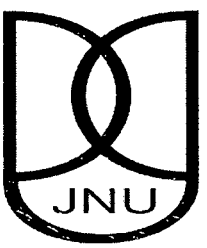
TRENDS AND DETERMINANTS OF FERTILITY IN NORTH-EAST INDIA: AN INSHIGHT FROM RECENT DATA

Dissertation submitted to Jawaharlal Nehru University in partial fulfillment of the requirements for the award of the degree of

MASTER OF PHILOSOPHY

P. THONGKHANTHANG



CENTRE FOR THE STUDY OF REGIONLA DEVELOPMENT
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI-110067
2011

DEDICATED TO

MY FATHER,

SISTER AND BROTHER

WHO HAD GONE TO

THEIR HEAVELY ABORD

SINCE A COUPLE OF YEARS AGO

जवाहरलाल नेहरू विश्वविद्यालय
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25th JULY 2011

DECLARATION

I, P. Thongkhanthang, hereby declare that the dissertation entitled **"TRENDS AND DETERMINANTS OF FERTILITY IN NORTH EAST INDIA: AN INSIGHT FROM RECENT DATA"** submitted by me for the award of the degree of **MASTER OF PHILOSOPHY** is my bona fide work and that it has not been submitted so far in part or in full, for any degree or diploma of this university or any other university.

(P.THONGKHANTHANG)

CERTIFICATE

It is hereby recommended that the dissertation may be placed before the examiners for evaluation.

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INTRODUCTION

CHAPTER- I: INTRODUCTION

A sustained natural increase in population resulting from continued declines in mortality levels in the context of socio-economic developments provides a multiphasic demographic response involving postponement of marriage, increased celibacy, resort to abortion, use of contraceptives and out-migration which eventually decreases fertility rates.

-Kingsley Davis

1.1 Introduction

Serious concern has been expressed regarding population growth and its impact on human welfare. As a result, research in the field of human fertility has tremendous importance in recent years. It is estimated that unless there is reduction in fertility rate, the world population will cross 7billion by the year 2020. With only 2.4 per cent out of the world landmass, India covers 16 per cent of the world's population and has crossed one billion in the 2002 Census. Despite the phenomenon of rapid population growth is not very important issue in the developed countries today; it is still a big and vital issue in some of the developing and less developed countries including India. While many developed countries witnessed low mortality and low fertility that leads to slow growth of population; the situation in developing countries is still alarming. In developing countries the economic development is unable to keep pace with population growth as a result of which rapidly increasing population in these countries eats away all the benefits derived from programmes of economic development. In India, the rapid growth of population has retarded the pace of economic development since independence which can be described as a serious national calamity. In fact gains achieved through economic development are generally insufficient to meet the requirement of the increasing population. This has worried policy makers regarding world resources and sustainable population. Hence, the immediate solution of the problem is to check this rapid growth of population through reduction in fertility through socio-economic and demographic variables.

"The Global 2000 Study" underscored the social and environmental consequences of rapid population growth, which threatens the human existence. This study also pointed out that if the present trends of population growth rate continue the world will be more crowded, more polluted, ecologically unstable in the near future. In the similar light of thought, "The Limits to Growth" by researchers from the Club of Rome have alarmed that steady population growth; along with economic growth exhaust the non-renewable resources, accelerating environmental pollution, aggravating famines and starvation thereby causing human disaster in about a century. Excessive population growth not only would adversely affects the increase in per capita income, but it would also causes serious difficulties in food supply, housing, education, employment and environment, and it may even disrupt the social balance and stability of the system. Recently, in India, it is realized that the population problem is vital in determining whether we shall be able to accomplish the task of modernization of agriculture, industry, defense, science and technology by 2020. Thanks to astounding medical advancement in the developed countries over the years that a drastic decline in mortality in developing countries and noticeable increase in the longevity of life have been experienced. The death rate in the developing countries also started declining rapidly but simultaneously declines in the birth rate to keep population growth rate under control which did not follow at equal pace. Thus, the unprecedented growth of the population caused by the gap between birth rate and death rate over a long period has posed several challenges for overall development.

India is the first country in the world to set up a national family planning programme in 1951. But from 350 million inhabitants in 1952, the year the first family planning programme was initiated, India's population had grown to 593 million by 1974, 900 million by 1992 and it crossed one billion marks before 2001. The projected population figure indicates that by 2035 it will overtake China as the world's most populous nation if present trends continue. Meanwhile the gradual increase in the growth rate of population was unnoticed till 1951 in the country. The Indian Government became concerned with the rapid growth of population only after the results of 1961 Census came out. In spite of all the efforts made by international and government agencies, there has been little

headway in solving the problem. Only by 1991, rate of population growth registered a very marginal decline. Rele observed that the initial stage of the onset of fertility decline has been well on its way since 1966 (Rele, 1974 p.351). He also asked: What happened since 1966? Why the second stage is not yet achieved? In his opinion, the second stage of the demographic transition cannot be achieved without taking account of the support of socio-economic development. It is, therefore, presumed that the failure of population control programs in India is rooted in the neglect of socio-economic factors.

As per the census reports (Provisional 2011 Census), India added 181 million people between 2001 to 2011, which is a little lower than the estimated population of Brazil (the world's fifth most populous country) but it is almost equal to the combined population of USA, Indonesia, Brazil, Pakistan, Bangladesh and Japan put together. In 2011, the population of Uttar Pradesh alone stood around 200 million, which is more than the population of Brazil. The Total Fertility Rate (TFR) of India during 1951-61 was estimated to be higher than 6 and the same for the next decade, i.e., 1961-71 which was observed in the vicinity of 6 only. During the first half of 1980's, the TFR declined by 1.3 units to 4.5. During 1996-2001, the projected TFR varied in the range of 3.21 to 3.46 (Registrar General, India, 1997; Dyson 2002; Retherford and Mishra 2001). It indicates that India is still in the process of second phase of demographic transition. The geographic heterogeneity of the vast country has created diverse population problems overtime. Ram and Ram (2002) stated that such a steady decline in fertility is obviously related to the implementation of the Government's family planning programme established in 1951 as well as perceptible changes in socio-economic development of the country over the previous 30 years.

A brief history of demographic characteristics of Indian population during last three decades is given in table 1.1. The trends of various demographic aspects are presented in the figure 1.1. Along with this, the government intervention, directly or indirectly from time to time with divergent intensity as a part of the population policy has worsened the disparities to a great extent. As a result, states are in a different phases of demographic transition. North South gap is noticeably high. For example, in the southern states of Kerala and Tamil Nadu there has been a

spectacular drop in TFR from around 5 in the early 1960s to below the replacement level in 1998. By contrast, women in the northern states of Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh reported some declines in TFR from over 6 children per woman to over 4.0 during the same period (Kumar 2002). Therefore it is improper to tackle population problem of India as a whole though there is a sizeable intra-state variability. If the present fertility rate with associated regional characteristics continues, then it is likely that the growth momentum and tempo of the population will be halted in near future.

Moreover, there are various reasons through which rapid population growth creates developmental problems especially in developing and less developed countries such as reduction in availability of per capita resources making it difficult for further investment for improving the population quality, which further affect developmental processes inversely through various ways. Hence it is very important to know about the significant aspects of the population growth or fertility behaviour. The study of the relationship between socio-economic and demographic aspects and fertility in the different parts of the country can provide more precise information regarding the determinants of the fertility behaviour in different places. Proper understanding of such type of relationships can guide us in the process of the formulation of the strategies for population control or regulating the fertility behaviour. The stability of population growth is all about the necessities of a sustainable growth. Higher the distance from stable growth rate, greater is the imbalance in the socio-economic structure.

According to their levels of socio-economic development, all the developing societies are currently experiencing demographic transition. In India as diverse societies with varying socio-economic and demographic characteristics exist, that significant differences in the phases of fertility decline across different societies and states exist. Therefore, steps should be taken to identify the area specific needs for effective implementation of family planning programmes to reduce the fertility level and regional differences in it. The government should take up initiative in the forefront to prepare need based, demand driven socio-demographic plans at the micro level, aimed at identifying and providing responsive people centered and integral strategic programmes for the future. At

the same time socio-demographic goals for the future should be set in accordance with the specific area approach concerning the local needs and their potential.

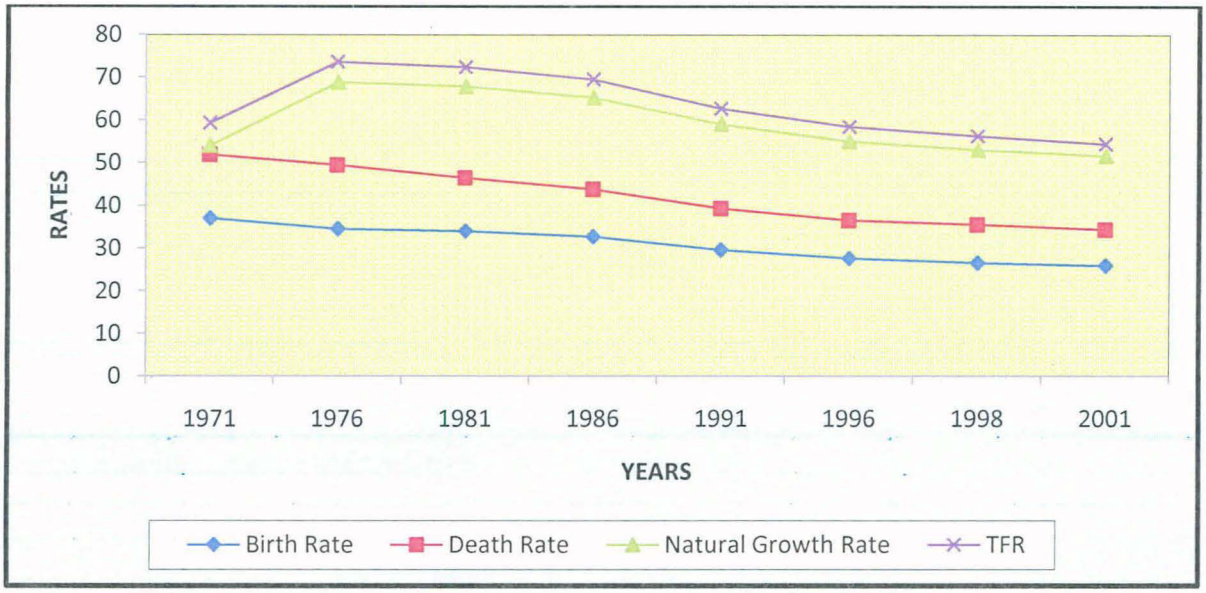
Table 1.1 Demographic Characters of India, 1972-2001

Year	Birth Rate	Death Rate	Natural Growth Rate	IMR	TFR
1971	36.9	14.9	2.2	129	5.2
1976	34.4	15	19.4	129	4.7
1981	33.9	12.5	21.4	110	4.5
1986	32.6	11.1	21.5	96	4.2
1991	29.5	9.8	19.7	80	3.6
1996	27.5	9	18.5	72	3.4
1998	26.5	9	17.5	72	3.2
2001	25.8	8.5	17.3	6.8	2.7

Source: Various Reports of Sample Registration System

The rate of fertility decline varying from one population group to another. First, upper social and economic strata of urban population experienced the change and then it spread to the other intermediate groups and then finally reaches the lower social and economic groups and rural population. As such it is quite evident that fertility decline can be expected to occur when a country undergoes equitable social and economic development with the aim of reducing regional differences. The meaning of socio-economic development is to increase awareness among the people, improve their quality of life, enhance their overall well being and provide them with opportunities and choices to become the productive assets in society. The addition of 15.5 million persons annually in population of India is large enough to neutralize the efforts made by the government in all the fronts of social and economic development and environmental conservation. It is much essential for the government to set up new strategies so as to achieve stabilization of population in near future, at a level consistent with the requirement of sustainable economic growth, social development and environmental protection

Fig: 1.1 Estimates of birth rates, death rates, natural growth rates and total fertility rates, India, 1971-2001



Source: NFHS-3, India, 2005-2006

Population growth in North East context reveals that the increase in the rate of growth of population in the Region is higher than the country's average. It is striking to note that India's total population increased by 51.80 per cent in the period 1951-71, 54.39 per cent in 1971-91 and 21.35 per cent in 1991-2001. Whereas for North East Region, in comparison to all-India, respective growth rates are 90.86 per cent, 62.11 per cent and 22.02 per cent. At the same time share of population of NER, in comparison to all-India, increased from 2.84 per cent in 1951 to 3.75 per cent in 2001. As regards the growth rate of population, the highest decadal growth rate (41.33 %) was seen in the decade 1951-61. The decadal growth rates of population in NER were high as compared to all-India level. It is to be noted here that the percentage of population in the region with respect to India was 1.70 in 1941. In can be concluded here that population is increasing faster in North East Region as compared to the country as a whole. It is observed that there is a large variation in the density of population among the States of NER. Within the region it varies from 13 in Arunachal Pradesh to 340 in Assam. The bulk of population of the region (almost 70 per cent of total population of the region) is concentrated mainly of three sectors, viz. Brahmaputra Valley and Barak Valley of Assam and Tripura. The large variation

is caused by the geographical and economic factors, which vary greatly within the region. Population growth in the region has been unusually rapid, mainly due to inter-state migration in earlier decades and to immigration from other countries and relatively high fertility among some immigrants groups in recent decades.

North East India which is also called as mini-India witnesses striking demographic diversity. Substantial differences are visible between states in the achievement of basic demographic indices. This has led to significant disparity in current population size, pattern and the potential to influence population increase during the last few decades. There are wide inter-state, male-female and rural-urban disparities in outcomes and impacts. These differences stem largely from poverty, illiteracy, and inadequate access to health and family welfare services, which coexist and reinforce each other. In many parts, the widespread health infrastructure is not responsive.

Keeping in view the above facts, the present study is an attempt at studying the socio-economic and demographic determinants that influence fertility behavior of women in the North Eastern States of India. Efforts are also being made to see the levels and trends of fertility through TFR, CBR and ASFR. The study has been concluded with some suggestions for future planners and policy-makers of the country to resolve the issues. For the purpose, the study is based on secondary sources of data relating to socio-economic and demographic variables for the North Eastern Region of India.

1.2 Socio-Economic and Demographic Profile of North East India

The North East Region of India, stretching between 22^0N and 29^05'N latitudes and between 89^0 70'E and 97^0 30'E longitudes and covers a total geographical area of about 2, 62,379 square kilometers, accounting for 7.9 per cent of the country's total land area and nearly 5 per cent of India's total population (Census of India 2001).The Region consists eight states (under the North Eastern Council). These are Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. These states are sharing its boundaries with

neighboring countries like Nepal, China, Bhutan, Myanmar and Bangladesh. The North East Region, consisting of 70 per cent of hilly area, undulating hilly terrains and plateaus and only 30 per cent is the plain area basically covering two river valleys of Assam, namely Brahmaputra and Barak and certain portions of the state of Tripura. In view of the fact that the physiographical nature of this region is hilly the habitation of the population is also unevenly distributed. It is believed that a sizeable population of the region originated from Thailand, China and other neighboring countries, that the region is inhabited mostly by the Mongoloid race, has different socio-cultural beliefs and practices and is rich in biodiversity. The states of Mizoram, Nagaland and Meghalaya are predominantly Christian, whereas Tripura has a predominantly Hindu population. Mixed populations of Hindus, Christians, Buddhists and other local regions are found in the states of Arunachal Pradesh, Manipur and Sikkim.

The density of population per sq. km in the states of the region is also uneven in nature because the topographical features of the different states are not equally suitable for human habitation. On the other hand, the river valleys of Assam, the valley of Tripura and Imphal valley of Manipur shows higher concentration of population as these areas are conducive for human habitation. On the other hand, large areas of the hill states are totally unsuitable for human settlement due to the steep gradients of hills and mountains covered by evergreen rain forest etc. As such due to the physiographic variations the density of population in the states is also not equal. The table 1.2 also shows the density of population per sq. km. in the various states of North East India.

From the table it appears that the State of Assam has recorded highest density with about 340 persons per sq. km. which is followed by Tripura (304), Meghalaya (120), Manipur (107) and Nagaland (103) while the state of Arunachal Pradesh (13) has recorded the lowest density of population. With respect to sex ratio, the region presents a mixed picture. While sex ratio is higher than all-India average (933) in Manipur (978), Meghalaya (972), Tripura (984), Assam (935) and Mizoram (935), it is lower in Arunachal Pradesh (901), Nagaland (909) and Sikkim (875).

Table 1.2 State Profiles and Demographic Characteristics, 2001

	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	India
Population (in millions)	1.09	26.6	2.39	2.31	0.89	1.99	0.54	3.19	1027.02
Percentage to national population	0.1	2.6	0.2	0.2	.0.1	0.2	0.1	0.3	100
Total land area (km2)	83,743	78,438	22,327	22,429	21,081	16,579	7,096	10,486	
Population density	13	340	107	103	42	120	76	304	324
Sex ratio (females per 1,000 males)	901	935	978	972	935	909	875	948	933
Growth rate (%) per decade	2.6	1.9	3	3	2.9	6.4	3.3	1.6	1.93
Urbanisation (% of pop.)	20.4	12.7	23.9	19.6	49.5	17.7		17	
Crude Birth Rate (Per 1000)	24.1	22.1	25	28.7	24.8	28.5	18.2	21.9	23.1
Female literacy rate (%)	44.24	54.61	59.7	60.41	86.13	61.92	61.5	65.41	54.16
Infant mortality rate (per 1,000 live births	61	66	30	45	34	38	34	52	57
Median age at first marriage (25-49)	19.9	20.7	23.7	21.7	22.3	21.8	21.9	20.3	19.8
Median birth interval (months)	30.8	37	35.4	31.7	30.6	28.6	34.5	39	31.1
Total fertility rate (per woman)	3.03	2.42	2.83	3.8	2.86	3.74	2.02	2.22	2.7

Source: Census of India, 2001 and North Eeastern Sates, NHFS-III (2005-06), International Institute for Population Sciences

The average decadal growth rate of population of the North-East is about 30 per cent during 1991-2001 with Nagaland (6.4) as the highest whereas Tripura is the lowest at only 1.6 per cent. About 84 per cent of the people of North East are living in rural area. Mizoram (49.5), Manipur (23.9) and Arunachal Pradesh (20.4) have the least number of rural populations which is below the region's average. Sikkim has the lowest urban population with about 11 per cent of their total population lives in urban areas.

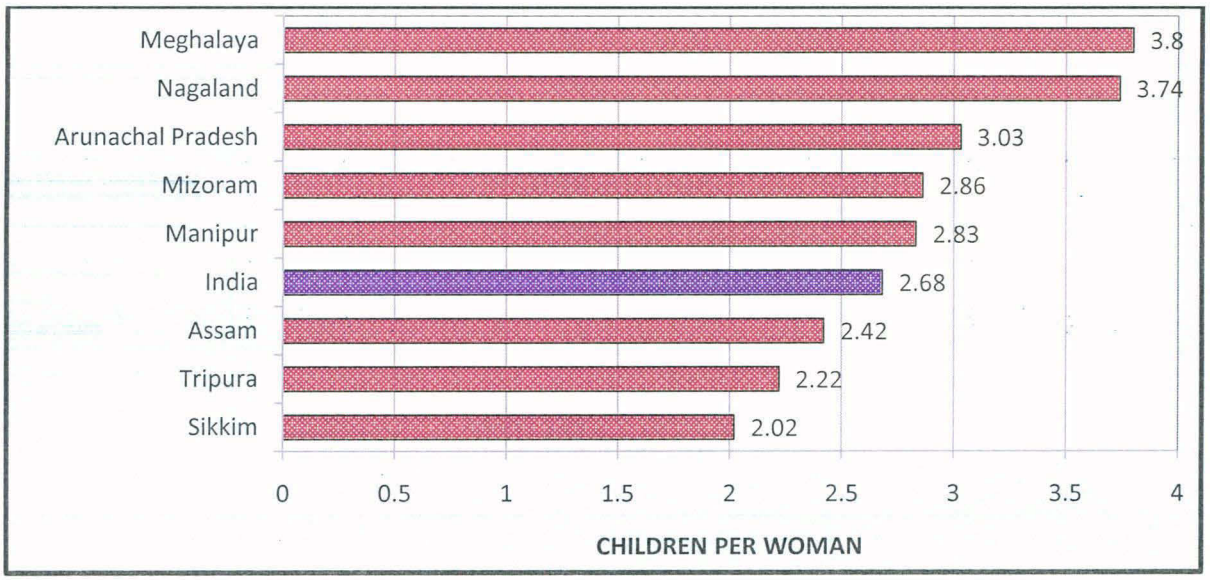
The economy of the North Eastern Region is dominated by tea, oil and timber. Industries do not have significant impact on the economy of the region. There is no denying of the fact that sufficient financial allocation has been allocated to the region but, the pace of development has not been achieved. Moreover, resources and development have not fallen in line. It is interesting to note that education has outstripped economic development resulting in unemployment leading to resentment in the unemployed youth.

Considering the female education, literacy rate for female in North East Region is not discouraging except for Arunachal Pradesh which accounts for only 44.24 per cent in 2001 as against all-India average of 54.16 per cent. In the region Mizoram is the highest at around 86.13 per cent, followed by Tripura, Nagaland and Sikkim with 65.41 per cent, 61.92 per cent and 61.50 per cent respectively, while female literacy rate in Arunachal Pradesh marginally falls short of the all India percentage.

TFR is 2.68 per woman at the national level but ranges from 1.8 per woman in Tamil Nadu, Goa and Andhra Pradesh to 4 per woman in Bihar (NFHS-3). Within the North-Eastern states, it has been seen that fertility level is highest among the women; e.g. as high as 3.8 per woman in Meghalaya and 2.02 in Sikkim. According to National Family Health Survey (NFHS-3) reports, all of the states except Assam and Tripura have a Crude Birth Rate (CBR) higher than the national average of 23.1. The highest birth rate is registered by Meghalaya at 28.7 per thousand, followed by Nagaland at 28.5 and the lowest by Sikkim at 18.2 as against all-India average. The death rate (Infant Mortality Rate) per thousand is, however, the highest in Assam at 66 per thousand followed by Arunachal Pradesh at 61 and the lowest in Manipur (30) as against all-India average of 57. Manipur

has the distinction of having the region's lowest death rate which declined from 37 per thousand in 1993 to 30 in 2006. Among the other states with low death rates, mention may be made of Sikkim (34), Mizoram (34), Nagaland (38) and Meghalaya (45). Only two states of the region, viz., Assam (66) and Arunachal Pradesh (63) registered higher than all-India death rate (57) in 2006 though Arunachal Pradesh had recorded lower than all-India rate in 1992.

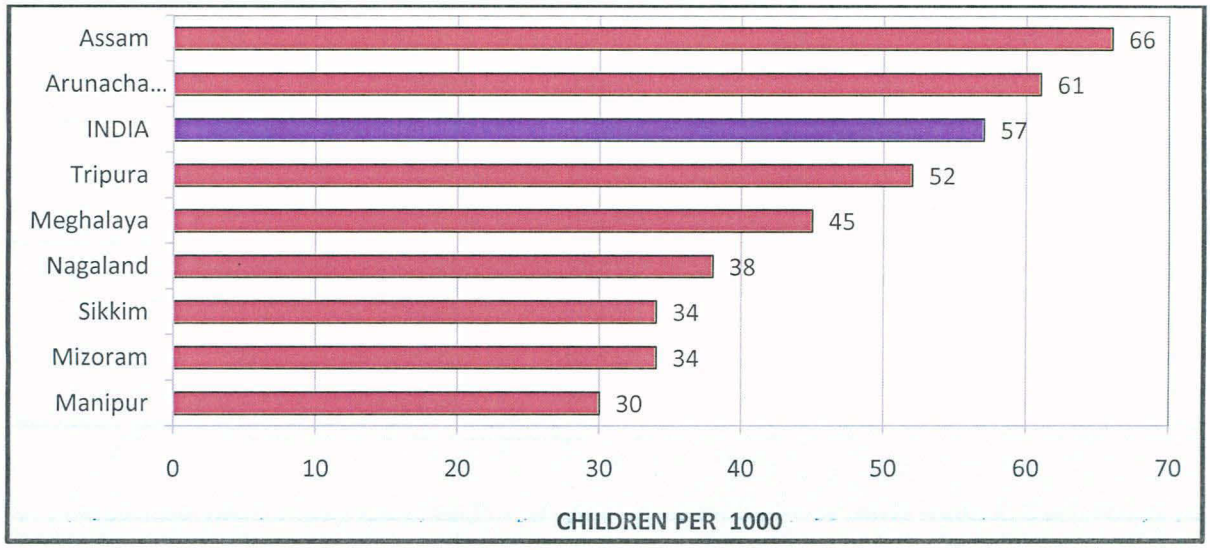
Fig: 1.2 TOTAL FERTILITY RATE OF NORTH EAST INDIA, 2005-06



Source: NFHS-3, India, 2005-2006

In addition, the share of region's population to the country's total increases from 1.79 per cent in 1901 to 3.74 per cent in 2001. Despite the fact that prevalence of almost similar trend of birth and death rates in the country, the considerably high growth rates of population in the region had been due to both natural increase and significant volume of migration from within and outside the country, (Sharma and Kar 1997).

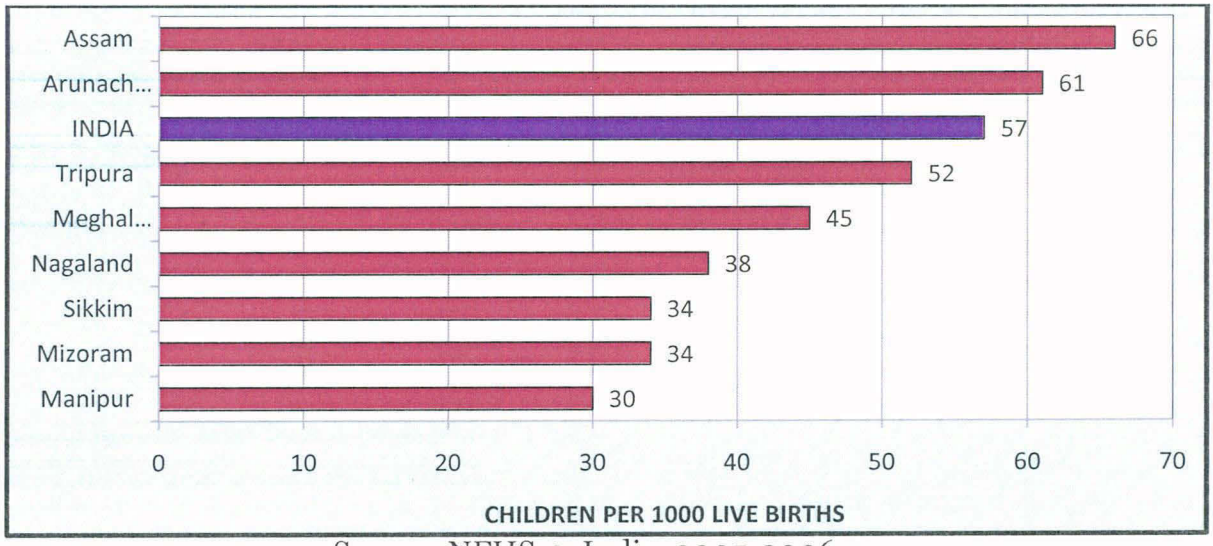
Fig: 1.3 CRUDE BIRTH RATE OF NORTH-EAST INDIA, 2005-06



Source: NFHS-3, India, 2005-2006

As it is shown in Table 1.3, if we consider the natural growth rate of population from the First Plan to the last census it is found that the rate of growth of population of North Eastern Region has been higher than the rate of whole country. The increasing trend of growth rate of population is not only because of the natural process but mainly due to migration from neighbouring states and countries as well.

Fig:1.4 INFANT MORTALITY RATE OF NORTH-EAST INDIA, 2005-06



Source: NFHS-3, India, 2005-2006

According to Hazarika in the early part of the last century migration from Bangladesh became illegal and continuing the flow of population from

Bangladesh into India's North Eastern Region was the most important factor of transforming the demographic, cultural and religious profile of this region. It is estimated that the number of illegal migrants in Assam alone varies from 4-5 millions to 10-14 millions. According toArchanaUpadhya (2006), "the high growth rate of population in Tripura during 1951-61 (78.71 per cent), for example, can be explained in terms of migration of Hindu refugees from East Pakistan (now Bangladesh) in the aftermath of Partition.

TABLE 1.3 GROWTH RATE OF POPULATION IN NORTH EAST INDIA: 1951-2001

State	Growth Rate of Population				
	1951-1961	1961-1971	1971-1981	1981-1991	1991-2001
Assam	34.98	34.95	23.36**	24.24	18.85
Arunachal Pradesh*	-	38.91	35.15	36.83	26.21
Manipur	35.04	37.53	32.46	29.29	30.02
Meghalaya	27.03	31.5	32.04	32.86	29.94
Mizoram	35.61	24.93	48.55	39.7	29.18
Nagaland	14.07	39.88	50.05	56.08	64.41
Tripura	78.71	36.28	31.92	34.3	15.74
Sikkim***	17.76	29.38	50.77	28.97	32.98
N.E. India	38.04	35.04	26.4	27.46	22.02
India	21.51	24.8	24.69	23.82	21.34

Notes:

*Census was conducted for the first time in 1961.

**Since Census was not conducted in Assam in 1981, the rates for 1971-1981 and 1981-91 are estimated on the basis of interpolation.

*** The data for Sikkim is incorporated from different Census Reports.

Source: ArchanaUpadya (2006).

According to the Census report it is found that the percentage of migrant of Bangladeshi origin and other neighboring countries is higher in the North Eastern States than the whole country. According to Walter Fernandes (2005) "in 1981, 5.68 per cent of the Arunachal Pradesh population was of foreign origin

(including the Chakma) and 14.13 per cent were immigrants from other Indian states outside the north-east. In Assam their proportion was 6.68 per cent and 8.92 per cent, respectively. Only in Tripura the immigrants of foreign (mostly Hindu Bangladeshi) were 22.67 per cent. According to 2001 Census report total legal migration from neighboring countries which are connected with North Eastern Region of India, viz. Bangladesh, Bhutan, China, Myanmar are 3084826, 8337, 23721, 49086 respectively.

1.3 Research Questions

The study is an attempt to understand:

1. What are the variables that influence fertility differentials across the state of North-East India? Baseline data from Census, NFHS and SRS indicate that, Sikkim and Tripura registered the highest rate of fertility decline; Mizoram, Manipur and Assam, moderate decline; and Meghalaya, Nagaland and Arunachal Pradesh, the lowest decline. The fertility trends call for demographic explanation(s).

2. How various socio-economic and demographic determinants have played their role differently in Northeastern states of India?

3. On the basis of NFHS-I (1992-93), H. Goswami (2010) has claimed that social variables (eg., urbanization, age at marriage, etc.) played more significant role in explaining fertility decline than demographic and economic factors (eg., infant mortality, per capita income, etc.). This claim still needs to be confirmed, contradicted or qualified by subsequent data provided by NFHS III.

1.4 Objectives of the Study

The aim behind the empirical study is to investigate the influence of socio-economic and demographic variables in determining the fertility behavior of human population and try to explore the differentials in fertility across the states in the region. This basic objective can be translated into the following objectives:

1. To analyze the process of fertility transition in northeast India.

2. To examine the variation of the influence of important social, economic and demographic variables in North East India.

3. To compare the fertility differentials among northeastern states of India.

1.5 Hypothesis

Based on the past studies and the reports of the Indian National Family Health Survey the following hypotheses have been examined.

Hypothesis (1) All things being equal, female education is inversely related to fertility. But education fails to prevent higher fertility in case of child loss.
Hypothesis (2) In general the higher level of urbanization leads to lower level of fertility. The rural-urban differential is presumably a critical factor in explaining fertility differential in the Northeastern region of India.
Hypothesis (3) There is an inverse relationship between caste and rate of fertility. In general the people having lower social status also have lower economic status. The cost of bringing the child in the people of lower economic structure is not very high and sometime they may be used as economic asset also. Thus lower castes tend to reflect higher fertility.
Hypothesis (4) The higher level of female labour force participation leads to low fertility.
Female work participation in general will go with lower fertility. The female work participation non-agricultural activities have more pronounced negative effect on fertility.
Hypothesis (5) Infant and child mortality will have positive relationship with fertility.
The reason is lower infant child mortality or reduces mortality conditions ensures couples higher probability for survival of their children. This will motivate couples having a target number of surviving children to reduce their number of births for the same target.

Hypothesis (6) Female Age at marriage is inversely related to fertility. If the age of marriage is high, obviously the whole span of fertility will be a smaller and fertility will be less.

Hypothesis (7) Family planning performance and fertility are inversely related. People using contraceptives, medical termination of pregnancy and sterilization for the postponement of child bearing. In general the family planning performance is directly related to increase the gap between two births and to have a desire number of children.

1.6 Organization of the Study

The organization of the study in the ensuing (including the present chapter) is a follows:

The *introductory* chapter, that is, the present chapter discussed the objectives, data-base, methodology and the socio-demographic profile of the study area, apart from giving hypothesis and highlighting the research questions, a review of the literature has been presented in the *second* chapter. The *third* chapter deals with conceptual framework, deterministic models, data base, selection of variables and methodology. The *fourth* chapter examines the trends and differentials of fertility in the Northeastern states of India and the *fifth* chapter deals with important background variables related to fertility behaviour under the study region. The background variables considered are : age at marriage, dead of son, type of residence, education of women, work status of women, caste, use of contraception, religion, media exposure and wealth index.

The fifth chapter also examines the study of the relationships between background variables and the mean children ever born (CEB). The background variables used in the previous section are again used here as independent variables. The mean CEB serve as the dependent variable. Moreover, this section examines the major factors influencing the fertility behavior of women aged 15-49 and discusses the results of multivariate analyses of factors affecting number of children ever born which is a dummy variable for total fertility rate. The *final* chapter provides summary of the key findings of the study. A bibliography of the literature relevant to this work has to be appended at the end.

Chapter-II

REVIEW OF LITERATURE

CHAPTER-II: REVIEW OF LITERATURE

Concern upon the issue of fertility behavior and population growth was considerably augmented during the second half of 20th century. Literatures related to demographic and fertility has been published more widely at national and global level. In India, many empirical studies have been conducted and numerous fertility determinants have been identified, of which some of them are discussed in the following.

Before 1960s, claims have been made that none of the socio-economic factors had any major effect on fertility across the country. The Gokhele Institute of Politics and Economics, Pune has undertaken study in line with fertility in different parts of Maharashtra and concluded that none of the socio-economic factors had any considerable impact on fertility. Based on the calculation of child-woman ratio, Kingsley Davis (1951) concluded that fertility differentials exist not only between rural and urban areas but also by town size. He found that fertility and size of the city to be inversely related. In late 1950s, Driver's study had conducted on fertility differentials in Nagpur district and came to a similar conclusion. Nevertheless, a large-scale survey was conducted in erstwhile Mysore state during 1951-52 and observed very small impact on fertility differences by religion, education and economic status. In 1956, fertility survey was also conducted in rural Banaras tehsil and found an impact of differences in mortality and in the portions of terminated marriages. Robinson (1961) examined the child-woman ratios given by the census data for 1921-1951 for the three strata: cities with population of at least five lakhs, cities with population between one and five lakhs and the rest of India. He found that rural-urban differentials in the child-woman ratio has somewhat declined and that by 1951 the differentials were only made, particularly in the case of marital fertility. There were no significant rural-urban differentials. Robison found that infant mortality had been declining more rapidly in urban than rural areas, making the child-woman ratio to behave as if fertility had increased. He found that differences of about 40-50 per cent can arise due to differential infant and childhood mortality alone.

Thus it has been observed that before 1960s, there was consistently an absence of substantial socio-economic influence on the differences in fertility behavior in various parts of India. Women most commonly have high levels of fertility. Even if fertility differences did exist, it is largely attributed by demographic variables like age at marriage, duration of marriage.

After 1960s, differences in fertility were emerging and these were accelerated by the modernization in the contraceptive method. Gordon et al. (1965) made a detailed study of fertility differentials of the two dominant caste groups, Jat farmers and Chamar leather workers, in the rural areas of Punjab. Based on the data for 223 Jat women and 108 Chamar women aged 45 and over, all married once and currently married, they found the average number of children born to be 6.78 and 8.23 respectively- a moderate difference. Bopegamage (1966) made a very useful study of variation of fertility in the different wards of Poona city and its socio-economic correlates. He found a spatial distribution of fertility rates, which increased with distance from the main business centres and distribution was not very uniform in all directions. He calculated zero-order partial and multiple correlations between ward fertility rates and the six socio-economic variables: (1) percentage of adult literates, (2) percentage of house-owners, (3) median rental per 50 square feet, (4) percentage of advanced castes (Brahmins and Marathas), (5) percentage of Marathas and (6) per capita income. He found that (1) and (6) were inversely related to fertility and (2) was related directly. The rest were below significance level.

John B. Wyon& John E. Gordon (1971) in their work in rural Punjab revealed a willingness of the population to accept contraception, particularly foam tablets. More at older house-wives than younger wives accepted contraceptive practice with at least one surviving, some rather than no son at all. In this study they found that delayed marriage and long breastfeeding influenced their birth rates. Additionally, findings of these studies revealed that birth interval averaged slightly more than 30 months, and breastfeeding of children for an average of two years delayed ovulation by more than ten months after child birth (i.e., long breastfeeding evidently lengthened birth intervals by nearly 50 per cent) with a consequent effect on birth rates. Adlakha and Kirk (1974), using the age

distribution from 1961 and 1971 Censuses, has concluded that fertility decline in India occurred during the second half of 1960s, when the child-women ratio for children aged 0-4 years have lowered by 2 per cent during 1961-71. This small decline in ratio shows a greater decline (7-10 per cent) in fertility rates, which is attributed to the continuous decline in mortality, especially in child mortality, during 1960s.

Mandelbaum (1974) have reviewed various personal, motivational, social and cultural factors regulating fertility behavior in selected segments of Indian society and found that higher infant mortality and strong son-preference motivates couples to have larger families. He noted that various reasons (like the higher status value attached to a mother with sons, involvement in family feuds, demand for family labour on farms, old age security, and certain religious rites which can only be performed by sons) are responsible for the strong son-preference which, in turn, motivates couples to have larger families to ensure two or more surviving sons.

Mahadevan (1979) in his studies on determinants of fertility differentials in South India found that duration of marriage, number of economically active members in the family, number of dependents in the family and the trichotomised family structure have played significant role in inter-caste variations on fertility. He revealed that intensive desire to prevent the division of landed property (Property-genic status) for the sake of maintaining the status of the family was the chief motivation of the Gounders to maintain very low fertility. Induced abortion was the principal method used traditionally by the Gounders for regulation of fertility.

Dreze and Murthi by using the 1981 Census district level data of the 15 States analysed the determinants of fertility, child mortality, and gender bias for child mortality in India. Adopting the reduced form a simultaneous equations, it was found that the effects of variables relating to women's empowerment was strong in reducing fertility, infant mortality and gender inequality, rather than variables relating to the general level of development and modernization.

Zacharia (1984),and Bhat and Rajan (1990) have studied the anomaly of fertility decline in Kerala where despite the low economic development, and agricultural growth statistics, fertility decline was experienced in last two-three decades. They found that high female literacy, agrarian reforms, increasing health and educational infrastructure, family welfare programmes, influence of mass media and political will are responsible for rapid decline in fertility behavior in Kerala.

Mahadevan (1989), based on the framework of analysis on value of children (Arnold, et al. 1975) and the Intermediate variables of Davis and Blake (1956) studied three major ecological regions of Utter Pradesh (U.P.), Andhra Pradesh (A.P.), and Kerala states which was carried out during 1984-1985 and according to the path analysis conducted separately for the three states, he found that five major variables have emerged as the crucial determinants of fertility behaviour in these states. They are: value of children, interaction between mortality and fertility, opportunity cost, education of wife, and breastfeeding. These five variables differentially and significantly have influenced fertility in the three states.

In Tami Nadu, Jayalalitha's 15 point programme that is largely based on the welfare of children, women's empowerment through education and health care with special reference to reproductive health care, etc. is considered the main source of fertility decline in the recent past. This is an integrated and quality oriented and women and children centered programme, aimed at population stabilization without relying heavily on contraceptive targets alone. It has to be seen as a model population policy for Indian nation (S. Ramasunduram 1994).

Dreze, Guio and Murthy (1996) have studied the determinants of demographic outcomes of India for 1981. They found that the female literacy and their labour force participation have negative and statistically significant relationship with TFR, child mortality and anti female bias attitude. Moreover, level of urbanization, medical infrastructure also has significant negative effect, where poverty has positive association with fertility and child mortality. They also found that fertility is significantly lower in southern region and in districts with high proportion of scheduled tribe.

Audirayana (1997), in his analysis of the linkage between the study of woman and fertility in urban Tamil Nadu found that educational status, work status, income, autonomy in certain personal, material and domestic affairs etc. are the various dimensions of status of women and improvement in these dimensions can bring considerable change in the fertility behavior. Kaushik (1999) revealed the importance of husband's approval of using contraception, lack of women's autonomy, women unequal social status and limited access to economic resources, issue of women empowerment, age at marriage, and exposure to mass media.

Meashan, Rao, Jamison, Wang and Singh (1999) have studied the role of income changes and other aspects over the period of time in determining IMR and TFR for different countries and of individual Indian States. Through regression analysis they found that increase in income has a significant influence on IMR and TFR reduction. For Indian states they found weak correlation of per capita income with IMR and TFR, due to non-income, state specific factors which are weakly correlated with income. The factors such as levels of female literacy, female age at marriage and access to medical facilities which have much higher association with decreasing IMR and TFR along with income in India. Mausumi Manna (1998), in an interstate analysis base on NFHS data for 1992-93 has found a high degree of negative association between fertility and level of female education and mother and child health. She also observed an inverse relationship between state ranks in terms of fertility behaviour with the use of contraceptives as well as achievement of family planning targets. It has been observed that the levels and patterns of fertility vary considerably in terms of educational attainment, occupation, income, family type etc., (Bhende and Kanitkar, 2000). Andhra Pradesh, the first state that formulates a state population policy, and also witnessed a rapid fertility decline during 1990s, despite slow progress in socio-economic development. The TFR has declined from 4 (1980) to 2.5 (1996), a 38 per cent decline in 15 years (Sekher, Raju and Sivakumar 2001). They found in their regional analysis that low literacy, low female age at marriage, poor health infrastructure and low status of women are the major factors in northern states for lagging behind this region in comparison to southern states.

In the following part of this section various studies are discussed in the separate categories of different fertility influencing factors.

EDUCATION

Generally, an inverse relationship has been found to exist between fertility and educational level in many parts of the world since the late nineteenth century. But the magnitude of this relationship has now diminished in recent decades and a direct relationship has even been observed at the highest educational levels in a few countries (UN, 1973). More education is not always associated with fewer children (Freedman et al. 1959, Mason et al. 1971). Studies based on England and Wales, the Netherlands, Norway and West Germany have detected a U-shaped relationship (Chronche 1979) - the average number of children born tends to be higher among the least and most educated woman. However, T.W. Schultz (1973) states that the education of parents, notably that of the mother, appears to be important one. It affects the choice of mates in marriage. It may affect the parents' preferences for children. It assuredly affects the earnings of women who enter the labour force. It perhaps affects the incidence of child mortality and it undoubtedly affects the ability of parents to control the number of births.

Easterlin (1978) finds education is one of the most pervasive factors influencing completed family size. Education acts on fertility by diversifying improved knowledge of personal hygiene, food care, environmental danger and it also helps in weakening down traditional beliefs and customs and consequently undermines cultural practices. In addition, education may decrease the price of alternative goods in relation to children by improving the income earning chances of women and thus increasing the cost of child raising in terms of tastes, education may also reduce the desire for children by encouraging new life styles. And finally education may contribute to higher standards of child care and child rearing or both of them raising the cost of children and emphasizing quality over number.

On the basis of the empirical study based on the NFHS data, the working committee on primary and secondary education found that there is a significant correlation between the educational status of potential parents, more particularly of the potential mothers and their fertility behavior. The higher the level of

education, the lower is the fertility. They emphasized educational programmes should keenly motivate the youth and adults about family planning and to inculcate the consciousness about the problems of high population growth in primary and secondary education.

Two national surveys conducted by the Office of the Registrar general of India in 1972 and 1979 with sample size of 6.23 million and 1.05 million ever-married women form all parts of the country respectively have found an inverse relationship between fertility rates and level of education in both rural and urban areas. The decline in fertility was more significant, when the educational attainment of women was above matriculation. The similar results were obtained form the second All India Family Planning Survey. Arkansan and Bhate (1989)also got the similar picture in Maharashtra. The Mysore survey showed a completed family size of six children for those women with less than high school education, five for those who had passed high-school and two for those with college education.

Caldwell (1980) has found that the greatest impact of education is indirect, through the restructuring of family relationships and family economies and the effects of these on direction of net wealth flows between the generations. He believes that schooling attacks the traditional family economic structure by weakening the authority of the old over the young and of the male over the female. Further, he (1982) considered that when parents begin to invest more in the education of their children, then children contribute to the family through child labour and care for the aged parents. This reversal in the intergenerational wealth flow from children to parents and from parents to children encourages couples to opt small family norms. In 1996, he said that fall in fertility rates in second half of 20th century in Sri Lanka and recently in Bangladesh is attributed largely to the increasing level of education, especially female education. Where the low level of female education in Pakistan is mainly responsible for their high fertility rates.

Bhende and Kanithkar (1982) also subscribe to the view that higher levels of education also leads to higher knowledge of information of keeping fertility under control, and create the situation motivation to keep the family size small with a

view to achieve better standard of life. They are associated with lower infant mortality rates and better child care, a greater appreciation of the mothers' role and a greater receptivity to innovations in general.

K.C. Zachariah (1983) found that the rate of fertility decline in Kerala was greatest among those women whose years of schooling and family income were in the intermediate range. Among the determinants of fertility decline, higher age at marriage, assumed a crucial factor at a very high significant level. In Kerala, Zachariah also found that unemployment and dowry problems causes for the delay in marriage. Further, land reforms and other redistributive social justice policies helped to popularize the small family norm.

Jejeebhoy, S.J. (1986) had taken the cross-sectional analysis in Maharashtra and found the female education had a consistent and significant negative influence on fertility. Economic status indicators like income, ownership of consumer durables and living conditions tended to be a powerful determinant of the number of surviving children. He also argued that family size preference becomes an important intervening variable in the determination of fertility. Besides, value indicators such as labour contribution of sons by way of earning activities and expectations regarding children as old age security, determined the family size preferences.

Dreze and Murthi (2001) argued that more education works indirectly to reduce fertility in number of ways – by delaying marriage, and increasing the chance that a woman will never marry, by reducing desired family size by stimulating aspirations for a higher standard of living and increased investments in fewer children, by preparing women for employment, specially in the formal sector, and by exposing women to new knowledge regarding contraceptive methods.

John Bongaarts (2003) examined the pattern of educational differentials in wanted and unwanted fertility at different stages of fertility transition by using the data from Demographic and Health Surveys. He conducted his study in 57 less developed countries and had come up by saying that educational differentials in wanted fertility tended to decline and differentials in unwanted fertility tended to rise. He said that educational composition of the population remains a key

predictor of overall fertility in late transitional countries and that low levels of schooling can be a cause of stalling fertility. Higher levels of education are usually associated with lower levels of wanted and unwanted fertility though it still has a transitional differential.

AGE AT MARRIAGE

Age at marriage, especially for girls is important as far as their fertility behavior is concern. According to Charles C. Westoff of Princeston University "the age at marriage is the best single prediction of fertility in the U.S.A., as well as in developing countries because it combines mutually reinforcing biological and sociological selective factors such as fecundablility and education". Societies where the late marriage is a norm have more autonomy and they adopt control over their child bearing. Malthus also advocated that delay marriage as a strategy to control population growth.

The mean age at marriage is an important indicator of the status of women. However, low mean age at marriage brings two important results: First, it increases the reproductive period of women for child bearing, which has direct influence on fertility behaviour. Secondly, it has adverse impact on the educational attainment, work experience and employment opportunity of the young mothers. It ultimately decreases the socio-economic status of women and their families, which indirectly affect the fertility behaviour at societal level.
If the average age of marriage for women is pushed forward to 20 years, the birth rate would very likely de-cline by 30 per cent because women who marry at these ages will lose an appreciable amount of their fertile period and are not likely to compensate for the loss, (Agarwala 1966).Das (1969) claimed, on the basis of an empirical study, that women marrying between 20 and 24 have similar fertility to those marrying before the age of 20. However, with a marriage age of 25 and above, there seems to be a different effect on fertility.

In India, prior to 1961 fertility rates were consistently high. Based on SRS of 1972 and 1978, the estimates total fertility rate are 5.5 and 4.3 respectively, which shows around 22 per cent decrease, where fertility estimates through proximate determinants show 9 to 15 points reduction for the same period. In other words

CBR fall from 40.6 births per thousand in 1972 to 35-37 in 1978. The fertility reduction has been observed in all age groups but decline in young age group reflects the effect of rising age at marriage and in other group because of use of birth control measures (Jain and Adlakha, 1982).

Carol Vlassoff (1991) in his study of village of Satara district in Maharashtra found that age at marriage along with educational attainment and marriage distance have inverse relationship with fertility i.e., those who married later experienced greater willingness to adopt birth control measures. In a study of 230 currently married couples, conducted in a village of Varanasi district of U.P. in 1994 reveals that the age at marriage determines the fertility behavior of population. Among the studied sample 32.48 per cent mothers married below age of 15 years had produced 3.8 children, 52.17 per cent mothers married between age of 15-19 years, had produced 3.02 children and 14.35 per cent mothers married later had given birth to an average 2.45 children per women, (Singh and Singh, 1996).

Verma (1996) in his village level analysis found that, the fertility among married women varies according to differences in their ages at marriage. He found that with increasing age at marriage significant decline in fertility is experienced. According to LeelaVisaria (1999), the mean age at marriage of women for Kerala is 23.9 years, which is the highest in India, whereas for Rajasthan it is 17.6 year, which is the lowest in India in the recent past. The results indicate that the rate of fertility is just opposite and this is due to the impact of mean age at marriage on fertility behaviour. In a study of fertility behaviour in Pakistan, Hakim (1999) has found that among the important demographic variables age at marriage is the most important determinant of reproductive behaviour.

RELIGION

Although most of the religions throughout the world are pro-natalists, differentials in fertility according to religion, ethnicity and other cultural groups have been reported in many studies. In many developing countries particularly in India, religions and other cultural diversities have contributed to fertility differences. The Mysore Population Study (1961) carried out by the United

Nations specifies that religion is associated with fertility; ever married Muslim women have borne on average a larger number of children than Hindu women. Davis (1951) and Visaria (1974), in pre-partition India observe that, the fertility of the Muslims was about 15% higher than that of the Hindus.Rele and Kanitkar (1980) also found that the general marital fertility of Muslim women was higher than that of Hindu women.

Dandekar (1967),Krishnakumar (1971) andCassen (1978) observed, on the basis of the evidence drawn from the Erankulam vasectomy campus that participation of Hindus in family planning has been proportionately slightly more than that of Muslims, though the latter have been increasing their share in the total participation over time. Srinivasan (1967) found from the Athoor Block data that in all age groups Hindu and Christian married women showed lower fertility than Muslim married women, except in ages 25-29 and 35-39. The Dharwar Survey did not reveal any caste differentials. Driver found the standardized average number of children born for Hindus to be 4.5, for Muslims 4.6 and for Buddhist 4.9.The Lucknow Survey gives the general marital fertility rate for upper-caste Hindus as 160, middle-caste Hindus as160, low-caste Hindus as 200, Muslims as 230, Christians as 180 and Sikhs as 260.

Mahadevan (1986) in his study conducted in Ramapuram, a village in the Chittoor district of Andhra Pradesh during 1982-83 found that there was a significant differentials in fertility based on religion. He argued that female education, literacy level in general, extensive use of child labour in agriculture and animal husbandry, greater value shown to sons, differential occupational mobility and religious fundamentalism of the Muslims were the major determinants of fertility. Heer (1986) and some sociologists are of the opinion that minority religious groups may tend to have higher fertility rates to gain more political power. This, however, does not hold true in all the cases. The minority communities' i.e., the Zoroastrian community in India and the Jewish community in United States have always shown lower fertility rates than the majority group. Rele and Kanitkar (1980) found that the fertility of Zoroastrian community was the lowest among all the religious groups studied in Greater Bombay.

Recently, several authors reported that the religion plays an important role in determining the attitude of the people in limiting the fertility and religious disparities also plays an important role in declining or increasing fertility (Shobha 1990;Mari Bhat and Zavier 1999).

TYPE OF RESIDNECE

The place of residence markedly determines the fertility behavior of women. Generally, fertility is lower in urban areas than in rural areas due to several factors. Fertility in urban is often lower due to certain factors, like larger proportion of couples who are well educated, open to innovative ideas and new life style, engaged in white-colour jobs and marry late and thus have smaller family. Whereas in rural areas women have lower education, limited formal sector employment and limited access to health and family planning facilities, and contraceptive users are lower and thus have higher fertility. Number of studies found that in India fertility level is higher in rural areas than in urban areas.

In India, many studies have provided sufficient evidence to prove that urban fertility tends to be lower than rural. Crude birth rate for urban and rural India in 1969 was 32.8 and 38.8 respectively while the corresponding figures in 1979 were 27.8 and 34.3 respectively (Basic Statistics: 1981). Kingsley Davis (1951) on the basis of his calculation of child-woman ratio concluded that fertility differentials exist not only between rural and urban areas but also by town size. He found fertility and size of the city to be inversely related.

An outstanding difference between rural urban fertility was observed in SRS survey, 1972. In this survey urban fertility has been found lower than the rural fertility across the country. The TFR was 4.3 for urban India in comparison to 5.8 children per women in rural India. But the results of base line survey in Bihar did not reveal any significant difference in rural urban fertility, where the overall fertility level was very high in both the places. Census data on fertility, after 1971, also revealed considerable rural urban differentials in fertility behaviour. E.D. Driver's study (1963) also suggests that differences among residential groups are not significant. In his study of Poona, Bopagamage (1966) found that there was a

spatial pattern in the distribution of human fertility rates which tended to increase with increasing distance from main business centers though the distribution was not uniform in all directions.

Rele et al. (1974), in Fertility and Family Planning study conducted in Greater Bombay in 1966, found that migrant women with a rural residential background had the highest standardized average number of children ever born (3.42) in comparison with migrant women having urban residential background (2.90) and non migrant women (3.0). Singh and Choudhary (1984) in their state level analysis found that the TFR in rural areas in every stratum in India is higher than the urban areas, where majority of Indian population (around 74.3 per cent) live in rural areas. During 1992-93, TFR for rural population was 3.69 against 2.7 children per women for urban areas.

Thus rural urban fertility differences is basically attributed to low level of education and poor performance of health parameters in rural areas such as IMR, CBR, acceptance of contraceptive methods, immunization etc.

CASTE/TRIBE

Traditionally, Indian society is stratified on the basis of caste. Each caste is a socio-cultural group which distinguishes it from other castes. This system of closed stratification has penetrated so deep in society that it is not possible to think of studying Indian population without incorporating this variable. Sharma (1984) has emphasized the importance of caste in the study of population. "Differential contribution to population by various strata of society should be understood in the context of differential gain in the developmental processes in a class society".

Saxena (1965) in a survey of 1413 U.P. village couples and found the inverse relation of caste and fertility. Women over 45 of the highest category averaged 7.6 live-births, those of the intermediate rank 8.2 and those of the lowest category averaged 8.8 live-births. Dandekar and Dandekar (1953) in a survey of Poona District conducted by Gokhale Institute in 1936-38, it was found that Brahmin had lower fertility than other caste groups.

Gordon (1965) made a detailed study of the fertility differential of the two dominant caste groups the Jat farmers and Chamar (leather workers) in the rural area of Punjab. Based on the data for 223 Jat women and 108 chamar women aged 45 and over, all married once and currently married, it was found that the average number of children born were 6.78 and 8.23 respectively. Driver (1963) also indicates that scheduled castes have the highest fertility and Brahmins the lowest. A large-scale survey of 100 villages and 104 urban blocks in the state of Maharashtra in 1960 as a part of National Fertility Survey and Mortality Survey (NFMS) was conducted. It was found that, in terms of current fertility measures after Muslims, SC and ST exhibited the highest CBR (31.4) in comparison to intermediate (28.6), and advance caste Hindus (26.1), (Srikantan and Bhate 1989).

Reddy (1984) who studied the relationship between caste and sterilization found that people of higher economic and caste status (kammar) adopted sterilization at earlier ages, after fewer living children, fewer sons and with experience of least number of infant or child deaths as compared to those of lower economic status, namely the harijans.

Mehta (1993), in his study of the tribal region of Rajasthan, has found that the opportunity cost of child birth and rearing is not very high because of the compatibility of women's work and child care and the sharing of this responsibility with other members of the household, mainly other siblings. Along with this because of the prevalence of the child labour tradition, children are looked as net producers and as the children grow their net contribution to the household increases.

Number of studies and large scale sample surveys on fertility including those by Census Organization and NFHS has shown that tribal fertility varies not only across the states but also higher in some regions and lowers in others as compared to the fertility of mainstream population (Maharastha 1998).

EXPOSURE TO MASS MEDIA

Diffusion of information through mass media plays an important role in changing the attitude towards small family norms. Retherford and Mishra (1997) have found that media exposure increases significantly the acceptance of contraception. On the basis of NFHS data (1992-93), they observed that contraceptive use increases by 76 per cent when women have general media exposure. They said that the recent exposure of family planning messages on radio and television are very important in case of India where 63 per cent of currently married women of reproductive age are illiterate.

ECONOMIC STATUS

Wealth index of a household is a good indicator of the economic condition. Women belong to high class of wealth index, generally record low fertility and high use of contraceptive methods. Kanitkar and Murthy (1983), in a study of contraceptive use in Rajasthan and Bihar, have found a direct relationship between wealth index and contraceptive use. Bhende and Kanitkar (1993)also found that, low acceptance of contraceptives and high fertility in developing countries is largely because of the low level of standard of living or wealth index of their people. The second All India Family Planning Survey also depicted the similar results i.e., an inverse relationship between family income and family size. With the rise in income, a greater concern for the quality of children dominates over the numbers. It requires greater investments than returns and as a consequence, rise in income might lead to reduction in fertility. The negative relationship is supported by Easterlin (1975); Bulatao and Lee (1983); Registrar General (1989). However Roy, Jayachandran and Banerjee (1999) have found in their study of four major states of India that, the standard of living or economic status is not always sufficient to understand the complex mechanisms of fertility decline. Only Punjab has shown negative relationship between economics status and fertility. According to them a set of other socio-economic factors, directly or indirectly, influence couple's decision on reproductive behaviour.

Arora (1990) has attempted to refine the theory by explicitly introducing the sociological determinants of reproductive motivation in the form of a preference system and by suggesting that potential rather than current income should be used.Murthy (1991) examined the relationship between agricultural modernization, cost and benefits of rearing a marginal child and fertility behaviour of couples of rural Andhra Pradesh. He found that couples form backward villages had different perception than the couples from developed areas, couples scored high on the indices of economic and non-economic costs and scored low on similar benefits. As a consequence they desired to have small family size in comparison to couples from agricultural less developed areas.
According to Singh and Singh (1996), family income exerts much influence on fertility behavior. As adoption rate for contraceptive measures is much higher in middle and high-income families as compared to low-income families.

FEMALE WORK STATUS

Work status is a good indicator of the status of women. The general explanation is that working women tend to have fewer children than the non-working women, because working women have greater opportunities to communicate with the outside world, which help in widening their worldview and bring changes in their attitudes towards the family size and use of contraceptives (Basu, 1992). Aggrawala (1970) found that the wives of cultivators and laborers had on an average 7.4 children, while the wives of professional and service occupations had on an average 6.6 children. Driver (1963), also found that the wives of unskilled workers, agriculturists and artisans had higher fertility than the wives of clerks.
Judith Blake (1967) argues that the foregoing employment is an indirect cost that must be considered by the working wife and that this indirect cost has a negative influence on the decision of the working wife to bear additional children. Further Blake contends that employment often entails satisfactory alternative to children such as companionship, recreation, stimulation and creative activity or the means of such satisfaction in the form of financial remuneration. Another explanation given by Ridley (1969) is based on husband wife dominance. He states that labour force participation of women leads to a more egalitarian relationship between husband and wives, which in turn is said to be related to lower fertility. Similarly,

Weller (1969) adds that wives manifest lower fertility behavior in wife dominant and egalitarian families rather than in husband dominated families. Thus it seems that the distribution of dominance between the husband and the wife plays a crucial role in affecting the fertility behavior.

Although a negative association between female work participation and fertility has been found in various studies in India, it is not consistent. Women who work in other than primary activities and earn in cash are presumed to have active participation in decision making regarding family matters and subsequently control family size. Becker (1981)has said that the higher wages might be expected to increase the opportunity cost of women's time and hence raise the 'price' of children. In SRS survey of 1979, it was found that female workers have exhibited lower fertility than non-workers. Further, women engaged in service sector have shown lower fertility than those engaged in other occupations.
In a district level analysis (358 districts) of fertility behaviour in India, Malhotra, Vanneman and Kishore (1995) have found that female labour force participation had the most significant effect on fertility and observed a distinct divide between northern and southern regions of India.

INFANT AND CHILD MORTALTIY

In all the societies, there is a family size goal or targeted number of surviving children that parents want. So the incidence of deaths among offspring's necessitates a compensating adjustment in birth rates to achieve any specific family size goal, (Schultz 1969). Where IMR and CMR are high parents generally want large number of children, to ensure that some of them will survive up to adulthood to provide them old age security. Fertility tends to drop along with the positive changes in socio-economic status. In Sub-Saharan countries IMR and CMR are the highest in the world where in some of the countries, nearly 20 per cent children die prior to their fifth birthday. These countries are also showing the highest fertility rates in the world.

Using the age distribution from 1961 and 1971 Censuses, Adlakha and Kirk (1974) has concluded that fertility decline in India occurred during the second half of 1960s, when the child-women ratio for children aged 0-4 years have lowered by 2

per cent during 1961-71. This small decline in ratio shows a greater decline (7-10 per cent) in fertility rates, which is attributed to the continuous decline in mortality, spatially in child mortality, during 1960s.

A survey in Mogra village in Jodhpur district of Rajasthan, Tulsi (1990) observed that a fall in child mortality has made younger couples more favorably disposed towards a small family size and acceptance of contraceptive methods. Malhotra, Vanneman and Kishore (1995) also found that similar results in their district level analysis. They also revealed a strong influence of the sex ratio of child mortality on fertility.

CONTRACEPTIVE USE

Contraceptive prevalence as a major proximate determinant of fertility has been extensively studied in India. A review of the Indian family planning programme since its inception in 1952 reveals that it is largely one of missed opportunity (Soni 1983). Its weakness lies in its overemphasis on sterilization which is generally accepted at higher parties, (Srikantan and Balasubramanian 1983). The slow progress of the programme may be attributed to its voluntary nature and fertility- increasing effects of modernization, so that its impact is not very strongly felt (Srinivasan 1983). Nevertheless, the programme should continue because, even at its present level of performance, it is cost effect (Bery 1982).
Wyon& Gordon (1971) in their work revealed a willingness of the population to accept contraception, particularly foam tablets. More at older house-wives than younger wives accepted contraceptive practice with at least one surviving some rather than no son at all. In another study, several researchers (Rao and Somayajulu 1991; Regassa 2007; Singh et al. 2004) noted that the extent of acceptance of contraceptive methods still vary within and between societies and also among different castes and religious groups. Also contraceptive prevalence rate has been found to be lower among the Muslim and lower caste Hindu women (Bora et al. 1998; Gulati 1996). Acceptance of contraception by a couple is governed by various socio-cultural factors, such as religion (NFHS 1998-99), education of husband and wife etc. (Berelson 1976; Coale 1965).

On the basis of the Bongaarts' model, the fertility decline in India during 1971-81 has been largely attributed to an increase in contraception which accounts for 27 per cent of the fall in Total Fertility Rate. This is followed by a change in marriage pattern (3-4 per cent) and induced abortion (2 percent) (Pathak and Ram, 1987). Similar studies in Bihar (Rai, 1988) and Karnataka (Patil, 1987) also reveal the same trend.

All the above-mentioned existing literatures obviously put forth the message that social, economic and demographic factors have very strong association with fertility behavior. Moreover, these literatures suggest a wide range of determinants affecting the fertility behavior.

Chapter –III

THEORIES OF POPULATION GROWTH AND FERTILITY BEHAVIOUR

CHAPTER–III: THEORIES OF POPULATION GROWTH AND FERTILITY BEHAVIOUR

This chapter describes the influence of socio-economic factors on fertility behavior through framework. This chapter has been divided into six sections. The first section of this chapter deals with the conceptual framework for influence of fertility behavior of women. The second section shows the deterministic models of fertility. Section third contains source of data. Selection of dependent and independent variables is mentioned in section fourth and fifth section explains the methodology used for analyzing the influence of fertility behavior of women.

3.1 Conceptual framework

Economists, population scientists and others have conceptualized on the issues of population growth and fertility behavior for over a long period of time in order to find out the different attributes that have an association with fertility behavior and how these attributes are responsible in determining the fertility behavior of a society. Here focus is given on the dynamism of fertility behavior and its relationship with socio-economic and demographic variables.

The classical economists supposed that stationary state of population growth is reached when the economy has fully adopted new technological possibilities or choices. They(classical economists) believed that in the absence of new technological choices, there would be more demand for food with fixed land resources and would eventually lead to lowering the per capita income.Adam Smith, the founder of classical school of thought hadan optimistic view regarding growing of population and assumed that increase in population would, in turn, brings more labor and development. He contended that an ever-expanding population would widen the scope of the market and thereby enhancing division of labor and specialization of economic activities and thus generating greater output.

Robert Malthus (1789) gave his pessimistic view regarding the rapid growth of populationbased on the law of diminishing returns to land. He postulated that

while population grows at a geometric progression, food production grew at an arithmetic progression. He assumed that there is a competition between population growth and food production where population growth surpasses food production. So if population growth is not controlled it would lower the per capita income to a subsistence level. Malthus asserted that if voluntary checks are not followed natural calamities such as pestilence, war and misery would act as a restraint to population growth. Similarly, Ricardo argued that the population growth would result in a steady decline of per capita income, which would consequently lead to a stationary state.Although both Malthus and Ricardo have pessimistic view over the growth of population; Karl Marx disagreed with them and claimed that population problem was an offspring of the capitalist mode of development. Marx asserts that with the proper management of population growth, it could serve as an asset for the wellbeing of a nation.

In 19thcentury, Arsene Dumont, a French philosopher, put forward the view that people like to move up along the social ladder (scale) and this is usually possible in small families. He encouraged that people should restrict their family size. In the beginning of 20th century another sociologist and demographer, Kinsley Davis had argued that every change brings multiple responses, such as change in mortality in terms of decline in mortality rate brings consequent responses on population growth, age at marriage, contraception prevalence rate, migration etc.

These classicists were in fact criticized for lacking in their foresight in terms of technological development and the discovery of new lands.For instance, theapplication of Malthus theory in Europe failed as per capita income rose with rapid population growth. While the above theories relate population to economic indicators but none of them tried to explain the process of population growth and its impact on development.

In 1929, American demographer Warren Thompson developed the demographic transition model, which was an attempt to explain the historical process of the population growth indeveloped countries. This theory postulated that during the process of modernization first decline in mortality is experienced and followed by a fall of fertility. During the intervening period, population explosion takes place largely due to the natural growth. This theory divides developmental processes

into four phases-the pre-modern, early transition, late transition and modern phase.In the pre-modern phase both birth and death rates are relatively high and population is in high stationary stage. In the early transition, death rates fall sharply due to the application of modern medicine, improved sanitation and poverty reduction, while birth rates remain unchanged and therefore population growth occurs. In late transition, birth rates and death rates are both low; however population growth continues because of a large number of individuals in the reproductive age group. Increasing female literacy and participation in economic activities, reduction in infant mortality, traditional belief loosened, betterment of health infrastructure, increase in social security also worked considerably in fertility reduction. With the sharp reduction in fertility rates, mortality was also continuously declining and population growth retards. In the last phase both fertility and mortality have fallen to very low levels and population attains a low stationary state. The theory was also criticized on various grounds like, it does not have predicting values, seems like a grand historical generalization and even the experiences of various developed European countries were not consistent.

In 1957, Leibensteinformulated the firstmicro-economic theory relating to income and fertility decision.Under this framework parents make decisions on whether to have children by weighing the utility and dis-utility of having additional children. So here he gave an importance to rational decision for marginal child. He mentioned three types of utilities, such as, consumption, production and security utility and two types of dis-utilities, such as, direct costs for feeding a child and indirect costs as loosing opportunities for better earning. He believed that utilities always decrease (except consumption utility) with higher birth order but dis-utilities do not give a clear picture.Gary Becker, who belongs from Chicago school, also favored this type of explanations in his paper, published in 1960s. He favored strong interlinkages between economic development and fertility reduction. To explain fertility he used Hicksian's version of micro consumption theory and developed a demand theory as a pioneering work in this field. He argued that children should be viewed like the household views the purchase of durable goods. He studied the American society to explore that why richer families prefer

small family size. He found that the children are not inferior goods and as income rises, parents aspire to improve the investment on each existing children.

Easterlin (1975) added the supply component (number of children parents would have if they did not use methods to limit fertility) and costs of fertility regulation to the economic theory of fertility. He assumedthat there would be motivation to control fertility only if the supply exceeds the demand give costless fertility regulation.In addition, Namboodarimodified the backer's concept and argued that decision regarding the family size is taken on the basis of past experience initially after having the first child. Heasserted that tastes also changes during this gap between the present and next order children.Regarding cost of time and changing opportunity cost of mother,Beckerclaimed that, as the opportunity cost of mother's time increases, it raises the cost of additional child care. T. Paul Schultz's (1969), who work on infant mortality, however, suggested that household desire a target number of surviving children. As income increases the possibility of survival also increases and therefore desires to have few births.

Some sociologists, economists and demographers have emphasized the effect of socio-economic status on the taste for children, or the preferences for the material goods or relation between these two. With these developments in seventies the great debate on population policy started. Two views of arguments were occurred:first, economists and sociologists believed that 'development' is the best contraceptive. Theypresumed that as society develops, fertility reduction take place.Second,the proponents of family planning programmes had pointed out to the large unmet need for contraception. They contended that high level of unwanted fertility could be reduced by strengthening the family planning programmes.

In 1960s and '70s,Easterlin developed the 'demand theory'. Heindicated that, when the level of development is low, demand for children exceeds potentials supply because of high child mortality rates (CMR) and the situation of deficit supply takes place. But when the increasing level of development reduces child mortality rate, potential supply increases and after a critical point it overtakes the demand for children and the age of excess supply starts.With increasing level of

development, means of fertility regulation become socially acceptable and then after a period of time the stage of equilibrium would establish.

J.C. Caldwell (1970) explained the fertility behaviour in terms of intergenerational wealth flow at the societal level. He explained that, in a society, the fertility is high if children are economically useful to parents, low if children are economically not beneficial to the parents. He maintains that if the flow of wealth is from younger persons to the older persons, fertility is high or *vice versa*.

Considering the quality of children, in 1970s Leibenstein stated that, in countries, wherestate takes responsibility of children's education and other facilities, the cost is unlikely to be a significant deterrent in terms direct cost of children for fertility control. Also,value of mother's time is largely cultural bound rather than household income.Somother's time is not significant here. Women's education also has an impact on taste rather than on value of time.Toovercome these limitations, Leibenstein argued that, income differentials with increasing socio-economic status are much more significant than the increase in the costs of children because costs of child rearing need not increase proportionately with increase in income.

Thus it is evident that social and economic influences must not be considered in isolation because the economic changes always influences the social status of families and later on taste change regarding children and goods that compete from one another. So in high status household it may become necessary to spend more on commodities to maintain their status and demands more in terms of commodities. This results into tastes differences of people in different classes, which gets influenced by the occupation and education of the group members. Therefore, it is possible that households in higher income group would have few children than the low-income group households.

Judith Blake (1968) emphasis on the role of norms in determining the fertility behaviour. In the societies such as the Catholic Church norms of fertility are motivated by the fear of sanctions. Norms which usually stands in opposition to desires, whishes, preferences and drives, allow groups to solve dilemmas of

cooperation that flow the egoistic motivations of their members, (Freedman and Weingast 1993).

Due to above limitations, in the last quarter of 20th century, rational choice models have become increasingly prominent in fertility research. These are based on constraints and values where former refer to conditions external to individual and later refer to inner state that enable people to evaluate the consequences of desirable behaviors. But the problem is the unobservability of values, which are subjective constructs. So the rational choice theories usually specify values by assumption rather than by imputation (H. Simon 1986; Stigler and Becker 1977).

Cleland (1987) has given an iconoclastic view of the fertility behavior after attacking on the traditional believes of fertility theories. He criticized demand theories and argued that, even in societies where children are not costly people are adopting fertility regulation methods as found in Europe. He said that, people adopt fertility regulation behaviour to see the others or through the diffusion of innovation ideas. Further he found that upper classes welcome the innovative behaviour first and bring ideational changes and then it spreads in the other social groups. The speed of the diffusion of innovation depends on the efficiency of communication network.In another explanation theorists he said that, their should be a threshold level of development to experience decline in fertility behavior.

Walle (1992) has specified that a fertility decline is not very far away, when people start conceptualizing their family size and it cannot take place without such conceptualization. He also stated that population has now become numerate about children and the event is interesting only in retrospect and has little bearing on the future.

Freedman, Hechter and Kanazowa (1994) have proposed a theory of the value of children which specify a new assumption of common immanent values to supplement the more familiar instrumental values. They use the assumption of uncertainty reduction to explain why some people in advanced societies have no children while others have at least one child. They argued that intraditional circumstances children were doubly important for uncertainty reduction both in

terms of their ability to provide wealth and insurance for their ageing parents and for their contribution to social integration. The first set of contributions diminished in value over time but not the second. The temporal shift in the value of children suggests the economic theories of fertility decline, that the number of children demanded should reduce but not to zero.

However, the crucial question is how much of fertility change in a particular society can be attributed to each of these broad explanatory factors, such as socio-economic development and diffusion of family planning programmes, remains unanswered. Along with the process through which social and economic variables affect fertility and its proximate determinants have received relatively little attention. Bongaarts in 1993 have attempted to address this problem by proposing a variant of Easterlin's model. The variant allows the convenient quantification of the three key mediating variables the supply ofanddemand for births, and the degree of implementation of reproductive preferences. He also proposed a new technique to trace the fertility trend in terms of the separate effects attributable to the individual mediating variables in the application of this model be found that increase in preference implementation are on average slightly more important determinants of fertility decline than changes in wanted fertility. Further, in the study of effects of development and family planning programmes on the mediating variables, he found that socio-economic development has the expected negative effect on wanted fertility as well as a positive on implementation of preferences. Family planning programmes exert their strongest effect by increasing the level of implementation, and also have influence on wanted fertility.

Caroline Foster (2000) has propounded "a bio-social approach" to limits the low fertility. She acknowledged that our biological predisposition towards nurturing behaviour plays an important role in the motivation for child bearing does not mean that all women are genetically determinant to become mother i.e., biology and destiny also broke with use of efficient contraceptives and induced abortion. Despite of the high costs and greater difficulties of bearing and brining up children and in the absence of social force most women will choose to have at least one child. There is no inevitable link between genetic disposition and

behavior. Therefore it is possible that predisposition towards nurturing could be supposed, resulting in further fall in fertility rates that is why women will continue to fulfill this fundamental human need by having children.

As discussed above it is quite clear that socio-economic development has played a prominent role in changing fertility behavior.

3.2 Deterministic Models of Fertility

Although different type of fertility models have been put forward by scholars, hereattempt has been made to streamline the interrelationship between fertility behavior and its determinants. Models have been made in connection with how various socio-economic and demographic variables are associated with fertility behavior and their relationship among themselves. These models deal with variables that are operating to have an impact on fertility behavior. In the following it has been discussed how these relationship have changed in terms of direction and nature of variable over a period of time.

The birth of a child is basically a biological phenomenon, but child bearing is affected by social, cultural and economic factors. Conception of baby is affected by the social set up of that particular society, such as its customs, structure, norms and value system related to the various aspects of the childbirth. Thus it can be said that, the social environment in which people live, which comprises various political and economic settings, regulates fertility behavior of its inhabitants. Along with the societal effects on child bearing, decisions of individual couples about whether to have a child or not also have significant influence. Therefore, to have a deep insight into the issue of differential fertility one has to have a clear idea about the relationship between the independent variables, viz., social, economic and demographic variables and fertility behavior.

Kingsley Davis and Judith Blake(1956) have explained the way in which all non-psychological factors affect fertility in any society. They gave eleven intermediate variables, for three stages of child bearing, through which non-psychological factors affect fertility behavior. All the eleven intermediate variables have either a positive or negative effect on fertility. These are as follows.

INTERMEDIATE VARIABLE

I. Factors Affecting Exposure to Intercourse ("Intercourse Variables")

A. Those governing the formation and dissolution (suspension) of unions in the reproductive period.

1. Age of entry into sexual unions.

2. Permanent celibacy: proportion of women never entering sexual unions.

3. Amount of reproductive period spent after or between unions.

a) When unions are broken by divorce, separation, or desertion.

b) When unions are broken by death of husband.

B. Those governing the exposure to intercourse within unions.

4. Voluntary abstinence.

5. Involuntary abstinence (from impotence, illness, unavoidable but temporary separations).

II. Factors Affecting Exposure to Conception ("Conception Variables")

7. Fecundity (fruitfulness) or infecundity, as affected by involuntary causes.

8. Use or non-use of contraception.

a) By mechanical and chemical means.

b) By other means.

9. Fecundity or infecundity, as affected by voluntary causes (sterilization, subincision, medical treatment, etc).

III. Factors Affecting Gestation and Successful Parturition ("Gestation Variables")

10. Foetal mortality from involuntary causes.

11. Foetal mortality from voluntary causes.

All of these variables are present in every society and any change in fertility may be affected through change in one or more of these intermediate variables.

Freedman (1962) has made modification in the above model by including a set of variables like education, occupation, income, family structure etc.

Yankey (1969) presented a model, which explains the taxonomy of fertility determinants. He gave three individual classes of his model. Class 'A' includes the norms regarding family size and intermediate variables, Class 'B' incorporate intermediate variables and Class 'C' includes the dependent variables.

He has argued that most of the population scientists, especially fertility researchers focused on the relationship between the Class 'A' and Class 'C' variables. He said that there is a need to look into the interrelationship between Class 'A' and Class 'B' variables and between Class 'B' and Class 'C' variables.

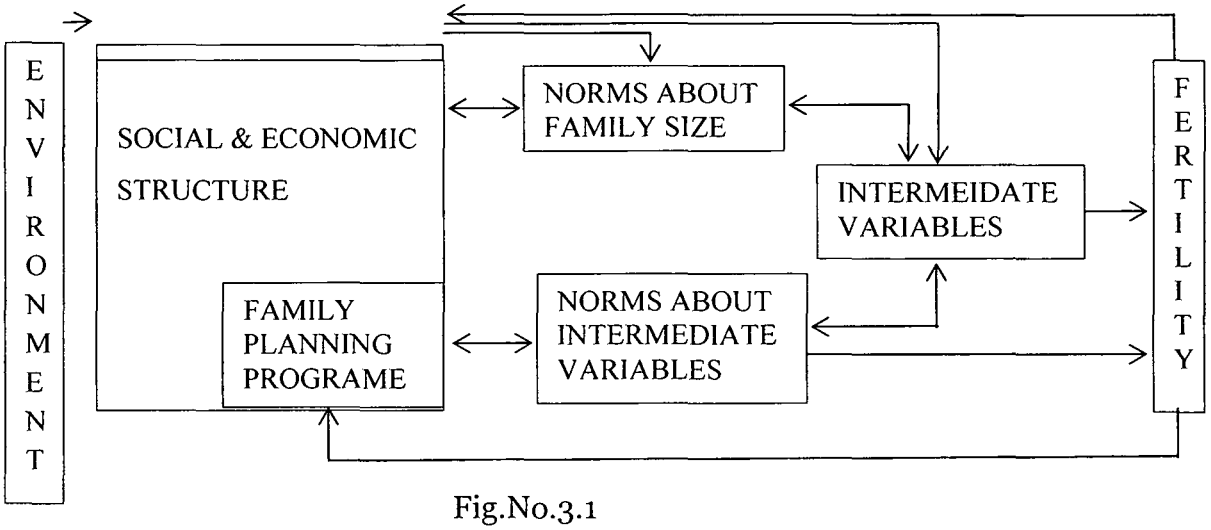


Fig.No.3.1

YANKEY'S MODEL (1969)

Similarly,Bongaarts in 1978 tried to make quantitative assessment of the effects of intermediate variables on fertility. He effectively simplified the relationship of fertility and its determinants, which can be presented in following diagrammatic form.

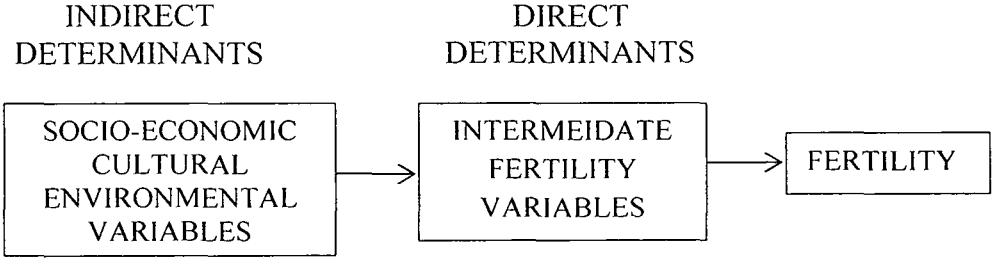


Fig. No.3.2

BONGAARTS MODEL (1978)

Bongaartsfound in his empirical research that a major portion in the change in fertility levels could be explained by only four intermediate variables out of eleven intermediate variables. These variables are called proximate determinants of fertility. The details are as follows:

(1) Nuptility variable (age at marriage and proportion of non-marriages).

(2) Period of lactation following childbirth.

(3) Incidence foetal wastage

(4) Prevalence of contraceptive practice.

Richard P. Bagozzi and M. Frances Von Loo (1978) developed a general fertility theory and hypothesized that demand for children is primarily determined by social-psychological process within the family, subject to certain socio-economic constraints. They proposed two social-psychological processes as determinants of fertility. First, the attitude or tastes of family members influence the demand for children. Second, the nature of the husband-wife interaction (in terms of sharing of power, conflict, decision making process and marital satisfaction) decides family size. They mentioned that the socio-economic factors influence fertility through their impact on social-psychological processes within family, which then direct influence the fertility behavior.

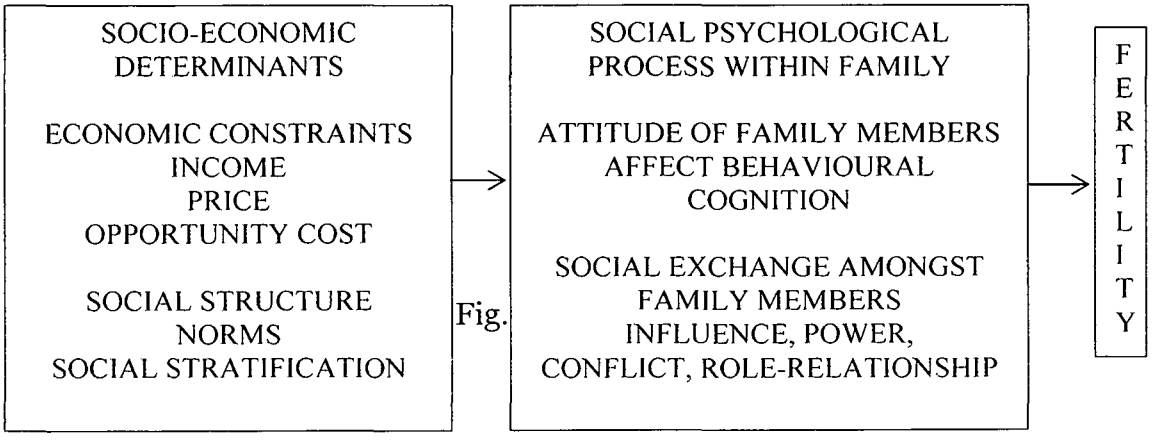


Fig.No.3.3

RECHARD BAGOZZI AND LOO (1978)

T.R. Balakrishnan, G.E. Embanks and G.F. Grindstaff (1980) have studied the influence of socio-economic and demographic variables on fertility.They tried to prepare a model to explain the relationship between fertility and its socio-economic and demographic determinants. They took religion, ethnicity, mother tongue and residence as inherent characteristics, education, income and work status as achieved characteristics. The current age of women and age at first birth isincorporated as demographic factors in their model to explain fertilitybehavior.

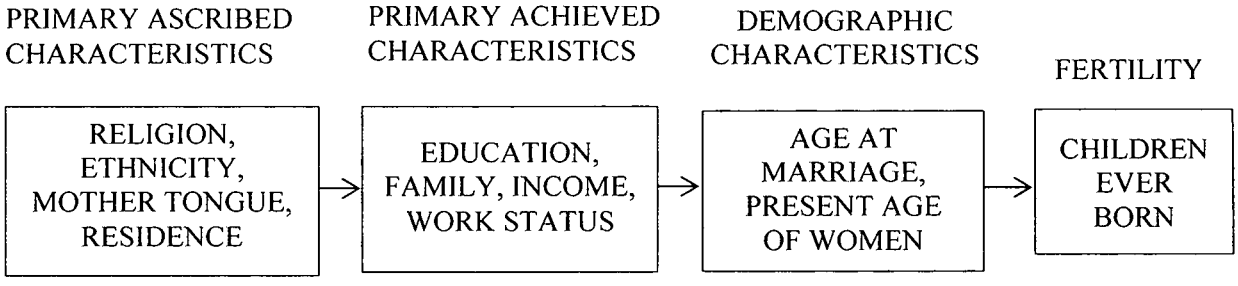


Fig. No. 3.4

BALAKRISHNAN, AMBANKS AND GRINDSTAFF (1980)

Kennith C.W. and Helon L. Ginin (1988) have proposed a model for the analysis of fertility behavior in which the process of family formation in modern world has explained. According to them fertility behavior is not always a result of decisions at conscious level and it certainly act as at given time frame. There decision are not always national ones, but some of these are made rationally where people weight alternatives and make decisions to fulfill their needs or objectives at the best. They said that a decision to have a child or not, is not a decision of a single occasion. The ultimate decision regarding family size is the result of a series of minor decision.

Before the analysis of their framework one should know the inherent meaning of terms like "cultural press" and "situationally specific factor". Cultural press comprises all the institutional and cultural support for child bearing. It is a set of values in favor of having children. Where the later includes the factors, which mold couple to have more children and the factors, which stop them for having more children. The term "Situationally Specific Factors" refers to the conscious

and explicit reasons for having a child or not, in favor of couples decision, at any particular time.

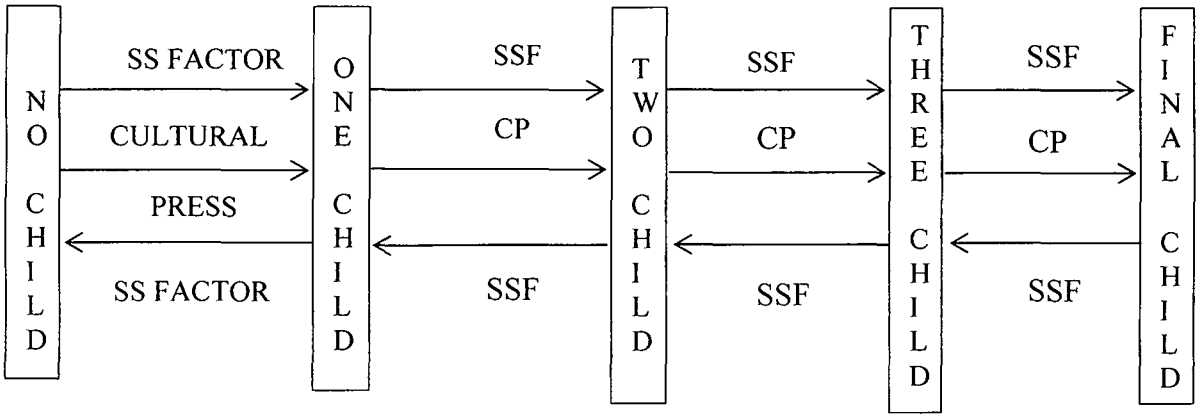


Fig. No.3.5

KENNITH, KAMMEGER AND GININ (1988)

Premi (2002) has found that the capacity to reproduce is governed by several parameters. These parameters are gene selection, age at menarche and age at marriage, length of lactation period, natural sterility, contraceptive use etc. The socio-economic status of any community has control over these parameters, which determine the fertility behavior of that particular society.

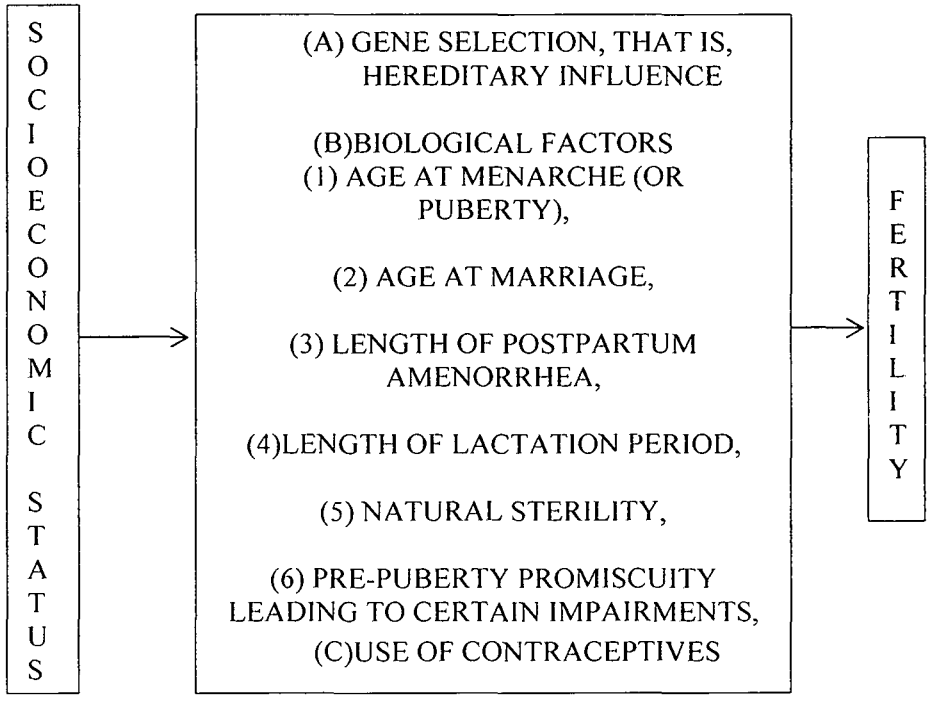


Fig. No. 3.6

PREMI (2002)

3.3 Data Base

The study is based on secondary data. The data used in this work on women aged 15-49 were gleaned from the National Family Health Surveys (NFHS) conducted by the Ministry of Health and Family Welfare (MOHFW), Government of India (GOI), with a representative sample of households throughout the country. The NFHS surveys provide high quality data on population and health indicators. Three NFHS surveys have been conducted till date in India. An important objective of the NFHS surveys has been to provide national and state estimates of fertility, family planning, infant and child mortality, reproductive and child health, nutrition of women and children, the quality of health and family welfare services, and socio-economic conditions. The NFHS surveys use standardized questionnaires, sample designs, and field procedures to collect data. The MOHFW designated the International Institute for Population Sciences (IIPS), Mumbai, as the nodal agency for each of the three rounds of NFHS. The East-West Centre, Hawaii, USA, and Macro International, Maryland, USA, provided technical assistance for NFHS-1. Funding was provided by the United States Agency for International Development (USAID).

The country's first National Family Health Survey (NFHS-1) was conducted in 1992-93. Interviews were conducted with a nationally representative sample of 88,562 households and 89,777 ever-married women age 13-49 years in 24 states and the National Capital Territory of Delhi.

The second National Family Health Survey (NFHS-2), conducted in 1998-99, was an important step in strengthening the database for implementation of the Reproductive and Child Health (RCH) approach adopted by India after the International Conference on Population and Development (ICPD) in 1994 in Cairo. In addition to the population and health components covered in NFHS-1, NFHS-2 collected information on the quality of health and family welfare services, reproductive health problems, the status of women, and domestic violence. Height and weight measurements were extended to cover ever-married women. Ever-married women and their children below three years of age had their haemoglobin levels measured to provide the first national estimates of the

prevalence of anaemia. NFHS-2 covered a representative sample of over 91,000 ever-married women age 15-49 years across all 26 states of India.

The third National Family Health Survey (NFHS-3) was conducted in 2005-06. In addition to the indicators covered in NFHS-2, NFHS-3 provides information on several new and emerging issues such as perinatal mortality, male involvement in the use of health and family welfare services, adolescent reproductive health, high risk sexual behaviour, family life education, safe injections, and knowledge about tuberculosis. In addition to interviewing ever-married women age 15-49, NFHS-3 included never married women age 15-49 and both ever-married and never married men age 15-54 as eligible respondents. Interviews were conducted with 124,385 women age 15-49 and 74,369 men age 15-54 from all 29 states.

3.4 Selected Socio-Economic and Demographic Variables

Dependent Variable

Dependent or response variable in the present study is to be indicated by the mean number of children ever born (CEB) of women aged 15-49. Since children ever born are a continuous variable, thus it has been transformed into dichotomous form. The groups are as follows-

1. Women with children ever born less than and equal to two.
2. Women with children ever born more than two.

These two categories have been formed because they correspond with replacement level of fertility.

Independent Variables

The independent variables considered are-

A) Demographic Variables

1.Age at Marriage: The age at which these women started living with their husbands is classified into:

1- Below 20 years

2 - 20 -30 years

3 - 31- 49 years

2. Death of a Son: Women who experience death of a son have been categorized as:

1-Not dead

2-Dead

3. Use of contraception: Women who practice contraception for controlling births are classified as:

1 – No

2 – Yes

B) Social Variables

4. Type of Residence: The place of residence of women is classified into rural and urban areas.

1 – Urban

2 – Rural

5. Education: The educational level of women is measured as:

1 – No education

2 – Primary

3 – Secondary and above

6. Caste/Tribe: Women were categorized into:

1 – Scheduled tribe (ST)

2 – Others

7. Religion: Women's religious background is classified into:

1 – Hindu

2 – Christian

3 – Others

8. Media Exposure (exposed to television, radio and newspaper): Women's who listen to radio, read newspaper and watching television are considered as exposure to mass media otherwise not. It is classified as:

1 – No

2 – Yes

C) Economic Variables

9. Work Status of Women: The occupation of women is classified into:

1 – Not working

2 – Working

10. Wealth Index: The economic status of women was classified into:

1 – Poor

2 – Middle

3 – Rich

3.5 Methodology

The three rounds of India's National Family Health Survey (NFHS), 1992-93, 1998-99 and 2005-06 provide representative data on fertility. For the analysis of fertility patterns and its determinants we have used the latest NFHS-3 (2005-06) data. The NFHS-3 provides estimates of important indicators on family welfare, maternal and child health, and nutrition. In addition, it provides information on several new and emerging issues, including family life education, safe injections, perinatal mortality, adolescent reproductive health, high-risk sexual behaviour, tuberculosis, and malaria and HIV/AIDS. Though NFHS-3 interviews were conducted with 124,385 of women age 15-49, we have selected 21,843 women from the North East Region, and its frequency distributions are: Manipur (4,521), Nagaland (3,896), Assam (3,840), Sikkim (2,137), Meghalaya (2,124), Tripura (1,906), Mizoram (1,791) and Arunachal Pradesh (1,647).

In the present study we have used statistical techniques for the analysis of fertility. In order to understand the nature of distribution of variables, univariate descriptive statistics in terms of percentage distribution of women aged 15-49 years for the response and predictor variables was obtained. The univariate distribution is followed by a cross tabulation analysis. The cross tabulation analysis is carried out to understand how the predictor variables and the dependent positively or negatively associated with each other. Moreover, Pearson's chi-square is calculated to show the statistical association between the dependent and independent variables.

For the multivariate analysis, the statistical technique used in this study is Multiple Classification Analysis (MCA). The technique is useful as most of our predictor variables are either continuous or categorical in nature. MCA is a technique for examining the interrelationship between several predictor variables

and a dependent variable within the context of an additive model (Retherford and Choe, 1993).

Statistical Model: The statistical model specifies that a coefficient should be assigned to each category of each predictor, and that each person's score on the dependent variable should be treated as the sum of the coefficients assigned to categories characterized plus average for all classes plus an error term. Symbolically,

Yijk = Y + ai + bj ... + Cijk

Where, Yijk = Score (on the dependent variable) of a particular individual variable who falls into the ith category of predictor A, jth category of predictor B, etc.

Y = Grand mean of the dependent variable.

ai = The effect of the membership in the ith category of predictor A.

bj = The effect of membership in the jth category of predictor B (=difference between Y and the mean of jth category of predictor B).

eijk= Error term of individual.

In the absence of effects of other predictors the impact of a predictor variable on response variable is called unadjusted effect and the effect of a predictor variable controlling the effect of other predictor variables is called adjusted effect. In addition to the adjusted and unadjusted effects, the Eta (n) coefficient is the correlation ratio, which shows how well a given predictor can explain the variation in the dependent variable; while the Eta square (n^2) coefficient indicates the proportion of the variation explained by the predictor alone. On the other hand, the beta (ß) coefficient measures, on the basis of the adjusted mean, the ability of a given predictor to account for variation in the dependent variable whereas the n coefficient shows the proportion of the variation that is explained by the predictor, after taking into account the proportion explained by the other predictors.

Further, R^2 unadjusted is the actual proportion of variance in the dependent variable explained by using the obtained coefficients in the additive model applied to the data cases actually used in the analysis. R^2 adjusted is an estimated

of how much variance the predictors would explain if used in an additive model applied to a different but comparable set of data cases.

Computationally, R^2 adjusted is derived form R^2 unadjusted by applying the adjustment factor AD which is determined by the number of cases (N), categories (C) and predictors (P) as

R^2 adjusted = (1 (1-R^2 unadjusted) (AD)

Where, AD = N-1/N+P-C-1

Using this technique, determinants of fertility has been analyzed in the present work.

Chapter –IV

FERTILITY LEVELS AND TRENDS IN NORTH EAST INDIA

CHAPTER –IV: FERTILITY LEVELS AND TRENDS IN NORTH EAST INDIA

4.1 Introduction

Remarkable success has been achieved during the recent years in the reduction of fertility in the country including the northeastern region. The TFR of India during 1951-61 was estimated to be higher than 6 and the same for next decade i.e., 1961-71 was observed to be in the vicinity of 6 only. During the first half of 1980's, the TFR declined by 1.3 units to 4.5. During 1996-2001, the TFR varied in the range of 3.21 to 3.46. The process of decline in fertility continued at a gradual pace and such a steady decline in fertility at the national level is obviously related to the implementation of the Government's family planning programme established in 1951 as well as perceptible changes in socio-economic development of the country over the previous 30 years (Ram and Ram 2002). The pace of fertility decline varies from one state to another. While most of the northern states have experienced very slow pace of fertility decline, showing their fertility levels much higher than the replacement level (2 children per woman), all the southern states have significant fertility declined to the replacement level or below.

Generally, due attention to the connection between culture, development and demographic diversities have been paid as far as fertility is concerned. Several scholars have chiefly documented cultural, development and demographic differentials between northern and southern states of the country. But the same work, especially in the Northeast region of India is quite rare and infrequent. The fact that the region is composed of different tribal groups having different cultures, traditions, religious beliefs and the like. As a result, different family systems e.g., nuclear or joint family, patriarchal or matriarchal kinship systems etc. have emerged that led to differentials in adoption of family planning method and in return fertility rates significantly varies among the states within the region. Due to differences in social, economic and culture system among these states, the demographic pattern reveals a contrasting picture. This draw the attention of demographers to investigate the factors behind the peculiar

demographic patterns that occurred in the region which is substantially differs from the major states in the country. In the present study we rely only on the NFHS reports (only state level data) from the three rounds of NFHS for the study of levels and trends of fertility as the data source. Here the fertility trends have been studied through Total Fertility Rate (the actual total number of births delivered by a woman during her reproductive span), Crude Birth Rate (births per 1,000 populations) and Age-specific Fertility Rate (births per woman). Like other major states in the country fertility has declined in the Northeastern states, however, at a very slow pace. Keeping all this in mind the present effort is mainly to see the fertility trends and differentials during the three rounds of NFHS surveys.

4.2 Objectives

The basic objectives of this chapter are:

1. To examine the trends in Total Fertility Rate in Northeastern States.
2. To analyze the trends and differentials in Total Fertility Rate and Crude Birth Rate across the region.
3. To know how fertility have declined in different age-groups across the region.

4.3 Data Source

The National Family Health Surveys (NFHS) data have been used in the present work. NFHSs are nationwide surveys conducted with a representative sample of households throughout the country. The Ministry of Health and Family Welfare (MOHFW), Government of India (GOI), started the NFHS surveys to provide high quality data on population and health indicators. Three NFHS surveys have been conducted till date in India. An important objective of the NFHS surveys has been to provide national and state estimates of fertility, family planning, infant and child mortality, reproductive and child health, nutrition of women and children, the quality of health and family welfare services, and socio-economic conditions. The NFHS surveys use standardized questionnaires, sample designs, and field procedures to collect data. The MOHFW designated the International Institute for Population Sciences (IIPS), Mumbai, as the nodal agency for each of

the three rounds of NFHS. The East-West Centre, Hawaii, USA, and Macro International, Maryland, USA, provided technical assistance for NFHS-1. Funding was provided by the United States Agency for International Development (USAID).

The country's first National Family Health Survey (NFHS-1) was conducted in 1992-93. Interviews were conducted with a nationally representative sample of 88,562 households and 89,777 ever-married women age 13-49 years in 24 states and the National Capital Territory of Delhi.

The second National Family Health Survey (NFHS-2), conducted in 1998-99, was an important step in strengthening the data base for implementation of the Reproductive and Child Health (RCH) approach adopted by India after the International Conference on Population and Development (ICPD) in 1994 in Cairo. In addition to the population and health components covered in NFHS-1, NFHS-2 collected information on the quality of health and family welfare services, reproductive health problems, the status of women, and domestic violence. Height and weight measurements were extended to cover ever-married women. Ever-married women and their children below three years of age had their haemoglobin levels measured to provide the first national estimates of the prevalence of anaemia. NFHS-2 covered a representative sample of over 91,000 ever-married women age 15-49 years across all 26 states of India.

The third National Family Health Survey (NFHS-3) was conducted in 2005-06. In addition to the indicators covered in NFHS-2, NFHS-3 provides information on several new and emerging issues such as perinatal mortality, male involvement in the use of health and family welfare services, adolescent reproductive health, high risk sexual behaviour, family life education, safe injections, and knowledge about tuberculosis. In addition to interviewing ever-married women age 15-49, NFHS-3 included never married women age 15-49 and both ever-married and never married men age 15-54 as eligible respondents. Interviews were conducted with 124,385 women age 15-49 and 74,369 men age 15-54 from all 29 states.

4.4 Methodology

In view of the fact that states in the Northeast region are at different levels of fertility, it is pertinent to review the levels and trends of fertility, examine factors affecting fertility and give some suggestion. For the purpose of this section, trends in fertility have been analyzed from the reports of all the three rounds of NFHS (1992-93, 1998-99 and 2005-06). Fertility trends have been prepared by graphs for all the states. Data from three different surveys have also been analyzed to examine the differences between rural-urban fertility trends and for this graphs have also been prepared for each state.

4.5 Trends in Total Fertility Rate (TFR) in Northeastern States

Although the proportion of population growth rate in Northeastern region seems to be trivial and negligible when compared with other major states, it is crucial and necessary to understand the population growth and fertility patterns so as to curb the population problems that can come shortly in the near future. NFHS reveals that TFR in the states of Arunachal Pradesh, Assam and Tripura have been still increasing in 2005-06 survey compared with 1998-99 survey.

National Family Health Survey- estimated that the TFR in Arunachal Pradesh was 4.25 children in 1990-92, and NFHS-2 and NFHS-3 estimated that it was 2.52 and 3.03 respectively, indicating a fertility decline of forty-one per cent (1.73 children) between the first and the second survey, however, it increased by twenty per cent (0.51 children) during 1998-99 and 2005-06 surveys. (Table 4.1)

The total fertility rate estimated in Assam in NFHS-1 was 3.53 children and in NFHS-2 it was 2.31 and NFHS-3 estimated that it was 2.42 children. This implies that the TFR decline of thirty-five per cent (1.22 children) during NFHS-1 and NFHS-2, and it increase by five per cent (0.11 children) during 1998-99 and 2005-06 surveys.

Similarly, Manipur's TFR in 1990-92 was 2.76 children and 3.04 children in 1998-99. This shows that the TFR is increased by ten per cent (0.28 children) during the period. In 2005-06, the TFR of Manipur was 2.83 children per woman, indicating a decrease of seven per cent (0.21 children) between NFHS-2 and NFHS-3. (Table 4.1)

In case of Meghalaya, the estimated TFR in 1992-93 was 3.73 children and in 1998-99, it was 4.57 children, demonstrating an increase of twenty-three per cent (0.84 children) during NFHS-1 and NFHS- 2. NFHS-3 estimated that the TFR was 3.8 children in the state, which indicates that the TFR declines of seventeen per cent (0.77 children) between the last two surveys.

Mizoram's estimated TFR in NFHS-1 was 2.3 children and NFHS-2 estimated that it was 2.89. The results present an increase of TFR by twenty-six per cent (0.59 children) between NFHS-1 and NFHS-2 (Table 4.1). But 2005-06 NFHS survey estimated that the TFR of Mizoram stands at 2.86 children, revealing a minimal decline of only one per cent (0.03 children) as compare to NFHS-2 records (2.89 children).

TABLE 4.1 TOTAL FERTILITY RATE IN NORTH EAST INDIA, NFHS-1, NFHS-2 & NFHS- 3

State	1992-93	1998-99	2005-06	Percentage Change	
				1992-93 to 1998-99	1998-99 to 2005-06
Sikkim	-	2.75	2.02	0.73	26.55
Tripura	2.67	1.87	2.22	29.96	-18.72
Assam	3.53	2.31	2.42	34.56	-4.76
India	3.4	2.9	2.7	14.71	6.9
Manipur	2.76	3.04	2.83	-10.14	6.91
Mizoram	2.3	2.89	2.86	-25.65	1.04
Arunachal Pradesh	4.25	2.52	3.03	40.71	-20.24
Nagaland	3.26	3.77	3.74	-15.64	0.8
Meghalaya	3.73	4.57	3.8	-22.52	16.85

Source: Computed from NFHS 1, 2 & 3.

In NFHS-1, the TFR was estimated at 3.26 children against 3.77 children in NFHS-2, in Nagaland. This means that the TFR has an increased of sixteen per cent (0.51 children) during NFHS-1 and NFHS-2. However, the TFR declined by .03 children when compare with NFHS-2 (3.77) and NFHS-3(3.7) estimates.

In Tripura, the TFR for 1992-93 was estimated at 2.67 children per woman as against 1.87 children in 1998-99, indicating the TFR increases by thirty per cent (0.8 children per woman) from NFHS-1 to NFHS-2 (Table 4.1), whereas between NFHS-2(1.87 children) and NFHS-3(2.2 children) the TFR rose by nineteen per cent (0.35 children).

The TFR for Sikkim in 1998-99 survey was estimated at 2.75 children per woman against 2.02 children in 2005-06, implying that the TFR decline of twenty-seven per cent (0.73 children) between NFHS-2 and NFHS-3 surveys(see table 1).

4.6 Fertility Differentials and Trends

NFHS provides estimates of age-specific fertility rate (ASFR), total fertility rate (TFR), and crude birth rate (CBR) for the three-year period preceding the surveys in Northeast states. The three-year period was chosen as a compromise between the need to obtain recent information (suggesting the use of a short period close to the survey date) and the need to reduce sampling variation and minimize problems related to displacement of births from recent years to earlier years (suggesting thus use of longer period). The ASFR for any specific age-group is calculated by dividing the number of births preceding the survey by the number of women-years lived by woman in the age-group during the same period. TFR in the number of children a woman would have if she passes through the prevailing age-specific fertility rate. And crude birth rate is the annual number of births per 1,000 populations.

Table 4.1 and 4.2 give the estimates of TFR and CBR for all the Northeastern states. As is evident from the figures, there is a considerable variation in the levels of fertility across these states. The CBR ranges from 17.8 per 1,000 populations in Tripura to 28.7 per 1,000 populations in Meghalaya (NFHS-3). In NFHS-1, when

compared with the national average (28.7 per 1,000 populations) except Mizoram (21), Tripura (23) and Manipur (24), the rest of the states recorded higher CBR than the national average (28.7 per 1,000 populations). In NFHS-2, CBR is lower than the national average (24.8 per 1,000 populations) in Tripura (18), Assam (22), Arunachal Pradesh (23), and Sikkim (24.5). The rest of the states record higher than the national level. In NFHS-3, the states of Tripura (18) Sikkim (18.2) and Assam (22) record their CBR is lower than the national average (23.1 per 1, 000 population) and the rest of the states record higher than the national average. (Table 4. 2)

Moreover, the TFR ranges from 2.02 children per woman in Sikkim to 3.8 children in Meghalaya (NFHS-3). Compared with the national average (3.4 children) of TFR in NFHS-1, except Arunachal Pradesh (4.3), Meghalaya (3.7) and Assam (3.5), the rest of the states recorded lower TFR than the national average. In NFHS-2, it is observed that the TFR is lower than the national average (2.9 children) in Tripura (1.9), Assam (2.3), Arunachal Pradesh (2.6), Sikkim (2.8) and Mizoram (2.9) which is exactly equal to the national average. The rest of the states record higher than the national average (Table 4.1). And in NFHS-3, Sikkim (2), Tripura (2.2), and Assam (2.4) are the states having lower TFR than the national average (2.7 children) and the rest maintain higher TFR than the national average. Thus, fertility varies from almost at the level of replacement level in Tripura to almost highest fertility level i.e., Meghalaya across the country.

TABLE 4.2 CRUDE BIRTH RATE IN NORTH EAST INDIA, NFHS-1, NFHS-2 & NFHS-3

State	1992-93	1998-99	2005-06	Percentage Change	
				1993-94 to 1998-99	1998-99 to 2004-05
Tripura	23.1	17.8	17.8	22.94	0
Sikkim	-	24.5	18.2	6.3	25.71
Assam	30.4	21.8	22.1	28.29	-1.38
India	28.7	24.8	23.1	13.59	6.85

Arunachal Pradesh	34.6	22.6	24.1	34.68	-6.64
Mizoram	20.8	25.7	24.8	-23.56	3.5
Manipur	24.4	25.8	25	-5.74	3.1
Nagaland	31.3	30.4	28.5	2.88	6.25
Meghalaya	31.9	35.7	28.7	-11.91	19.61

Source: Computed from NFHS,1,2 & 3

Of all the states in the region, Sikkim achieved the lowest level of fertility (2 children per woman) in NFHS-3, showing a considerable TFR decline of twenty-seven per cent (0.73 children) from NFHS-2 to NFHS-3.

For Meghalaya, the state with one of the highest fertility levels in the region as well as across the country, a comparison with the corresponding estimate from NFHS-1 shows a substantial increase in fertility. From NFHS-1 to NFHS-2, the TFR increased by twenty-three per cent (0.84 children).

But between NFHS-2 to 3, the TFR of the state has declined seventeen per cent (0.77 children). Both CBR and TFR have increased by twelve per cent (3.8 per 1,000 populations) and twenty-one per cent (0.8 children) respectively during the two surveys (NFHS-1 and 2). However, from NFHS-2 to NFHS-3 the CBR and the TFR has decreased by eight per cent and 0.77 children respectively. (Table 4.1)

Manipur and Mizoram also experience increase in fertility, as revealed by the first two rounds of NFHS. According to NFHS-2, the TFR in the two states is 3.04 and 2.89, respectively, and the CBR is 26 per 1,000 populations in both the states (Table 4.1 & 4.2). A comparison with the NFHS-1 TFR estimates shows that there has been ten per cent (0.3 children) increased in the TFR in Manipur and 26 per cent (0.6 children) increased in Mizoram. However, according to NFHS-3, the TFR in the two states are 2.83 and 2.86, respectively, and the CBR is 25 per 1,000 populations each in both the states. A comparison with the NFHS-2 estimates shows that the TFR has been decreased by 0.21 children in Manipur and 0.03 children in Mizoram.

In the region Nagalandhas the next highest fertility after Meghalaya (Table 4.1). As per NFHS-2, the TFR in the state is 3.77 (higher than the all-India average of 2.85 children per woman) and the CBR is 30 per 1,000 populations. A comparison with NFHS-1 shows that Nagaland, like Meghalaya, has experienced an increase in fertility in the recent periods. The TFR in the state increased between the two surveys by about half a child (16 per cent). However, in NFHS-3, the TFR in the state is 3.74 and the CBR is 28.5 per 1,000 populations. A comparison with NFHS-2 indicates that Nagaland has experienced a nominal decrease of 0.03 children (0.8 per cent) in the TFR and the CBR has decrease by 1.9 per 1,000 populations (6 per cent).

For Assam, the state with the third lowest fertility level of all the states in the region, a comparison of NFHS-2 and NFHS-1 estimates for fertility shows considerable decline in fertility in the state (Table 4.1). Between the two surveys (NFHS-1 & 2), the TFR has declined in the state by 35 per cent (1.22 children). In contrast, a comparison of NFHS-3 and NFHS-2 TFR estimates shows that there has been an increase of 0.11 children (5 per cent). A comparison of NFHS-1 and NFHS-2 of CBR estimates shows that there was a substantial decline by twenty-eight per cent (8.6 per 1,000 populations), and a comparison of NFHS-2 and NFHS-3 estimates of CBR shows an increase of 0.3 per 1,000 populations (one per cent).

In the region Tripura has the lowest CBR (17.8) and second lowest in TFR (2.22) of all the states. A comparison of the NFHS-1 and NFHS-2 estimates for fertility reveals that TFR and CBR have declined by thirty per cent (0.8 children) and twenty-three per cent (5.3 per 1,000 populations) respectively. But a comparison of the NFHS-3 and NFHS-2 TFR estimates shows that there has been a 0.35 children (19 per cent) increase in the TFR in Tripura and virtually unchanged in CBR (17.8 per 1,000 populations).

The TFR in Arunachal Pradesh at 3.03 is the third highest, and in respect of CBR is the third lowest (24.1 per 1,000) in the region. A comparison of the NFHS-2 estimates with the NFHS-1 estimates of TFR reveals a very sharp decline in fertility, of forty per cent (1.7 children), shaper than any other state. Yet, a comparison of the NFHS-3 and NFHS-2 estimates of TFR reveals 0.51 children

(20 per cent) increase and CRB has a moderate increase of six per cent (1.5 per 1,000 populations) as compared to NFHS-2 from NFHS-1, but CBR shows a decline of three per cent (0.8 per 1,000 populations).

TABLE 4.3 AGE-SPECIFIC FERTILITY RATES BY TYPE OF RESIDENCE, ARUNACHAL PRADESH, NFHS-1, NFHS-2 & NFHS-3

Age	Total			Rural			Urban		
	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3
15-19	0.115	0.066	0.070	0.118	0.075	0.067	*	0.045	0.078
20-24	0.246	0.160	0.178	0.246	0.160	0.190	*	(0.158)	0.154
25-29	0.194	0.129	0.165	0.194	0.138	0.166	*	*	0.165
30-34	0.139	0.068	0.113	0.150	0.072	0.117	*	*	(0.105)
35-39	0.081	0.043	0.053	0.086	0.045	0.069	*	*	(0.000)
40-44	(0.039)	(0.013)	0.026	(0.045)	(0.002)	(0.033)	*	*	*
45-49	(0.000)	(0.000)	(0.000)	*	*	(0.000)	*	*	*

Source : National Family Health Survey, IIPS, Mumbai, 1992-93, 1998-99 and 2005-06

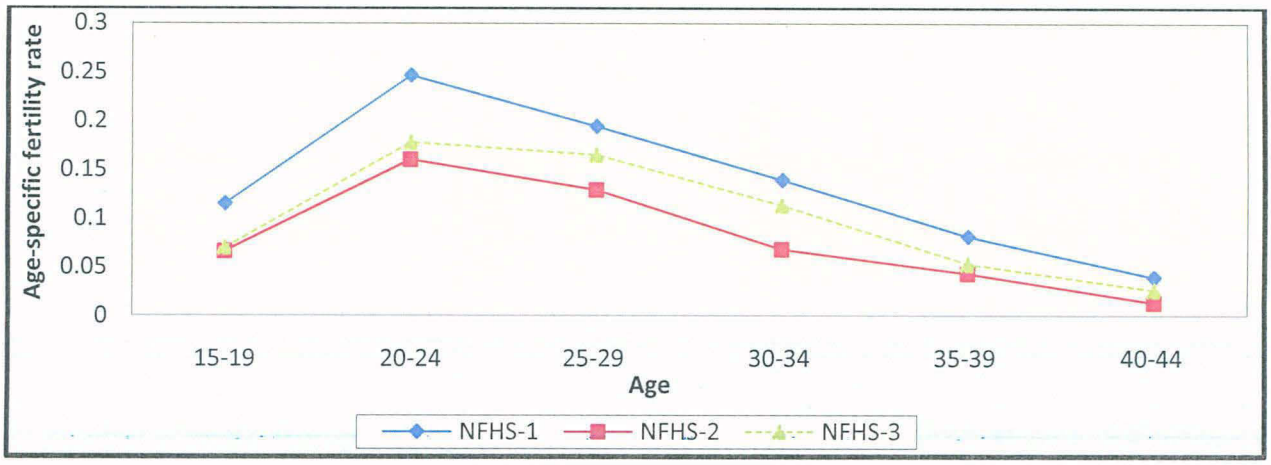
Note: Age-specific fertility rates are expressed per woman.

( ) Based on 125-249 unweighted woman-years of exposure.

* Rate not shown; based on fewer than 125 unweighted woman-years of exposure.

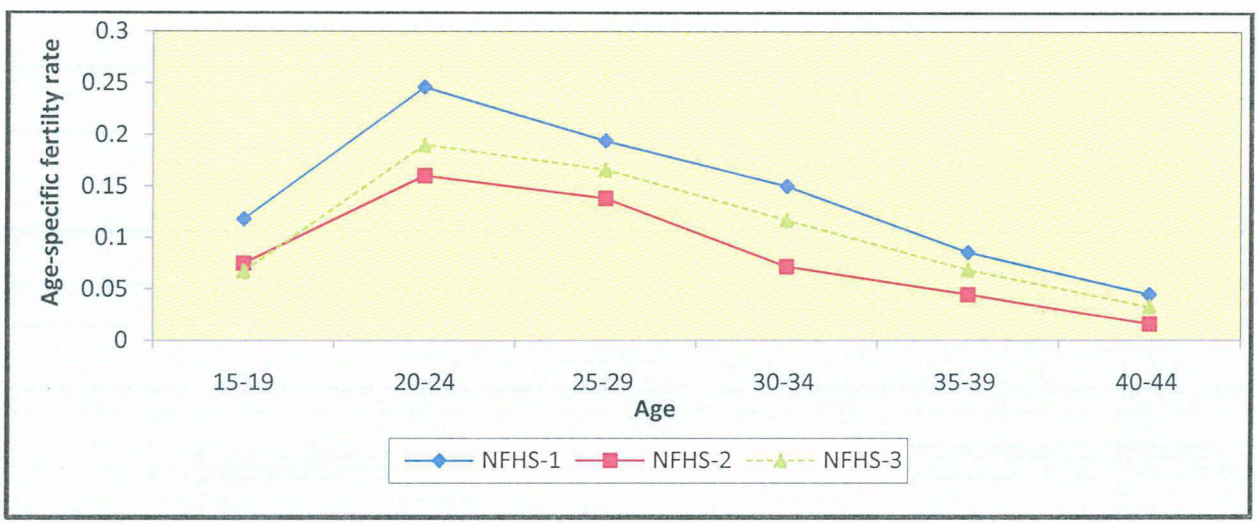
In Arunachal Pradesh, it is observed from the table 4.3 that all age group shows a declining trend from NFHS-1 to NFHS-2, but it reversed from NFHS-2 to NFHS-3 where all age groups rose from NFHS-2, yet it is lower than the previous record of NFHS-1. In respect of rural-urban ASFRs, due to shortage of ASFR's sample size in urban areas, we could only compared rural and urban age groups of NFHS-2 and NFHS-3. In comparison of rural and urban areas, ASFRs of rural areas in all age groups were slightly higher than in urban areas except in 15-19 year age group in NFHS-3. Similar to the total fertility trend, in rural areas, ASFRs declined from NFHS-1 to NFHS-2, but from NFHS-2 to NFHS-3 the ASFRs in the state increases to some extent in all the age groups.

Fig: 4.1 AGE-SPECIFIC FERTILITY RATES, ARUNACHAL PRADESH, NFHS-1, NFHS- 2 & NFHS-3



Source: Computed from National Family Health Survey

Fig: 4.2AGE-SPECIFIC FERTILITY RATES, ARUNACHAL PRADESH, RURAL, NFHS-1, NFHS-2 & NFHS-3



Source: Computed from National Family Health Survey

ASFR for different age groups of Assam gives a different picture when compared with Arunachal Pradesh. During the period of six years, from NFHS-1 to NFHS-2 the ASFRs declined substantially in all the age groups except in the age group of 20-24 year. The prime age group (20-24) experiences the reverse trend since in this age group (20-24) fertility significantly increased from the level of 0.2 (per woman) to 0.149. This increased fertility could be due to age misreporting in Assam. Although the ASPF declined in lower age groups (40-44 to 45-49), but it

is in a slower pace from NFHS-2 to NFHS-3. Similar to Arunachal Pradesh, fertility in all age groups on average increased from NFHS-2 to NFHS-3, despite a slight decline is recorded in the prime age group (15-19), that is, from 0.089 (per woman) to 0.086. (Table 4.4)

TABLE 4.4 AGE-SPECIFIC FERTILITY RATES BY TYPE OF RESIDENCE, ASSAM NFHS-1, NFHS-2 & NFHS-3

Age	Total			Rural			Urban		
	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3
15-19	0.116	0.089	0.086	0.122	0.094	0.094	0.070	0.040	0.049
20-24	0.200	0.149	0.154	0.205	0.152	0.167	0.167	0.110	0.096
25-29	0.195	0.116	0.127	0.200	0.119	0.138	0.159	0.084	0.077
30-34	0.117	0.070	0.071	0.128	0.072	0.076	0.054	0.052	0.050
35-39	0.055	0.031	0.039	0.057	0.033	0.046	0.046	0.014	0.014
40-44	0.021	0.007	0.007	0.023	0.008	0.010	0.011	(0.000)	(0.000)
45-49	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

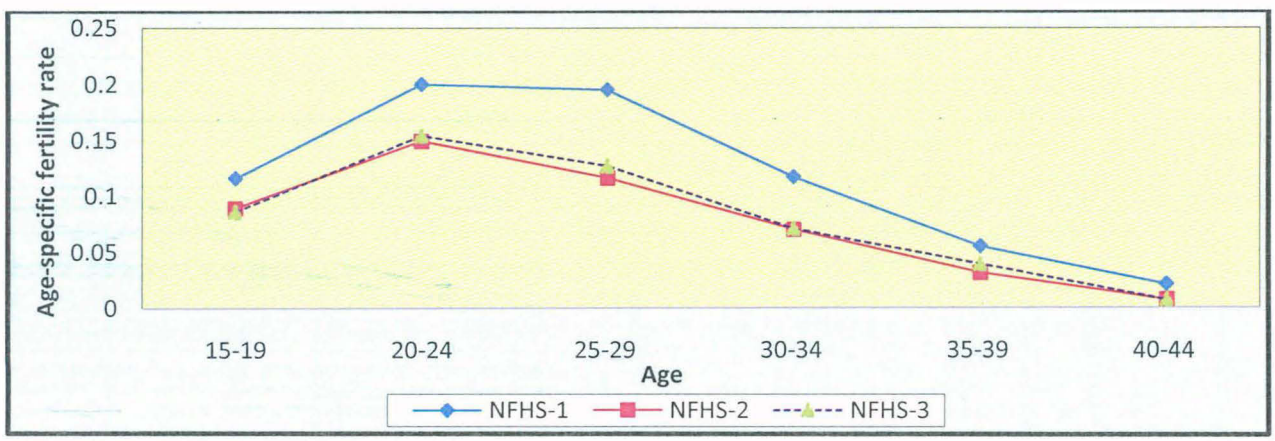
Source : National Family Health Survey, IIPS, Mumbai, 1992-93, 1998-99 and 2005-06

Note: Age-specific fertility rates are expressed per woman.

( ) Based on 125-249 unweighted woman-years of exposure.

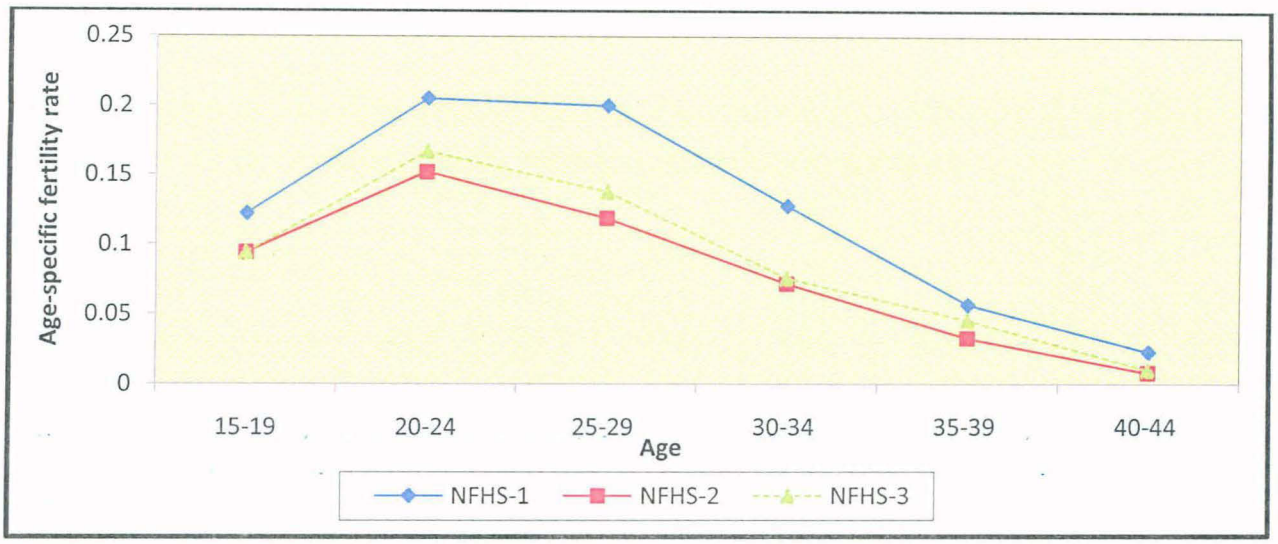
* Rate not shown; based on fewer than 125 unweighted woman-years of exposure.

Fig: 4.3 AGE-SPECIFIC FERTILITY RATES, ASSAM, NFHS-1, NFHS-2 & NFHS-3



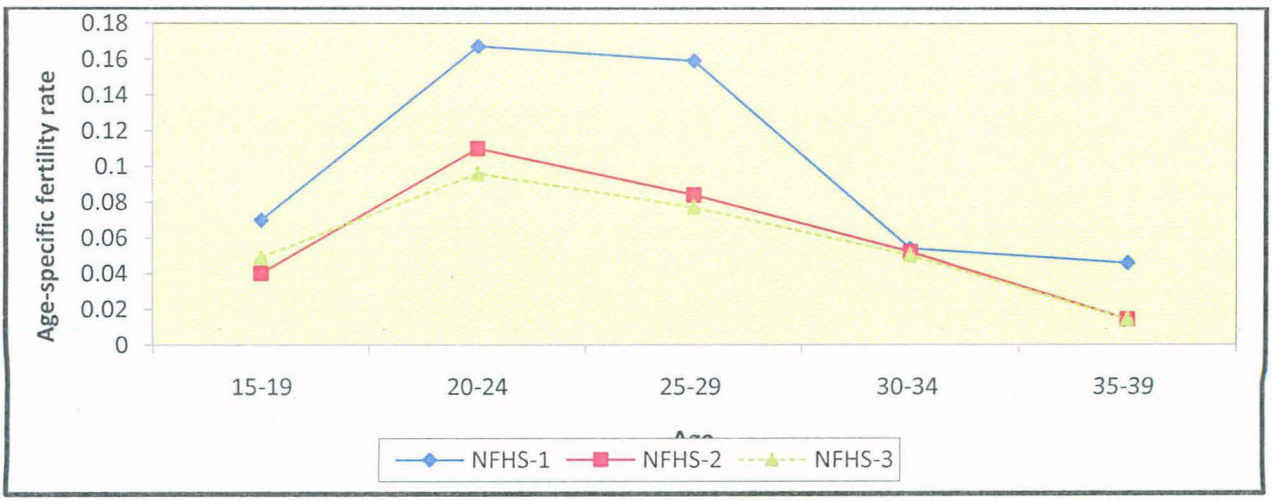
Source: Computed from National Family Health Survey

Fig: 4.4: AGE-SPECIFIC FERTILITY RATE, ASSAM, RURAL, NFHS-1, NFHS-2 & NFHS-3



Source: Computed from National Family Health Survey

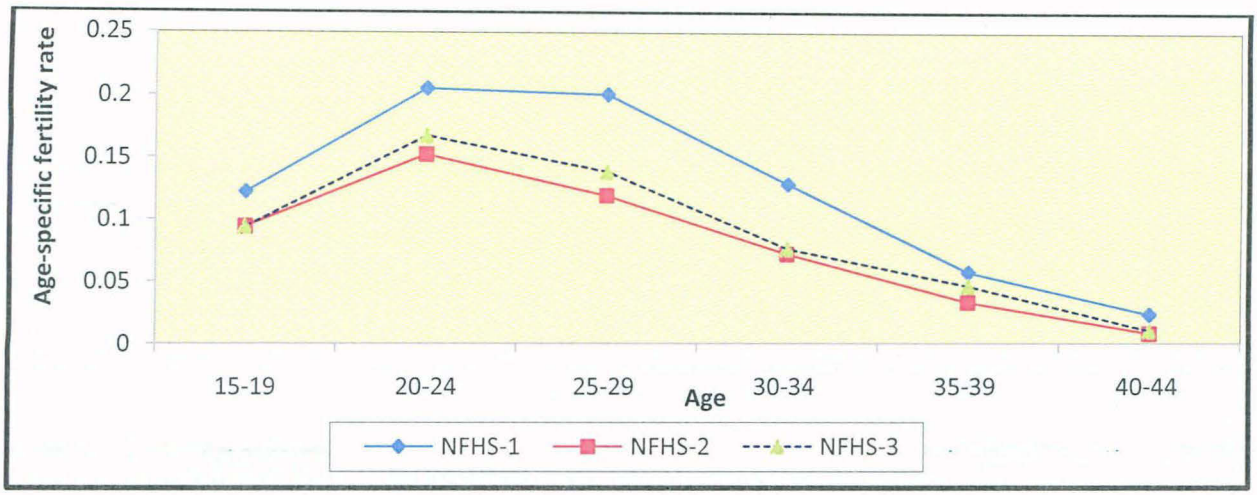
Fig: 4.5: AGE-SPECIFIC FERTILITY RATE, ASSAM, URBAN, NFHS-1, NFHS-2 & NFHS-3



Source: Computed from National Family Health Survey

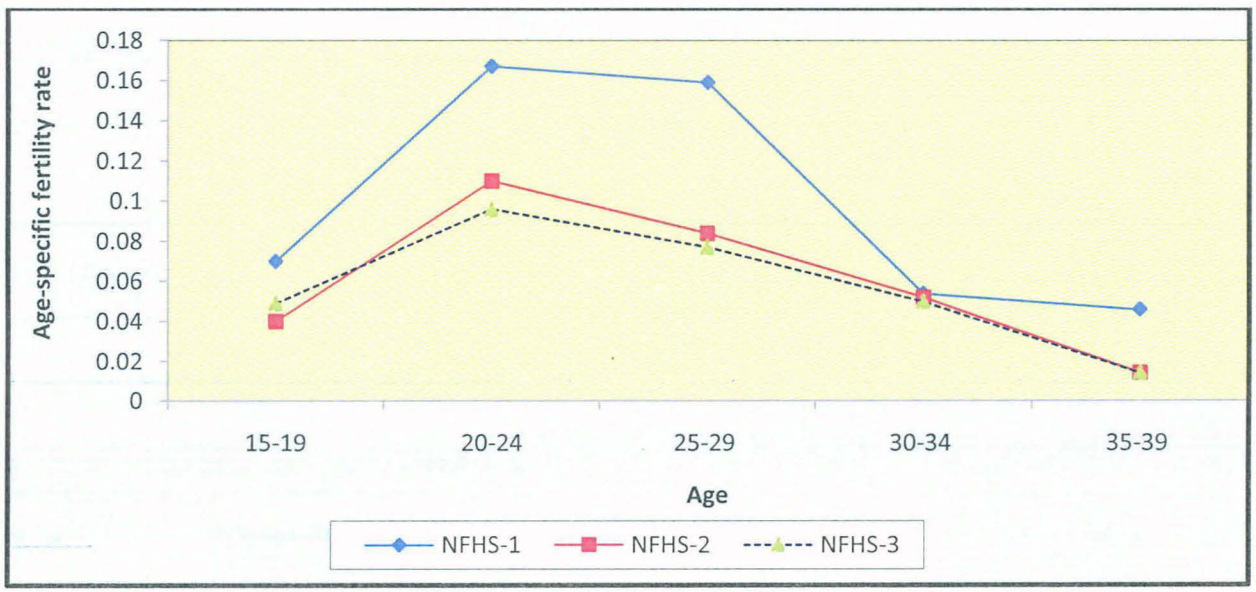
The rural and urban age groups of the ASFRs give a contrast picture in Assam (Table 4.4). In 1992-93, all the age groups (except 25-29) in rural areas were having higher ASFRs than the same age groups of urban areas and the same is true with NFHS-2 and NFHS-3. Although fertility has declined during NFHS-1 to NFHS-2 in urban areas, it increased from NFHS-2 to NFHS-3 in the prime age group 15-19 from 0.07 (per woman) to 0.04 (per woman). In rural areas,

Fig: 4.7 AGE-SPECIFIC FERTILITY RATES, MANIPUR, RURAL, NFHS-1, NFHS-2 & NFHS-3



Source: Computed from National Family Health Survey

Fig: 4.8 AGE-SPECIFIC FERTILITY RATES, MANIPUR, URBAN, NFHS-1, NFHS- 2 & NFHS-3



Source: Computed from National Family Health Survey

The ASFRs from Manipur presents a significant different picture compared with the above states of Arunachal Pradesh and Assam. The table (Table 4.5) shows that fertility increased from NFHS-1 to NFHS-2 in all age groups, except in the prime age groups 15-19 and 20-24, and surprisingly slightly decline in all age groups from NFHS-2 to NFHS-3. Comparison of rural and urban areas in the

state reveals that, the ASFRs of all groups of rural areas were having higher fertility level than the urban areas in all the three surveys. Thus, in rural areas the ASFRs increased consistently from NFHS-1 to NFHS-3, whereas in urban areas the ASRRs increased from NFHS-1 to NFHS-2 and declined from NFHS-2 to NFHS-3 in almost all the age groups.

TABLE 4.6 AGE-SPECIFIC FERTILITY RATES BY RESIDENCE, MEGHALAYA, NFHS-1, NFHS-2& NFHS-3

Age	Total			Rural			Urban		
	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3
15-19	0.079	0.086	0.054	0.086	0.103	0.062	0.046	(0.030)	0.032
20-24	0.182	0.211	0.19	0.176	0.222	0.219	(0.207)	(0.182)	0.116
25-29	0.180	0.232	0.197	0.176	0.261	0.215	(0.194)	0.138)	0.150
30-34	0.117	0.184	0.136	0.125	0.208	0.166	*	*	0.061
35-39	0.115	0.105	0.100	0.116	0.123	0.118	*	(0.063)	0.049
40-44	0.051	0.080	0.055	0.053	(0.094)	0.067	*	*	(0.023)
45-49	0.022	(0.014)	0.027	(0.029)	*	(0.03)	*	*	*

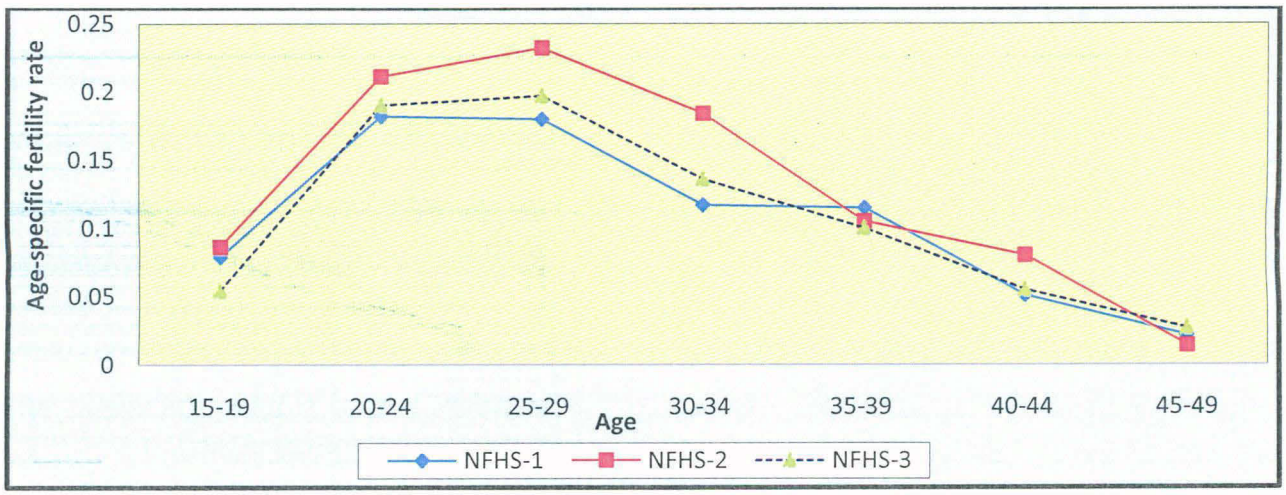
Source : National Family Health Survey, IIPS, Mumbai, 1992-93, 1998-99 and 2005-06

Note: Age-specific fertility rates are expressed per woman.

( ) Based on 125-249 unweighted woman-years of exposure.

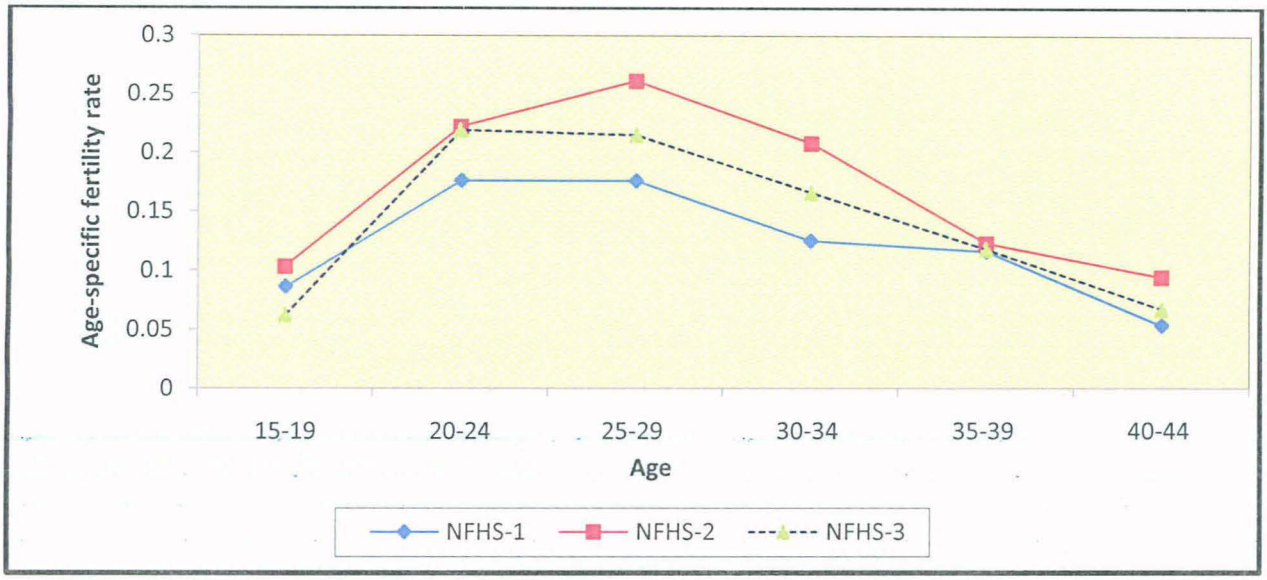
* Rate not shown; based on fewer than 125 unweighted woman-years of exposure.

Fig: 4.9 AGE-SPECIFIC FERTILITY RATES, MEGHALAYA, NFHS-1, NFHS-2 & NFHS-3



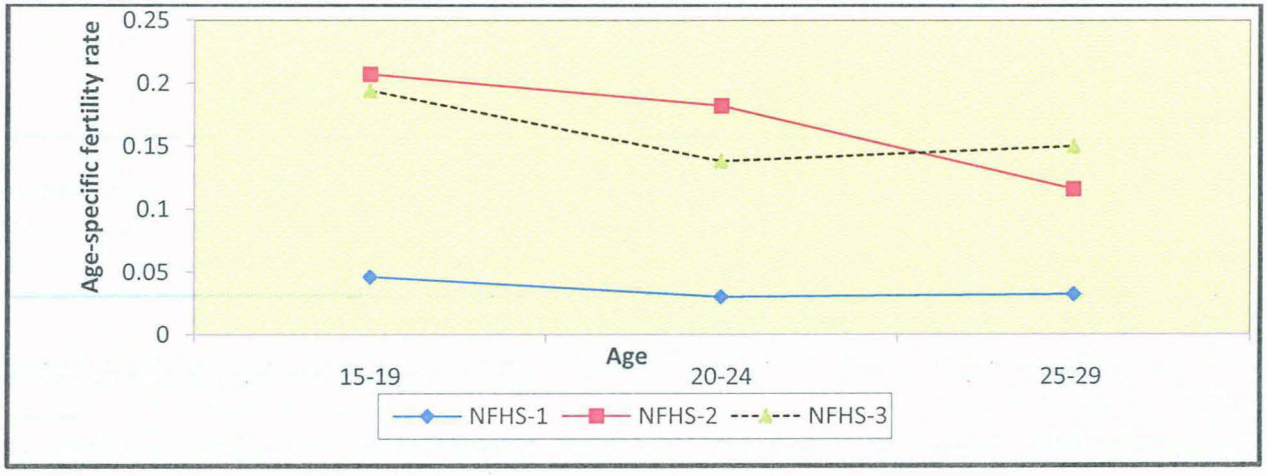
Source: Computed from National Family Health Survey

Fig: 4.10 AGE-SPECIFIC FERTILITY RATES, MEGHALAYA, RURAL, NFHS-1, NFHS-2 & NFHS-3



Source: Computed from National Family Health Survey

Fig: 4.11 AGE-SPECIFIC FERTILITY RATES, MEGHALAYA, URBAN, NFHS-1, NFHS- 2 & NFHS-3



Source: Computed from National Family Health Survey

In Meghalaya, ASFRs indicates that fertility substantially increased in all age groups, except in old age group 40-44 and 45-49, from NFHS-1 to NFHS-2 (Table 4.6). But, from NFHS-2 to NFHS-3, fertility declined steeply significantly in the age group 35-39, which is from 0.105 (per woman) to 0.1. Quite startlingly, fertility in the old age group of 40-44 year and 45-49 year increased in the periods of 1998-99 to 2005-06. If we have a look on the rural and urban age groups, we

get a contrast picture. In NFHS-3 all the age groups of rural areas were having ASFRs higher than the same age groups in urban areas. In rural areas, ASFRs increases from the periods between NFHS-1 to NFHS-2 in all age groups. However, ASFRs declined from NFHS-2 to NFHS-3 in all age groups. On the contrary, in urban areas ASFR declined from NFHS-1 to NFHS-2 and from NFHS-2 to NFHS-3 in all age groups, except in the prime age group 15-19, which increases from 0.03 (per woman) to 0.032.

TABLE 4.7 AGE-SPECIFIC FERTILITY RATES BY TYPE OF RESIDENCE, MIZORAM, NFHS-1, NFHS-2 & NFHS-3

Age	Total			Rural			Urban		
	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3
15-19	0.046	0.054	0.074	0.039	0.064	0.099	0.053	0.038	0.054
20-24	0.140	0.188	0.172	0.157	0.248	0.192	0.125	0.143	0.156
25-29	0.143	0.167	0.152	0.129	0.198	0.155	0.154	0.144	0.150
30-34	0.085	0.110	0.109	(0.082)	0.139	0.133	0.089	0.091	0.091
35-39	0.031	0.048	0.044	(0.033)	0.040	0.049	(0.029)	0.046	0.041
40-44	0.014	0.009	0.02	(0.020)	(0.005)	(0.040)	(0.006)	(0.013)	0.007
45-49	(0.000)	(0.000)	(0.000)	(0.000)	*	*	(0.000)	*	(0.000)

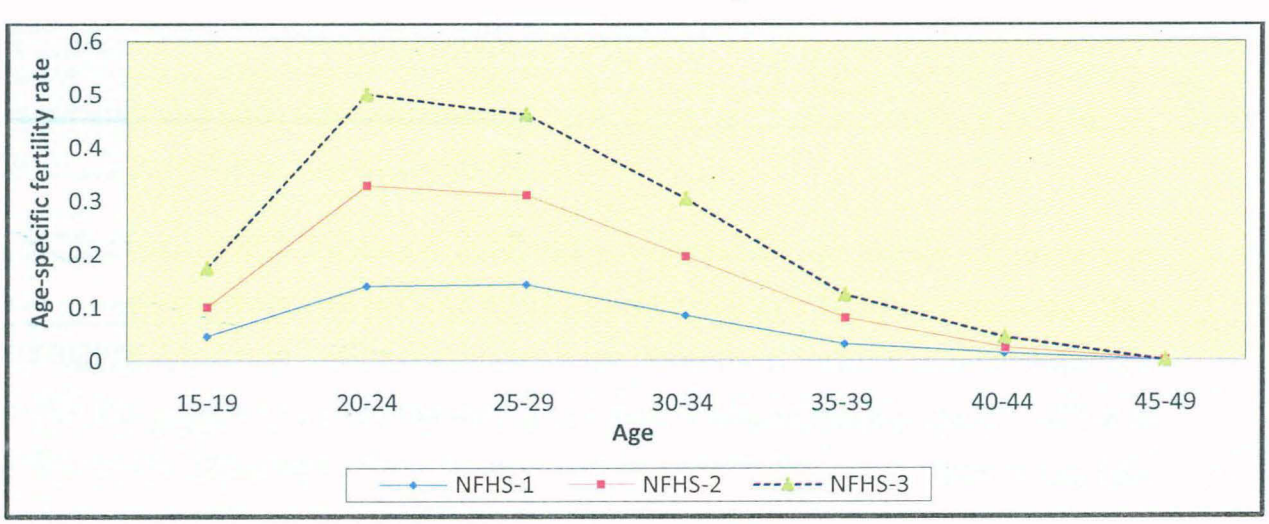
Source : National Family Health Survey, IIPS, Mumbai, 1992-93, 1998-99 and 2005-06

Note: Age-specific fertility rates are expressed per woman.

( ) Based on 125-249 unweighted woman-years of exposure.

* Rate not shown; based on fewer than 125 unweighted woman-years of exposure.

Fig: 4.12 AGE-SPECIFIC FERTILITY RATES, MIZORAM, NFHS-1, NFHS- 2 & NFHS- 3



Source: Computed from National Family Health Survey

group 30-34. In rural areas, Age-specific fertility rates increases from NFHS-1 to NFHS -2 in all the age groups, but it decline only in the age groups of 20-24 year, 25-29 year and 30-34 year and the rest age groups show an increased in ASFRs from NFHS-2 to NFHS-3. In urban areas, fertility increases in all age groups, except age group (15-19 year) between the two surveys (NFHS-1 to NFHS-2). Between NFHS-2 to NFHS-3, fertility increases in the 15-19 and 20-24 year age groups, and slightly decline in the rest of the age groups. (Table 4.7)

TABLE 4.8 AGE-SPECIFIC FERTILITY RATES BY TYPE OF RESIDENCE,NAGALAND, NFHS-1, NFHS-2 & NFHS-3

Age	Total			Rural			Urban		
	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3
15-19	0.057	0.056	0.06	0.064	0.060	0.065	0.026	(0.034)	0.050
20-24	0.188	0.224	0.175	0.199	0.237	0.189	(0.145)	(0.187)	0.144
25-29	0.196	0.203	0.200	0.212	0.212	0.221	(0.126)	*	0.147
30-34	0.131	0.162	0.142	0.15	0.172	0.156	*	*	0.110
35-39	0.059	0.076	0.112	0.670	0.091	0.130	(0.035)	*	0.053
40-44	0.015	0.023	0.042	0.019	(0.025)	0.047	*	*	0.031
45-49	0.006	(0.012)	0.016	0.008	(0.014)	(0.02)	*	*	(0.000)

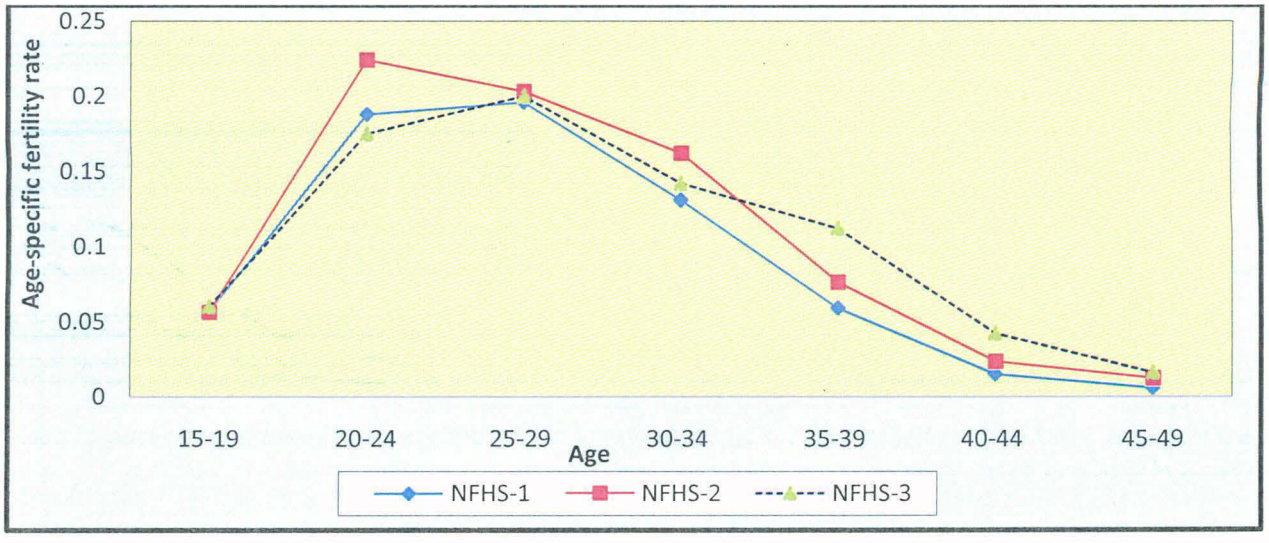
Source : National Family Health Survey, IIPS, Mumbai, 1992-93, 1998-99 and 2005-06

Note: Age-specific fertility rates are expressed per woman.

( ) Based on 125-249 unweighted woman-years of exposure.

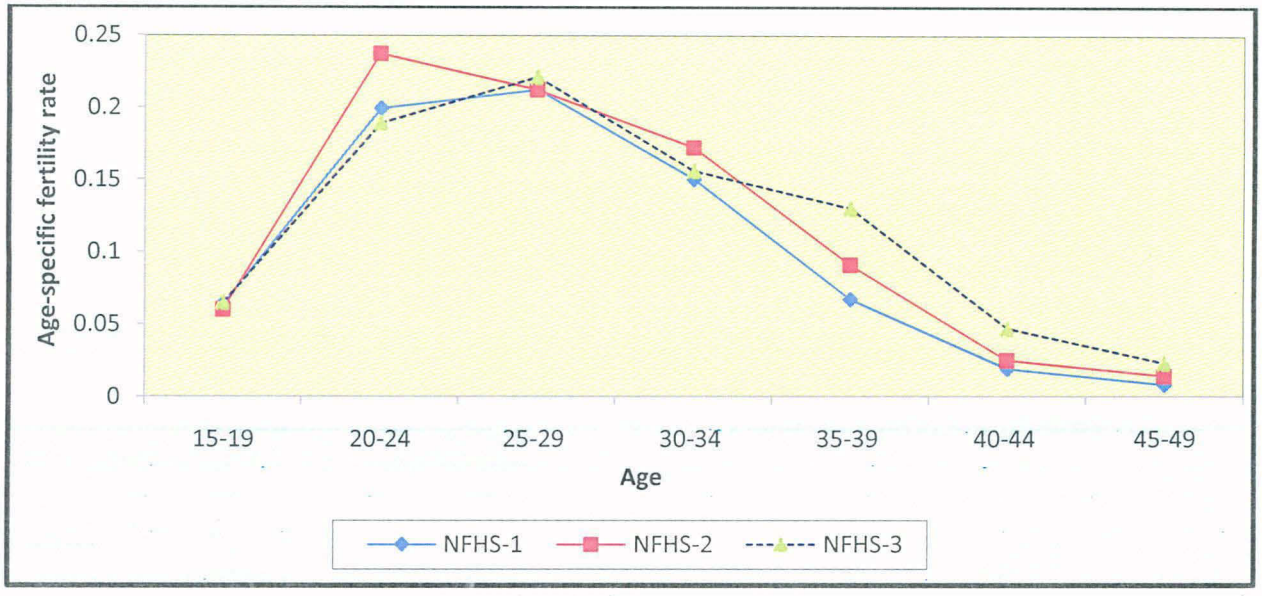
* Rate not shown; based on fewer than 125 unweighted woman-years of exposure.

Fig: 4.15 AGE-SPECIFIC FERTILITY RATES, NAGALAND, NFHS-1, NFHS-2 & NFHS-3



Source: Computed from National Family Health Survey

Fig: 4.16 AGE-SPECIFIC FERTILITY RATES, NAGALAND, RURAL, NFHS-1, NFHS-2 & NFHS-3



Source: Computed from National Family Health Survey

Age-Specific Fertility Rates from Nagaland increases in almost of the age groups during 1992-93 to 1998-99 periods. It is surprising to note that fertility increases in the higher age groups of 35-39, 40-44 and 45-49 year, while other age groups shows a declining trend, precisely in the age group of 25-29 year, that is, from 0.203 (per woman) to 0.20 in the two surveys (NFHS-2 and NFHS-3). In rural areas of Nagaland, ASFRs increases in most of the age groups from NFHS-1 to NFHS-3. ASFR also increases in lower age group (15-19) and higher age group (40-44 and 45-49) from NFHS-2 to NFHS-3. ASFRs in urban areas show that it increases from NFHS-1 to NFHS-2 and decline from NFHS-2 to NFHS-3 in all the age groups. (Table 4.8)

TABLE 4.9 AGE-SPECIFIC FERTILITY RATES BY TYPE OF RESIDENCE, SIKKIM,NFHS-1, NFHS-2 & NFHS-3

Age	Total			Rural			Urban		
	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3
15-19	-	0.065	0.059	-	0.069	0.067	-	(0.053)	0.028
20-24	-	0.171	0.141	-	0.166	0.156	-	(0.158)	0.094
25-29	-	0.141	0.108	-	0.145	0.117	-	*	0.071
30-34	-	0.078	0.062	-	0.083	0.064	-	*	0.056
35-39	-	0.053	0.024	-	0.064	0.028	-	*	0.007
40-44	-	0.032	0.010	-	0.036	0.012	-	*	(0.000)
45-49	-	(0.011)	(0.000)	-	(0.012)	(0.000)	-	*	*

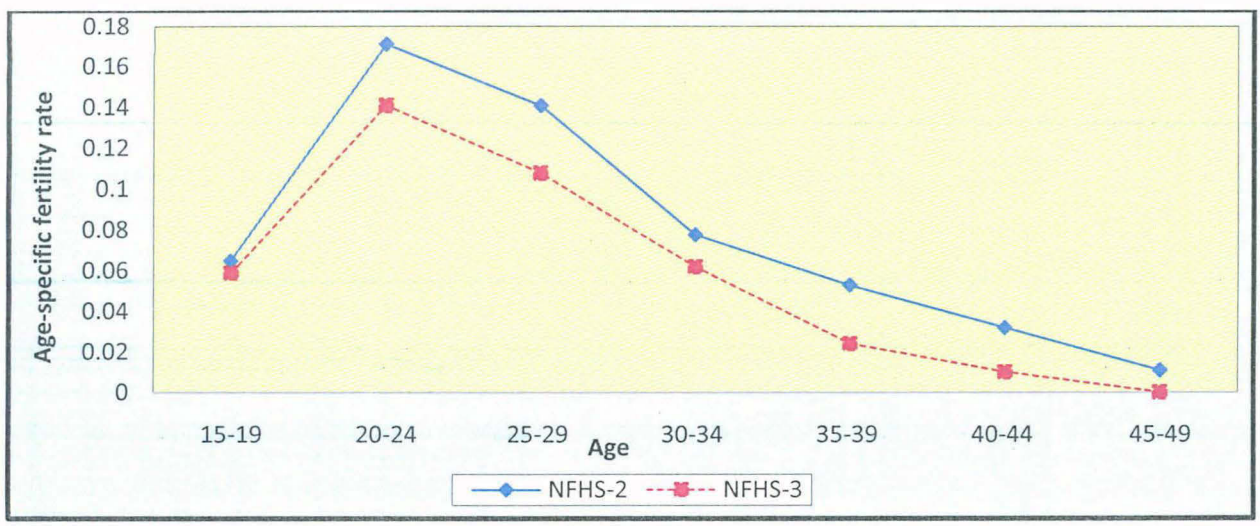
Source : National Family Health Survey, IIPS, Mumbai, 1992-93, 1998-99 and 2005-06

Note: Age-specific fertility rates are expressed per woman.

( ) Based on 125-249 unweighted woman-years of exposure.

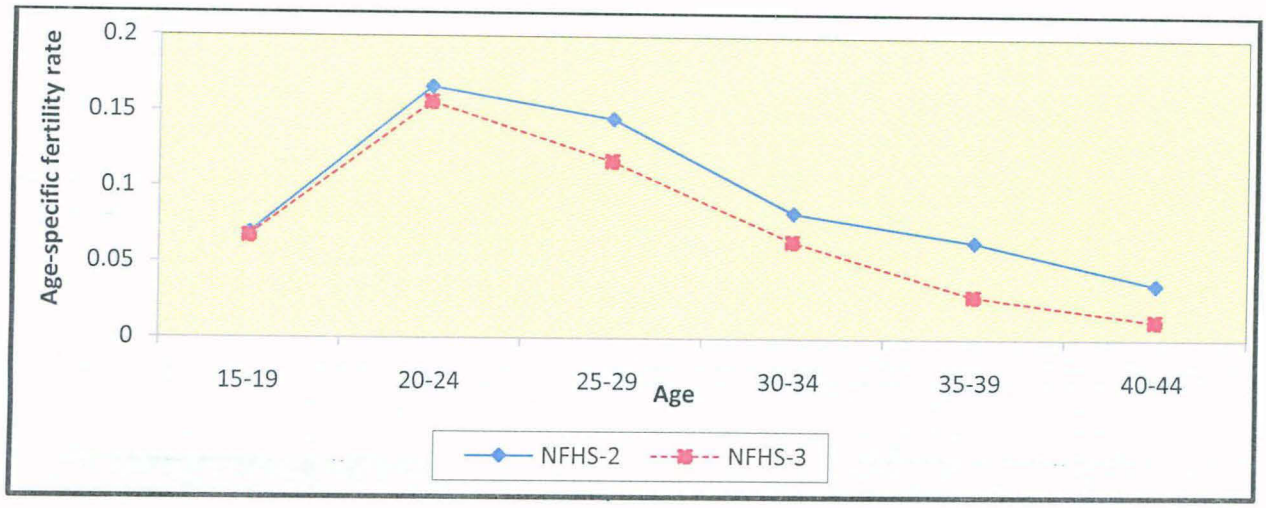
* Rate not shown; based on fewer than 125 unweighted woman-years of exposure.

Fig: 4.17 AGE-SPECIFIC FERTILITY RATES, SIKKIM, NFHS-2 & NFHS-3



Source: Computed from National Family Health Survey

Fig: 4.18 AGE-SPECIFIC FERTILITY RATES, SIKKIM, RURAL, NFHS-2 & NFHS-3



Source: Computed from National Family Health Survey

ASFRs of different age groups from Sikkim show that between 1998-99 and 2005-06, a sharp decline was experienced in all age groups (15-19 to 44-49). In rural areas, ASFRs decline substantially from the two surveys. Similarly, in urban areas, ASFRs from NFHS-2 to NFHS-3 show a declining trend in all the age groups as well(Table 4.9).

TABLE 4.10 AGE-SPECIFIC FERTILITY RATES BY TYPE OF RESIDENCE, TRIPURA NFHS-1, NFHS-2 & NFHS-3

Age	Total			Rural			Urban		
	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3	NFHS-1	NFHS-2	NFHS-3
15-19	0.085	0.075	0.109	0.091	-	0.114	(0.057)	-	0.081
20-24	0.166	0.126	0.147	0.185	-	0.157	(0.089)	-	(0.104)
25-29	0.125	0.102	0.103	0.126	-	0.109	(0.121)	-	(0.078)
30-34	0.081	0.049	0.075	0.090	-	0.077	(0.062)	-	(0.064)
35-39	0.052	0.019	0.007	0.058	-	0.008	*	-	(0.006)
40-44	0.026	0.003	0.002	0.031	-	0.002	0.002	-	(0.000)
45-49	(0.000)	(0.000)	(0.000)	(0.000)	-	(0.000)	(0.000)	-	(0.000)

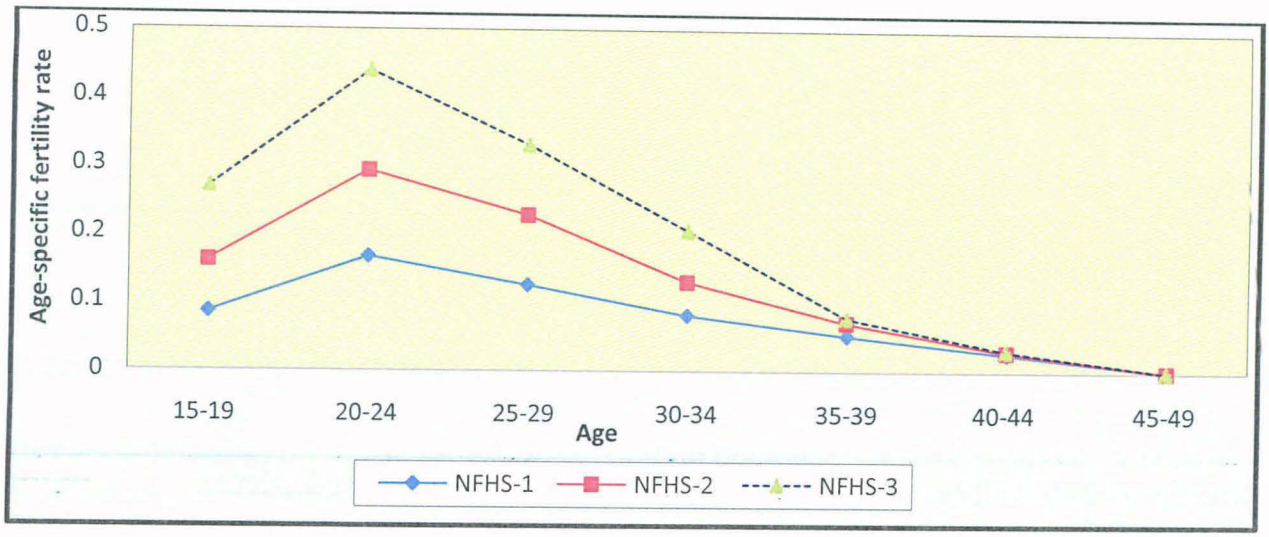
Source : National Family Health Survey, IIPS, Mumbai, 1992-93, 1998-99 and 2005-06

Note: Age-specific fertility rates are expressed per woman.

( ) Based on 125-249 unweighted woman-years of exposure.

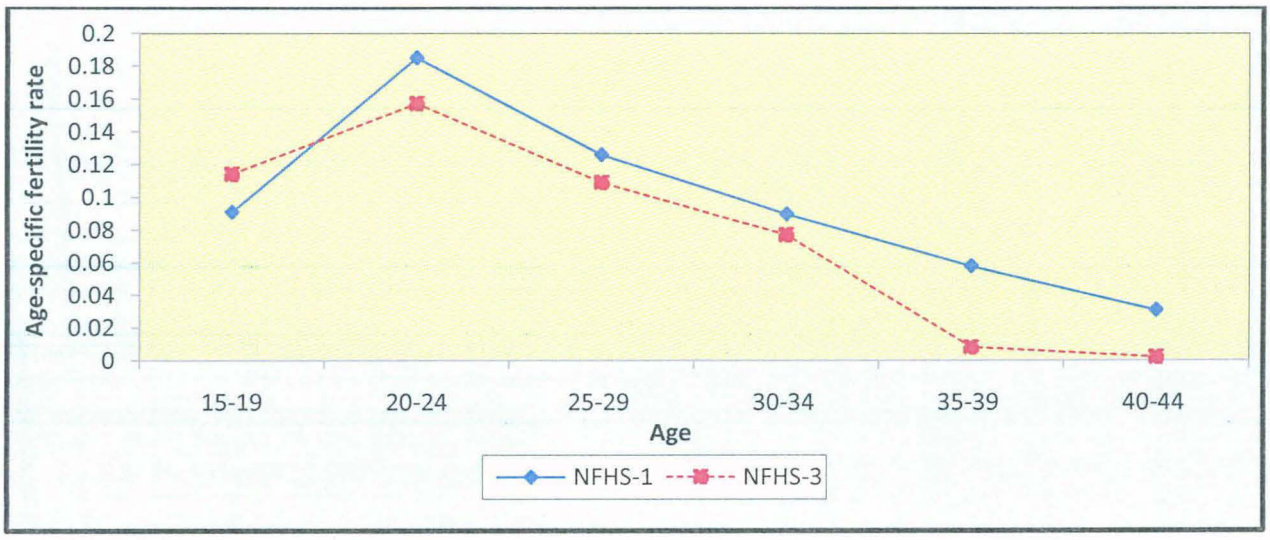
* Rate not shown; based on fewer than 125 unweighted woman-years of exposure.

Fig: 4.19 AGE-SPECIFIC FERTILITY RATES, TRIPURA, NFHS-1, NFHS-2 & NFHS-3



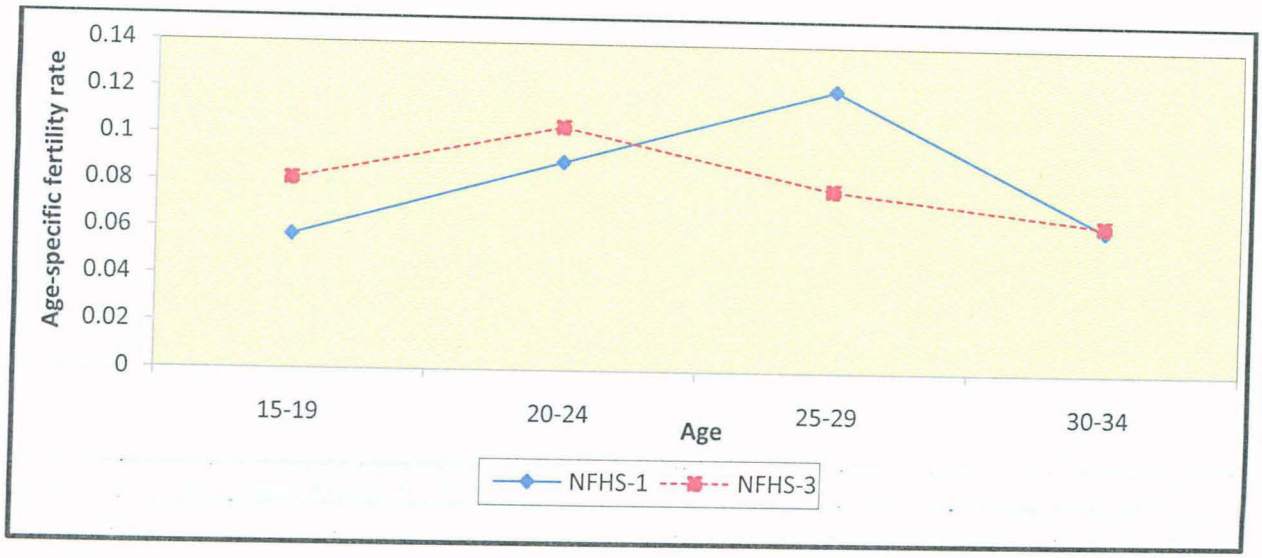
Source: Computed from National Family Health Survey

Fig: 4.20 AGE-SPECIFIC FERTILITY RATES, TRIPURA, RURAL, NFHS-1 & NFHS-3



Source: Computed from National Family Health Survey

Fig: 4.21 AGE-SPECIFIC FERTILITY RATES, TRIPURA, URBAN, NFHS-1 & NFHS-3



Source: Computed from National Family Health Survey

ASFRs data for Tripura is given for 1992-92(NFHS-1) and 2005-06(NFSH-2) only. It is seen from the table that ASFR declined significantly from NFHS-1 to NFHS-3 in all age groups. In rural areas, ASFRs declined as it declined in urban areas in all the age groups. The results of ASFRs in Tripura are quite contrasting to other states of the region.

4.7 SUMMARY

This chapter deals with the trends and differentials in fertility in the Northeastern states of India. The effort here is to examine how fertility declines in varying speed in all the states. Although other than NFHS data were not used in this analysis, yet it is quite evident that fertility declines in varying speed across the region. Fertility declines in all the states but the levels were considerably different. The level achieved by Sikkim and Tripura are not reached by the rest.

Crude Birth Rates decline in all states but the speed vary from state to state. Of all the states, CBR in Manipur is substantially more or less equal in the three rounds of the surveys. Arunachal Pradesh experiences significant declines in CBR when compared with other states. Age-specific Fertility Rates among the different age-groups of women also experiences a different pace of declines as compared to NFHS-3 from NFHS-1 across the states. Fertility noticeably declines among the

earlier and later age-groups in all the states. Sudden declines have been experienced by Manipur and Sikkim. Women in the age group of above 40 years declines by more than 90 per cent in Tripura while women of age group above 40 years in Arunachal Pradesh declines by thirty-three per cent. Next to Tripura, seventy-one per cent of ASFR has declined in Sikkim followed by Assam (66 %), Manipur (50 %), and Mizoram (36 %), whereas in the rest of the other states ASFRs among women of age above 40 years have increased during the study periods.

Fertility at young age of mother (15-19) shows significant decline in Arunachal Pradesh (43 percent) followed by Meghalaya (32 per cent), Assam (23 percent), Sikkim (9 per cent) and Nagaland (-5 per cent).

For the states of Meghalaya and Tripura, the ASFR for the 15-39 year age-group of the sample women shows a rapid decline in rural areas than any other rural areas across the region. But, in urban areas ASFR for the age-group of 15-39 year shows that it declines more rapidly in Tripura and Mizoram. Results from NFHS-1, NFHS-2 and NFHS-3 show that age-specific fertility rates decline faster in rural areas than in urban areas in almost all of the states.

Chapter –V

FERTILITY BEHAVIOUR AND IT'S DETERMINANTS

CHAPTER -V: FERTILITY BEHAVIOUR AND ITS DETERMINANTS

5.1 Introduction

Human society replenishes through the process of fertility (the actual number of children born to a group of women during a given period of time); it is a positive force through which the population expands, counteracting the force of attrition caused by mortality. The analysis of fertility is of vital interest and it occupies a central position in the study of population for several reasons. If the replacement of human numbers is not adequate then the society would face the danger of becoming extinction. On the other hand, excessive replacement of human numbers can also create several social and political problems for a country. Fertility is influenced by several social, cultural, psychological, as well as economic and political factors. In European and other developed and industrialized countries of the world, where individualism dominates the modes of living, education is perfect, economic condition is sound, standard of living is high and people are exposed to various media of communication, such conditions and values prevail there to account for low birth rates and controlled fertility. On the other hand, in a country like ours, where society is agricultural, traditional and joint family oriented, people are living below poverty line and literacy and education are comparatively low, such conditions perhaps lead to the prevalence of high fertility.

Like other developing countries, India has experienced substantial declines in fertility in the past few decades. The decline has been pretty steady with some fluctuations from decade to decade. The marked regional variations in fertility decline in India is due to differences in income levels, the quality of social services (particularly education and healthcare), and human development (Murthi 2002). The pace of fertility decline has been higher in southern states than the northern states. While Kerala and Tamil Nadu in southern India has already achieved replacement level of fertility (2 children per women), some states in northern India, BIMARU states including Northeastern states are still having total fertility

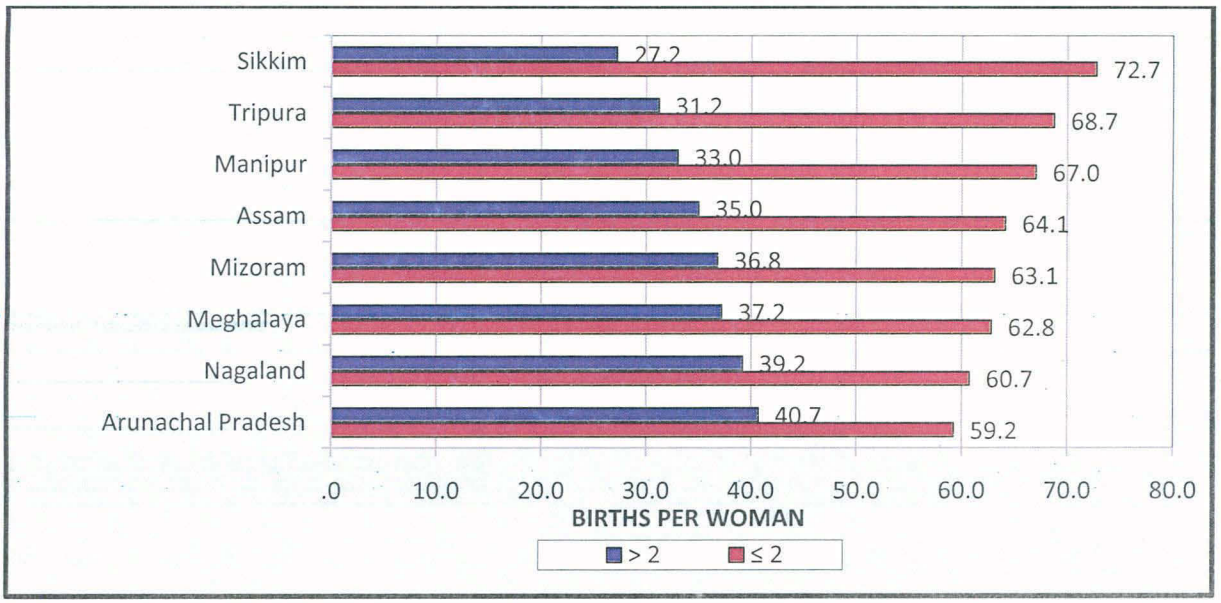
rate of nearly 5 children per woman. The graph given below gives us a comparative view of the distribution of mean number of children ever born (CEB) which are categories into: less than and equal to two and more than two CEB in Northeastern states of India. Accordingly, women having more than two children from some states like Sikkim (27.2 per cent), Tripura (31.2 per cent), Manipur (33 per cent) and Assam (35 per cent) have their CEB lower than the national average (36.1 per cent). Rests of the states -Mizoram, Meghalaya, Nagaland and Arunachal Pradesh- have CEB above the national average. Thus, it is believed that certain social, economic and demographic factors might have resulted in the reduction or variation of fertility across India's Northeast states. On the basis of NFHS-I (1992-93), Goswami has claimed that social variables (eg., urbanization, age at marriage, etc.) played more significant role in explaining fertility decline than demographic and economic factors (eg., infant mortality, per capita income, etc.).

In the present study children ever born (CEB) is considered as the standard measurement of fertility level which is used as the dependent variable throughout the analysis. CEB is a more standardized measure of fertility because age-sex structure of a population cannot affect it. The NFHS gives information in a continuous data on children ever born. To make the analysis simpler, easier and more clear this continuous variable have been transformed into dichotomous form viz., less than or equal to two children and children more than two. These two categories correspond to replacement level of fertility. The present study also has undertaken a standardized measure of fertility – total children ever born to women age 15-49 years- and analyzed in various selected variables such as age at marriage (below 20 years/20-30/31-49), death of a son (not dead/dead),type of residence (rural/urban), education of women (no education/primary/secondary & above), work status of women (not working/working), caste (Scheduled tribe/others), use of contraception(no/yes), religion (Hindu/Christian/others), media exposure(no/yes) and wealth index(poor/middle/rich).

This chapter deals with the differential fertility behavior and its determinants among the Northeastern States of India. The influence of fertility will be discussed in terms of different social, economic and demographic factors, which

are most crucial in declining the fertility behavior of women. Also, an attempt has been made to explain the fertility behaviors through explanatory variables.

Fig: 5.1 DISTRIBUTIONS OF WOMEN BY MEAN CHILDREN EVER BORN, NORTH EAST INDIA



Source: Computed from National Family Health Survey

5.2 Background of the Study Area

Before analyzing fertility levels, it is necessary to describe the socio-economic and demographic characteristics of the study area. This is vital because the very process of reproduction and the attitudes governing the same take place within this framework. The analysis of fertility determinants in subsequent pages takes into account the variables that are being specified here and their interrelationships. Here we shall discuss these variables in order to get a total picture of the population under study.

The NFHS has given age at marriage in a continuous series. However, for the present study the age at marriage has been categorized into age below 20 years, age between 20 to 29 years and age above 29 years. Empirical evidence on age at marriage by Gulati (1969) and Das Gupta (1974) clearly show that age at marriage is higher in urban areas than in rural areas, and educated men and women marry later than uneducated ones. It is clear from the table 5.2 that the mean age at

marriage differs from state to state. In Tripura the percentage of women who married at the age below 20 years were very high (56.4 per cent) in comparison to other states, yet Manipur registered the lowest at 30 percentage points, indicating that Manipur has the highest proportion of women who were late married against early married in Tripura. From the table 5.2 it is also observed that the proportion of women by age at marriage for the states of Manipur and Mizoram have comparatively equally distributed.

TABLE: 5.1 DISTRIBUTIONS OF WOMEN BY AGE AT MARRIAGE, NORTH EAST INDIA

Age at Marriage	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
below 19	54.0	53.3	40.4	30.0	37.9	56.4	43.1	34.4
20-29	17.9	20.2	23.9	30.1	25.0	18.7	24.4	30.2
30 +	28.0	26.5	35.5	39.7	37.0	24.7	32.4	35.3

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences, Mumbai, 2007

In Arunachal Pradesh, fifty-four per cent of the women married below 20 years, which is the second highest percentage in this category. Like in Tripura eighteen per cent of the women married between 20 to 29 years, which is lower than women who married at the age above 29 (29 per cent). Assam is the third state sharing above 50 per cent of women who married at an age under 20 years. It is also observed that 20 and 26.5 per cent of the women married at the age 20-29 and above 29, respectively in Assam. In contrast, Manipur has the largest proportion of late married women (40 per cent) who have married at an age above 29. However, Manipur has equal proportions of women (30 and 30.1 per cent) who married at the prime age- below 20 and 20-29, respectively. Nagaland has the second highest proportion of women (37 per cent) who married at the age above 29, but within the state the highest percentage (38 per cent) is belonging to women who married below 20 years. Twenty-five per cent of the women married at the age between 20-29 years in the state. Meghalaya and Mizoram have 35.5 and 35.3 per cent, respectively of women who married at the age above 29. In the case of women who married at young age (below 20), Meghalaya surpassed Mizoram by 6 per cent, that is, 40.4 per cent in Meghalaya and 34.4 per cent in

Mizoram. Sikkim has, however, slightly higher proportion of women who married at the age below 20 (43 per cent) whereas twenty-four per cent of women married between 20-29 years, and also 32 per cent have married at the age above 29.

High infant mortality leads to high demand for children and consequently led to high fertility. Parents try to replace the lost child to secure a given family size before the end of their reproductive years. In fact, especially death of a son determines significantly the birth interval and in return affect fertility behavior. Table 5.3 presents the percentage of women by death of a son as per NFHS-3 survey. It is apparent that the percentage distribution of women by death of a son differs from state to state and majority of the women did not experience death of a son across the states. The percentage of women who experience death of a son ranges from 4.3 per cent in Sikkim to 12 per cent in Arunachal Pradesh.

TABLE: 5.2 DISTRIBUTIONS OF WOMEN BY DEATH OF A SON, NORTH EAST INDIA

Dead of son	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
Not Dead	87.9	89.9	92.0	93.9	92.0	90.3	95.6	94.0
Dead	12.0	10.1	8.0	6.0	7.9	9.6	4.3	5.9

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences, Mumbai, 2007

Sikkim has the highest percentage (95.6 per cent) of women who did not experience death of a son. Mizoram and Manipur have relatively the same proportion (94 per cent) of women who did not experience death of a son, whereas 5.9 per cent in Mizoram and 6 per cent of women in Manipur have experienced the same. Meghalaya has ninety-two per cent of women who did not experience death of a son and eight per cent have experienced the same. In Tripura, while 90 per cent of women did not experience death of a son, only 10 per cent experience it. Nearly 90 per cent from Assam has did not experience death of a son; however, ten per cent has experienced it. Finally, eighty-eight per cent of women in Arunachal Pradesh did not experience death of a son while twelve per cent experience the same in the state.

It is well known that fertility is normally higher in rural areas than in urban areas. Table 5.4 shows that on the average majority of the sample women in all the

states were living in rural areas. Of all the states, highest percentage of women who reside in rural areas is found in Tripura, followed by Assam, Sikkim and on the contrary, Mizoram has the lowest proportion of women living in rural areas.

TABLE: 5.3 DISTRIBUTIONS OF WOMEN BY TYPE OF RESIDENCE, NORTH EAST INDIA

Place of Residence	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
Urban	28.7	18.8	27.5	33.2	29.4	17.6	21.2	56.3
Rural	71.2	81.2	72.4	66.7	70.5	82.3	78.7	43.6

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences,Mumbai, 2007

While 18 per cent of women were living in urban areas of Assam, twenty-one per cent were found in Sikkim. Meghalaya has 72 per cent of women living in rural areas and lesser percentage of women was living in urban areas. In Arunachal Pradesh 71 per cent were living in rural areas against nearly twenty-nine per cent living in urban areas. Next to Mizoram, Manipur accounts for the second highest percentage (33 per cent) of women residing in urban areas whereas women living in rural areas constitute two-thirds. In Nagaland 71 per cent and 29 per cent of women were living in rural and urban areas, respectively.

Education of women affects significantly the fertility level of women. More education helps indirectly in reducing fertility in number of ways – by delaying marriage, by increasing the chance a woman will never marry, by reducing desired family size, by stimulating aspirations for a higher standard of living and increased investments in fewer children; by preparing woman for employment, especially in the formal sector, and by exposing women to new knowledge regarding contraceptive methods. Based on the National Family Health Survey, 2005-06 table5.5 gives the percentage of women by women's educational level across the region. Percentage distributions of women by education differ from one state to another. Under no education it is significantly low (5.5 per cent) in Mizoram and considerably high (42 per cent) in Arunachal Pradesh. On the other hand, while women who completed secondary and above education is highest in Mizoram (74 per cent), Arunachal Pradesh has the lowest (40 per cent) in this

category. Percentage of women who have primary level of education ranges from 25 per cent in Tripura to 12 per cent in Manipur.

TABLE: 5.4 DISTRIBUTIONS OF WOMEN BY EDUCATION, NORTH EAST INDIA

Women's Education	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
No Education	41.9	30.2	29.5	21.8	21.7	22.4	26.6	5.5
Primary	17.7	17.9	18.4	11.8	18.4	25.3	21.0	20.3
Sec.& Higher Education	40.3	51.8	51.9	66.3	59.7	52.1	52.3	74.0

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences,Mumbai, 2007

Among the states, Mizoram has the highest proportion (74 per cent) of women who completed secondary and above education, while Manipur records 66 per cent which is the second highest in this category. Nagaland, the state with the third highest percentage (60 per cent) of women under the same category and the rest of the states –Sikkim, Tripura, Meghalaya, and Assam -have almost equal proportions [slightly more than one-half (51 plus)] of women who completed secondary and above education. Although Arunachal Pradesh has the higher percentage (42 per cent) of women under no education, yet the proportion of women who completed secondary and above education is almost equal to no education which stands at 40 percentage points. The more the state have higher percentage of women belonging to primary, secondary and higher education categories the state will have lower fertility levels.

Working women generally have lower fertility rates than non-working women. Working women have greater opportunity to communicate with the outside world, which brings changes in their attitudes towards the family size and use of contraception. Working women have higher educational level, generally marry at later age; they use contraception more effectively than non-working women, which leads to lowering of fertility rates. Table 5.6 presents the percentage distributions of women by work status. The proportion of currently working women is highest in Manipur (sixty-four per cent), followed by Arunachal Pradesh, Nagaland, Mizoram, Meghalaya, Tripura, Sikkim and Assam at the

bottom. As regards non-working women it is correspondingly highest in Assam (71 per cent) and lowest in Manipur (36 per cent).

TABLE: 5.5 DISTRIBUTIONS OF WOMEN BY WORK STATUS, NORTH EAST INDIA

Women's Occupation	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
Not working	41.6	70.6	58.8	36.1	54.1	68.3	68.9	54.6
Working	58.3	29.4	41.1	63.8	45.8	31.6	31.0	45.3

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences,Mumbai, 2007

Besides, more than one-half (fifty-eight per cent) of women in Arunachal Pradesh were working and the rest were non-working. Nagaland and Mizoram have almost equal proportion of working women that constituted 46 and 45 per cent, respectively in 2005-06. Non-working women account for 54 and 55 per cent in Nagaland and Mizoram, respectively. While lesser proportion (twenty-nine per cent) of women was working in Assam, seventy-one per cent belonged to non-working category. Larger proportions (59 per cent) of women were non-working in Meghalaya and forty-one per cent constituted under working category in the state. Similarly, larger proportion (64 per cent) belonged to working in Manipur and thirty-six per cent which is the lowest across the states in this category belong to Manipur. Tripura and Sikkim (31.6 per cent in Tripura and 31 per cent in Sikkim) have almost equal percentage of women belonging to working category.

Scheduled caste and tribe were typically belonging to lower economic strata of the society, having low standard of education and access to public health. Therefore, their fertility is normally higher than others. The NFHS-3 has given data on scheduled caste, scheduled tribe, other backward caste and others. However, as per the sample size it is transformed into Scheduled tribe and others in the study. As is evident from the table 5.7 that most of the states show larger proportion of tribal over the others. The percentage of ST women is lowest (ten per cent) in Assam and highest (ninety-eight per cent) in Mizoram. Yet, other than tribal, the percentage of women ranges from only 2 per cent in Mizoram to 91 per cent in Assam.

TABLE: 5.6 DISTRIBUTIONS OF WOMEN BY CASTE/TRIBE, NORTH EAST INDIA

Caste/tribe	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
ST	73.2	9.5	83.0	23.5	85.8	15.5	34.3	97.6
Others	26.7	90.5	17.0	76.4	14.1	84.4	65.6	2.3

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences, Mumbai, 2007

The NFHS-3 reveals that ST is also most commonly found in Nagaland (86 per cent), followed by Meghalaya and Arunachal Pradesh. On the contrary, other than ST is most prevalent in Assam, Tripura, Manipur and Sikkim.

Whenever fertility is considered, the role of family planning measures become an important part to be analyzed. Table 5.8 indicates that contraceptive prevalence ranges from fourteen per cent in Meghalaya to forty-eight in Tripura. In Assam around one-third (40 per cent) of the women use contraceptives and more than one-half (60 per cent) were non users. Thirty-eight per cent were accepting contraceptives in Sikkim yet around two-third (61 per cent) were non-users in the state. Mizoram has thirty-seven per cent of contraceptive users against 63 per cent were non-users. In Arunachal Pradesh, while 30 per cent use contraceptives, seventy per cent were non-users. With nearly seventy-one percent have not used contraceptives in Manipur and the rest have used. Nagaland shows only eighteen per cent of women have accepted contraceptives and more that two-third (82 per cent) did not apply the same. Meghalaya, the state with lowest users of contraceptives recorded less than one-fourth (14 per cent) and the rest were non-users of contraception.

TABLE: 5.7 DISTRIBUTIONS OF WOMEN BY CURRENT USE OF CONTRACEPTION, NORTH EAST INDIA

Use of Contraception	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
No	69.8	60.1	85.8	70.8	81.7	52.3	61.6	62.8
Yes	30.1	39.9	14.1	29.1	18.2	47.6	38.3	37.1

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences,Mumbai, 2007

Religion has been quite an important factor in the causation of fertility differentials. The National Family Health Survey-3 has given information about each religion; nevertheless, we classified these variables into three categories, viz., Hindu, Christian and others, because the sample size for other religions is too small to be taken into consideration.

TABLE: 5.8 DISTRIBUTIONS OF WOMEN BY RELIGION, NORTH EAST INDIA

Religion	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
Hindu	31.0	69.9	14.3	54.8	10.0	87.1	58.9	1.8
Christian	30.4	5.2	68.2	24.6	85.4	.6	9.2	94.8
Others	38.5	24.9	17.4	20.4	4.5	12.2	31.8	3.2

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences, Mumbai, 2007

Of all the states, Arunachal Pradesh is the only state that registered equal distribution of women among all religious groups in the state. Under the category of Hindu, the proportion of women ranges from two per cent in Mizoram to eighty-seven per cent in Tripura. In case of Christian, the percentage is as high as ninety-five per cent in Mizoram and it is lowest in Tripura (less than one per cent). For the other religious groups, the percentage of women ranges from three per cent in Mizoram to thirty-nine per cent in Arunachal Pradesh.

By state, the study shows that in Tripura the proportion of women belonging to Hindu is significantly high (87 per cent), but Christian constituted the least (less than one per cent). Similarly, in Assam two-third (70 per cent) of the sample women belonging to Hindu and Christian constituted only five per cent. Sikkim shows the highest percentage (59 per cent) of women belonging to Hindu and Christian constituted the only 9 per cent. In Manipur, while larger proportion of women constituted the Hindu, women belonging to 'others' represent the least percentage. Mizoram shows the highest percentage of Christian (95 per cent) and Hindu accounts for only 2 per cent. In Arunachal Pradesh, 'others' constituted the larger proportion, but Christian constituted the least. In case of Meghalaya, two-thirds (68 per cent) of women belonged to Christian, whereas Hindu constituted

lesser percentage in the state. Nagaland has 85 per cent of women belonging to Christian but 'others' accounts for only 4.5 per cent.

Diffusion of information through mass media plays an important role in changing the attitude towards small family norms. Rutherford and Mishra (1997) have found that exposure to mass media significantly increases the acceptance of contraception. Exposure to mass media is not given directly in individual level data of NFHS. Here, exposure to mass media have been computed on the basis of three variables viz., read newspaper once a week, listens to radio once a week, and watches TV once a week.

TABLE: 5.9 DISTRIBUTIONS OF WOMEN BY MEDIA EXPOSURE, NORTH EAST INDIA

Exposure to Mass Media	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
No Exposure	18.0	20.3	22.0	1.2	16.7	16.7	12.8	3.6
Exposure	81.9	79.7	77.9	98.7	83.2	83.2	87.1	96.3

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences, Mumbai, 2007

Table 5.10 reveals that the percentage distribution of women exposed to mass media also differs from state to state and the percentage of media exposure is highest in Manipur, but it is lowest in Meghalaya. Media exposure is also high in Mizoram, Sikkim, Nagaland and Tripura.

In Assam, more than three-quarters (79.7 per cent) of women exposed to media and the rest were non-exposed. Seventy-eight per cent were exposed in Meghalaya and a lesser per cent of women were non-exposed in the state. Nagaland and Tripura recorded similar percentages (eighty-three per cent each) of exposed women. NFHS-3 also registered that in Sikkim more than one-third (eighty-seven per cent) were exposed to media and the rest were non-exposed. Finally, Mizoram recorded 96 per cent of the women were exposed to media and only four per cent were non-exposed to media.

The economic status of the respondent is indicated by the wealth index (see table 5.11). As per NFHS data, the wealth index is constructed by combining

information on 33 household assets and housing characteristics such as ownership of consumer items, type of dwelling, source of water, and availability of electricity, into a single wealth index. Women belonging to the high standard to living record low fertility and higher use of contraceptive methods. High fertility and low acceptance of family planning methods in developing countries is due to low standard of living. Though NFHS-3 data has classified wealth index into five categories, but due to incompatibility of the sample size, that it has been categorized into three categories viz., Poor, Middle and Rich.

TABLE: 5.10 DISTRIBUTIONS OF WOMEN BY WEALTH INDEX, NORTH EAST INDIA

Wealth Index	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
Poor	40.7	45.1	29.0	16.3	25.3	32.0	9.3	7.4
Middle	21.2	23.7	23.4	32.5	28.5	43.6	20.9	16.1
Rich	37.9	31.3	47.4	51.1	46.0	24.2	69.6	76.4

Source : National Family and Health Survey, 2005-06, International Institute of Population Sciences, Mumbai, 2007

In North-East region data on wealth index shows that the percentage distribution of women belonging to poor households is as low as 7 per cent in Mizoram and it is highest in Assam (45 per cent). With regard to middle households, the proportion of women ranges from 16 per cent in Mizoram to 44 per cent in Tripura. Further, large proportion of women is found in Mizoram (76 per cent) and only 24 per cent is found in Tripura under the rich category.

In Mizoram women belonging to the poor account for only 7 per cent, but the rich represented more than two-thirds (76 per cent). Sikkim has nearly seventy per cent of women who belong to rich households and only nine per cent constituted the poor. Although Manipur has more than one-half (51 per cent) of women belonging to the rich households, sixteen per cent belonged to the poor households. In Meghalaya, forty-seven per cent belonged to rich households but women who belonged to poor households constituted 29 per cent which is almost equal to the rich households. Arunachal Pradesh shows higher percentage of women belonging to the rich households than Assam which stands at 40 percentage points. Women belonging to the poor households (41 per cent) exceeded the middle and rich percentages in Assam.

5.3 Association between Total Fertility Rate and the Independent Variables

Studying sociological and demographic variables normally mean studying the behavior and characteristics of people or of organizations and groups established and perpetuated by people. What causes human behavior is a complex and sometimes unanswerable question: we should not expect to find in social sciences the kind of clear-cut relationship of cause and effect obtainable in the natural sciences. Instead we talk in terms not of certainly but of probability and rather than about causality we talk about association between variables.So this section aspires only to establish association amongst the variables and tries to analysis the nature and strength of that association.

Age at Marriage

The age at marriage, or to be more precise, the age at consummation of marriage is an important factor affecting fertility behavior of a woman. The low mean age at marriage is generally associated with high fertility since it increases the reproductive period of women for child bearing, which has direct influence on her fertility behavior. Das (1969) claimed, on the basis of an empirical study, that women marrying between 20 and 24 have similar fertility to those marrying before the age of 20. However, with a marriage age of 25 and above, there seems to be a different effect on fertility. This situation has led us to formulate the following hypothesis: 'the women with earlier marriage are endowed with a higher fertility'. The numbers of children ever born by age of women at marriage are given in Table 5.1. It is seen that as the age at marriage increases the proportion of women whose fertility above replacement level decreases in all the states. Among women having more than two children who married at the age below 20, the proportion ranges from 46.1 per cent in Sikkim to 68.1 per cent in Nagaland. In the later marriage age group of 30-49 years, women's percentage ranges from 0 per cent in Tripura to 2.4 per cent in Mizoram. But in the middle marriage age group (20-29), women having more than two children are highest in Nagaland (51.5 per cent) and lowest in Tripura (23 per cent).The calculated value of chi-square, being 469.066 in Arunachal Pradesh, 908.540 in Assam, 685.980

in Meghalaya, 1476.542 in Manipur, 1445.086 in Nagaland, 136.882 in Tripura, 421.876 in Sikkim and 510.975 in Mizoram with a probability of lesser than 0.001 in each state that there is a strong association between the dependent variable and age at marriage of the respondent. This gives a positive support to our hypothesis which holds that women with earlier marriage are endowed with a higher fertility.

TABLE 5.11 CROSS TABULATION BETWEEN AGE AT MARRIAGE AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Age at Marriage	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2
Below 20 years	38.5	61.5	44.7	55.3	37.4	62.6	35.1	64.9	31.9	68.1	52.3	47.7	53.9	46.1	39.9	60.1
20-29 years	58.3	41.7	69.1	30.9	52.0	48.0	57.4	42.6	48.5	51.5	77.0	23.0	70.0	30.0	49.3	50.7
30 -49 years	99.6	.4	99.8	.2	98.9	1.1	98.	1.7	98.6	1.4	100.0	.0	99.9	0.1	97.6	2.4
X^2	469.066(.000)		908.540(.000)		685.980(.000)		1476.542(.000)		1445.086(.000)		361.882(.000)		421.876(.000)		510.975(.000)	

Source : Computed from National Family Health Survey, 2005-06

Death of a Son

The mortality of the children has a role to play in fertility performance. It is generally believed that high infant mortality leads to high demand for children and consequently led to high fertility. But more specifically, it is expected that women who experience death of a son tend to have higher fertility level than women who did not experience death of a son (see Table 5.2). This situation has led us to formulate the following hypothesis: 'the women experiencing death of a son are endowed with a higher fertility'. The distributional analysis of the women experiencing death of a son shows that the proportion of women having more than two children is highest in Mizoram (97.2 per cent), followed by Nagaland, Manipur, Assam, Arunachal Pradesh, Meghalaya, Sikkim and Tripura.

TABLE 5.12 CROSS TABULATION BETWEEN DEATH OF A SON AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Death of a Son	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2
Not Dead	65.5	34.5	70.2	29.8	67.1	32.9	70.7	29.3	65.4	34.6	74.3	25.7	75.4	24.6	66.9	33.1
Dead	13.6	86.4	10.3	89.7	13.6	86.4	9.9	90.1	8.0	92.0	15.8	84.2	14.0	86.0	2.8	97.2
X^2	193.800(.000)		542.852(.000)		190.235(.000)		429.109(.000)		395.861(.000)		265.112(.000)		169.269(.000)		176.154(.000)	

Source : Computed from National Family Health Survey, 2005-06

On the other hand, among women who did not experience death of a son and have more than two children, the percentage is highest in Nagaland (34.6 per cent) and it is lowest in Sikkim (24.6 per cent). In addition, women without experiencing death of a son are high in Arunachal Pradesh, Mizoram and Meghalaya. The calculated value of chi-square, being 193.800 in Arunachal Pradesh, 542.852 in Assam, 190.235 in Meghalaya, 429.109 in Manipur, 395.861 in Nagaland, 265.112 in Tripura, 169.269 in Sikkim and 176.154 in Mizoram and at a probability of lesser than 0.001 in all the states that there is a strong positive association between death of a son and the dependent variable. This lends a positive support to our hypothesis which describes that the women experiencing death of a son are endowed with higher fertility.

Type of Residence

It is generally found that fertility is higher in rural areas than in urban areas. The reasons are: illiteracy are higher in rural areas than urban areas, women marry early in rural areas than in urban areas, contraceptive use is higher in urban areas than in rural areas, son preference is more powerful in rural areas than in urban areas. This has led us to formulate the following hypothesis: 'the women inhabiting in rural areas are endowed with a higher fertility'. Cross tabulation between type of residence and the mean number of children ever born given in the table 5.3 reveals that in urban areas, Arunachal Pradesh has the highest proportion of women (32.8 per cent) having more than two children, followed by Mizoram, Nagaland, Manipur, Meghalaya, Assam, Tripura and Sikkim, whereas in rural areas, percentage of women having more than two children is highest also

in Arunachal Pradesh (44.0 per cent) and it is lowest in Sikkim (30.4 per cent). The calculated value of chi-square, being 17.723 in Arunachal Pradesh, 46.564 in Assam, 37.882 in Meghalaya, 36.729 in Manipur, 39.203 in Nagaland, 37.406 in Tripura, 37.739 in Sikkim and 21.731 in Mizoram and at a probability of lesser than 0.001 in all the states that there is a strong association between the dependent variable and type of residence. Thus, the hypothesis which describes that the women living in rural areas are endowed with a higher fertility is valid and acceptable.

TABLE 5.13 CROSS TABULATION BETWEEN TYPE OF RESIDENCE AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Type of Residence	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2
Urban	67.2	32.8	75.2	24.8	73.3	26.7	73.0	27.0	68.4	31.6	82.7	17.3	84.1	15.9	67.8	32.2
Rural	56.0	44.0	61.7	38.3	58.8	41.2	64.0	36.0	57.6	42.4	65.7	34.3	69.6	30.4	57.1	42.9
X^2	17.723(.000)		46.564(.000)		37.882(.000)		36.729(.000)		39.203(.000)		37.406(.000)		37.739(.000)		21.731(.000)	

Source : Computed from National Family Health Survey, 2005-06

Educational level of Women

It is held that the literacy level of women has a bearing on their fertility performance. Many studies found that the literate women have a lower level of fertility and non-literate women have higher level of fertility. Education helps women in delaying marriage, reducing desired family size by using more contraceptives, etc. This situation has led us to formulate the following hypothesis: 'the women who are non-literates are endowed a higher fertility'. For measuring the level of literacy it is held that a non-literate as distinguished from a literate is a person who does not know how to read and how to write. The table 5.4 presents that among the no education category of women having more than two children, large proportion is found in Tripura (64.4 per cent), followed by Arunachal Pradesh, Nagaland, Manipur , Meghalaya, Assam, Sikkim and Mizoram. As regards to women who completed secondary and above and have more than two children, the proportion is highest in Mizoram (29.8 per cent) and

it is lowest in Sikkim (11 per cent). Percentage of women is also high in Nagaland, Meghalaya, Manipur and Assam in the same category. Among the women who passed primary level, the percentage ranges from 28.8 per cent in Sikkim to 56.7 per cent in Mizoram. The calculated value of chi-square, being 310.797 in Arunachal Pradesh, 568.605 in Assam, 266.598 in Meghalaya, 590.500 in Manipur, 280.469 in Nagaland, 426.720 in Tripura, 422.974 in Sikkim and 108.688 in Mizoram, and at a probability level of lesser than 0.001 in all the states, is statistically significant. This leads us to conclude that our hypothesis which describes that the women who are non-literates are endowed with a higher fertility.

TABLE 5.14 CROSS TABULATION BETWEEN EDUCATIONAL LEVEL OF WOMEN AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Woman's Education	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2
No Education	36.5	63.5	39.6	60.4	39.6	60.4	38.7	61.3	38.7	61.3	35.6	64.4	41.8	58.2	42.6	57.4
Primary	57.5	42.5	56.7	43.3	56.2	43.8	53.2	46.8	54.7	45.3	57.4	42.6	71.2	28.8	43.3	56.7
Sec.& Higher Education	83.6	16.4	81.1	18.9	78.4	21.6	78.8	21.2	70.7	29.3	88.4	11.6	89.0	11.0	70.2	29.8
X^2	310.797(.000)		568.605(.000)		266.598(.000)		590.500(.000)		280.469(.000)		426.720(.000)		422.974(.000)		108.688(.000)	

Source : Computed from National Family Health Survey, 2005-06

Work Status of Women

In this study, woman engaged in the paid work may be taken as working and otherwise considered as not working. Working women generally have greater opportunity to communicate with the outside world, which brings changes in their attitudes towards the family size and use of contraception. Working women have higher educational level, generally marry at later age; they use contraception more effectively than non-working women, which leads to lowering of fertility rates (Sahu, 1998). This situation has led us to frame up the following hypothesis: 'the non- working women are endowed with a higher fertility'. The table 5.5 presents that larger proportion of women who are currently working have their

fertility less than the replacement level while higher percentage of non-working women, on an average, have more than two children. Among the non-working women who have more than two children, the proportion is highest in Assam (34 per cent), followed by Nagaland, Mizoram, Meghalaya, Tripura, Arunachal Pradesh, Sikkim and Manipur, whereas among the currently working women under the same category (more the two children) larger proportion is found in Arunachal Pradesh (50.2 per cent) followed by Nagaland (47.3 per cent), Meghalaya (46.9 per cent), and Mizoram (43.3 per cent). Of all the states, Sikkim has the lowest proportion of currently working women having more than two children. The calculated value of chi-square, being 85.058 in Arunachal Pradesh, 12.827 in Assam, 60.024 in Meghalaya, 81.543 in Manipur, 88.975 in Nagaland, 21.963 in Tripura, 2.747 in Sikkim and 26.579 in Mizoram and at a probability level of lesser than 0.001 in all the states except in Sikkim, that there is a strong positive association between CEB and work status of women. In the case of Sikkim, however, there is a weak association between the dependent and independent variable. Thus on the ground of statistical significance the hypothesis which describes that the non-working women are endowed with a higher fertility can be accepted, but perhaps due to sample size issue the percentage of currently working women having their fertility below replacement level is lower than currently non-working women in all the states. This calls for further research on this issue.

TABLE 5.15 CROSS TABULATION BETWEEN WORK STATUS OF WOMEN AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Work Status of Women	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2
Currently Not working	72.4	27.6	66.0	34.0	69.6	30.4	75.4	24.6	67.6	32.4	72.1	27.9	73.8	26.2	68.5	31.5
Currently Working	49.8	50.2	59.9	40.1	53.1	46.9	62.3	37.7	52.7	47.3	61.4	38.6	70.3	29.7	56.7	43.3
X^2	85.058(.000)		12.827(.000)		60.024(.000)		81.543(.000)		88.975(.000)		21.963(.000)		2.747(.097)		26.579(.000)	

Source : Computed from National Family Health Survey, 2005-06

Caste/tribe

Caste is also considered as one of the most important factors as far as fertility performance of women is concerned. Scheduled Castes and Scheduled Tribes usually belonging to lower economic strata of the society, having low standard of education and access to public health. The NFHS-3 shows that women belonging to Scheduled Tribe (ST) are having more children than other communities – Scheduled Caste and other backward caste in all the states except in Sikkim- the proportion of women belonging to ST are higher who have their fertility below the replacement level. Accordingly, the following hypothesis can be made: 'the women belonging to Scheduled Tribe are endowed with a higher fertility'. Table 5.6 indicates that the proportion of women belonging to ST and having more than two children ranges from 23.3 per cent in Sikkim to 41.3 per cent in Arunachal Pradesh. Under the same category (more than two children), the percentage of women is also high in Manipur, Nagaland, Meghalaya, and Assam. However, it is low in Mizoram and Tripura in the same category. On the other extreme, women belonging to other caste and have more than two children, the proportion is highest in Arunachal Pradesh (39.3 per cent), followed by Nagaland, Assam, Meghalaya and Manipur. Percentage of women under the same category is lowest in Mizoram (23.8 per cent), followed by Sikkim and Tripura. The calculated value of chi-square, being in .521 in Arunachal Pradesh, .991 in Assam, 5.305 in Meghalaya, 35.240 in Manipur, 3.200 in Nagaland, 6.916 in Tripura, 8.777 in Sikkim and 3.143 in Mizoram, and at a probability level of more than 0.001 in all the states except in Manipur is statistically not significant (negatively associated) to conclude that our hypothesis is valid. Thus on the ground of statistical significance the hypothesis, which explains that the women belonging to ST are endowed with a high fertility, cannot be accepted in all the states of the region except in Manipur.

TABLE 5.16 CROSS TABULATION BETWEEN CASTE/TRIBE AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Caste/tribe	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2
ST	58.7	41.3	61.8	38.2	61.7	38.3	59.5	40.5	60.2	39.8	62.2	37.8	76.7	23.3	62.8	37.2
Others	60.7	39.3	64.4	35.6	68.1	31.9	69.3	30.7	64.2	35.8	69.9	30.1	70.7	29.3	76.2	23.8
X^2	.521(.470)		.991(.320)		5.305(.021)		35.240(.000)		3.200(.074)		6.916(.009)		8.777(.003)		3.143(.076)	

Source : Computed from National Family Health Survey, 2005-06

Contraceptive Use

Contraceptive use is one of the major factors in controlling population growth. By using the contraceptive methods a woman can avoid unwanted pregnancy and thus led to lower fertility. Many researchers have explained that the fertility rate in India has declined during the last decade from 3.4 in 1992-93 to 2.9 in 1998-99 (NFHS-1 & 2) this is due to an increase in the use of contraceptives (Dwivedi, 2006). Our experience from the data source (NFHS reports) led to formulate the following hypothesis: 'the women not using contraceptives are endowed with a higher fertility'. As per the table 5.7, among women having more than two children and not using contraceptives the proportion is highest in Meghalaya (33.5 per cent) and it is lowest in Mizoram (16.9 per cent). Contraceptive use is also low among women having more than two children in Nagaland, Arunachal Pradesh, Assam and Manipur. In the other ends of the spectrum, among mothers who adopted contraceptives and have more than two children is highest in Mizoram (70.6 per cent), followed by Nagaland, Arunachal Pradesh, Meghalaya, Manipur, Assam, Sikkim and Tripura. The calculated value of chi-square, being 171.522 in Arunachal Pradesh, 321.214 in Assam, 76.725 in Meghalaya, 450.325 in Manipur, 355.928 in Nagaland, 81.737 in Tripura, 183.082 in Sikkim and518.046 in Mizoram, and at a probability level of more than 0.001 in all the states, are statistically significant (strong positive association between the dependent and independent variable). This leads us to conclude that our hypothesis, which holds that the women not using contraceptives are endowed with a higher fertility, is statistically valid and is, therefore, acceptable.

TABLE 5.17 CROSS TABULATION BETWEEN CURRENT USE OF CONTRACEPTION AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Current Use of Contra-ception	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2	≤ 2	> 2
Not using	69.7	30.3	75.5	24.5	66.5	33.5	76.6	23.4	67.7	32.3	77.9	22.1	83.0	17.0	83.1	16.9
Using	35.1	64.9	47.2	52.8	40.2	59.8	43.9	56.1	29.5	70.5	58.7	41.3	56.1	43.9	29.4	70.6
X^2	171.522(.000)		321.214(.000		76.725(.000)		450.325(.000)		355.928(.000)		81.737(.000)		183.082(.000)		518.046(.000	

Source : Computed from National Family Health Survey, 2005-06

Religion

Many studies claimed that fertility is generally higher in those religious groups where children are accepted as gift of god. Fertility variation can be seen where use of family planning method is restricted and reproductive decision is governed by religious beliefs. Accordingly, the following hypothesis is made: 'the women belonging to other than Hindu is endowed with a higher fertility'. The table 5.8 shows that the percentage distribution of women having their fertility below replacement level is highest among the Hindus, followed by Christians and others across the region. Among the Hindus, the proportion of women having more than two children is as high as 37 per cent in Arunachal Pradesh and it is lowest in Mizoram (18.2 per cent). The proportion of Hindu women in the same category is also high in Nagaland, Assam, Tripura and Meghalaya. As regards to women having more than two children and belonging to Christian, the proportion is highest in Assam (42.7 per cent), followed by Arunachal Pradesh, Nagaland, Manipur and Meghalaya, yet it is lowest in Tripura (27.3 %). Moreover, among women whose religion is other than Hindu and Christian, the percentage ranges from 26.5 per cent in Sikkim to 45.2 per cent in Assam. The calculated value of chi-square, being 5.666 in Arunachal Pradesh, 59.008 in Assam, 10.930 in Meghalaya, 63.089 in Manipur, 7.148 in Nagaland, 12.219 in Tripura, 1.090 in Sikkim and 5.119 in Mizoram, and at a probability level of less than 0.001 in Assam and Manipur are highly significant and the rest of the states are

statistically not significant. Thus on the grounds of statistical significance the hypothesis, which describes that the women belonging to other than Hindu is endowed with a higher fertility cannot be accepted in Arunachal Pradesh, Meghalaya, Nagaland, Tripura, Sikkim and Mizoram. However, the hypothesis is valid in Assam and Manipur.

TABLE 5.18 CROSS TABULATION BETWEEN RELIGION AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Religion	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2
Hindu	63.0	37.0	68.1	31.9	70.9	29.1	72.1	27.9	66.8	33.2	70.1	29.9	72.7	27.3	81.8	18.2
Christian	59.3	40.7	57.3	42.7	62.0	38.0	60.4	39.6	60.2	39.8	72.7	27.3	69.7	30.3	62.9	37.1
Others	56.1	43.9	54.8	45.2%	59.3	40.7	61.5	38.5	57.3	42.7	58.8	41.2	73.5	26.5	61.0	39.0
X^2	5.666(.059)		59.008(.000)		10.930(.004)		63.089(.000)		7.148(.028)		12.219(.002)		1.090(.580)		5.119(.077)	

Source : Computed from National Family Health Survey, 2005-06

Media Exposure

Exposed to mass media such as listening to radio, watching television and reading newspaper have significant impact on fertility performance of women. Women who are more exposed to mass media know better about family planning methods, and to limit the family size. Rutherford and Mishra (1997) have found that exposure to mass media significantly increases the acceptance of contraception. This proposition has led us to formulate the following hypothesis: 'the women not exposed to mass media are endowed with a higher fertility'. The table 5.9 gives that the proportion of women having their fertility below the replacement level and exposed to mass media are higher in all the states as compared to their not exposed counterparts. Among the not exposed women having more than two children, the percentage is significantly high in Arunachal Pradesh (59.6 per cent) compared to Mizoram (47.7 per cent). The percentage is also high in Meghalaya, Sikkim, Nagaland and Assam in the same category. At the same time among the women having more than two children and exposed to mass media, the proportion is highest in Arunachal Pradesh (36.6 per cent), followed

by Mizoram, Nagaland, Manipur, Meghalaya, Assam, Tripura and Sikkim.The calculated value of chi-square, being 53.132 in Arunachal Pradesh, 138.275 in Assam, 89.559 in Meghalaya, 8.800 in Manipur, 75.235 in Nagaland, 71.434 in Tripura, 120.966 in Sikkim and 3.407 in Mizoram, and at a probability level of less than 0.001 in Arunachal Pradesh, Assam, Meghalaya, Nagaland, Tripura, and Sikkim are highly associated and the probability level is more than 0.001 in the states of Manipur and Mizoram, which are not statistically significant or negatively associated. This leads us to conclude that our hypothesis which describes that the women not exposed to mass media are endowed with a higher fertility is acceptable in all the states except in Manipur and Mizoram.

TABLE 5.19 CROSS TABULATION BETWEEN MEDIA EXPOSURE AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Media Exposure	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2
No	40.4	59.6	46.1	53.9	44.1	55.9	48.1	51.9	45.6	54.4	48.8	51.3	45.1	54.9	52.3	47.7
Yes	63.4	36.6	68.8	31.2	68.1	31.9	67.2	32.8	63.8	36.2	72.8	27.2	76.8	23.2	63.6	36.4
X^2	53.132(.000)		138.275(.000)		89.559(.000)		8.800(.003)		75.235(.000)		71.434(.000)		120.966(.000)		3.407(.056)	

Source : Computed from National Family Health Survey, 2005-06

Wealth Index

Wealth index indicates the economic status of the households. As the scale of wealth index increases, educational level increases, woman marry later, use contraceptives effectively and consequently led to low fertility. This assumption has led us to formulate the following hypothesis: 'the women living in poor families are endowed with a higher fertility'. Table 5.10 shows that with increases in the level of wealth status the percentage of women having their fertility below replacement level simultaneously increased, indicating that the fertility level decreases with increasing status of the women. The proportion of women belonging to poor family and having more than two children ranges from 43.4 per cent in Tripura to 49.7 per cent in Sikkim. Percentage of women in the same

category is also high in Arunachal Pradesh, Meghalaya, Nagaland and Mizoram. In respect of women belonging to rich households and having more than two children, the proportion is highest in Mizoram (32.7 per cent) followed by Nagaland, Arunachal Pradesh, Manipur, and Meghalaya, whereas it is lowest in Sikkim and Assam, apart from Tripura. The proportion of women having more than two children and belonging to Middle category reveals that it is highest in Mizoram (51.7 per cent) and lowest in Tripura (31.3 per cent). The calculated value of chi-square, being 52.567 in Arunachal Pradesh, 166.536 in Assam, 131.517 in Meghalaya, 127.437 in Manipur, 77.603 in Nagaland, 96.279 in Tripura, 118.750 in Sikkim and 43.749 in Mizoram, and at a probability level of lesser than 0.001 in all the states, is statistically associated. This leads us to conclude that our hypothesis which holds that the women living in poor families are endowed with a higher fertility is statistically valid and is, therefore, acceptable.

TABLE 5.20 CROSS TABULATION BETWEEN WEALTH INDEX AND MEAN CHILDREN EVER BORN, NORTH EAST INDIA

Predictor variable	Arunachal Pradesh		Assam		Meghalaya		Manipur		Nagaland		Tripura		Sikkim		Mizoram	
	CEB		CEB		CEB		CEB		CEB		CEB		CEB		CEB	
Wealth Index	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2	≤2	>2
Poor	50.4	49.6	54.0	46.0	50.4	49.6	54.5	45.5	50.5	49.5	56.6	43.4	50.3	49.7	52.6	47.4
Middle	56.7	43.3	66.5	33.5	52.6	47.4	61.7	38.3	59.2	40.8	68.7	31.3	60.4	39.6	48.3	51.7
Rich	70.0	30.0	77.1	22.9	75.4	24.6	74.4	25.6	67.4	32.6	84.7	15.3	79.5	20.5	67.3	32.7
X^2	52.567(.000)		166.536(.000)		131.517(.000)		127.437(.000)		77.603(.000)		96.279(.000)		118.750(.000)		43.749(.000)	

Source : Computed from National Family Health Survey, 2005-06

5.4 Factors Influencing Total Children Ever Born: Multivariate Analysis

To study the impact of demographic, social and economic factors on fertility, multiple classification analyses (MCA) were used. This technique is useful as most of our predictor variables are either continuous or categorical in nature. In fact MCA is a technique for examining the interrelationship between several predictor variables and a dependent variable within the context of an additive model. Here

MCA has been carried out taking CEB as dependent variable, and the selected background characteristics of women as independent variables. The result gives the sole effect of each variable on fertility, when the effects of other confounding (intermediate) factors are controlled. It is to be mentioned in this context that only those variables with significant result are to be discussed here.

Arunachal Pradesh

The results of MCA for the state of Arunachal Pradesh are given in table 5.11. The table presents the grand mean, both adjusted and unadjusted mean number of children ever born for each predictor variable, the eta (Þ), beta and other relevant statistics. From table 5.11 it is observed that some of the predictors are found to have relatively stronger influence on fertility while some others have weaker effects, and the rest have no significant effect on the response variable. The relationship between some of the significant predictors, such as work status of mothers, contraceptive use and wealth index and fertility is not in the expected direction. The beta (ß) coefficients indicates the level of importance or the magnitude of the contribution of the individual predictor, that is to say, the larger the value of beta (ß), the greater its effect on fertility will be. Therefore, the most important predictors explaining the variability in the response variable in order of prominence are: age at marriage, death of a son, level of education, contraceptive use, religion, type of residence and media exposure. The grand mean of children ever born for all the 1647 women aged 15-49 was computed as 2.45.

In Arunachal Pradesh, it is apparent from table 5.11 that the mean children ever born among the sample women varied significantly according to age at marriage of the mothers. The adjusted mean decreases as the age of marriage increases. Thus the adjusted mean shows that women in the age group of 20-29 and 30 above years have 0.65 and 2.38 children lesser than a woman who married below 20 years, respectively. In this regard, it is believed that when women married early fertility become the higher compared with women who lately married.

There is a positive relationship between women who experience death of a son and fertility level has been well established by several studies. After adjustment for other variables, it is evident that a woman who experience death of a son has

2.07 children more than a woman who did not experience son death. Level of education is the other significant variable in the MCA analysis (see table 5.11). The table reveals that the adjusted mean for only the mean value of the women under no education has shown a positive deviation, indicating that this group of women experience higher fertility than the other two groups. In other words, not educated women experience about 0.85 and 1.12 children more than women who completed primary and secondary and above education respectively.

Religion is also significant in the MCA analysis. The table also reveals that the adjusted mean for women belonging to other religious group has 0.32 and 0.14 children more than Hindu and Christian, respectively. Also, it is apparent from the table that the mean number children ever born among the sample women varied significantly according to type of residence. The adjusted values for a woman who lives in rural areas on an average may have 0.23 children more than a woman who resides in urban areas. In regards to media exposure, the table shows that the adjusted mean value of the women who are not exposed to mass media experiences about 0.19 children more than women who exposed to mass media.

Surprisingly, the MCA result shows that there is a positive relationship between contraceptive use and fertility, in the sense that where contraceptive use increases fertility correspondingly increase. If we look at the adjusted mean, contraceptive users have 0.62 children more than women who did not use contraceptives. This might perhaps be due to sample size issue or as the women have large number of children that they embraced more contraception in order to control their family size.

Table 5.21 Results of Multiple Classification Analysis (MCA) for mean Children Ever Born(CEB) by Selected Predictors, Arunachal Pradesh, NFHS-3,2005-06

Predictor Variable	*N*	*Unadjusted mean*	*Eta(Þ)*	*Adjusted mean*	*Beta(ß)*
Age at Marriage					
Below 20	890	3.51	.615	3.13	.422***
20-29	295	2.48		2.48	
30 +	462	.03		.75	
Death of a Son					
Not dead	1449	1.94	.451	2.10	.278***
Dead	198	5.31		4.17	
Type of Residence					
Urban	473	1.90	.116	2.18	.044**
Rural	1174	2.53		2.41	
Level of Education					
No Education	690	3.59	.461	2.95	.214***
Primary	292	2.17		2.10	
Sec.& Above Education	664	1.13		1.83	
Work Status of Mother					
Not working	686	1.62	.254	2.25	.035
Working	961	2.87		2.42	
Caste/tribe					
ST	1206	2.36	.012	2.36	.007
Others	441	2.30		2.32	
Contraceptive Use					
Not using	1150	1.88	.292	2.16	.117***
Using	497	3.43		2.78	
Religion					
Hindu	511	2.13	.061	2.17	.056**
Christian	501	2.40		2.35	
Others	635	2.48		2.49	
Media Exposure					
No Exposure	297	3.50	.223	2.56	.041**
Exposure	1350	2.09		2.30	
Wealth Index					
Poor	671	2.90	.222	2.38	.014
Middle	350	2.45		2.30	
Rich	626	1.69		2.34	

R =.738, R^2 =.544, Grand mean = 2.45, Number of cases = 1647, ** 5 % level of significance, ***1 % level of significance

Assam

Table 5.12 presents the grand mean, both adjusted and unadjusted mean number of children ever born for each predictor variable, the eta (Þ), beta and other

relevant statistics for the state of Assam. The table shows that some of the predictors have relatively stronger influence on fertility while others have no significant effect on the response variable. The relationships between some of the significant predictors (work status of mother and contraceptive use) and fertility is not in the expected direction. The beta (ß) coefficients show that the most important predictors explaining the variability in the response variable in order of prominence are: age at marriage, son death, level of education, contraceptive use, religion and type of residence. The grand mean of children ever born for all the 3839 women aged 15-49 was computed as 2.18.

It is obvious from the table 5.12 that the mean children ever born varied significantly according to age at marriage of the mothers. The adjusted mean diminishes as the age of marriage increases. The adjusted mean for women who married at an age below 20 years on an average may have 0.54 and 1.99 children more than a woman who married at an age between 20-29 and 30-49, respectively. In regard to women who experience death of a son, the result shows that women who experience death of a son have higher fertility than women who did not experience death of a son. The adjusted mean for a woman who experience death of a son has 2.03 children more than a woman who experience without death of a son. Level of education is the other significant variable in the MCA analysis. The table indicates there is a negative relationship between level of education and fertility. The adjusted mean for women with no education has would experience about 0.49 and 0.89 children more than women who attained primary and secondary and above education, respectively.

Considering religion the table reveals that after controlling other variables, women belonging to other than Hindu and Christian has respectively 0.37 and 0.17 children more than Hindu and Christian. It is also evident from the table 5.12 that the mean number of children ever born varied significantly according to type of residence of the mothers. The adjusted mean for the women who lives in rural areas on an average may have 0.2 children more than a woman who resides in urban areas.

In respect of contraceptive use, it is surprising that there is a positive relationship between contraceptive use and fertility where contraceptive users have higher fertility than their non user counterparts. The adjusted mean for women who are

not using contraceptives users have 0.56 children more than women who did not use contraceptives. This might be due to sample size or perhaps the women who have higher number of children tend to accept contraceptives in order to control for their family size.

Table 5.22 Results of Multiple Classification Analysis (MCA) for mean Children Ever Born(CEB) by Selected Predictors, Assam, NFHS-3, 2005-06

Predictor Variables	*N*	*Unadjusted mean*	*Eta(Þ)*	*Adjusted mean*	*Beta(ß)*
Age at Marriage					
Below 20	2048	3.03	.605	2.68	.403***
20-29	774	2.06		2.14	
30 +	1017	.04		.69	
Death of a Son					
Not dead	3452	1.74	.440	1.84	.293***
Dead	387	4.77		3.87	
Type of Residence					
Urban	721	1.55	.115	1.88	.037***
Rural	3118	2.16		2.08	
Level of Education					
No Education	1161	3.21	.420	2.59	.187***
Primary	686	2.39		2.10	
Sec.& Above Education	1992	1.24		1.70	
Work Status of Mother					
Not working	2711	1.98	.045	2.02	.014
Working	1128	2.19		2.09	
Caste/tribe					
ST	364	1.98	.009	1.99	.008
Others	3474	2.05		2.05	
Contraceptive Use					
Not using	2307	1.47	.336	1.82	.133***
Using	1532	2.90		2.38	
Religion					
Hindu	2682	1.79	.187	1.94	.076***
Christian	200	2.33		2.14	
Others	957	2.68		2.31	
Media Exposure					
No Exposure	778	2.98	.227	2.10	.015
Exposure	3061	1.80		2.03	
Wealth Index					
Poor	1732	2.57	.240	2.01	.021
Middle	907	1.86		2.02	
Rich	1200	1.43		2.11	

R = .716, R^2 =.513, Grand mean = 2.18, Number of cases = 3839, ** 5 % level of significance, ***1 % level of significance

Meghalaya

As revealed by the MCA results some of the predictors are found to have relatively stronger influence on fertility while others have no significant effects on the response variables. The relationship between some of the significant predictors, viz., work status of mothers and contraceptive use and fertility is not in the expected direction. The beta (ß) coefficients indicates that the most important predictors explaining the variability in the response variable in order of prominence are: age at marriage, son death, level of education, work status of mother, contraceptive use, religion and wealth index. The grand mean children ever born for all the 2124 women aged 15-49 was computed as 2.43.

The mean children ever born among the sample women varied significantly according to age at marriage of the mothers (see Table 5.13). The adjusted mean decreases as the age of marriage increases. The adjusted mean for women who married at an age below 20 years may have 0.62 and 2.87 children more than a woman who married at an age between 20-29 and 30-49 years, respectively. The adjusted mean for women who experience death of a son has higher fertility than women who undergone with death of a son. It is evident that a woman who experience death of a son has 2.08 children more than a woman did not experience death of a son. The table 5.13 also shows that after controlling other variables, the mean value for women who are under no education would experience about 0.33 and 0.79 children more than women who attained respectively primary and secondary and above education.

Considering religion the adjusted mean for all the three religious groups of women have shown that women belonging to Christian and other religious groups have about 0.49 and 0.21 children more than women belonging to the Hindu. Wealth index is another significant variable that is shown in the table 5.13. However, it is surprising that the MCA analysis shows that there is a positive relationship between wealth index and fertility. As per the result, women belonging to middle and rich households would have about 0.42 and 0.11 children, respectively more than women belonging to the poor households. Therefore, this might be due to data issue or perhaps the women who are richer

have higher potentiality to manage larger family and thus higher fertility. Similarly, as regards to work status of mother, it is surprising that the adjusted mean for working women have higher fertility than non-working women. The table reveals that working women may experience 1.05 children more than the non-working women. Perhaps this might be due to working women are financially sound than their non-working counterparts that fertility is higher for them.

Also, it is surprising that there is a positive relationship between contraceptive use and fertility in the state. The adjusted mean reveals that non-contraceptive users have lower fertility than contraceptive users, which indicates that women using contraceptives have 0.58 children more than women who did not use contraceptives. This might be due to women who have larger number of children have the desire to adopt contraceptive more than non-contraceptive users in order to curtail unwanted pregnancy.

Table 5.23 Results of Multiple Classification Analysis (MCA) for mean Children Ever Born (CEB) by Selected Predictors, Meghalaya, NFHS-3, 2005-06

Predictor Variable	*N*	*Unadjusted mean*	*Eta(Þ)*	*Adjusted mean*	*Beta(ß)*
Age at Marriage					
Below 20	859	3.71	.641	3.38	.505***
20-29	510	2.87		2.76	
30 +	756	.07		.51	
Death of a Son					
Not dead	1955	1.94	.365	2.05	.222***
Dead	169	5.37		4.13	
Type of Residence					
Urban	584	1.56	.157	2.18	.007
Rural	1540	2.46		2.22	
Level of Education					
No Education	628	3.47	.373	2.68	.137***
Primary	393	2.65		2.35	
Sec.& Above Education	1103	1.34		1.89	
Work Status of Mother					

Not working	1250	1.78	.205	2.04	.081***
Working	874	2.83		2.46	
Caste/tribe					
ST	1762	2.29	.067	2.23	.015
Others	362	1.83		2.13	
Contraceptive Use					
Not using	1823	2.02	.188	2.13	.079***
Using	301	3.39		2.71	
Religion					
Hindu	306	1.62	.096	1.84	.074***
Christian	1449	2.29		2.33	
Others	370	2.41		2.05	
Media Exposure					
No Exposure	468	3.27	.221	2.35	.029
Exposure	1656	1.91		2.17	
Wealth Index					
Poor	617	2.91	.268	2.06	.062***
Middle	498	2.80		2.48	
Rich	1009	1.50		2.17	

R = .710, R^2 =.504, Grand mean = 2.43, Number of cases = 2124, ** 5 % level of significance, ***1 % level of significance

Manipur

From table 5.14, it is noticed that some of the predictors have relatively stronger influence on fertility while others have weaker effects, and the rest have no significant effects on the response variable. The relationship between some of the significant predictors (work status of mothers and contraceptive use) and fertility is not in the expected direction. The beta (ß) coefficients indicate that the most important predictors explaining the variability in the response variable in order of prominence are: age at marriage, son death, level of education, contraceptive use, work status of mothers, religion and caste. The grand mean of children ever born for all the 4512 women aged 15-49 was computed as 2.17. The mean number of children ever born among the sample women diverse significantly according to age at marriage of the mothers. The adjusted mean number of children ever born declines as the age of marriage increases. The adjusted mean for woman who married at the age below 20 on an average may have 2.66 and 1.92 children more

than a woman who married at the age between 20-29 and 30-49, respectively. From the table it is found that death of a son in also significant predictor variable on fertility. The adjusted mean for the women who experience death of a son would have 1.86 children more than a woman did not experience death of a son.

Level of education in the table reveals that after adjustment, the mean value for illiterate women would experiences about 0.52 and 0.81 children more than women who completed primary and secondary and above education, respectively. Considering work status of mothers it is observed that the adjusted mean for working women would have on an average about 0.29 children more than the not working women. This might be because of non-working women have no source of income for looking after their children in terms of education, job etc. and therefore have less number of children.

Religion is the other significant variable in the MCA analysis. The table shows that after adjustment, the mean value for women belonging to other religious group experiences higher fertility than the Hindu and Christian. In other words, women belonging to other religious group would experience about 0.17 and 0.2 children more than women belonging to Christian and Hindu, respectively. Caste is also significant in the MCA analysis. It is observed that the adjusted mean for both of the groups (ST and others) has shown a negative deviation from the grand mean (-0.06 and -0.39). Though their adjusted mean value is below the grand mean, ST women experiences higher fertility than 'others'. Thus, it is obvious that ST women experiences about 0.33 children more than women belonging to other castes.

However, it is surprising that a positive relationship between contraceptive use and fertility have been observed where contraceptive use increases fertility instantaneously increase. Apparently, the adjusted mean for women using contraceptives have 0.37 children more than women who did not use contraceptives. This might be due to sample size issue or women who have large number of children accepted more contraceptives in order to control their family size.

Table 5.24 Results of Multiple Classification Analysis (MCA) for mean Children Ever Born(CEB) by Selected Predictors, Manipur, NFHS-3, 2005-06

Predictor Variable	*N*	*Unadjusted mean*	*Eta(Þ)*	*Adjusted mean*	*Beta(ß)*
Age at Marriage					
Below 20	1355	3.53	.690	3.14	.544***
20-29	1362	2.47		2.40	
30 +	1795	.13		.48	
Death of a Son					
Not dead	4239	1.66	.372	1.75	.210***
Dead	273	4.97		3.61	
Type of Residence					
Urban	1499	1.55	.102	1.87	.004
Rural	3013	2.01		1.85	
Level of Education					
No Education	984	3.33	.406	2.46	.156***
Primary	534	2.43		1.94	
Sec.& Above Education	2993	1.27		1.65	
Work Status of Mother					
Not working	1631	1.49	.131	1.67	.066***
Working	2881	2.07		1.96	
Caste/tribe					
ST	1064	2.30	.116	2.11	.066**
Others	3448	1.72		1.78	
Contraceptive Use					
Not using	3195	1.39	.341	1.75	.078***
Using	1317	2.99		2.12	
Religion					
Hindu	2476	1.54	.167	1.81	.036***
Christian	1114	2.26		1.84	
Others	922	2.24		2.01	
Media Exposure					
No Exposure	55	2.76	.047	2.00	.007
Exposure	4457	1.85		1.86	
Wealth Index					
Poor	737	2.58	.192	1.81	.014
Middle	1469	2.06		1.89	
Rich	2306	1.50		1.86	

R = .749, R^2 =.561, Grand mean = 2.17, Number of cases = 4512, ** 5 % level of significance, ***1 % level of significance

Mizoram

The relationships between some of the significant predictors (work status of mother and contraceptive use) and fertility is not in the expected direction is observed in table 5.15. The beta (ß) coefficients indicates that the most important predictors explaining the variability in the response variable in order of prominence are: age at marriage, contraceptive use, son death, level of education, wealth index, religion, and work status of mothers. The grand mean of children ever born for all the 1791 women aged 15-49 was computed as 2.22.

As regards age at marriage, the adjusted mean for women who married at an age below 20 years have shown higher mean children ever born than the other two groups. After controlling other variables, a woman who married at the age below 20 may have 0.22 and 1.93 children more than a woman who married at the age between 20-29 and 30-49, respectively. The adjusted mean for women who experience death of a son would have 1.73 children more than a woman did not experience death of a son. Level of education is the other significant variable in the MCA analysis. The table reveals that with the increase of education the mean number of children ever born decrease simultaneously. As per the result the adjusted mean for illiterate women have experiences respectively about 0.91 and 0.09 children more than women who have completed primary and secondary and above educational. In respect of wealth index the table shows that the adjusted mean for women belonging to the poor households' have higher fertility than the other two groups. Hence, women belong to middle and rich households experience respectively about 0.42 and 0.11 children more than women belonging to the poor households.

Religion is the other significant variable in the MCA analysis (Table 5.15). After controlling other predictor variables the mean value for women belonging to Christian experience higher fertility than the Hindu and other religious group. However compared to women belonging to Hindu, Christian experiences 0.71 more number of children but women belonging to 'other' experiences 0.41 less number of children than the Hindus. The MCA analysis also shows that work status of mother has a significant relationship with fertility. The table 5.15

indicates that the adjusted mean for working women have about 0.2 children more than the non-working women. This might be due to working women have enough source of income so as to look after larger number of children and thus have higher CEB.

A positive relationship between contraceptive use and fertility has been observed in the table where contraceptive users have higher fertility than the non-user counterparts. The adjusted mean for women using contraceptives have 1.08 children more than women who did not use contraceptives. This is surprising but it may be due to the awareness of family planning programme initiated by the government that women who have large number of children have accepted contraceptives in large scale.

Table 5.25 Results of Multiple Classification Analysis (MCA) for mean Children Ever Born (CEB) by Selected Predictors, Mizoram, NFHS-3,2005-06

Predictor Variables	*N*	*Unadjusted mean*	*Eta(Þ)*	*Adjusted mean*	*Beta(ß)*
Age at Marriage					
Below 20	617	3.09	.667	2.69	.449***
20-29	542	2.68		2.47	
30 +	633	.19		.76	
Death of a Son					
Not dead	1685	1.76	.367	1.84	.209***
Dead	106	4.80		3.57	
Type of Residence					
Urban	1010	1.71	.136	1.91	.021
Rural	781	2.24		1.99	
Level of Education					
No Education	100	3.12	.319	2.69	.141***
Primary	365	2.96		2.31	
Sec.& Above Education	1326	1.57		1.78	
Work Status of Mother					
Not working	978	1.71	.132	1.85	.052***
Working	813	2.22		2.05	
Caste/tribe					

ST	1749	1.95	.028	1.95	.029
Others	42	1.59		1.58	
Contraceptive Use					
Not using	1125	1.12	.545	1.54	.268***
Using	666	3.33		2.62	
Religion					
Hindu	33	1.50	.036	1.67	.067***
Christian	1699	1.94		1.97	
Others	59	2.14		1.26	
Media Exposure					
No Exposure	65	2.66	.071	1.75	.019
Exposure	1726	1.91		1.95	
Wealth Index					
Poor	133	2.76	.212	2.34	.086***
Middle	289	2.65		2.20	
Rich	1369	1.71		1.85	

R = .769, R^2 =.592, Grand mean = 2.22, Number of cases = 1791, ** 5 % level of significance, ***1 % level of significance

Nagaland

From table 5.16 it is observed that some of the predictors are found to have comparatively stronger influence on fertility while some others have weaker effects on the response variable. The relationship between some of the significant predictors (work status of mothers, contraceptive use and wealth index) and fertility is not in the expected direction. The beta (ß) coefficients indicates that the most important predictors explaining the variability in the response variable in order of prominence are: age at marriage,death of a son,level of education, contraceptive use, wealth index, media exposure,work status of mothers, religion, caste and place of residence. In the state, the grand mean of CEB for all the 3896 women aged 15-49 was computed as 2.53. The mean CEB among the sample women varied significantly according to age at marriage of the mothers. The adjusted values for women who married at an age below 20 years have shown higher than other age groups. Thus, it can be inferred that a woman who married at the age below 20, on the average, may have 0.79 and 3.13 children more than a woman who married at the age between 20-29 and 30-49, respectively.

Regarding death of a son after adjustment for other factors, the women who experience death of a son showed higher mean value than the other group. It is, thus, obvious that a woman who experience death of son has 2.38 children more than a woman who did not experience death of a son. The same table also reveals that the adjusted mean value of women under no education has shown higher value than the other groups, indicating that no education women have the highest fertility among the groups. Thus, it is obvious that women who have primary level of education and women who completed secondary and above education have experience respectively about 0.94 and 0.43 children more than women who are under no education. Wealth index is another significant variable in the MCA analysis (Table 5.16). The table displays that the adjusted mean value of the poor have shown higher than other groups. This indicates that poor women have higher fertility than others and, therefore, it can be inferred that women belong to middle and rich households experience respectively about 0.21 and 0.32 children more than women belonging to the poor households.

The table also shows that the adjusted mean value of the women not exposed to media has shown higher value than the other group, indicating that women belonging to not exposed to mass media have higher fertility than the other group. In other words, not exposed to mass media experience about 0.33 children more than women who exposed to mass media. With regard to religion, the adjusted mean value for the women belonging to Christian have shown higher than other groups, indicating that Christian women have the highest fertility under the variable of religion. Thus, it can be inferred that women belong to Christian experience about 0.43 and 0.45 children more than women belonging to Hindu and 'other', respectively. Further, it is also observed from the table that the adjusted mean for women belong to ST is higher than the other group and, therefore, it may be inferred that the ST women may experience about 0.4 children more than women belonging to other castes. The MCA analysis indicates that there is an inverse relationship between type of residence and fertility in the study state. The adjusted mean value for the women residing in rural areas has shown higher value than women living in urban areas. It can, thus, be inferred that a woman who lives in rural areas on the average, may have 0.16 children more than a woman who resides in urban areas.

However, it is surprising that in the study the adjusted mean for working women have higher mean value than their non-working counterparts. Here on average working women have about 0.21 children more than non-working women. This might be due to financial stability for working women that they have larger number of children over non-working women. Also, it is surprising that contraceptive use have a positive relationship with fertility. In the state contraceptive users have higher fertility than their non-user counterparts. It is observed from the table that women using contraceptives have 0.56 children more than women who did not use contraceptives. Perhaps contraceptive is largely used by women who already have their desire family size in the state.

Table 5.26 Results of Multiple Classification Analysis (MCA) for mean Children Ever Born (CEB) by Selected Predictors, Nagaland, NFHS-3, 2005-06

Predictor Variables	*N*	*Unadjusted mean*	*Eta(Þ)*	*Adjusted mean*	*Beta(ß)*
Age at Marriage					
Below 20	1477	3.90	.672	3.61	.557***
20-29	976	2.93		2.82	
30 +	1443	.11		.48	
Death of a Son					
Not dead	3585	1.94	.424	2.06	.258***
Dead	311	5.86		4.44	
Type of Residence					
Urban	1147	1.77	.126	2.14	.030**
Rural	2749	2.46		2.30	
Level of Education					
No Education	846	3.60	.320	2.91	.152***
Primary	720	2.64		2.40	
Sec.& Above Education	2330	1.65		1.97	
Work Status of Mother					
Not working	2111	1.88	.163	2.16	.041***
Working	1785	2.70		2.37	
Caste/tribe					
ST	3343	2.28	.024	2.31	.055**
Others	553	2.11		1.91	

Contraceptive Use					
Not using	3184	1.95	.256	2.15	.086***
Using	712	3.61		2.71	
Religion					
Hindu	391	1.89	.056	1.89	.061**
Christian	3328	2.28		2.32	
Others	178	2.61		1.87	
Media Exposure					
No Exposure	652	3.30	.187	2.53	.049***
Exposure	3244	2.04		2.20	
Wealth Index					
Poor	986	2.92	.177	2.05	.051***
Middle	1114	2.34		2.25	
Rich	1796	1.83		2.37	

R = .753, R^2 =.567, Grand mean = 2.53, Number of cases = 3896, ** 5 % level of significance, ***1 % level of significance

Sikkim

Some of the predictors have comparatively strong influence on fertility while others have no significant effects on the response variable has been observed in the table 5.17. The relationship between contraceptive use and fertility is not in the expected direction. The beta (ß) coefficients specify that the most important predictors explaining the variability in the response variable in order of prominence are: age at marriage, level of education, dead of a son, contraceptive use, wealth index, media exposure and caste. The grand mean of CEB for all the 2127 women aged 15-49 was computed as 1.93.

It is apparent from the table that the mean CEB among the sample women varied significantly according to age at marriage of the mothers. The adjusted values for women who married at an age below 20 years have shown higher other groups. Thus, a woman who married at an age below 20 years on the average have 0.39 and 1.72 children more than a woman who married at the age between 20-29 and 30-49, respectively. The table also reveals that the adjusted mean value of the illiterate women have shown higher than other in all the groups, demonstrating that this group of women (no education) experience about 0.88 and 1.07 children more than women who completed primary and secondary and above education,

respectively. Considering women who experience death of a son, the adjusted value for the women who undergone death of a son have shown higher than the other group. Thus, it is obvious that a woman who experience death of a son has 2.29 children more than a woman did not experience death of a son.

Wealth index is another significant variable in the MCA analysis (Table 5.17). The table reveals that after controlling other variables, the mean value of women belonging to poor households have shown higher than other groups, indicating that fertility is highest among the poor. Thus, it may be inferred here that women belonging to middle and rich households have experience respectively about 0.29 and 0.4 children more than women belonging to the poor households.
In the case of Media exposure the table reveals that the adjusted mean value for women who are not exposed to media are higher than the other group. Therefore, not exposed to mass media on the average experiences about 0.25 children more than women who exposed to mass media.

The MCA table also shows that there is a significant relationship between caste and fertility. It is observed that the adjusted mean 'others' has shown higher than the ST group. Thus it is obvious that women belonging to other than scheduled tribe experience about 0.16 children more than women belonging to Scheduled tribe. It is surprising to note which contradict with other empirical findings with regard to contraceptive use in the state where there is a positive relationship between contraceptive use and fertility. As per the table, woman using contraceptives have 0.65 children more than women who did not use contraceptives. This may be due to the large scale acceptance of family planning methods by women who already have the desire family size.

Table 5.27 Results of Multiple Classification Analysis (MCA) for mean Children Ever Born (CEB) by Selected Predictors, Sikkim, NFHS-3, 2005-06

Predictor Variables	*N*	*Unadjusted mean*	*Eta(Þ)*	*Adjusted mean*	*Beta(ß)*
Age at Marriage					
Below 20	917	2.70	.636	2.33	.410***
20-29	520	2.05		1.94	
30 +	690	.03		.61	
Death of a Son					
Not dead	2034	1.53	.369	1.58	.256***
Dead	93	4.84		3.87	
Type of Residence					
Urban	453	1.23	.126	1.64	.010
Rural	1674	1.80		1.69	
Level of Education					
No Education	567	3.04	.471	2.42	.248***
Primary	447	1.67		1.54	
Sec.& Above Education	1113	.98		1.35	
Work Status of Mother					
Not working	1466	1.60	.066	1.66	.015
Working	661	1.86		1.72	
Caste/tribe					
ST	730	1.50	.068	1.57	.041**
Others	1397	1.77		1.73	
Contraceptive Use					
Not using	1312	1.07	.419	1.43	.174***
Using	815	2.66		2.08	
Religion					
Hindu	1255	1.68	.055	1.68	.004
Christian	196	1.97		1.65	
Others	677	1.59		1.68	
Media Exposure					
No Exposure	273	2.92	.259	1.90	.047***
Exposure	1854	1.49		1.65	
Wealth Index					
Poor	199	2.71	.247	2.02	.064***
Middle	445	2.17		1.73	
Rich	1483	1.39		1.62	

R = .759, R^2 =.575, Grand mean = 1.93, Number of cases = 2127, ** 5 % level of significance, ***1 % level of significance

Tripura

It is observed from the table 5.18 that the relationship between the variable i.e., contraceptive use and fertility is not in the expected direction. The beta (ß) coefficients indicate that the most important predictors explaining the variability in the dependent variable in order of prominence are: age at marriage, dead of a son, level of education, contraceptive use and media exposure. The grand mean of children ever born for all the 1906 women aged 15-49 was computed as 2.05. The mean children ever born among the sample women varied significantly according to age at marriage of the mothers. The adjusted value for only women who married at an age below 20 has higher than the grand mean. Thus, a woman who married at an age below 20 on the average may have 0.49 and 1.79 children more than a woman who married at the age between 20-29 and 30-49, respectively.

The adjusted mean for the women who undergone death of a son have higher fertility than women who had no son death. Thus, it is obvious that a woman who experience death of a son has 2 children more than a woman did not experience dead of a son. Regarding educational level of mother, after adjustment, the mean value for illiterate women has shown higher than others, indicating that these illiterate women experience respectively about 0.66 and 1.2 children more than women who completed primary and secondary and above education. Media exposure is another significant variable in the MCA analysis. The table reveals that the adjusted mean for women who did not expose to media have shown higher than women who exposed to media which indicates that not exposed women have on the average, experiences about 0.33 children more than women who exposed to mass media.

However, in the case of contraceptive use it is surprising to note that there is a positive relationship between contraceptive use and fertility where contraceptive users have higher fertility than their non-user counterparts. As the result, it is apparent that women using contraceptives have 0.38 children more than women who did not use contraceptives. This might be due to larger acceptance of family planning method by the women who have large number of children in the state.

Table 5.28 Results of Multiple Classification Analysis (MCA) for mean Children Ever Born (CEB) by Selected Predictors, Tripura, NFHS-3, 2005-06

Predictor Variable	*N*	*Unadjusted mean*	*Eta(Þ)*	*Adjusted mean*	*Beta(ß)*
Age at Marriage					
Below 20	1077	2.78	.584	2.45	.382***
20-29	358	1.81		1.96	
30 +	472	.04		.66	
Death of a Son					
Not dead	1722	1.63	.444	1.72	.303***
Dead	184	4.56		3.72	
Type of Residence					
Urban	336	1.44	.114	1.78	.033
Rural	1570	2.02		1.95	
Level of Education					
No Education	427	3.38	.476	2.71	.248***
Primary	484	2.29		2.05	
Sec.& Above Education	995	1.11		1.51	
Work Status of Mother					
Not working	1302	1.81	.081	1.90	.014
Working	604	2.15		1.96	
Caste/tribe					
ST	296	2.18	.058	1.82	.020
Others	1610	1.87		1.93	
Contraceptive Use					
Not using	999	1.36	.300	1.74	.098***
Using	907	2.53		2.12	
Religion					
Hindu	1662	1.82	.128	1.89	.037
Christian	11	1.71		2.12	
Others	233	2.59		2.11	
Media Exposure					
No Exposure	320	2.77	.197	2.19	.063***
Exposure	1586	1.74		1.86	
Wealth Index					
Poor	611	2.43	.222	1.83	.029
Middle	832	1.89		1.95	
Rich	462	1.27		1.96	

R = .720, R^2 =.518, Grand mean = 2.05, Number of cases = 1906, ** 5 % level of significance, ***1 % level of significance

5.5 Summary

Based on an enquiry made in cross tabulation among the North-eastern States of India, it has been found that a strong association with CEB have been witnessed in all the states with the selected variables such as age at marriage, death of a son, type of residence, educational level of women, use of contraception, media exposure and wealth index. However, with the exception of the state of Sikkim all other states showed highly significant between work status of mother and fertility. Further with the exception of Manipur, all other states experienced a strong association between the dependent variable and caste. Under religion, Arunachal Pradesh, Meghalaya, Tripura, Sikkim, Mizoram and Nagaland have witnessed a strong association between the dependent and independent variable.

Furthermore, from the comparative examination of fertility models, it has been found that different set of factors (demographic, social and economic variables) have affected the fertility (CEB) performance of women in the North-eastern States. The most important predictors explaining the fertility behaviour of women in order of prominence are: age at marriage, death of a son, level of education, contraceptive use, religion, work status of mother, wealth index, media exposure and caste/tribe. Other socio-economic factors such as work status of mothers, wealth index and media exposure have moderate influence in fertility behaviour of women. It is surprising that type of residence and caste/tribe have little influence on fertility behaviour of women in North East Region. Another interesting finding is that wealth index has a significant impact on fertility in the states of Sikkim, Tripura, Meghalaya, and Mizoram.

In a nutshell, it is evident from the table 5.19 that the demographic and social factors become the most important predictors of fertility decline in the region. Apart from social factor, demographic factors have the highest influence in fertility behaviour of women in North-eastern states that in these states of the region where social and demographic variables have made better progress over the years, the decline of fertility would be faster.

TABLE 5.29 SUMMARY FOR CHILDREN EVER BORN, NORTH EAST INDIA, NFHS-3, 2005-06 (IN RANK)

Independent Variable	Arunachal Pradesh	Assam	Meghalaya	Manipur	Nagaland	Tripura	Sikkim	Mizoram
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Demographic								
Age at Marriage	1***	1***	1***	1***	1***	1***	1***	1***
Death of a Son	2***	2***	2***	2***	2***	2***	3***	3***
Contraceptive Use	4***	4***	5***	4***	4***	4***	4***	2***
Social								
Type of Residence	6**	6***	-	-	10**	-	-	-
Level of Education	3***	3***	3***	3***	3***	3***	2***	4***
Caste/tribe	-	-	-	7**	9**	-	7**	-
Religion	5**	5***	6***	6***	8**	-	-	6***
Media Exposure	7**	-	-	-	6***	5***	6***	-
Economic								
Work Status of Mothers	-	-	4***	5***	7***	-	-	7***
Wealth Index	-	-	7***	-	5***	-	5***	5***

** 5 % level of significance, ***1 % level of significance

Chapter –VI

CONCLUSION

CHAPTER –VI: CONCLUSION

Although India has implemented various population programmes in the last fifty years, surprisingly it has no national population policy until as recently as the year 2000. In spite of the emphasis on family planning programmes (including family welfare and reproductive and child health programmes) India is still nowhere near a satisfactory solution of its demographic challenges. The strategy to control population growth only through family planning programmes is inadequate; socio-economic development is crucial to the success of India's goals in family planning. The repeated failure of the family planning targets compels us to examine various dimensions of population growth so that future strategies to check rapid growth of population can be better designed to meet the desired outcomes.

The present study attempts to examine the levels and trends of fertility among the Northeast states. It enquires into fertility behaviours and its determinants. It also focuses on high variations of fertility rates within the Northeast. While some states have very high fertility rates, others reach replacement level. What are the reasons for such differences in the fertility levels among the states of North-East India? The findings of the dissertation confirm that fertility varies among groups differentiated by their socio-economic and demographic characteristics.

The finding reveals that fertility declines in all the states with varying speed. The level achieved by Sikkim and Tripura are not reached by the rest. Crude Birth Rate declines in all the states but the speed varies from one state to another. Among the Northeast states, Arunachal Pradesh experiences the most significant decline in CBR during 1992-93 and 1998-99 which is followed by Assam and Tripura. Although from 1998-99 to 2005-06, the CBR shows a sharp declines in Sikkim followed by Meghalaya and Nagaland, Arunachal Pradesh and Assam show a slight increase during the same period. One significant finding in connection with decline in CBR is that in Tripura during 1998-99 and 2005-06, the levels of CBR remain the same (22.94). The reason why the two states (Sikkim and Tripura) roughly sustain their fertility at replacement level requires an explanation. Although both of the states are not economically much better off

than the rest, both of them exhibit significant social and economic development and growth in the recent past – especially in terms of Per Capita Net State Domestic Product, IMR, literacy rates, etc. According to Human Development Reports (2001) in Sikkim, the per capita net state domestic product has increased from Rs. 1571 in 1980-81 to Rs. 9472 in 1995-96 and IMR dropped from 60 in 1991 to 51 in 1997. Literacy rates went up from 7 per cent in 1951 to almost 70 per cent in 2001. Similarly, Tripura witnessed substantial progress in literacy rate and access to schooling in the 1990s. In 2001, Tripura witnessed a literacy rate of 73 per cent as against 65 per cent in the region and 63 per cent in India. Of all the North-eastern states, literacy rate in Tripura ranks second only to Mizoram during 1991-2001. Thus, the phenomena of fertility decline here is broadly a reflection of socio-economic development in these two states.

TFR declines over time in all the states but with varying speed. During 1992-93 and 1998-99, TFR falls most significantly in Arunachal Pradesh (40 per cent), followed by Assam and Tripura. During 1998-99 and 2005-06, TFR declines most in Sikkim, Meghalaya and Manipur; however, Tripura, Arunachal Pradesh and Assam show an increasing trend during the same period.

Fertility Rate among different age-groups of women experience different pace of decline over time across the region. While some states show steady decline in the ASFR from NFHS-1 to NFHS-3, there is significant increase from NFHS-2 to NFHS-3 in Mizoram, Tripura, Arunachal Pradesh, Meghalaya and Assam. Fertility has noticeably declined among the younger and older age-groups in all the states. Sudden ASPF declines have been registered in Manipur and Sikkim. Women in the age group of above 40 years decline by more than 90 per cent in Tripura while women of the same age group in Arunachal Pradesh decline by only thirty-three per cent. Next to Tripura, 71 per cent of ASFR has declined in Sikkim followed by Assam, Manipur, and Mizoram, whereas ASFRs among women of aged above 40 years have increased during the study periods in the rest of the states.

Fertility at young age of mother (15-19) shows significant decline in Arunachal Pradesh (43 per cent) followed by Meghalaya (32 per cent), Assam (23 per cent), Sikkim (9 per cent) and Nagaland (-5 per cent). Results from NFHS-1, NFHS-2

and NFHS-3 indicates that age-specific fertility rates decline faster in rural areas than their urban counterparts in almost all of the states. For the states of Meghalaya and Tripura, the ASFR for the 15-39 year age-group of the sample women shows a rapid decline in rural areas than any other rural areas across the region. But in urban areas, the ASFR for the age-group of 15-39 year shows more rapid decline for Tripura and Mizoram.

The present study further investigates into the factors associated with fertility and its determinants among the groups in all the states. Multiple classification analysis shows the most significant demographic factors that influence fertility behaviour among all the states in North East Region. Further these variables are followed by social and economic variables.

Among demographic variables, age at marriage and death of a son emerge as the most significant explanatory variables influencing fertility behaviour in all the states; they rank first and second among all the selected demographic variables. Age at marriage is inversely related with fertility while death of a son has a positive relation with it. Although the proportion of early marriage (below 20 years) has been the highest in Tripura, Assam and Sikkim, their fertility levels have been the lowest among all the states in North East Region. This indicates that the variables which are significant in one state might not necessarily be significant in other states.

Under social variables, the magnitude to influence the fertility behaviour of different social variables is not identical for different states. Among the social variables, level of education is found to be an important predictor variable for explaining variation in fertility levels in all the states. Level of education has potential to influence fertility behaviour – both directly and indirectly with considerable magnitude. In Sikkim, level of education has emerged as the most potent factor in determining fertility behavior. This might be so because in Sikkim, female literacy is widespread and literacy rates went up from 7 per cent in 1951 to almost 70 per cent in 2001; this substantially influences the fertility behaviour of women in the state. Apart from Sikkim, level of education also plays significant role in fertility behaviour in other states such as Tripura, Manipur,

Nagaland, Meghalaya, Assam and Arunachal Pradesh. Therefore, we can infer that age at marriage and level of education enlighten one's mind and widens perspectives; they produced an outcome similar to the use of contraceptives.

Considering the economic variables, work status of mothers has emerged as the most powerful indicator in determining reduction in fertility levels, especially in Meghalaya. However, wealth index play significant role in Nagaland, Mizoram and Sikkim.

In this work we find that the socio-economic status of any state plays a dominant role in shaping preferences regarding family size for the concerned population. Thus, we can conclude that the level of socio-economic development of any region governs the relationship of the various explanatory variables with fertility behaviour.

Now it is evident that the social, economic and demographic aspects of a society are the actual determinants of its fertility behavior. Hence it can be said that mere family planning programmes have not been sufficient for stimulating any significant decline in fertility. There will be significant decline in fertility levels in the region only after the socio-economic factors permit smaller family norms (Mehta 1993).

The present study has validated claims made by H. Goswami, who asserted that social variables played more significant role in explaining fertility decline than demographic and economic factors. As per the analysis, demographic factors have the highest influence in determining fertility behaviour in the North-eastern States of India. It follows that the decline of fertility would be faster in states of the region where demographic variables have made better progress over the years.

Policy Implications

Given the variations in fertility levels within the Northeast, this study suggests that there are large pockets of the population where people have little motivated towards small family and/or have poor access to quality family planning services

and modern contraceptives. This demographic problem cannot be addressed in isolation without paying equal attention to general improvement in social and economic conditions along with increasing and affordable access to good quality reproductive health services for all. In order to better serve less-advantaged women, it is important to determine the categories of women who still need government-subsidized family planning services and women who can afford to purchase contraceptives from commercial sources. Studies undertaken by the Agro-Economic Research Centre for North-East India stressed that the need for improved coordination and deeper understanding among various government departments associated with different types of development activities: this is an important pre-requisite for the success of development programmes in tribal areas (Saikia and Borah 1990). Vast differences in the physical geography of North-eastern states and the variations in the socio-cultural structure from one society to another should be taken into consideration in all development programmes. The existing top-down approach to SC/ST welfare policies needs to move towards a bottom-up decentralized approach where communities at the grassroots get opportunities to actively participate in formulating and implementing policies. Involving local populations and organizations in the formulation and implementation of policies will help not only in developing more effective programmes, but also in getting wide acceptance by the target community.

To conclude, population policies and programmes for population control should include socio-economic factors as important ingredients. To be effective, the programmes need to be tailored to the specificities to a given area. The formulation of the programmes should be based on extensive fieldwork. Empirical studies of specific regions can reveal grassroots level relationship between fertility and its determinants. On the basis of such studies, important explanatory variables can be taken into consideration. Once enough information gets generated, appropriate strategies for controlling fertility may be formulated. In the process, weightage should be rationalized for the different attributes for population control in specific regions. Meanwhile, the outcome of these programmes should be assessed periodically since the impacts of various explanatory variables are themselves subject to change.

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APPENDIX

Population Size and Growth, Northeast India, 1901-2001

Census Year	Population	Growth over Decade	
		Number	Percent
1901	4271978		
1911	5058699	786721	18.4
1921	6005043	946344	18.7
1931	7172512	1167469	19.4
1941	8618116	1445604	20.2
1951	10260371	1642255	19.1
1961	14500572	4240201	41.3
1971	19582296	5081724	35.0
1981*	24751604	5169308	26.4
1991	31547314	6795710	27.5
2001	38444026	6896712	21.9

POPULATION of North-East India (1951- 2001) (in thousand)

States	1951	1961	1971	1981	1991	2001
Arunachal Pradesh		337	468	632	865	1098
Assam	8029	10837	14625	18041	22414	26656
Manipur	578	780	1073	1421	1837	2294
Meghalaya	606	769	1012	1336	1775	2319
Mizoram	196	266	332	494	690	889
Nagaland	213	369	516	775	1210	1990
Tripura	639	1142	1556	2053	2757	3199
Sikkim	138	162	210	316	406	541
NE India	10399	14662	19792	25068	31954	38986
All India	361088	439235	548160	683329	846421	1028737

Note: (1) Census used for the first time in 1961.

(2) The 1981 Census could not be held in Assam. Total population for 1981 has been worked out by Interpolation.

(3) The 1991 Census could not be held in Jammu & Kashmir. Total population for 1991 has been worked out by Interpolation.

(4) India and Manipur figures include estimated population for those of the three sub-divisions viz. Mao Maram, Paomata and Purul

Senapati district of Manipur as census results of 2001 in these three sub-divisions were cancelled due to technical and administrative reasons

Source : Office of the Registrar General of India, Ministry of Home Affairs.

Table Total Fertility Rate in North East India, 1992-2006

State	Sector	NFHS-1(1992-93)	NFHS-2(1998-99)	NFHS-3(2005-06)
Arunachal Pradesh	T	4.25	2.52	3.03
	R	4.38	2.68	3.21
	U	nc	1.77	2.51
Assam	T	3.53	2.31	2.42
	R	3.68	2.39	2.65
	U	2.53	1.5	1.43
Manipur	T	2.76	3.04	2.83
	R	3.03	3.41	3.07
	U	nc	2.36	2.35
Meghalaya	T	3.73	4.57	3.8
	R	3.8	5.16	4.38
	U	nc	2.75	2.28
Mizoram	T	2.3	2.89	2.86
	R	2.3	3.47	3.33
	U	nc	2.37	2.5
Nagaland	T	3.26	3.77	3.74
	R	3.6	4.06	4.15
	U	nc	2.66	2.68
Tripura	T	2.67	1.87	2.22
	R	2.91	1.99	2.34
	U	nc	1.36	1.66
Sikkim	T	na	2.75	2.02
	R	na	2.87	2.22
	U	na	nc	1.29
India	T	3.39	2.85	2.68
	R	3.67	3.07	2.98
	U	2.7	2.27	2.06

Note: ( ) Based on 125-249 unweighted woman-years of exposure.

na = not applicable

nc = not calculated because there are too few women.

T = Total, R = Rural, U = Urban

Source: NFHS-I (1992-93);NFHS-II (1998-99);NFHS-III (2005-06), IIPS, Mumbai

Growth Rates and Proportion of Scheduled Caste and Scheduled Tribe Population in North East India, 1971-2001

	Scheduled Castes			*Scheduled Tribes*		
		Proportion of S.C. Population out of Total Population (%)			Poportion of S.T. Population out of Total Population (%)	
State	Annual Growth Rate, 1971-2001 (%)	1971	2001	Annual Growth Rate, 1971-2001 (%)	1971	2001
Arunachal Pradesh	10.29	0.07	0.56	2.18	79.02	64.22
Assam	2.34	6.24	6.85	2.44	10.98	12.41
Manipur	4.42	1.53	2.77	2.69	31.18	34.2
Meghalaya	3.6	0.38	0.48	3.03	80.48	85.94
Mizoram	4.8	0.02	0.03	3.34	94.26	94.46
Nagaland	0	0	0	4.62	88.61	89.15
Tripura	3.59	12.39	17.37	2.67	28.95	31.05
North East	2.64	5.75	6.4	3.44	19.17	26.93
India	2.42	14.82	16.2	2.75	6.82	8.2

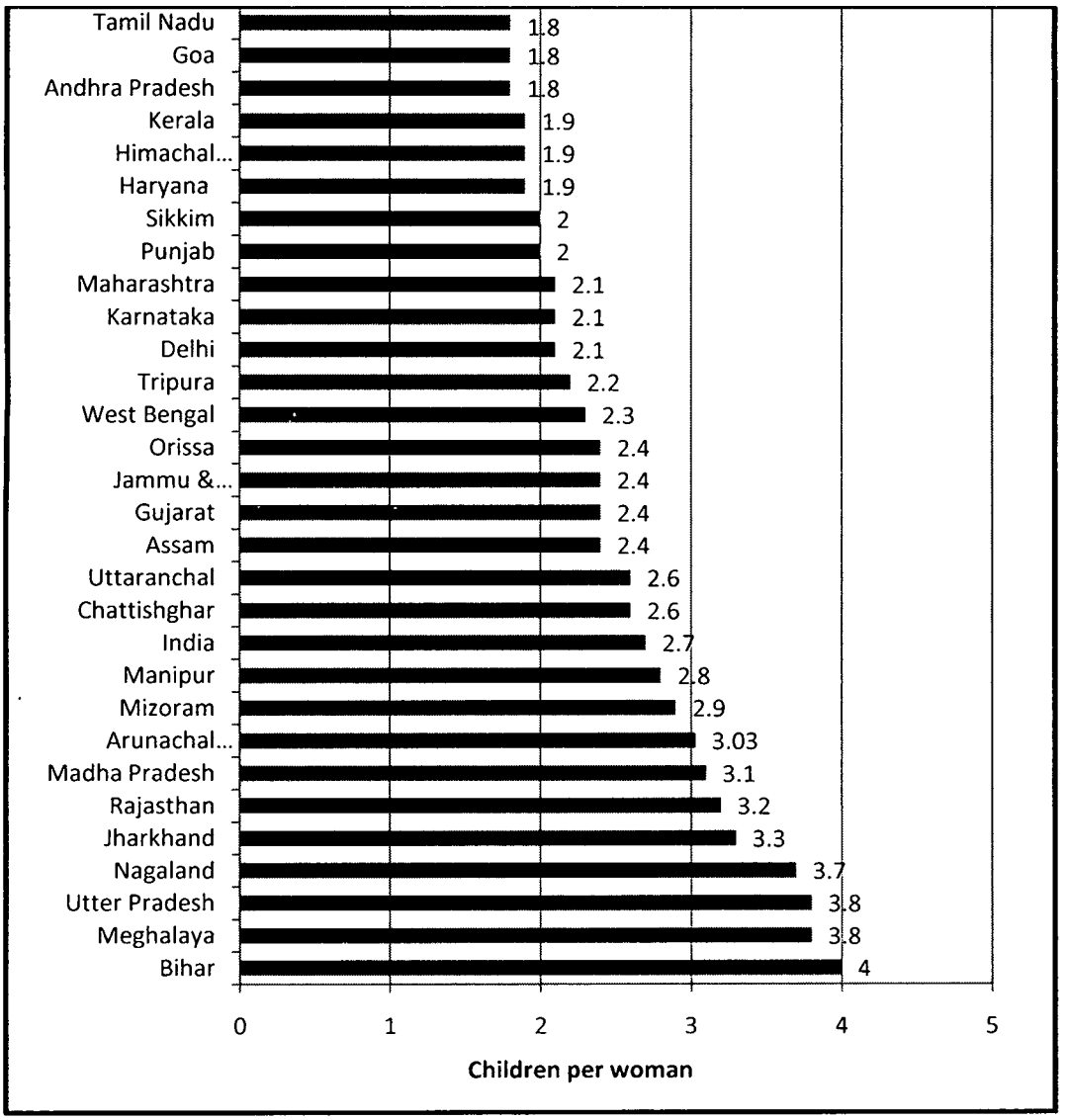
Source: Census of India, Primary Census Abstract, 1971 and 2001.

Distribution of Population by Religion, North-East India, 1981 Census

State	Hindu	Muslim	Christian	Sikh	Buddhist	Jains	Others
Arunachal Pradesh	29.23	4.32	4.32	0.2	16.68	-	51.77
Assam	64.37	31.36	6.37	0.12	0.93	0.12	0.03
Manipur	60.04	6.67	0.06	0.03	0.06	0.06	3.15
Meghalaya	18.02	3.1	52.61	0.12	0.2	0.04	25.76
Mizoram	7.14	0.45	83.81	0.08	80.19	-	0.23
Nagaland	14.36	1.52	80.9	-	0.07	0.15	3.68
Tripura	89.38	60.47	1.2	60.01	20.69	0.01	0.01
North East(Total)	40.35	7.73	32.75	8.65	3.68	0.35	12.09

Source: Census of India, 1981

Total Fertility Rate in India, 2005-06



Crude Birth Rate in North-East India: 1971-2008

Year	India	NE	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura	Sikkim
1971										
1971	36.9	35.86	NA	38.5	33.3	NA	NA	NA	35.8	NA
1975	35.2	25.2	NA	30.1	24.5	NA	NA	19.5	29.2	NA
1979	33.7	29.78	NA	33.8	28.6	33.2	NA	24.9	28.4	NA
1981	33.9	29.65	NA	33	26.6	32.6	NA	NA	26.4	NA
1983	33.6	30	35.4	34.7	28.6	30	NA	23.1	23.7	34.5
1991	29.5	25.67	30.9	30.9	20.1	32.4	NA	18.5	24.4	22.5
1998	26.5	21.84	22.5	27.9	19	29.2	15.8	NA	17.6	20.9
1999	26	21.74	22.3	27	18.6	28.7	17	NA	17	21.6
2000	25.8	21.01	22.3	26.9	18.3	28.5	16	N.A.	16.5	21.8
2001	25.4	21.24	22	26.8	18.2	28.3	15.7	N.A.	16.1	21.6
2003	24.8	19.68	18.9	26.3	15.5	24.7	16	NA	14.5	21.9
2004	NA	20.44	20.2	26.6	16.8	25.8	16.9	NA	14.9	21.9
2005	23.8	19.9	23.3	25	14.7	25.1	18.8	16.4	19.9	16
2006	23.5	19.51	22.5	24.6	13.4	24.7	17.8	17.3	19.2	16.6
2007	23.1	19.53	22.2	24.3	14.6	24.4	18.2	17.4	18.1	17.1
2008	22.8	19.45	21.8	23.9	15.8	25.2	17.8	17.5	18.4	15.4
2009	NA	19.47	21.8	23.9	15.8	25.2	17.8	17.5	15.4	18.4

Source: Registrar General, India (various years)

Estimates of Birth Rate and Total Fertility Rate for District in 2001

Districts	CBR	TFR
Arunachal Pradesh	**29.9**	**3.9**
Tawang	30.2	3.8
West Kameng	27.3	3.4
East Kameng	34.1	4.4
Papum Pare	29.9	3.5
Lower Subansiri	28.7	3.4
Upper Subansiri	31	4.1
West Siang	26.1	3.8
East Siang	27.6	3.7
Upper Siang	29.5	4
Dibang Valley	29.3	3.9
Lohit	31.6	4.2
Changlang	32.4	4.4
Tirap	31.9	4.4

Districts	CBR	TFR
Manipur	**21**	**2.6**
Senapati	19.3	2.2
Tamenglong	22	2.8
Churachand-pur	20.5	2.5
Bishnupur	20.4	2.5
Thoubal	25.8	3.3
Imphal West	18.3	2.2
Imphal East	20.7	2.6
Ukhrul	23	3.1
Chandel	23	2.8

Districts	CBR	TFR
Assam	**27**	**3.2**
Kokrajhar	29.3	3.3
Dhubri	35.2	4.3
Goalpara	32	3.9
Bongaigaon	29.4	3.5
Barpeta	30.8	3.8
Kamrup	22.1	2.6
Nalbari	23	2.7
Darrang	29.1	3.4
Marigaon	31.8	3.9
Nagaon	29.9	3.6
Sonitpur	25.6	3
Lakhimpur	27.4	3.3
Dhemaji	27.7	3.5
Tinsukia	25.1	2.9
Dibrugarh	22	2.4
Sibsagar	21.6	2.4
Jorhat	19.4	2.2
Golaghat	23.3	2.7
KarbiAnglong	29.6	3.7
North Cachar Hills	26.4	3.1
Cachar	25.3	3.1
Karimganj	29	3.6
Hailakandi	30.2	3.8

Meghalaya	**33.6**	**4.5**
West Garo Hills	32.1	4.1
East Garo Hills	34.2	4.4
South Garo Hills	36.2	4.6
West Khasi Hills	38.6	5.5
RiBhoi	41.2	5.4
East Khasi Hills	27.7	3.6
Jaintia Hills	38	5.4

Districts	CBR	TFR
Mizoram	27.3	3.4
Mamit	26.9	3.3
Kolasib	27.7	3.4
Aizawl	24.4	3
Champhai	28.7	3.5
Serchhip	27.1	3.3
Lunglei	28.1	3.5
Lawngtlai	34.1	4.2
Saiha	32.4	4

Nagaland	**24.1**	**3.2**
Mon	25.1	3.4
Tuensang	24.2	3.4
Mokokchung	16.4	2
Zunheboto	26.9	3.5
Wokha	23.9	3.2
Dimapur	25.8	3.3
Kohima	23.6	3
Phek	29	3.8
Sikkim	**23.7**	**3**
North	25.5	3.4
West	26.5	3.5
South	26.4	3.4
East	20.6	2.5

Tripura	**21.2**	**2.5**
West Tripura	19.6	2.3
South Tripura	21.8	2.6
Dhalai	24	2.8
North Tripura	23.4	2.8