally the percentage of matriculate males in all age groups in rural areas showed no change between the 1971 Census and NFMS 1980.

Compared to rural areas, the major difference in the urban pattern of change in the education of males between 1971 and 1980 was the larger percentage of matriculates reported in NFMS than in the Census (27.8 against 17.9) in ages 15-19. Among adult males aged 20 and over, there was a significantly larger percentage with middle school education in the NFMS compared to the Census (49.0 against 21.8). As for adult males aged 20 years and over with education up to matriculation or above, NFMS showed a slightly lower percentage of 22.9 compared to 25.0 for the Census, perhaps due to the less precise reporting of completed matriculation in the Census.

Table 3.12 gives the female education level in broad age groups from the 1971 Census and NFMS, 1980. While female illiteracy in ages 5 and above in Maharashtra declined from 69.0 in 1971 to 52.0 in 1980, the improvement in the education was spread over primary and middle school levels. For primary

or below, the percentage was 11.0 for the Census against 20.8, for NFMS whereas for middle school, the corresponding percentages were 6.1 and 22.9. The percentage with education up to or above matriculation remained nearly the same, 2.9 for the Census and 3.3 for NFMS.

In the age group 5-14, rural female illiteracy declined from 69.1 in the Census to 41.2 in NFMS 1980. Rural females with primary level of education or below was 42.2 per cent from NFMS against 10.8 per cent from the 1971 Census in this age group. In the next age group, 15-19, the largest difference was in middle school level, 12.2 for the Census and 34.0 for NFMS. Among adult rural women aged 20 and above, illiteracy was much higher than among the corresponding group of men. The largest percentage difference between the two sources, in this age group was in middle school level, 1.8 per cent from the Census and 10.2 per cent from NFMS. In urban areas, the percentage of females in ages 15 to 19 with education up to or above matriculation rose from 16.3 in 1971 to 21.2 in 1980.

In the measurement of literacy status and education level, some of the differences between the Census and survey figures arise, no doubt, from definitional dissimilarity. However, as the changes between 1971 and 1980 revealed by the figures are large, they confirm the increasing trend in the level of education among both males and females in this period.

Summary of Findings

To sum up, in this chapter the demographic profile from NFMS was presented and compared with that from the 1971 Census in order to examine the representativeness of the sample, to establish the trends in demographic variables and to find the differences in the definitions used in the Census and the survey.

Significant demographic trends emerge from this comparison.

The age distribution suggests a decline in both the fertility and mortality levels between 1971 and 1980 in rural regions as well as urban zones. The child-woman ratio confirms the decline in fertility among both married women and all women. The age at marriage has risen and the percentage married in younger ages has declined in all the domains of study. The fertility and mortality levels and differentials from NFMS are assessed directly and in far greater details in the following chapters.

The percentage of Scheduled Castes and Tribes, and Muslims in the population of each domain has been compared between NFMS and the 1971 Census. While the Scheduled Castes were more evenly distributed, the Scheduled Tribes were concentrated in the rural regions of Nagpur Division and Western Maharashtra and the Muslims were concentrated in the rural region of Aurangabad and in the two urban zones. Comparison of the educational levels in broad age groups showed an improvement in the literacy and educational attainment of both sexes in NFMS 1980 compared to the 1971 Census.

Subject to the various trends explained above the NFMS sample appears to be representative of Maharashtra's population. The definitions employed in the survey and the Census are generally comparable with the following exceptions. While NFMS and the Census covered the household population on a *de jure* basis, the Census population included, additionally, persons staying in institutions and without fixed abode. All persons following the religion of Navaboudha were included in the Scheduled Castes in NFMS while the Census practice is ambiguous. The educational levels of persons at school and not at school were obtained separately in NFMS but not in the Census.

Table 3.1 : Percentage Distribution of Persons by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980

Age Group	Aurangabad Division		Nagpur Division		Western Maharashtra		Rural Maharashtra		Urban excluding Greater Bombay		Greater Bombay		Urban Maharashtra		Total Maharashtra	
	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS
0 - 4	16.1	13.0	15.3	12.0	14.7	12.1	15.1	12.3	13.8	11.1	11.2	10.5	12.8	10.8	14.4	11.8
5 - 9	16.2	12.9	15.0	12.5	15.5	12.4	15.2	12.5	13.9	12.2	11.3	11.9	12.8	12.1	14.8	12.4
10 - 14	11.5	12.9	12.2	13.5	13.1	13.0	12.6	13.0	12.6	12.4	10.1	12.8	11.6	12.6	12.3	12.9
15 - 19	7.1	9.1	7.6	9.8	8.3	9.9	7.9	9.7	9.9	10.8	9.5	10.1	9.8	10.5	8.5	10.0
20 - 24	7.3	9.0	7.1	9.7	7.0	8.6	7.1	9.0	9.6	9.9	11.9	9.4	10.5	9.7	8.1	9.2
25 - 29	7.6	8.0	7.2	7.7	7.0	7.4	7.2	7.6	7.9	8.2	10.6	8.8	9.0	8.4	7.7	7.9
30 - 34	6.9	6.3	6.6	6.0	6.2	5.8	6.4	6.0	6.7	6.7	8.6	7.4	7.4	7.0	6.7	6.3
35 - 39	6.0	5.6	6.4	4.8	6.1	5.3	6.1	5.2	6.1	5.5	7.6	6.5	6.7	5.9	6.3	5.4
40 - 44	5.3	4.5	5.3	4.8	5.0	4.6	5.1	4.6	5.1	4.7	5.8	5.4	5.3	5.0	5.2	4.7
45 - 49	4.0	3.3	4.5	4.3	4.5	3.8	4.4	3.8	4.0	4.4	4.4	5.1	4.2	4.7	4.3	4.1
50 - 54	3.6	3.7	3.7	4.1	3.5	4.3	3.6	4.2	3.3	3.9	3.3	4.1	3.3	4.0	3.5	4.1
55 - 59	2.3	3.6	2.7	3.8	2.8	3.8	2.7	3.8	2.1	3.0	2.0	2.9	2.1	3.0	2.5	3.5
60 +	6.1	8.1	6.4	7.0	6.3	9.0	6.3	8.3	5.0	7.2	3.7	5.1	4.5	6.3	5.7	7.7
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		5857		8897		17256		32010		9387		6657		16044		48054

Table 3.2 : Percentage Distribution of Males by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980

Age Group	Aurangabad Division		Nagpur Division		Western Maharashtra		Rural Maharashtra		Urban excluding Greater Bombay		Greater Bombay		Urban Maharashtra		Total Maharashtra	
	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS
0 - 4	15.9	12.4	15.3	12.3	14.9	12.4	15.2	12.4	13.1	10.9	9.9	10.2	11.8	10.7	14.1	11.8
5 - 9	15.8	12.6	14.9	12.3	15.8	12.4	15.6	12.3	13.3	12.8	9.9	11.6	11.9	12.2	14.3	12.3
10 - 14	12.3	13.0	12.3	13.1	13.7	12.7	13.0	12.9	12.5	12.6	9.2	12.2	11.2	12.3	12.4	12.7
15 - 19	7.4	9.8	8.0	9.2	8.9	10.4	8.4	10.0	10.4	10.6	9.4	10.3	10.0	10.5	8.9	10.1
20 - 24	6.5	8.3	6.6	9.9	6.5	8.0	6.5	8.6	9.9	9.5	12.7	10.3	11.1	9.8	8.0	9.0
25 - 29	7.2	8.6	6.7	8.0	6.4	7.8	6.6	8.0	7.9	8.1	11.1	8.4	9.2	8.2	7.5	8.1
30 - 34	6.7	6.3	6.4	6.4	5.7	5.8	6.1	6.0	6.7	7.8	9.1	7.0	7.7	7.0	6.6	6.4
35 - 39	6.2	5.7	6.6	5.0	5.9	5.2	6.2	5.2	6.1	5.4	8.2	6.9	6.9	6.1	6.4	5.5
40 - 44	5.4	4.8	5.3	4.2	4.9	4.7	5.1	4.6	5.3	4.5	6.4	5.3	5.7	4.9	5.3	4.7
45 - 49	4.3	3.8	4.7	4.7	4.6	4.0	4.6	4.2	4.3	4.4	5.0	5.8	4.6	5.0	4.6	4.4
50 - 54	3.7	3.2	3.9	3.7	3.6	3.3	3.7	3.4	3.5	3.7	3.6	3.8	3.5	3.7	3.6	3.5
55 - 59	2.5	2.6	2.9	3.5	3.0	3.7	2.9	3.5	2.2	3.0	2.1	3.4	2.2	3.2	2.7	3.4
60 - 69	4.1	5.8	4.4	5.8	4.1	6.1	4.1	5.9	3.2	4.8	2.4	3.4	2.9	4.2	3.8	5.4
70 +	2.0	3.1	2.0	1.9	2.0	3.5	2.0	3.0	1.6	2.7	1.0	1.4	1.3	2.2	1.8	2.7
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		= 3028		= 4585		= 8635		= 16248		= 4790		= 3449		= 8239		= 24487

Table 3.3 : Percentage Distribution of Females by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980

Age Group	Aurangabad Division		Nagpur Division		Western Maharashtra		Rural Maharashtra		Urban excluding Greater Bombay		Greater Bombay,		Urban Maharashtra		Total Maharashtra	
	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS
0 - 4	16.3	13.6	15.4	11.7	14.6	11.9	15.0	12.1	14.3	11.2	13.2	10.8	13.9	11.1	14.7	11.8
5 - 9	16.7	13.2	15.1	12.7	15.3	12.5	15.5	12.7	14.4	11.8	13.1	12.2	13.9	11.9	15.2	12.5
10 - 14	10.8	12.9	12.1	14.0	12.5	13.0	12.1	13.2	12.7	12.4	11.4	13.7	12.2	13.0	12.1	13.1
15 - 19	6.8	8.3	7.1	10.4	7.7	9.4	7.4	9.4	9.4	11.0	9.7	9.9	9.5	10.5	8.0	9.9
20 - 24	8.1	9.8	7.5	9.6	7.5	9.1	7.6	9.4	9.2	10.3	10.9	8.4	9.8	9.5	8.3	9.4
25 - 29	8.1	7.2	7.7	7.3	7.6	7.2	7.8	7.2	8.0	8.2	9.9	9.2	8.7	8.6	8.0	7.7
30 - 34	7.0	6.3	7.0	5.7	6.6	5.8	6.8	5.9	6.7	6.4	7.8	7.8	7.1	7.0	6.9	6.2
35 - 39	5.8	5.5	6.2	4.6	6.2	5.4	6.1	5.2	6.1	5.5	6.8	6.0	6.3	5.7	6.2	5.4
40 - 44	5.2	4.2	5.0	5.4	5.1	4.5	5.1	4.7	4.9	4.9	4.8	5.5	4.9	5.1	5.0	4.8
45 - 49	3.7	2.8	4.2	3.9	4.4	3.5	4.2	3.5	3.7	4.3	3.6	4.3	3.7	4.3	4.0	3.8
50 - 54	3.4	4.3	3.6	4.6	3.5	5.4	3.5	5.0	3.2	4.2	2.8	4.3	3.1	4.3	3.4	4.7
55 - 59	2.0	4.7	2.6	4.0	2.6	3.9	2.5	4.1	2.0	3.1	1.8	2.3	2.0	2.7	2.3	3.6
60 - 69	4.0	5.2	4.3	4.5	4.2	5.3	4.2	5.1	3.5	4.5	2.8	3.5	3.2	4.1	3.9	4.7
70 +	2.1	2.0	2.2	1.6	2.2	3.1	2.2	2.5	1.9	2.2	1.4	2.1	1.7	2.2	2.0	2.4
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		= 2829		= 4312		= 8621		= 15762		= 4597		= 3208		= 7805		= 23567
Child Woman Ratio:																
All Women																
15-44	797.3	650.4	768.1	587.3	721.0	587.3	747.9	595.9	655.4	488.5	538.8	465.7	611.1	479.1	704.3	554.4
Married Women																
15-44	878.4	732.6	879.7	722.8	839.3	722.8	857.2	721.5	832.2	721.7	742.5	682.3	799.8	705.3	840.5	716.5

Table 3.4 : Percentage Distribution of Males 10 Years and Above by Age Groups: 1971 Census and NFMS Maharashtra, 1980

Age Group	Aurangabad Division		Nagpur Division		Western Maharashtra		Rural Maharashtra		Urban excluding Greater Bombay		Greater Bombay		Urban Maharashtra		Total Maharashtra	
	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS
10 - 14	17.9	17.4	17.5	17.5	19.8	17.0	18.8	17.2	17.2	16.6	11.5	15.4	14.7	16.2	17.3	16.9
15 - 19	10.9	13.1	11.4	12.2	12.9	13.7	12.1	13.2	14.2	13.9	11.8	13.2	13.2	13.5	12.5	13.3
20 - 24	9.5	11.1	9.5	13.1	9.4	10.7	9.4	11.4	13.5	12.4	15.7	13.2	14.4	12.7	11.2	11.9
25 - 29	10.5	11.5	9.5	10.6	9.2	10.2	9.6	10.6	10.7	10.6	13.9	10.7	12.0	10.7	10.4	10.6
30 - 34	9.8	8.4	9.1	8.4	8.3	7.8	8.8	8.1	9.1	9.1	11.3	9.0	10.1	9.1	9.2	8.4
35 - 39	9.1	7.5	9.5	6.6	8.6	6.9	8.9	6.9	8.3	7.1	10.2	8.9	9.1	7.9	9.0	7.2
40 - 44	7.9	6.4	7.9	5.6	7.0	6.2	7.4	6.1	7.1	5.9	8.0	6.8	7.5	6.3	7.5	6.2
45 - 49	6.3	5.1	6.8	6.2	6.6	5.3	6.6	5.5	5.8	5.7	6.2	7.4	6.0	6.5	6.4	5.8
50 - 54	5.4	4.2	5.5	4.9	5.1	4.4	5.3	4.5	4.7	4.8	4.5	4.9	4.6	4.8	5.1	4.6
55 - 59	3.7	3.5	4.2	4.6	4.3	5.0	4.2	4.6	3.0	4.0	2.7	4.4	2.9	4.1	3.7	4.4
60 +	9.0	11.8	8.1	10.3	8.8	12.8	8.9	11.9	6.4	9.9	4.2	6.1	5.5	7.2	7.7	10.7
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		= 2273		= 3457		= 6495		= 12225		= 3657		= 2698		= 6355		= 18582

Table 3.5 : Percentage Distribution of Females 10 Years and Above by Age Groups: 1971 Census and NFMS Maharashtra, 1980

Age Group	Aurangabad Division		Nagpur Division		Western Maharashtra		Rural Maharashtra		Urban excluding Greater Bombay		Greater Bombay		Urban Maharashtra		Total Maharashtra	
	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS
10 - 14	16.1	17.5	17.5	18.5	17.7	17.3	17.4	17.6	17.7	15.9	15.4	17.8	17.0	16.7	17.2	17.2
15 - 19	10.1	11.4	10.2	13.7	11.0	12.4	10.6	12.6	13.2	14.2	13.1	12.8	13.1	13.7	11.4	12.9
20 - 24	12.0	13.4	10.7	12.7	10.7	12.1	11.0	12.5	12.9	13.4	14.8	11.0	13.7	12.4	11.8	12.4
25 - 29	12.2	9.9	11.1	9.7	10.8	9.5	11.2	9.6	11.3	10.7	13.4	12.0	12.1	11.2	11.5	10.2
30 - 34	10.5	8.6	10.0	7.6	9.5	7.7	9.8	7.8	9.4	8.4	10.7	10.1	9.8	9.1	9.8	8.2
35 - 39	8.7	7.5	8.9	6.1	8.9	7.1	8.8	6.9	8.6	7.2	9.2	7.7	8.8	7.4	8.8	7.1
40 - 44	7.7	5.7	7.2	7.1	7.2	5.9	7.3	6.2	6.8	6.3	6.6	7.2	6.7	6.7	7.1	6.4
45 - 49	5.5	3.8	6.1	5.2	6.2	4.7	6.0	4.7	5.3	5.6	4.9	5.6	5.1	5.6	5.8	5.0
50 - 54	5.1	5.8	5.2	6.1	5.0	7.1	5.1	6.6	4.4	5.5	3.9	5.6	4.2	5.5	4.8	6.3
55 - 59	3.1	6.5	3.7	5.3	3.7	5.1	3.6	5.4	2.9	4.0	2.5	3.0	2.7	3.6	3.3	4.8
60 +	9.0	9.9	10.4	8.1	9.3	11.1	9.2	10.1	7.5	8.8	5.5	7.2	6.8	8.1	8.5	9.5
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		= 2070		= 3260		= 6517		= 11847		= 3540		= 2468		= 6008		= 17855

Table 3.6 : Females per 1,000 Males by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980

Age Group	Aurangabad Division		Nagpur Division		Western Maharashtra		Rural Maharashtra		Urban excluding Greater Bombay		Greater Bombay		Urban Maharashtra		Total Maharashtra	
	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS
0 - 4	986	1029	979	897	975	961	978	956	973	996	957	989	967	993	975	967
5 - 9	1019	984	987	966	977	1005	988	990	961	879	943	982	955	920	979	967
10 - 14	844	922	954	998	914	1013	911	991	898	936	881	1050	892	982	905	988
15 - 19	879	791	855	1052	866	900	866	920	800	998	733	893	775	955	832	932
20 - 24	1194	1099	1087	910	1160	1139	1148	1057	828	1042	621	761	732	919	959	1006
25 - 29	1092	785	1123	856	1199	935	1156	882	910	972	638	1021	777	993	1002	920
30 - 34	1008	932	1057	849	1161	992	1099	938	884	886	618	1033	757	948	968	942
35 - 39	906	906	901	877	1049	1045	979	972	892	973	595	799	751	890	898	941
40 - 44	926	808	881	1203	1042	953	973	989	822	1028	540	967	694	1000	874	993
45 - 49	820	681	859	793	952	879	902	818	776	948	521	692	664	822	824	820
50 - 54	899	1260	900	1165	979	1640	941	1426	812	1114	561	1045	708	1085	866	1304
55 - 59	778	1696	846	1087	869	1034	847	1142	816	972	621	619	740	814	818	1038
60 - 69	927	841	950	736	1030	870	988	828	963	904	826	957	918	922	970	853
70 +	964	606	1095	787	1089	888	1065	815	1063	779	1025	1357	1052	939	1062	848
All ages	962	934	967	940	1002	998	985	970	889	960	717	930	820	947	930	962

Table 3.7 : Percentage of Ever Married to Total by Sex by Age Group : 1971 Census and NFMS Maharashtra, 1980

Age Group	Aurangabad Division		Nagpur Division		Western Maharashtra		Rural Maharashtra		Urban excluding Greater Bombay		Greater Bombay		Urban Maharashtra		Total Maharashtra		
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
10-14	Census	2.4	18.6	1.7	6.1	1.0	7.1	1.4	8.8	0.4	2.9	0.4	1.0	0.4	2.3	1.2	7.0
	NFMS	2.3	16.2	0.2	2.5	0.1	5.4	0.5	6.5	0.0	1.8	0.2	0.0	0.1	1.0	0.4	4.7
15-19	Census	15.6	81.5	10.2	62.4	9.6	60.6	10.8	64.8	4.0	40.3	5.9	22.9	4.7	34.1	8.5	54.2
	NFMS	14.1	68.1	3.3	43.1	7.5	43.4	7.7	47.2	2.0	23.0	0.8	12.7	1.5	19.1	5.5	37.2
20-24	Census	58.6	97.0	51.8	97.4	50.2	94.8	52.3	95.9	28.2	84.7	28.9	70.3	28.5	79.1	41.5	90.1
	NFMS	56.3	99.3	44.3	91.8	37.4	91.5	43.1	93.0	17.0	67.9	9.8	58.3	13.8	64.3	32.3	83.4
25-29	Census	90.1	98.9	89.8	99.5	86.2	98.8	88.0	99.0	74.2	96.7	66.0	92.0	70.1	94.8	80.8	97.6
	NFMS	90.8	99.5	85.9	98.4	82.2	99.0	85.0	98.9	61.2	91.8	49.3	90.9	56.1	91.4	75.1	96.1
30-34	Census	96.8	99.1	97.1	99.7	96.3	99.5	96.6	99.5	92.7	98.6	87.9	96.0	90.4	97.6	94.2	98.9
	NFMS	100.0	100.0	96.0	99.6	97.0	99.6	97.6	99.7	91.9	97.0	83.9	94.0	88.5	95.6	94.2	98.2
35-39	Census	98.3	99.7	96.2	99.7	98.0	99.7	97.5	99.7	96.5	99.2	94.2	97.4	95.4	98.5	96.7	99.3
	NFMS	99.4	99.4	99.6	100.0	98.2	99.0	98.9	99.9	95.4	99.6	93.7	97.4	94.6	98.7	97.3	99.4
40-44	Census	98.5	99.7	98.3	99.9	98.5	99.6	98.5	99.7	97.4	99.2	96.0	97.4	96.8	98.6	97.9	99.4
	NFMS	98.6	100.0	99.5	100.0	98.5	100.0	98.8	100.0	96.3	97.8	97.3	99.4	96.8	98.5	98.1	99.5
45-49	Census	98.6	99.8	98.2	99.9	98.8	99.8	98.6	99.8	98.0	99.4	96.7	97.5	97.4	98.8	98.2	99.5
	NFMS	98.3	100.0	99.5	100.0	99.7	100.0	99.4	100.0	98.6	99.0	97.0	99.3	97.8	99.1	98.8	99.7
Total	Census	60.5	81.2	58.2	74.7	53.8	73.6	56.2	75.4	48.3	67.5	53.8	64.0	49.7	66.2	54.3	73.6
	NFMS	57.3	76.2	52.1	66.4	50.3	68.1	52.1	69.0	43.6	60.5	43.0	57.9	43.4	59.4	49.0	65.6

Table 3.8 : Percentage of Currently Married Women to Total Women by Five Year Age Groups: 1971 Census and NFMS Maharashtra, 1980

Age Group	Aurangabad Division		Nagpur Division		Western Maharashtra		Rural Maharashtra		Urban excluding Greater Bombay		Greater Bombay		Urban Maharashtra		Total Maharashtra	
	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS
10 - 14	18.3	16.2	6.0	2.5	6.9	5.4	8.7	6.5	2.9	1.8	1.0	0.0	2.3	1.0	6.8	4.7
15 - 19	80.1	66.0	60.6	42.2	59.6	42.5	63.5	46.1	39.5	22.2	22.7	11.4	33.5	18.0	53.1	36.1
20 - 24	94.9	95.3	94.6	89.1	92.7	88.7	93.6	96.0	83.0	66.8	69.6	56.9	77.7	63.1	88.1	81.0
25 - 29	96.1	96.6	96.4	95.9	95.7	94.7	95.9	95.3	94.2	86.2	90.5	88.9	92.7	87.4	94.9	92.4
30 - 34	94.6	96.0	94.7	96.8	94.2	94.6	94.4	95.5	94.0	89.6	92.6	90.8	93.4	90.1	94.1	93.5
35 - 39	91.7	92.3	91.6	97.0	90.6	95.5	91.3	95.3	91.7	89.4	91.2	92.2	91.5	90.6	91.4	93.6
40 - 44	83.6	89.8	84.6	92.2	84.6	91.2	84.4	91.3	83.8	87.5	83.7	92.1	83.8	89.5	84.2	90.7
45 - 49	75.2	82.3	76.3	91.1	76.9	86.5	76.4	87.3	75.9	85.9	75.9	90.7	75.9	87.9	76.3	87.6
All ages	75.7	72.0	69.1	63.8	68.2	64.6	69.9	65.7	62.8	56.1	60.3	55.2	61.9	55.7	67.4	62.1

Table 3.9 : Singulate Mean Age at Marriage by Sex: NFMS Maharashtra, 1980, Compared to 1971 Census

	Census 1971		NFMS Maharashtra, 1980	
	Males	Females	Males	Females
Aurangabad Division	21.7	15.2	21.9	16.0
Nagpur Division	22.4	16.7	23.4	18.3
Western Maharashtra	22.8	16.9	23.8	18.1
Rural Maharashtra	22.5	16.6	23.4	17.8
Urban Excluding Greater Bombay	24.9	18.8	26.7	21.0
Greater Bombay	25.4	20.6	28.2	22.4
Urban Maharashtra	25.2	19.5	27.2	21.5
Total Maharashtra	23.6	17.5	25.1	19.0

Table 3.10: Percentage of Scheduled Castes, Scheduled Tribes and Muslims to Total Population by Sex:
1971 Census and NFMS Maharashtra, 1980

Region	Total Males = 100.0						Total Females = 100.0					
	Scheduled Castes		Scheduled Tribes		Muslims		Scheduled Castes		Scheduled Tribes		Muslims	
	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS	Census	NFMS
Aurangabad Division	17.6	16.8	2.0	0.8	8.3	9.9	17.6	17.6	2.0	0.8	8.4	9.5
Nagpur Division	18.0	17.2	5.6	9.3	4.3	5.6	18.3	17.6	5.7	9.4	4.1	5.6
Western Maharashtra	9.9	10.4	11.7	15.3	4.2	5.0	9.8	10.0	11.4	16.3	4.2	5.0
Rural Maharashtra	13.5	13.5	8.2	10.9	5.0	6.1	13.5	13.4	8.1	11.6	5.0	6.0
Urban excluding Greater Bombay	11.2	15.9	1.0	3.7	16.8	14.3	11.7	16.1	1.0	4.4	17.2	13.2
Greater Bombay	7.8	10.1	0.5	0.5	14.4	18.6	8.9	10.1	0.5	0.8	13.7	19.9
Urban Maharashtra	9.8	13.5	0.8	2.3	15.8	16.1	10.7	13.6	0.9	2.9	16.0	16.0
Total Maharashtra	12.3	13.5	5.7	8.0	8.6	9.4	12.7	13.5	6.0	8.7	8.2	9.3

Table 3.11 : Percentage Distribution of Males by Educational Level in Broad Age Groups: 1971 Census and NFMS Maharashtra, 1980

Age Group		Illit- erate	Literate without formal education	Primary or below	Middle but above Primary	Matri- culate and above	Total
<u>RURAL</u>							
5 - 14	Census	51.1	26.0	18.9	4.0	0.0	100.0
	NFMS	27.3	0.0	49.3	23.4	0.0	100.0
15 - 19	Census	25.8	10.0	23.1	36.3	4.8	100.0
	NFMS	26.6	0.2	13.8	54.6	4.8	100.0
20 +	Census	51.9	14.1	19.9	9.8	4.3	100.0
	NFMS	41.9	2.2	21.4	30.2	4.3	100.0
5 +	Census	49.0	17.7	19.9	10.5	2.9	100.0
	NFMS	36.0	1.3	28.6	31.0	3.1	100.0
<u>URBAN</u>							
5 - 14	Census	30.4	35.1	24.5	9.9	0.1	100.0
	NFMS	3.3	0.0	57.0	39.5	0.2	100.0
15 - 19	Census	10.9	4.9	17.0	49.3	17.9	100.0
	NFMS	5.3	0.6	6.2	60.1	27.8	100.0
20 +	Census	24.0	8.5	20.7	21.8	25.0	100.0
	NFMS	13.1	3.2	11.8	49.0	22.9	100.0
5 +	Census	24.1	15.1	21.3	21.8	17.7	100.0
	NFMS	9.5	2.0	23.6	47.7	17.2	100.0
<u>TOTAL MAHARASHTRA</u>							
5 - 14	Census	45.2	28.6	20.5	5.7	0.0	100.0
	NFMS	19.4	0.0	51.8	28.7	0.1	100.0
15 - 19	Census	20.3	8.1	20.9	41.0	9.7	100.0
	NFMS	19.2	0.3	11.1	56.6	12.8	100.0
20 +	Census	41.8	12.1	20.2	14.1	11.8	100.0
	NFMS	32.0	2.5	18.1	36.7	10.7	100.0
5 +	Census	40.7	16.8	20.3	14.3	7.9	100.0
	NFMS	26.9	1.6	26.9	36.7	7.9	100.0

Table 3.12 : Percentage Distribution of Females by Educational Level in Broad Age Groups: 1971 Census and NFMS Maharashtra, 1980

Age Group		Illiterate	Literate without formal education	Primary or below	Middle but above Primary	Matriculate and above	Total
<u>RURAL</u>							
5 - 14	Census	69.1	18.3	10.8	1.8	0.0	100.0
	NFMS	41.2	0.2	42.2	16.4	0.0	100.0
15 - 19	Census	59.7	9.3	17.3	12.2	1.5	100.0
	NFMS	48.4	0.5	16.0	34.0	1.1	100.0
20 +	Census	87.3	4.8	5.6	1.8	0.5	100.0
	NFMS	79.5	0.5	9.5	10.2	0.3	100.0
5 +	Census	79.0	9.6	8.3	2.7	0.4	100.0
	NFMS	64.8	0.4	19.9	14.6	0.3	100.0
<u>URBAN</u>							
5 - 14	Census	37.0	32.4	21.7	8.9	0.0	100.0
	NFMS	5.4	0.2	54.7	39.4	0.3	100.0
15 - 19	Census	22.1	5.3	17.9	38.4	16.3	100.0
	NFMS	13.6	0.7	7.7	56.8	21.2	100.0
20 +	Census	53.5	6.8	15.5	12.5	11.7	100.0
	NFMS	38.3	3.3	10.8	36.4	11.2	100.0
5 +	Census	45.0	14.4	17.6	14.3	8.7	100.0
	NFMS	26.3	2.1	22.6	39.7	9.3	100.0
<u>TOTAL MAHARASHTRA</u>							
5 - 14	Census	60.1	22.3	13.8	3.8	0.0	100.0
	NFMS	29.7	0.2	46.2	23.8	0.1	100.0
15 - 19	Census	46.7	7.9	17.5	21.3	6.6	100.0
	NFMS	36.0	0.6	13.0	42.1	8.3	100.0
20 +	Census	77.4	5.4	8.5	4.9	3.8	100.0
	NFMS	65.6	1.5	9.9	19.0	4.0	100.0
5 +	Census	69.0	11.0	11.0	6.1	2.9	100.0
	NFMS	52.0	1.0	20.8	22.9	3.3	100.0

CHAPTER 4

DEMOGRAPHIC, SOCIAL, ECONOMIC AND HEALTH BACKGROUND CHARACTERISTICS

Introduction

This chapter summarises the differentials, among the three rural regions and two urban zones, in the background characteristics relating to demographic, social, economic, health and modernisation aspects. Indicators of development, social change, health environment and modernisation for each rural region and urban zone are related to its fertility and mortality levels and trends. Hence the differentials in these background characteristics should provide a better understanding of the differentials in vital rates presented in the following chapters.

Demographic Characteristics

First the demographic characteristics are considered. As seen from Table 4.1, in Maharashtra, the head of the family is generally a married male, aged 30 years or over. The only significant variation among the study domains is in the age of the head. In rural areas, the middle aged heads, between 30 and 49 years old, were 44.5 per cent while in urban areas they were 53.9 per cent.

In rural areas, migrating families formed 8.5 per cent whereas they formed 37.6 per cent in urban areas. Migration of families in the ten years preceding the survey was 20.1 per cent in other urban areas against 11.0 per cent in Greater Bombay. Thus the recent migration to other urban areas was more rapid than to Greater Bombay (Table 4.2).

Average family size in rural Maharashtra was 6.4 and in urban Maharashtra 6.0 as seen from Table 4.3. The composition of families varied, but slightly, over the regions and zones, consisting, on the average, of about two adult males, two adult

females (15 years of age or over) and one each of non-adult male and female. The percentage of members under age 15 was 38.1 for rural areas against 35.8 for urban areas, suggesting higher rural fertility. There was little variation in this percentage among the rural regions and between the urban zones.

The changes in family size over the two years preceding the survey are shown in Table 4.4. The average size two years ago was 6.13 for Maharashtra. The major additions to the family in the two year period were 0.10 persons due to marriage and 0.37 persons due to births. Losses due to migration was 0.8 persons, due to other reasons, 0.16 persons and due to deaths, 0.10 persons. The average family size at the time of the survey was 6.28. These magnitudes were roughly of the same order for all study domains. The unweighted birth and death rates per 1,000 population, calculated from these averages were 32.4 and 8.7 respectively for rural areas, 25.1 and 6.7 for urban areas, and 29.8 and 8.1 for the State. Thus the vital rates were higher in rural compared to urban areas. Weighted estimates of vital rates are given in the next chapter and their differentials discussed in greater details.

Figures on the in-migration of persons to families by reasons are given in Table 4.5 for males and in Table 4.6 for females. The addition to male members to the family due to births formed 6.0 per cent in rural and 4.5 per cent in urban areas. Other reasons contributed negligibly to the increase in the male members of the family. By contrast to males, Table 4.6 shows the importance of marriage migration for females. It accounted for 3.5 per cent of the number of female members in the family in rural areas and for 2.5 per cent in urban areas. This sex differential in marriage migration is a distinct cultural trait for Maharashtra and for India as a whole.

Social Characteristics

Caste is an important social characteristic for marriage,

kin group and fertility because of the enforcement of endogamy within caste groups. Table 4.9 shows the distribution of families by the caste-cum-religion classification adopted in this study. Advanced Hindus includes Brahmins, Marathas and out-of-State caste groups. Intermediate Hindus includes traditional artisan and higher service castes. Backward Hindus are the residual castes that were not traditionally regarded as "untouchable". Scheduled Castes and Tribes have been defined in the last chapter. Scheduled Castes also included Navaboudhas.

Advanced Hindus comprised 45.0 per cent, intermediate Hindus 17.9 per cent, backward Hindus 3.9 per cent, Scheduled Castes 14.1 per cent, Scheduled Tribes 7.9 per cent, Muslims 8.3 per cent and other religions 2.9 per cent of Maharashtra's families (Table 4.9). As mentioned in the last chapter, Scheduled Castes were more evenly distributed over the rural regions and urban zones than Scheduled Tribes. The highest percentage of Scheduled Tribes was found in Western Maharashtra region (14.6) and the next highest in Nagpur Division (10.0). The highest percentage of Muslims was found in urban areas (13.3). The next highest percentage of Muslims in the rural regions was in Aurangabad Division (9.7). The percentage of advanced Hindus increased from 42.7 in rural areas, to 44.5 in other urban areas and to 56.5 in Greater Bombay. A higher percentage of intermediate Hindus was found in rural than in urban areas. The highest percentage of backward Hindus was found in Aurangabad Division.

The percentage of ever married women in younger age groups by caste-cum-religion is a sensitive indicator of the status and roles of women as also of the female age at marriage. This percentage is given in Table 4.7. To increase the numbers of which the percentages are based and to control the sampling errors, the community classification was combined into four categories:

- 1) advanced castes, 2) intermediate castes, 3) Scheduled Castes

and Tribes and backward Hindus and 4) Muslims. In the youngest age group of 10 to 14 years, 8.8 per cent of females in Scheduled Castes and Tribes were ever married against 5.4 per cent among the intermediate castes, 2.7 per cent among the advanced castes and 1.7 per cent among Muslims. The same ranking generally holds for the study domains. However, Aurangabad region had much higher percentages ever married in all the castes. In the next age group 15-19, the percentage married increases for all communities. The ranking by communities remains the same except that, in urban areas, the percentage of married Muslim women exceeded considerably the percentage for advanced castes. In age group 20-24, over 90 per cent of the women of all communities in the rural regions had been married. In this age group, in the urban areas about 58 per cent of the women of the advanced castes had been married against around 70 per cent for the other communities. For Aurangabad, the percentage married was consistently higher in all age groups for all communities than the corresponding figures for the other study domains. This reveals an younger age at marriage for females in Aurangabad Division and all the social sanctions on the status and roles of women associated with it.

Similar data on the percentage of ever married women in age groups 10-14, 15-19 and 20-24 are given in Table 4.8 for the three educational levels, 1) literate or illiterate with no formal education, 2) formal education up to or below seventh standard and 3) formal education up to eighth standard or above. There is a consistent gradient in this percentage with the highest percentage for category 1) and the lowest for 3) in each age group for all the study domains. This clearly indicates the rising age at marriage with more of formal education. For instance, for Maharashtra, the percentage of women who had ever married in the ages 15 to 19 was 60.7 for those without formal education, 42.2 for those with education up to seventh standard and 22.1 for those with eighth standard education or more. The

rural percentage is higher than the corresponding urban percentage in each age group for each educational level. Similarly the percentages for Aurangabad Division are higher than the corresponding percentages for the other domains of study. Thus the age at marriage in Aurangabad Division is systematically higher within each educational level.

Current status of school enrolment of boys and girls is shown in Table 4.10. The enrolment rate at primary, secondary and tertiary levels is the ratio of the total enrolment at that level to the population in the ages corresponding to that level of education. It could exceed unity sometimes. The age ratio is the ratio of number enrolled in a specified age group to the population in that age group. The following findings may be noted from Table 4.10. Although the enrolment at the primary level was high in all domains of study, the drop-out rate was also high. Thus, in the State, the male enrolment rate at primary level was just over unity and declined to 0.59 at the secondary level and to 0.41 at the tertiary level. The corresponding figures for female enrolment was only 0.94, 0.44 and 0.23. Urban enrolment rates were higher than rural enrolment rates for each sex. Among all the domains of study, Aurangabad Division had the lowest enrolment rates for males as well as females. In fact, the rates for females for this rural region were well below the rates for the other two rural regions. Thus Aurangabad appears to be more backward in school enrolment, especially for females, than the other two rural regions. The age ratio for ages 7-10, by definition, is lower than the enrolment rate but the patterns observed for it were also found for the age ratio.

Economic Characteristics

As expected, in rural areas 52.5 per cent of the families were cultivators and 11.1 per cent were agricultural labourers or engaged in activities allied to it (Table 4.11). The corresponding percentages for urban areas were only 3.4 and 1.1. The urban

families were well distributed over other means of livelihood: 13.5 per cent were professional and administrative, 15.1 per cent clerical, 14.6 per cent in sales and 13.5 per cent in service activities. In rural areas less than 3.0 per cent was engaged in each of these livelihoods. Processing and manufacturing activities supported 23.7 per cent of the families in rural areas and 34.4 per cent in urban areas. About 3.2 per cent of rural families and 4.4 per cent of urban families lived on unearned income. The variations among rural regions and between urban zones was inconsiderable by the source of livelihood.

When the work participation status of males and females is considered (Table 4.12), in rural areas 44.2 per cent of the males and 74.7 per cent of the females were non-workers whereas in urban areas, 54.1 per cent of the males and 91.1 per cent of the females were non-workers. The higher percentage of male non-workers in urban areas is explained by the higher proportions of males at school and in retirement in urban than in rural areas. The higher percentage of female non-workers in urban areas could be attributed to the higher proportion of the females at school and the unimportance of agriculture which absorbs more female labour. A higher proportion of child labour in rural compared to urban areas is yet another factor contributing to a greater work participation rate in rural areas. Among the rural regions, the percentage of non-workers among females was highest in Aurangabad Division, 81.9 per cent compared with 71.7 per cent for Nagpur Division and 73.7 per cent for Western Maharashtra. The difference in the percentage female non-workers between the two urban zones was not large.

In rural areas the largest percentage of males were engaged in farming and allied occupations (38.9) and the next largest percentage in processing, manufacturing and transport (11.8). In urban areas, only 2.3 per cent of the male population was engaged in agriculture and the rest were well distributed

over all the other major occupations, with 16.8 per cent in processing, manufacturing and transport occupations. Of the urban female population, 2.3 per cent was in processing and manufacturing and 2.7 per cent in service occupations.

The average number of earners, non-earners and unemployed per family are shown in Table 4.13. Perceived unemployment was very low in both rural and urban areas for females and in rural areas for males. For females it was negligible in rural areas and other urban areas and only around 0.09 per family in Greater Bombay. For males, it was 0.09 per rural family and 0.24 per urban family. As a percentage to the average number of earners per family, this works out to 2.9 per cent in rural areas and 13.9 per cent in urban areas. Thus, in the survey, only urban males had a clear cut perception of unemployment.

The average rural family size was 6.41 members of whom 3.07 were earners and 3.34 were non-earners, whereas in an urban family of average size 6.03, only 1.73 were earners and 4.30 were non-earners. The larger average number of earners in rural families compared to urban families arose from a larger number of male adult earners, a much larger number of female adult earners and also a larger number of non-adult earners. In fact, the dependency ratio of non-earners per earner was only 1.10 in rural areas compared to 2.49 in urban areas. The difference is largely accounted for by the greater work participation of females in agriculture and a larger utilization of child labour in rural areas. The variation in the dependency ratio among rural regions and between urban zones was negligible.

The distribution of the average annual family income is shown in Table 4.14 and that of the average per capita income in Table 4.15. The data on income were obtained in the survey by asking a few broad questions since the main purpose was to collect data on fertility and mortality. Hence income data cannot be regarded as accurate. The average per capita income in

Maharashtra from the survey was Rs. 1,090 for 1980 compared to a per capita net domestic product for the State of Rs. 1,694 for 1978-79 (Reserve Bank of India Bulletin, September 1981, p.821). The difference between the two figures is large and would be larger if the latter figure were available for 1980. This difference cannot be accounted for merely by the fact that the domestic product should be larger than the disposable personal income. Hence it is suspected that such items as income in kind and self-consumption by the farmer might be under-reported in the survey. These types of errors are likely to lead to greater under-estimation of rural than urban incomes.

The average annual family income was about Rs. 4,500 in rural Maharashtra, about Rs. 8,600 in other urban areas and Rs. 12,500 in Greater Bombay. Although for each rural region the average income was about the same, Western Maharashtra region had only 35.9 per cent of families in the middle income group compared to 43.3 per cent in Aurangabad Division and 45.1 per cent in Nagpur Division. However, as the percentage of population in this income group was also larger for Western Maharashtra, it did not lead to greater income inequality in this region compared to the other two regions.

In per capita terms, the average annual income was about Rs. 710 in rural areas, Rs. 1500 in other urban areas and Rs. 2,153 in Greater Bombay. Nearly 64.0 per cent of families in rural areas had a per capita annual income below or up to Rs. 650, compared to 29.4 per cent in other urban areas and only 9.7 per cent in Greater Bombay. Among the rural regions, Aurangabad Division had the lowest per capita income of Rs. 690, although the distribution of families by per capita income was similar in all three regions.

The distribution of rural families by land owned, land cultivated and land irrigated and share of agriculture in family income for the three rural regions are shown in Tables 4.16 and

4.17. Nagpur Division had the highest percentages of families not owning any land, not cultivating any land and not irrigating any land, 32.2, 35.0 and 58.2 respectively. The percentage of families, with the share of agricultural income below 10 per cent was, therefore, highest for this Division, 35.0 compared to 30.9 for Aurangabad Division and 29.4 for Western Maharashtra.

Health Environment

The type of housing, source of drinking water, access to latrine and prevalence of disabilities and illness are the major indicators considered under health environment. Differentials among the rural regions and urban zones are examined.

An independent accommodation was defined as either a separate structure or one with a separate entrance. In rural areas 70.4 per cent of the houses were independent, 11.6 per cent were not independent and 18.0 per cent were huts. There were about 3.3 persons per room (Table 4.18). However, access to open spaces should not be as limited in rural areas as in urban areas. Houses that were not independent formed 18.0 per cent in Aurangabad Division, 7.0 per cent in Nagpur Division and 12.0 per cent in Western Maharashtra.

In urban areas excluding Greater Bombay, 49.7 per cent of the residences were independent, 41.0 per cent were not independent and 9.3 per cent were huts and hutments. In Greater Bombay the corresponding percentages were 29.1, 56.9 and 14.0. The number of persons per room was 2.4 in other urban areas and 3.0 in Greater Bombay. These figures indicate the amount of overcrowding in Greater Bombay. Living conditions in houses or flats that are not independent and in huts or hutments should be particularly hard in a city like Bombay since access to open spaces is limited.

In rural areas, 12.1 per cent of families got their drinking water from taps, 80.2 per cent from wells and 7.7 per cent from other sources (Table 4.19). In other urban areas, the

corresponding percentages were 89.8, 9.7 and 0.5, and in Greater Bombay they were 98.6 and 1.4 and 0.0. Thus wells were the chief source in rural areas and taps were the main source in urban areas for drinking water. Among the rural regions, only 9.7 per cent of the rural population of Aurangabad Division obtained drinking water from taps against 10.7 per cent in Western Maharashtra and 16.2 per cent in Nagpur Division. Although nearly all families in Greater Bombay depended on tap water, it should be noted that water supply is limited and restricted to only a few hours in a day in most parts of the city and that all residences are not provided with running water taps.

Access to latrine is another important factor in the health environment. In urban areas, if a family has no access to a latrine, it creates a double health hazard to the family and to the community. In rural areas lack of access to latrine does not necessarily imply a health hazard so long as open space is available for this purpose and so long as the drinking water source is not polluted by defecation. In rural areas 95.9 per cent of the families had no access to latrine (Table 4.20). In other urban areas 16.8 per cent and in Greater Bombay 4.0 per cent had no such access. In addition, in other urban areas 23.6 per cent and in Greater Bombay 20.0 per cent of the families had to use public latrines. This is an alarming state of affairs, especially in Greater Bombay, where 24.0 per cent of the families did not have access to either an independent or a common latrine.

The reporting of disabilities and illnesses depends on the severity of the condition and its perception by respondent. Data collected in surveys on disability and morbidity cannot be regarded as objectively reliable but they reveal the subjective perception of the individuals regarding their physical limitations and well-being. Table 4.21 shows that in rural areas, 7.8 per thousand under age 15, 17.9 per thousand in ages 15 to 59 and

51.0 per thousand in ages 60 and over were reported to be disabled. The corresponding figures for urban areas were 9.3, 9.8 and 32.6. Greater Bombay reported 41.1 per thousand disabled persons in ages 60 and over against 28.3 per thousand for other urban areas. Among rural regions, Aurangabad Division had 71.6 per thousand disabled in ages 60 and over compared to 43.6 per thousand for Nagpur Division and 47.6 for Western Maharashtra. Part of this large difference might be due to errors in interviewing and errors in age reporting.

In rural areas, 13.6 per thousand under 15 years of age and 18.4 per thousand aged 15 to 59 were reported to have fallen ill in the preceding year. The corresponding figures for other urban areas were 12.5 and 18.1 and for Greater Bombay 4.3 and 13.1. While prevalence of illness was at about the same level in rural and other urban areas, it was significantly at a lower level in Greater Bombay. The incidence rate of illness was more in working ages than in ages below 15.

Indicators of Modernization

Lighting facility and ownership of certain expensive consumer durable items have been used as indicators of modernization. Table 4.22 shows that among the rural regions, in Aurangabad Division only 15.9 families had electric lighting whereas in Nagpur division the percentage of families using electric lighting was 22.5 and in Western Maharashtra it was 24.5. In other urban areas, the percentage of families using electric lighting was 76.1 and in Greater Bombay it was 88.0. Thus this percentage shows a regular gradation from rural to urban and can be used as an index of modernization.

Families were classified by their ownership of consumer durables into four categories: Owning 1) car or T.V. or telephone or refrigerator, 2) cycle or scooter or electric fan or sewing machine or motor cycle, 3) table or chair or cot, or wooden cupboard or radio, 4) None of these items. Families falling in

more than one category were placed in the highest (most expensive) ownership category.

Considering the most expensive category, there is a gradient in the percentage of families owning any item in this category with Aurangabad Division, 0.5, Nagpur Division, 0.6, Western Maharashtra, 1.0, other urban, 17.0 and Greater Bombay 33.4. The gradient was sharper for the next category of cycles, scooters, etc. The percentage of families owning one or more of these items in each study domain was, Aurangabad Division, 10.7, Nagpur Division, 19.1, Western Maharashtra, 27.1, other urban, 47.3 and Greater Bombay, 37.5. Since many of these items are for personal transport, Greater Bombay with a better public transport system had a smaller percentage of these items than other urban areas. Items in the third category might also be owned by families falling in the first two categories and the ownership of charpoy (cot made of coir ropes), that is more common in Nagpur Division than elsewhere, distorts the regular gradient for this category. Therefore, excluding Nagpur Division, the percentage of families not owning any of these consumer durables was, Aurangabad Division, 49.1, Western Maharashtra, 46.3, other urban, 11.9 and Greater Bombay, 4.9.

The spread of electric lighting and ownership of expensive consumer durables indicates the extent of modernization of the rural regions and urban zones. It is found that among the rural regions, Western Maharashtra is most modernized, Nagpur Division is somewhat less modernized and Aurangabad Division is the least modernized. Rural regions, other urban areas and Greater Bombay form a continuum from least to most modernized.

Summary of Findings

In this chapter the differentials, among the three rural regions and two urban zones, in the demographic, social, economic and health background characteristics were examined.

Characteristics of the head of the family, migration, average family size and composition, changes in family sizes, and reasons for in- and out-migration were the demographic characteristics considered. A gradient running from rural to other urban to Greater Bombay is clearly evident for most of these characteristics.

Among social characteristics, community, percentage ever married in younger age groups, and literacy, educational attainment and school enrolment by age group were considered. Apart from the concentration of Scheduled Tribes and Muslims in certain areas, the social indicators revealed a rural to urban continuum. Among rural regions, Aurangabad Division appeared to be socially the most backward.

Economic indicators of occupational structure, work participation, dependency load and unemployment, family and per capita income, and land holdings confirmed the rural to urban continuum with rural regions at one end, other urban areas in the middle and Greater Bombay at the other end. Aurangabad Division is backward compared to the other two rural regions in some of the economic indicators.

Indicators of health environment included type of housing, source of drinking water, access to latrine, and the prevalence of disabilities and incidence of illness. Housing condition in Greater Bombay was worse than in rural areas. The main source of water supply in Greater Bombay was from taps whereas only 12 per cent of rural families drew their drinking water from this source. Access to latrine was particularly important in a city like Greater Bombay. About 24.0 per cent of families in this city did not have access to either an independent or a common latrine. The proportion of the population with physical disabilities increased with age. Urban areas had a smaller proportion disabled compared to rural areas. In ages 60 and over, Aurangabad Division had a higher percentage disabled than the other regions. The incidence of illness was least in Greater Bombay.

Electric lighting and ownership of certain expensive consumer durables were used as modernization indicators. A systematic gradient was found from Aurangabad Division (least modern) to Nagpur Division to Western Maharashtra to other urban areas to Greater Bombay (most modern).

The observed differentials in the several background characteristics among the three rural regions and two urban zones provide the necessary social and economic context to the study of differential fertility and mortality levels in the following chapters.

Table 4.1 : Percentage Distribution of Heads of the Families according to Age, Sex and Marital Status:
NFMS Maharashtra, 1980

	Age (in years) of the head			Marital status of the head			Percentage of male heads	Number of families
	Upto 29	30-49	50+	Unmarried	Married	Widowed or divorced		
Aurangabad Division	13.6	44.7	41.7	1.0	92.1	6.9	97.4	900
Nagpur Division	11.7	48.1	40.2	0.5	93.6	5.9	97.3	1450
Western Maharashtra	7.9	42.4	49.7	0.9	90.0	9.1	92.7	2643
Rural Maharashtra	10.0	44.5	45.5	0.8	91.4	7.8	94.9	4993
Urban excluding Greater Bombay	7.6	50.1	42.3	1.5	87.3	11.2	90.1	1561
Greater Bombay	5.9	59.4	34.7	1.0	93.5	5.5	95.2	1100
Urban Maharashtra	6.9	53.9	39.2	1.3	89.9	8.8	92.5	2661
Total Maharashtra	8.9	47.8	43.3	1.0	90.9	8.1	94.1	7654

Table 4.2 : Percentage Distribution of Families according to Migration Status and Duration of Stay at Current Place of Residence: NFMS Maharashtra, 1980

	Duration of residence of immigrant families		Non-migrant families	All families
	Upto 10 years	More than 10 years		
Aurangabad Division	2.1	1.3	96.6	100.0 = 900
Nagpur Division	7.5	5.5	87.0	100.0 = 1450
Western Maharashtra	4.5	3.3	92.2	100.0 = 2643
Rural Maharashtra	4.9	3.6	91.5	100.0 = 4993
Urban excluding Greater Bombay	20.1	18.1	61.8	100.0 = 1561
Greater Bombay	11.0	25.6	63.4	100.0 = 1100
Urban Maharashtra	16.4	21.2	62.4	100.0 = 2661
Total Maharashtra	8.9	9.7	81.4	100.0 = 7654

Table 4.3 : Family Size, Male and Female Adults and Non-Adults Per Family: NFMS Maharashtra, 1980

	Average family size	Composition of the family			
		Average male adults	Average female adults	Average male non-adults	Average female non-adults
Aurangabad Division	6.51	2.08	1.90	1.28	1.25
Nagpur Division	6.14	1.97	1.83	1.18	1.16
Western Maharashtra	6.53	2.04	2.04	1.23	1.22
Rural Maharashtra	6.41	2.02	1.96	1.22	1.22
Urban excluding Greater Bombay	6.02	1.97	1.89	1.12	1.04
Greater Bombay	6.05	2.06	1.84	1.07	1.08
Urban Maharashtra	6.03	2.00	1.87	1.10	1.06
Total Maharashtra	6.28	2.02	1.93	1.18	1.15

Table 4.4 : Changes in Average Family Size in the Last Two Years: NFMS Maharashtra, 1980

	Average family size two years ago	In- migrants due to marriage (+)	Other in- migrants (+)	Births (+)	Out- migrants due to marriage (-)	Other out- migrants (-)	Deaths (-)	Average current family size
Aurangabad Division	6.25	.13	0.00	.45	.05	0.14	.13	6.51
Nagpur Division	5.96	.09	0.02	.41	.12	0.11	.11	6.14
Western Maharashtra	6.40	.11	0.02	.40	.09	0.21	.10	6.53
Rural Maharashtra	6.24	.11	0.02	.41	.08	0.18	.11	6.41
Urban excluding Greater Bombay	5.92	.09	0.01	.31	.07	0.15	.09	6.02
Greater Bombay	5.90	.07	0.02	.27	.05	0.10	.06	6.05
Urban Maharashtra	5.91	.07	0.02	.30	.06	0.13	.08	6.03
Total Maharashtra	6.13	.10	0.02	.37	.08	0.16	.10	6.28

Table 4.5 : Percentage Distribution of Males by Births, Non-migrants and Immigration by Reason During Last Two Years: NFMS Maharashtra, 1980

	Births	Non-migrants	Immigration by reason			Total
			Marriage	For Work	Other reasons	
Aurangabad Division	5.7	94.2	0.1	0.0	0.0	100.0= 3028
Nagpur Division	6.1	93.5	0.1	0.1	0.2	100.0= 4585
Western Maharashtra	6.0	93.6	0.1	0.1	0.2	100.0= 8635
Rural Maharashtra	6.0	93.6	0.1	0.1	0.2	100.0=16248
Urban excluding Greater Bombay	4.7	95.0	0.0	0.1	0.2	100.0= 4790
Greater Bombay	4.1	95.3	0.1	0.4	0.1	100.0= 3449
Urban Maharashtra	4.5	95.2	0.0	0.2	0.1	100.0= 8239
Total Maharashtra	5.5	94.2	0.1	0.1	0.1	100.0=24487

Table 4.6 : Percentage Distribution of Females by Births, Non-migrants and Immigration by Reason During Last Two Years: NFMS Maharashtra, 1980

	Births	Non-migrants	Immigration by reason			Total
			Marriage	For work	Other reasons	
Aurangabad Division	6.8	89.2	3.9	0.0	0.1	100.0= 2829
Nagpur Division	5.9	90.5	3.9	0.1	0.2	100.0= 4312
Western Maharashtra	5.6	90.6	3.5	0.0	0.3	100.0= 8621
Rural Maharashtra	5.9	90.4	3.5	0.0	0.2	100.0=15762
Urban excluding Greater Bombay	4.9	92.0	2.8	0.1	0.2	100.0= 4597
Greater Bombay	4.6	92.9	2.2	0.0	0.3	100.0= 3208
Urban Maharashtra	4.8	92.4	2.5	0.1	0.2	100.0= 7805
Total Maharashtra	5.5	91.1	3.2	0.0	0.2	100.0=23567

Table 4.7 : Percentage of Ever Married to All Women in Selected Age Groups by Caste cum Religion:
NFMS Maharashtra, 1980

	Age group 10-14				Age group 15-19				Age group 20-24			
	Adva- nced Caste	Inter- mediate Caste	Sche- duled Castes and Sche- duled Tribes	Muslims	Adva- nced Caste	Inter- mediate Caste	Sche- duled Castes and Sche- duled Tribes	Muslims	Adva- nced Caste	Inter- mediate Caste	Sche- duled Castes and Sche- duled Tribes	Muslims
Aurangabad Division	13.3	16.4	25.5	3.3	62.0	77.5	78.1	66.7	99.2	98.0	100.0	100.0
Nagpur Division	1.4	3.8	3.3	0.0	38.7	44.8	51.4	19.0	92.7	93.2	92.5	87.0
Western Maharashtra	2.2	6.0	11.0	1.6	39.6	45.8	51.5	41.5	89.0	92.5	95.7	89.7
Rural Maharashtra	4.0	7.2	10.6	1.5	42.7	49.9	55.4	43.0	91.9	93.6	95.4	92.0
Urban excluding Greater Bombay	0.0	0.8	3.9	4.0	10.9	28.9	34.2	34.7	59.1	80.0	73.6	74.3
Greater Bombay	0.0	0.0	0.0	0.0	7.6	9.4	20.5	21.4	56.9	48.1	63.0	63.2
Urban Maharashtra	0.0	0.7	2.7	1.8	9.5	23.8	30.5	28.3	58.1	72.3	71.5	69.8
Total Maharashtra	2.7	5.4	8.8	1.7	31.8	41.8	48.6	33.8	80.7	88.0	89.7	78.4

Table 4.8 : Percentage of Ever Married to All Women in Selected Age Groups by Literacy/Educational Attainment:
NFMS Maharashtra, 1980

	Age group 10-14			Age group 15-19			Age group 20-24		
	Illit- erate + Literate	Upto 7th std.	8th std. or above	Illit- erate + Literate	Upto 7th std.	8th std. or above	Illit- erate + Literate	Upto 7th std.	8th std. or above
Aurangabad Division	21.10	16.13	-	75.44	55.56	-	99.54	100.00	-
Nagpur Division	5.88	4.76	-	60.26	47.06	25.58	93.22	94.12	80.65
Western Maharashtra	12.02	6.52	-	56.46	41.29	25.00	96.45	86.57	80.00
Rural Maharashtra	13.69	6.93	-	61.79	44.76	26.02	96.58	90.48	81.29
Urban excluding Greater Bombay	17.65	2.56	-	58.54	41.74	21.51	95.37	81.97	55.39
Greater Bombay	-	-	-	40.00	23.88	12.33	87.50	76.27	44.52
Urban Maharashtra	12.50	1.41	-	53.57	35.16	17.47	92.95	80.11	50.86
Total Maharashtra	13.59	5.80	-	60.68	42.18	21.11	96.01	87.65	59.51

- Percentage not shown if the number of women in the sample is below 30.

Table 4.9 : Percentage Distribution of families by Caste-cum-Religion: NFMS Maharashtra, 1980

	Advanced Hindus	Inter- mediate Hindus	Backward Hindus	Scheduled Castes (Including Nava Boudhs)	Scheduled Tribes	Muslims	Other Religions	All Religions
Aurangabad Division	42.4	17.2	10.6	18.5	0.9	9.7	0.7	100.0= 900
Nagpur Division	36.3	23.3	7.3	18.0	10.0	4.8	0.3	100.0=1450
Western Maharashtra	46.4	18.8	2.3	11.5	14.6	4.7	1.7	100.0=2643
Rural Maharashtra	42.7	19.9	5.3	14.6	10.8	5.6	1.1	100.0=4993
Urban excluding Greater Bombay	44.5	18.7	1.5	15.4	3.6	11.1	5.2	100.0=1561
Greater Bombay	56.5	8.0	1.2	9.6	0.6	16.4	7.7	100.0=1100
Urban Maharashtra	49.4	14.3	1.4	13.0	2.4	13.3	6.2	100.0=2661
Total Maharashtra	45.0	17.9	3.9	14.1	7.9	8.3	2.9	100.0=7654

There were 36 families that did not report their religion. They were treated as Hindus and proportionately distributed.

Table 4.10 : Enrolment Rates (ER) by Levels and Age Ratios (AR) for Males, Females and Persons: NFMS Maharashtra, 1980

		Males			Females			Persons		
ER Std.	AR Age	1 to 4th std. 7-10 yrs	5 to 7th std. 11-14 yrs	8 to 10th std. 15-19 yrs	1 to 4th std. 7-10 yrs	5 to 7th std. 11-14 yrs	8 to 10th std. 15-19 yrs	1 to 4th std. 7-10 yrs	5 to 7th std. 11-14 yrs	8 to 10th std. 15-19 yrs
Aurangabad Division	ER	0.93	0.36	0.17	0.61	0.12	0.04	0.78	0.25	0.11
	AR	0.66	0.48	0.14	0.42	0.21	0.02	0.54	0.35	0.09
Nagpur Division	ER	1.10	0.48	0.34	1.00	0.37	0.16	1.05	0.42	0.25
	AR	0.82	0.65	0.28	0.72	0.55	0.12	0.77	0.60	0.20
Western Maharashtra	ER	1.09	0.57	0.38	0.90	0.34	0.10	0.99	0.45	0.25
	AR	0.79	0.73	0.32	0.66	0.46	0.09	0.73	0.59	0.21
Rural Maharashtra	ER	1.06	0.50	0.33	0.87	0.31	0.11	0.97	0.41	0.22
	AR	0.78	0.66	0.28	0.63	0.44	0.09	0.71	0.55	0.19
Urban excluding Greater Bombay	ER	1.07	0.73	0.57	1.06	0.66	0.45	1.06	0.70	0.51
	AR	0.93	0.87	0.31	0.88	0.81	0.22	0.91	0.84	0.27
Greater Bombay	ER	1.15	0.82	0.55	1.11	0.78	0.44	1.13	0.80	0.50
	AR	0.92	0.91	0.35	0.93	0.85	0.26	0.92	0.88	0.31
Urban Maharashtra	ER	1.10	0.77	0.56	1.08	0.71	0.45	1.09	0.74	0.51
	AR	0.93	0.89	0.33	0.90	0.83	0.24	0.91	0.86	0.28
Total Maharashtra	ER	1.08	0.59	0.41	0.94	0.44	0.23	1.01	0.52	0.32
	AR	0.83	0.74	0.30	0.72	0.57	0.14	0.77	0.65	0.22

ER Enrolment rate by level: (Total enrolled in specified level)/(Population in corresponding age group).

AR Age ratio: (Number enrolled in specified age group)/(Population in corresponding age group).

Table 4.11 : Percentage Distribution of Families by Main Occupation: NFMS Maharashtra, 1980

	Profe- ssional and admini- strative	Clerical	Sales	Service	Agriculture and Allied ----- Cultiv- Labour ation	Process- ing and manufac- turing	Unearned income	All Occupations	
Aurangabad Division	1.8	2.6	1.9	1.4	51.0	8.7	31.8	0.8	100.0 = 900
Nagpur Division	3.7	2.6	2.9	1.0	51.4	12.9	24.0	1.5	100.0 = 1450
Western Maharashtra	2.4	2.7	2.5	2.3	53.5	10.9	20.7	5.0	100.0 = 2643
Rural Maharashtra	2.6	2.6	2.5	1.8	52.5	11.1	23.7	3.2	100.0 = 4993
Urban excluding Greater Bombay	14.2	16.9	12.8	10.4	5.7	1.0	33.3	5.7	100.0 = 1561
Greater Bombay	12.5	12.4	17.3	17.7	0.3	1.1	36.1	2.6	100.0 = 1100
Urban Maharashtra	13.5	15.1	14.6	13.5	3.4	1.1	34.4	4.4	100.0 = 2661
Total Maharashtra	6.4	7.0	6.7	5.8	35.5	7.6	27.4	3.6	100.0 = 7654

Table 4.12 : Percentage Distribution for Males and Females by Their Main Occupation: NFMS Maharashtra, 1980

		Professional and Administrative	Clerical and related	Sales	Service	Farmer, fisherman, hunter, etc.	Processing, manufac- turing and related + transport	Non- worker	All occupations
Aurangabad Division	M	0.6	1.0	1.5	1.3	39.8	16.0	39.8	100.0 = 3028
	F	0.1	0.0	0.1	0.0	9.0	8.9	81.9	100.0 = 2829
Nagpur Division	M	1.7	1.2	1.9	0.8	34.9	14.0	45.5	100.0 = 4585
	F	0.4	0.0	0.1	0.1	16.6	11.1	71.7	100.0 = 4312
Western Maharashtra	M	1.1	1.2	1.4	1.3	40.7	9.2	45.1	100.0 = 8635
	F	0.1	0.0	0.1	0.1	21.8	4.2	73.7	100.0 = 8621
Rural Maharashtra	M	1.1	1.2	1.6	1.2	38.9	11.8	44.2	100.0 = 16248
	F	0.1	0.0	0.1	0.1	18.1	6.9	74.7	100.0 = 15762
Urban excluding Greater Bombay	M	5.4	6.9	7.0	4.7	3.6	16.9	55.5	100.0 = 4790
	F	1.4	1.1	0.6	2.3	1.2	3.1	90.3	100.0 = 4597
Greater Bombay	M	5.5	5.8	9.3	10.2	0.5	16.5	52.2	100.0 = 3449
	F	1.1	1.2	0.6	3.1	0.2	1.1	92.7	100.0 = 3208
Urban Maharashtra	M	5.4	6.4	8.0	7.0	2.3	16.8	54.1	100.0 = 8239
	F	1.3	1.2	0.6	2.7	0.8	2.3	91.1	100.0 = 7805
Total Maharashtra	M	2.6	2.9	3.7	3.1	26.6	13.5	47.6	100.0 = 24487
	F	0.5	0.4	0.3	1.0	12.3	5.4	80.1	100.0 = 23567

and Females

Table 4.13 : Average Family Size, Earners by Sex Per Family and Average Unemployed Males: NFMS Maharashtra, 1980

	Average family size	Total earners	Average earners			Average non-earners	Average unemployed males	Average unemployed females	Average non-earners per earner
			Male adult earners	Female adult earners	Non-adult earners				
Aurangabad Division	6.51	3.21	1.90	1.03	0.28	3.30	0.07	..	1.04
Nagpur Division	6.14	2.85	1.68	1.03	0.14	3.29	0.09	..	1.15
Western Maharashtra	6.53	3.15	1.75	1.24	0.16	3.38	0.09	..	1.09
Rural Maharashtra	6.41	3.07	1.76	1.14	0.17	3.34	0.09	..	1.10
Urban excluding Greater Bombay	6.02	1.74	1.39	0.34	0.01	4.28	0.22	..	2.46
Greater Bombay	6.05	1.71	1.49	0.21	0.01	4.34	0.27	0.09	2.53
Urban Maharashtra	6.03	1.73	1.43	0.29	0.01	4.30	0.24	0.04	2.49
Total Maharashtra	6.28	2.60	1.64	0.84	0.12	3.68	0.14	0.01	1.42

.. Negligible percentage.

Table 4.14 : Percentage Distribution of Families by Annual Family Income: NFMS Maharashtra, 1980

	Upto Rs.2050	Rs.2051- Rs.5050	Rs.5051 and above	All Incomes	Average annual family income (Rs.)
Aurangabad Division	30.5	43.3	26.2	100.0= 900	4468
Nagpur Division	30.6	45.1	24.3	100.0=1450	4495
Western Maharashtra	39.3	35.9	24.8	100.0=2643	4475
Rural Maharashtra	35.2	39.8	25.0	100.0=4993	4480
Urban excluding Greater Bombay	12.1	32.0	55.9	100.0=1561	8558
Greater Bombay	1.7	19.4	78.9	100.0=1100	12497
Urban Maharashtra	7.8	26.9	65.3	100.0=2661	10186
Total Maharashtra	25.8	35.3	38.9	100.0=7654	6464

There were 57 families which did not report their incomes; these are distributed proportionately.

Table 4.15 : Percentage Distribution of Families by Annual Per Capita Income: NFMS Maharashtra, 1980

	Upto Rs. 650	Rs. 651- Rs.1050	Rs.1051 and above	All Incomes	Average annual per capita income (Rs.)
Aurangabad Division	63.7	19.4	16.9	100.0 = 900	692
Nagpur Division	61.9	19.9	18.2	100.0 = 1450	743
Western Maharashtra	65.4	18.6	16.0	100.0 = 2643	709
Rural Maharashtra	64.0	19.1	16.9	100.0 = 4993	716
Urban excluding Greater Bombay	29.4	22.4	48.2	100.0 = 1561	1537
Greater Bombay	9.7	17.9	72.4	100.0 = 1100	2153
Urban Maharashtra	21.3	20.6	58.1	100.0 = 2661	1792
Total Maharashtra	49.3	19.6	31.1	100.0 = 7654	1090

There were 57 families which did not report their incomes; these are distributed proportionately.

Table 4.16 : Percentage Distribution of Rural Families by Land Owned, Cultivated and Irrigated: NFMS
Maharashtra, 1980

	Land Owned				Land Cultivated				Land Irrigated					All Families
	No land owned	Upto 2.5 acres	2.51- 5.5 acres	5.51 acres and above	No land cultivated	Upto 2.5 acres	2.51- 5.5 acres	5.51 acres and above	No land cultivated	No land irrigated	Upto 2.5 acres	2.51- 5.5 acres	5.51 acres and above	
Aurangabad Division	26.4	8.9	21.2	43.5	30.1	8.5	19.3	42.1	30.1	48.0	10.1	8.0	3.8	100.0 = 900
Nagpur Division	32.2	13.4	18.2	36.2	35.0	12.8	16.9	35.3	35.0	58.2	3.5	2.1	1.2	100.0 = 1450
Western Maharashtra	26.0	27.3	20.2	26.5	28.3	26.9	20.4	24.4	28.3	45.9	15.0	6.9	3.9	100.0 = 2643
Rural Maharashtra	27.9	19.9	19.8	32.4	30.6	19.4	19.2	30.8	30.6	49.8	10.8	5.7	3.1	100.0 = 4993

Families not reporting land owned, cultivated or irrigated have been distributed proportionately.

Table 4.17 : Percentage Distribution of Rural Families by Income from Agriculture as Percentage of Total Income: NFMS Maharashtra, 1980

	Percentage of income from agriculture to total income			Total
	Under 10	10-89	90 and over	
Aurangabad Division	30.9	40.1	29.0	100.0 = 900
Nagpur Division	35.0	39.3	25.7	100.0 = 1450
Western Maharashtra	29.4	48.0	22.6	100.0 = 2643
Rural Maharashtra	31.3	44.0	24.7	100.0 = 4993

Table 4.18 : Percentage Distribution of Families by Type of Housing: NFMS Maharashtra, 1980

	Independent house or flat	Not independent	Huts or hutments	All families	No. of persons per room
Aurangabad Division	63.0	18.0	19.0	100.0 = 900	3.5
Nagpur Division	75.4	7.0	17.6	100.0 = 1450	3.0
Western Maharashtra	70.1	12.0	17.9	100.0 = 2643	3.4
Rural Maharashtra	70.4	11.6	18.0	100.0 = 4993	3.3
Urban excluding Greater Bombay	49.7	41.0	9.3	100.0 = 1561	2.4
Greater Bombay	29.1	56.9	14.0	100.0 = 1100	3.0
Urban Maharashtra	41.1	47.6	11.3	100.0 = 2661	2.7
Total Maharashtra	60.2	24.1	15.7	100.0 = 7654	2.9

There were 51 families that did not report their type of housing. These have been distributed proportionately.

Table 4.19 : Percentage Distribution of Families by Source of Drinking Water: NFMS Maharashtra, 1980.

	Tap water	Well water	River, lake or spring water	All families
Aurangabad Division	9.7	83.4	6.9	100.0 = 900
Nagpur Division	16.2	80.0	3.8	100.0 = 1450
Western Maharashtra	10.7	79.2	10.1	100.0 = 2643
Rural Maharashtra	12.1	80.2	7.7	100.0 = 4993
Urban excluding Greater Bombay	89.8	9.7	0.5	100.0 = 1561
Greater Bombay	98.6	1.4	-	100.0 = 1100
Urban Maharashtra	93.4	6.3	0.3	100.0 = 2661
Total Maharashtra	40.4	54.5	5.1	100.0 = 7654

Table 4.20 : Percentage Distribution of Families by Access to Latrine : NFMS Maharashtra, 1980

	Independent latrine	Common latrine	Public latrine	No latrine	All Families
Aurangabad Division	0.2	0.2	-	99.6	100.0 = 900
Nagpur Division	6.7	0.5	0.1	92.7	100.0 = 1450
Western Maharashtra	1.8	0.9	1.0	96.3	100.0 = 2643
Rural Maharashtra	2.9	0.7	0.5	95.9	100.0 = 4993
Urban excluding Greater Bombay	31.0	28.6	23.6	16.8	100.0 = 1561
Greater Bombay	34.2	41.8	20.0	4.0	100.0 = 1100
Urban Maharashtra	32.3	34.1	22.1	11.5	100.0 = 2661
Total Maharashtra	13.2	12.3	8.0	66.5	100.0 = 7654

Incidence Rate

Table 4.21 : Prevalence Rate of Disability and of Illness Per 1000 Persons by Age Group:
NFMS Maharashtra, 1980

	Disabled Persons				Ill Persons	
	Under 15 years	15-59 years	60 years and above	All ages	Under 15 years	15-59 years
Aurangabad Division	9.2	17.0	71.6	18.4	13.2	19.6
Nagpur Division	5.6	16.1	43.6	14.0	14.5	12.1
Western Maharashtra	8.5	19.2	47.6	17.7	13.3	21.3
Rural Maharashtra	7.8	17.9	51.0	16.8	13.6	18.4
Urban excluding Greater Bombay	10.1	11.9	28.3	12.5	12.5	18.1
Greater Bombay	8.1	6.8	41.1	9.0	4.3	13.1
Urban Maharashtra	9.3	9.8	32.6	11.0	9.1	16.0
Total Maharashtra	8.3	15.1	45.9	14.9	12.2	17.5

Table 4.22 : Percentage Distribution of Families by Lighting Facility: NFMS Maharashtra, 1980

	Electric lighting	Kerosene lamp with protected flame	Other lighting	All lighting
Aurangabad Division	15.9	50.9	33.2	100.0 = 900
Nagpur Division	22.5	50.6	26.9	100.0 = 1450
Western Maharashtra	24.5	53.1	22.4	100.0 = 2643
Rural Maharashtra	22.3	52.0	25.7	100.0 = 4993
Urban excluding Greater Bombay	76.1	18.1	5.8	100.0 = 1561
Greater Bombay	88.0	10.8	1.2	100.0 = 1100
Urban Maharashtra	81.0	15.1	3.9	100.0 = 2661
Total Maharashtra	42.9	39.1	18.0	100.0 = 7654

There were 90 families that did not answer this question. These have been proportionately distributed.

Table 4.23 : Percentage Distribution of Families by Household Durables: NFMS Maharashtra, 1980

	Car, T.V., tele- phone, refrigerator	Cycle, scooter, electric fan, sewing machine, motor-cycle	Table, chair, wooden cupboard, radio, etc.	Nothing in the list	Total
Aurangabad Division	0.5	10.7	39.7	49.1	100.0 = 900
Nagpur Division	0.6	19.1	*53.6	26.7	100.0 = 1450
Western Maharashtra	1.0	27.1	25.6	46.3	100.0 = 2643
Rural Maharashtra	0.8	21.8	36.3	41.1	100.0 = 4993
Urban excluding Greater Bombay	17.0	47.3	23.8	11.9	100.0 = 1561
Greater Bombay	33.4	37.5	24.2	4.9	100.0 = 1100
Urban Maharashtra	23.8	43.2	24.0	9.0	100.0 = 2661
Total Maharashtra	8.8	29.2	32.0	30.0	100.0 = 7654

*This group included charpoy (cot with coir ropes) which is in more common use in Nagpur Division than elsewhere.

CHAPTER 5

CURRENT FERTILITY AND MORTALITY RATES AND DIFFERENTIALS

Introduction

In this chapter current fertility and mortality differentials are compared. The crude birth, death and natural increase rates are estimated and compared among the three rural regions and the two urban zones. The rates are given by community, main family occupation and annual family income. Age-specific fertility rates for married and all women are also estimated for the domains of study. The NFMS age-specific fertility rates for Maharashtra 1980 are compared with Sample Registration System (SRS) rates for 1972 to find the changes. To assess the effect of family planning on fertility, age-specific marital fertility rates for all women are compared with those for non-contracepting women. Age-specific mortality rates are estimated for rural and urban Maharashtra for males and females. Age-standardized death rates are compared among the domains of study.

The current estimates given in this chapter are based on the births and deaths reported by the family in the two years preceding the date of interview. Since the field interviews were taken during the period June to December 1980, the annual rates may be taken to refer to the period April 1979 to March 1980.

As explained in Chapter 2, the sampling design was not self-weighting. The family was reweighted inversely in proportion to the number of adults 21 years and over in the rural sample and, in the urban sample, the wards were reweighted inversely in proportion to their probability of inclusion in the sample. The rural and urban estimates were combined in the ratio 65:35. This ratio was observed between the numbers of rural and urban families in the sample and also between the rural and urban population in the 1981 Census.

The birth, death and natural increase rates were calculated as central rates. The mid-period population was obtained as the average of the family size two years ago and the current family size. Since the reference period for reporting births and deaths was two years, their estimated numbers were divided by two.

The main purpose of this chapter is to examine the differentials in current fertility and mortality rates among the three rural regions and two urban zones. There is evidence indicating some degree of under-enumeration of births and a somewhat larger degree of under-enumeration of deaths. Indirect estimation of these errors and adjustment of the vital rates for under-enumeration are taken up in a later chapter. On the assumption that under-enumeration does not differ by domains and by characteristics, the findings of this chapter would not be affected by the presence of such uniform under-enumeration.

Differentials by Domains

The crude birth rate of the three rural regions and two urban zones is affected both by differences in the background characteristics presented in Chapter 4 and the socio-economic composition of the domain by community, and occupational and income groups.

In Chapter 4, on the basis of social, economic, health and modernization indicators, it was found that there is a gradient from rural to other urban to Greater Bombay and within rural regions, Aurangabad Division is least modern, followed by Nagpur Division and Western Maharashtra. The crude birth rates in Table 5.4 and crude death rates in Table 5.7 are consistent with this ranking. The crude birth rate for Aurangabad Division was 33.7, for Nagpur Division 33.2, for Western Maharashtra 28.7, for other urban areas 24.6 and for Greater Bombay 23.9. The differences between Aurangabad and Nagpur Divisions and that between other urban areas and Greater Bombay are diminished, possibly by dissimilar socio-economic composition. The crude birth rate for Maharashtra State was 28.5 during April 1978 to March 1980.

The crude death rates for the five domains were Aurangabad Division 11.8, Nagpur Division 10.0, Western Maharashtra 8.6, other urban 6.4 and Greater Bombay 5.4. Clearly these rates conform to the ranking by socio-economic characteristics in Chapter 4. The crude death rate for Maharashtra State was 8.3 during April 1979 to March 1980.

The rate of natural increase is the difference between the birth and death rates. The differentials in the natural increase rate tend to be evened out since a high (low) birth rate goes together with a high (low) death rate. The percentage natural increase rate was somewhat higher in rural regions, 2.2 in Aurangabad Division, 2.3 in Nagpur Division and 2.0 in Western Maharashtra, compared to the urban zones, 1.8 in other urban areas and 1.9 in Greater Bombay. The rate of natural increase for Maharashtra State was 2.02 per cent during April 1979 to March 1980.

Socio-Economic Differentials in Vital Rates

The three socio-economic characteristics chosen for the study of differentials in birth and death rates were community, main family occupation and annual family income. In many micro-socio-demographic surveys, these characteristics have shown a high degree of association with fertility and mortality levels.

The community classification is based on religion and caste among Hindus and has been described in Chapter 4. The following broad classes were used in order to provide large enough samples and, at the same time, to reveal the major differentials in the population: (1) advanced caste Hindus, (2) intermediate caste Hindus, (3) Scheduled Castes and Tribes and other backward Hindus, (4) Muslims and (5) other religions.

The weighted distribution of communities in each domain is given in Table 5.1. The features noted for the unweighted distributions in Chapter 4 are also true of the weighted distributions. Compared to rural areas, there is a higher percentage of advanced caste Hindus, Muslims and other religions in other

urban areas and Greater Bombay. About a third of the rural population and only about a sixth of the urban population belonged to Scheduled Castes and Tribes, and backward castes.

In the State as a whole, the crude birth rate for advanced caste Hindus was 26.1, for intermediate caste Hindus 28.6, for Scheduled Castes and Tribes and backward Hindus 31.4, and for Muslims 34.1 (Table 5.4). The sample size for other religions was too small to provide a reliable rate. In urban Maharashtra, the birth rates for these four groups were 21.6, 26.0, 23.3 and 32.8 respectively whereas in rural Maharashtra the birth rates for the four groups were 29.2, 29.4, 33.4 and 35.9 respectively. Thus the rural birth rate for each community was higher than its urban rate. Muslims had high fertility rates in both rural and urban areas. Scheduled Castes and Tribes and backward Hindus had a high fertility rate in rural areas. Since the number of sample families in some of the cells was small, more detailed comparisons are not warranted.

The composition of the population by communities had an effect on the birth rate of each study domain. The rural birth rate was higher compared to the urban rate because of a lower percentage of advanced caste Hindus whose birth rate was low and a higher percentage of Scheduled Castes and Tribes and backward Hindus whose birth rate was high. The higher percentage of Muslims in Aurangabad Division tended to increase its birth rate in relation to the other two rural regions. Similarly a higher percentage of Muslims in Greater Bombay tended to bring its birth rate closer to that of other urban areas.

The crude death rate in Maharashtra, by community was 7.2 for advanced caste Hindus, 9.7 for intermediate caste Hindus, 9.8 for S.C., S.T. and backward Hindus and 6.5 for Muslims (Table 5.7). The rural rates for the four communities were 8.5, 10.9, 10.5 and 8.4 respectively with corresponding urban rates of 5.4, 5.8, 6.8 and 5.1 respectively. The rural rate for each community

was above its corresponding urban rate. The rather low death rates for Muslims may be noted. In fact, in both rural and urban areas, advanced caste Hindus and Muslims had lower death rates in comparison with the other two communities.

Unlike on the birth rate, on the death rate the effect of the composition of the population by community seems to be less than the situational effect. For instance, the death rate in Aurangabad Division for each community was higher than its rural death rate. Similarly the rural death rate for each community was higher than its urban death rate. It is not surprising to find that composition by community exerted a higher influence on the birth rate and environmental factors on the death rate.

With a high birth rate and a low death rate, the Muslims had the highest rate of natural increase, 2.76 per cent. The rural and urban rates of natural increase for this community were 2.7 per cent and 2.8 per cent (Table 5.10). Thus there was not much difference for Muslims between their rural and urban rates of natural increase. The same is true for intermediate caste Hindus, since a higher rural birth rate was balanced by a higher rural death rate and a lower urban birth rate was balanced by a lower urban death rate. For the other two communities, their urban rates of natural increase were less than their rural rates. The natural increase rate for the remaining communities were 1.89 per cent each for advanced caste Hindus and intermediate caste Hindus and 2.16 per cent for S.C., S.T. and backward Hindus.

The composition by community of the population of each domain tends to even out the differences in the rate of natural increase. The rural regions had a rate of natural increase slightly above 2 per cent while the urban zones had a rate slightly below 2 per cent.

Main family occupation is the second characteristic for which the vital rates were calculated. The broad categories used in this classification and the differentials in their

distribution, by study domains, were described in Chapter 4. Agriculture and allied activities absorbed 59.7 per cent of rural families and processing, manufacturing and transport another 25.9 per cent (Table 5.2). In urban areas, only 4.1 per cent of families had agriculture and allied activities as their main occupation and 34.2 per cent were engaged in processing, manufacturing and transport. The rest of the urban families were engaged in professions and administration, clerical and sales jobs, and service activities. Thus the division of labour was distinct between rural and urban areas. Among rural regions, Aurangabad Division had the largest percentage of families employed in processing, manufacturing and transport, mainly in the unorganized sector, and the smallest percentage in agriculture. Greater Bombay had a larger percentage of families engaged in processing and manufacturing, largely in the organized sector, and a smaller percentage in agriculture compared to other urban areas.

In Maharashtra State, the crude birth rate was the lowest for families engaged in professions and administration (21.7), slightly higher for services (24.5), much higher for clerical and sales occupations (28.8), and agriculture and allied activities (29.3) and highest in processing, manufacturing and transport (30.5), as seen from Table 5.5. The birth rates for the corresponding categories in urban areas were 17.0, 23.2, 24.5, 23.1 and 27.1 respectively. In rural areas, families engaged in clerical and trading occupations had the highest birth rate of 41.6. Agriculture and allied activities had the lowest birth rate of 29.5 and families in other occupations had birth rates only slightly above this. Thus, excluding the clerical and trading families which constituted only 5.2 per cent of rural families, the differentials in birth rate among the other occupational classes in rural areas were not large. Contrary to expectations, families engaged in agriculture and allied pursuits had the lowest rural birth rate. This finding has important implications and needs to be investigated further.

For the State as a whole, higher death rates were found in families engaged in agriculture and allied activities (9.4) and processing, manufacturing and transport (8.7) compared to professions and administration (6.6), clerical and sales (6.0) and services (5.0). In urban areas the differentials in death rates were not large but in rural areas, death rates were higher for agriculture and allied activities (9.6) and processing, manufacturing and transport (10.5) as might be expected (Table 5.8). Only for these occupational groups, the rural death rate was substantially above the urban death rate.

The rate of natural increase given in Table 5.11 shows a rate of 2.1 per cent in urban areas and 2.3 per cent in rural areas for processing, manufacturing and transport occupations. The professional and administrative class had the lowest natural increase rate of 0.9 per cent in urban areas. Other occupational groups had a rate just below 2.0 in urban areas. The sample is not large enough to yield dependable rates in rural areas for the three classes, professional and administrative clerical and sales, and service.

Annual family income is the third major characteristic for which vital rates were estimated. The income categories were divided into three broad groups with roughly one-third of the families in each group in Maharashtra State. The annual family income groups were, (1) Rs. 2,050 and below, (2) Rs. 2,501 to Rs. 5,050 and (3) Rs. 5,051 and above, with 28.9 per cent, 33.4 per cent and 37.7 per cent of the families respectively. The unweighted distributions were presented in Chapter 4 and the weighted distributions are presented in Table 5.3. The weighted distributions generally showed a shift towards higher income groups compared to the unweighted distributions.

As should be expected, the percentage in the highest income group showed a gradient with 19.8 per cent of rural families, 60.8 per cent of other urban families and 76.5 per

cent of families in Greater Bombay in this income group. Among rural regions, Western Maharashtra showed the largest income inequality with only 34.7 per cent in the middle income group of Rs. 2,051 to Rs. 5,050, compared to 42.5 per cent in Aurangabad Division and 43.7 per cent in Nagpur Division in this income group. As mentioned in Chapter 4, there might be considerable under-reporting of incomes, especially in rural areas. Also the classification is coarse, with only three income groups.

For Maharashtra State, the birth rate by income groups shows an inverted U-shape, with a birth rate of 28.8 for families with annual income Rs. 2,050 or below, 30.5 for the middle income group and 27.5 for the highest income group (Table 5.6). In urban areas, the same inverted U-shape is observed but the birth rate for the highest income group fell to 22.7 from 29.6 for the middle income group. In rural areas, there is a direct, but rather weak, relationship between annual family income and birth rate. Thus the highest income group in urban areas has the lowest birth rate but, in rural areas, this group has the highest birth rate. Some other micro-demographic studies also suggest this pattern of differential relationship in rural and urban areas that would bear closer investigation. The sample sizes are too small to warrant comments, within each domain, on the pattern of birth rate by income group.

The crude death rate bears an inverse relationship to the annual family income as seen from Table 5.9. For Maharashtra, the lowest income group had a death rate of 12.0, the middle income group, 9.0 and the highest income group, 5.4. The same pattern is found within both the rural and urban areas. Interestingly enough, in the lowest income group, the rural death rate of 12.1 was below the urban death rate of 13.1. Further investigation is needed to establish whether the death rate among the urban slum-dwellers is really higher than among the rural poor.

The natural increase rate is the difference between the birth and the death rates. For Maharashtra, there was a direct relationship between the rate of natural increase and income. The percentage rate for the lowest income group was 1.68, for the middle income group 2.15 and for the highest income group, 2.21 (Table 5.12). Thus the direct relationship of death rate with income seems to dominate over the inverted U-shaped relationship between birth rate and income. In rural areas, the same type of direct relationship between natural increase rate and income is seen, rather more strongly. In urban areas, an inverted U-shaped relationship is seen, perhaps, because of the large differentials in birth rate by income groups.

Patterns of Age-Specific Fertility Rates

Age-specific fertility rates by quinquennial age groups from 15-19 to 45-49 are shown for the several domains of study for married women in Table 5.13 and for all women in Table 5.14. The reference period for reporting birth was the two years preceding the interview date. The number of married women in an age group, a year before the date of interview, was used as the denominator for calculation of the age-specific marital fertility rate (ASMFR) in Table 5.13. These rates are expressed per 1,000 married women. For the State and for all the domains, the peak rate of ASMFR was reached in ages 20-24. In age group 15 to 19, the rural ASMFR was below that for either urban zone. Thus early marriage was more selective for higher fertility in urban areas than in rural areas. From the next age group onwards, ASMFR in the two urban zones was below rural ASMFR. ASMFR declined rapidly after ages 30 to 34 in all the domains.

The total marital fertility rate (TMFR) cannot be simply interpreted as the number of children a married woman would have at the end of her reproductive life span, with the prevailing fertility schedule, since it does not relate to a constant cohort of married women. It would tend to over-estimate their

completed fertility since the first, second, etc., parities of newly wed women in each age group would be counted more than once. This error would be more if the percentage married is less in younger age groups. Thus the over-estimation would be larger in urban compared to rural areas. This is the reason for the small difference found between the rural TMR of 4.97 and the urban TMR of 4.62. The general marital fertility rate (GMFR) is not affected by the proportions married in younger age groups and, therefore, provides a better summary measure of fertility levels and differentials. The GMFR for married women aged 15 to 44 was 179.0 for Maharashtra, 188.2 for rural areas, 166.9 for other urban areas and 145.7 for Greater Bombay. Thus the GMFR for other urban areas was 88.7 per cent and for Greater Bombay 77.4 per cent that for rural areas.

Similar differentials were found in the GMFR of women aged 15 to 49. These differentials arise from fertility and family planning within marriage and are not affected by other factors such as age at marriage. If it ^{is} assumed that married women in ages 15 to 44 constituted roughly one-sixth of the population, the GMFR's given in Table 5.13, would correspond to a crude birth rate of 31.4 in rural areas, a birth rate of 27.8 in other urban areas and of 24.3 in Greater Bombay.

The age-specific fertility rates (ASFR) for all women given in Table 5.14 are affected both by fertility and family planning within marriage and by age at marriage and proportion married. The pattern of these rates over the age groups is similar for all domains. Starting from a low value for ages 15 to 19, the age-specific rate reaches its peak value in ages 20 to 24, remains high in ages 25 to 29, falls to about half that value in ages 30 to 34 and declines more rapidly in the next three age groups. For each age group the ASFR was higher for rural than urban areas.

The total fertility rate can be interpreted as the

completed family size per woman according to the current schedule of ASFR's. Table 5.14 shows that according to the current ASFR's, a woman would have, by the time she completes her family, 4.21 children in rural areas, 3.03 children in other urban areas and 2.80 children in Greater Bombay. The general fertility rate (GFR) for women aged 15 to 44 was 154.5 in rural areas, 112.1 in other urban areas and 99.8 in Greater Bombay. As a percentage to rural TFR, the TFR of other urban areas was 72.0 and that of Greater Bombay was 66.5. The GFR for women aged 15 to 44 showed similar differentials. Other urban GFR was 72.6 per cent and the GFR for Greater Bombay 64.6 per cent of the rural GFR. The differentials in GFR were larger than the corresponding differentials in GMFR because GFR is affected not only by fertility and family planning within marriage but also by the age at marriage and the proportion married. Making the assumption that women aged 15 to 44 constituted one-fifth of the population, the rural GFR of 154.5 would correspond to a crude birth rate of 30.9, the other urban GFR of 112.1 to a rate of 22.4, and the GFR of 99.8 for Greater Bombay to a rate of 20.0.

The ASFR and ASMFR for the three rural regions are given in Table 5.15. Generally the ASFR schedule for Aurangabad Division was the highest, that for Nagpur Division intermediate and for Western Maharashtra the lowest. The pattern of the schedule was similar for all these regions and also similar to those for urban areas given in Table 5.14. However, ASMFR was higher for Nagpur Division and Western Maharashtra in the two youngest age groups, 15-19 and 20-24. The TMFR for Nagpur Division was consequently higher than that for Aurangabad Division.

The fertility levels of the three regions may be compared in terms of TFR or GFR for women aged 15 to 44 and that of married women in terms of GMFR for married women aged 15 to 44. As a percentage of the rural TFR, that of Aurangabad was 110,

Nagpur Division 104 and Western Maharashtra 95. As a percentage of rural GFR' (ages 15 to 44), the GFR's for the three regions were 112, 102 and 95 respectively. As a percentage of rural GMFR (ages 15 to 44) 104, 104 and 97 were the figures for the three regions respectively. These summary measures indicate that within marriage, the fertility level was about the same in Aurangabad Division and Nagpur Division while it was slightly less in Western Maharashtra. But when the fertility level of all women is considered, Aurangabad Division had the highest fertility, followed by Nagpur Division while Western Maharashtra had the lowest fertility among the rural regions. These differences in fertility may be attributed mainly to other reasons such as age at marriage and proportion of women married.

The schedule of ASFR for 1972 from the Sample Registration System (SRS) are compared with the NFMS 1980, separately for rural and urban areas, in Table 5.16. In rural areas, there was a decline in ASFR of 9.0 per cent from SRS, 1972 for ages 15 to 19 and an increase of 3.5 per cent in the next age group. This shift could be ascribed to an increase in the age at marriage between 1972 and 1980. From age group 25-29 onwards, the percentage decline rapidly rose from 7.2 to 91.9 for ages 45 to 49. This pattern of decline could be attributed to increasing recourse to family planning with increasing age.

The percentage decline in ASFR in urban areas, for NFMS 1980 compared to SRS 1972, steadily rose from 3.2 in ages 15 to 19 to 100.0 in ages 45 to 49. Since the age at marriage was already high in 1972 in urban areas, its increase did not result in an increase in fertility between 1972 and 1980, in ages 20 to 24 that was found for rural areas. Moreover, for urban areas, the effect of family planning in older ages was larger than for rural areas. The GFR for NFMS 1980 compared to SRS 1972, declined by 8.8 per cent in rural areas and by 23.3 per cent in urban areas, and the TFR declined by 16.8 per cent in rural areas and

by 26.2 per cent in urban areas. As observed earlier, the declines in the younger age groups could be attributed to the rise in the age at marriage and the decline in the older age groups could be attributed to the increasing use of family planning methods by couples between 1972 and 1980.

The urban ASFR and ASMFR are compared with the rural rates by age group in Table 5.17. The urban ASFR was 52.1 per cent of the rural rate in ages 15 to 19 and reached a peak of 78.4 per cent in ages 30 to 34 and declined sharply after ages 35 to 39. The urban GFR for women aged 15 to 44 was 69.3 per cent of the rural rate. These figures show the rural-urban differentials in the age-specific fertility schedule that arise from differences in fertility within marriage and family planning on the one hand and from differences in the age at marriage and proportion married on the other hand.

If only the fertility of married women is considered, the urban ASMFR was 130.0 per cent of the rural rate in ages 15 to 19 since the women who married young in urban areas were self-selected for higher fertility. In the following age groups, this percentage declined steadily up to ages 35 to 39 (79.9 per cent), and then more rapidly in the two older age groups. The percentage of urban to rural ASMFR was below 100.0 due only to differential fertility and family planning within marriage. For this reason this percentage was above the percentage of urban to rural ASFR which was also affected by the age at marriage and the proportion of married women.

By comparing the ASMFR schedule of all married women with that for non-contracepting married women, the impact of family planning on fertility could be assessed. The assumption is made that the fertility of all married women could have been that of non-contracepting married women in the absence of family planning. Since non-contracepting women might be selected for sub-fecundity

and sterility, this method would provide a conservative estimate of the effect of family planning on the lower side.

In Table 5.18, the percentage family planning impact (FPI) on the fertility rate is measured by the difference between the rates for non-contracepting and all married women expressed as a percentage to the rate for the non-contracepting married women. First it may be noted that both in rural and urban areas, the ASMFR for all married women was systematically lower than that for non-contraceptors among them. The percentage of urban to rural ASMFR was also lower for all married women compared to that for non-contraceptors among them, except in the age groups 35-39 and 40-44.

The percentage family planning impact (FPI) was negligible in ages 15 to 19 in both rural and urban areas and reached 58.8 for rural and 53.1 for urban areas in ages 40 to 44. The urban FPI was greater than the rural FPI in all age groups up to 30-34. Taking reproductive ages 15 to 44, the FPI for rural areas was 29.5 and for urban areas it was 37.5. The impact was slightly higher if ages 15 to 49 were taken. Compared to the fertility of non-contraceptors, the impact of family planning on all married women in reproductive ages was to reduce the rural fertility by 29 per cent and urban fertility by 37 per cent. Since almost all rural women and most urban women accepted family planning methods from the programme, it may be concluded, conservatively, that, by 1980, the impact of the programme was to reduce rural fertility by about 29 per cent and urban fertility by somewhat less than 37 per cent in Maharashtra State.

Patterns of Age-Specific Mortality

Age-specific mortality rates for rural and urban areas, and all-Maharashtra are given in Table 5.19 for males and in Table 5.20 for females. The estimates of mortality were subject to larger sampling errors than for fertility, since deaths were rarer events than births. Also they were subject to various

response and recall errors. Hence these rates have been adjusted indirectly and life tables constructed from them in a later chapter. In this section the pattern of the unadjusted mortality rates is discussed briefly.

The mortality rates presented in Tables 5.19 and 5.20 were calculated from deaths occurring during the two years preceding the date of interview. The sum of the current population and the population two years ago in a particular age group for males or females was taken to be the number of years exposed to the risk of mortality and used as the denominator for calculation of the rate. All numbers used are unweighted. The annual age-specific mortality rate is expressed per 1,000 exposure years.

For males the age-specific mortality rates (ASMR), shown in Table 5.19, follow the typical J-shaped curve, with a sharp decline from childhood to adult ages, a gradual increase over adult ages and finally a sharp increase in old age. Urban rates are generally lower than rural rates. The unweighted crude death rate for males was 8.8 for rural areas, 8.0 for urban areas and 8.5 for Maharashtra.

The ASMR's for females are shown for rural, urban and all-Maharashtra in Table 5.20. These also show the typical J-shape of a mortality curve. The crude female death rate in rural areas was 8.2 and in Maharashtra 7.3. However, the crude death rate for urban females was unusually low, only 5.5 compared to 8.0 for urban males. It is suspected that female deaths might be under-reported to a greater extent than male deaths, especially in urban areas. The errors in reporting deaths in the survey are assessed and indirect estimates of death rates and life tables are presented later in this report.

The crude unweighted death rates are the result of the age distribution of ASMR. To eliminate the effect of the age distribution, the death rate was standardized to the all-Maharashtra age distribution and the results are shown in

Table 5.21. The standardized rates were below the corresponding crude rates in rural areas and above them in urban areas. This is to be expected since a higher percentage of the urban population falls in working ages where ASMR is low. For instance, in Greater Bombay males had a crude death rate of 7.3 and a standardized rate of 9.5 and females had a crude rate of 3.5 and a standardized rate of 4.2. Even the standardized rates were low for urban females, clearly indicating larger response and other non-sampling errors in reporting deaths occurring to urban females. These errors are investigated later.

Summary of Findings

Current fertility and mortality rates and differentials in them among the study domains are presented in this chapter. The reference period was the two years preceding the date of interview and the rates would relate roughly to the year April 1979 to March 1980.

Consistent with the other socio-economic and modernization indicators presented in Chapter 4, among the rural regions, Aurangabad Division had the highest fertility and mortality rates, Nagpur Division had intermediate rates and Western Maharashtra had the lowest rates. Other urban areas had birth and death rates below the rural rates and Greater Bombay had the lowest rates. The rates of natural increase did not vary widely, rural rates being slightly above 2.0 per cent and urban rates slightly below 2.0 per cent. For Maharashtra State, the birth rate during April 1979 to March 1980 was 28.5, the death rate 8.3 and the rate of natural increase 2.02 per cent.

By communities, the birth and death rates were lowest for advanced Hindus. Muslims had the highest birth rate but a low death rate. Scheduled Castes and Tribes and backward Hindus had high birth and death rates. Intermediate caste Hindus had birth and death rates between the rates for advanced Hindus and those for Scheduled Castes and Tribes and backward Hindus. Muslims

had the highest rate of natural increase. Aurangabad Division had the highest birth and death rates within each community.

By family occupation, families engaged in professions and administration had the lowest birth rate and a low death rate. Families engaged in agriculture and allied activities and those engaged in processing, manufacturing and transport had the highest death rates and high birth rates. The rates for families with other occupations fell in between. Contrary to expectations, in rural areas, families engaged in agriculture and allied pursuits had low birth rates compared to other occupations. In urban areas, the professional and administrative class had the lowest natural increase rate while other occupational classes had a rate just below 2.0 per cent. In rural areas the rate of natural increase was above 2.0 per cent.

For the State, birth rate by income group showed an inverted U-shape, with the highest rate for the middle income group. Urban areas showed a similar pattern but in rural areas, there was a direct, but weak, relationship between income and birth rate. An inverse relationship was found between income and death rate, both in rural and urban areas. The inverted U-shaped relationship was observed between income and the rate of natural increase in urban areas, but in rural areas and for the State as a whole, the relationship between income and the rate of natural increase was direct due to the larger differentials in the death rate.

The age-specific marital fertility rates followed the usual pattern, rapidly reaching a plateau in ages 20 to 29, and falling off at higher ages. The GMFR for married women aged 15 to 44 for other urban areas was 88.7 per cent and for Greater Bombay 77.4 per cent of the rural GMFR. These differentials could be attributed to differential fertility and family planning within marriage.

The age-specific fertility rates conformed to the usual

pattern, skewed to the right of the modal age group 20-24. As a percentage of the rural TFR, the other urban TFR was 72.0 and the TFR for Greater Bombay was 66.5. The differentials were wider than those found in GMFR since TFR is also affected by the age at marriage and proportion of married women in addition to fertility and family planning within marriage.

The summary measures indicated that, within marriage, the fertility level was about the same in Aurangabad Division and Nagpur Division while it was slightly less in Western Maharashtra. But when the fertility level of all women was considered, Aurangabad Division had the highest fertility followed by Nagpur Division and Western Maharashtra had the lowest fertility.

Compared to SRS, 1972, the rural TFR declined by 16.8 per cent and the urban TFR by 26.2 per cent in NFMS, 1980. The declines at younger ages were due to a rise in the age at marriage and the declines in older ages were due to the use of family planning methods by couples.

The urban ASFR was less than the rural ASFR in all age groups. But the urban ASMFR was higher than the rural ASMFR only in ages 15 to 19 since the women who married young in urban areas were self-selected for higher fertility.

By comparing the ASMFR schedule of all married women with that for non-contracepting married women, the impact of family planning on fertility was assessed. It was found that there was a reduction in the GMFR of married women aged 15 to 44 by 29.5 per cent in rural areas and 37.5 per cent in urban areas compared to the GMFR of non-contraceptors among them. Since almost all rural women and most urban women accepted family planning methods from the programme, all the reduction in fertility, by the year 1980, in rural areas and most of the reduction in urban areas could be attributed to the programme in Maharashtra State.

The age-specific mortality rates followed the typical J-shaped curve in rural and urban areas for males and females.

While the death rates for males were at reasonable levels, the death rate for urban females was unusually low even after standardizing for the age distribution. This low rate clearly indicated response and other non-sampling errors in reporting deaths occurring to urban females. These errors are investigated, the rates adjusted, and male and female life tables constructed later in this report.

Table 5.1 : Percentage Distribution* of Families by Caste-cum-Religion: NFMS Maharashtra, 1980

Caste-cum-religion	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Advanced Caste Hindus	40.7	36.0	46.6	42.4	51.7	56.2	54.4	46.7
Intermediate Caste Hindus	16.9	22.6	18.8	19.6	16.4	8.2	11.2	16.7
Scheduled Castes, Scheduled Tribes and other Hindus	31.8	36.8	28.1	31.4	17.1	12.2	14.1	25.2
Muslims	9.9	4.3	4.9	5.6	9.9	16.3	14.0	8.5
Other religions	0.7	0.3	1.6	1.0	4.9	7.1	6.3	2.9
All castes-cum-religions	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	897	1448	2637	4982	1553	1083	2636	7618
Caste not reported: No. of families	3	2	6	11	8	17	25	36

* Weighted according to the sampling design.

Table 5.2 : Percentage Distribution* by Main Family Occupation: NFMS Maharashtra, 1980

Main Family Occupation	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Professional and Administrative	2.3	3.7	2.7	2.9	13.0	12.1	12.5	6.3
Clerical and Sales	4.8	5.6	5.1	5.2	28.8	27.9	28.3	13.3
Service	1.6	1.1	2.5	1.9	16.7	17.6	17.3	7.4
Agriculture and allied	55.1	62.4	59.8	59.7	7.9	1.9	4.1	40.0
Processing and Manufacturing	35.3	25.4	22.8	25.9	27.9	38.0	34.2	28.8
Non-earners	0.9	1.8	7.1	4.4	5.7	2.5	3.6	4.2
All occupations	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	899	1450	2643	4992	1561	1099	2660	7652
Occupation not reported: No. of families	1	-	-	1	-	1	1	2

* Weighted according to the sampling design.

Table 5.3 : Percentage Distribution* by Annual Family Income: NFMS Maharashtra, 1980

Annual family income	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Rs.2050 and below	37.5	35.5	46.1	41.4	12.3	1.8	5.7	28.9
Rs.2051 - Rs. 5050	42.5	43.7	34.7	38.8	26.9	21.7	23.6	33.4
Rs. 5051 and above	20.0	20.8	19.2	19.8	60.8	76.5	70.7	37.7
All family incomes	100.0 = 895	100.0 = 1447	100.0 = 2634	100.0 = 4976	100.0 = 1551	100.0 = 1070	100.0 = 2621	100.0 = 7597
Family income not reported: No.of families	5	3	9	17	10	30	40	57

* Weighted according to the sampling design.

Table 5.4 : Births Per 1,000 Population* by Caste-cum-Religion: NFMS Maharashtra, 1980

Caste-cum-Religion	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Advanced Caste Hindus	30.5 (381)	30.1 (524)	28.3 (1221)	29.2 (2126)	20.7 (691)	22.1 (609)	21.6 (1300)	26.1 (3426)
Intermediate Caste Hindus	32.3 (154)	32.8 (338)	26.2 (497)	29.4 (989)	25.9 (290)	26.1 (86)	26.0 (376)	28.6 (1365)
Scheduled Castes, Scheduled Tribes and other Hindus	38.4 (269)	36.9 (512)	29.0 (749)	33.4 (1530)	29.2 (318)	18.4 (123)	23.3 (441)	31.4 (1971)
Muslims	35.7 (87)	32.1 (69)	37.8 (125)	35.9 (281)	33.8 (173)	32.5 (180)	32.8 (353)	34.1 (634)
All castes-cum-religions@	33.7 (900)	33.2 (1450)	28.7 (2643)	30.9 (4993)	24.6 (1561)	23.9 (1100)	24.1 (2661)	28.5 (7654)

* Rate weighted according to the sampling design.

The number of families on which the rate is based is shown in parentheses.

@ The group "all castes-cum-religions" includes other religions such as Christians, Parsees, etc.

Table 5.5 : Births per 1,000 Population* by Main Family Occupation: NFMS Maharashtra, 1980

Main family occupation	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Professional and administrative	- (15)	29.0 (53)	38.0 (63)	32.8 (131)	12.5 (221)	19.9 (137)	17.0 (358)	21.7 (489)
Clerical and sales	- (40)	44.1 (80)	34.9 (137)	41.6 (257)	24.9 (464)	24.3 (327)	24.5 (791)	28.8 (1048)
Service	- (13)	- (15)	36.1 (61)	31.0 (89)	14.5 (163)	28.0 (195)	23.2 (358)	24.5 (447)
Agriculture and allied	33.4 (538)	31.3 (933)	27.2 (1703)	29.5 (3174)	25.5 (105)	- (15)	23.1 (120)	29.3 (3294)
Processing and Manufacturing	32.5 (286)	37.2 (348)	30.6 (548)	33.0 (1182)	35.6 (519)	23.4 (397)	27.1 (916)	30.5 (2098)
All occupations ⁺	33.7 (900)	33.2 (1450)	28.7 (2643)	30.9 (4993)	24.6 (1561)	23.9 (1100)	24.1 (2661)	28.5 (7654)

* Rate weighted according to the sampling design.

The number of families on which the rate is based is shown in parentheses.

- Rate not shown if based on less than fifty families.

+ The group "all occupations" includes other occupations not shown in the classification.

Table 5.6 : Births Per 1,000 Population* by Annual Family Income: NFMS Maharashtra, 1980

Annual family income	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Rs. 2050 and below	31.9 (273)	39.9 (442)	23.7 (1035)	29.1 (1750)	29.3 (187)	- (19)	27.2 (206)	28.8 (1956)
Rs. 2051 - Rs. 5050	32.3 (387)	29.2 (653)	31.8 (945)	31.1 (1985)	30.4 (497)	29.0 (208)	29.6 (705)	30.5 (2690)
Rs. 5051 and above	35.3 (235)	33.6 (352)	29.4 (654)	31.8 (1241)	21.7 (867)	23.1 (843)	22.7 (1710)	27.5 (2951)
All family incomes ⁺	33.7 (900)	33.2 (1450)	28.7 (2643)	30.9 (4993)	24.6 (1561)	23.9 (1100)	24.1 (2661)	28.5 (7654)

* Rate weighted according to the sampling design.

The number of families on which the rate is based is shown in parentheses.

- Rate not shown if based on less than fifty families.

+ The group "all family incomes" includes 52 families whose income was not reported.

Table 5.7 : Deaths Per 1,000 Population* by Caste-cum-Religion: NFMS Maharashtra, 1980

Caste-cum-religion	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Advanced Caste Hindus	10.3 (381)	8.4 (524)	8.0 (1221)	8.5 (2126)	5.5 (691)	5.4 (609)	5.4 (1300)	7.2 (3426)
Intermediate Caste Hindus	17.1 (154)	12.6 (338)	7.9 (497)	10.9 (989)	5.3 (290)	6.4 (86)	5.8 (376)	9.7 (1365)
Scheduled Castes, Scheduled Tribes and Other Hindus	12.2 (269)	10.1 (512)	10.2 (749)	10.5 (1530)	9.0 (318)	5.0 (123)	6.8 (441)	9.8 (1971)
Muslims	8.9 (87)	10.6 (69)	7.1 (125)	8.4 (281)	7.1 (173)	4.4 (180)	5.1 (353)	6.5 (634)
All castes-cum-religions ⁺	11.8 (900)	10.0 (1450)	8.6 (2643)	9.6 (4993)	6.4 (1561)	5.4 (1100)	5.8 (2661)	8.3 (7654)

* Rate weighted according to the sample design.

The number of families on which the rate is based is shown in parentheses.

+ The group "all caste-cum-religions" includes religions such as Christians, Parsees, etc.

Table 5.8 : Deaths Per 1,000 Population* by Main Family Occupation: NFMS Maharashtra, 1980

Main family occupation	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Professional and administrative	- (15)	5.6 (53)	6.7 (63)	6.0 (131)	5.3 (221)	7.8 (137)	6.8 (358)	6.6 (489)
Clerical and Sales	- (40)	7.5 (80)	7.6 (137)	7.4 (257)	7.2 (464)	4.4 (327)	5.5 (791)	6.0 (1048)
Service	- (13)	- (15)	5.9 (61)	4.9 (89)	3.3 (163)	5.9 (195)	5.0 (358)	5.0 (447)
Agriculture and allied	10.8 (538)	10.8 (933)	8.6 (1703)	9.6 (3174)	7.2 (105)	- (15)	5.1 (120)	9.4 (3294)
Processing and manufacturing	13.0 (286)	10.2 (348)	9.4 (548)	10.5 (1182)	6.7 (519)	5.8 (397)	6.1 (916)	8.7 (2098)
All occupations ⁺	11.8 (900)	10.0 (1450)	8.6 (2643)	9.6 (4993)	6.4 (1561)	5.4 (1100)	5.8 (2661)	8.3 (7654)

* Rate weighted according to the sampling design.

The number of families on which the rate is based is shown in parentheses.

- Rate not shown if based on less than fifty families.

+ The group "all occupations" include other occupations not shown in the classification.

Table 5.9 : Deaths Per 1,000 Population* by Annual Family Income: NFMS Maharashtra, 1980

Annual family income	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Rs. 2050 and below	16.8 (273)	12.9 (442)	10.5 (1035)	12.1 (1750)	14.0 (187)	- (19)	13.1 (206)	12.0 (1956)
Rs. 2051 - Rs. 5050	12.2 (387)	8.7 (653)	11.5 (945)	10.7 (1985)	6.9 (497)	8.0 (208)	7.5 (705)	9.0 (2690)
Rs. 5051 and above	5.7 (235)	9.3 (352)	4.4 (654)	6.1 (1241)	4.9 (867)	4.7 (843)	4.8 (1710)	5.4 (2951)
All family incomes ⁺	11.8 (900)	10.0 (1450)	8.6 (2643)	9.6 (4993)	6.4 (1561)	5.4 (1100)	5.8 (2661)	8.3 (7654)

* Rate weighted according to the sampling design.

The number of families on which the rate is based is shown in parentheses.

- Rate not shown if based on less than fifty families.

+ The group "all family incomes" includes 57 families where income was not reported.

Table 5.10 : Percentage Rate* of Natural Increase by Caste-cum-Religion: NFMS Maharashtra, 1980

Caste-cum-Religion	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Advanced Caste Hindus	2.0 (381)	2.2 (524)	2.0 (1221)	2.1 (2126)	1.5 (691)	1.7 (609)	1.6 (1300)	1.89 (3426)
Intermediate Caste Hindus	1.5 (154)	2.0 (338)	1.8 (497)	1.9 (989)	2.1 (290)	2.0 (86)	2.0 (376)	1.89 (1365)
Scheduled Castes, Scheduled Tribes and other Hindus	2.6 (269)	2.7 (512)	1.9 (749)	2.3 (1530)	2.0 (318)	1.3 (123)	1.7 (441)	2.16 (1971)
Muslims	2.7 (87)	2.2 (69)	3.1 (125)	2.7 (281)	2.7 (173)	2.8 (180)	2.8 (353)	2.76 (634)
All Castes-cum-religions ⁺	2.2 (900)	2.3 (1450)	2.0 (2643)	2.1 (4993)	1.8 (1561)	1.9 (1100)	1.8 (2661)	2.02 (7654)

* Rate weighted according to the sampling design.

The number of families on which the rate is based is shown in parentheses.

+ The group "all caste-cum-religions" includes other religions such as Christians, Parsees, etc.

Table 5.11 : Percentage Rate* of Natural Increase by Main Family Occupation: NFMS Maharashtra, 1980

Main family occupation	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Professional and administrative	- (15)	2.3 (53)	3.1 (63)	2.7 (131)	0.7 (221)	1.2 (137)	0.9 (358)	1.51 (489)
Clerical and sales	- (40)	3.7 (80)	2.7 (137)	3.4 (257)	1.8 (464)	2.0 (327)	1.9 (791)	2.28 (1048)
Service	- (13)	- (15)	3.0 (61)	2.6 (89)	1.1 (163)	2.2 (195)	1.8 (358)	1.95 (497)
Agriculture and allied	2.3 (538)	2.0 (933)	1.9 (1703)	2.0 (3174)	1.8 (105)	- (15)	1.8 (120)	1.99 (3294)
Processing and manufacturing	2.0 (286)	2.7 (348)	2.1 (548)	2.3 (1182)	2.9 (519)	1.8 (397)	2.1 (916)	2.18 (2098)
All occupations [†]	2.2 (900)	2.3 (1450)	2.0 (2643)	2.1 (4993)	1.8 (1561)	1.9 (1100)	1.8 (2661)	2.02 (7654)

* Rate weighted according to the sampling design.

The number of families on which the rate is based is shown in parentheses.

- Rate not shown if based on less than fifty families.

+ The group "all occupations" includes other occupations not shown in the classification.

Table 5.12 : Percentage Rate* of Natural Increase by Annual Family Income: NFMS Maharashtra, 1980

Annual family income	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Urban Maharashtra	Total Maharashtra
Rs. 2050 and below	1.5 (273)	2.7 (442)	1.3 (1035)	1.7 (1750)	1.5 (187)	- (19)	1.4 (206)	1.68 (1956)
Rs. 2051 - Rs. 5050	2.0 (387)	2.1 (653)	2.0 (945)	2.0 (1985)	2.4 (497)	2.1 (208)	2.2 (705)	2.15 (2690)
Rs. 5051 and above	3.0 (235)	2.4 (352)	2.5 (654)	2.6 (1241)	1.7 (867)	1.8 (843)	1.8 (1710)	2.21 (2951)
All family incomes ⁺	2.2 (900)	2.3 (1450)	2.0 (2643)	2.1 (4993)	1.8 (1561)	1.9 (1100)	1.8 (2661)	2.02 (7654)

* Rate weighted according to the sampling design.

The number of families on which the rate is based is shown in parentheses.

- Rate not shown if based on less than fifty families.

+ The group "all family incomes" includes 57 families where income was not given.

Table 5.13 : Age Specific Fertility Rate for Married Women : NFMS Maharashtra, 1980

Age group	Rural Maharashtra			Urban excluding Greater Bombay			Greater Bombay			Urban Maharashtra			Total Maharashtra		
	No. of married women*	Births during last 2 years	Annual ASMFR	No. of married women*	Births during last 2 years	Annual ASMFR	No. of married women*	Births during last 2 years	Annual ASMFR	No. of married women*	Births during last 2 years	Annual ASMFR	No. of married women*	Births during last 2 years	Annual ASMFR
15 - 19	687	232	168.9	112	48	214.3	36	17	236.1	148	65	219.6	835	297	177.8
20 - 24	1331	833	312.9	316	186	294.3	160	89	278.1	476	275	288.9	1807	1108	306.6
25 - 29	1088	575	264.2	326	155	237.7	263	111	211.0	589	266	225.8	1677	841	250.7
30 - 34	883	262	148.4	265	64	120.8	227	57	125.6	492	121	123.0	1375	383	139.3
35 - 39	781	114	73.0	227	25	55.1	176	22	62.5	403	47	58.3	1184	161	68.0
40 - 44	670	32	23.9	195	3	7.7	164	3	9.1	359	6	8.4	1029	38	18.5
45 - 49	482	2	2.1	171	0	0.0	126	0	0.0	297	0	0.0	779	2	1.3
Total	5922	2050		1612	481		1152	299		2764	780		8686	2830	
TMFR			4.97			4.65			4.61			4.62			4.81
GMFR (15-49)			173.1			149.2			129.8			141.1			162.9
GMFR (15-44)			188.2			166.9			145.7			158.1			179.0

ASMFR = Age specific marital fertility rate o/oo.

TMFR = Total marital fertility rate per woman.

GMFR = General marital fertility rate o/oo.

* Since the births related to a 2 year period the number of married women in the age group a year ago was taken as the denominator for calculation of ASMFR.

Table 5.14 : Age Specific Fertility Rate for All Women : NFMS Maharashtra, 1980

Age group	Rural Maharashtra			Urban excluding Greater Bombay			Greater Bombay			Urban Maharashtra			Total Maharashtra		
	Fe- male expo- sure years*	Births during last 2 years	Annual ASFR	Fe- male expo- sure years*	Births during last 2 years	Annual ASFR	Fe- male expo- sure years*	Births during last 2 years	Annual ASFR	Fe- male expo- sure years*	Births during last 2 years	Annual ASFR	Fe- male expo- sure years*	Births during last 2 years	Annual ASFR
15 - 19	3028	232	76.6	1000	48	48.0	628	17	27.1	1628	65	39.9	4656	297	63.8
20 - 24	2952	833	282.2	958	186	194.2	540	89	164.8	1498	275	183.6	4450	1108	249.0
25 - 29	2298	575	250.2	768	155	201.8	590	111	188.1	1358	266	195.9	3656	841	230.0
30 - 34	1874	262	139.8	604	64	106.0	500	57	114.0	1104	121	109.6	2978	383	128.6
35 - 39	1642	114	69.4	512	25	48.8	382	22	57.6	894	47	52.6	2536	161	63.5
40 - 44	1474	32	21.7	448	3	6.7	356	3	8.4	804	6	7.5	2278	38	16.7
45 - 49	1110	2	1.8	400	0	0.0	278	0	0.0	678	0	0.0	1788	2	1.1
Total	14378	2050		4690	481		3274	299		7964	780		22342	2830	
TFR			4.21			3.03			2.80			2.95			3.76
GFR (15-49)			142.6			102.6			91.3			97.9			126.7
GFR (15-44)			154.5			112.1			99.8			107.1			137.6

ASFR = Age specific fertility rate o/oo.

TFR = Total fertility rate per woman.

GFR = General fertility rate o/oo.

* Since the births related to a 2 year period, the female exposure years was calculated as the sum of the current female population and the population 2 years ago in the age group.

Table 5.15 : Age Specific Fertility Rates for All Women and For Married Women for Rural Regions:
NFMS Maharashtra, 1980

Age group	Age specific fertility rate o/oo				Age specific marital fertility rate o/oo			
	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra	Aurangabad Division	Nagpur Division	Western Maharashtra	Rural Maharashtra
15 - 19	96.1	82.6	67.9	76.6	141.9	196.8	165.1	168.9
20 - 24	293.5	287.1	272.6	282.2	306.8	323.4	306.5	312.9
25 - 29	263.4	254.3	245.2	250.2	272.7	268.2	260.8	264.2
30 - 34	163.4	137.2	135.6	139.8	170.6	144.4	145.4	148.4
35 - 39	86.3	93.2	54.0	69.4	94.4	95.4	56.6	73.0
40 - 44	21.1	15.2	25.9	21.7	23.6	16.4	28.6	23.9
45 - 49	0.0	2.9	1.6	1.8	0.0	3.3	1.9	2.1
Total fertility rate per woman	4.62	4.36	4.01	4.21	5.05	5.23	4.82	4.97
General fertility rate o/oo (15-49)	162.7	144.7	135.05	142.6	183.5	177.3	167.2	173.1
General fertility rate o/oo (15-44)	173.8	157.6	146.4	154.5	195.0	195.1	182.2	188.2

Table 5.16 : Comparison of Age Specific Fertility Rates for All Women: SRS 1972 and NFMS Maharashtra, 1980

Age group	Rural			Urban		
	SRS 1972	NFMS Maharashtra 1980	% Decline (SRS=100)	SRS 1972	NFMS Maharashtra 1980	% Decline (SRS=100)
15 - 19	84.2	76.6	9.0	41.2	39.9	3.2
20 - 24	272.8	282.2	-3.5	215.7	183.6	14.9
25 - 29	269.7	250.2	7.2	225.6	195.9	13.2
30 - 34	188.8	139.8	26.0	182.8	109.6	40.0
35 - 39	127.1	69.4	45.4	97.7	52.6	46.2
40 - 44	48.3	21.7	55.1	33.3	7.5	77.5
45 - 49	22.1	1.8	91.9	3.4	0.0	100.0
General fertility rate 15-49 o/oo	156.4	142.6	8.8	127.6	97.9	23.3
Total fertility rate per woman	5.06	4.21	16.8	4.00	2.95	26.2

Table 5.17 : Urban as Percentages of Rural ASFR and ASMFR: NFMS Maharashtra, 1980

Age group	ASFR			ASMFR		
	Rural	Urban	Urban as % of rural ASFR	Rural	Urban	Urban as % of rural ASMFR
15-19	76.6	39.9	52.1	168.9	219.6	130.0
20-24	282.2	183.6	65.1	312.9	288.9	92.3
25-29	250.2	195.9	78.3	264.2	225.8	85.5
30-34	139.8	109.6	78.4	148.4	123.0	82.9
35-39	69.4	52.6	75.8	73.0	58.3	79.9
40-44	21.7	7.5	34.6	23.9	8.4	35.1
45-49	1.8	0.0	0.0	2.1	0.0	0.0
All ages						
(15-49)	142.6	97.9	68.7	173.1	141.1	81.5
(15-44)	154.5	107.1	69.3	188.2	158.1	84.0

ASFR : Age specific fertility rate o/oo.

ASMFR : Age specific marital fertility rate o/oo.

Table 5.18 : ASMFR of Married Women and Non-contracepting Married Women and Per Cent Family Planning Impact* : NFMS Maharashtra, 1980

Age group	ASMFR for married women			ASMFR for non-contracepting married women			% Family Planning impact*	
	Rural	Urban	Urban as % of rural ASMFR	Rural	Urban	Urban as % of rural ASMFR	Rural	Urban
15 - 19	168.9	219.6	130.0	169.8	221.1	130.2	0.53	0.68
20 - 24	312.9	288.9	92.3	327.4	321.3	98.1	4.43	10.08
25 - 29	264.2	225.8	85.5	346.0	334.2	96.6	23.64	32.44
30 - 34	148.4	123.0	82.9	280.5	258.5	92.2	47.09	52.42
35 - 39	73.0	58.3	79.9	182.1	139.9	76.8	59.91	58.33
40 - 44	23.9	8.4	35.1	58.0	17.9	30.9	58.79	53.07
45 - 49	2.1	0.0	0.0	3.9	0.0	0.0	46.15	-
All ages (15-49)	173.1	141.1	81.5	250.0	227.0	90.8	30.76	37.84
(15-44)	188.2	158.1	84.0	266.8	252.8	94.8	29.46	37.46

ASMFR : Age specific marital fertility rate o/oo.

*Impact = $100 - 100 \cdot (\text{ASMFR for married women}) / (\text{ASMFR for non-contracepting married women})$.

- Indeterminate.

Table 5.19 : Age Specific Mortality Rates for Males : NFMS Maharashtra, 1980

Age group	Rural Maharashtra			Urban Maharashtra			Total Maharashtra		
	Male exposure years*	Deaths during last 2 years	Annual ASMR	Male exposure years*	Deaths during last 2 years	Annual ASMR	Male exposure years*	Deaths during last 2 years	Annual ASMR
0 - 4	3162	106	34.2	1394	19	13.6	4496	125	27.8
5 - 9	4083	12	2.9	2037	4	2.0	6120	16	2.6
10 - 14	4285	5	1.2	2053	2	1.0	6338	7	1.1
15 - 19	3379	5	1.5	1739	2	1.2	5118	7	1.4
20 - 24	2932	4	1.4	1647	3	1.8	4579	7	1.5
25 - 29	2662	7	2.6	1414	1	0.7	4076	8	2.0
30 - 34	2015	3	1.5	1178	5	4.2	3193	8	2.5
35 - 39	1705	4	2.3	1014	3	3.0	2719	7	2.6
40 - 44	1496	5	3.3	817	9	11.0	2313	14	6.1
45 - 49	1359	6	4.4	837	8	9.6	2196	14	6.4
50 - 54	1110	10	9.0	621	4	6.4	1731	14	8.1
55 - 59	1136	11	9.7	535	7	13.1	1671	18	10.8
60 - 69	1968	36	18.3	721	25	34.7	2689	61	22.7
70 +	1047	69	65.9	399	39	97.7	1446	108	74.7
Total	32279	283	8.8	16406	131	8.0	48685	414	8.5

ASMR = Age specific mortality rate o/oo.

* Sum of current male population and population 2 years ago.

Table 5.20 : Age Specific Mortality Rates for Females : NFMS Maharashtra, 1980

Age group	Rural Maharashtra			Urban Maharashtra			Total Maharashtra		
	Female exposure years*	Deaths during last 2 years	Annual ASMR	Female exposure years*	Deaths during last 2 years	Annual ASMR	Female exposure years*	Deaths during last 2 years	Annual ASMR
0 - 4	2952	101	34.2	1390	27	19.4	4342	128	29.5
5 - 9	4016	5	1.2	1865	1	0.5	5881	6	1.0
10 - 14	4177	9	2.2	2010	2	1.0	6187	11	1.8
15 - 19	3028	17	5.6	1629	2	1.2	4657	19	4.1
20 - 24	2953	7	2.4	1499	2	1.3	4452	9	2.0
25 - 29	2299	4	1.7	1358	1	0.7	3657	5	1.4
30 - 34	1874	5	2.7	1104	2	1.8	2978	7	2.4
35 - 39	1642	1	0.6	894	1	1.1	2536	2	0.8
40 - 44	1475	3	2.0	805	2	2.5	2280	5	2.2
45 - 49	1110	5	4.5	679	2	2.9	1789	7	3.9
50 - 54	1576	7	4.4	674	6	8.9	2250	13	5.8
55 - 59	1296	6	4.6	436	3	6.9	1732	9	5.2
60 - 69	1633	34	20.8	654	10	15.3	2287	44	19.2
70 +	853	50	58.6	364	24	65.9	1217	74	60.8
Total	30884	254	8.2	15361	85	5.5	46245	339	7.3

ASMR = Age specific mortality rate o/oo.

* Sum of current female population and population 2 years ago.

Table 5.21 : Crude Death Rate (Unweighted) and Standardized to Maharashtra Age Distribution by Sex : NFMS Maharashtra, 1980

	Males		Females	
	Crude Death Rate o/oo	Standardized Death Rate o/oo	Crude Death Rate o/oo	Standardized Death Rate o/oo
Aurangabad Division	11.3	10.8	9.5	9.0
Nagpur Division	9.7	10.3	9.0	9.8
Western Maharashtra	7.4	6.8	7.4	6.9
Rural Maharashtra	8.8	8.4	8.2	8.0
Urban excluding Greater Bombay	8.5	8.4	7.0	7.2
Greater Bombay	7.3	9.5	3.5	4.2
Urban Maharashtra	8.0	8.9	5.5	5.9
Total Maharashtra	8.5	8.5	7.3	7.3

**NATIONAL FERTILITY AND
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MAHARASHTRA 1980**

VOLUME - II

**SIVASWAMY SRIKANTAN
VAIJAYANTI BHATE**

**GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
PUNE - 411 004**

Preliminary

Not To Be Quoted

NATIONAL FERTILITY AND MORTALITY SURVEY

MAHARASHTRA 1980

VOLUME II

(Chapter 6 Onwards)

K. SIVASWAMY SRIKANTAN

VAIJAYANTI BHATE

Population Research Centre
GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
PUNE

FAMILY FORMATION AND CUMULATIVE FERTILITY

Introduction

In this chapter, the results of NFMS Maharashtra, 1980 on family formation and cumulative fertility are presented. The process of family formation is spread over the reproductive ages of the woman, 15 to 49 years. More specifically, it starts with marriage or menarchy of the woman, whichever is later and ends when the family size is completed or at menopause, whichever is earlier. The pace of child-bearing is quicker initially and slows down later. Cumulative fertility is a measure of a woman's childbearing experience, up to the time of her interview. Hence it varies widely by the woman's current age and the duration since first marriage. The latter two variables are related to each other by the age at first marriage.

Ideally a woman's completed family size is the best measure of her fertility. However, completed family size can be known only after the woman reaches menopause. Hence it will not throw any light on recent changes in fertility. Moreover, it will not reveal the process of family formation over the life cycle of the woman. For these reasons, it is necessary to study the cumulative fertility of women at different stages of family formation.

The principal measure of cumulative fertility used in this chapter is the number of children ever borne by the woman. The number of children ever borne by a woman is also the number of live births to her. A live birth is defined as a foetus which shows any sign of life after expulsion from the mother's womb. In this report, parity is used as synonymous with the number of children ever borne by a woman.

The mean number of children ever born per currently married woman is used as a measure of the cumulative fertility of a group. Since the group might consist of a cross-section

of women in different stages of family formation, the mean would be affected by the distribution of the women by their ages or marital durations. For instance, the age distribution of currently married women in rural areas is generally younger than in urban areas. For this reason, the rural mean parity would be less than the mean parity obtained by using, hypothetically, the urban age distribution on the rural parity. This procedure is called standardization. An alternative method would be to compare the rural with the urban mean parity in each age group. The same difficulty in comparing mean parity arises with regard to the distribution of the women by their marital duration since this distribution may be different, for instance, between illiterate women and women educated up to the eighth standard. It is, therefore, necessary to bear in mind the compositional differences with regard to age and marital duration in comparing the mean parity between any two groups of women.

The results are generally presented for the three rural regions and the two urban zones. As stated before, current age, age at first marriage and duration in years since the first marriage are important demographic variables that determine the stage of family formation and, hence, account for most of the variation in cumulative fertility of currently married women. It is, therefore, necessary to control for these variables before examining differentials for family formation and cumulative fertility by other characteristics.

Illiteracy and educational attainment of the currently married woman and that of her husband are important characteristics that determine cumulative fertility and the pattern of family formation. The community of the woman, based on her caste and religion, is another important variable in the study of cumulative fertility and family formation since each community has distinct marriage customs, kinship patterns and fertility values and generally practises endogamy within its sub-groups.

Differentials in cumulative fertility by both these characteristics are examined in this chapter.

In addition to parity, several other measures of cumulative fertility are presented. These measures are based on the numbers of conceptions and living children, numbers of sons and daughters ever born and numbers of living sons and daughters.

Values regarding family size are reflected to some extent in the ideals about the number of children, sons and daughters, about the age at marriage for brides and grooms, and educational aspirations for sons and daughters. Hence these characteristics are also presented in this chapter.

The data analysed in this chapter were obtained in the supplementary questionnaire completed for all currently married women aged 15 to 50 in the sample families. There were 8,874 such women. Some items of information were not available for a few women as indicated in the tables.

Differentials by Background Variables

In this section, the distributions of currently married women aged 15 to 50, by selected background variables are presented. Current age, age at first marriage and duration since first marriage are proximate demographic variables that determine the stage of family formation and the level of cumulative fertility. Apart from this, the mean parity of a group of women depends on their composition by age or by marital duration. These variables have, therefore, to be controlled for in comparing the cumulative fertilities of different groups of women. Finally, in a period of declining fertility, different age cohorts of women would have different patterns of family formation and levels of completed family size. For these reasons it is necessary to analyse the fertility of current married women aged 15 to 50 by their current age and duration since first marriage.

Age at first marriage links the current age with duration since first marriage. It is also a sensitive indicator of the

status and roles of women and extent of social change. The literacy and educational attainment of the woman and that of her husband are also indicators of social status and modernization. Hence the distribution of currently married women by these characteristics are also presented in this section for the study domains.

The age composition of currently married women, 15 to 50 years old, is given for the study domains in Table 6.1. The mean age of currently married women was 29.9 years for Aurangabad Division, 31.3 years for both Nagpur Division and Western Maharashtra, 32.4 years for other urban areas and 33.8 years for Greater Bombay. The percentages of currently married women in ages 15 to 19 in these domains were 13.9, 11.3, 10.6, 6.8 and 3.1 respectively. The rural to urban gradient persisted in the percentages currently married in the next age group also. These figures confirm the gradient in the age at marriage by domains that was previously commented on.

Duration since first marriage is a measure of the duration of exposure to reproduction within marriage. In this survey, it was defined as the difference between the current age and the age at first marriage, if the first marriage occurred after menarchy. Otherwise it was defined to be the difference between the current age and the age at menarchy. It is seen from Table 6.2 that the percentage in the marital duration group, 0 to 4 years, was highest for Nagpur Division and lower for Aurangabad Division and Western Maharashtra, in spite of the fact that the mean age at marriage was lowest for Aurangabad Division. This apparent anomaly is explained by the definition used for determining marital duration. In Aurangabad Division, a larger proportion of marriages took place before menarchy than in Nagpur Division. Differential errors in reporting or recording the current age, the age at marriage and the age at menarchy would also account for some of the differences, among

the rural regions, in the distribution by marital duration.

The distribution by the age at first marriage is given in Table 6.3. This distribution confirms the gradient in the age at marriage among the rural regions and the urban zones. In fact, in Aurangabad Division 25.4 per cent of the women were married on or before completing age 12 compared to 14.8 per cent for rural Maharashtra. The average age at first marriage for these women was 15.0 years for Aurangabad Division, 16.0 years for Nagpur Division, 16.3 years for Western Maharashtra, 17.3 years for other urban areas and 18.9 years for Greater Bombay.

The average age at marriage by age groups, given in Table 6.4, reveals a steady increase in the age at marriage over the cohorts in recent times. In rural areas, for the age cohort 20-24, the mean age at marriage was 16.7 and is unlikely to increase since few first marriages would take place beyond age 24. For the following age cohorts the mean ages were 16.6, 15.9, 15.7, 15.2 and 15.0 respectively. Thus in the last 25 years, the rural mean age at marriage increased by 1.7 years. Since most marriages in urban areas take place before reaching age 30, the trend in age cohorts 25-29 to 45-49 is considered. In other urban areas, the mean age at marriage steadily declined from 18.1 years for age cohort 25-29 to 16.4 years for age cohort 45-49, a decline of 1.7 years. Similarly, the decline for Greater Bombay was about 1.4 years, from 19.4 years for age cohort 25-29 to 18.0 years for age cohort 40-44, ignoring the mean for the age cohort 45-49 which was subject to a large sampling error.

The distributions of the currently married women aged 15 to 50 and their husbands by their educational attainment are given in Tables 6.5 and 6.6. Women's educational attainment was far below that of their husbands'. There was a sharp rural-urban difference in the educational attainment of the women as well as their husbands. Among the rural regions, Aurangabad Division had the highest percentage illiterate and the lowest percentage

in each of the other educational levels both for the women and their husbands.

Measures of Cumulative Fertility

Several measures of cumulative fertility are presented in this section to facilitate the discussion of the differentials in cumulative fertility by domains and other characteristics in the following section. The mean number of live births by sex and by whether alive or dead, the mean number of conceptions by live births, still births and miscarriages, and the number of living children are the principal measures of cumulative fertility used in this report.

The mean numbers of live births per woman by domains were 2.91 for Aurangabad Division, 3.29 for Nagpur Division, 2.97 for Western Maharashtra, 3.08 for other urban and 3.03 for Greater Bombay (Table 6.7). The age composition of the currently married women was not the same in all the domains. The average ages, in years, of such women were 29.9, 31.3, 31.3, 32.4 and 33.8 respectively for the domains mentioned above. Hence the mean number of live births cannot be compared directly over the domains. Either the comparison has to be made for each age group separately or the mean has to be standardized for the age distribution of these women. These comparisons are, therefore, made in the next section.

The sex-ratio at birth and the sex-ratio of living children, given in the last two columns of Table 6.7, are important indicators of the quality of reporting of live births by sex.

Biologically the sex-ratio at birth is expected to be around 960 and, under Indian conditions, the sex-ratio of living children is expected to be somewhat lower due to the relatively higher infant and child mortality of females compared to males. The exceptionally low sex-ratio at birth for Aurangabad Division (901) and urban areas excluding Greater Bombay (915) and the equally low sex-ratio for living children in these two domains (909 and 908 respectively) indicate that there might have been a greater

under-count of female than male live births in Aurangabad Division and other urban areas.

In Maharashtra State, of 1.57 male live births per currently married woman, only 0.09 sons were living away from their mothers whereas among the 1.49 female live births, 0.23 daughters were living away from their mothers. This is mainly explained by marriage migration of the bride to her in-laws' home.

The figures on the average number of conceptions are presented in Table 6.8. It is suspected that the percentage of under-reporting due to recall lapse and other reasons would be larger in reporting still-births than live births and much larger in reporting miscarriages since early foetal loss might not be recognized or might be easily forgotten. The ratio of still-births per 1000 live and still-births was 12.6 for Maharashtra and varied in the range, from 16.8 for Aurangabad Division to 9.2 for Greater Bombay. Recall lapse of still-births and misclassification between live and still-births would contribute to errors in this ratio. The ratio of miscarriages per 1,000 conceptions in Maharashtra was 33.1, ranging from 18.8 for Aurangabad Division to 57.1 for other urban areas. The ratio is also subject to recall and other response errors. Perhaps both still-birth and miscarriage rates were grossly underestimated in the survey for the several reasons mentioned earlier.

The distribution of currently married women in each domain by the number of conceptions is shown in Table 6.9, by the number of children ever borne in Table 6.10 and by the number of living children in Table 6.11. The means for these measures of fertility are also given in these tables. Currently married women in Maharashtra had, according to NFMS, 1980, on the average, 3.21 conceptions, 3.07 live births and 2.60 living children. These averages were the result of both the pattern of cumulative fertility and the age composition of currently

married women. Since their age composition varied among the domains, their cumulative fertility, by domains, can not be compared simply in terms of the mean numbers of conceptions, live births or living children given in Tables 6.9 to 6.11. Appropriate comparisons, controlling for the age distribution, are made in the next section.

Family Formation and Cumulative Fertility

The average number of children ever born per currently married woman by age groups in Table 6.12 shows the pace of family formation by age cohorts. The mean parity per currently married woman aged 45 and above was 5.34 live births in rural Maharashtra, 5.14 live births in other urban areas and 3.92 live births in Greater Bombay. For the cohort of women aged 40 to 44, the corresponding figures were 5.35, 4.63 and 4.49 respectively. The figure of 4.49 for Greater Bombay may be somewhat large due to sampling fluctuation since it does not fit in with the family building process for women in this city. For the age cohort 35 to 39, the mean parities for these three domains were 4.58, 4.33 and 3.68 respectively. The same rural to urban gradient was observed in the mean parities for women aged 30 to 34 and 25 to 29. Thus, for all cohorts of currently married women aged 25 and over, the cumulative fertility was highest in rural Maharashtra, intermediate in other urban areas and lowest in Greater Bombay. However, in age groups 15 to 19 and 20 to 24, the pace of family building was more rapid in urban than in rural areas. It should be noted that the number of currently married women was considerably augmented up to age group 25 to 29 but not in ages 30 and above. So, only women in age groups 30-34 and above could be more properly regarded as forming a cohort.

Within rural areas, by cohorts, currently married women aged 30 to 34 had a mean parity of 3.62, women aged 35-39 a mean parity of 4.58, women aged 40-44 a mean parity of 5.34 and those aged 45 and above a mean parity of 5.34. The increasing mean

parity, by age group, was due both to increasing family size with advancing age and to a larger completed family size for older cohorts. Progressive memory lapse had, perhaps, resulted in greater under-enumeration of live birth in the oldest cohort in ages 45 and above compared to younger cohorts. Similarly, in other urban areas, the mean parities, by cohorts, were 3.40 for women aged 30-34, 4.33 for women aged 35-39, 4.63 for women aged 40-44 and 5.14 for women aged 45 and above. The increasing trend is again due to the family building process and a larger completed family size for older cohorts. The mean parities for Greater Bombay also showed an upward gradient, with 3.26 for women aged 30-34, 3.68 for those aged 35-39, 4.49 for those aged 40-44 and 3.92 for those aged 45 and above. The mean for ages 40 to 44 does not fit the trend and the deviation could be ascribed to errors arising from a small sample.

The mean parity of currently married women in ages 15 to 49 cannot be directly compared over the domains since their age composition varied. To make valid comparisons, the mean was standardized to the age distribution of currently married women in Maharashtra State and the results are given in the last column of Table 6.12. The standardized mean parities were 3.18 live births in rural Maharashtra, 3.02 in other urban areas and 2.68 in Greater Bombay. Thus the mean cumulative fertility for rural women was slightly above that for women in other urban areas and substantially above that for women in Greater Bombay. This gradient is not evident from the unstandardized means.

As is the practice in all demographic surveys in India, in consonance with the cultural sensibilities of the population, the supplementary questionnaire on fertility and family planning was filled in only for currently married women aged 15 to 50. It has been indicated in the preceding paragraphs that the currently married women in younger age groups do not properly form a cohort since their numbers are substantially and continuously augmented

up to age 30. But the mean parity for all women by age groups does not suffer from this limitation and hence it can be given a cohort interpretation from the youngest age group. However, such a measure mixes up married women engaged in family building with women not currently married who have either not started on or have been interrupted in the process of family building. For older cohorts this might not prove to be a serious hindrance since most of the women were found to be in the ever married status in NFMS Maharashtra, 1980.

A method was developed for converting the mean parity of currently married to that of ever married women. It was based on the cumulative proportion, by age group, of time spent in currently married status by the ever married women by using the NFMS age distributions of all, currently married and ever married women. The method is described in the Appendix B to this chapter. The method was tested on the results of Fertility Differentials in India 1972 published by the Office of the Registrar General, Government of India (1976). It was found to provide satisfactory estimates of mean parity for ever married and all women from the mean parity for currently married women.

Estimates obtained by applying this method are shown in Table 6.13. The mean parity of ever married women was slightly below that of currently married women and the difference between the two increased with age group since the proportion of time spent in currently married state by the ever married women was near unity in the youngest age group and declined steadily with age. The mean parity for all women was much lower than for ever married women in the youngest age group since the proportion ever married was also low in this age group. The mean parity for all women came closer to the mean parity for ever married women for age groups 20 and above in rural areas and for age groups 25 and above in urban areas.

Since over 95 per cent of women were ever married in

age groups 30 and above, the mean parity for all women may be taken as a measure of their cumulative fertility in these age groups. For rural Maharashtra, this measure was 3.49 in ages 30 to 34, 4.41 in ages 35 to 39, 5.14 in ages 40 to 44 and 5.13 in ages 45 to 49. The steady increase with age may be attributed both to the progress of family building and to the increasing trend in the completed family size for older cohorts. The slight decline in the oldest age group could be the result of relatively greater lapse in the recall of live births by these women.

Compared to rural Maharashtra, the pace of family building was slower and the completed family size for ages 45 to 49 smaller in other urban areas. The mean parity of 4.29 for women aged 40 to 44 in Greater Bombay is out of line with the cumulative fertility for the two adjacent age groups and also with that for other urban women aged 40 to 44. This large mean parity could be due to the large sampling error arising from the small sample size for this cell. With this exception, the pace of family building was found to be slower and the completed family size smaller in Greater Bombay compared to other urban areas.

The cohort of women aged 35 to 39 had nearly completed their family size since their mean parity would increase by only 2.4 per cent in the next ten years according to the current schedule of ASFR presented in Table 5.14. Hence the recent decline in completed family size can be roughly assessed by comparing the mean parity for all women for the cohort aged 45 to 49 with that for the cohort aged 35 to 39. In rural areas, the mean parity for the cohort of women aged 45 to 49 was 5.13 live births and declined by 14.0 per cent to 4.41 for the cohort aged 35-39. In other urban areas it declined from 4.71 by 13.4 per cent to 4.08 for these two cohorts and in Greater Bombay it declined from 3.77 by 8.2 per cent to 3.46 for the two cohorts. Thus a significant decline in the completed family size of the cohort of women aged 35 to 39 may be expected in the next ten

years in both rural and urban areas. Since the completed family size for Greater Bombay was already lower than that for the other two domains, the anticipated percentage decline in it is also less.

The age-standardized mean numbers of living children for the three domains are given in the last column of Table 6.14. This is another measure of cumulative fertility. However, it gives the effect of fertility netted for the effect of child mortality. For this reason, its variation over the domains may be expected to be less. This age-standardized mean was 2.64 for rural Maharashtra, 2.73 for other urban areas and 2.44 for Greater Bombay. The lower cumulative fertility in other urban areas does not seem to offset the much lower mortality of children with the result that the mean number of living children is somewhat greater in other urban than in rural areas. A similar pattern of rural to urban differentials is found in the standardized mean numbers of living sons (Table 6.15) and living daughters (Table 6.16). While the standardized mean was about the same for rural and other urban areas, it was distinctly lower for Greater Bombay. Similarly the mean number of living children, as well as of sons and daughters, for currently married women aged 45 to 50 in rural areas was about equal to that in other urban areas but smaller for Greater Bombay.

The mean cumulative fertility has been compared over the domains by duration since first marriage in Table 6.17. Marital duration was defined before as the number of years lapsed, up to the date of survey, since their first marriage or menarchy, whichever was later, for currently married women. The standard marital duration distribution for the State was heavily weighted for longer durations which did not prevail in urban areas. Also standardization by duration removes some of the effect of the age at marriage. Therefore, the duration standardized mean parity did not vary much by rural and urban areas and Greater

Bombay. Comparing the mean parity for marital duration 20 to 24 years, rural women had 4.91 live births, those of other urban areas 4.33 and those of Greater Bombay 4.40. For marital duration 25 years and above, the corresponding mean parities were 5.40, 5.33 and 4.52. Thus for the oldest marital duration cohort, the mean parity for Greater Bombay was substantially below that for the other two domains, while for the next marital duration cohort of 20 to 24 years, both the urban domains had mean parities below that for the rural areas. Table 6.18 provides marital duration specific mean numbers of living children. Here the rural-urban differentials in the means for the two oldest cohorts were reduced because of the counteracting differentials in the mortality levels of children. For the same reason, the duration standardized mean number of living children in rural areas was below that in urban areas.

Cumulative Fertility Differentials
by Concomitant Characteristics

In this section, the cumulative fertility by community, by educational attainment of the currently married woman and her husband and by her age at first marriage are compared. The cumulative fertility is measured by the age standardized and the duration-standardized mean parity. These measures are presented separately for rural Maharashtra, urban areas other than Greater Bombay and Greater Bombay.

The mean parity by community is presented in Table 6.19. For the State as a whole, the mean parity was lowest for advanced caste Hindus, highest for Scheduled Castes and Muslims, and intermediate for other castes. This was also true of the age standardized mean parities in rural Maharashtra, other urban areas and Greater Bombay. The range of variation among the communities in the age standardized mean parity within rural areas was less than within the two urban zones. The standardized rural mean parity for advanced caste Hindus and backward Hindus,

was significantly higher than their respective mean parities in the two urban zones. But for the other communities, including the Muslims, there was not much difference between their rural and urban mean parities. Thus the effect of urbanization on fertility was felt mostly by advanced and backward caste Hindus.

In Table 6.20, figures of mean parity, standardized to the Maharashtra distribution of marital duration, are presented. While ranking of communities by cumulative fertility discussed for Table 6.19 still remained good, the range of variation in the duration standardized mean was less than the age-standardized mean within each domain. For each community, the rural-urban differences in this mean was also less than that for the age-standardized mean.

The cumulative fertility of currently married women by their educational attainment is shown in Table 6.21 for the three domains. In the State, illiterate and literate women without formal education had a mean parity of 3.43 live births, women with formal education below or up to VII standard had a mean parity of 2.74, those with education VIII to XII standard had a mean parity of 2.18 and those with education above XII standard had a mean parity of 1.73. The mean parity, standardized to the all-Maharashtra age distribution of these women, may be compared over the domains. While there was a gradient in this mean by educational attainment in all three domains, the urban differentials were larger than the rural differentials. However, the mean parity of women with the same educational attainment did not vary much over the three domains. It may be inferred, therefore, that the effect of education was, perhaps stronger than the effect of residence. This finding would bear further analytical investigation.

In Table 6.22, the cumulative fertility of currently married women is measured in terms of the mean parity standardized for marital duration. The pattern of the duration-standardized

mean parity by the woman's educational attainment and place of residence (rural, other urban or Greater Bombay) was broadly similar to that for the age-standardized mean parity except that the range of variation in the standardized means was narrower in Table 6.22. This is because, in standardizing for the marital duration, the effect of age at marriage is removed to some extent. Also shorter marital durations would predominate the distribution for urban women compared to the standard distribution. The most significant rural-urban difference in the duration-standardized mean parity occurred among women with an educational attainment of or above VIII standard.

The mean parity, standardized for the Maharashtra age distribution of currently married women, is given by husband's educational level in Table 6.23. A similar pattern of relationship as that for the woman's own educational attainment (Table 6.21) is found in this table. The gradient in the mean by educational level within each domain seems stronger than the rural-urban gradient within each educational level. Thus education appears to be a more important factor than residence in determining the mean cumulative fertility. However, the range of variation in the age-standardized mean by husband's educational level seems to be less than that by the woman's own educational attainment. Hence the currently married woman's educational attainment appears to have a larger effect on her cumulative fertility than the educational level of her husband.

Age at first marriage is a proximate variable that affects the fertility of currently married women. In rural areas, 31.9 per cent of these women were married before reaching age 15, while for other urban areas and Greater Bombay this percentage was only 24.4 and 11.7 (Table 6.24). The corresponding percentages for women who were first married in ages 15 to 18 were 54.3, 46.5 and 44.1 respectively. The lower age at marriage in rural areas for all currently married women is evident from these

figures. In Maharashtra, the mean parity for women who were married before age 15 was 4.25, those first married in ages 15 to 18 was 3.10, those first married in ages 19 to 22 was 2.34 and those first married in ages 23 and above was 1.75. The differentials in these means cannot be attributed solely to age at marriage since each group of women could be at different stages of family formation and their distribution by duration of marriage could be different. In Table 6.27, the mean parity is given by age at first marriage by duration of marriage. Comparing only those women with a marital duration of 20 years or more, in rural Maharashtra, the mean parity was 5.79 for those married before age 15, 5.21 for those married in ages 15 to 18 and 4.73 for those married in ages 19 and above (Table 6.27). The corresponding mean parities for other urban areas were 5.70, 4.95 and 3.60 and for Greater Bombay they were 4.87, 4.81 and 3.70. Thus there was a difference by the age at marriage, in the cumulative fertility of women with the longest marital duration within each domain. The range of variation in the mean parity by age at marriage was smaller in rural compared to urban areas. Higher age at marriage and urban residence jointly appeared to reduce the mean parity by more than the sum of the separate effects of the two factors. This type of interactive effective needs further analytical investigation.

Age at the delivery of the first child is another indicator related to the age at marriage. However, for a girl married before her menarchy, the duration between her marriage and first delivery could be longer than for a girl married after menarchy. This would partly explain the higher percentage of women who delivered their first baby before reaching 16 years of age in other urban areas compared to rural areas (Table 6.25). In rural areas 16.3 per cent of the women, in other urban areas 20.4 per cent of the women and in Greater Bombay 32.6 per cent of the women delivered their first baby only after reaching

22 years of age. This indicates the earlier start of family building in rural compared to urban areas.

Mean parity by community and age at marriage is given in Table 6.26. The differences among communities of the mean parity of women married before age 15 was not large. These differences show up more clearly in the mean parity of women first married in ages 15 to 18 and in ages above 18. Advanced and intermediate castes had the lowest mean parity and Muslims had the highest mean parity in both these age at marriage groups. Standardizing for the age at first marriage, the mean parity was lowest for advanced and intermediate Hindus and highest for Scheduled Castes and Tribes and Muslims. Hence the differentials in mean cumulative fertility by communities persist even after controlling for the age at first marriage. So these differentials arise from other social and cultural factors and not merely from the age at marriage.

Ideals About Age at Marriage, Family Size and Educational Aspirations for Children

In this section, the differences among the domains, in the ideals of currently married women on number of children, sons and daughters, age at marriage for brides and grooms and women's aspirations for the education of their sons and daughters are examined. Values regarding these variables have an effect on fertility and family size.

Whereas in rural areas only 8.5 per cent of the currently married women stated that their ideal family size was two, in other urban areas 28.0 per cent and in Greater Bombay 37.9 per cent considered the two child family as their ideal (Table 6.28). Among the rural regions, the two child family was an ideal for 5.2 per cent of the women in Aurangabad Division, 4.9 per cent of the women in Nagpur Division and 11.5 per cent of the women in Western Maharashtra. The three child and four child family were the ideals for 63.9 and 21.0 per cent of the rural women,

for 46.7 and 22.4 per cent of other urban women, and for 44.5 and 16.4 per cent of women in Greater Bombay. Thus there was a definite preference for the two child family in urban but not in the rural areas.

The mean ideal number of children was 3.3 in rural areas against 3.0 in other urban areas and 2.8 in Greater Bombay (Table 6.29). The mean ideal number of sons for the three domains were 2.0, 1.7 and 1.6 respectively and, for daughters, 1.3, 1.3 and 1.2 respectively. The preference for sons in both rural and urban areas is clear from these figures although the rural preference for sons was sharper.

From Table 6.31 it is seen that 29.4 per cent of currently married women in rural areas and 34.4 per cent in urban areas said that they had more children than they wanted. A further 26.3 per cent of rural women and 27.4 per cent of urban women did not want an additional child. Thus 55.7 per cent of the rural women and 61.8 per cent of the urban women had already as many or more children than they wanted. This percentage shows the contradiction between the actual number of children that a currently married woman had and the ideal number of children she would like to have. However, the percentage cannot be readily interpreted as the unmet need for family planning since the decision to have an additional child rests in the family, contingent on prevailing social norms and values.

The ideal mean age at marriage for brides was 16.4 years in rural areas, 18.6 years in other urban areas and 19.8 years in Greater Bombay whereas that for grooms was 20.8 years, 23.3 years and 24.9 years respectively (Table 6.29). Although these ideals were higher than the actual mean age at marriage for women (Table 6.4), yet the rural-urban differentials were similar for both the ideal and the actual age at marriage. Among the rural regions, Aurangabad Division had the lowest mean ideal age at marriage for both brides and grooms.

The mean ideal age at marriage for brides by community is given in Table 6.30. In rural Maharashtra, this mean was highest for other religions and lowest for backward Hindus and Scheduled Castes and Tribes. There was not much difference between the means for other communities. In other urban areas, advanced Hindus had the highest and Scheduled Castes the lowest mean ideal age at marriage. In Greater Bombay the highest mean was for other religions while all the other communities had nearly the same mean ideal age at marriage. For each community, the ideal age at marriage was lowest for rural areas and highest for Greater Bombay. On the whole, the ideal age at first marriage for brides was above the actual age at first marriage (Table 6.4) and there was less variation, by community, in the ideal than in the actual age at marriage.

The educational aspirations for daughters is indicative of the changing roles and status of girls as perceived by currently married women. In rural areas 23.2 per cent of women were satisfied to educate their daughters up to IV standard compared to 4.4 per cent of urban women with such low educational aspirations for their daughters (Table 6.32). Complementally, only 7.9 per cent of the rural women had the aspiration to educate their daughters above S.S.C. compared to 30.5 per cent of women in urban areas with a similar aspiration. Among the rural regions, Aurangabad Division was more backward, in this respect, than the other two regions. The percentage of women desiring to educate their daughters only up to IV standard was 39.6 for Aurangabad Division, 19.6 for Nagpur Division and 19.5 for Western Maharashtra.

Educational aspirations for sons, reported by currently married women, was naturally higher than for daughters and the variation by domains was less for sons than for daughters (Table 6.33). The percentage of women desiring to give an education above S.S.C. to their sons was 32.1 for rural areas,

40.3 for other urban areas and 54.8 for Greater Bombay.

Summary of Findings

The mean age of the currently married women aged 15 to 50 showed a gradient within the rural regions and between rural areas and urban zones. Aurangabad Division had the lowest mean age for these women while Nagpur Division and Western Maharashtra had higher mean ages. Urban areas had a higher mean age and Greater Bombay had the highest mean age for currently married women aged 15 to 50. The same gradient was observed among the percentages of women aged 15 to 19 and 20 to 24. The distribution of currently married women by marital duration was fairly similar in all the domains. A rising gradient was found in the mean age at first marriage from Aurangabad Division to Nagpur Division to Western Maharashtra to urban areas to Greater Bombay. In the last 25 years, the mean age at marriage has risen for all age cohorts of women aged 25 years and over.

Women's educational attainment was far below that of their husbands'. There was a sharp rural-urban difference in the educational attainment of these women as well as their husbands. Among rural regions, Aurangabad Division had the highest percentage illiterate and the lowest percentage in each of the other educational levels both for the women and their husbands.

By domains, no clear pattern was discernible in the mean number of live births per currently married woman since the age composition varied among the domains. The sex-ratios at birth and of living children were rather low for Aurangabad Division and other urban areas suggesting that there might have been a greater under-count of female than male live births in these two domains. The mean number of daughters living away from the woman was larger than the mean number of sons living away from her due to the custom of marriage migration. Currently married women in Maharashtra had, according to NFMS, 1980, on the average 3.21 conceptions, 3.07 live births and 2.60 living

children. These averages were the result of both the pattern of cumulative fertility and the age composition of currently married women.

The mean parity per currently married woman aged 45 and above was greatest for rural Maharashtra and least for Greater Bombay. The same pattern was repeated for ages 25 to 29 and above. Currently married women aged 30 and above could be regarded as constituting age cohorts since few first marriages take place above this age. The mean parity increased with the age of the cohort in all three domains. The increasing mean parity was due both to increasing family size with advancing age and to a larger completed family size for older cohorts. Age standardized mean parity for currently married women aged 15 to 50 also showed a rural to urban gradient.

The mean parities per ever married and all women were estimated indirectly. The mean parity of ever married women was slightly below that of currently married women and the difference between the two increased with age group since the proportion of time spent in currently married state by the ever married women was near unity in the youngest age group and declined steadily with age. The mean parity for all women came closer to the mean parity for ever married women for age groups 25 years and above since the proportion of ever married women was near unity for these age groups. The mean parity of all rural women in age cohorts 30 years and above increased steadily with age. This steady increase may be attributed both the progress of family building and to the increasing trend in the completed family size for older cohorts. Compared to rural Maharashtra, the pace of family building was slower and the completed family size for ages 45 to 49 smaller in other urban areas. Similarly, the pace of family building was found to be slower and the completed family size smaller in Greater Bombay compared to other urban areas.

The cohort of women aged 35 to 39 had nearly completed their family size. The mean parity of this cohort was compared with that for the cohort of women aged 45 to 49. It was found that there was a fall in the mean parity of the younger cohort in all three domains. Thus a significant decline in the completed family size of the cohort of women aged 35 to 39 may be expected in the next ten years in both rural and urban areas.

The age-standardized mean number of living children for Greater Bombay was below that of the other two domains. The same relationship holds good for age-standardized mean numbers of sons and daughters. Similar relationships are seen in the means for currently married women aged 45 to 50. Since the numbers of living children, sons and daughters are affected by both differential fertility and differential mortality, the rural to urban gradient is not as clear for these variables as for live births.

For the oldest marital duration cohort, the mean parity for Greater Bombay was substantially below that for the other two domains, while for the next marital duration cohort of 20 to 24 years, both the urban domains had mean parities below that for rural areas. The rural-urban differentials in the mean numbers of living children for the two oldest cohorts were reduced because of the counteracting differentials in the mortality levels of children. For the same reason, the duration standardized mean number of living children in rural areas was below that in urban areas.

For the State as a whole, the mean parity was lowest for advanced caste Hindus, highest for Scheduled Castes and Muslims, and intermediate for other castes. This was also true of the age-standardized mean parities in rural Maharashtra, other urban areas and Greater Bombay. The range of variation by communities in the standardized mean within rural areas was less than within the two urban zones. The effect of urbanization

on fertility was felt mostly by advanced and backward caste Hindus. While the mean parities, standardized for marital duration, gave the same ranking of communities as that obtained by standardizing the mean for age, the range of variation in the duration standardized mean was less within each domain.

There was a gradient, in all three domains, in the mean parity by the educational attainment of the currently married woman. However, the urban differentials were larger than those for rural areas and the mean parity of women with the same educational attainment did not vary much over the three domains. It may be inferred that the effect of education was, perhaps, stronger than the effect of residence.

The pattern of the duration-standardized mean parity by the woman's educational attainment and place of residence was broadly similar to that for the age-standardized mean parity except that the range of variation in the former was narrower. This is because, in standardizing for the marital duration, the effect of age at marriage is removed to some extent. Also shorter marital durations would predominate the distribution for urban women compared to the standard distribution. The most significant rural-urban difference in the duration-standardized mean parity occurred among women with an educational attainment of or above VIII standard.

The mean parity, standardized for age, showed a gradient, within each domain, by husband's educational level also. This gradient was steeper than the rural-urban gradient in standardized parity within each educational level. However, the range of variation in the age-standardized mean by husband's educational level seems to be less than that by the woman's own educational attainment. Hence the currently married woman's educational attainment appears to have a larger effect on her cumulative fertility than the educational level of her husband.

From the distribution of currently married women by

their age at first marriage, it is evident that the age at first marriage was less in rural than in urban areas. The mean parity shows a sharp gradient by the age at marriage. These differentials cannot be attributed solely to the age at marriage, since each group of women could be at different stages of family formation and their distribution by duration of marriage could be different. Comparison, within each domain, of the cumulative fertility of women with the longest marital duration revealed a difference, by their age at marriage, in their mean parity. The range of variation in the mean parity, by the age at marriage, was smaller in rural compared to urban areas. Higher age at marriage and urban residence jointly appeared to reduce the mean parity by more than the sum of the separate effects of these two factors.

The percentage of women who delivered their first baby after reaching 22 years of age was lowest in rural areas, somewhat higher in other urban areas and highest in Greater Bombay. This indicates the earlier start of family building in rural compared to urban areas.

Differences in mean parity by community showed up more clearly among women first married in ages 15 to 18 and in ages above 18. Advanced and intermediate castes had the lowest mean parity and Muslims had the highest mean parity in both these age at marriage groups. The differentials in mean parity by community persist even after controlling for the age at first marriage. So these differentials arise from other social and cultural factors and not solely from the age at marriage.

There was a definite preference for the two child family in the urban but not in the rural areas. The mean ideal numbers of children, sons and daughters showed a gradient from rural areas to Greater Bombay. These figures showed also a preference for sons over daughters, which was sharper in rural areas.

The large percentage of currently married women in both

rural and urban areas, who already had as many or more children than they wanted, showed the contradiction between the actual and desired number of children. However, this percentage cannot be readily interpreted as the unmet need for family planning since the decision to have an additional child may rest with the family, contingent on prevailing social norms and values.

Among the rural regions, Aurangabad Division had the lowest mean ideal age at marriage for both brides and grooms. The rural-urban pattern in the ideal age at marriage was similar to the actual age at marriage but the mean ideal age was higher than the actual mean age at first marriage for brides.

In rural Maharashtra, the mean ideal age at marriage for brides was highest for other religions and lowest for backward Hindus. In other urban areas, advanced Hindus and other religions had the highest and Scheduled Castes and Tribes the lowest mean ideal age. In Greater Bombay, other religions had a higher ideal age at first marriage than all other communities. For each community, the ideal age at marriage was lowest for rural areas and highest for Greater Bombay. On the whole, the ideal age at first marriage for brides was above the actual age at first marriage and there was less variation, by community, in the ideal than in the actual age at marriage.

Rural women did not have high educational aspirations for their daughters compared to women in other urban areas and Greater Bombay. Among the rural regions, Aurangabad Division was more backward, in this respect, than the other two regions. Educational aspirations for sons, reported by currently married women, was naturally higher than that for daughters and the variations by domains was less for sons than for daughters.

Table 6.1 : Percentage Distribution of Currently Married Women 15 to 50 Years by Age Group:
NFMS Maharashtra, 1980

	Age group in years							All ages	Age not given	Total No. of women	Average age
	15-19	20-24	25-29	30-34	35-39	40-44	45 and above				
Aurangabad Division	13.9	23.5	17.5	15.4	12.8	9.3	7.6	100.0=1124	3	1127	29.9
Nagpur Division	11.3	21.7	17.7	13.6	12.1	12.6	11.0	100.0=1686	-	1686	31.3
Western Maharashtra	10.6	21.4	18.1	14.7	13.5	10.7	11.0	100.0=3250	4	3254	31.3
Total Rural	11.4	21.9	17.9	14.5	13.0	10.9	10.4	100.0=6060	7	6067	31.0
Urban excluding Greater Bombay	6.8	18.8	20.2	15.8	13.9	11.9	12.6	100.0=1631	4	1635	32.4
Greater Bombay	3.1	12.8	22.1	19.3	15.2	14.0	13.5	100.0=1172	-	1172	33.8
Total Urban	5.2	16.3	21.0	17.3	14.4	12.8	13.0	100.0=2803	4	2807	33.0
Total Maharashtra	9.4	20.2	18.9	15.4	13.4	11.5	11.2	100.0=8863	11	8874	31.6

**Table 6.2 : Percentage Distribution of Currently Married Women by Years Since First Marriage:
NFMS Maharashtra, 1980**

	Years since first marriage						All durations	Duration not given	Total No. of women
	0-4	5-9	10-14	15-19	20-24	25 and more			
Aurangabad Division	18.1	22.2	19.2	12.9	12.6	15.0	100.0 = 1117	10	1127
Nagpur Division	23.8	15.9	17.9	10.7	13.3	18.4	100.0 = 1679	7	1686
Western Maharashtra	18.7	21.0	17.4	13.7	12.9	16.3	100.0 = 3235	19	3254
Total Rural	20.1	19.8	17.9	12.7	12.9	16.6	100.0 = 6031	36	6067
Urban excluding Greater Bombay	18.5	20.0	17.8	13.0	13.0	17.7	100.0 = 1613	22	1635
Greater Bombay	16.6	19.1	19.9	14.0	14.1	16.3	100.0 = 1158	14	1172
Total Urban	17.7	19.6	18.7	13.4	13.5	17.1	100.0 = 2771	36	2807
Total Maharashtra	19.3	19.8	18.1	12.9	13.1	16.8	100.0 = 8802	72	8874

Table 6.3 : Percentage Distribution of Currently Married Women by Age at First Marriage: NFMS Maharashtra, 1980

	Age at first marriage in years										Age at first marriage not given	Total No. of women	Average age at first marriage	
	12 and below	13 and 14	15 and 16	17 and 18	19 and 20	21 and 22	23 and 24	25 to 29	30 and above	All ages				
Aurangabad Division	25.4	20.8	30.1	16.3	5.5	0.9	0.7	0.2	0.1	100.0 =	1015	112	1127	15.0
Nagpur Division	16.5	15.1	33.0	21.6	9.9	2.6	0.6	0.6	0.1	100.0 =	1609	77	1686	16.0
Western Maharashtra	10.3	17.0	35.2	21.6	12.0	2.9	0.7	0.3	0.0	100.0 =	3000	254	3254	16.3
Total Rural	14.8	17.1	33.6	20.7	10.2	2.4	0.7	0.4	0.1	100.0 =	5624	443	6067	16.0
Urban excluding Greater Bombay	11.6	12.8	25.2	21.3	14.5	6.8	4.8	12.7	0.3	100.0 =	1568	67	1635	17.3
Greater Bombay	4.8	6.9	22.0	22.1	18.6	11.8	6.9	6.3	0.6	100.0 =	1166	6	1172	18.9
Total Urban	8.7	10.3	23.9	21.6	16.2	8.9	5.7	4.3	0.4	100.0 =	2734	73	2807	18.0
Total Maharashtra	12.8	14.9	30.4	21.0	12.2	4.6	2.3	1.6	0.2	100.0 =	8358	516	8874	16.6

Table 6.4 : Average Age at Marriage of Currently Married Women by Age Group: NFMS Maharashtra, 1980

	Age group of woman							All ages
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
Rural Maharashtra	16.2	16.7	16.6	15.9	15.7	15.2	15.0	16.0
Urban excluding Greater Bombay	16.1	17.6	18.1	17.9	16.9	17.0	16.4	17.3
Greater Bombay	16.7	18.7	19.4	19.2	19.1	18.0	18.9	18.9
Urban Maharashtra	16.2	17.9	18.7	18.5	17.9	17.5	17.4	18.0
Total Maharashtra	16.2	17.1	17.3	16.9	16.4	16.0	16.0	16.6

Table 6.5 : Percentage Distribution of Currently Married Women by Educational Attainment:
NFMS Maharashtra, 1980

	Illiterate	Upto 7th std.	8th std. to S.S.C.	Above S.S.C.	All levels	Educational attainment not given	Total No. of women
Aurangabad Division	85.6	12.3	2.0	0.1	100.0 = 1124	3	1127
Nagpur Division	62.8	30.9	6.1	0.2	100.0 = 1686	0	1686
Western Maharashtra	71.4	24.9	3.5	0.2	100.0 = 3246	8	3254
Total Rural	71.7	24.2	3.9	0.2	100.0 = 6056	11	6067
Urban excluding Greater Bombay	36.3	32.8	24.2	6.7	100.0 = 1630	5	1635
Greater Bombay	30.2	33.9	28.4	7.5	100.0 = 1171	1	1172
Total Urban	33.7	33.2	26.0	7.1	100.0 = 2801	6	2807
Total Maharashtra	59.6	27.1	10.9	2.4	100.0 = 8857	17	8874

Table 6.6 : Percentage Distribution of Currently Married Women by Educational Attainment of Husband:
NFMS Maharashtra, 1980

	Illiterate	Upto 7th std.	8th std. to S.S.C.	Above S.S.C.	All levels	Educational attainment not given	Total No. of women
Aurangabad Division	47.2	34.2	16.2	2.4	100.0 = 1123	4	1127
Nagpur Division	30.2	47.3	19.4	3.1	100.0 = 1683	3	1686
Western Maharashtra	35.9	43.9	17.9	2.3	100.0 = 3220	34	3254
Total Rural	36.4	43.1	18.0	2.5	100.0 = 6026	41	6067
Urban excluding Greater Bombay	11.6	34.9	37.5	16.0	100.0 = 1625	10	1635
Greater Bombay	13.1	28.3	45.5	13.1	100.0 = 1171	1	1172
Total Urban	12.2	32.1	40.9	14.8	100.0 = 2796	11	2807
Total Maharashtra	28.8	39.6	25.2	6.4	100.0 = 8822	52	8874

Table 6.7 : Average Number of Live Births Per Currently Married Woman by Sex and Whether Living or Dead; Average Age of Woman; and Sex-ratio of Children at Birth and of Living Children: NFMS Maharashtra, 1980

	Average No. per woman							Average age of woman	Sex-ratio of children at birth *	Sex-ratio of living children *
	Sons living with woman	Sons living away	Sons dead	Daughters living with woman	Daughters living away	Daughters dead	Total live births			
Aurangabad Division	1.15	0.08	0.30	0.89	0.23	0.26	2.91	29.9	901	909
Nagpur Division	1.27	0.07	0.35	1.04	0.24	0.32	3.29	31.3	945	950
Western Maharashtra	1.16	0.15	0.21	0.98	0.26	0.21	2.97	31.3	951	945
Total Rural	1.19	0.11	0.27	0.98	0.25	0.25	3.05	31.0	940	940
Urban excluding Greater Bombay	1.34	0.07	0.20	1.12	0.16	0.19	3.08	32.4	915	908
Greater Bombay	1.35	0.04	0.16	1.19	0.16	0.13	3.03	33.8	949	967
Total Urban	1.35	0.06	0.18	1.15	0.16	0.16	3.06	33.0	929	932
Total Maharashtra	1.24	0.09	0.24	1.04	0.23	0.22	3.05	31.6	937	938

* Sex-ratio = Females per 1000 males.

Table 6.8 : Average Number, Per Currently Married Woman, of Live Births, Still-births, Miscarriages and Conceptions; Still-birth Rate and Miscarriage Rate : NFMS Maharashtra, 1980

	Average per woman				Still-births per 1,000 all births*	Miscarriages per 1,000 conceptions
	Live births	Still- births	Mis- carriages	Conceptions		
Aurangabad Division	2.91	0.05	0.06	3.02	16.76	18.80
Nagpur Division	3.29	0.04	0.10	3.43	11.58	28.38
Western Maharashtra	2.97	0.04	0.08	3.09	12.75	24.37
Total Rural	3.05	0.04	0.08	3.17	13.11	24.59
Urban excluding Greater Bombay	3.08	0.04	0.19	3.37	13.26	57.08
Greater Bombay	3.03	0.03	0.13	3.19	9.21	41.21
Total Urban	3.06	0.04	0.17	3.30	11.61	50.67
Total Maharashtra	3.05	0.04	0.11	3.21	12.63	33.06

* All births include still and live births.

Table 6.9 : Percentage Distribution of Currently Married Women by Number of Conceptions:
NFMS Maharashtra, 1980

	Number of conceptions									Total	Average No. of con- ceptions
	0	1	2	3	4	5	6	7 or more			
Aurangabad Division	21.5	12.5	13.5	12.7	13.8	9.5	6.8	9.7	100.0 = 1127	3.02	
Nagpur Division	15.5	13.9	12.3	13.2	12.0	10.6	8.8	13.7	100.0 = 1686	3.43	
Western Maharashtra	17.3	14.1	14.1	14.3	12.9	10.8	6.9	9.6	100.0 = 3254	3.09	
Total Rural	17.6	13.8	13.5	13.7	12.8	10.5	7.4	10.7	100.0 = 6067	3.17	
Urban excluding Greater Bombay	12.7	11.9	14.8	17.4	15.6	10.5	5.6	11.5	100.0 = 1635	3.38	
Greater Bombay	10.2	12.1	18.2	18.5	16.4	11.4	6.1	7.1	100.0 = 1172	3.19	
Total Urban	11.6	12.0	16.3	17.9	15.9	10.8	5.8	9.7	100.0 = 2807	3.30	
Total Maharashtra	15.7	13.2	14.4	15.0	13.8	10.6	6.9	10.4	100.0 = 8874	3.21	

Table 6.10 : Percentage Distribution of Currently Married Women by the Number of Children Ever Borne:
NFMS Maharashtra, 1980

	Number of children borne								Total	Average No. of children borne
	0	1	2	3	4	5	6	7 or more		
Aurangabad Division	21.6	13.7	13.4	13.6	13.2	9.0	6.9	8.6	100.0 = 1127	2.91
Nagpur Division	16.3	13.9	12.9	13.5	12.8	10.0	8.7	11.9	100.0 = 1686	3.29
Western Maharashtra	17.8	14.7	14.4	14.6	12.8	11.2	6.4	8.1	100.0 = 3254	2.98
Total Rural	18.1	14.3	13.8	14.1	12.9	10.4	7.2	9.2	100.0 = 6067	3.05
Urban excluding Greater Bombay	13.2	13.5	16.2	17.6	15.2	10.0	5.3	9.0	100.0 = 1635	3.14
Greater Bombay	10.7	14.2	18.5	19.0	15.7	10.4	5.5	6.0	100.0 = 1127	3.03
Total Urban	12.1	13.8	17.2	18.1	15.4	10.2	5.4	7.8	100.0 = 2807	3.09
Total Maharashtra	16.2	14.1	14.9	15.4	13.7	10.3	6.6	8.8	100.0 = 8874	3.07

Table 6.11 : Percentage Distribution of Currently Married Women by Number of Living Children:
NFMS Maharashtra, 1980

	Number of living children								Total	Average No. of living children
	0	1	2	3	4	5	6	7 or more		
Aurangabad Division	22.8	17.2	15.7	15.8	13.6	8.4	4.0	2.5	100.0 = 1127	2.36
Nagpur Division	17.6	17.1	15.8	17.3	13.3	9.3	6.7	2.9	100.0 = 1686	2.62
Western Maharashtra	18.9	16.6	16.6	17.1	13.2	9.5	4.8	3.3	100.0 = 3254	2.55
Total Rural	19.3	16.8	16.2	16.9	13.3	9.2	5.2	3.1	100.0 = 6067	2.53
Urban excluding Greater Bombay	13.7	15.7	18.6	18.8	15.8	8.0	5.1	4.3	100.0 = 1635	2.75
Greater Bombay	11.6	14.7	21.2	20.3	16.1	9.3	3.4	3.4	100.0 = 1172	2.75
Total Urban	12.8	15.3	19.6	19.4	16.0	8.6	4.4	3.9	100.0 = 2807	2.75
Total Maharashtra	17.2	16.3	17.4	17.8	14.1	9.0	4.9	3.3	100.0 = 8874	2.60

Table 6.12 : Average Number of Children Ever Borne Per Currently Married Woman by Age Group and Age-Standardized Average* : NFMS Maharashtra, 1980

	Age group							Ages 15-49	Age- stand- ardized average*
	15-19	20-24	25-29	30-34	35-39	40-44	45 and above		
Rural Maharashtra	0.36	1.25	2.68	3.62	4.58	5.35	5.34	3.06	3.18
Urban excluding Greater Bombay	0.45	1.43	2.53	3.40	4.33	4.63	5.14	3.15	3.02
Greater Bombay	0.61	1.19	2.25	3.26	3.68	4.49	3.92	3.03	2.68
Urban Maharashtra	0.49	1.35	2.41	3.33	4.04	4.57	4.61	3.10	2.87
Total Maharashtra	0.38	1.27	2.59	3.52	4.40	5.08	5.07	3.07	3.07

* Age standardized to Maharashtra distribution.

Table 6.13 : Mean Parity for Currently Married Women, Ever Married Women and All Women:
NFMS Maharashtra, 1980

	Mean parity for currently married women				Mean parity for ever married women*				Mean parity for all women			
	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Total Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Total Maharashtra	Rural Maharashtra	Urban excluding Greater Bombay	Greater Bombay	Total Maharashtra
15-19	0.36	0.45	0.61	0.38	0.35	0.43	0.55	0.37	0.17	0.10	0.07	0.14
20-24	1.25	1.43	1.19	1.27	1.22	1.39	1.13	1.23	1.13	0.94	0.66	1.03
25-29	2.68	2.53	2.25	2.59	2.60	2.45	2.18	2.51	2.57	2.24	1.98	2.41
30-34	3.62	3.40	3.26	3.52	3.50	3.24	3.16	3.40	3.49	3.15	2.97	3.34
35-39	4.58	4.33	3.68	4.40	4.42	4.09	3.56	4.23	4.41	4.08	3.46	4.21
40-44	5.35	4.63	4.49	5.08	5.14	4.34	4.31	4.86	5.14	4.24	4.29	4.83
45-49	5.38	5.12	3.97	5.09	5.13	4.76	3.79	4.83	5.13	4.71	3.77	4.82

* The mean parities per ever-married and all women were estimated indirectly from the mean parity per currently married woman by the method given in the Appendix.

Table 6:14 : Average Number of Living Children Per Currently Married Woman by Age Group and Age-Standardized Average* : NFMS Maharashtra, 1980

	Age group							Ages 15-49	Age- stand- ardized average*
	15-19	20-24	25-29	30-34	35-39	40-44	45 and above		
Rural Maharashtra	0.32	1.11	2.32	3.10	3.82	4.30	4.10	2.54	2.64
Urban Excluding Greater Bombay	0.43	1.32	2.32	3.06	3.80	4.06	4.11	2.76	2.73
Greater Bombay	0.58	1.12	2.16	2.99	3.29	3.95	3.55	2.75	2.44
Urban Maharashtra	0.47	1.25	2.25	3.02	3.57	4.01	3.87	2.75	2.56
Total Maharashtra	0.34	1.14	2.29	3.07	3.73	4.20	4.02	2.61	2.61

* Age standardized to Maharashtra distribution.

Table 6.15 : Average Number of Living Sons Per Currently Married Woman by Age Group and Age-Standardized Average* : NFMS Maharashtra, 1980

	Age group							Ages 15-49	Age- stand- ardized average*
	15-19	20-24	25-29	30-34	35-39	40-44	45 and above		
Rural Maharashtra	0.17	0.57	1.18	1.60	1.98	2.22	2.12	1.31	1.36
Urban excluding Greater Bombay	0.18	0.68	1.25	1.59	1.93	2.00	2.08	1.41	1.36
Greater Bombay	0.22	0.53	1.12	1.45	1.65	2.02	1.92	1.39	1.23
Urban Maharashtra	0.19	0.63	1.19	1.53	1.81	2.01	2.01	1.41	1.30
Total Maharashtra	0.17	0.59	1.18	1.57	1.92	2.14	2.08	1.34	1.34

* Age standardized to Maharashtra distribution.

Table 6.16 : Average Number of Living Daughters Per Currently Married Woman by Age Group and Age-Standardized Average* : NFMS Maharashtra, 1980

	Age group							Ages 15-49	Age- stand- ardized Average*
	15-19	20-24	25-29	30-34	35-39	40-44	45 and above		
Rural Maharashtra	0.15	0.53	1.15	1.50	1.84	2.08	1.98	1.23	1.28
Urban excluding Greater Bombay	0.25	0.64	1.07	1.47	1.86	2.06	2.03	1.35	1.30
Greater Bombay	0.36	0.59	1.04	1.54	1.63	1.93	1.63	1.35	1.21
Urban Maharashtra	0.28	0.63	1.06	1.50	1.76	2.00	1.86	1.35	1.26
Total Maharashtra	0.17	0.56	1.12	1.50	1.81	2.05	1.93	1.27	1.27

* Age standardized to Maharashtra distribution.

Table 6.17 : Average Number of Children Ever Born per Currently Married Woman by Duration of Marriage and Duration-Standardized Average* : NFMS Maharashtra, 1980

	Duration of marriage in years						All durations	Duration std. average*
	0-4	5-9	10-14	15-19	20-24	25 and above		
Rural Maharashtra	0.71	1.81	2.96	3.96	4.91	5.40	3.06	3.09
Urban excluding Greater Bombay	0.89	2.22	3.06	3.93	4.33	5.33	3.15	3.14
Greater Bombay	0.91	2.17	3.10	3.76	4.40	4.52	3.03	2.99
Urban Maharashtra	0.90	2.20	3.08	3.85	4.36	5.01	3.10	3.08
Total Maharashtra	0.77	1.93	3.00	3.93	4.73	5.28	3.07	3.07

* Duration standardized to Maharashtra distribution.

Table 6.18 : Average Number of Living Children Per Currently Married Woman by Duration of Marriage and Duration-Standardized Average* : NFMS Maharashtra, 1980

	Duration of marriage in years						All durations	Duration std. average*
	0-4	5-9	10-14	15-19	20-24	25 and above		
Rural Maharashtra	0.64	1.60	2.58	3.38	4.04	4.16	2.54	2.57
Urban excluding Greater Bombay	0.83	2.07	2.80	3.42	3.95	4.33	2.76	2.76
Greater Bombay	0.85	2.05	2.89	3.35	3.89	3.93	2.75	2.70
Urban Maharashtra	0.84	2.06	2.84	3.39	3.92	4.17	2.75	2.74
Total Maharashtra	0.70	1.74	2.67	3.38	4.00	4.16	2.61	2.61

* Duration standardized to Maharashtra distribution.

Table 6.19 : Mean Parity and Age Standardized Mean Parity* Per Currently Married Woman by Caste-cum-Religion : NFMS Maharashtra, 1980

Caste-cum-religion	Rural Maharashtra		Urban other than Greater Bombay		Greater Bombay		Total Maharashtra mean parity
	Mean parity	Std. mean parity*	Mean parity	Std. mean parity*	Mean parity	Std. mean parity*	
Advanced caste Hindus	2.95	3.01	2.78	2.51	2.86	2.47	2.90
Intermediate caste Hindus	3.01	3.22	3.16	3.17	3.25	3.31	3.05
Backward Hindus	3.17	3.49	2.79	2.33	3.50	2.29	3.16
Scheduled caste Hindus	3.28	3.34	3.46	3.55	3.64	3.22	3.35
Scheduled tribe Hindus	3.03	3.28	4.00	3.68	-	-	3.11
Muslims	3.29	3.35	3.56	3.83	3.30	3.23	3.37
Other religions	3.37	3.10	3.53	3.71	2.54	2.06	3.12
All castes-cum-religions	3.05	3.18	3.14	3.02	3.03	2.68	3.07

* Mean parity standardized to Maharashtra age distribution.

- Number of currently married women below 20.

Table 6.20 : Mean Parity and Duration Standardized Mean Parity* Per Currently Married Woman by Caste-cum-Religion : NFMS Maharashtra, 1980

Caste-cum-religion	Rural Maharashtra		Urban other than Greater Bombay		Greater Bombay		Total Maharashtra mean parity
	Mean parity	Std.mean parity*	Mean parity	Std.mean parity*	Mean parity	Std.mean parity*	
Advanced caste Hindus	2.95	2.97	2.78	2.73	2.86	2.78	2.90
Intermediate caste Hindus	3.01	3.11	3.16	3.18	3.25	3.15	3.05
Backward Hindus	3.17	3.32	2.79	2.70	3.50	2.08	3.16
Scheduled Caste Hindus	3.28	3.14	3.46	3.38	3.64	3.37	3.35
Scheduled tribe Hindus	3.03	3.03	4.00	3.82	-	-	3.11
Muslims	3.29	3.35	3.56	3.80	3.30	3.50	3.37
Other religions	3.37	3.21	3.53	3.47	2.54	2.43	3.12
All castes-cum-religions	3.05	3.07	3.14	3.12	3.03	2.97	3.07

* Mean parity standardized to Maharashtra distribution.

- Number of currently married women below 20.

Table 6.21 : Mean Parity and Age Standardized Mean Parity* Per Currently Married Woman by Educational Level of Woman : NFMS Maharashtra, 1980

Educational level of woman	Total Rural		Urban excluding Greater Bombay		Greater Bombay		Total Maharashtra mean parity
	Mean parity	Std. mean parity*	Mean parity	Std. mean parity*	Mean parity	Std. mean parity*	
Illiterate and literate without formal education	3.33	3.20	3.86	3.48	3.86	3.17	3.43
Upto 7th standard	2.42	3.11	3.24	3.21	3.25	2.92	2.74
8th to 12th standard	1.90	2.97	2.34	2.32	2.18	2.08	2.18
Above 12th standard	-	-	1.62	1.58	2.08	1.50	1.73
All levels of education	3.05	3.18	3.14	3.02	3.03	2.68	3.07

* Mean parity standardized to Maharashtra age distribution.

- Number of currently married women below 20.

Table 6.22 : Mean Parity and Duration Standardized Mean Parity* Per Currently Married Woman by Educational Level of Woman : NFMS Maharashtra, 1980

Educational level of woman	Total Rural		Urban excluding Greater Bombay		Greater Bombay		Total Maharashtra
	Mean parity	Std. mean parity*	Mean parity	Std. mean parity*	Mean parity	Std. mean parity*	
Illiterate and literate without formal education	3.33	3.05	3.86	3.39	3.86	3.22	3.43
Upto 7th standard	2.42	3.08	3.24	3.19	3.25	3.14	2.74
8th to 12th standard	1.90	3.05	2.34	2.58	2.18	2.42	2.18
Above 12th Standard	-	-	1.62	2.31	2.08	2.01	1.73
All levels of education	3.05	3.07	3.14	3.12	3.03	2.97	3.07

* Mean parity standardized to Maharashtra distribution.

- Number of currently married women below 20.

Table 6.23 : Mean Parity and Age Standardized Mean Parity* Per Currently Married Woman by Educational Level of Husband : NFMS Maharashtra, 1980

Educational level of husband	Total Rural		Urban excluding Greater Bombay		Greater Bombay		Total Maharashtra mean parity
	Mean parity	Std. mean parity*	Mean parity	Std. mean parity*	Mean parity	Std. mean parity*	
Illiterate and literate without formal education	3.53	3.23	4.14	3.52	3.94	3.18	3.62
Upto 7th standard	3.13	3.19	3.65	3.43	3.78	3.18	3.28
8th to 12th standard	2.08	3.07	2.75	2.83	2.51	2.41	2.37
Above 12th standard	2.04	3.01	2.22	2.13	2.26	1.85	2.18
All levels of education	3.05	3.18	3.14	3.02	3.03	2.68	3.07

* Mean parity standardized to Maharashtra age distribution.

Table 6.24 : Mean Parity Per Currently Married Woman by Age at First Marriage: NFMS Maharashtra, 1980

	Age at first marriage					Age at first marriage not given	Total women
	14 years and below	15-18 years	19-22 years	23 years and above	All ages		
Total Rural							
Percentage of women	31.9	54.3	12.6	1.2	100.0 = 5624	443	6067
Mean parity	4.20	2.97	2.29	2.21	3.05	0.30	
Urban excluding Greater Bombay							
Percentage of women	24.4	46.5	21.3	7.8	100.0 = 1568	67	1635
Mean parity	4.49	3.31	2.38	1.48	3.14	0.48	
Greater Bombay							
Percentage of women	11.7	44.1	30.4	13.8	100.0 = 1166	6	1172
Mean parity	4.17	3.57	2.42	1.77	3.03	0.67	
Total Maharashtra							
Percentage of women	27.7	51.4	16.8	4.1	100.0 = 8358	516	8872
Mean parity	4.25	3.10	2.34	1.75	3.07	0.33	

Table 6.25 : Mean Parity Per Currently Married Woman by Age at First Delivery: NFMS Maharashtra, 1980

	Age at first delivery				All Ages
	15 years or less	16-21 years	22 years and above	Zero parity or age at first delivery not given	
Total Rural					
Percentage of women	4.66	61.00	16.26	18.08	100.0 = 6067
Mean parity	4.95	3.78	3.09	0.05	3.05
Urban excluding Greater Bombay					
Percentage of women	9.11	56.93	20.44	13.52	100.0 = 1635
Mean parity	4.68	3.84	2.55	0.05	3.14
Greater Bombay					
Percentage of women	4.44	52.13	32.59	10.84	100.0 = 1172
Mean parity	4.69	3.77	2.61	0.04	3.03
Total Maharashtra					
Percentage of women	5.45	59.09	19.18	16.28	100.0 = 8874
Mean parity	4.84	3.80	2.87	0.05	3.07

Table 6.26 : Mean Parity and Standardized Mean Parity Per Currently Married Woman by Caste-cum-Religion by Age at First Marriage for Maharashtra : N S Maharashtra, 1980

	Age at first marriage				Standardized mean parity
	Upto 14 years	15-18 years	19 years and above	All ages	
Advanced Hindus	4.21	3.04	2.11	2.90	2.90
Intermediate Hindus	4.09	2.92	2.08	3.05	3.07
Backward Hindus	3.84	3.33	2.63	3.16	3.13
Scheduled caste Hindus	4.38	3.28	2.17	3.35	3.37
Scheduled tribe Hindus	4.42	2.90	2.77	3.11	3.39
Muslims	4.44	3.46	2.86	3.37	3.35
Other religions	5.27	3.65	2.26	3.12	3.30
All castes-cum-religions	4.25	3.10	2.22	3.07	3.07

**Table 6.27 : Mean Parity Per Currently Married Woman by Age at First Marriage by Duration of Marriage:
NFMS Maharashtra, 1980**

Duration of marriage	Age at first marriage				Age not given	Number of married Women	Age at first marriage				Age not given	Number of married women
	14 - 15 years and below	15-18 years	19 years and above	All ages			14 years and below	15-18 years	19 years and above	All Ages		
	Rural Maharashtra					Urban excluding Greater Bombay						
Upto 10 years: Percentage	17.9	62.3	19.8	100.0= 2243	170	2413	11.5	46.6	41.9	100.0= 611	18	629
Mean parity	1.52	1.36	1.18	1.26			1.74	1.79	1.41	1.58		
10-20 years: Percentage	32.6	55.0	12.4	100.0= 1699	159	1858	24.8	50.6	24.6	100.0= 469	35	504
Mean parity	3.73	3.71	3.39	3.38			4.06	3.79	2.98	3.43		
20 years and above: Percentage	50.4	42.7	6.9	100.0= 1682	114	1796	41.1	42.8	16.1	100.0= 488	14	502
Mean parity	5.79	5.21	4.73	5.19			5.70	4.95	3.60	4.94		
All durations: Percentage	31.9	54.3	13.8	100.0= 5624	443	6067	24.4	46.5	29.1	100.0= 1568	67	1635
Mean parity	4.20	2.97	2.28	3.05			4.49	3.31	2.14	3.14		

(continued)

Table 6.27 : (continued)

Duration of marriage	Age at first marriage				Age not given	Number of married women	Age at first marriage				Age not given	Number of married women
	14 years and below	15-18 years	19 years and above	All ages			14 years and below	15-18 years	19 years and above	All ages		
	Greater Bombay					Total Maharashtra						
Upto 10 years:												
Percentage	3.4	34.9	61.7	100.0=	1	418	14.8	55.8	29.4	100.0=	190	3462
Mean parity	2.43	1.71	1.47	1.59			1.57	1.45	1.32	1.36		
10-20 years:												
Percentage	12.1	48.3	39.6	100.0=	3	398	28.0	53.3	18.7	100.0=	196	2758
Mean parity	3.55	3.85	2.80	3.37			3.76	3.74	3.10	3.39		
20 years and above:												
Percentage	21.7	51.2	27.1	100.0=	2	356	44.6	44.0	11.4	100.0=	130	2654
Mean parity	4.87	4.81	3.70	4.46			5.72	5.10	4.01	5.05		
All durations:												
Percentage	11.7	44.1	44.2	100.0=	6	1172	27.7	51.4	20.9	100.0=	516	8874
Mean parity	4.17	3.57	2.22	3.03			4.25	3.10	2.23	3.07		

**Table 6.28 : Percentage Distribution of Currently Married Women by Ideal Number of Children:
NFMS Maharashtra, 1980**

	Ideal number of children										Ideal not given	Total No. of women	Average ideal number of children
	1	2	3	4	5	6	7	8	9 or more	Total			
Aurangabad Division	0.0	5.2	52.4	31.4	7.7	2.9	0.4	0.0	0.0	100.0= 854	273	1127	3.5
Nagpur Division	0.0	4.9	72.7	19.9	1.8	0.5	0.0	0.2	0.0	100.0=1524	162	1686	3.2
Western Maharashtra	0.1	11.5	62.5	18.4	4.2	2.3	0.4	0.3	0.3	100.0=2783	471	3254	3.3
Total Rural	0.1	8.5	63.9	21.0	4.1	1.8	0.3	0.2	0.1	100.0=5161	906	6067	3.3
Urban excluding Greater Bombay	0.1	28.0	46.7	22.4	1.1	0.8	0.1	0.3	0.5	100.0=1519	116	1635	3.0
Greater Bombay	0.1	37.9	44.5	16.4	0.4	0.4	0.0	0.2	0.1	100.0=1112	60	1172	2.8
Total Urban	0.1	32.3	45.9	19.8	0.8	0.6	...	0.2	0.3	100.0=2631	176	2807	2.9
Total Maharashtra	0.1	16.5	57.8	20.6	3.0	1.4	0.2	0.2	0.2	100.0=7792	1082	8874	3.2

.. Negligible.

Table 6.29 : Average, per Currently Married Woman, of Ideal Number of Children by Sex and Ideal Age at Marriage for Males and Females: NFMS Maharashtra, 1980

	Ideal No. of children	Ideal No. of sons	Ideal No. of daughters	Ideal age at marriage	
				Males	Females
Aurangabad Division	3.5	2.1	1.4	19.6	15.2
Nagpur Division	3.2	2.0	1.2	21.2	17.1
Western Maharashtra	3.3	2.0	1.3	21.0	16.5
Total Rural	3.3	2.0	1.3	20.8	16.4
Urban excluding Greater Bombay	3.0	1.7	1.3	23.3	18.0
Greater Bombay	2.8	1.6	1.2	24.9	19.8
Total Urban	2.9	1.7	1.2	24.4	19.1
Total Maharashtra	3.2	1.9	1.3	22.0	17.3

Table 6.30 : Average Ideal Age at Marriage for Women by Caste-cum-Religion : NFMS Maharashtra, 1980

	Advanced caste Hindus	Intermedia- te caste Hindus	Backward Hindus	Scheduled caste Hindus	Scheduled tribe Hindus	Muslims	Other religions	All castes- cum- religions
Rural Maharashtra	16.7	16.5	15.8	15.8	16.0	16.5	17.6	16.4
Urban excluding Greater Bombay	19.3	18.3	-	17.3	18.5	17.9	18.9	18.6
Greater Bombay	19.9	19.8	-	19.3	-	19.5	21.0	19.8
Urban Maharashtra	19.6	18.6	19.4	18.0	18.7	18.7	20.0	19.1
Total Maharashtra	17.7	17.0	16.2	16.5	16.2	17.7	19.3	17.3

Number of currently married women below 20.

Table 6.31 : Percentage Distribution of Currently Married Women by Children Ever Borne Compared to Children Wanted: NFMS Maharashtra, 1980

	More children than wanted	Additional children wanted			Total No. of women
		None	One	Two or more	
Aurangabad Division	26.4	29.2	13.8	30.6	100.0 = 1127
Nagpur Division	30.1	24.9	14.7	30.3	100.0 = 1686
Western Maharashtra	29.9	26.1	14.6	29.4	100.0 = 3254
Total Rural	29.4	26.3	14.5	29.8	100.0 = 6067
Urban excluding Greater Bombay	34.1	26.9	16.3	22.7	100.0 = 1635
Greater Bombay	34.6	28.2	18.9	18.3	100.0 = 1172
Total Urban	34.4	27.4	17.4	20.8	100.0 = 2807
Total Maharashtra	30.9	26.7	15.4	27.0	100.0 = 8874

Table 6.32 : Percentage Distribution of Currently Married Women by Level of Education Desired for Daughters:
NFMS Maharashtra, 1980

	Upto 4th std.	5th to 7th std.	8th to S.S.C.	Above S.S.C.	Accord- ing to capacity	Training in household occupa- tion	Enough to earn living	All levels	Level not given	Total No.of women
Aurangabad Division	39.6	25.6	19.4	4.6	9.9	0.7	0.2	100.0 = 923	204	1127
Nagpur Division	19.6	30.8	31.8	13.1	4.7	0.0	0.0	100.0 = 1411	275	1686
Western Maharashtra	19.5	36.3	23.5	6.5	13.1	0.4	0.7	100.0 = 2776	478	3254
Total Rural	23.2	32.9	25.1	7.9	10.2	0.3	0.4	100.0 = 5110	957	6067
Urban excluding Greater Bombay	5.8	9.6	42.2	27.6	13.2	0.0	1.6	100.0 = 1520	115	1635
Greater Bombay	2.5	10.8	49.7	34.3	2.5	0.0	0.2	100.0 = 1134	38	1172
Total Urban	4.4	10.1	45.4	30.5	8.6	0.0	1.0	100.0 = 2654	153	2807
Total Maharashtra	16.7	25.2	32.1	15.6	9.6	0.2	0.6	100.0 = 7764	1110	8874

Table 6.33 : Percentage Distribution of Currently Married Women by Level of Education Desired for Sons:
NFMS Maharashtra, 1980

	Upto 4th std.	5th to 7th std.	8th std. to S.S.C.	Above S.S.C.	Accord- ing to capacity	Training in household occupa- tion	Enough to earn living	All levels	Level not given	Total No.of women
Aurangabad Division	4.5	13.4	35.5	31.2	13.3	1.5	0.6	100.0 = 934	193	1127
Nagpur Division	3.2	6.7	39.5	39.3	10.8	0.1	0.4	100.0 = 1423	263	1686
Western Maharashtra	2.3	6.3	36.1	28.7	25.0	0.5	1.1	100.0 = 2793	461	3254
Total Rural	2.9	7.7	36.8	32.1	19.0	0.6	0.9	100.0 = 5150	917	6067
Urban excluding Greater Bombay	1.5	2.8	32.7	40.3	20.7	0.0	2.0	100.0 = 1529	106	1635
Greater Bombay	0.3	1.0	37.8	54.8	5.7	0.0	0.4	100.0 = 1138	34	1172
Total Urban	1.0	2.0	34.9	46.5	14.3	0.0	1.3	100.0 = 2667	140	2807
Total Maharashtra	2.3	5.8	36.2	36.9	17.4	0.4	1.0	100.0 = 7817	1057	8874

APPENDIX B

CHAPTER 6

INDIRECT ESTIMATION OF MEAN PARITY OF EVER MARRIED WOMEN

In this appendix the method of indirect estimation of the mean parity of ever married women from that of currently married women is described. Since information on fertility and family planning, in surveys conducted in India, is generally collected only from currently married women, it is necessary to indirectly estimate the mean parity of ever married women. The mean parity of all women could then be estimated by multiplying the mean parity of ever married women by the proportion of ever married to all women. In converting the mean parity of ever married to that of all women, the assumption is made that the number of illegitimate births is negligible, which appears valid in current Indian conditions.

The basic data needed are the numbers of currently married, ever married and all women and the mean parity of currently married women, specific for all age groups in reproductive ages. The method of indirect estimation of the mean parity of ever married from that of currently married women was tested for validity and accuracy on the data given in Fertility Differentials in India, 1972, published by the Office of the Registrar General, Government of India (1976), for rural and urban Maharashtra. From this survey the mean parity for currently married and ever married women are available by the age group of women. The numbers currently married and ever married were estimated from this source. The number currently married in an age group was obtained up to a scale factor, as the ratio of the percentage of births in that age group to the age specific fertility for that age group. This is given in Column (2) of Table B. The proportion of ever married to

currently married in an age group was calculated as the ratio of the mean parity of ever married to that of currently married for that age group and then the number ever married was obtained, upto the same scale factor. This is shown in column (3) of Table B.

The time spent in currently married state was calculated as

$$\sum_1^{i-1} C_t + (C_i/2),$$

shown in column (4) and similarly the time spent in ever married state was calculated as

$$\sum_1^{i-1} E_t + (E_i/2),$$

shown in column (5). The ratio of column (4) to (5) is the proportion of time spent in currently married state by ever married women and is a close measure of the exposure of ever married women to child-bearing.

In column (7), the mean parity of currently married women is shown from Fertility Differentials in India, 1972. In column (8), column (7) is multiplied by the proportion of time spent in currently married state obtained in column (6), to get the indirect estimate of the mean parity of ever married women. In the next column, the direct estimate taken from Fertility Differentials is given for comparison.

As can be seen from Table B, the indirect estimates of mean parity for ever married women are very close to the direct estimates in both rural and urban areas, differing at most by 0.02 live births per woman. This simple procedure yields entirely satisfactory results and can be applied to data on children ever borne by currently married women by age groups, if the numbers of ever married and all women by these age groups are also available from the same survey.

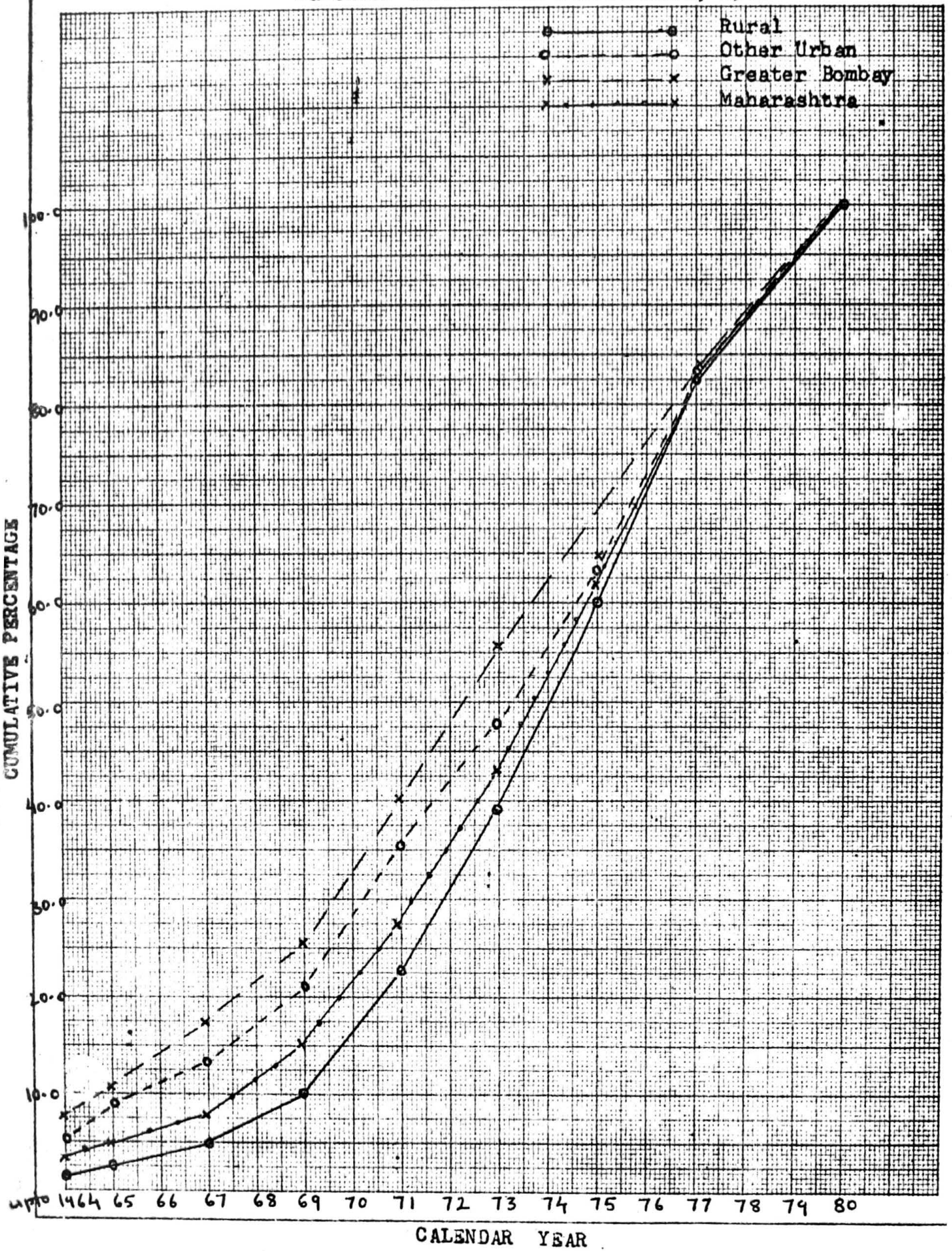
Table B : Comparison of the Indirect Estimate of Mean Parity of Ever Married Women with the Direct Estimate

Age group (i)	$1000C_i/B^*$ (2)	$1000E_i/B^*$ (3)	$1000(\sum C_{i-1} + \frac{1}{2}C_i)/B$ (4)	$1000(\sum E_{i-1} + \frac{1}{2}E_i)/B^*$ (5)	Proportion time spent in married state (4)/(5) = (6)	Mean parity of currently married (7)	Mean parity per ever married woman ----- Indirect estimate (6)x(2)= (8)		Direct estimate+ (9)
<u>Rural Maharashtra</u>									
15-19	553	553	276	276	1.0000	0.29	0.29	0.29	
20-24	944	961	1025	1033	0.9923	1.31	1.30	1.30	
25-29	933	965	1964	1997	0.9835	2.73	2.68	2.69	
30-34	974	1030	2917	2995	0.9740	3.83	3.73	3.75	
35-39	804	892	3806	3956	0.9621	4.61	4.44	4.44	
40-44	622	738	4519	4771	0.9472	5.10	4.83	4.84	
45-49	521	681	5091	5480	0.9290	5.15	4.78	4.79	
<u>Urban Maharashtra</u>									
15-19	392	392	196	196	1.0000	0.34	0.34	0.34	
20-24	1024	1035	904	910	0.9934	1.33	1.32	1.32	
25-29	1099	1103	1966	1979	0.9934	2.59	2.57	2.58	
30-34	1030	1075	3031	3068	0.9879	3.78	3.73	3.71	
35-39	900	964	3996	4088	0.9775	4.62	4.52	4.54	
40-44	667	788	4779	4964	0.9627	5.20	5.01	5.02	
45-49	477	745	5351	5730	0.9339	5.38	5.02	5.02	

Notes: C_i = Number currently married. B = Number of births.
 E_i = Number ever married. * = Estimated from source.
+ = From source.

Source : Fertility Differentials in India, 1972, Office of the Registrar General (1976).

Graph 7.1 : Cumulative Percentage of Couples Sterilized by Calendar Years: NFMS Maharashtra, 1980



CHAPTER 7

FAMILY-PLANNING KNOWLEDGE AND USE

Introduction

In this chapter, the knowledge about and the prevalence of family planning methods are assessed for the State of Maharashtra. The data are from NFMS, 1980 and relate to currently married women aged 15 to 50. Family planning methods include the modern contraceptive methods of condom, oral pills and IUD, and sterilization.

The data are presented separately for the three rural regions and the two urban zones. Figures about the prevalence of knowledge about and use of various methods are presented first. Both current users and ever users are considered. The use of family planning is examined in relation to the duration of marriage. Data on the knowledge and current use by age and by whether wanting additional children are presented.

The source of the family planning method, after effects and parity, and the age of wife and husband at acceptance are some of the aspects examined for each method of family planning.

The characteristics of the women like her education and community are examined in relation to her age and parity or the number of living children. Within each age group of currently married women, for those with and without any knowledge of contraceptives, the mean parity and mean number of living children are given. The same parameters are presented by age group by contraceptive method currently used - sterilization, other methods, none. These parameters are also presented by the educational level of the women for knowledge and for current method used. Finally mean parity and mean number of living children are given by community and by the contraceptive method currently used.

The data presented in this chapter reveal the spread of family planning knowledge and use in the rural regions and urban

zones by the method used, by demographic characteristics such as age and parity and by social characteristics such as the woman's education and community.

Knowledge and Use of Methods

In Maharashtra State the percentage of currently married women knowing about condom was 24.1, oral pill 18.0, IUD 15.5 and sterilization 79.0 (Table 7.1). The percentage knowing each method was much higher in other urban areas compared to rural areas and highest in Greater Bombay. Among rural regions, Aurangabad Division had the lowest percentage of knowledge about each method.

In terms of the number of modern methods known, 18.7 per cent women had knowledge of no method, 52.9 per cent knew of one method only and 28.4 per cent knew of two or more methods as given in Table 7.2. The rural-urban and regional differentials were similar to those found for each modern contraceptive method including sterilization. While in rural areas, only 18.7 per cent knew of two or more methods of family planning, the corresponding percentages were 37.3 for other urban areas and 65.8 for Greater Bombay. Thus most of the women in rural areas knew only about sterilization.

In terms of the usage of modern methods, 65.0 per cent of the women had never used any method, 33.3 per cent had ever used one method and 1.7 per cent two or more methods as seen from Table 7.3. The percentage of women who had never used any method was 68.2 in rural areas and 58.2 in urban areas. The corresponding percentage for Aurangabad Division was 77.4. The percentage of women who had ever used one modern method of contraception was 31.2 for rural and 37.7 for urban areas, while the percentage who had ever used two or more methods was 0.6 and 4.1 respectively for the two areas.

Table 7.4 shows the percentage of women who had ever

used different methods. Condom, oral pill and IUD were used by, respectively 6.7 per cent, 5.1 per cent and 3.0 per cent of the urban couples and only by 1.3 per cent, 0.5 per cent and 0.3 per cent of the rural couples. There was not much difference in the percentage of couples sterilized between the rural areas (30.4) and the urban areas (32.0).

From the Family Planning Programme Service Statistics, it has been indirectly estimated that roughly 30.6 per cent of the eligible couples (with wife aged 15 to 44) in rural areas and 39.5 per cent in urban areas were effectively protected by sterilization in 1980-81 in Maharashtra State (Strikantan et al., Performance of India's Family Planning Programme, presented at the Conference on India's Population, Worcester College, Oxford, December 1982). From the survey it was found that 30.0 per cent of these eligible couples in rural areas and 31.8 per cent in urban areas were sterilized. The direct estimate for rural areas from the survey was close enough to the indirect estimate made from the service statistics by the method of attrition due to mortality and aging. The urban estimate from the service statistics was, however, higher than the direct estimate from the survey. In estimating indirectly the percentage of eligible couples protected by sterilization in rural and urban areas, a number of assumptions were made and data from 1971 Census were used. These would account for the larger discrepancy between the direct and indirect estimates for urban areas.

The total of the percentages of women who had ever used various methods or no method of family planning came to 100.7 per cent for rural areas and 105.0 per cent for urban areas. The slight excess in this total over 100.0 per cent clearly shows that only about 0.7 per cent of the rural and 5.0 per cent of the urban women had used multiple methods or shifted from one method to another.

Table 7.5 shows the percentage distribution of the current use of modern family planning methods by currently married women and is similar to Table 7.4 which gives figures on the ever use of such methods. In order to avoid double counting of users of multiple methods, all sterilized couples were included in that category. Of the remaining women, those wearing IUD were classified under IUD. Of the still remaining women, those taking the pills were placed under the pill category. Couples using condom but not using any of the above methods were counted as condom users. Those not using any of the four methods were counted as non-users.

In rural areas, the percentage of women who were not currently using any modern method, given in Table 7.5, was only slightly higher than the corresponding percentage of women who had never used any modern method, given in Table 7.4. In urban areas, the percentage not currently using was 3.9 per cent higher than the percentage who had never used any modern method. The reason for the larger urban difference was that the percentage of urban women currently using the condom, oral pill and IUD was well below the percentage of women who had ever used these methods. In urban areas only 1.4 per cent of the women were currently using IUD compared to 3.0 per cent who had ever used it. The corresponding percentages for the oral pill were 1.4 against 5.1 and for the condom, they were 3.1 against 6.7. In rural areas, both the percentages of ever and current users were low for all three methods. For the State as a whole, 30.9 per cent of the couples were sterilized, 0.5 per cent women were currently wearing IUD, 0.6 per cent women were taking oral pills and 1.4 per cent couples were using condoms while 66.6 per cent couples were currently using none of these methods of family planning.

Table 7.6 shows the current and ever user rates for

thousand married couples (with wife aged 15 to 50) by the method of contraception. The percentage of current and ever use of condom, oral pill and IUD was negligible in rural areas but somewhat higher in urban areas. The practice of coitus interruptus was insignificant in both rural and urban areas. As a percentage of ever users, current users formed 50.4 per cent for condom, 30.5 per cent for oral pill and 41.7 per cent for IUD.

The rate of non-users of modern methods of family planning - sterilization, IUD, condom and the pill - per 1000 married couples by marital duration showed a decrease up to 20-24 years and then increased slightly for couples married for 25 years or more (Table 7.7). The rates for Maharashtra were 955 for 0-4 years duration, 814 for 5-9 years duration, 592 for 10-14 years duration, 442 for 15-19 years duration, 386 for 20-24 years duration and 521 for marital duration 25 years or more. This is consistent with the increasing practice of family planning with increasing marital duration except for the oldest cohort who might have larger family size values and who were not exposed to the programme during their prime child-bearing years. The rural and urban rates showed similar trends by marital duration, though the rural rates for non-users were generally higher. The largest rural-urban difference in the rate was observed for marital duration 5-9 years. The rural rate was 889 against a rate of 650 for other urban areas and 643 for Greater Bombay. Thus urban women accepted family planning earlier in their marital cycle than rural women did.

The percentage distributions of currently married women in specified age groups, by whether wanting or not wanting additional children are shown by contraceptive method currently used in Table 7.8 and by knowledge of contraceptive methods in Table 7.9. For women aged under 25, the percentage having no

knowledge of contraception was not consistent between women wanting more children and those wanting no more children (Table 7.9). In fact, for woman wanting more children this percentage was lower than for women wanting no more children for this age group since contraceptive knowledge was not relevant to reproductive behaviour in the youngest age group. However, for women aged 25-34 years and those aged 35 and over, the percentage with no knowledge of contraceptive methods was generally higher among women wanting more children compared to those wanting no more children. In fact, among women aged 35 years or more, the percentage for the former group was nearly twice as large as for the latter group in all three domains. Thus clearer differentials in contraceptive knowledge developed, between women wanting and those not wanting additional children, as the women reached their desired family size.

The percentage of women currently using a contraceptive method was consistently higher for women wanting no more children compared to those wanting more children in each age group (Table 7.8). This percentage steadily increased with age and the difference in the percentages for the two groups of women also increased with age. For women aged 35 years and above, percentage non-users were 72.7 among rural women wanting more children compared to 37.8 among rural women wanting no more children. The corresponding percentages of non-users among women aged 35 or above in other urban areas were 79.8 against 41.7 and in Greater Bombay they were 83.5 against 44.6. Similarly, in the same age group, the percentages sterilized among women wanting more children and those wanting no more children were 27.1 against 61.6 in rural areas, 18.3 against 54.1 in other urban areas and 13.2 against 52.0 in Greater Bombay. In ages 25 to 34, the same patterns of relationship were observed, although generally, the percentage using contraception was less than for women aged 35 years or above. Thus reproductive desires

were more closely linked to contraceptive use than to contraceptive knowledge.

Source of Supply and After Effects of Oral Pill, Condom and IUD

The sources of supply and after effects of the oral pill, condom and IUD are discussed in this section. The figures are given in Tables 7.10 to 7.16. It should be noted that very few couples were using these methods in the State sample. Hence only broad findings are presented here.

About one-fifth of the condom users in urban areas and two-fifths in rural areas had obtained it free of cost. Among women using the pill, two-fifths of the urban women and three-tenths of the rural women had obtained it free of cost (Table 7.10). About 90 per cent of women who had ever used the pill reported no inconvenience. Roughly the remaining ten per cent complained of nausea, headache, etc. (Table 7.11).

About 60 per cent of the IUD's were fitted by private doctors in urban areas, whereas in rural areas very few IUD's were inserted (Table 7.12). The percentage of women reporting no inconvenience after IUD insertion was 35.0 in rural Maharashtra, 53.5 in other urban areas and 62.5 in Greater Bombay. The after effect of bleeding was reported by 50.0 per cent of rural women who ever had an IUD insertion, 30.3 of other urban women ever wearing IUD and 15.0 of IUD wearers in Greater Bombay. About 10 per cent reported other physical troubles after the IUD insertion (Table 7.13).

Among urban women who had ever worn IUD, 45.5 per cent were aged 20 to 24 and 33.7 per cent were aged 25 to 29 when the device was first inserted (Table 7.14). Among these women, 34.7 per cent had used the device after the first live birth, 26.7 per cent after the second live birth and 18.8 per cent after the third live birth (Table 7.15). Thus IUD, both as a limiting method and as a reversible spacing method, was used sufficiently

early in the life cycle of the women. Of the women who had worn IUD, 35.0 per cent shifted to sterilization in rural areas, 16.3 per cent in other urban areas and 20.0 per cent in Greater Bombay whereas current users formed 15.0 per cent of ever users in rural areas, 46.5 per cent in other urban areas and 47.5 per cent in Greater Bombay. Hence the percentage of women shifting from IUD to sterilization was larger in rural than in urban areas.

Age and Parity at Sterilization and After Effects

Data relating to the age and parity at sterilization and its after effects are presented in this section. The percentage distribution of sterilized couples by years since sterilization (Table 7.17) shows the highest percentage of 22.9 done 3 to 4 years before the survey in 1980 and the next highest percentage of 18.6 done 5 to 6 years before the survey. These high percentages related to the Emergency period. Whereas in urban areas the percentage of sterilizations done 3 to 4 years ago and 5 to 6 years ago were 19.4 and 13.2, in rural areas they were much higher, 24.6 and 21.2 respectively. Thus the effect of the programme during the Emergency was felt more sharply in rural than in urban areas.

The tapering off in the percentage of sterilizations done in earlier years of the programme may be attributed somewhat to the attrition due to mortality and marriage dissolution but more to the steadily increasing tempo of the programme up to the time of the Emergency. It may also be noted that percentage of couples sterilized in the initial years of the programme (11 to 12 years ago, 13 to 14 years ago, 15 to 16 years ago and 16 years before the survey) was higher in urban areas than in rural areas. Further, Aurangabad Division lagged in the percentage of sterilized couples in earlier years and picked up during the Emergency compared to the other two rural regions.

Graph 7.1 reveals the more salient features of Table 7.17.

The cumulative percentage sterilized before 1964 and from that year to 1980 is shown for rural areas, other urban areas and Greater Bombay. It is seen that in urban, compared to rural areas, relatively more sterilizations were done in the earlier period, that the tempo of sterilizations picked up over the years since the slope is over 45° , that the gradient was steeper in the Emergency years than before, that the rural gradient was steeper than the urban gradient during the Emergency years and that the gradient declined after the Emergency due to the backlash effect on the programme.

The average age of wife at sterilization was 30.4 years in rural areas and 28.9 years in urban areas (Table 7.18). In rural areas 32.2 per cent of couples were sterilized when the wife was aged 25 to 29 and 31.5 per cent were sterilized when the wife was aged 30 to 34. The corresponding percentages for other urban areas were 37.8 and 27.9 and for Greater Bombay 41.7 and 30.2. Hence a somewhat larger percentage of couples in urban, compared to rural areas, was sterilized when the wife was 25 to 29 years old.

The average age of husband at sterilization of the couple was 36.6 years for the State against an average age of wife of 29.9 years. The average age of husband was 36.9 years in rural areas and 35.9 years in urban areas (Table 7.19). The percentages of husbands aged 30 to 34, 35 to 39 and 40 to 44 at sterilization of the couple were 27.3, 29.3 and 21.2 in rural areas and 30.6, 31.6 and 16.1 in urban areas. Thus a larger percentage of couples were sterilized in urban than in rural areas when the husband was 30 to 34 years old. A reverse rural-urban differential was observed for couples sterilized when the husband was 40 to 44 years old.

In urban areas only 3.1 per cent of the couples underwent sterilization at a camp against 23.6 per cent in rural areas (Table 7.20). But 28.2 per cent of urban couples were sterilized

in private hospitals or dispensaries against only 9.0 per cent of rural couples. The percentage of couples who were sterilized in government or work-place hospitals was about the same in rural and urban areas.

There were significant differences among rural regions in the distribution of couples by the place of sterilization. In Western Maharashtra, 12.8 per cent of the couples were sterilized in private hospitals or dispensaries against 1.6 per cent in Aurangabad Division and 4.8 per cent in Nagpur Division. By contrast, sterilization camps played an important role in Nagpur Division where 44.0 per cent of the couples were operated against 13.0 per cent in Aurangabad Division and 15.6 per cent in Western Maharashtra. Correspondingly sterilization was done in government or work-place hospitals only on 51.2 per cent of the couples in Nagpur Division compared to 85.4 per cent in Aurangabad Division and 71.6 per cent in Western Maharashtra.

Of the two urban zones, in Greater Bombay a higher percentage (32.2) of sterilizations were performed privately compared to other urban areas (25.4). Only 0.8 per cent of the sterilized couples in Greater Bombay had the operation done in camps against 4.8 per cent in other urban areas.

The percentage distribution of sterilized couples is shown by the number of children living at sterilization in Table 7.21 and by the number of sons living at sterilization in Table 7.22. The percentage of couples who had 4 or more living children at sterilization was 68.3 for Aurangabad Division, 65.8 for Nagpur Division, 62.9 for Western Maharashtra, 62.7 for other urban areas and 60.6 for Greater Bombay. The percentages of couples who had 2 living children at the time of sterilization were 6.9, 8.3, 8.1, 9.9 and 10.0 respectively for these domains. Thus a slight rural-urban gradient was observed in the percentage of couples sterilized with two living

children with a higher percentage for urban zones compared to rural regions. But the difference between Aurangabad Division and Greater Bombay in this respect was more significant.

The percentage of couples who underwent sterilization when they had three or more living sons was 42.3 in Aurangabad Division, 37.9 in Nagpur Division, 37.3 in Western Maharashtra and other urban areas and 36.5 in Greater Bombay. The percentages of couples who had one living son at sterilization in these domains were, respectively, 17.3, 16.2, 18.2, 22.9 and 21.7. Thus a larger percentage of urban couples underwent sterilization with only one living son.

The after effects of vasectomy and tubectomy operations reported by the wives are shown in Table 7.23. In rural Maharashtra 81.2 per cent of the husbands were reported to have had no after effects while for other urban areas this percentage was 86.1 and for Greater Bombay 89.0. The after effect of frequent physical pain was reported for 5.6 per cent of vasectomies performed in the State and sepsis or swelling that was successfully treated was reported for 1.8 per cent of vasectomies. The complaints of strain on nerves and a feeling of weakness was reported for 11.2 per cent of the cases in rural areas but only 5.6 per cent of cases in other urban areas and 4.4 per cent of cases in Greater Bombay. Thus a higher percentage reported after effects of the vasectomy operation in rural than in urban areas.

After the tubectomy operation, the percentage of rural women reporting no trouble was 84.1 against 91.4 for other urban areas and 92.4 for Greater Bombay. These percentages were higher than the corresponding percentages for vasectomy. For the State of Maharashtra, 87.5 per cent of the women reported no trouble after the tubectomy operation, 4.3 per cent reported minor troubles, 2.3 per cent reported general weakness, 1.1 per

cent reported serious backache most of the time, 3.5 per cent reported menstrual trouble and 1.3 per cent reported sepsis or other serious complications.

Mean Parity and Mean Number of Living Children by Family Planning Knowledge and Use in Relation to Educational Level and Community Type

The mean parity and mean number of living children are presented in this section by family planning knowledge and method used. These means are shown separately for each educational level and community. Tables 7.24 to 7.29 throw light on the differentials in the fertility levels of couples by family planning knowledge and use according to the level of education or community type.

Table 7.24 shows the mean parity and mean number of living children by broad age groups according to whether the woman had any or no knowledge of contraceptive methods. There is the usual life cycle variation in these means over the age groups. Considering women aged 35 and above, in rural areas 85.4 per cent of the women knew about family planning and 14.6 per cent had no such knowledge. The mean parity of the former group of women was 5.24 against the mean parity of 3.99 for the latter. This difference could be attributed to some extent to the selectivity of sub-fecund and sterile women in the group with no knowledge of contraceptive methods and to breast-feeding and other practices accounting for larger birth intervals and a smaller parity in this group. However, the large mean parity in the group with no knowledge of contraceptive methods certainly indicates the potential for further spread of family planning knowledge. The differentials in the mean number of living children were similar and were accounted for by the same factors.

The differentials in mean parity of women aged 35 or above between those with and without knowledge of contraception for other urban areas and for Greater Bombay were similar. The mean

for women with no knowledge was less than the mean for women with knowledge of contraception and could be attributed to the reasons mentioned for rural areas. In other urban areas, 18.3 per cent of the women aged 35 years or over had no knowledge of contraception and had a mean parity of 4.14. In Greater Bombay, 15.2 per cent of these women had no knowledge of contraception and had a mean parity of 3.68. These figures reveal the scope for further spread of the knowledge of family planning methods in urban areas also. The findings are confirmed by the figures on mean number of living children.

The mean parity and mean number of living children are given in Table 7.25 for three groups of couples by method used, those sterilized, those using other methods and those not using any method of family planning. To control for life cycle variations, only figures for women aged 35 and over are considered below. In rural areas, 54.8 per cent of these couples were sterilized and had a mean parity of 5.52. Those using other methods were insignificant, 0.5 per cent and had a mean parity of 4.46. Finally those not using any contraceptive method formed 44.7 per cent with a mean parity of 4.49. The lower mean parity of the last group may be attributed to selective factors such as sub-fecundity. Those using other methods also had a lower mean parity than sterilized women because these methods were reversible and were used for both spacing and limiting the family size. These figures clearly reveal the scope for further family planning practice among women using no method, since their average parity was high. The figures on mean number of living children support these findings.

In other urban areas and Greater Bombay, considering only women aged 35 years or more, similar differentials were found among the three groups of couples, those sterilized, those using other methods of contraception and those not using any method.

Women not using any method constituted 48.1 per cent in other urban areas and had a mean parity of 4.24 while in Greater Bombay they formed 51.7 per cent with a mean parity of 3.50. Thus, in urban areas also, there is much scope for extending family planning services to the group of women who had a high mean parity. Similar findings emerge when the mean number of living children is considered.

The mean parity is given by the level of education of the woman in Table 7.26 for women with and without knowledge of contraceptive methods. The mean parities were generally lower among women with no knowledge since they tend to be selected for lower age and parity and an earlier stage of family formation. A gradient, by educational level, in mean parity is clearly seen for both groups of women in rural and other urban areas and Greater Bombay. For Maharashtra State, women with knowledge of family planning had a mean parity of 3.81 if illiterate, a mean parity of 3.00 if literate or with formal education below VII standard, a mean of 2.32 if educated at least up to VII standard but not above SSC and a mean of 1.79 if educated above SSC. The corresponding means for women with no knowledge of contraception were 2.05, 1.42, 1.06 and 0.87. Hence the range of variation in the mean parity by educational level was substantial for both groups of women.

Table 7.27 shows the mean parity by the level of education of the wife separately for sterilized couples, and couples using other methods and no method of contraception. For sterilized couples, the mean parity shows sharp gradations by educational level. In rural areas, illiterate women belonging to this group had a mean parity of 5.00, literate women and those educated below VII standard had a mean parity of 4.42, those educated at least to VII standard but not above SSC a mean parity of 4.02 and those educated above SSC a mean parity of 3.20. Thus there

was a significant fall in the mean parity with increasing education, with the sharpest drop between education up to SSC and education above SSC. The mean number of living children presented a similar gradation by the level of education although the range of variation was less. This was, perhaps, due to the decrease in the mortality risk for children borne by women reaching a higher educational level. Again the sharpest decline in the mean was between women with education up to SSC (3.83) and those with education above SSC (3.00). As regards couples using other methods of contraception, their numbers were small, their mean parities did not show consistent gradations and the range of their variation was also small by the educational level of the wife. Rural couples not using any method of contraception showed the expected gradient in their mean parity by the educational level of the wife although the range of variation was less than among sterilized couples.

A similar pattern of **gradation** in the mean parity and mean number of living children by the level of education of the woman was found in other urban areas and in Greater Bombay among sterilized couples. In other urban areas, among sterilized couples, illiterate women had a mean parity of 5.25, those literate or educated below VII standard had a mean parity of 4.54, those educated at least up to VII standard but not above SSC a mean parity of 3.59 and women educated above SSC a mean parity of 2.95. The corresponding figures for Greater Bombay were 5.26, 4.25, 3.61 and 3.07. In urban areas the decrease in the mean parity by the educational level of wives of sterilized couples was more evenly spaced than in rural areas but the range of variation was about the same. The gradation in the mean number of living children was similar to that observed in the mean parity but the range of variation was naturally less due to higher survival rates for children

borne by women with more education. Again among urban couples using other methods of contraception, the numbers by the level of education of the wife were small, the gradient in the mean parity was not always consistent nor the range of variation in it large. Couples not using any method in urban areas showed the expected gradient in mean parity by the educational level of the wife although the range of variation was less than for sterilized couples.

The mean parity by community is given in Table 7.28 for sterilized couples, and couples using other methods and no method. The means for the latter two groups depended on the composition of women by age and the stage of life cycle in each community. Hence these means cannot be directly compared. But it is instructive to compare the mean parity of sterilized couples by community as these couples had completed the families. In rural areas, there were no sharp differences in the mean parity of sterilized couples except that Hindus belonging to advanced castes had a slightly lower mean parity. In other urban areas, advanced caste Hindu couples had the lowest mean parity, couples belonging to intermediate caste Hindus and other religions except Islam had somewhat higher mean parities and all other communities had distinctly higher mean parities. In Greater Bombay, among sterilized couples, women belonging to other religions and advanced caste Hindus had the lowest mean parity and Muslims had the highest mean parity, excluding Scheduled Tribes couples who were too few in the sample. All the other communities had intermediate values for their mean parity. Thus Table 7.28 suggests that sterilization was accepted at a somewhat lower parity by advanced caste Hindu couples in rural and urban areas and by women belonging to religions other than Hinduism and Islam in urban areas whereas Muslim couples accepted it at a higher parity in both rural and urban areas.

Summary of Findings:

In this chapter, the results on family planning knowledge and use and the socio-demographic characteristics of acceptors and non-acceptors of modern contraceptive methods of condom, oral pill, IUD and sterilization were presented.

In Maharashtra State, 24.1 per cent of the women knew of condom, 1.0 per cent knew of oral pill, 15.5 per cent of IUD and 79.0 per cent of sterilization. The percentage knowing each method was much higher in urban compared to rural areas and highest in Greater Bombay. Among rural regions, Aurangabad Division had the lowest percentage knowledge about each method.

In terms of the number of modern methods known, 18.7 per cent women had knowledge of no method, 52.9 per cent knew of one method only and 28.4 per cent knew of two or more methods. Most of the women in rural areas knew only about sterilization.

In terms of the usage of modern methods, 65.0 per cent of the women had never used any method, 33.3 per cent had ever used one method and 1.7 per cent two or more methods. There was not much difference in the percentage of couples sterilized between rural and urban areas. As regards the other methods, the percentage of couples using them was rather low in urban areas and negligible in rural areas. The direct estimate of the percentage of eligible couples sterilized in rural areas from the survey was close enough to the indirect estimate made from the programme statistics by the method of attrition due to mortality and aging. The corresponding estimate for the urban areas from the service statistics was, however, higher than the direct estimate from the survey. Only about 0.7 per cent of the rural and 5.0 per cent of the urban women had used multiple methods or shifted from one method to another.

The pattern of differentials for current use was similar to that for ever use of contraceptive methods. For the State as

a whole, 30.9 per cent of the couples were sterilized, 0.5 per cent women were currently wearing IUD, 0.6 per cent women were taking oral pills and 1.4 per cent couples were using condoms while 66.6 per cent of the couples were currently using none of these methods. The percentage of current and ever use of condom, oral pill and IUD was negligible in rural areas but somewhat higher in urban areas.

The rate of non-users of modern methods of family planning by marital duration showed a decrease up to 20-24 years and then increased slightly for couples married for 25 years or more. This is consistent with the increasing practice of family planning with increasing marital duration except for the oldest cohort who might have had larger family size values and who were not exposed to the programme during their prime child-bearing years. Urban women accepted family planning earlier in their marital cycle than rural women did.

Among women aged 35 years or more, the percentage with no knowledge of contraceptive method was nearly twice as large for women wanting more children compared to those wanting no more children. The percentage of couples currently using a contraceptive method was consistently higher for wives wanting no more children compared to those wanting more children. The percentage steadily increased with age and the difference in the percentages for the two groups of women also increased with age. Reproductive desires were more closely linked to contraceptive use than to contraceptive knowledge.

About one-fifth of the condom users in urban areas and two-fifths in rural areas had obtained it free of cost. Among women using the pill, two fifths of the urban women and three-tenths of the rural women had obtained it free of cost. About ten per cent complained of nausea, headache, etc.

About 60 per cent of the IUD's were fitted by private

doctors in urban areas, whereas in rural areas very few IUD's were inserted. A higher percentage of rural women reported bleeding as an after effect than urban women did. The IUD, both as a limiting method and as a reversible spacing method, was used sufficiently early in their life cycle by younger women with a lower parity. The percentage of women shifting from IUD to sterilization was larger in rural than in urban areas.

The percentage distribution of sterilized couples by years since sterilization tapered in the earlier years of the programme somewhat because of attrition, due to mortality and marriage dissolution but more because of the steadily increasing tempo of the programme up to the time of the Emergency. The percentage of couples sterilized was higher in urban areas than in rural areas. Further, Aurangabad Division lagged in this percentage in earlier years and picked up during the Emergency compared to the other two regions. Immediately after revoking the Emergency, the percentage of sterilized couples fell due to the backlash effect on the programme.

The average age of wife at sterilization was 30.4 years in rural areas and 28.9 years in urban areas. A somewhat larger percentage of couples in urban compared to rural areas was sterilized when the wife was 25 to 29 years old. The average age of husband at sterilization of the couple was 36.6 years for the state against an average age of wife of 29.9 years. The corresponding average age of husband was 36.9 years in rural areas and 35.9 years in urban areas. A larger percentage of couples were sterilized in urban than in rural areas when the husband was 30 to 34 years old. A reverse rural-urban differential was observed for couples sterilized when the husband was 40 to 44 years old.

In urban areas, only 3.1 per cent of the couples underwent sterilization at a camp against 23.6 per cent in rural areas. But 28.2 per cent of urban couples were sterilized in private hospitals or dispensaries against only 9.0 per cent of rural

couples. There were significant differences among rural regions in the distribution of couples by the place of sterilization. In Western Maharashtra, a higher percentage of couples were sterilized in private hospitals or dispensaries compared to the other two regions. Sterilization camps played a more important role in Nagpur Division whereas for this region the percentage sterilized in government or work-place hospitals was less than for the other two regions.

The percentage of couples who had four or more living children at sterilization was 68.3 for Aurangabad Division, 65.8 for Nagpur Division, 62.9 for Western Maharashtra, 62.7 for other urban areas and 60.6 for Greater Bombay. A slight rural-urban gradient was observed in the percentage of couples sterilized with two living children, with a higher percentage for urban zones. While a larger percentage of rural couples underwent sterilization with three or more living sons, a larger percentage of urban couples underwent sterilization with only one living son.

The after effect of frequent physical pain was reported for 5.6 per cent of vasectomies performed in the State and sepsis or swelling that was successfully treated was reported for 1.8 per cent of vasectomies. A higher percentage reported after effects of the vasectomy operation in rural than in urban areas.

The percentage of women reporting no trouble after the tubectomy operation was higher than the corresponding percentage for vasectomy operation in both rural and urban areas. For the State of Maharashtra, 87.5 per cent of the women reported no trouble after the tubectomy operation, 4.3 per cent reported minor troubles, 2.3 per cent reported general weakness, 1.1 per cent reported serious backache most of the time, 3.5 per cent reported menstrual trouble and 1.3 per cent reported sepsis or other serious complications.

The mean parity and mean number of living children by contraceptive knowledge and method used showed the usual life cycle variation by age. Considering rural women aged 35 years and over, the mean parity of women who knew about family planning was 5.24 against the mean parity of 3.99 for women who did not know about family planning. This difference could be attributed to some extent to the selectivity of sub-fecund and sterile women in the group with no knowledge of contraceptive methods and to breast-feeding and other practices accounting for longer birth intervals and a smaller parity in this group. However, the large mean parity for this group of women certainly indicates the potential for further spread of family planning knowledge. The differentials in the mean number of living children were similar and were accounted for by the same factors. For women aged 35 and over in other urban areas and Greater Bombay, similar differentials were found between women who wanted additional children and those who did not.

As regards the family planning method used, there were differentials in the mean parity and mean number of living children among women aged 35 and over. In rural areas, the mean parity of sterilized couples was 5.52, for couples using other methods the mean parity was 4.46 and for couples using no methods it was 4.49. The lower mean parity of the last group may be attributed to selective factors such as sub-fecundity. Those using other methods also had a lower mean parity than sterilized women because these methods were reversible and were used for both spacing and limiting the family size. The figures clearly reveal the scope for further family planning practice among women using no method since their average parity was high. The figures on mean number of living children support these findings. Similar differentials were found for other urban areas and Greater Bombay.

A gradient, by the educational level of the wife, in mean parity was clearly seen among the two groups of women with and without knowledge of contraceptive methods in rural and other urban areas and Greater Bombay. The range of variation in the mean parity by educational level was substantial for both groups of women.

For sterilized couples in rural areas, the mean parity showed sharp gradations by the educational level of the wife. There was a significant fall in the mean parity with increasing education, with the sharpest drop between education up to SSC and education above SSC. The mean number of living children presented a similar gradation by the level of education, although the range of variation was less. This was due, perhaps, to the decrease in the mortality risk for children borne by women reaching a higher educational level. The number of couples using other methods were too few to yield reliable findings. Rural couples not using any method of contraception showed the expected gradient in their mean parity by the educational level of the wife although the range of variation was less than among sterilized couples. A similar pattern of gradation in the mean parity and mean number of living children by the level of education of the woman was found in other urban areas and in Greater Bombay, for both the groups of sterilized couples and those not using any method of family planning. The range of variation in the mean parity was, however, less for the latter group. In urban areas, the decrease in the mean parity by the educational level of wives of sterilized couples was more evenly spaced than in rural areas but the range of variation was about the same.

The mean parity of sterilized couples by community was compared as these couples had completed their families. In rural areas there were no sharp differences except that Hindu

wives belonging to advanced castes had a slightly lower mean parity. In other urban areas, advanced caste Hindu couples had the lowest mean parity, couples belonging to intermediate caste Hindus and other religions except Islam had somewhat higher mean parities and all other communities had distinctly higher mean parities. In Greater Bombay, among sterilized couples, women belonging to other religions and advanced caste Hindus had the lowest and Muslims the highest mean parity. By community, sterilization was accepted at a somewhat lower parity by advanced caste Hindu couples in rural and urban areas and also by women belonging to religions other than Hinduism and Islam in urban areas whereas Muslim couples accepted it at a higher parity in both rural and urban areas.

Distribution

Table 7.1 : Percentage of Currently Married Women by Knowledge of Modern Contraceptive Methods: NFMS Maharashtra, 1980

	Condom	Oral pill	IUD	Sterilization	All women
Aurangabad Division	6.9	2.0	5.0	65.5	1127
Nagpur Division	18.5	9.1	9.1	83.8	1686
Western Maharashtra	16.0	11.3	10.9	82.1	3254
Total Rural	15.0	9.0	9.3	79.5	6067
Urban excluding Greater Bombay	34.3	27.6	22.6	73.9	1635
Greater Bombay	57.3	51.7	37.9	83.5	1172
Total Urban	43.9	37.7	29.0	77.9	2807
Total Maharashtra	24.1	18.0	15.5	79.0	8874

The total of percentages may be greater than 100.0 since some women knew about more than one method.

Table 7.2 : Percentage Distribution of Currently Married Women by Number of Contraceptive Methods Known: NFMS Maharashtra, 1980

	No knowledge of any method	One method	Two methods	Three methods	Four methods	All women
Aurangabad Division	34.4	56.4	5.6	2.5	1.1	100.0=1127
Nagpur Division	15.0	64.4	9.2	8.0	3.4	100.0=1686
Western Maharashtra	17.6	61.3	9.2	7.0	4.9	100.0=3254
Total Rural	20.0	61.3	8.5	6.4	3.8	100.0=6067
Urban excluding Greater Bombay	19.3	43.4	12.0	10.2	15.1	100.0=1635
Greater Bombay	11.2	23.0	15.4	25.1	25.3	100.0=1172
Total Urban	15.9	34.9	13.4	16.4	19.4	100.0=2807
Total Maharashtra	18.7	52.9	10.1	9.6	8.7	100.0=8874

Table 7.3 : Percentage Distribution of Currently Married Women by Number of Contraceptive Methods Ever-used: NFMS Maharashtra, 1980

	Never used any method	Used one modern method	Used two or more modern methods	All women
Aurangabad Division	77.4	22.5	0.1	100.0 = 1127
Nagpur Division	65.2	33.2	1.6	100.0 = 1686
Western Maharashtra	66.4	33.2	0.4	100.0 = 3254
Total Rural	68.2	31.2	0.6	100.0 = 6067
Urban excluding Greater Bombay	58.2	37.4	4.4	100.0 = 1635
Greater Bombay	58.2	38.0	3.8	100.0 = 1172
Total Urban	58.2	37.7	4.1	100.0 = 2807
Total Maharashtra	65.0	33.3	1.7	100.0 = 8874

Distribution

Table 7.4 : Percentage of Currently Married Women by Contraceptive Method Ever-used: NFMS Maharashtra, 1980

	Never used any modern method	Ever used			Sterilization	All Women
		Condom	Oral pill	IUD		
Aurangabad Division	77.4	0.7	0.1	0.2	21.8	1127
Nagpur Division	65.2	2.8	0.8	0.6	32.3	1686
Western Maharashtra	66.4	0.8	0.6	0.3	32.4	3254
Total Rural	68.2	1.3	0.5	0.3	30.4	6067
Urban excluding Greater Bombay	58.2	7.3	4.8	2.6	32.2	1635
Greater Bombay	58.2	5.7	5.4	3.4	31.7	1172
Total Urban	58.2	6.7	5.1	3.0	32.0	2807
Total Maharashtra	65.0	3.0	2.0	1.2	30.9	8874

The total of percentage may exceed 100.0 since some women used more than one method.

Table 7.5 : Percentage Distribution of Currently Married Women by Contraceptive Method
Currently Used: NFMS Maharashtra, 1980

	Steril- ization	IUD	Oral pill but not IUD	Condom but not pill or IUD	No modern method used	All women
Aurangabad Division	21.8	0.0	0.1	0.5	77.6	100.0 = 1127
Nagpur Division	32.3	0.0	0.2	0.8	66.7	100.0 = 1686
Western Maharashtra	32.4	0.1	0.2	0.6	66.7	100.0 = 3254
Total Rural	30.4	0.0	0.2	0.6	68.8	100.0 = 6067
Urban excluding Greater Bombay	32.2	1.2	1.1	3.3	62.2	100.0 = 1635
Greater Bombay	31.7	1.6	1.8	2.9	62.0	100.0 = 1172
Total Urban	32.0	1.4	1.4	3.1	62.1	100.0 = 2807
Total Maharashtra	30.9	0.5	0.6	1.4	66.6	100.0 = 8874

Table 7.6 : Current and Ever User Rates Per Thousand Married Couples (with Wife Aged 15 to 50) by Method of Contraception: NFMS Maharashtra, 1980

	Condom			Oral pill			IUD			Coitus interruptus			Steril- ization rate o/oo	No. of married couples 15-50
	Current user rate o/oo	Ever user rate o/oo	% Current users/ever users	Current user rate o/oo	Ever user rate o/oo	% current users/ever users	Current user rate o/oo	Ever user rate o/oo	% current users/ever users	Current user rate o/oo	Ever user rate o/oo	% current users/ever users		
Rural Maharashtra	7	13	51.9	2	5	40.6	..	3	15.0	66.7	304	6067
Urban excluding Greater Bombay	36	73	49.2	12	48	24.1	13	26	48.8	2	2	100.0	322	1635
Greater Bombay	29	57	50.7	18	54	33.3	16	34	47.5	3	7	50.0	317	1172
Total Maharashtra	15	30	50.4	6	20	30.5	5	12	41.7	1	2	66.7	309	8874

.. Negligible.

Table 7.7 : Rate of Non-users of Contraception* Per 1000 Married Couples (with Wife Aged 15 to 50) by Duration of Marriage: NFMS Maharashtra, 1980

	Duration of marriage in years							Number, 'Duration not given'	No. of married couples 15-50
	0-4	5-9	10-14	15-19	20-24	25 or more	All durations		
Rural Maharashtra	976	889	640	460	392	507	679	36	6067
Urban excluding Greater Bombay	906	650	491	359	352	563	577	22	1635
Greater Bombay	896	643	494	463	405	529	578	14	1172
Total Maharashtra	955	814	592	442	386	521	647	72	8874

* Non-users of the modern methods of sterilization, IUD, condom and the pill.

Table 7.8 : Percentage Distribution of Currently Married Women by Specific Age Groups, by Contraceptive Method Currently Used, by Additional Children Wanted or Not Wanted: NFMS Maharashtra, 1980

	Upto 24 years				25-34 years			
	Steri- lized	User of other modern method ⁺	Non- user*	Number of women	Steri- lized	User of other modern method ⁺	Non- user*	Number of women
Rural Maharashtra:								
Additional children wanted	1.3	0.9	97.8	100.0 = 1431	14.3	1.2	84.5	100.0 = 851
Additional children not wanted	5.0	0.7	94.3	100.0 = 584	48.2	1.3	50.5	100.0 = 1114
Urban excluding Greater Bombay:								
Additional children wanted	1.6	2.8	95.6	100.0 = 317	9.7	8.3	82.0	100.0 = 216
Additional children not wanted	15.8	5.0	79.2	100.0 = 101	49.3	9.7	41.0	100.0 = 371
Greater Bombay:								
Additional children wanted	0.0	4.2	95.8	100.0 = 144	4.5	12.4	83.1	100.0 = 201
Additional children not wanted	16.7	2.4	80.9	100.0 = 42	46.2	8.7	45.1	100.0 = 286
Total Maharashtra:								
Additional children wanted	1.3	1.5	97.2	100.0 = 1892	12.0	4.2	83.8	100.0 = 1268
Additional children not wanted	7.2	1.4	91.4	100.0 = 727	48.1	4.2	47.7	100.0 = 1771

(continued)

+ Modern methods include sterilization, IUD, condom and the pill.

* 'Non-users' also includes users of traditional methods such as coitus interruptus.

Ten cases of "age not given" are excluded from the table.

Table 7.8 : (continued)

	35 years and above				All ages			
	Steri- lized	User of other modern method+	Non- user*	Number of women	Steri- lized	User of other modern method+	Non- user*	Number of women
Rural Maharashtra:								
Additional children wanted	27.1	0.2	72.7	100.0 = 410	9.4	0.9	89.7	100.0 = 2692
Additional children not wanted	61.6	0.6	37.8	100.0 = 1670	47.3	0.8	51.9	100.0 = 3368
Urban excluding Greater Bombay:								
Additional children wanted	18.3	1.9	79.8	100.0 = 104	7.1	4.6	88.3	100.0 = 637
Additional children not wanted	54.1	4.2	41.7	100.0 = 523	48.5	6.3	45.2	100.0 = 995
Greater Bombay:								
Additional children wanted	13.2	3.3	83.5	100.0 = 91	4.8	7.8	87.4	100.0 = 436
Additional children not wanted	52.0	3.4	44.6	100.0 = 408	47.7	5.4	46.9	100.0 = 736
Total Maharashtra:								
Additional children wanted	23.5	1.0	75.5	100.0 = 605	8.4	2.3	89.3	100.0 = 3765
Additional children not wanted	58.5	1.8	39.7	100.0 = 2601	47.6	2.6	49.8	100.0 = 5099

Table 7.9 : Percentage Distribution of Currently Married Women, by Specific Age Groups, by Knowledge of Modern Contraceptive Methods* by Additional Children Wanted and Not Wanted: NFMS Maharashtra, 1980

	Upto 24 years				25-34 years			
	No know- ledge	Knowledge of		Number of women	No know- ledge	Knowledge of		Number of women
		One method	Two or more methods			One method	Two or more methods	
Rural Maharashtra:								
Additional children wanted	19.7	52.5	27.8	100.0 = 1431	11.6	69.6	18.8	100.0 = 851
Additional children not wanted	67.1	25.2	7.7	100.0 = 584	11.7	66.0	22.3	100.0 = 1114
Urban excluding Greater Bombay:								
Additional children wanted	27.1	34.7	38.2	100.0 = 317	16.7	38.9	44.4	100.0 = 216
Additional children not wanted	43.6	28.7	27.7	100.0 = 101	8.4	46.6	45.0	100.0 = 371
Greater Bombay:								
Additional children wanted	10.4	15.3	74.3	100.0 = 144	10.4	12.4	77.2	100.0 = 201
Additional children not wanted	11.9	21.4	66.7	100.0 = 42	4.9	26.9	68.2	100.0 = 286
Total Maharashtra:								
Additional children wanted	20.2	46.7	33.1	100.0 = 1892	12.3	55.3	32.4	100.0 = 1268
Additional children not wanted	60.7	25.4	13.9	100.0 = 727	9.9	55.7	34.4	100.0 = 1771

* This includes sterilization, IUD, condom and the pill.

Ten cases of age not given are excluded from the table.

(continued)

Table 7.9 : (continued)

	35 years and above				All ages				
	No know- ledge	Knowledge of		Number of women	No know- ledge	Knowledge of		Number of women	
		One method	Two or more methods			One method	Two or more methods		
Rural Maharashtra:									
Additional children wanted	24.1	64.9	11.0	100.0 = 410	17.8	59.8	22.4	100.0 = 2692	
Additional children not wanted	12.2	73.4	14.4	100.0 = 1670	21.6	62.6	15.8	100.0 = 3368	
Urban excluding Greater Bombay:									
Additional children wanted	31.7	42.3	26.0	100.0 = 104	24.3	37.4	38.3	100.0 = 637	
Additional children not wanted	15.7	51.8	32.5	100.0 = 523	15.8	47.5	36.7	100.0 = 995	
Greater Bombay:									
Additional children wanted	25.3	18.7	56.0	100.0 = 91	13.5	14.7	71.8	100.0 = 436	
Additional children not wanted	13.0	29.2	57.8	100.0 = 408	9.8	27.9	62.3	100.0 = 736	
Total Maharashtra:									
Additional children wanted	25.6	54.1	20.3	100.0 = 605	18.4	50.8	30.8	100.0 = 3765	
Additional children not wanted	13.0	62.2	24.8	100.0 = 2601	18.7	54.7	26.6	100.0 = 5099	

Table 7.10 : Percentage Distribution of Currently Married Women by Source of Condom and Oral Pill:
NFMS Maharashtra, 1980

	Condom					Oral pill				
	Bought from chemist	Free supply	Number reporting	Number not reporting	Number of couples	Bought from chemist	Free supply	Number reporting	Number not reporting	Number of couples
Rural Maharashtra	62.2	37.8	100.0= 74	7	81	70.4	29.6	100.0= 27	5	32
Urban excluding Greater Bombay	81.7	18.3	100.0= 109	11	120	78.9	21.1	100.0= 71	8	79
Greater Bombay	85.9	14.1	100.0= 64	3	67	85.5	14.5	100.0= 62	1	63
Total Maharashtra	76.9	23.1	100.0= 247	21	268	80.0	20.0	100.0= 160	14	174

Table 7.11 : Percentage Distribution of Ever Users of the Pill by Reported Inconvenience:
NFMS Maharashtra, 1980

	No incon- venience	Not avail- able	Costly	Nausea, headache, etc.	Fatten- ing	Ever users of pill
Rural Maharashtra	90.6	0.0	0.0	9.4	0.0	100.0 = 32
Urban excluding Greater Bombay	87.2	1.3	1.3	8.9	1.3	100.0 = 79
Greater Bombay	88.9	0.0	0.0	11.1	0.0	100.0 = 63
Total Maharashtra	88.4	0.6	0.6	9.8	0.6	100.0 = 174

Table 7.12 : Percentage Distribution of Ever Users of IUD by Source of Device: NFMS
Maharashtra, 1980

	Fitted by private doctor	Fitted in Government, public or charitable hospital	Number reporting	Number not reporting	Ever users of IUD
Rural Maharashtra	-	-	100.0 = 16	4	20
Urban excluding Greater Bombay	56.4	43.6	100.0 = 39	4	43
Greater Bombay	69.2	30.8	100.0 = 39	1	40
Total Maharashtra	60.6	39.4	100.0 = 94	9	103

- If the number of couples reporting is below 20, the percentage distribution is not shown.

Table 7.13 : Percentage Distribution of Ever Users of IUD by Inconvenience: NFMS Maharashtra, 1980

	No incon- venience	Bleeding	White discharge	Physical trouble only	Irregular menses or pregnancy	Ever users of IUD
Rural Maharashtra	35.0	50.0	5.0	10.0	0.0	100.0 = 20
Urban excluding Greater Bombay	53.5	30.3	2.3	11.6	2.3	100.0 = 43
Greater Bombay	62.5	15.0	7.5	15.0	0.0	100.0 = 40
Total Maharashtra	53.4	28.1	4.9	12.6	1.0	100.0 = 103

Table 7.14 : Percentage Distribution of Ever Users of IUD by Age at Start of IUD Use:
NFMS Maharashtra, 1980

	Age of wife in years				Number in all ages	Number not reporting	Ever users of IUD
	19 and below	20-24	25-29	30 and above			
Rural Maharashtra	-	-	-	-	100.0 = 19	1	20
Urban excluding Greater Bombay	9.5	50.0	33.3	7.2	100.0 = 42	1	43
Greater Bombay	7.5	42.5	42.5	7.5	100.0 = 40	0	40
Total Maharashtra	7.9	45.5	33.7	12.9	100.0 = 101	2	103

- If the number of couples reporting is below 20, the percentage distribution is not shown.

Table 7.15 : Percentage Distribution of Ever Users of IUD by Number of Children at Start of IUD Use: -
NFMS Maharashtra, 1980

	No. of children				Number reporting	Number not reporting	Ever users of IUD
	1	2	3	4 or more			
Rural Maharashtra	-	-	-	-	100.0 = 19	1	20
Urban excluding Greater Bombay	33.3	35.7	16.7	14.3	100.0 = 42	1	43
Greater Bombay	45.0	17.5	25.0	12.5	100.0 = 40	0	40
Total Maharashtra	34.7	26.7	18.8	19.8	100.0 = 101	2	103

- If the number of couples reporting is below 20, the percentage distribution is not shown.

Table 7.16 : Percentage Distribution of Ever Users of IUD by Shift from IUD to Other Methods:
NFMS Maharashtra, 1980

	No shift		Shift	Shift	Shift	Shift	Ever users
	Current	Others	to	to	to	to	of IUD
	users		condom	oral	steril-	other	
				pill	ization	methods	
Rural Maharashtra	15.0	35.0	15.0	0.0	35.0	0.0	100.0 = 20
Urban excluding Greater Bombay	46.5	20.9	4.7	11.6	16.3	0.0	100.0 = 43
Greater Bombay	47.5	17.5	7.5	5.0	20.0	2.5	100.0 = 40
Total Maharashtra	40.7	22.3	7.8	6.8	21.4	1.0	100.0 = 103

Table 7.17 : Percentage Distribution of Sterilized Couples* by Years Since Sterilization: NFMS Maharashtra, 1980

	Years since sterilization										All years	Years since sterilization not given	Total sterilizations
	Upto 2	3 to 4	5 to 6	7 to 8	9 to 10	11 to 12	13 to 14	15 to 16	Above 16				
Aurangabad Division	11.7	30.9	25.1	17.4	8.1	3.6	1.6	1.6	-	100.0 =	247	0	247
Nagpur Division	17.7	23.0	19.2	17.0	15.5	4.6	1.5	0.4	1.1	100.0 =	542	3	545
Western Maharashtra	14.4	24.0	21.3	15.9	12.1	6.2	3.1	1.6	1.4	100.0 =	1042	13	1055
Total Rural	15.0	24.6	21.2	16.4	12.6	5.4	2.4	1.3	1.1	100.0 =	1831	16	1847
Urban excluding Greater Bombay	16.7	19.7	16.2	14.4	12.1	7.6	4.4	4.0	4.9	100.0 =	526	1	527
Greater Bombay	16.3	19.2	8.9	16.3	11.7	10.8	6.5	3.5	6.8	100.0 =	369	3	372
Total Urban	16.5	19.4	13.2	15.2	12.0	8.9	5.3	3.8	5.7	100.0 =	895	4	899
Total Maharashtra	15.5	22.9	18.6	16.0	12.4	6.6	3.3	2.1	2.6	100.0 =	2726	20	2746

* Currently married and wife aged 15 to 50.

Table 7.18 : Percentage Distribution of Sterilized Couples* by Age of Wife at Sterilization: NFMS Maharashtra, 1980

	Age of wife at sterilization (in years)							Age at sterilization not given	Total sterilizations	Average age of wife at sterilization	
	Upto 19	20-24	25-29	30-34	35-39	40-44	45-49				All Ages
Aurangabad Division	0.4	9.7	32.8	34.0	15.8	6.1	1.2	100.0 = 247	0	247	30.9
Nagpur Division	1.1	13.8	33.1	28.4	18.8	4.2	0.6	100.0 = 543	2	545	30.3
Western Maharashtra	1.2	13.0	31.6	32.6	16.0	4.6	1.0	100.0 = 1049	6	1055	30.4
Total Rural	1.1	12.8	32.2	31.5	16.8	4.7	0.9	100.0 = 1839	8	1847	30.4
Urban excluding Greater Bombay	1.9	19.6	37.8	27.9	10.5	2.1	0.2	100.0 = 526	1	527	28.7
Greater Bombay	0.3	14.6	41.7	30.2	12.4	0.8	-	100.0 = 371	1	372	29.1
Total Urban	1.2	17.5	39.4	28.9	11.3	1.6	0.1	100.0 = 897	2	899	28.9
Total Maharashtra	1.1	14.3	34.5	30.7	15.0	3.7	0.7	100.0 = 2736	10	2746	29.9

* Currently married and wife aged 15 to 50.

Table 7.19 : Percentage Distribution of Sterilized Couples* by Age of Husband at Sterilization:
NFMS Maharashtra, 1980

	Age of husband at sterilization (in years)								All ages	Age at sterilization not given	Total sterilizations	Average age of husband at sterilization
	Upto 24	25-29	30-34	35-39	40-44	45-49	50-54	Above 54				
Aurangabad Division	-	6.9	29.6	29.1	23.5	8.1	2.4	0.4	100.0 = 247	0	247	37.3
Nagpur Division	0.7	12.1	28.2	25.9	22.3	8.1	2.0	0.7	100.0 = 544	1	545	36.6
Western Maharashtra	1.0	9.8	26.4	30.9	20.2	8.2	2.5	1.0	100.0 = 1051	4	1055	37.0
Total Rural	0.8	10.1	27.3	29.3	21.2	8.1	2.3	0.9	100.0 = 1842	5	1847	36.9
Urban excluding Greater Bombay	1.1	12.0	30.2	30.6	16.2	7.2	2.5	0.2	100.0 = 526	1	527	36.1
Greater Bombay	0.5	13.6	31.1	33.3	15.9	4.9	0.8	0.5	100.0 = 370	2	372	35.6
Total Urban	0.9	12.4	30.6	31.6	16.1	6.3	1.8	0.3	100.0 = 896	3	899	35.9
Total Maharashtra	0.8	10.8	28.4	30.1	19.5	7.5	2.2	0.7	100.0 = 2738	8	2746	36.6

* Currently married with wife aged 15 to 50.

Table 7.20 : Percentage Distribution of Sterilized Couples* by Place of Sterilization:
NFMS Maharashtra, 1980

	Private hospital/ dispensary	Government or work- place hospital	Camp	All places	Place of steril- ization not given	Total steril- izations
Aurangabad Division	1.6	85.4	13.0	100.0 = 246	1	247
Nagpur Division	4.8	51.2	44.0	100.0 = 538	7	545
Western Maharashtra	12.8	71.6	15.6	100.0 = 1047	8	1055
Total Rural	9.0	67.4	23.6	100.0 = 1831	16	1847
Urban excluding Greater Bombay	25.4	69.8	4.8	100.0 = 524	3	527
Greater Bombay	32.2	67.0	0.8	100.0 = 369	3	372
Total Urban	28.2	68.7	3.1	100.0 = 893	6	899
Total Maharashtra	15.3	67.8	16.9	100.0 = 2724	22	2746

* Currently married with wife aged 15 to 50.

Table 7.21 : Percentage Distribution of Sterilized Couples* by Number of Children Living at Sterilization:
NFMS Maharashtra, 1980

		No. of Children living at sterilization (X)				Living children reported	Living children not reported	Total sterilizations	Average No. of living children at sterilization
		1	2	3	4 or more				
Aurangabad Division:	Percentage	1.6	6.9	23.2	68.3	100.0 = 246	1	247	4.2
	Cumulative percentage (X+)	100.0	98.4	91.5	68.3				
Nagpur Division:	Percentage	0.9	8.3	25.0	65.8	100.0 = 544	1	545	4.2
	Cumulative percentage (X+)	100.0	99.1	90.8	65.8				
Western Maharashtra:	Percentage	1.7	8.1	27.3	62.9	100.0 = 1051	4	1055	4.1
	Cumulative percentage (X+)	100.0	98.3	90.2	62.9				
Total Rural:	Percentage	1.5	8.0	26.1	64.4	100.0 = 1841	6	1847	4.1
	Cumulative percentage (X+)	100.0	98.5	90.5	64.4				
Urban excluding Greater Bombay:	Percentage	0.6	9.9	26.8	62.7	100.0 = 526	1	527	4.1
	Cumulative percentage (X+)	100.0	99.4	89.5	62.7				
Greater Bombay:	Percentage	0.5	10.0	28.9	60.6	100.0 = 370	2	372	4.0
	Cumulative percentage (X+)	100.0	99.5	89.5	60.6				
Total Urban :	Percentage	0.6	9.9	27.7	61.8	100.0 = 896	3	899	4.1
	Cumulative percentage (X+)	100.0	99.4	89.5	61.8				
Total Maharashtra:	Percentage	1.2	8.6	26.6	63.6	100.0 = 2737	9	2746	4.1
	Cumulative percentage (X+)	100.0	98.8	90.2	63.6				

* Currently married with wife aged 15 to 50.

Table 7.22 : Percentage Distribution of Sterilized Couples* by Number of Sons Living at Sterilization:
NFMS Maharashtra, 1980

		No. of sons living at sterilization (X)			Living sons reported	Living sons not reported	Total sterilizations	Average No. of living sons at sterilization
		1	2	3 or more				
Aurangabad Division:	Percentage	17.3	40.4	42.3	100.0 = 243	4	247	2.4
	Cumulative percentage (X+)	100.0	82.7	42.3				
Nagpur Division:	Percentage	16.2	45.9	37.9	100.0 = 531	14	545	2.4
	Cumulative percentage (X+)	100.0	83.8	37.9				
Western Maharashtra:	Percentage	18.2	44.5	37.3	100.0 = 1033	22	1055	2.4
	Cumulative percentage (X+)	100.0	81.8	37.3				
Total Rural:	Percentage	17.5	44.4	38.1	100.0 = 1807	40	1847	2.4
	Cumulative percentage (X+)	100.0	82.5	38.1				
Urban excluding Greater Bombay:	Percentage	22.9	39.8	37.3	100.0 = 515	12	527	2.3
	Cumulative percentage (X+)	100.0	77.1	37.3				
Greater Bombay:	Percentage	21.7	41.8	36.5	100.0 = 359	13	372	2.3
	Cumulative percentage (X+)	100.0	78.3	36.5				
Total Urban:	Percentage	22.4	40.7	36.9	100.0 = 874	25	899	2.3
	Cumulative percentage (X+)	100.0	77.6	36.9				
Total Maharashtra:	Percentage	19.1	43.2	37.7	100.0 = 2681	65	2746	2.4
	Cumulative percentage (X+)	100.0	80.9	37.7				

* Currently married with wife aged 15 to 50.

Table 7.23 : Percentage Distribution of Vasectomies and Tubectomies by Post-operational Troubles:
NFMS Maharashtra, 1980

	<u>Vasectomies</u>					Number of vasectomies
	No trouble	Other frequent physical pain	Strain on nerves, feeling of weakness	Sepsis or swelling after operation but cured now	Persistent swelling	
Rural Maharashtra	81.2	5.8	11.2	1.6	0.2	100.0 = 881
Urban excluding Greater Bombay	86.1	4.6	5.6	3.7	0.0	100.0 = 108
Greater Bombay	89.0	4.4	4.4	2.2	0.0	100.0 = 45
Total Maharashtra	82.0	5.6	10.4	1.8	0.2	100.0 = 1034

	<u>Tubectomies</u>					Number of tubectomies	
	No trouble	Minor trouble	General weakness	Serious backache most of the time	Menstrual trouble		Sepsis or other serious trouble
Rural Maharashtra	84.1	5.6	3.7	1.7	3.7	1.2	100.0 = 939
Urban excluding Greater Bombay	91.4	2.4	0.0	0.0	4.3	1.9	100.0 = 415
Greater Bombay	92.4	3.1	1.2	0.9	1.5	0.9	100.0 = 326
Total Maharashtra	87.5	4.3	2.3	1.1	3.5	1.3	100.00 = 1680

The table excludes 32 couples, of whom for 28 couples both husband and wife were sterilized and for 4 couples the sex of the sterilized was not given.

Table 7.24 : Percentage Distribution, Mean Parity and Mean Number of Children Living Per Currently Married Women by Age Group by Knowledge of Contraceptive Methods: NFMS Maharashtra, 1980

Age group	Rural Maharashtra			Urban excluding Greater Bombay		
	Know- ledge	No know- ledge	Number of women	Know- ledge	No know- ledge	Number of women
Upto 24 years:						
Percentage	66.5	33.5	100.0 = 2015	68.9	31.1	100.0 = 418
Mean parity	1.18	0.47	0.94	1.39	0.67	1.17
Mean No. of children living	1.06	0.39	0.84	1.29	0.62	1.08
25 - 34 years:						
Percentage	88.3	11.7	100.0 = 1965	88.6	11.4	100.0 = 587
Mean parity	3.26	1.95	3.10	3.07	1.81	2.93
Mean No. of children living	2.80	1.69	2.67	2.77	1.64	2.64
35 years and above:						
Percentage	85.4	14.6	100.0 = 2080	81.7	18.3	100.0 = 627
Mean parity	5.24	3.99	5.06	4.79	4.14	4.67
Mean No. of children living	4.24	2.99	4.06	4.12	3.37	3.98
All ages:						
Percentage	80.0	20.0	100.0 = 6060	80.9	19.1	100.0 = 1632
Mean parity	3.41	1.26	3.05	3.37	2.17	3.14
Mean No. of children living	2.85	1.28	2.53	2.97	1.83	2.75

(continued)

Excludes 10 cases of age not reported.

Table 7.24 : (continued)

Age group	Greater Bombay			Total Maharashtra		
	Know- ledge	No know- ledge	All of women	Know- ledge	No know- ledge	All of women
Upto 24 years:						
Percentage	89.2	10.8	100.0 = 186	68.5	31.5	100.0 = 2619
Mean parity	1.14	0.60	1.08	1.21	0.50	0.99
Mean No. of children living	1.07	0.55	1.02	1.10	0.43	0.89
25 - 34 years:						
Percentage	92.8	7.2	100.0 = 487	89.1	10.9	100.0 = 3039
Mean parity	2.81	2.00	2.74	3.14	1.93	3.01
Mean No. of children living	2.61	1.66	2.55	2.76	1.67	2.65
35 years and above:						
Percentage	84.8	15.2	100.0 = 499	84.6	15.4	100.0 = 3206
Mean parity	4.10	3.68	4.64	4.98	3.98	4.82
Mean No. of children living	3.70	2.99	3.59	4.13	3.07	3.97
All ages:						
Percentage	88.8	11.2	100.0 = 1172	81.4	18.6	100.0 = 8864
Mean parity	3.06	2.76	3.03	3.35	1.82	3.07
Mean No. of children living	2.81	2.26	2.75	2.86	1.46	2.60

Table 7.25 : Percentage Distribution, Mean Parity and Mean Number of Children Living Per Currently Married Women by Age Group by Contraceptive Currently Used: NFMS Maharashtra, 1980

Age group	Rural Maharashtra				Urban excluding Greater Bombay			
	Steril-ization	Other methods	Not using	Number of women	Steril-ization	Other methods	Not using	Number of women
Upto 24 years:								
Percentage	2.4	0.8	96.8	100.0 = 2015	5.0	3.4	91.6	100.0 = 418
Mean parity	2.52	1.06	0.90	0.94	3.10	1.57	1.04	1.17
Mean No. of children living	2.35	1.00	0.80	0.84	2.90	1.57	0.96	1.08
25 - 34 years:								
Percentage	33.5	1.3	65.2	100.0 = 1965	34.6	9.3	56.1	100.0 = 587
Mean parity	3.86	3.04	2.71	3.10	3.84	2.24	2.48	2.93
Mean No. of children living	3.43	2.92	2.28	2.67	3.56	2.09	2.16	2.64
35 years and above:								
Percentage	54.8	0.5	44.7	100.0 = 2080	48.2	3.7	48.1	100.0 = 627
Mean parity	5.52	4.46	4.49	5.06	5.21	3.38	4.24	4.67
Mean No. of children living	4.56	3.91	3.44	4.06	4.54	3.08	3.50	3.98
All ages:								
Percentage	30.4	0.9	68.7	100.0 = 6060	32.3	5.6	62.1	100.0 = 1632
Mean parity	4.85	2.69	2.26	3.05	4.59	2.43	2.45	3.14
Mean No. of children living	4.10	2.50	1.84	2.53	4.09	2.26	2.10	2.75

Excludes 10 cases of age not reported.

(continued)

Table 7.25 : (continued)

Age group	Greater Bombay				Total Maharashtra			
	Steril- ization methods	Other methods	Not using	Number of women	Steril- ization methods	Other methods	Not using	Number of women
Upto 24 years:								
Percentage	3.8	3.7	92.5	100.0 = 186	2.9	1.4	95.7	100.0 = 2619
Mean parity	3.43	1.43	0.97	1.08	2.76	1.32	0.93	0.99
Mean No. of children living	2.71	1.43	0.93	1.02	2.54	1.29	0.83	0.89
25 - 34 years:								
Percentage	29.0	10.2	60.8	100.0 = 487	33.0	4.2	62.8	100.0 = 3039
Mean parity	3.96	2.14	2.26	2.74	3.87	2.35	2.60	3.01
Mean No. of children living	3.70	2.04	2.08	2.55	3.49	2.22	2.23	2.65
35 years and above:								
Percentage	44.9	3.4	51.7	100.0 = 499	51.9	1.7	46.4	100.0 = 3206
Mean parity	4.70	3.41	3.50	4.04	5.35	3.61	4.27	4.82
Mean No. of children living	4.22	3.24	3.06	3.59	4.51	3.31	3.39	3.97
All ages:								
Percentage	31.7	6.3	62.0	100.0 = 1172	31.0	2.5	66.5	100.0 = 8864
Mean parity	4.40	2.36	2.40	3.03	4.74	2.47	2.31	3.07
Mean No. of children living	3.99	2.26	2.16	2.75	4.08	2.32	1.92	2.60

Table 7.26 : Percentage Distribution and Mean Parity Per Currently Married Woman by Education by Knowledge of Contraceptive Methods: NFMS Maharashtra, 1980

Educational level	Rural Maharashtra			Urban excluding Greater Bombay		
	Know- ledge	No know- ledge	Number of women	know- ledge	No know- ledge	Number of women
Illiterate: Percentage Mean parity	78.5 3.74	21.5 1.85	100.0 = 4341 3.33	76.1 4.26	23.9 2.55	100.0 = 591 3.85
Literate Upto 7th std.: Percentage Mean parity	83.4 2.73	16.6 0.98	100.0 = 1466 2.48	82.0 3.46	18.0 2.44	100.0 = 534 3.28
7th std. to S.S.C.: Percentage Mean parity	88.6 2.11	11.4 0.22	100.0 = 237 1.89	84.8 2.52	15.2 1.32	100.0 = 395 2.34
Above S.S.C.: Percentage Mean parity	100.0 2.33	0.0 0.0	100.0 = 12 1.14	87.3 1.76	12.7 0.71	100.0 = 110 1.63
All levels: Percentage Mean parity	80.0 3.41	20.0 1.62	100.0 = 6056 3.05	80.9 3.37	19.1 2.17	100.0 = 1630 3.14

Excludes 17 cases of educational level not given.

(continued)

Table 7.26 : (continued)

Educational level	Greater Bombay			Total Maharashtra		
	Know- ledge	No know- ledge	Number of women	Know- ledge	No know- ledge	Number of women
Illiterate:						
Percentage	77.4	22.6	100.0 = 354	78.1	21.9	100.0 = 5286
Mean parity	4.00	3.48	3.88	3.81	2.05	3.43
Literate upto 7th std.:						
Percentage	93.2	6.8	100.0 = 396	84.7	15.3	100.0 = 2396
Mean parity	3.37	1.85	3.27	3.00	1.42	2.76
7th std. to S.S.C.:						
Percentage	93.4	6.6	100.0 = 333	88.7	11.3	100.0 = 965
Mean parity	2.24	1.41	2.19	2.32	1.06	2.18
Above S.S.C.:						
Percentage	98.9	1.1	100.0 = 88	92.9	7.1	100.0 = 210
Mean parity	1.75	3.00	1.76	1.79	0.87	1.72
All levels:						
Percentage	88.8	11.2	100.0 = 1171	81.4	18.6	100.0 = 8857
Mean parity	3.06	2.76	3.03	3.35	1.82	3.07

Table 7.27 : Percentage Distribution, Mean Parity and Mean Number of Living Children Per Currently Married Woman by Educational Level by Contraceptive Currently Used: NFMS Maharashtra, 1980

Educational level	Rural Maharashtra				Urban excluding Greater Bombay			
	Sterilization	Other methods	Not using	None All of women	Sterilization	Other methods	Not using	None All of women
Illiterate:								
Percentage	32.9	0.4	66.7	100.0 = 4341	36.4	1.0	62.6	100.0 = 591
Mean parity	5.00	3.00	2.51	3.33	5.25	3.33	3.05	3.85
Mean No. of living children	4.15	2.79	1.99	2.71	4.50	2.83	2.44	3.19
Literate upto 7th:								
Percentage	24.8	1.1	74.1	100.0 = 1466	36.5	3.2	60.3	100.0 = 534
Mean parity	4.42	3.19	1.76	2.44	4.54	3.59	2.50	3.28
Mean No. of living children	3.96	2.93	1.55	2.16	4.14	3.35	2.21	2.95
7th to S.S.C.:								
Percentage	19.4	6.3	74.3	100.0 = 237	24.6	12.4	63.0	100.0 = 395
Mean parity	4.02	2.00	1.33	1.89	3.59	2.41	1.84	2.34
Mean No. of living children	3.83	1.87	1.23	1.78	3.34	2.25	1.69	2.17
Above S.S.C.:								
Percentage	41.7	16.6	41.7	100.0 = 12	17.3	18.2	64.5	100.0 = 110
Mean parity	3.20	1.00	2.00	2.33	2.95	1.25	1.38	1.63
Mean No. of living children	3.00	1.00	2.00	2.25	2.89	1.25	1.35	1.60
All levels:								
Percentage	30.4	0.9	68.7	100.0 = 6056	32.3	5.6	62.1	100.0 = 1630
Mean parity	4.85	2.69	2.26	3.05	4.59	2.43	2.45	3.14
Mean No. of living children	4.10	2.50	1.84	2.53	4.09	2.26	2.10	2.75

Excludes 17 cases of educational level not given.

(continued)

Table 7.27 : (continued)

Educational level	Greater Bombay				Total Maharashtra			
	Steril-ization	Other methods	Not using	Number of women	Steril-ization	Other methods	Not using	Number of women
Illiterate:								
Percentage	34.2	0.6	65.2	100.0 = 354	33.4	0.5	66.1	100.0 = 5286
Mean parity	5.26	3.00	3.16	3.88	5.04	3.07	2.61	3.43
Mean No.of living children	4.64	3.00	2.76	3.40	4.22	2.82	2.09	2.81
Literate upto 7th:								
Percentage	39.9	4.8	55.3	100.0 = 396	29.9	2.2	67.9	100.0 = 2396
Mean parity	4.25	3.58	2.53	3.27	4.41	3.46	2.01	2.76
Mean No.of living children	3.85	3.37	2.27	2.95	3.98	3.23	1.78	2.47
7th to S.S.C.:								
Percentage	23.7	10.8	65.5	100.0 = 333	23.0	10.4	66.6	100.0 = 965
Mean parity	3.61	2.06	1.69	2.19	3.68	2.22	1.65	2.18
Mean No.of living children	3.47	1.94	1.61	2.08	3.49	2.08	1.54	2.04
Above S.S.C.:								
Percentage	15.9	19.3	64.8	100.0 = 88	18.1	18.6	63.3	100.0 = 210
Mean parity	3.07	1.59	1.49	0.76	3.03	1.39	1.45	1.72
Mean No.of living children	2.93	1.59	1.44	1.70	2.92	1.39	1.41	1.68
All levels:								
Percentage	31.7	6.3	62.0	100.0 = 1171	31.0	2.5	66.5	100.0 = 8857
Mean parity	4.40	2.36	2.40	3.03	4.74	2.47	2.31	3.07
Mean No.of living children	3.99	2.26	2.16	2.75	4.08	2.32	1.92	2.60

Table 7.28 : Percentage Distribution and Mean Parity of Currently Married Women by Caste-cum-Religion by Contraceptive Currently Used: NFMS Maharashtra, 1980

Caste-cum-religion	Rural Maharashtra				Urban excluding Greater Bombay			
	Steril- ization	Other methods	Not using	Number of women	Steril- ization	Other methods	Not using	Number of women
Advanced caste Hindus:								
Percentage	32.0	0.8	67.2	100.0 = 2606	32.4	9.0	58.6	100.0 = 680
Mean parity	4.68	2.57	2.13	2.95	4.00	2.39	2.17	2.78
Intermediate caste Hindus:								
Percentage	30.4	0.8	68.8	100.0 = 1214	36.2	4.1	59.7	100.0 = 318
Mean parity	4.90	3.00	2.18	3.01	4.70	2.15	2.29	3.16
Backward Hindus:								
Percentage	29.7	0.6	69.7	100.0 = 310	29.2	4.2	66.6	100.0 = 24
Mean parity	5.01	1.50	2.41	3.17	5.29	2.00	1.75	2.79
Scheduled caste :								
Percentage	31.5	1.0	67.5	100.0 = 819	33.5	0.4	66.1	100.0 = 263
Mean parity	5.21	1.37	2.41	3.28	5.36	3.00	2.49	3.46
Scheduled tribe :								
Percentage	27.2	0.6	72.2	100.0 = 701	23.7	1.7	74.6	100.0 = 59
Mean parity	4.93	2.75	2.32	3.03	5.43	3.00	3.57	4.00
Muslims:								
Percentage	21.0	1.5	77.5	100.0 = 343	26.1	3.5	70.4	100.0 = 203
Mean parity	4.86	5.00	2.84	3.29	5.23	3.72	2.93	3.56
Other religions:								
Percentage	43.7	1.6	54.7	100.0 = 64	33.8	9.1	57.1	100.0 = 77
Mean parity	4.82	6.00	2.14	3.37	4.50	2.00	3.20	3.53
All castes-cum-religions:								
Percentage	30.4	0.9	68.7	100.0 = 6057	32.3	5.6	62.1	100.0 = 1624
Mean parity	4.85	2.69	2.26	3.05	4.59	2.43	2.45	3.14

Excludes 39 cases of caste-cum-religion not given.

(continued)

Table 7.28 : (continued)

Caste-cum-religion	Greater Bombay				Total Maharashtra			
	Steril- ization	Other methods	Not using	Not Alt of women	Steril- ization	Other methods	Not using	Not Alt of women
Advanced caste Hindus:								
Percentage	34.7	7.5	57.8	100.0 = 642	32.5	3.3	64.2	100.0 = 3928
Mean parity	4.13	2.25	2.18	2.86	4.47	2.37	2.14	2.90
Intermediate caste Hindus:								
Percentage	36.1	3.6	60.3	100.0 = 83	31.8	1.6	66.6	100.0 = 1615
Mean parity	4.83	2.33	2.36	3.25	4.85	2.50	2.21	3.05
Backward Hindus:								
Percentage	58.3	0.0	41.7	100.0 = 12	30.6	0.9	68.5	100.0 = 346
Mean parity	5.00	0.0	1.40	3.50	5.03	1.67	2.34	3.16
Scheduled caste :								
Percentage	37.9	3.5	58.6	100.0 = 116	32.5	1.1	66.4	100.0 = 1198
Mean parity	4.95	1.25	2.93	3.64	5.21	1.46	2.47	3.35
Scheduled tribe :								
Percentage	28.6	0.0	71.4	100.0 = 7	27.0	0.6	72.4	100.0 = 767
Mean parity	5.50	0.0	3.60	4.14	4.97	2.80	2.43	3.11
Muslims:								
Percentage	17.7	5.3	77.0	100.0 = 209	21.5	3.0	75.5	100.0 = 755
Mean parity	5.38	4.09	2.77	3.30	5.10	4.18	2.84	3.37
Other religions:								
Percentage	30.6	7.1	62.3	100.0 = 85	35.4	6.2	58.4	100.0 = 226
Mean parity	3.77	1.16	2.09	2.54	4.37	1.93	2.48	3.12
All castes-cum-religions:								
Percentage	31.7	6.3	62.0	100.0 = 1154	31.0	2.5	66.5	100.0 = 8835
Mean parity	4.40	2.36	2.40	3.03	4.74	2.47	2.31	3.07

CHAPTER 8
INDIRECT ESTIMATES OF FERTILITY
AND MORTALITY LEVELS

Introduction

In the earlier chapters differentials in fertility and mortality measures were presented for the three rural regions and urban zones of Maharashtra State. Since survey respondents tend to under-report to some extent births and to a larger extent deaths, the extent of such under-reporting is assessed and indirect estimates of fertility and mortality levels are presented in this chapter. For checking their validity these estimates are compared with available SRS rates. Based on the corrected age-specific mortality rates for ages 10 and above on the one hand and indirect estimates of infant and child mortality derived by the method of person years lived on the other hand, life tables are constructed for males and females in Maharashtra for 1980.

Estimates of the level of mortality obtained from a survey depend on the reported age distributions of the population and of deaths. If, however, in the survey there is more relative under-reporting of deaths compared to the population, the mortality level may be under-estimated. In these circumstances, indirect methods of determining the mortality level, based on a stable or quasi-stable population model, may yield more reliable estimates of the death rate.

In surveys deaths are more likely to be under-reported than births due to various reasons. People are often reluctant to report a death in the family or they may not readily recall a traumatic event like an infant death. Sometimes the death is not reported because it is considered to be outside the family unit included in the sample. If a death leads to the break-up of the family into smaller units, then too the death may not be reported. Infant deaths are more likely to be forgotten than deaths to adults. Where a culture has a social

bias against females, female deaths may be less completely reported than male deaths. All these factors make data on deaths less reliable than on births. Two indirect methods due to Brass and Preston, with suitable modifications, are applied in this chapter to the NFMS data on the age distributions of the population and of deaths to obtain alternative estimates of the completeness of death reporting and the corrected mortality level.

As mentioned in Chapter 1, soon after the completion of the field work, a reinterview was conducted in a sub-sample of 44 villages and 33 urban blocks by the field supervisors to assess the response errors in selected items of information such as the numbers of births and deaths in the sample family during the two years preceding the date of the original interview. The birth and death rates, corrected for response errors on the basis of the reinterview data, are also presented in this chapter. They provide alternative checks on the mortality rates obtained by the indirect methods.

In this chapter, male and female life tables are constructed for Maharashtra. For ages 10 and over, the age-specific death rates from NFMS, corrected by indirect methods for under-reporting, are used. The infant and child mortality rates are indirectly estimated applying the method of exposure years to children under age 10 from the birth histories of women. The central death rates are graduated graphically before constructing the life table. Using these life tables and the population aged 0 and 1, the birth rate is estimated by a reverse survival procedure. This provides yet another estimate of the birth rate.

The indirect estimates of the birth and death rates presented in this chapter give a fairly narrow range of credible and consistent values for the fertility and mortality levels of Maharashtra in 1980.

Indirect Methods of Mortality Estimation

The two indirect methods used in this chapter are due to Brass and Preston. The Brass method (Brass 1975) is based on a stable population assumption and consists of fitting a straight line to partial birth and death rates for the population aged 'x' and above. In a stable population the schedules of age specific birth and death rates remain constant over time. Therefore, the percentage age distributions of the population and the deaths remain constant and their numbers grow at the same rate 'r'. The partial birth rate is defined as the ratio of the number of persons turning exact age 'x' that year to those aged 'x' and over at mid-year. The partial death rate is likewise the ratio of deaths of those aged 'x' that year to those aged 'x' and above at mid-year.

Plotting the partial birth rates against partial death rates by age should yield a set of points scattered around a straight line, with an intercept equal to the growth rate 'r' of the stable population, and a slope of unity, if the reporting of deaths were complete at all ages and if there were no age misreporting. If, however, there were uniform relative under-reporting of deaths at all ages, the scatter would still be linear but the slope of the line would be greater than unity. The reciprocal of the slope would measure the degree of completeness of deaths reported relative to the population.

The Preston method (Preston 1980), on the other hand, uses the reported age distributions of male and female deaths and an external estimate of the growth rate. In a stationary population, the number of persons at exact age 'x' is equal to the number of deaths that occur to persons after reaching age 'x'. Therefore, in a stable population, with a constant age distribution and a growth rate 'r', the number of persons aged 'x' should equal the sum of deaths to persons at ages above 'x' weighted by the

exponential of the product 'r' times 'x'. The completeness of death reporting is measured by a formula involving the estimated population aged 'x', the reported death rate and the assumed growth rate (Appendix C).

An analysis of the results obtained from the application of these methods to NFMS data provided estimates of the degree of under reporting and indirect estimates of the level of mortality. No attempt was made to smoothen either the age structure of the population or the reported age structure of deaths before applying these methods.

The Brass Method and Its Variants

Data on the reported age structure of the population and deaths were available by five year age groups. The number of persons at exact age 'x' ($n(x)$) was calculated by adding the number of persons in two adjacent age groups and dividing the sum by 10. For example the number of persons aged 5 was calculated by summing the number of persons in ages 0 to 4 and 5 to 9, and dividing this by 10. The number of persons aged 'x' and over ($N(x+)$) and the number of deaths to persons aged 'x' and over ($D(x+)$) were obtained by adding the number of persons in the succeeding age groups. The partial birth and death rates for males and females are shown in Table 8.1.

These partial birth and death rates are plotted in Graph 8.1 for males and for females in Graph 8.2. The scatter of the points for males lies closely around a straight line, but it is not so for females where deviation is evident particularly for the age groups 55 and over. As the data for the age group 5+ is influenced by various factors such as the infant and child mortality rates and reporting errors, the age group 5 to 10 has been excluded from the following analysis.

The method of least squares was used to estimate the line of best fit. For males, the line was $y = .0255 + 1.03(x)$, and for females it was $y = .0232 + 1.69(x)$. The constant term

in the equation estimates the rate of growth while the coefficient of 'x' (the slope of the line) determines the correction factor. The reciprocal of this factor gives the completeness of reporting. According to this method, the growth rate for males was about 2.5 per cent with 3 per cent under-reporting of deaths. The growth rate for females was 2.3 per cent with 41 per cent under-reporting.

As the growth rate given by this method was found to be too high, other modifications of the method were tried. The growth rate obtained from the crude birth and death rates of NFMS was 2.05 per cent. Using this growth rate as the value of the constant term in the regression, the method of least squares was applied. The estimated lines were $y = 0.0205 + 1.24(x)$ for males and $y = 0.0205 + 1.84(x)$ for females. Thus with the growth rate at 2.05 per cent for both males and females, the percentage of under-reporting was 19 for males and 46 for females.

In the first variant, the method of least squares was used to determine the growth rate that was common to all age groups and the extent of under-reporting. In the second variant, the method of least squares was used with a predetermined growth rate. Both the methods assume the population to be demographically stable. However, as the population was not stable in this period of declining death rates, the changing growth rate must also be taken into account. The growth rates corresponding to the different age groups were calculated using the inter-censal growth rates for appropriate periods and these were subtracted from their respective partial birth rates. The estimated growth rate, the partial birth rate (PBR), and the partial birth rate less growth rate (PBR - r) by age are shown in Table 8.2 for each sex.

Graphs 8.3 and 8.4 show the partial birth rate less growth rate (PBR - r) plotted against the partial death rate. Keeping the intercept at zero, the linear regression $y' = \text{PBR} - r$ on the

partial death rate, estimated by the least squares method, was $y' = 1.25(x)$ for males and $y' = 1.87(x)$ for females. This method indicated a 20 per cent under-reporting for males and 47 per cent for females. These results were close to those determined by using a fixed growth rate of 2.05.

In a stable population at each age 'x', birth rate (PBR) is equal to the sum of the partial growth rate (PGR) on the one hand and the product of the reported partial death rate (PDR) and the partial correction factor (PK) for under-reporting in ages x and above on the other hand.

$$\text{Hence } PBR = PGR + (PDR \cdot PK)$$

$$\text{so that } PK = (PBR - PGR)/PDR$$

where PBR = partial birth rate at age x,

PDR = reported partial death rate at age x,

PGR = partial growth rate for ages x+ and

PK = partial correction factor for ages x+.

Therefore, the ratio of $(PBR + PGR)$ to PDR at each age should provide the partial correction factor PK above that age.

As can be seen from Table 8.3, the median correction factor was 1.27 for males and 1.86 for females which corresponded to 21 per cent under-reporting for males and 46 per cent under-reporting for females. These results are close to those derived by the previous methods.

The Preston Method

The Preston method is based on the age distribution of deaths and an external estimate of the rate of growth. Using a growth rate of 2.05, the estimated death rate for each cumulative age group by sex was calculated. The ratio of these estimated death rates to the reported death rates gives the correction factor. As Table 8.3 shows, the median correction factor for males by this method was 1.32 and 1.82 for females. These corresponded to 24 per cent under-reporting for males and 45 per cent for females. These results are close enough to those obtained earlier by variants of Brass method.

Corrected Death Rates for Ages 10 and Over and Comparison with SRS Rates

A summary of the correction factors determined by the different methods is given in Table 8.4. A consideration of all the previous estimates indicates that there was about 20 per cent under-reporting for males and about 46 per cent for females. Hence, the correction factor for under-reporting of deaths in NFMS was placed approximately at 1.25 for males and 1.85 for females.

A comparison of the reported death rates and ^{the} corrected

death rates for the population above age 10 and for each cumulated age group, with the SRS rates reveals the extent to which these indirect methods can be relied upon to correct the death rate. The SRS data is expected to be relatively more reliable as it is based on a dual system of registration which maintains a periodic account of vital events. A continuing system of registration has the advantage of being able to record the occurrences of vital events better than a one point survey as these events are less likely to be missed or forgotten. Moreover these events have a greater chance of being accounted for in such a dual reporting system than in a single report.

Table 8.6 compares the corrected and uncorrected NFMS, 1980 death rates with the SRS 1975 rates for ages 10 and above. While comparing the NFMS and SRS rates, it must be pointed out that SRS rates fluctuate from year to year and may also be subject to some under-reporting of deaths. The uncorrected NFMS rates are lower than SRS rates, showing that there was an under-count of deaths in NFMS relative to SRS. The discrepancy between the corrected NFMS rates and the SRS rates could be attributed to two facts having opposite effects. First, there could be a slight decline in the rate between 1975 and 1980. Secondly SRS rates could also be lower due to under-counting of deaths. The net effect seems to yield corrected NFMS rates for males and females that are slightly higher than the corresponding SRS rates. For males in ages 10 and above, the corrected NFMS death rate was 9.0 against 8.5 from SRS while for females the NFMS rate was 10.5 against 9.5 from SRS.

Table 8.6 compares, for cumulative age groups, the uncorrected NFMS death rates with the corrected rates using a constant correction factor for all ages for each sex and with the SRS rates. The male death rates have been corrected by a factor of 1.25 while the female rates have been corrected by a factor of 1.85. The SRS rates and NFMS rates are comparable in

the first five age groups but in the succeeding ages the SRS rates systematically exceed the corrected NFMS rates. A possible explanation for this could be that as a major proportion of deaths occur in these ages, especially over age 45, the under-reporting would affect these ages to a greater extent.

Particular attention must be drawn to two characteristics of the data, revealed in the scatter of points in Graph 8.2. First the degree of under-reporting for females was greater than that for males. This is evident from the slope of the line fitted to the points. Secondly there was considerable age misreporting in the data. The plot for age 55 is an example of such age distortion. One explanation for this could be an age preference bias. Women above age 50 were to be excluded for the detailed questionnaire. This could partly explain why more women were returned as above this age.

Few mortality surveys have been conducted in India. Retrospective reporting of deaths appears to be less complete than births. Hence indirect methods of estimation of the death rate are essential to correct the rate. Another check is a reinterview of a sub-sample of families to detect the response errors. This method was also used in NFMS, Maharashtra, 1980. About 3000 families were interviewed for this purpose. The results of this check on the birth and death rates are presented later in this chapter.

Indirect Estimation of Infant Mortality Rate from NFMS Data on Birth Histories of Women

Indirect estimates of age specific mortality rates for ages 10 and above was obtained in the preceding sections of this chapter. In constructing male and female life tables, the next step is to estimate infant and child mortality. This was done by the method of exposure years using the birth histories of women collected in NFMS.

The indirect method is based on the years of exposure to

the risk of dying and the number of deaths that occurred in the five years preceding the date of interview from birth to exact age 5. The data on the birth histories of about 5,000 married women in reproductive ages obtained in NFMS were used. Living children below five years of age and those aged 5 to 9 years were taken into account separately in calculating the exposure years. To this sum, the exposure years of children born during the ten years preceding the interview but deceased at the time of the survey were added. For children who died in their first year of life during the last five years, the exact period of exposure in days and months was calculated. Similarly for births in the year preceding the interview, the exact period of exposure upto the date of survey was reckoned. These exposure years were calculated separately from birth to exact age 1, from exact age 1 to 2, from exact age 2 to 3, from exact age 3 to 4 and from exact age 4 to 5.

The death rates between exact ages 1-2, 1-3, 1-4 and 1-5 were obtained from data on the number of deaths and exposure years in these ages. Then the corresponding IMR (q_0) was estimated from each of these age groups using the West Model Life Tables. The median value among these was chosen as the best estimate of q_0 . These estimates are shown below:

	1000 q_0		
	Male	Female	Both Sexes
Aurangabad Division	143	103	
Nagpur Division	136	113	
Western Maharashtra	102	95	
Rural Maharashtra	120	102	120
Urban excluding G.B.	87	74	
Greater Bombay	56	54	
Urban Maharashtra	73	66	73
Maharashtra State	104	89	104

The q_0 value in rural areas for females was far below that for males. While females could have a slight advantage in infant survival rates, most of the difference stems from gross under-reporting of female infant and child deaths. Hence the male q_0 value of 103.6 was also adopted for females in the State.

The method of exposure years also provided child mortality rates between exact ages 1 to 5 for males and females which were utilized for constructing life tables. The mortality rates between exact ages 5 and 10 were also taken from the corresponding West Model Life Tables.

Male and Female Life Tables for Maharashtra, 1980

Male and female life tables were constructed for Maharashtra from the NFMS age-specific death rates. For ages 10 and above, then rates were adjusted by indirect methods as described in earlier sections. Child mortality between exact ages 1 and 5 and q_0 were obtained by the method of exposure years summarized in the last section.

The age-specific mortality rates for each sex were graduated graphically. To these graduated values of central death rates, the Reed-Merrell formula was applied to get the probabilities of dying between corresponding exact ages. The abridged life tables 8.7 for males and 8.8 for females were constructed from these probabilities of dying. Thus the life tables presented in this chapter are based on several assumptions, indirect estimates and data corrections.

According to Tables 8.7 and 8.8, the life expectancy at birth was 58.1 years for males and 56.9 years for females in 1980 according to NFMS. At exact age 1, these expectancies rose rapidly to 63.8 years for males and 62.5 years for females since the probability of dying ⁱⁿ the first year of life was high for both sexes. The life expectancy then declined steadily with age and at age 70, it was 10.7 years for males and 9.4 years for females.

The life table parameters from NFMS, 1980 are compared with those based on the Census for the decade 1961-71 in Table 8.9. In the 14 years between 1966 and 1980, male life expectancy had risen from 48.6 years to 58.1 years and female life expectancy from 49.0 years to 56.9 years. The census figures relate to Western Zone consisting of Gujarat, Maharashtra and Goa. The gain in years of life expectancy was 9.5 for males and 7.9 for females in this period.

Separate estimates of rural and urban life expectancies by sex were made to obtain the rural-urban differentials. For this purpose, the rural and urban q_0 and child mortality rate between exact ages 1 to 5, obtained by the method of exposure years that was summarized in the last section, were used.

For ages 10 and over, correction factors for adjusting mortality rates were obtained for rural and urban areas for males as follows. The death rates for both areas were corrected using the reinterview data as described in the next section. The ratio of the corrected to uncorrected death rate gave an initial correction factor as shown below:

	CDR	
	<u>Rural</u>	<u>Urban</u>
Corrected	11.72	6.42
Uncorrected	9.58	5.76
Initial correction factor	1.22	1.11

Giving the rural and urban areas a weightage of 65:35, in proportion to their populations, the correction factors were scaled upwards so that the overall factor for males was equal to the value of 1.25 that was obtained in the earlier sections by indirect methods. The revised correction factors turned out to be 1.29 for rural male death rates and 1.18 for urban male death rates. Following a similar procedure for females, a rural correction factor of 1.92 and an urban factor of 1.74 were obtained. These correction factors were applied to the age-specific

mortality rates of males and females aged 10 and above. The rural and urban life tables were then constructed for each sex following the procedure outlined earlier.

The life table parameters for rural and urban areas are also given in Table 8.9. For 1980, in urban areas the male life expectancy was 62.1 years compared to 60.7 years for females whereas in rural areas the male life expectancy was 56.1 years against 55.1 years for females. Although male life expectancy was about a year more than female life expectancy in both rural and urban areas, the urban life expectancy exceeded the rural life expectancy by over five years for both sexes. The rural-urban differential narrowed down considerably by age 5.

Comparison of NFMS 1980 Mortality Rates with SRS Rates

Earlier the mortality rates for ages 10 and over by sex from NFMS, 1980 were compared with SRS 1975 rates in Table 8.5. For both sexes together, the NFMS mortality rate was 9.8 against 9.0 from SRS (Table 8.10). The male mortality rate below age 10, from the life tables based on NFMS data, was 18.6 compared to 18.4 from SRS 1975 and for females the corresponding rate was 19.1 from NFMS against 18.6 from SRS. For both sexes combined, the mortality rate below age 10 was 18.8 from NFMS and 18.5 from SRS, 1975. Thus the 1980 NFMS rates were close to the 1975 SRS rates of mortality below age 10.

For all ages, the death rate for males was 11.6 from NFMS against 11.0 from SRS, 1975 and for females it was 12.8 from NFMS against 11.9 from SRS. For both sexes combined the NFMS death rate was 12.2 against the SRS rate of 11.3 averaged over 1977-79. Although there should be some decline in the death rate between 1978 and 1980, the indirect estimate of the death rate from NFMS, 1980 was slightly above the SRS average for 1977-79. This small difference could arise from under-reporting of deaths in SRS or over-correction of the NFMS rate or more probably from a combination

of both these factors.

Adjustment of the Birth and Death Rates for Response Errors

As mentioned in Chapter 1, in order to assess the response errors in reporting births and deaths during the two years preceding the date of interview, a sub-sample of 44 villages and 33 urban blocks were reinterviewed by the field supervisors. The sub-sample consisted of 2,192 rural families and 855 urban families. Comparing the answers given at the original interview and reinterview, the birth and death rates were adjusted for response errors. This method provided another set of independent estimates for the birth and death rates.

Unweighted estimates of the birth and death rates made from the individual and the family cards are shown in Table 8.11. The estimates from the individual cards were slightly but consistently higher than those made on the basis of the family cards. The weighted estimates of birth rates from the family cards were generally lower than the unweighted estimates. But the weighted estimates of death rates from the family cards were generally higher than the unweighted estimates.

Since families were selected with unequal probabilities, the weighted estimate was considered to be the appropriate one to be used. However, since this estimate was available only from family cards, to adjust for the more complete information contained in individual cards, the weighted rate from family cards was adjusted by the ratio of the unweighted estimate from individual cards to that from family cards. For instance, for Aurangabad Division, the weighted birth rate from family cards was 33.67. This was multiplied by the ratio (35.51/34.4) of the unweighted rate estimated from individual cards to that estimated from family cards. This yielded a weighted birth rate of 34.78 adjusted for individual cards. A similar adjustment was made for death rates for other rural regions and urban

zones. The rates for rural and urban Maharashtra and for the State were obtained as weighted averages of those for the regions or zones. The weighted birth and death rates adjusted for individual cards are shown in the last two columns of Table 8.11.

The correction for response errors was made by comparing the rate based on the original interview with that based on the reinterview from the sub-sample of 3,047 families. Rural and urban estimates were made separately. The necessary calculations are shown in Table 8.12. For instance, from the sub-sample, the birth rate in rural areas was estimated as 32.124 from the reinterview against 30.773 from the original interview. Since villages or blocks with low death rates were over-represented in the sub-sample, the correction for response errors was taken to be the difference between the reinterview rate and the original interview rate. This difference of 1.35 in the birth rate was then added to the weighted and adjusted rate of 31.74 from Table 8.11 to obtain a corrected birth rate of 33.09 in rural areas from NFMS. Similar corrections were made to the rural and urban death rates to adjust for response errors. These adjustments and the corrected rates are shown in Table 8.12.

The birth rates, adjusted for response errors, were 33.1 for rural areas, 25.5 for urban areas and 30.4 for Maharashtra State. The corresponding death rates for the three domains were 11.9, 6.5 and 10.0. As mentioned earlier, under-reporting of deaths might arise not only from recall lapse but also from a number of other circumstances. For this reason, the death rate corrected for response errors, may still be under-estimated. This may be especially true of urban areas where the corrected rate appears to be far below the corrected rural death rate.

An alternative estimate of the birth rate was obtained by the reverse-survival method. The number of persons aged 0 and 1 (between birth and exact age 2) from NFMS was multiplied

by the ratio $2(l_0/2L_0)$ to obtain the births. This was done separately for rural and urban areas for both sexes together from the life tables. The birth rate estimated by the reverse survival procedure was 33.9 for rural areas, 25.1 for urban areas and 30.8 for Maharashtra State.

Table 8.13 compares the vital rates corrected for response errors with SRS rates. The rural birth rate from NFMS, corrected for response errors, was 33.1 against an average rate of 27.5 from SRS for 1977-1979. By reverse survival method applied to NFMS data the rate was 33.9. Since the correction for response errors is unlikely to over-correct the NFMS rate, the lower rate from SRS for an earlier period may be attributed mainly to non-sampling errors and sampling fluctuations in SRS. In fact, the SRS rate for 1979 rose to 28.1 (and 28.3 if the pooled estimate is used) from the average of 27.5 for 1977-1979. For urban areas, the birth rate from NFMS and SRS did not differ much. The NFMS birth rate, corrected for response errors, was 25.5 and by the reverse-survival method it was 25.1 against an average of 25.1 from SRS for 1977-1979. Compared to SRS, the higher rural birth rate in NFMS resulted in a somewhat higher birth rate for the State. The NFMS birth rate for the State was 30.4 corrected for response errors (and 30.8 by the reverse-survival method) against an average birth rate of 26.8 from SRS for 1977-1979.

The rural death rate from NFMS, corrected for response errors, was 11.9 compared to an average rate of 12.7 from SRS over 1977-1979 (Table 8.13). The difference in the death rate between the two sources was larger for urban areas, 6.5 from NFMS and 8.4 from SRS. For the entire State, the NFMS death rates, corrected for response errors, was 10.0 against an average rate of 11.3 from SRS over 1977-1979. Thus the NFMS death rates, even after correction for response error, were well below the SRS rates, possibly because of other sources of under-reporting of deaths in the family survey.

Summary of Findings

In this chapter the fertility and mortality levels in rural and urban Maharashtra and in the State were estimated using indirect methods and the reinterview data. After applying Brass and Preston methods, the correction factor for under-reporting of deaths in ages 10 and above in NFMS was placed approximately at 1.25 for males and 1.85 for females. For males in ages 10 and above, the corrected NFMS death rate was 9.0 against 8.5 from SRS for 1975 while for females the NFMS rate was 10.5 against 9.5 from SRS. The discrepancy between the corrected NFMS rate and the SRS rate could be attributed to two facts having opposite effects. First, there could be a slight decline in the rate between the years 1975 and 1980. Secondly SRS rates could also be lower due to under-counting of deaths. By age groups, the SRS rates were comparable with NFMS rates in the first five age groups in ages 10 and above but in the succeeding ages the SRS rates systematically exceeded the corrected NFMS rates. A possible explanation for this could be that as a major proportion of deaths occur in these ages, especially over age 45, the under-reporting would affect these ages to a greater-extent.

Age-specific mortality rates for males and females in ages 10 and over were corrected by indirect methods. Infant and child mortality rates were estimated by the method of exposure years using the birth histories of women collected in NFMS. Taking the population under 10 years of age, the exposure years to the risk of dying was calculated separately from birth to exact age 1, from exact age 1 to 2, from exact age 2 to 3, from exact age 3 to 4 and from exact age 4 to 5. The death rates between exact ages 1-2, 1-3, 1-4 and 1-5 were obtained from data on the number of deaths and exposure years in these ages. Then the corresponding IMR (q_0) was estimated from

each of these age groups using the West Model Life Tables. The median value among these was chosen as the best estimate of q_0 . For both sexes, for rural Maharashtra the estimate of q_0 was 120, for urban Maharashtra 73 and for the State it was 104. The method of exposure years also provided child mortality rates between exact ages 1 to 5 for males and females which were used for constructing life tables. The mortality rates between exact ages 5 and 10 were also taken from the West Model Life Tables.

Male and female life tables were constructed on the basis of these estimates of infant and child mortality rates and corrected age-specific mortality rates in ages 10 and over. First the age-specific mortality rates for each sex were graduated graphically. To these graduated values of central death rates, the Reed-Merrell formula was applied to get the probabilities of dying between corresponding exact ages. Abridged male and female life tables were prepared from these probabilities.

The life expectancy in Maharashtra State, circa 1980, was 58.1 years for males and 56.9 years for females according to NFMS. From the Population Censuses, the life expectancy during the decade 1961-71 was estimated to be 48.6 years for males and 49.0 years for females in Western Zone consisting of Gujarat, Maharashtra and Goa. During the fourteen years from 1966 to 1980, the gain in life expectancy was 9.5 years for males and 7.9 years for females. In urban areas the male life expectancy was 62.1 years compared to 60.7 years for females whereas in rural areas the male life expectancy was 56.1 years against 55.1 years for females. Although male life expectancy was about a year more than female life expectancy in both rural and urban areas, the urban life expectancy exceeded the rural life expectancy by over five years for both sexes.

The male mortality rate below age 10, from the life tables based on NFMS data, was 18.6 compared to 18.4 from SRS 1975 and.

for females the corresponding rate was 19.1 from NFMS against 18.6 from SRS. For both sexes combined, the mortality rate below age 10 was 18.8 from NFMS and 18.5 from SRS, 1975. Thus the 1980 NFMS rates were close to the 1975 SRS rates of mortality below age 10.

For all ages, the death rate for males was 11.6 from NFMS against 11.0 from SRS, 1975 and for females it was 12.8 from NFMS against 11.9 from SRS. For both sexes combined, the NFMS death rate was 12.2 against the SRS rate of 11.3 averaged over 1977-79. The small difference observed between the two rates could be ascribed to under-reporting of deaths in SRS and also to possible over-correction of the NFMS rate by indirect methods.

The weighted birth and death rates from family cards were slightly adjusted for the more complete information in the individual cards. To this a term was added to correct for response errors between the interview and the reinterview. This correction term was obtained by comparing the rate based on the original interview with that based on the reinterview from a sub-sample of 3,047 families.

The rural birth rate from NFMS, corrected for response errors, was 33.1 against an average rate of 27.5 from SRS for 1977-1979. By the reverse survival method, applied to NFMS data, the rate was 33.9. Since the correction for response errors is unlikely to over-correct the NFMS data, the lower rate from SRS for an earlier period may be attributed mainly to non-sampling errors and sampling fluctuations in SRS. For urban areas, the birth rate from the two sources did not differ much. The NFMS birth rate, corrected for response errors, was 25.5 and by the reverse survival method it was 25.1 against an average of 25.1 from SRS for 1977-1979. Compared to SRS, the higher rural birth rate in NFMS resulted in a somewhat higher birth rate for

the State. The State birth rate was 30.4 corrected for response errors (30.8 by the reverse-survival method) against an average birth rate of 26.8 from SRS for 1977-1979.

Corrected for response errors, the NFMS death rates were 11.9 for rural areas, 6.5 for urban areas and 10.0 for the State. The corresponding death rates from SRS, averaged over 1977-1979, were 12.7, 8.4 and 11.3. The difference in the rate between the two sources was larger for urban areas than for rural areas. The NFMS death rates, even after correction for response errors, were well below the SRS rates possibly because of other sources of under-reporting of deaths in the family survey.

Based on the several alternative estimates by indirect procedures and from the reinterview data, limits can be set to the level of rural, urban and State birth and death rates from NFMS. Weighted birth rates from NFMS, corrected for response errors and obtained by the reverse survival method were 33.1 and 33.9 for rural areas; 25.5 and 25.1 for urban areas and 30.4 and 30.8 for the State. These provide fairly narrow limits to the birth rate that are unlikely to be over-corrected. Weighted death rates from NFMS, corrected for response errors and obtained by indirect methods were 10.0 and 12.2 for the State. The weighted death rates, corrected for response errors, were 11.9 in rural areas and 6.5 in urban areas. The indirect estimates of death rates were 11.6 for males and 12.8 for females. In a family survey, deaths are likely to be under-reported for reasons other than response error. By contrast, the indirect methods might have over-corrected the death rate, especially of females. Hence the range for the death rate of Maharashtra State obtained by the two procedures extended from 10.0 to 12.2.

For the State of Maharashtra, taking the average of the limits, the birth rate may be placed at 30.6 while the death rate may be placed at 11.1. This would yield a natural

increase rate of 1.95 per cent per annum. Since the reference period for reporting vital events in NFMS was the two years preceding the date of interview and the field interview extended from June to December, 1980, the reference period for these rates may be taken as April 1979 to March 1980.

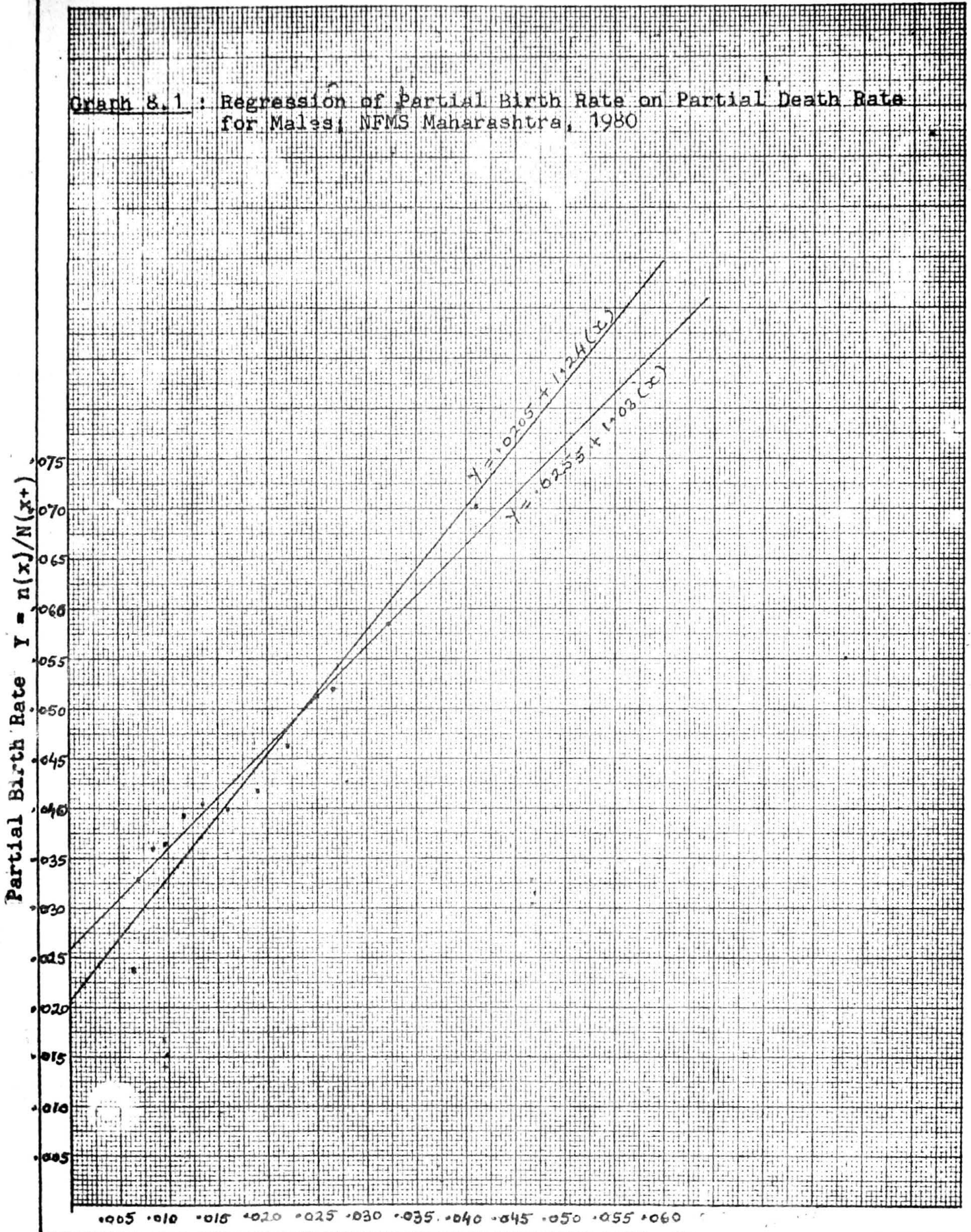
From the Census, the mean geometric growth rate for the State over the decade 1971-1981 was 2.2 per cent. The NFMS natural increase rate was slightly below the Census growth rate. This is reasonable since NFMS rates relate to a reference year about 3 years later than the mid-year of the intercensal period and since the Census growth rate includes net in-migration to the State during 1971-1981.

The demographic parameters estimated from NFMS were checked for mutual consistency using the stable populations generated by United Nations (1982). These stable age distributions and population parameters were generated for South Asia and other developing regions based on regional mortality patterns and life tables. The male life expectancy from NFMS was 58.1 years. Assuming a rate of natural increase of 2.0 per cent, this would correspond to a stable birth rate of 31.0 and a stable death rate of 11.0 according to the United Nations Stable Populations. The female life expectancy from NFMS was 56.9 years. Again assuming a rate of natural increase of 2.0 per cent, this would correspond to a stable birth rate of 31.9 and a stable death rate of 11.9. The average stable birth and death rates for both sexes are 31.4 and 11.4 respectively which come rather close to the NFMS birth and death rates of 30.6 and 11.1. Thus the demographic parameters estimated from NFMS appear to be mutually consistent.

REFERENCE

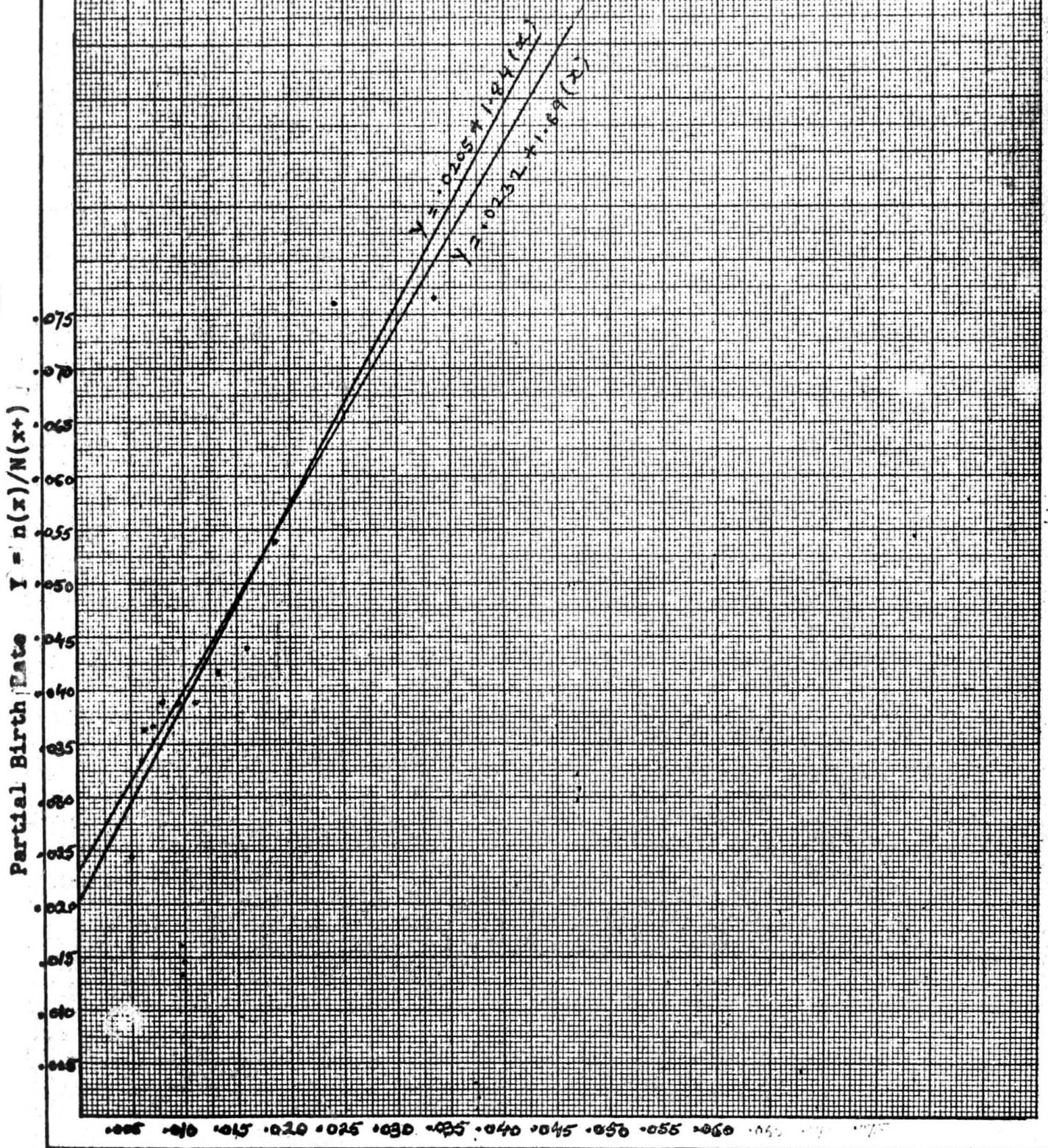
1. Brass, William (1975). Methods for Estimating Fertility and Mortality from Limited and Defective Data : Chapel Hill, University of North Carolina, International Program of Laboratories for Population Statistics. xii, pp. 159.
2. Bennett, Neil G., and Horiuchi, Shiro (1981). Estimating the completeness of Death Registration in a Closed Population. Population Index Vol. 47. No. 2, pp. 207-221.
3. Committee on Population and Demography (1981). Estimation of Recent Trends in Fertility and Mortality in Bangladesh. National Academy Press, Washington D.C.
4. Office of the Registrar General, India (1979). Report on Sample Registration System in Western Zone 1970-75. Vital Statistics Division, Ministry of Home Affairs. New Delhi.
5. Preston, Samuel, Coale, Ansley J, Trussell, James; and Weinstein, Maxine (1980). Estimating the completeness of reporting of adult deaths in populations that are approximately stable. Population Index Vol. 46 No. 2. pp. 179-292.
6. Preston, Samuel, and Hill, Kenneth (1980). Estimating the Completeness of death registration, Population Studies, Vol. 34, No. 2, pp. 349-366.
7. United Nations (1982). Stable Populations Corresponding to the New United Nations Model Life Tables for Developing Countries. United Nations : New York.

Graph 8.1 : Regression of Partial Birth Rate on Partial Death Rate for Males, NFMS Maharashtra, 1980



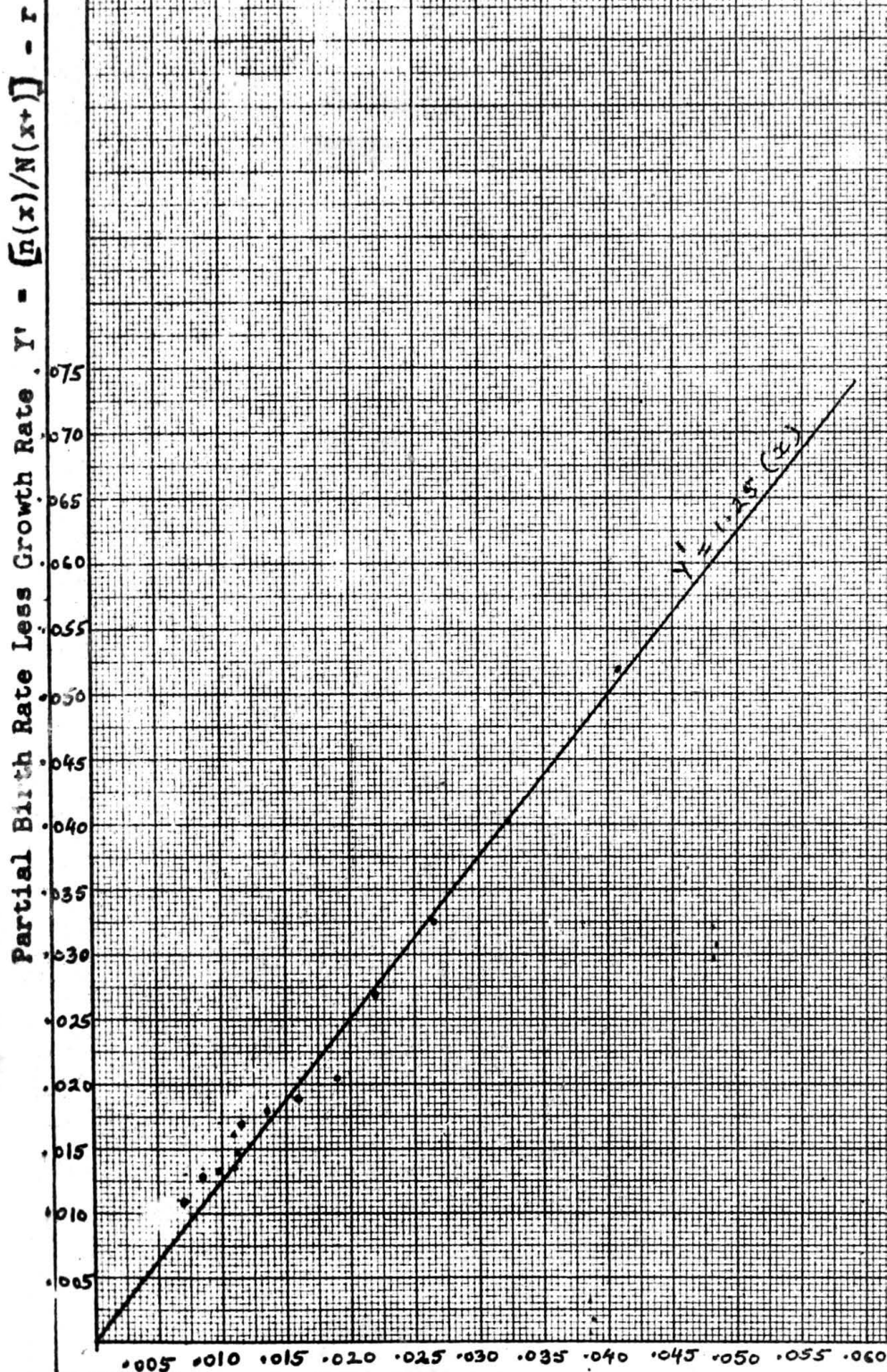
Partial Death Rate $X = D(x+)/N(x+)$
 See text for explanation

Graph 8.2 : Regression of Partial Birth Rate on Partial Death Rate for Females : NFMS Maharashtra, 1980



Partial Death Rate $X = D(x+0)/N(x+)$
 See text for explanation.

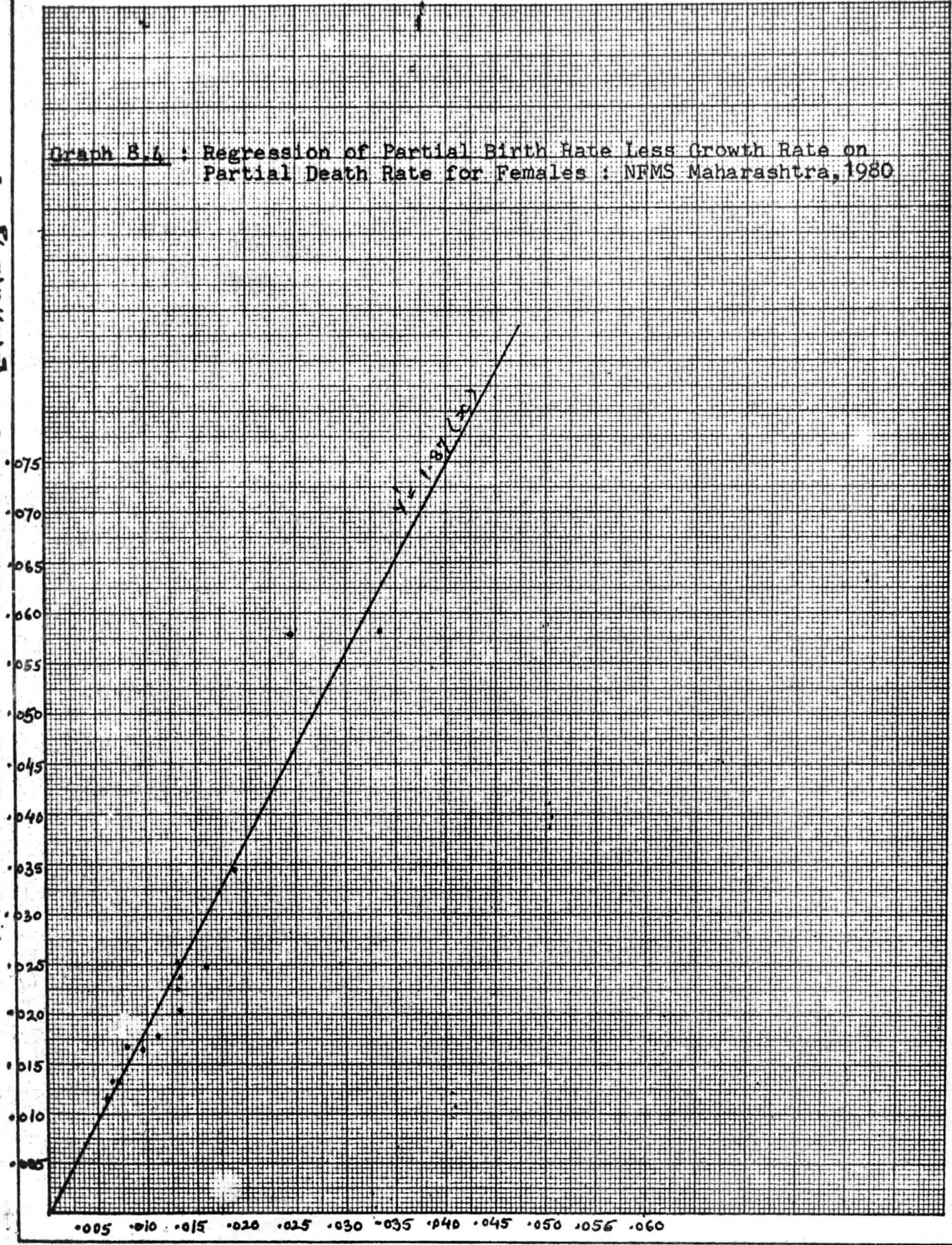
Graph 8.3 : Regression of Partial Birth Rate Less Growth Rate on Partial Death Rate for Males ; NFMS Maharashtra, 1980



Partial Death Rate $X = \frac{D(x+)}{N(x+)}$
See text for explanation.

Partial Birth Rate Less Growth Rate $Y' = \left[\frac{b(x)}{N(x+)} \right] - r$

Graph B.4 : Regression of Partial Birth Rate Less Growth Rate on Partial Death Rate for Females : NFMS Maharashtra, 1980



Partial Death Rate $X = D(x+)/N(x+)$
See text for explanation

Table 8.1 : Partial Birth and Death Rates for the Application of Brass Method: NFMS Maharashtra, 1980

Age 'X'	Males		Females	
	$n(x)/N(x+)$	$D(x+)/N(x+)$	$n(x)/N(x+)$	$D(x+)/N(x+)$
5	.0240	.0065	.0244	.0050
10	.0327	.0072	.0335	.0057
15	.0361	.0084	.0363	.0065
20	.0364	.0097	.0362	.0070
25	.0393	.0114	.0391	.0080
30	.0405	.0136	.0389	.0094
35	.0400	.0160	.0391	.0109
40	.0418	.0190	.0417	.0132
45	.0463	.0221	.0439	.0158
50	.0519	.0265	.0539	.0187
55	.0586	.0322	.0761	.0243
60	.0703	.0409	.0765	.0337

$n(x)/N(x+) =$ Partial Birth Rate. $D(x+)/N(x+) =$ Partial Death Rate.
For definitions see text.

Table 8.2 : Partial Birth Rate Adjusted for Changing Growth Rate by Sex for Applying the Modified Brass Method: NFMS Maharashtra, 1980

Age 'X'	Growth rate per 1000 r	Males (per 1000)		Females (per 1000)	
		PBR	PBR - r	PBR	PBR - r
10	21.8	32.7	10.9	33.5	11.7
15	23.0	36.1	13.1	36.3	13.3
20	23.0	36.4	13.4	36.2	13.2
25	22.4	39.3	16.9	39.1	16.7
30	22.4	40.5	18.1	38.9	16.5
35	21.2	40.0	18.8	39.1	17.9
40	21.2	41.8	20.6	41.7	20.5
45	19.2	46.3	27.1	43.9	24.7
50	19.2	51.9	32.7	53.9	34.7
55	18.3	58.6	40.3	76.1	57.8
60	18.3	70.3	52.0	76.5	58.2

PBR = Partial Birth Rate from Table 8.1.

'r' = Growth Rate per 1000.

Table 8.3 : Correction Factor for Each Cumulated Age Group by Sex by Preston and Brass Methods of Indirect Estimation of Underestimation of Deaths: NFMS Maharashtra, 1980

Age a and over	Males					Females				
	PDR	PBR - r	Preston Death Rate	K Brass	K Preston	PDR	PBR - r	Preston Death Rate	K Brass	K Preston
	b	c	d	c/b	d/b	e	f	g	f/e	g/e
10	7.2	10.9	9.9	1.51	1.37	5.7	11.7	10.9	2.05	1.91
15	8.4	13.1	11.3	1.56	1.35	6.5	13.3	12.1	2.05	1.86
20	9.7	13.4	12.9	1.38	1.33 ^m	7.0	13.2	12.8	1.89	1.83
25	11.4	16.9	14.9	1.48	1.31	8.0	16.7	14.4	2.01	1.80
30	13.6	18.1	17.3	1.33	1.27	9.4	16.5	16.8	1.76	1.79
35	16.0	18.8	20.4	1.17	1.28	10.9	17.9	19.5	1.64	1.79
40	19.0	20.6	24.5	1.08	1.29	13.2	20.5	23.7	1.55	1.80
45	22.1	27.1	29.1	1.23	1.32 ^m	15.8	24.7	28.9	1.56	1.83 ^m
50	26.5	32.7	35.5	1.23	1.34	18.7	34.7	35.9	1.86*	1.92
55	32.2	40.3	44.6	1.25	1.39	24.3	57.8	43.9	2.38	1.81 ^m
60	40.9	52.0	-	1.27*	-	33.7	58.2	-	1.73	-

* = Median. m : Median lies between these values. K = Correction factor.

See text for explanation of the methods.

Table 8.4 : Comparison of Correction Factors for Males and Females by Several Indirect Methods: NFMS Maharashtra, 1980

Method of estimation	Correction factor	
	Males	Females
1. Least squares with growth rate = 2.05	1.24	1.84
2. Least squares with changing growth rate	1.25	1.87
3. Brass Method with changing growth rate (Median)	1.27	1.86
4. Preston Method with growth rate = 2.05 (Median)	1.32	1.82

See text for explanation of the methods.

Table 8.5 : Comparison of Uncorrected and Corrected NFMS Death Rate with SRS Rate for Ages 10 and Over by Sex: NFMS Maharashtra, 1980

	Death rate for ages 10 and over	
	Males	Females
1. Uncorrected, NFMS estimate	7.2	5.7
2. Corrected, NFMS estimate	9.0	10.5
3. SRS estimate for 1975	8.5	9.5

Table 8.6 : Comparison of Corrected and Uncorrected Death Rates by Sex by Cumulated Age Groups from NFMS, 1980 with Those from SRS, 1975

Age X and above	Death Rate					
	Males			Females		
	Uncorrected NFMS	Corrected NFMS	SRS	Uncorrected NFMS	Corrected NFMS	SRS
10	7.2	9.0	8.5	5.7	10.5	9.5
15	8.4	10.5	10.3	6.5	12.0	11.3
20	9.7	12.1	12.1	7.0	12.9	13.1
25	11.4	14.2	14.3	8.0	14.8	14.9
30	13.6	17.0	16.7	9.4	17.4	17.3
35	16.0	20.0	20.2	10.9	20.2	20.5
40	19.0	23.7	24.9	13.2	24.4	24.6
45	22.1	27.6	31.4	15.8	29.2	31.2
50	26.5	33.1	41.9	18.7	34.6	40.0
55	32.2	40.2	57.3	24.3	45.0	53.9
60	40.9	51.1	82.3	33.7	62.3	72.2

See text for explanation.

Table 8.7 : Male Life Table for Maharashtra State: NFMS, Maharashtra, 1980

Age	n^m_x	n^q_x	l_x	n^d_x	n^L_x	T_x	e_x^0
0	0.1115	0.1036	100000	10360	92499	5809862	58.10
1	0.0119	0.0445	89640	3989	347815	5717363	63.78
5	0.0040	0.0198	85651	1696	424015	5369548	62.69
10	0.0020	0.0100	83955	840	417675	4945533	58.91
15	0.0019	0.0095	83115	790	413600	4527858	54.48
20	0.0019	0.0095	82325	782	409670	4114258	49.98
25	0.0021	0.0104	81543	848	405595	3704588	45.43
30	0.0030	0.0149	80695	1202	400470	3298993	40.88
35	0.0042	0.0208	79493	1653	393332	2898523	36.46
40	0.0055	0.0272	77840	2117	383907	2505191	32.18
45	0.0074	0.0364	75723	2756	371725	2121284	28.01
50	0.0103	0.0503	72967	3670	355660	1749559	23.98
55	0.0154	0.0743	69297	5149	333612	1393899	20.11
60	0.0302	0.2660	64148	17063	556165	1060287	16.53
70 +	0.0934	1.0000	47085	47085	504122	504122	10.71

The m_x values of central death rates are from NFMS Maharashtra, 1980. They have been adjusted for incomplete reporting of deaths as discussed in the text.

Table 8.8 : Female Life Table for Maharashtra State: NFMS Maharashtra, 1980

Age	n^m_x	n^q_x	l_x	n^d_x	n^L_x	T_x	e_x^0
0	0.1113	0.1036	10000	10360	92499	5691111	56.91
1	0.0125	0.0466	89640	4177	347292	5598612	62.46
5	0.0045	0.0223	85463	1906	422550	5251320	61.45
10	0.0035	0.0174	83557	1454	414150	4828770	57.79
15	0.0030	0.0149	82103	1223	407457	4414620	53.77
20	0.0025	0.0124	80880	1003	401892	4007163	49.54
25	0.0025	0.0124	79877	990	396910	3605271	45.14
30	0.0030	0.0149	78887	1175	391497	3208361	40.67
35	0.0035	0.0174	77712	1352	385180	2816864	36.25
40	0.0042	0.0208	76360	1588	377830	2431684	31.84
45	0.0056	0.0276	74772	2064	368700	2053854	27.47
50	0.0087	0.0426	72708	3097	355797	1685154	23.18
55	0.0145	0.0701	69611	4880	335855	1329357	19.10
60	0.0322	0.2813	64731	18209	556265	993502	15.35
70+	0.1064	1.0000	46522	46522	437237	437237	9.40

The m_x values of central death rates are from NFMS Maharashtra, 1980. They have been adjusted for incomplete reporting of deaths as discussed in the text.

**Table 8.9 : Life Table Parameters from Census and NFMS
Maharashtra, 1980 by Sex for Rural and Urban Areas**

Region/Sex	e_0^0	e_5^0	e_{10}^0
Total Maharashtra			
NFMS 1980 Males	58.10	62.69	58.91
Census 1961-71, Western zone, Males	48.57	53.98	50.94
NFMS 1980 Females	56.91	61.45	57.79
Census 1961-71, Western zone, Females	49.00	55.25	52.83
Urban Maharashtra			
NFMS 1980 Males	62.06	63.64	59.81
NFMS 1980 Females	60.74	62.42	58.70
Rural Maharashtra			
NFMS 1980 Males	56.07	62.16	58.39
NFMS 1980 Females	55.12	61.06	57.45

Census parameters are taken from 'Census of India 1971, Paper 1 of 1977 - Life Tables' and NFMS parameters from Tables 8.7 and 8.8. The method of calculation of rural and urban estimates is discussed in the text. Gujarat, Maharashtra and Goa are included in the Western zone in the Census Paper.

Table 8.10 : Comparison of Indirectly Estimated Death Rates from NFMS with SRS Rates for Ages upto 10, for Ages 10 and Over and for All Ages by Sex: NFMS Maharashtra, 1980

Age		Male		Females		Persons
		Death rate	Percentage of population	Death rate	Percentage of population	Death rate
Upto 10	NFMS*	18.6	28.0 ⁺	19.1	27.8 ⁺	18.8
	SRS 1975	18.4	26.45	18.6	26.85	18.5
10 and over	NFMS**	9.0	72.0 ⁺	10.5	72.2 ⁺	9.8
	SRS 1975	8.5	73.55	9.5	73.15	9.0
All Ages	NFMS	11.6	100.0	12.8	100.0	12.2
	SRS 1975	11.0	100.0	11.9	100.0	11.4
	SRS 1979	-	-	-	-	10.9
	SRS 1979 (pooled)	-	-	-	-	10.7
	SRS (1977-79)	-	-	-	-	11.3

* The central death rate calculated by the formula $(l_0 - l_{10}) / (T_0 - T_{10})$ from tables 8.7 and 8.8.

** Adjusted rate for ages 10 and over taken from Table 8.5.

+ Percentages calculated from NFMS age distribution.

Table 8.11 : Estimation of CBR and CDR, Unweighted for Individual and Family Cards, Weighted for Family Cards and Adjusted for Events Reported in Individual Cards: NFMS Maharashtra, 1980

	Unweighted				Weighted for family cards		Weighted and adjusted for individual cards	
	For individual cards		For family cards		CBR	CDR	CBR	CDR
	CBR	CDR	CBR	CDR				
Aurangabad Division	35.51	10.59	34.4	10.2	33.67	11.77	34.78	12.16
Nagpur Division	33.89	9.21	33.0	9.1	33.21	10.03	34.10	10.14
Western Maharashtra	31.41	7.42	30.7	7.3	28.67	8.57	29.38	8.69
Rural Maharashtra	32.84	8.49	32.0	8.3	30.91	9.58	31.74*	9.74*
Urban excluding Greater Bombay	26.00	7.67	25.9	7.6	24.59	6.37	24.69	6.44
Greater Bombay	23.24	5.39	22.7	5.3	23.86	5.40	24.40	5.49
Urban Maharashtra	24.86	6.73	24.6	6.7	24.13	5.76	24.51*	5.84*
Maharashtra	30.09	7.88	29.5	7.8	28.54	8.24	29.21*	8.37*

* Weighted average of regions/zones.

Table 8.12 : Correction Term from Reinterview by Difference
Method and Vital Rates Corrected for Response
Error: NFMS Maharashtra, 1980

	Rural		Urban		Maharashtra	
	CBR	CDR	CBR	CDR	CBR	CDR
Reinterview	32.124	7.258	23.671	6.492	-	-
Original	30.773	5.123	22.723	5.831	-	-
Correction term by difference	1.351	2.135	0.948	0.661	-	-
Weighted and adjusted rate*	31.74	9.74	24.51	5.84	29.21	8.37
Correction term	1.35	2.14	0.95	0.66	1.21	1.62
Corrected rate	33.09	11.88	25.46	6.50	30.42	9.99

* Weighted and adjusted rate taken from Table 8.11.

Table 8.13 : Comparison of NFMS Rates Corrected for Response
Error with SRS Rates for Relevant Years: NFMS
Maharashtra, 1980

	Rural		Urban		Maharashtra	
	CBR	CDR	CBR	CDR	CBR	CDR
NFMS weighted rates corrected for response error *	33.1	11.9	25.5	6.5	30.4	10.0
Reverse-survival estimate of CBR @	33.9	-	25.1	-	30.8**	-
SRS 1979	28.1	12.2	24.9	7.9	27.1	10.9
SRS 1979(Pooled)	28.3	12.0	24.7	7.9	27.2	10.7
SRS (1977-1979)	27.5	12.7	25.1	8.4	26.8	11.3

* Estimates are taken from Table 8.12.

** Weighted average

@ This was based on reverse-survival of the number of living children aged 0 and 1 as obtained from NFMS. The method is described in the text.

APPENDIX C
CHAPTER 8

BRASS AND PRESTON METHODS FOR INDIRECT
ESTIMATION OF THE DEATH RATE

The indirect methods make the following assumptions:

1. The population is demographically stable or quasi-stable;
2. The proportion of under-registration of death is the same for all age groups; and
3. There is no age misreporting.

BRASS METHOD

In a stable population

$$b = r + Kd \quad \dots(1b)$$

where b = birth rate, d = death rate, r = growth rate and K is the correction factor. If there is no under-reporting $K = 1$.

Using partial birth and death rates equation (1b) can be written as

$$\frac{n(x)}{N(x+)} = r + K \frac{D(x+)}{N(x+)} \quad \dots(2b)$$

where $n(x)$ = number of persons of exact age x ,

$n(x+)$ = number of persons aged x and over,

$D(x+)$ = number of deaths to persons aged x and over,

$\frac{n(x)}{N(x+)}$ = partial birth rate and

$\frac{D(x+)}{N(x+)}$ = partial death rate.

$$\text{Therefore, } K = \frac{[n(x) - r \cdot N(x+)]}{D(x+)} \quad \dots(3b)$$

The completeness of reporting C is given by $C = 1/K$.

K times the reported death rate gives an estimate of the true death rate.

PRESTON METHOD

In a stable population the following relation holds:

$$B = \sum_{x=0}^w D^*(x) \exp(rx) \quad \dots(1p)$$

where B = number of births to the population in a year/period,

C.2

$D^*(x)$ = number of deaths to the persons aged x in that population and

r = growth rate of the stable population.

If there is under-reporting of deaths then equation (1p) becomes:

$$B = K \sum_{x=0}^w D(x) \exp(rx) \quad \dots(2p)$$

where K = correction factor,

$D(x)$ = reported number of deaths to persons aged ' x '.

If N = population in a specific year/period,

b = birth rate for that year/period, and

d^* = death rate for that year/period

then $Nb = B$

and $b = r + d^*$ for a stable population.

Substituting this in equation P(2p) :

$$N(r + d^*) = K \sum_{x=0}^w D(x) \exp(rx) \quad \dots(3p)$$

If there is under-reporting, then $d^* = Kd$, where d is the observed death rate.

With D = Total number of deaths = $\sum_{x=0}^w D(x)$,
the reported death rate $d = D/N$

Substituting this into equation (3p),

$$\frac{D}{d} (r + Kd) = K \sum D(x) \exp(rx) \quad \dots(4p)$$

Solving for K we derive the equation :

$$K = \left\{ \sum d(x) \cdot \exp(rx) - 1 \right\} \left(\frac{d}{r} \right) \quad \dots(5p)$$

where $D(x)/D = d(x)$.

The completeness of registration $C = 1/K$.

K times the reported death rate gives the corrected death rate.

CHAPTER 9

QUALITY OF DATA AND RESPONSE ERRORS

Introduction

In Chapter 3 the demographic profile from NFMS was compared with that from the 1971 Census in order to examine the representativeness of the sample, to establish trends in demographic variables and to find the differences in the definitions used in the Census and the survey. In Chapter 8 the completeness of reporting deaths in the family was assessed by indirect methods and the birth and death rates were corrected for response errors on the basis of NFMS reinterview data. In this chapter, the quality of the data from NFMS, Maharashtra and the errors in response are further assessed. The key variables for which an assessment of quality is made are the reported age of the individual, numbers of births and deaths reported in the two years preceding the interview, family composition by male and female adults and non-adults, immigrants and births in the last two years, and out-migrants and deaths in the last two years.

Digital preference and age bias are measured by such indices as the age ratio, Myers' index and Whipple's index by sex for each domain of study. Response errors in the other characteristics are measured using the data from the original interview and the reinterview of a sub-sample of about 3,000 families. This analysis confirms some of the observations made in the earlier chapters regarding the relative quality of data on these several variables.

Quality of Age Returns

The quality of age returns was assessed from data collected in the family questionnaire which was generally answered by the head of the family. The age ratio is the number of individuals in a particular age in years (or months) to the average number in

the two adjacent ages (or months). For instance, the ratio of 1.15 shown for males under the second column "6 months" in Table 9.1 is the number of male infants aged 6 months to the average number aged 5 and 7 months. From this table, it is seen that the preference ratio for 12, 18 and 24 months for both males and females was much higher than for 6 months. Also the ratios for these three ages were larger for Aurangabad Division than for any other domain, indicating a poorer quality of age returns from this rural region.

At age 5, the age ratio was near unity for both sexes, more than due to reduced digit preference. perhaps/due to age misreporting/ The female preference for age 20 was more than the male preference for this age. For both males and females, the digital preferences for ages 30, 35, 40 and 45 were large. For females, the preference for age 50, was much less than for ages 45 or 55. This could be ascribed to the fact that an additional questionnaire was to be canvassed for currently married women aged 50 or below in NFMS so that some women preferred to give their actual age above 50 rather than to round it off to 50 years. There was marked rounding-off at ages 50, 65 and 70 among both males and females. The age ratio for females was, however, larger than for males at these ages. On the whole, the data reveal marked preference to ages 12 months and 24 months among infants and to multiples of 5 years among those aged 10 and over. This age rounding-off was more drastic in older ages among both sexes.

Among males and females aged 10 to 49, the digital preference is analysed in terms of conventional indices due to Myers and Whipple in Table 9.2. In each domain, for both sexes, the most preferred digit was 0 (19.2 per cent males and 18.8 per cent females returning ages ending in 0) followed by ages ending in digit 5 (18.7 per cent males and 18.4 per cent females returning ages ending in 5). The digits 2 and 8 were more balanced. The other digits were in deficit, below 10 per cent. Myers' index

for the State was 19.8 for males and 18.7 for females and Whipple's index 233 for males and 229 for females. Contrary to expectations, the female index was lower than the male index for two reasons. The ages of currently married women were checked for consistency and corrected to some extent on the basis of their reproductive histories. The information on the ages of family members was generally obtained from the head of the family who was mostly a male. Using his age as pivot, the head reported the ages of other members. For instance, he might report that his wife was four years younger than him. Hence the head's age was possibly subject to more digital preference than that of other family members and this could also affect the digital preference of males.

The rural indices were above the urban indices of digital preference. Myers' index in rural areas was 20.1 for males and 20.4 for females while in urban areas it was 19.2 for males and 15.6 for females. Whipple's index showed similar differentials, although the rural-urban differentials in digital preference were not large.

Response Errors

To assess the response errors, NFMS was immediately followed by a reinterview of a sub-sample of 44 villages, and 33 urban blocks consisting of 2,192 and 855 sample families respectively. Information was obtained in the reinterview only on a limited set of items such as the number and composition of usual family members and the numbers of births and deaths to them during the two years preceding the date of the original interview.

The number of births reported in the original interview to usual members of the family by the number reported in the reinterview is shown in Table 9.3 to examine the gross response error. Of the 1,454 rural families reporting no birth during the preceding two years in the original interview, 97.2 per cent reported no birth in the reinterview. Of 646 families reporting one birth

in the original interview, 93.7 per cent reported one birth in the reinterview. Similarly among the 79 families reporting 2 births in the original interview, 91.2 per cent reported 2 births in the reinterview. Among the 9 families reporting 3 births, only 77.8 per cent reported 3 births in the reinterview. Only four families reported four births in both interviews. The percentage of identical responses seems to decrease with increasing number of births reported. This relationship suggests that the error in the perception of the reference period might increase when more events are reported. A similar pattern of error was found for urban areas and for the State.

Table 9.4 shows the gross response error in the number of deaths to usual members of the family during two years preceding the date of the original interview by the number of deaths reported in the same period at reinterview. In rural areas, of the 2,058 families reporting no death in the original interview, 97.3 per cent reported no death in the reinterview, whereas among the 128 families reporting one death at the time of the original interview, 94.5 per cent reported one death in the reinterview. This pattern may again be attributed to errors in the perception of the reference period of two years preceding the date of the original interview. A similar pattern is observed for urban areas and for the State.

The composition of the family in terms of the average number of male and female adults and non-adults, and the family size as estimated from the interview and the reinterview of the subsample are presented in Table 9.5. The difference in the averages between the interview and the reinterview is a net difference, since random variations are cancelled to a large extent in the averages. The percentage difference between the reinterview and the original interview for all the compositional variables and family size was generally below 1.0 per cent showing that there were no systematic biases between the interview and the

reinterview. Only the average number of male non-adults was less in the reinterview compared to the original interview. For all other variables, the average from the reinterview was more than that from the interview. This is, perhaps indicative of a somewhat superior investigation at the time of the reinterview, which was done by the supervisor. Table 9.5 shows that the net errors in the estimates from the interview and the reinterview were rather small and that response errors varied randomly rather than systematically.

The gross response error is summarised for selected variables by two indices in Table 9.6. The off-diagonal proportion is the proportion of non-identical responses. However, this is a poor measure of gross response error since it depends on the number of categories in the answer. The more the non-zero response categories the larger should this proportion be. This index is also affected by the distribution of the responses over the categories. When most of the responses fall in one or two categories, this proportion would be small than when the responses are well distributed over all the categories. For these reasons, it is inappropriate to compare the off-diagonal proportion for different variables.

It is more valid to compare the response error defined as $100 - 100$ (measure of association), with the Crammer measure of association

$$= \sqrt{(X^2/n (k-1))}$$

where n = the number of observations and

k = the number of non-zero response categories

(Srikantan, 1979).

The percentage response error is shown in Table 9.6 for selected characteristics in rural and urban areas and for the State. In rural areas, family composition by sex and by whether adult or non-adult had the least response error. The number of non-adults

by sex had less response error than the number of adults. The number of births to usual members of the family in the preceding two years had a larger response error and the number of deaths to usual members had the largest response error. Immigrants and births in the last two years, and outmigrants and deaths in the last two years had response errors between those for the numbers of births and deaths. The same ranking of variables by response errors was found for urban areas and for the State.

These results clearly establish that the count of the usual members of the family was least subject to response errors. The number of births reported in the last two years contained larger response errors but the number of deaths reported in the last two years contained the largest response errors. These findings bear out the observations made in Chapter 8 regarding the larger errors involved in the estimation of the death rate compared to the birth rate from data collected in a family survey such as NFMS, Maharashtra.

Summary of Findings

In this chapter the quality of age reports and response errors in some key characteristics were assessed. The data revealed marked preference to ages 12 months and 24 months and among those aged 10 and over to multiples of 5 years. This age rounding-off was more drastic in older ages among both sexes. Both Myers' index and Whipple's index of digital preference were high with the largest preference for digit 0 followed by digit 5. Contrary to expectations, the female index was lower than the male index because the male head of the family generally reported the ages with his own age as pivot and because the ages of currently married women were checked for consistency on the basis of their reproductive histories. The rural indices of digital preference were somewhat above the urban indices.

The gross and net response errors were assessed by comparing the answers given in the original interview with those given in the

reinterview which was conducted for a sub-sample of 3,047 families. The number of births reported by the family in the interview was compared with the number reported in the reinterview. The percentage of identical responses decreased with increasing number of births reported. This relationship suggests that the error in the perception of the reference period might increase when more events are reported. A similar pattern was observed between the number of deaths reported to family members in the original interview and the number reported in the reinterview.

The net error was calculated for family composition and size in terms of the percentage difference in the averages based on the interview and reinterview of the sub-sample. The net errors were rather small and the response errors appeared to vary randomly rather than systematically.

The percentage response error was calculated using an appropriate index. Family composition by sex and by whether adult or non-adult had the least response error. The number of births to usual members of the family in the preceding two years had a larger response error and the number of deaths to usual members had the largest response error. The observations made in Chapter 8 regarding the larger errors involved in the estimation of the death rate compared to the birth rate from NFMS data are confirmed by this analysis of response errors.

Reference

Srikantan, K.S. (1979). An Evaluation of the Fiji Fertility Survey Based on the Post-Enumeration Survey. Occasional Papers, No.21. World Fertility Survey:London.

Table 9.1 : Age Ratios* at Selected Months for Those Under 2 Years and for Selected Ages for Those Above 2 Years of Age by Sex: NFMS Maharashtra, 1980

	6 months	12 months	18 months	24 months	5 years	10 years	15 years	20 years	25 years
<u>Males</u>									
Aurangabad Division	1.09	7.56	5.50	15.00	1.01	1.67	0.97	1.80	2.68
Nagpur Division	0.44	1.89	2.00	1.30	0.89	1.61	1.20	2.18	2.26
Western Maharashtra	1.50	3.35	5.76	3.70	0.92	1.33	1.39	1.72	2.15
Rural Maharashtra	1.00	3.55	3.90	3.10	0.93	1.46	1.19	1.73	2.28
Urban excluding Greater Bombay	1.37	2.19	3.00	2.67	0.96	1.36	1.17	1.29	2.19
Greater Bombay	2.00	3.60	12.00	0.70	0.87	1.50	1.15	2.16	1.75
Urban Maharashtra	1.57	2.65	4.29	1.44	0.92	1.41	1.17	1.61	1.98
Total Maharashtra	1.15	3.27	3.96	2.38	0.93	1.45	1.18	1.68	2.17
<u>Females</u>									
Aurangabad Division	3.00	6.80	2.20	4.67	0.93	1.44	1.10	2.64	1.97
Nagpur Division	0.89	1.91	2.75	1.77	1.05	1.37	0.77	2.59	1.98
Western Maharashtra	1.00	4.79	4.00	2.00	1.65	1.30	1.18	2.45	3.09
Rural Maharashtra	1.46	4.03	3.22	2.24	1.25	1.34	1.04	2.52	2.52
Urban excluding Greater Bombay	1.09	3.00	5.33	2.83	1.07	1.34	1.25	2.18	1.84
Greater Bombay	0.33	1.60	8.67	1.80	0.75	1.22	0.90	1.42	2.08
Urban Maharashtra	0.70	2.46	6.17	2.36	0.94	1.29	1.10	1.85	1.93
Total Maharashtra	1.23	3.56	3.80	2.28	1.12	1.32	1.06	2.27	2.29

* $2(\text{Number in age } x(\text{months/years})) / (\text{Sum of numbers in ages } (x-1) \text{ and } (x+1))$.

(continued)

Table 9.1 : (continued)

	30 years	35 years	40 years	45 years	50 years	55 years	60 years	65 years	70 years
<u>Males</u>									
Aurangabad Division	5.37	2.77	5.41	3.79	4.56	5.86	5.30	7.50	4.62
Nagpur Division	6.26	4.11	4.57	5.00	6.82	3.78	13.82	10.00	22.50
Western Maharashtra	4.69	3.44	4.92	5.23	7.55	4.48	6.44	14.90	20.00
Rural Maharashtra	5.21	3.46	4.91	4.89	6.58	4.42	7.61	11.51	13.45
Urban excluding Greater Bombay	5.11	4.27	7.52	4.28	5.18	3.35	9.52	18.86	15.67
Greater Bombay	3.18	3.77	5.94	4.60	3.75	3.33	6.67	4.75	7.33
Urban Maharashtra	4.20	4.02	6.73	4.42	4.48	3.34	8.33	11.33	12.89
Total Maharashtra	4.82	3.66	5.45	4.71	5.76	4.00	7.78	11.47	13.32
<u>Females</u>									
Aurangabad Division	4.51	2.22	3.14	3.91	1.88	5.23	7.48	41.00	8.80
Nagpur Division	5.19	2.54	7.57	5.31	3.09	5.04	82.67	24.50	15.00
Western Maharashtra	4.00	3.97	6.03	6.54	1.67	7.14	13.14	25.20	39.67
Rural Maharashtra	4.35	3.20	5.73	5.60	1.95	6.04	14.38	27.00	26.80
Urban excluding Greater Bombay	3.56	4.03	5.12	3.36	1.52	11.16	38.67	15.14	15.33
Greater Bombay	2.38	2.21	4.35	3.49	2.53	3.36	8.91	9.43	24.00
Urban Maharashtra	2.99	3.06	4.75	3.41	1.85	6.51	19.41	12.29	17.50
Total Maharashtra	3.79	3.15	5.37	4.60	1.91	6.16	15.45	20.13	23.57

Table 9.2 : Digit Preferences in Age Reporting as Measured by Myer's and Whipple's Indices:
NFMS Maharashtra, 1980

	Male/ Female	Ending Digit										Myer's Index *	Whipple's Index **
		0	1	2	3	4	5	6	7	8	9		
Aurangabad Division	M	19.9	7.1	10.3	5.8	5.6	17.0	9.0	9.3	10.8	5.2	18.0	217
	F	18.5	7.4	10.9	8.1	8.9	17.8	8.2	5.2	9.2	5.7	17.3	215
Nagpur Division	M	20.5	5.6	10.4	6.5	8.1	19.9	7.3	5.7	10.4	5.6	21.1	252
	F	20.5	5.6	12.5	6.6	7.3	16.7	8.5	6.7	10.3	5.4	20.0	239
Western Maharashtra	M	18.9	6.5	10.1	6.2	7.0	19.0	8.3	8.0	10.9	5.1	18.7	237
	F	19.5	7.4	12.0	6.5	6.9	20.5	6.5	6.0	9.1	5.6	22.0	246
Rural Maharashtra	M	19.8	6.5	10.3	6.3	7.1	19.1	7.1	7.7	10.8	5.3	20.1	238
	F	19.7	6.9	11.8	6.8	7.4	19.0	7.3	6.1	9.5	5.6	20.4	239
Urban excluding Greater Bombay	M	18.7	6.0	11.4	7.1	6.8	17.9	7.2	7.2	11.1	6.5	19.2	238
	F	17.8	7.1	11.2	7.0	7.3	18.0	7.9	7.9	9.5	6.3	17.0	223
Greater Bombay	M	17.5	6.0	11.1	7.6	6.7	18.2	8.5	6.4	12.4	5.7	19.2	209
	F	16.1	7.9	11.2	7.1	8.2	16.4	8.4	7.4	10.4	6.9	14.1	196
Urban Maharashtra	M	18.2	6.0	11.3	7.3	6.8	18.1	7.8	6.9	11.9	6.2	19.2	225
	F	17.1	7.4	11.2	7.1	7.7	17.3	8.1	7.7	9.9	6.6	15.6	212
Total Maharashtra	M	19.2	6.3	10.7	6.7	7.0	18.7	7.3	7.4	11.1	5.6	19.8	233
	F	18.8	7.1	11.6	6.9	7.5	18.4	7.6	6.6	9.6	5.9	18.7	229

* Myer's Index = $\frac{1}{2}$ x the sum of absolute deviation from 10 per cent.

** Whipple's Index = $\frac{5(f_{25} + f_{30} + \dots + f_{60})}{(f_{23} + f_{24} + f_{25} \dots f_{61} + f_{62})}$ x 100 where f_i denotes the frequency of age 'i'.

Table 9.3 : Births to Usual Members of Families during Two Years Period as Reported at Interview by the Number as Reported at Reinterview: NFMS Maharashtra, 1980

Number of births reported at interview	Number of births reported at reinterview																	
	Rural						Urban						Maharashtra					
	0	1	2	3	4	Total	0	1	2	3	4	Total	0	1	2	3	4	Total
0	1413	37	4	0	0	1454	650	7	2	0	0	659	2063	44	6	0	0	2113
	97.2	2.5	0.3	0.0	0.0	100.0	98.6	1.1	0.3	0.0	0.0	100.0	97.6	2.1	0.3	0.0	0.0	100.0
1	18	605	21	2	0	646	2	166	2	0	0	170	20	771	23	2	0	816
	2.8	93.7	3.2	0.3	0.0	100.0	1.2	97.6	1.2	0.0	0.0	100.0	2.4	94.5	2.8	0.3	0.0	100.0
2	0	5	72	2	0	79	0	1	21	1	0	23	0	6	93	3	0	102
	0.0	6.3	91.2	2.5	0.0	100.0	0.0	4.4	91.2	4.4	0.0	100.0	0.0	5.9	91.2	2.9	0.0	100.0
3	0	0	2	7	0	9	0	0	0	2	0	2	0	0	2	9	0	11
	0.0	0.0	22.2	77.8	0.0	100.0	0.0	0.0	0.0	100.0	0.0	100.0	0.0	0.0	18.2	81.8	0.0	100.0
4	0	0	0	0	4	4	0	0	0	0	1	1	0	0	0	0	5	5
	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	100.0	100.0
Total	1431	647	99	11	4	2192	652	174	25	3	1	855	2083	821	124	14	5	3047
	65.3	29.5	4.5	0.5	0.2	100.0	76.3	20.4	2.9	0.3	0.1	100.0	68.3	26.9	4.1	0.5	0.2	100.0

Table 9.4 : Deaths to Usual Members of Families during Two Years Period as Reported at Interview by the Number as Reported at Reinterview: NFMS Maharashtra, 1980

Number of deaths reported at interview	Number of deaths reported at reinterview														
	Rural					Urban					Maharashtra				
	0	1	2	3	Total	0	1	2	3	Total	0	1	2	3	Total
0	2003	52	3	0	2058	794	6	0	0	800	2797	58	3	0	2858
	97.3	2.5	0.2	0.0	100.0	99.3	0.7	0.0	0.0	100.0	97.9	2.0	0.1	0.0	100.0
1	2	121	5	0	128	1	49	2	0	52	3	170	7	0	180
	1.6	94.5	3.9	0.0	100.0	1.9	94.2	3.9	0.0	100.0	1.7	94.4	3.9	0.0	100.0
2	0	0	5	0	5	0	0	3	0	3	0	0	8	0	8
	0.0	0.0	100.0	0.0	100.0	0.0	0.0	100.0	0.0	100.0	0.0	0.0	100.0	0.0	100.0
3	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
Total	2005	173	13	1	2192	795	55	5	0	855	2800	228	18	1	3047
	91.4	7.9	0.6	0.1	100.0	93.0	6.4	0.6	0.0	100.0	91.9	7.5	0.6	0.0	100.0

Table 9.5 : Average Number of Male Adults, Female Adults, Male Nonadults, Female Nonadults in the Family and Average Family Size at Interview and Reinterview: NFMS Maharashtra, 1980

Composition by	Interview			Reinterview			Percentage change *		
	Rural	Urban	Maha-rashtra	Rural	Urban	Maha-rashtra	Rural	Urban	Maha-rashtra
Male adults	1.99	1.98	1.98	2.01	2.00	2.00	1.0	1.0	1.0
Female adults	1.97	1.85	1.94	1.99	1.86	1.95	1.2**	0.4**	1.0**
Male nonadults	1.24	1.08	1.19	1.23	1.09	1.19	-0.8	0.9	0.0
Female nonadults	1.18	0.95	1.12	1.19	0.96	1.13	0.8	1.0	0.9
Family size	6.36	5.87	6.22	6.41	5.91	6.27	0.8	0.7	0.8

* $100 \times (\text{Reinterview average}) / (\text{Interview average}) - 100$.

** Calculated to 4 decimal places and rounded off to 2.

Table 9.6 : Measure of Association,¹ Response Error² and Off-diagonal Proportion³ for Specific Variables:
NFMS Maharashtra, 1980

	Rural Maharashtra			Urban Maharashtra			Total Maharashtra		
	Measure of association	Response error percentage	Off-diagonal proportion	Measure of association	Response error percentage	Off-diagonal proportion	Measure of association	Response error percentage	Off-diagonal proportion
Male adults	0.956	4.40	0.033	0.946	5.36	0.016	0.954	4.57	0.029
Female adults	0.936	6.44	0.047	0.922	7.78	0.021	0.921	7.94	0.039
Male non-adults	0.975	2.46	0.023	0.985	1.55	0.013	0.979	2.12	0.020
Female non-adults	0.963	3.68	0.025	0.976	2.45	0.016	0.966	3.39	0.023
Married females (15-50)	0.948	5.19	0.030	0.953	4.68	0.021	0.935	6.53	0.028
Births to usual members	0.868	13.22	0.042	0.917	8.28	0.018	0.878	12.24	0.035
Deaths to usual members	0.825	17.52	0.028	0.851	14.94	0.011	0.846	15.41	0.023
Inmigrants and births in last two years	0.846	15.41	0.049	0.906	9.40	0.019	0.861	13.86	0.041
Outmigrants and deaths in last two years	0.830	16.98	0.047	0.877	12.26	0.027	0.797	20.26	0.042

1 = Measure of association = $\sqrt{(x^2/n(k-1))}$ where k is the number of non-zero response categories and n the number of observations.

2 = Response error = 100 - 100(measure of association).

3 = Proportion of responses for which the answers given at the interview and reinterview were not identical.

GLOSSARY OF DEMOGRAPHIC CONCEPTS AND DEFINITIONS

(Adapted from the U. S. Committee on Population and Demography, National Academy of Sciences)

AGE HEAPING: A tendency for enumerators or respondents to report certain ages instead of others; also called age preference or digit preference. Preference for ages ending in 0 or 5 is widespread.

AGE PATTERN OF FERTILITY: The relative distribution of a set of age-specific fertility rates. It expresses the relative contribution of each age group to total fertility.

AGE RATIO: The ratio of the population in a given age group to the average of the populations in the two neighbouring age groups.

AGE-SPECIFIC FERTILITY RATE: The number of births occurring during a specified period to women of a specified age or age group, divided by the number of person-years-lived during that period by women of that age or age group. When an age-specific fertility rate is calculated for a calendar year, the number of births to women of the specified age is usually divided by the mid-year population of women of that age.

AGE-SPECIFIC MORTALITY RATES: The number of deaths occurring during a specified period to persons (usually specified by sex) of a specified age or age group, divided by the number of person-years-lived during that period by the persons of that age or age group. When an age-specific mortality rate is calculated for a calendar year, the number of deaths to persons of the specified age is usually divided by the mid-year population of persons of that age. Age-specific mortality rates are generally denoted by nM_x , the annual death rate to persons aged x to $x+n$.

AGE STANDARDIZATION: A procedure of adjustment of crude rates (birth, death, or other rates) designed to control for the effect of differences in age structure when comparing rates for different populations.

BIRTH HISTORY: A report of the number and dates of all live births experienced by a particular woman; see also pregnancy history. The sex of each child, the survival of each child to the date of the interview, and, where pertinent, the date of death are also generally recorded.

BIRTH ORDER: The ordinal number of a given live birth in relation to all previous live births of the same woman (e.g., 5 is the birth order of the fifth live birth occurring to the same woman).

BIRTH RATE: See crude birth rate.

CHILDBEARING AGES: The span within which women are capable of bearing children, generally taken to be from age 15 to age 49 or, sometimes, to age 44.

CHILDREN EVER BORN(E): The number of children ever borne alive by a particular woman; synonymous with parity. In demographic usage, stillbirths are specifically excluded.

COHORT: A group of individuals who experienced the same class of events in the same period. Thus an age cohort is a group of people born during a particular period, and marriage cohort is a group of people who married during a particular period. The effects of a given set of mortality or fertility rates are often illustrated by applying them to hypothetical cohorts.

COHORT FERTILITY: The fertility experienced over time by a group of women or men who form a birth or a marriage cohort. The analysis of cohort fertility is contrasted with that of period fertility.

CRUDE BIRTH RATE: The number of births in a population during a specified period divided by the number of person-years-lived by the population during the same period. It is frequently expressed as births per 1,000 population. The crude birth rate for a single year is usually calculated as the number of births during the year divided by the mid-year population.

CRUDE DEATH RATE: The number of deaths in a population during a specified period divided by the number of person-years-lived by the population during the same period. It is frequently expressed as deaths per 1,000 population. The crude death rate for a single year is usually calculated as the number of deaths during the year divided by the mid-year population.

CUMULATED FERTILITY: An estimate of the average number of children ever borne by women of some age x , obtained by cumulating age-specific fertility rates up to age x ; also often calculated for age groups.

DEATH RATE: See crude death rate.

DE FACTO POPULATION: A population enumerated on the basis of those present at a particular time, including temporary visitors and excluding residents temporarily absent. See de jure population.

DE JURE POPULATION: A population enumerated on the basis of normal residence, excluding temporary visitors and including residents temporarily absent. See de facto population.

DIGITAL PREFERENCE: See age heaping.

EXPECTATION OF LIFE AT BIRTH: The average number of years that a member of a cohort of births would be expected to live if the cohort were subject to the mortality conditions expressed by a particular set of age-specific mortality rates. Denoted by the symbol $e(o)$ in life table notation.

FAMILY: For NFMS analysis, a family includes all usual members related by blood or marriage, living together and eating from a common kitchen. Permanent servants living and eating with the family are also to be included. Women visiting their parents for delivery are to be included at their usual residence.

GENERAL FERTILITY RATE: The ratio of the number of live births in a period to the number of person-years-lived by women of childbearing ages during the period. The general fertility rate for a year is usually expressed as the number of births per 1,000 women of childbearing ages at mid-year.

GROWTH RATE: The increase or decrease of a population in a period divided by the number of person-years-lived by the population during the same period. The increase in a population is the result of a surplus (or deficit) of births over deaths and a surplus (or deficit) of in-migrants over out-migrants. See also rate of natural increase.

INFANT MORTALITY RATE: The ratio of the number of deaths of children under 1 year of age to the number of births occurring in the same year; also used in a more rigorous sense to mean the number of deaths that would occur under 1 year of age in a life table with a radix of 1,000, in which sense it is denoted by the symbol ${}_1q_0$.

LIFE TABLE: A listing of the number of survivors at different ages (up to the highest age attained) in a hypothetical cohort subject from birth to a particular set of age-specific mortality rates. The rates are usually those observed in a given population during a particular period of time. The survivors of the radix to age x are generally denoted by $l(x)$. The tabulations commonly accompanying a life table include other features of the cohort's experience: its expectation of life at each age x , denoted by $e(x)$; the probability of dying between age x and age $x+n$, denoted by ${}_nq_x$; the person-years-lived by the hypothetical cohort as it passed from age x to age $x+n$, denoted by ${}_nL_x$; and the person-years-lived by the hypothetical cohort from age x onward, denoted by $T(x)$.

MARITAL FERTILITY: Any measure of fertility in which the births (in the numerator) are births to married women and in which the number of person-years-lived (in the denominator) also pertains to married women.

MEDIAN: The value associated with the central member of a set that is ordered by size or some other characteristic expressed in numbers.

MODEL LIFE TABLE: An expression of typical mortality experience derived from a group of observed life tables.

MOVING AVERAGES: The successive averaging of two or more adjacent values of a series in order to smoothen fluctuations.

MYERS' INDEX: An index of digit preference that essentially sums in turn the population ending in each digit over some age range, often 10-89, expressing the total as a percentage of the total population, and which avoids the bias introduced by the fact that the population is not evenly distributed among all ages by repeating the calculations 10 times, once for each starting digit, and averaging the results. The difference between the average percentage for each digit and the expected value of 10 per cent provides a measure of the preference for or avoidance of the digit over the age range considered.

NET MIGRATION: The difference between gross in-migration and gross out-migration.

PARTIAL BIRTH RATE: The proportion of the population that enters (that is, is "born" into) a given age category in a year. The age categories used are normally open-ended, thus the partial birth rate $x+$ designates the proportion of the population becoming x years and older.

PARTIAL DEATH RATE: The proportion of the population that leaves (that is, "dies" out of) a given age category in a year. See partial birth rate.

PERIOD FERTILITY: The fertility experienced during a particular period of time by women from all relevant birth or marriage cohorts; see also cohort fertility.

POPULATION CENSUS: The first population census of India was taken in 1872. Since 1881 India has had a regular and synchronous census every 10 years. The 1981 Census represents the twelfth census of India as reckoned from 1872 and the fourth after independence. The latest census count is as at sunrise of first March, 1981. The census operations were carried out through the State and Union Territory governments. The preliminary population count, rural-urban distribution and working characteristics from the 1981 Census were published in the same year. Detailed tabulations of economic, social and demographic characteristics, available for the 1971 Census, are used in this NFMS report.

PREGNANCY HISTORY: A report of the number and the dates of occurrence of all the pregnancies experienced by a particular woman. The outcome of the pregnancy, live birth, still birth, fetal death is also recorded.

RATE OF NATURAL INCREASE: The difference between the births and deaths occurring during a given period divided by the number of person-years-lived by the population during the same period. This rate, which specifically excludes charges resulting from migration, is the difference between the crude birth rate and the crude death rate.

RETROSPECTIVE SURVEY: A survey that obtains information about demographic events that occurred in a given past period, generally terminating at the time of the survey.

REVERSE SURVIVAL: A technique to estimate an earlier population from an observed population, allowing for those members of the population who would have died according to observed or assumed mortality conditions. It is used as a method of estimating fertility by calculating from the observed number of survivors of a given age x the expected number of births that occurred x years earlier.

SAMPLE REGISTRATION SYSTEM (SRS): This is a dual record system maintained from providing reliable estimates of birth and death rates at the national and State levels. The field investigation consists of continuous enumeration of births and deaths by a resident enumerator and an independent survey every six months by a supervisor. The data obtained through these two operations are matched. The unmatched and partially matched events are re-verified in the field and thereafter an unduplicated count of births and deaths is obtained. The sample unit in the rural areas is a village or a segment of a village if it had a population of over 2,000 in 1961. In the urban areas, the ultimate sampling unit is a census block with a population ranging from 750 to 1,000. From 1977 field work has been initiated in an additional 1,700 sample units selected from 1971 Census frame. The results of SRS are published bi-annually in the Sample Registration Bulletin.

SEX RATIO AT BIRTH: The number of male births for each female birth, or male births per 100 female births.

SINGULATE MEAN AGE AT MARRIAGE (SMAM): A measure of the mean age at first marriage derived from a set of proportions of people single at different ages or in different age groups, usually calculated separately for males and females.

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STABLE POPULATION: A population exposed for a long time to constant fertility and mortality rates, and closed to migration, establishes a fixed age distribution and constant growth rate characteristic of the vital rates. Such a population, with a constant age structure and constant rate of growth, is called a stable population.

SURVIVAL RATIO: The probability of surviving between one age and another; often computed for age groups, in which case the ratios correspond to those of the person-years-lived function, ${}_nL_x$, of a life table. Also called survivorship probabilities.

TOTAL FERTILITY RATE (TFR): The average number of children that would be born per woman if all women lived to the end of their childbearing years and bore children according to a given set of age-specific fertility rates; also referred to as total fertility. It is frequently used to compute the consequence of childbearing at the rates currently observed.

WHIPPLE'S INDEX: A measure of the quality of age reporting based on the extent of preference for a particular target digit or digits. The index essentially compares the reported population at ages ending in the target digit or digits with the population expected on the assumption that population is a linear function of age. For a particular age range, often 23 to 62, the population with ages ending in the target digits is divided by one-tenth of the total population, the result then being multiplied by 100 and divided by the number of different target digits. A value of 100 indicates no preference for those digits, whereas values over 100 indicate positive preference for them.