

**FERTILITY TRANSITION IN NORTH-EAST INDIA:
HISTORICAL AND COMPARATIVE PERSPECTIVES**

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Research Guide

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ABSTRACT

This thesis looks into the process of fertility transition in the North-Eastern Region of India (NER) from a historical and comparative perspective vis-à-vis India beginning 1901, using available data from standard secondary sources such as the Census, Sample Registration System and the National Family Health Surveys. Analysis of census data for the colonial period (1901-1941) reveals that the relatively higher population growth rates evinced by the region and its constituent states throughout the pre-Independence period as compared to the all-India average, was largely the result of incessant and relatively huge immigration into the Brahmaputra Valley initiated by the importation of ‘coolies’ and agriculturists from the over-populated areas of Bengal Province. More interestingly perhaps, indirect fertility estimates for the concerned period are indicative of an actual reproductive differential between NER (Assam) and all-India, with the former eliciting significantly higher fertility rates as compared to the latter during the pre-Independence period. Examination of socio-economic differences between Assam and India provide clues as to why such differentials might have existed during that time. Availability of a much greater amount of data for the post-colonial period allows for a greater flexibility of approach to examine fertility in NER and its constituent states. While we find that population growth rates for most of the period following 1951, continued to remain higher among the states of NER as compared to the all-India average at least partly due to continuing high migration into the region, there was a drastic change in the destination of the immigratory population- from the plain areas during the colonial period to the tribal dominated regions/states of NER in

the Independent era. No doubt, this has been one of the primary reasons behind the continuing socio-political turmoil in the region during most of the period following Independence. One of the rather important findings for this period, and especially the period after the 1990s, has been the stalling of fertility decline among the states of NER. Even though there have been discrepancies between the SRS and the NFHS, regarding the trend of fertility among the states of NER, indirect estimates based on census data corroborate the findings from the latter in that there has been insignificant reduction in fertility among the states of NER in the period following the 1990s till mid 2000s. Analysis of the determinants of fertility for NER and states presents several important results. The examination of the proximate determinants of fertility for the period 1990 to 2005, finds that as in the case of all-India and the major states, contraception is the most important proximate determinant of fertility. Interestingly, nuptiality has been also found to be a proximate determinant of much importance and its effect had been mostly towards reducing fertility as was seen in the case of Tripura and Nagaland. Results from the regression analyses (cross-sectional and panel data models) for the period 1991 and 2001 finds that women's status/autonomy as captured, for instance, by female literacy has significant fertility depressing effects. However, tribal status, at least as far as NER is concerned, is no longer a socio-cultural protection against the burden of repeated child-bearing for women. Indeed, to the contrary, ST status is associated with higher fertility rates in NER. Increasing son preference and broadly speaking, '*Sanskritization*' of the tribes, reflected for instance, in the relatively earlier and exogamous marriages among them, provide clues as to why such trends may have surfaced. Interestingly, we find that adherence to Christianity leads to lower fertility, possibly due to the higher age at marriage in this community. Also important

has been the factor of ethnic diversity in influencing fertility in NER. Indeed, we find that region or context specific factors may have significant impact on fertility differentials. For example, in our analysis we find that greater ethnic diversity leads to lower fertility, possibly due to the fact that these numerically smaller groups have been already assimilated to a great extent into the larger ethnic groups in the respective regions, and demographic war (or war on the basis of population strength) does not hold any significant promise for greater access to socio-political and economic power for these communities.

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*Dedicated in
loving memory of my father
Dr. Amitabha Sinha*

CONTENTS

	Page No.
<i>Title</i>	
<i>Certificate of the Research Guide</i>	ii
<i>Declaration by the Student</i>	iii
<i>Abstract of the Thesis</i>	iv
<i>Acknowledgement</i>	vii
<i>Dedication</i>	ix
<i>Contents</i>	x
<i>List of Tables</i>	xii
<i>List of Figures</i>	xiv
<i>List of Appendices</i>	xv
<u>CHAPTER 1- INTRODUCTION</u>	1
1.1: An Introduction to the Population, Economy and Society of North-east India	1
1.1.1: North-East India: The Land, its People and Their History	1
1.1.2: Economic and Social Development in NER: An Overview	16
1.1.3: Socio-Political Situation in NER: The Contemporary Picture	32
1.2: Research Questions, Methodology and Structure of the Thesis	40
<u>CHAPTER 2- LONG-TERM DEMOGRAPHIC TRENDS IN NORTH-EAST INDIA, 1901-2011: HISTORICAL AND COMPARATIVE PERSPECTIVES</u>	
2.1: Introduction and Background	49
2.2: Trend of Population Growth in NER, 1901-1941	50
2.2.1: Fertility and Mortality Trends in North-East India, 1901–1941	54
2.2.2: Migration into North-East India, 1901-1941	62
2.3: Trend of Population Growth in NER, 1951-2011	65
2.3.1 Trends in Birth Rate and Death Rate in NER, 1971-2011	68
2.3.2 Migration into North-east India, 1961-2001	75
2.4: Long-Term Trends in the Proportion of Tribal Population in NER and States, 1901-2011	80
2.5: Trends in Population Sex Ratio in NER, Constituent States, and All-India, 1901 to 2011	81
2.6: Discussion	87
	x

CHAPTER THREE- FERTILITY LEVELS, TRENDS AND DIFFERENTIALS IN NORTH-EAST INDIA, 1971-2011

3.1: Introduction	90
3.2: Fertility Trends in the North-eastern Region: 1971-2011	94
3.2.1: Data Sources and their Limitations	95
3.2.2: Alternative Estimates of the Total Fertility Rate of NER and States, 1990-92 to 2003-05	99
3.2.3: Indirect Fertility Estimates Based On Census Data: NER and States	106
3.2.4: Fertility Stall in NER during the 1990s: A Closer Look	110
3.3: Fertility Trends in NER: A Further Exploration	117
3.4: An Exploration of Fertility Differentials among North-Eastern States by Demographic and Socio-Economic Characteristics: 1990-2005	120

CHAPTER FOUR- THE PROXIMATE DETERMINANTS AND CORRELATES OF FERTILITY CHANGE AMONG THE NORTH-EASTERN STATES OF INDIA, 1990 to 2005

4.1: Introduction	127
4.2: Changes in the Proximate Determinants of Fertility in the North-eastern states: 1990-92 to 2003-05	130
4.2.1: Bongaarts Proximate Determinants Model: Theory and Facts from North-eastern States	131
4.2.1.1: Nuptiality	136
4.2.1.2: Contraception	143
4.2.1.3: Breast-Feeding and Postpartum Amenorrhea	149
4.2.1.4: Induced Abortion	153
4.2.1.5: The Combined Index of the Proximate Determinants and its Change over the 1990s	155
4.3: Changes in Fertility Preference among the North-Eastern States, 1990-92 to 2003-05	158
4.4. The Impact of Family Planning Programs on Fertility	163
4.5. The Socio-Economic Correlates of Fertility among the North-Eastern States	168
4.6: Discussion	176

CHAPTER FIVE- THE CONTEXTUAL DETERMINANTS OF FERTILITY IN NORTH-EAST INDIA: A DISTRICT-LEVEL ANALYSIS

5.1: Introduction	179
5.2: The Drivers of Fertility Decline: Perspectives and Evidence from India	180
5.2.1: Theories of Fertility Decline: An Overview	180
5.2.2: Determinants of Fertility Decline: Evidence from India	190
5.3: Fertility Decline in North-East India: Issues and Hypotheses	198
5.3.1: Socio-cultural Influences and Fertility	198
5.3.2: Socio-political Influences and Fertility	207
5.4: Material and Method of Statistical Analysis	210
5.4.1: Variables and Data sources	210
5.4.2: Empirical Model	216
5.5: Main Findings	217
5.6: Discussion	225
<u>CHAPTER SIX- CONCLUSION TO THE THESIS</u>	228

LIST OF TABLES

Table 1.1: Social Composition of the Population of NER, 2011	4
Table 1.2: Broad Indicators of Social and Economic Development in NER and Constituent States, A Long Term View	19
Table 1.3: Gender Disparity Indices along Various Dimensions of Well-Being among Children Aged 0-6, NER: 1998-99 and 2005-06	31
Table 2.1: Population Trends in North-Eastern Region and All-India, 1901-1941	51
Table 2.2: CBR, CDR and IMR: Assam and India, 1901-1941	55
Table 2.3: Fertility Estimates Using Rele Method: Assam and India, 1911 And 1931	58

Table 2.4: Broad Indicators of Socio-Economic Development and Their Variations: Assam and India, 1901-1941	59
Table 2.5: Migration in NER and India, 1911-1931	66
Table 2.6: Population Trends in North-Eastern Region, 1951-2011	69
Table 2.7: Birth Rate and Death Rate Estimates for North-Eastern States, 1977-2010	74
Table 2.8: Net Immigration, NER and Its States, 1961-2001	79
Table 2.9: Proportion (%) of Tribal Population, NER, Its States, and India, 1901-2011	82
Table 2.10: Sex Ratio (Females per 1,000 Males), NER, Its States, and India, 1901-2011	85
Table 3.1: Total Fertility Rate in India and Individual States in NER during the Post-Independence Period, Various Sources	101
Table 3.2: Fertility Change among the North-Eastern States: 1990-92 to 2003-05	114
Table 3.3: Cohort Fertility Rate among the North-Eastern States, 1990 to 2005	119
Table 3.4: Fertility by Socio-Economic Characteristics, North-Eastern States: 1990 to 2005	122
Table 4.1: Rating Of Intermediate Fertility Variables	132
Table 4.2: Singulate Mean Age At Marriage Of Females: North-Eastern States, 1961-2001	138
Table 4.3: Percentage Of Women 15-19 Years Married In North-Eastern States and India: 1991-2001	140
Table 4.4: Values of Select Fertility Indices for North-Eastern States: 1990-92, 1996-98, 2003-05	142
Table 4.5: Socio-Economic Differentials in Current Use Of Contraception, NER, 1992-2005	145
Table 4.6: Duration of Postpartum Amenorrhoea, Abstinence And Nonsusceptibility in North-Eastern States: 1992-93, 1998-99	150
Table 4.7: Combined Index For The North-Eastern States: 1990-92 to 1996-98	155

Table 4.8: Percent of Pregnancies Ending In Induced Abortion among Adolescents (15-24) In North-Eastern States: 1990-92 to 1996-98	157
Table 4.9: Wanted Fertility, Percent of Women Who Want No More Children, And Mean Ideal Number of Children: North-Eastern States, 1990-92 to 2003-05	159
Table 4.10: Unwanted Fertility, Percent Share Of Public Sector in Provision Of Modern Contraceptives, And Percent of Women (15-19) Exposed To Any Media, North-Eastern States, 1990-92 to 2003-05	166
Table 4.11: Per Capita Gross State Domestic Product Growth in NER and States, 1980-81 to 2005-06	170
Table 4.12: Changes in Socio-Economic Indicators of Development, 1990-2005	172
Table 5.1: Definition and Sample Means of Variables: NER 1991, 2001	213
Table 5.2: Results from Cross-Sectional and Panel Analyses: North-East India, 1991-2001	219

LIST OF FIGURES

1. Map of the North-eastern Region of India	3
2. Immigration and Assimilation of Various Ethno-Cultural Groups in Assam over Various Phases of History	8
3. Percentage of Villages Electrified, Various States of India, 2008	22
4. Trends in Total Fertility Rates in Assam And India, 1911 to 2010	105
5. Age-Specific Fertility Trends in North-Eastern States: 1990-92 to 2003-05	115
6. Schematic Representation of Analytical Framework of Determinants of Fertility	128

LIST OF APPENDICES

1. Calculation of the Gender Disparity Indices	266
2. Trends In Contraceptive Use (Percentage) Among Currently	

Married Women, 15-49 Years: 1992-2005	268
3. Infant Mortality among the North-eastern States, 1990-92 to 2003-05	269
4. Percentage Vaccinated Among Children 12-23 Months And Percentage of Children Less Than Four Years of Age Suffering From Diarrhoea, North-Eastern States, 1990-2005	270
5. Stability of Elected Governments (Political Stability) in North-Eastern States of India	271
6. Values of the Index of Ethnic Diversity (Herfindahl- Hirschman Index) for the North-Eastern States	272
7.1 Regression Diagnostics for 1991 OLS regression	273
7.2 Regression Diagnostics for 2001 OLS regression	274
8. Results of Estimation of Spatial Lag Model for 1991 and 2001	276
9. Socio-Economic and Reproductive Differentials between Scheduled Tribes and Others: 2003-05	278

CHAPTER ONE

INTRODUCTION

1.1 An Introduction to the Population, Economy and Society of North-East India

1.1.1 North-east India: The Land, it's People and their History¹

At the convergence of the Indo-Malayan, Indo-Chinese, Palearctic and Indian bio-geographical realms, lies the North-eastern Region of India (NER hereafter) - a region that still remains rather obscure from the viewpoint of 'mainland' India (Fig. 1). Situated between the latitudes of 21.57°N and 29.30°N and longitudes of 88°E and 97.30°E, NER comprises currently of eight states: Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura, which together cover a total area of about 2.6 lakh sq. km. and occupy 7.9 per cent of the total geographical area of the Indian subcontinent (Registrar General, 2004). Remarkably, it shares as much as 4200 km. of international boundary (that constitutes nearly 98 % of its total boundary) with four nations-Bangladesh, Bhutan, China and Myanmar- while at the same time being joined with the rest of India by means of a narrow route popularly known as the *Siliguri corridor* or *Chicken's neck* (the latter name being rather an apt description of the relative dimensions of this passage) (Taher and Ahmed, 2000).

Physiographically, the land can be categorized into four distinct regions- (i) the

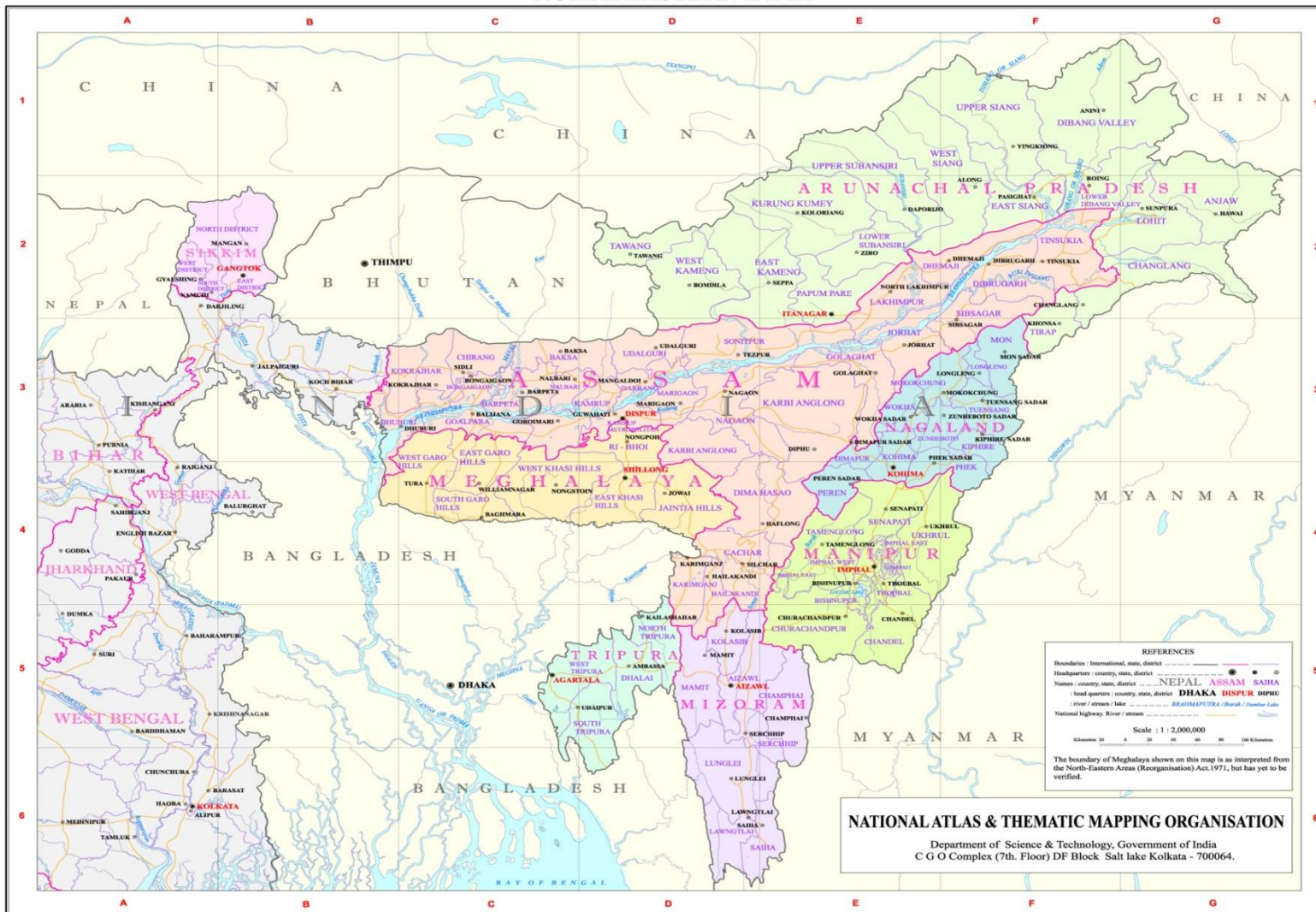
¹ It must be mentioned at the outset that this section does *not* present a complete discussion on the history and society of North-east India (which is indeed somewhat outside the scope and objective of the present research). In fact, the sole purpose of this part and its rather strategic insertion at the beginning of the thesis is to provide the most important facts on the region that have a bearing upon the issues to be presented and discussed in the rest of the dissertation.

Brahmaputra Valley (that lies almost entirely in Assam) (ii) the Eastern Himalayas (situated in Arunachal Pradesh and Sikkim) (iii) the Eastern Mountain Region (sprawled over parts of Assam and Arunachal Pradesh and all of Manipur, Mizoram, Nagaland and Tripura; with important low lying regions being the Tripura-Cachar plains and Imphal Valley) and (iv) the Meghalaya Mikir Tableland (a geological extension of the Indian Peninsula and covering the Garo, Khasi and Jaintia Hills of Meghalaya) (Government of India, 1981). The region is thus a mixture of hills and plains and specifically, while Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, and Sikkim could be described as hilly, Assam is largely a plain.

Not surprisingly, the distribution of population is highly skewed towards the plain areas, which in fact, finds reflection in the variation of population density across the states of the region (Table 1.1). Assam, which is obviously the largest state in NER, in terms of both the size of population and geographic extent, has the highest population density followed by Tripura, Meghalaya and Manipur. In fact, as can be seen from Table 1.1, with the sole exception of Meghalaya, all the hill states evince considerably lower population density vis-à-vis not just Assam, but also as compared to Manipur, Tripura, and the average for the region as a whole. In fact, the hills, while spreading across as much as 70 per cent of the entire landscape of NER, accommodate only about 30 per cent of its total population (Nayak, 2010).

It is perhaps obvious that the relatively higher productivity of plain land, determined in large part by the nature of soil and river systems, coupled with the arduous nature of the hilly terrain, has led to the aforesaid patterns of human settlement in the region. Indeed, soils of the plains are mostly alluvial in nature and ideal for agriculture, while those of the hills are red/red-loamy in nature and being generally less

NORTH EASTERN INDIA



Source: natmo.gov.in

FIG. 1: MAP OF THE NORTH-EASTERN REGION OF INDIA

fertile requires extensive treatment before cultivation. In fact, the differential nature of terrain and soil conditions has given rise to two distinct types of agricultural practice in NER- (i) settled agriculture in the plains, valleys and gentler slopes and (ii) slash and burn (called *jhum* in local terminology) elsewhere (Government of India, 1981). Needless to say, *jhumming* is the dominant agricultural practice in (but not restricted to) the hilly states of Arunachal Pradesh, Meghalaya, Mizoram and Nagaland.

TABLE 1.1: SOCIAL COMPOSITION OF THE POPULATION OF NER, 2011

State/Region	Total Population	Population Density (persons Per Sq.km.)	Percent of lower castes (SC) in total population	Percent of tribal (ST) in total population	Number of ST groups*
Arunachal Pradesh	13,83,727	17	0.0	68.7	16
Assam	3,12,05,576	397	7.1	12.4	23
Manipur	27,21,756	122	3.7	35.1	34
Meghalaya	29,66,889	132	0.6	86.1	17
Mizoram	10,97,206	52	0.1	94.4	15
Nagaland	19,78,502	119	0.0	86.5	5
Sikkim	6,07,688	86	5.0	20.6	4
Tripura	36,73,917	350	17.8	31.7	19
NER	4,56,35,261	174	6.6	27.2	133
India	1,21,01,93,422	312	16.6	8.6	659

Source: Census of India, 2011, Provisional Population Totals, Paper-1 of 2011; *tribal.nic.in

What is more important (though hardly surprising) is that the hilly regions of NER are predominantly occupied by tribes.² In fact, as is evident from Table 1.1, the

² It should be mentioned here that the terms ‘tribe’, ‘tribal’(population) and ‘scheduled tribe’ have been used interchangeably in the text, and unless specified otherwise, refer to population

four hill states, viz., Arunachal Pradesh, Meghalaya, Mizoram and Nagaland, have a largely tribal character, with the percentage of tribes in total population ranging from almost 69 per cent in Arunachal Pradesh to slightly under 95 per cent in Mizoram. However, the tribal population of the remaining states of NER including Assam cannot be said to be negligible either, given that they evince a far greater concentration of tribal population as compared to the all-India average (Table 1.1). Indeed, NER distinguishes itself in being home to at least 133 Scheduled Tribe groups out of a total of around 659 such distinct groups presently identified in India (Ministry of Tribal Affairs, Government of India).³

As mentioned earlier, the concentration of the tribal population in the hilly regions of NER hardly comes as a surprise. Several scholars (for e.g. Maharatna, 2005; Raza and Ahmad,1990) observe that the tribes of India, who are arguably the autochthones of the region, are now found largely concentrated in various hilly, forested and semi-arid areas of the subcontinent, which are mostly unsupportive of large agricultural settlements. Indeed, the spatial distribution of the various ethno-cultural groups within the Indian subcontinent could be explained as resulting from a process of ‘backwash’; with the invasion and ingress of each new migratory wave,

groups that have been recognized as Scheduled Tribes under Article 342 of the Constitution of India and declared as such by the President through public notification.

³ As is perhaps well known, the list of Scheduled Tribes (ST) has been expanded and modified several times since it was first promulgated in the year 1950, the same year that India adopted its Constitution. In fact, the number of ST groups has increased manifold since then, with the last Constitutional amendment of 2012 bringing a nearly three-fold rise in their number- from 212 ST groups in 1950 to 659 such distinct groups presently (tribal.nic.in). Indeed, in the context of NER, talks are underway for granting ST status to six communities of Assam- the tea tribes, Koch-Rajbongshi, Moran, Motok, Tai-Ahom and Chutia- that together account for around 60 per cent of the population of Assam presently. In that case, Assam would count among the tribal majority states of NER with more than 70 per cent of its population belonging to one or other of the tribal communities (Kalita, 2013).

pushing the existing groups to the periphery (Panikker, 1955). Speaking specifically of the distribution of tribal population in India, it appears that their present predicament has been largely designed by this historical process of peopling of the subcontinent coupled with their inability to withstand the aggression of the incoming population groups. In fact, as argued by Maharatna (2005), in the mainstream perception of the process of peopling of the Indian subcontinent (and the resulting distribution of the tribal and non-tribal population), it was possibly the superior social organization and techno-economy of the non-tribal, Indo-Aryan speaking peoples that had forced the indigenous peoples, originally settled in the plains and river valleys of India, to recede gradually to their present locations in these rather inaccessible terrains.

Needless to say, the geographic patterning of the tribes has had historic impact on the future course of their economic and social development. Here, it seems worthwhile to quote from Ahmad (1983), who expresses this concern succinctly in the following words:

“The locational constraints have exercised far-reaching impact on their (tribal) world view, social responses to the agrarian formations and the pattern of interaction with the neighbouring communities.... There is no gainsaying the fact that the problems of the Indian tribes in contemporary India cannot be understood if they are delinked from the geographical and social isolation.”

[Ahmad (1983), quoted in Nayak, 1998: 166]

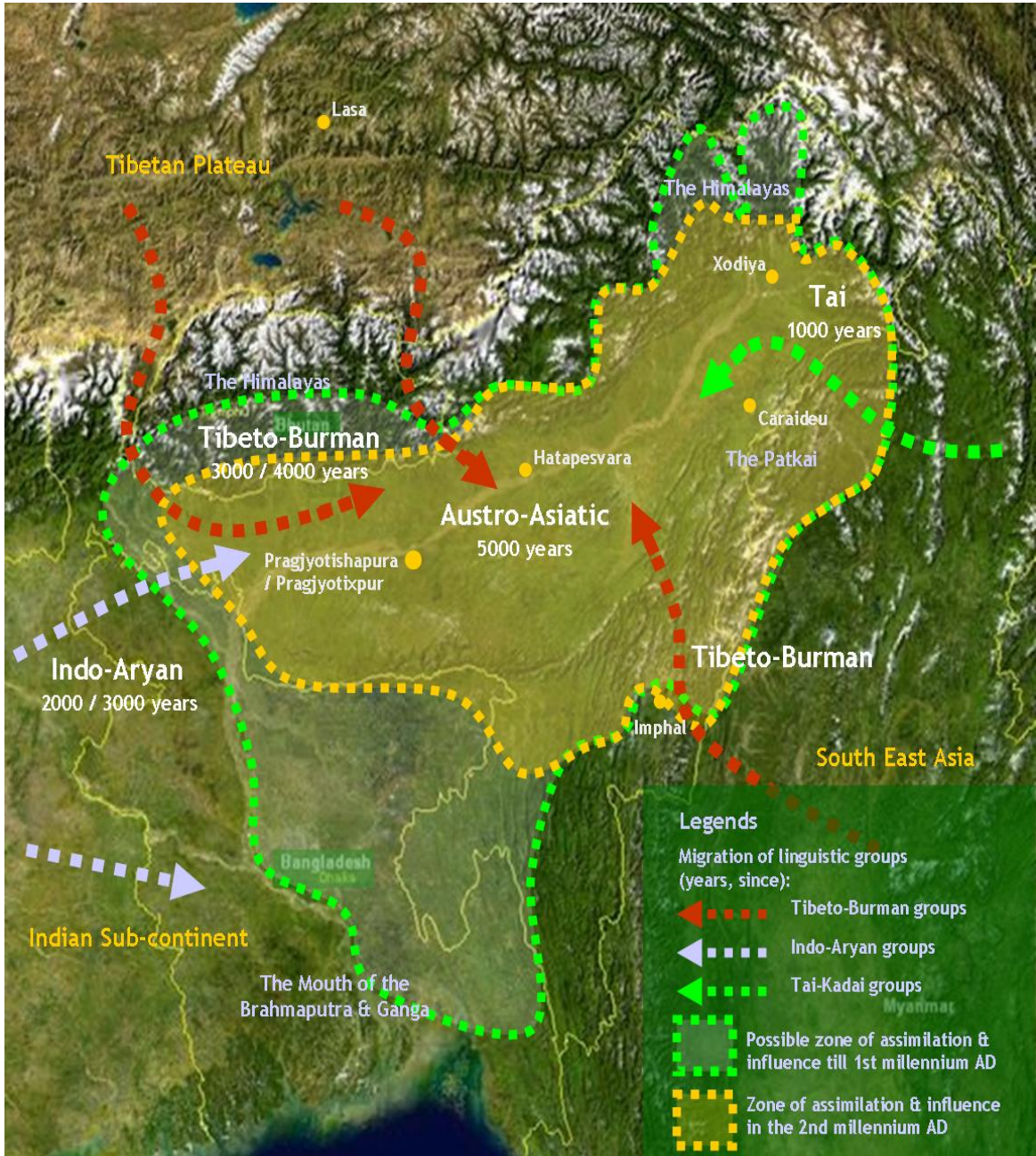
Indeed, it could be argued that, at least in the context of NER, the historical disadvantage in economic and social development was perpetuated (and possibly exacerbated) by the colonial, and to a certain extent, post-colonial policies on the

socio-political integration of the region with the remaining subcontinent (but more on this presently).

Anthropological research on the region finds its population to be primarily composed of four distinct ethno-cultural groups, viz., the Austro-Asiatic or Australoid groups, the Tibeto- Burmans, the Indo-Aryans, and the Tai-Ahoms (Barpujari, 1990; Baruah and Roy Choudhury, 1999; Kakati 1941, among others). Fig. 2 is a possible representation of the process of peopling of NER that has resulted in the presence of the aforementioned identities in the region. The Austro-Asiatic groups, represented primarily today by the Khasis of Meghalaya, are generally believed to be the earliest settlers of this region, who were driven from the foothills of the Brahmaputra Valley to their present habitats in the Khasi hills and the neighbouring hill districts of Karbi Anglong and Cachar, by the invasion of the Tibeto-Burmans (Nayak, 1998). These groups, in turn, were driven to their present primarily hilly habitats, by the invading Indo-Aryan groups who established the ancient kingdom of *Pragjyotishpur* (later known as *Kamrup*) including present day Assam and parts of Bengal and Bangladesh. The last ethno-cultural group to invade the region during the thirteenth century were the Ahoms/Tai-Ahoms, who came from the Yunnan province of China and established a kingdom that survived for nearly six hundred years before its annexation by the British in 1826 (Baruah, 1999).

Ethno-linguistically, the various dialects spoken in the region can be broadly assigned under the Austric, Sino-Tibetan and Indo-European language families (Taher, 1979; Moral, 1997). Interestingly perhaps, the Indo-European language finds its sole

FIG. 2: IMMIGRATION AND ASSIMILATION OF VARIOUS ETHNO-CULTURAL GROUPS IN ASSAM OVER VARIOUS PHASES OF HISTORY



Source: http://en.wikipedia.org/wiki/File:Assam_Assimilation.png#file

Original sources: Barpujari (1990); Kakati (1941); image from NASA

autochthonous representation in the Assamese (Asamiya) language.⁴ Likewise, the only representative of the Austric language family is the Mon-Khmer, spoken by the Khasis of Meghalaya (Kakati, 1941). Almost all the remaining languages spoken by the various major and minor population groups in the region including Meitei, Angami, Ao, Konyak, Bodo, Mising, Kak-borak, Mizo, Hmar etc. can be placed under the Tibeto-Burman group of the Sino-Tibetan language family. Not surprisingly perhaps, Assamese (and in several cases pidgins derived from Assamese, such as Nagamese and Arunachalese) has been serving as the *lingua franca* among many linguistic groups for the past several centuries (Moral, 1997). In this connection, it is worth mentioning that the Asamiya language itself, as it stands currently, is a result of the fusion of the Ahom dialect of the Tai-Ahoms with the then existing Assamese language of the Brahmaputra valley (an *Apabramsa* dialect developed from Magadhi Prakrit of the eastern group of Sanskritic languages). Indeed, the exchange of several linguistic features among the various dialects of NER, as indicated by several researches (e.g. Moral, 1997), indicates considerable acculturation and socio-cultural diffusion among the various communities residing in and around the Brahmaputra Valley in the pre-colonial era.

⁴ Of course, we find other dialects belonging to the Indo-European language family in NER- the most notable among them being Bengali. However, in contrast to the prehistoric presence of the other languages, the latter were introduced much later by the British. In fact, as the story goes, the inability of the Ahom rulers of the eighteenth century to protect themselves from Burmese invaders, led them to seek assistance from the British, who were equally willing to oblige due to their commercial interests in the region, and conceded in return for a ‘Commercial Treaty.’ This treaty, which was signed between Gaurinath Singha of Assam and Captain Welsh in 1793, led to the opening of free commerce between British occupied Bengal and Assam, which effectively unlocked the doors of the region to immigrants from Bengal who came to settle in the region in various medical, legal, and teaching professions as well as many positions in the railways and post office (Chadha, 2005; Baruah and Roy Choudhury, 1999, Weiner, 1978).

Indeed, the Ahom rulers expressed a zeal for secularism marked by a policy of peaceful co-existence with the surrounding tribes, which even extended towards cultural synthesis with the latter. Evidence suggests that the Ahoms maintained commercial ties with many of the tribes during the pre-colonial times. Weekly trade with the Garos, Nagas and some tribes of Arunachal Pradesh (especially the Apa Tanis, hill Miris, Adis) was a regular feature during the Ahom rule, to which the aforementioned Nagamese and Arunachalese languages bear testimony today. Indeed, there is evidence to suggest that Ahom kings conferred titles (such as *Bor Phukan*) on Naga individuals, allotted land to them and appointed them as officers in the army (Baruah, 1999). In fact, the bonds with the nearby tribes went further than interaction for commercial and military purposes and many Ahom kings are known to have sought alliance with women from neighbouring tribal communities. The records of the social interactions between the former and the latter, maintained carefully by the Ahoms, demonstrate this by indicating that many leading Ahom families had been formed by patriarchs belonging to non-Ahom (tribal) communities such as the Varahi, Miri, Chutiya, Koch, Kachari, and Garo (Ghosh, 2006). The Konyak Nagas maintain that at least up to 1936, they continued to receive an annual tribute, as acknowledgment of the marital bond between a certain Ahom king and a daughter of their village (Jacobs et.al., 1998). Indeed, some historians (e.g. Elwin, 2005) believe that tribes such as the Nagas may even have been subjects of the Ahom rulers. Overall, it appears that there was considerable interaction between the tribal communities and those residing in the plains of the Brahmaputra valley. However, much of that was to change with the advent of colonial rule in the Brahmaputra valley in 1826.

Indeed, the dominion of the Ahoms in the Brahmaputra valley had effectively come to an end before 1826 when the Burmese, after repeated attempts to overthrow the Ahom rule, finally succeeded in occupying Assam in 1821 and the Ahom kingdom came to be ruled by a Burmese commander. However, the Burmese rule in Assam was short-lived as the British, upon request from the Ahom ruler (and possibly being driven by the imminent threat of future invasions by the Burmese into Bengal), declared war against the latter in 1824. What followed was the two year long First Anglo Burmese war that ended with the Treaty of Yandaboo, signed on 24th February, 1826 between the Burmese and the British East India Company, leading to the British occupation of Assam (Baruah, 1999; Baruah and Roy Choudhury, 1999, among others).

However, what is more important from the socio-political (and economic) standpoint is the divisive policy adopted by the British administration between the Assam plains and the remaining (tribal) areas of North-east, after they established themselves in the region. In fact, “[t]he experience of the colonial rule in these areas (*tribal areas*), to say the least, was profoundly different from that of the regularly administered parts of British India,” (Baruah, 1999: 28) (italicized words added to original quotation). Specifically, while the principally non-tribal districts of the province of Assam were placed under the regular administrative regime of the Empire⁵ as in the rest of the British Provinces of India, the tribal tracts surrounding the Brahmaputra Valley (that today correspond roughly to the four states – Arunachal

⁵ Indeed, there was also some confusion regarding the position of Assam in the administrative map of British India (probably stemming in part from a lack of understanding of the region and its people). Assam was ruled as part of the Bengal Province till 1874, when it was declared a separate province due to administrative difficulties. However, again between 1905 and 1921, the region was merged with Bengal and administered as the Bengal and Assam Province. Amidst strong protests against the merger, it was once again separated from Bengal and constituted as the Assam Province and placed under the Governor-General of Assam Province (Inoue, 2005).

Pradesh, Meghalaya, Mizoram and Nagaland) faced severance and isolation- physical, social and perhaps even psychological- from the Valley (and as a consequence, the rest of India), through a series of rules and regulations beginning 1874. “First, the people living in the settled districts of Bengal and Assam were prohibited from entering these hills by the introduction of Inner Line System under the East Bengal Frontier Regulation, 1873. This was followed by removal of all outsiders not required by the British in the hills or considered undesirable under the Chin Hills Regulation of 1896. Then the operation of most of the general laws of the country was made inapplicable in these hills by an order under the Assam Frontier Tracts Regulation, 1880. The Government of India Acts of 1915 and 1919 termed these areas as "backward" and excluded them politically from the purview of the new provincial legislature and the High Court. Finally, the Government of India Act of 1935 created a totally new political status for these areas by excluding them fully from the federal and provincial legislatures as well as the jurisdiction of the High Court” (Jafa, 1999).

Thus, the colonial rule in NER, in effect, led to a hardening of the boundaries of the tribal hinterland with the rest of Assam. It would not be incorrect to say that the policies followed the British in NER laid the foundations for the balkanization of Assam witnessed in independent India, by sowing the seeds of ethnic determinism of nationhood (which is inherently opposed to the character of the Indian state marked by a multi-ethnic and socio-culturally diverse population) and more importantly, by creating a *political* cleavage with the rest of the subcontinent. Indeed, many researchers and scholars are of the opinion that the ethno-centric political movements in the tribal dominated areas of NER heralded by the Naga armed conflicts (beginning

1963) have their roots in the inability of the rising political consciousness of the Indians during the final years of the British *Raj* to penetrate the hills of NER.

It is perhaps interesting to note that the proclaimed reason behind the introduction of the various regulations on the tribal areas within NER was the ‘protection’ of the tribes from the plains people. Prima facie, the policy of ‘non-interference’ in the internal affairs of the tribes even adduced support for the benevolent intentions of the *Raj* towards the socio-economically backward region in NER. However, evidence perhaps suggests to the contrary and indeed, the reason behind granting the tribes the freedom to govern themselves, might have been a lack of commercial interest in the areas inhabited by them. In fact, a reading of the ‘*History of the Frontier Areas Bordering Assam*’ penned by one of the Governors of colonial Assam, Robert Reid, makes it amply clear that while on the one hand, the *Raj* started to raise considerable taxes of various kinds from the tribes, on the other, they thought it commercially more prudent to dissociate themselves from the direct administration of these areas, thus leaving them to manage their internal affairs according to existing rules (Reid, 1942). However, this is not to say that the condition of the directly administered plains region of Assam, at least as far as socio-economic conditions are concerned, was any better than the surrounding tribal areas.

In fact, on the eve of Independence, Assam was among the poorest states of India; the reasons for which can clearly be traced back to the policies adopted during the colonial period. There is no gainsaying that the administrative and economic policies followed by the British in India, which were mostly driven by their short-term commercial interests, led to an overall degeneration of India’s local/village economy, North-east India being no exception. However, it would be interesting here to point out

some drastic changes that occurred by way of the British involvement (or rather interference) in the economy of Assam.

It is well-known that the British were allured to the region by the possibility of financial gains from investment in its indigenous resources, of which tea is the primary example. However, the policies used by the British for the establishment and expansion of the tea estates (and a few other industries, such as coal and oil) entailed practically no involvement of local resources; leading to the formation of an enclave economy in Assam (Guha, 1977, 1991; Sharma, 2011). In fact, “the most significant aspect of the colonial economy was that the people of the region did not stand to benefit much from the “enclave” economy that was being developed by the British. The extracted surplus from the tea industry as well as a substantial portion of the wage bills went outside the province and there emerged a serious imbalance between the growing modern sector comprising the tea plantations, coal-mines, oil-fields and the associated infrastructure on the one hand and the near-stagnant agriculture on the other. With most of the head offices located in London and Calcutta, the indigenous sector of the economy may be said to have only marginally benefitted by the colonial development pattern” (Misra, 2005: 57). Interestingly, even the modest infrastructural investment undertaken by the British in the plains region of Assam failed to benefit the populace. For instance, the railway lines that were laid down for tea trade served merely the interests of the European planters and never connected the districts or towns of Assam (Sharma, 2011).

Furthermore, there were changes both in the nature and pattern of the existing trade relations of Assam with its neighbours. While on the one hand, trade with Bengal received substantial boost, that with the surrounding tribes or even with neighbouring

countries such as Bhutan, Tibet, Myanmar and China (even if comparatively marginal) declined tremendously during the first half of the twentieth century. Alongside with this, commodities such as tea, oil and jute came to occupy the most important place in the external trade of Assam replacing others like cotton, lac and ivory (Barpujari, 1996; Misra, 2004, Misra, 2005).

Remarkably perhaps, the financial relations between the Provincial Government in Assam and the Imperial Government at the Centre, was one marked by inequity and exploitation and added further to the socio-economic woes of the region. While on the one hand, the provincial governments had little control over the taxes collected by them, on the other they were made responsible for the provision of social services, which no doubt suffered due to lack of resources. In fact, such was the extent of exploitation that in spite of the presence of quite a few flourishing industries in the region such as tea, oil and coal, the province steeped deeper into financial deficits with each passing year. In fact, Assam's main industries fell under Central taxation, the profits of which never reached Assam (Jakhalu, 2001).

On the whole, it appears that that the occupation of Assam by the British was a turning point in the history of the region, one that set the course for its social, economic and political development (or misery?) in the years to come. In light of the preceding discussion, we next set out to examine and interpret the economic and social developments in NER in the post-colonial era, and identify the contemporary issues facing the people of the region today.

1.1.2 Economic and Social Development in NER: An Overview

That NER is economically the least developed region of the Indian subcontinent is a widely known fact. The average annual per capita income of NER during 2011-12 was around 27,500 I.N.R, which was around 38 per cent lower than the all-India average for the same period. Indeed, even as many parts of the country have made significant strides towards modernization, industrialization and economic prosperity, NER as a whole remains largely a rural agrarian society with the majority of its workforce engaged in the primary sector. According to the 2001 Census, the percentage of cultivators was highest in Nagaland (68.4%), followed by Meghalaya (65.8%), Arunachal Pradesh (61.7%) and Mizoram (60.6%). However, there is little variation in these figures over the states of the region and overall, agricultural labourers and cultivators together constituted 54.7% of the total workforce of NER.

Even though the proportion of workers engaged in the primary sector in NER is comparable to the all-India average of 58.2%, what is distressing is that while the agricultural sector has witnessed considerable progress elsewhere in India, it continues to remain backward in NER. Whereas NER accounts for 3.4 per cent of the agricultural land of the country, it contributes just 2.8 per cent to the total foodgrain production of India (RBI, 2005); a fact that underscores the extremely low agricultural productivity of the region. In fact, the agriculture of the region is primarily of the subsistence type dominated by small farmers. While around 60 per cent of the farmers possess landholdings below one hectare, around 80 per cent hold below two hectares of land (CMIE, 2007). Indeed, the entire gamut of factors including an exceptionally low proportion of total irrigated area (ranging from 5.5 per cent in Assam to 30.2 per cent

in Meghalaya- well below the national average of 41.5 per cent), the negligible use of agricultural inputs in the form of fertilizers (compare for instance the use of 1.5 kg per hectare in Sikkim or even 60 kg per hectare in Manipur to the all-India average of 104.5 kg per hectare during 2004-05) or even electricity, and the ground level utilization of credit, points towards the lack of development of the agricultural sector of NER (Karmakar, 2008). Surprisingly, even though the staple food of all the states of the region is rice, the lack of required infrastructural support and market forces do not encourage the region to specialize in foodgrain production (that is especially true of the hilly states Meghalaya, Mizoram, Nagaland and Sikkim), leading to high dependency. Indeed, each year more than a thousand crore is expended in importing food from the rest of the country (Sinha, 2010).

As mentioned earlier, there has been practically no growth of the secondary sector (manufacturing and industries) in NER. Keeping aside the few large-scale industries set up in Assam during the colonial period, the region has witnessed very little progress in this area. Indeed, so little has been the investment in the secondary sector that at present less than two per cent of the total number of large-scale industries and only around three per cent of the small and medium enterprises (SME) in the country is located in the region (Sinha, 2010). In fact, most of the employment outside the primary sector is concentrated in services, especially in Government services/public administration, which is in contrast to the reasonably high presence of the manufacturing and industrial employment elsewhere in the country (e.g. Saha, 2012; Sinha, 2010; Srivastav, 2006).

One of the primary (and immediate) causes of the deficient growth of both agriculture and industry is the lack of economic/physical infrastructure in NER

(Karmakar, 2008; Sinha, 2010). Even basic infrastructural facilities in the form of rail lines, metalled roads and power are grossly wanting in the region and majority of its states. The availability of all-weather roads is generally poor in NER. In terms of road density (as the standard indicator for measuring the development of road network), we find that all the North-eastern states (with the sole exception of Tripura) evinced lower figures as compared to the all-India average during 2004-05. In fact, the relative situation, in terms of differentials between the state figures and national averages, has worsened since 1979 (Table 1.2). Indeed, Assam had a higher road density compared to the national average in 1979, but the situation deteriorated rather fast during the preceding three decades, so that during 2004-05, it lagged behind the rest of India almost as much as it was ahead during 1979!

This appears even more distressing in the light of the fact that railway connectivity is practically non-existent in the hill states of NER. Remarkably, railways are yet to be established in Meghalaya, while rail routes are below 2 km in length in Arunachal Pradesh, Manipur and Nagaland. In fact, around 98 per cent of railway route lies within a single state viz., Assam. It perhaps goes without saying that the poor state of road and rail connectivity, apart from hindering the general mobility of population, retards the growth of both the agricultural and industrial sector by increasing the difficulties in accessing markets for finished commodities and material inputs to production, and even the movement of labour across states.

Indeed, the situation is not very different in the case of other physical infrastructural facilities as well. For instance, the per capita consumption of electricity among the North-eastern states is among the lowest in India, and even though

Table 1.2: Broad Indicators of Social and Economic Development in NER and Constituent States, A Long Term View

State → Year ↓	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	NER*	India
Compound annual growth rate of per capita NSDP at constant prices										
1980-81 to 1996-97 ^a	5.42	0.96	2.38	2.19	-	2.71 ^c	8.85 ^d	3.91	1.54 ^e	3.22
1999-00 to 2006-07 ^b	5.20	3.11	2.71	4.34	3.28	4.42 ^f	6.07	7.09	3.27 ^g	5.21
2004-05 to 2011-12	5.15	4.75	3.65	6.41	7.42	5.13	16.57	7.34	5.25	6.70
Sex Ratio (females per 1000 males)										
1901	-	919	1037	1036	1113	973	916	874	939	979
1951	-	868	1036	949	1041	999	907	904	891	965
1971	861	896	980	942	946	871	863	943	906	930
2011	919	953	987	985	975	931	889	961	956	940
Population Literacy Rates (per cent)										
1971	11.3	28.7	32.9	29.5	-	27.4	17.7	30.9	28.6	29.4
1991	32.8	42.5	49.9	38.2	66.9	51.1	46.5	49.5	43.9	42.5
2011	66.9	73.2	79.8	75.5	91.6	80.1	82.2	87.7	75.6	74.0
Female Literacy Rates (per cent)										
1971	3.7	19.3	19.5	24.6	-	18.6	8.9	21.1	19.3	18.9
2011	59.6	67.3	73.2	73.8	89.4	76.7	76.4	83.2	70.2	65.5

Table 1.2 continued..

State → Year ↓	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	NER*	India
Poverty Rates (Head Count Poverty)										
1983	40.9	40.5	37.0	38.8	36.0	39.2	39.7	40.0	-	44.5
1993-94	39.3	40.9	33.8	37.9	25.6	37.9	41.1	39.0	-	35.9
1993-94**	54.5	51.8	65.1	35.2	11.8	20.4	31.8	32.9	-	45.3
1999-00	33.5	36.1	28.5	33.9	19.5	32.7	36.5	34.4	-	26.1
2004-05**	31.4	34.4	37.9	16.1	15.4	8.8	30.9	40.0	-	37.2
2009-10**	25.9	37.9	47.1	17.1	21.1	20.9	13.1	17.4	-	29.8
Rural Male Unemployment Rate, Usual Principal Status (Current Daily Status) (per cent)										
1993-94	16 (19)	46 (70)	12 (22)	4 (6)	14 (10)	21 (21)	6 (6)	14(34)	-	14 (56)
1999-00	8 (13)	32 (64)	21 (24)	5 (6)	14(19)	26 (28)	32 (33)	7 (17)	-	17 (72)
2004-05	11 (16)	30 (60)	20 (19)	1 (2)	8 (8)	59 (40)	31 (29)	98 (122)	-	21 (80)
Rural Female Unemployment Rate, Usual Principal Status (Current Daily Status) (per cent)										
1993-94	2 (4)	77 (124)	7 (11)	0 (2)	4 (5)	0 (6)	16 (17)	58 (104)	-	8 (56)
1999-00	1 (1)	66 (125)	15 (26)	3 (5)	3 (5)	20 (31)	19 (25)	4 (57)	-	10 (70)
2004-05	6 (11)	70 (87)	12 (11)	6 (7)	1 (3)	33 (22)	17 (21)	350 (374)	-	31 (87)

Table 1.2 concluded

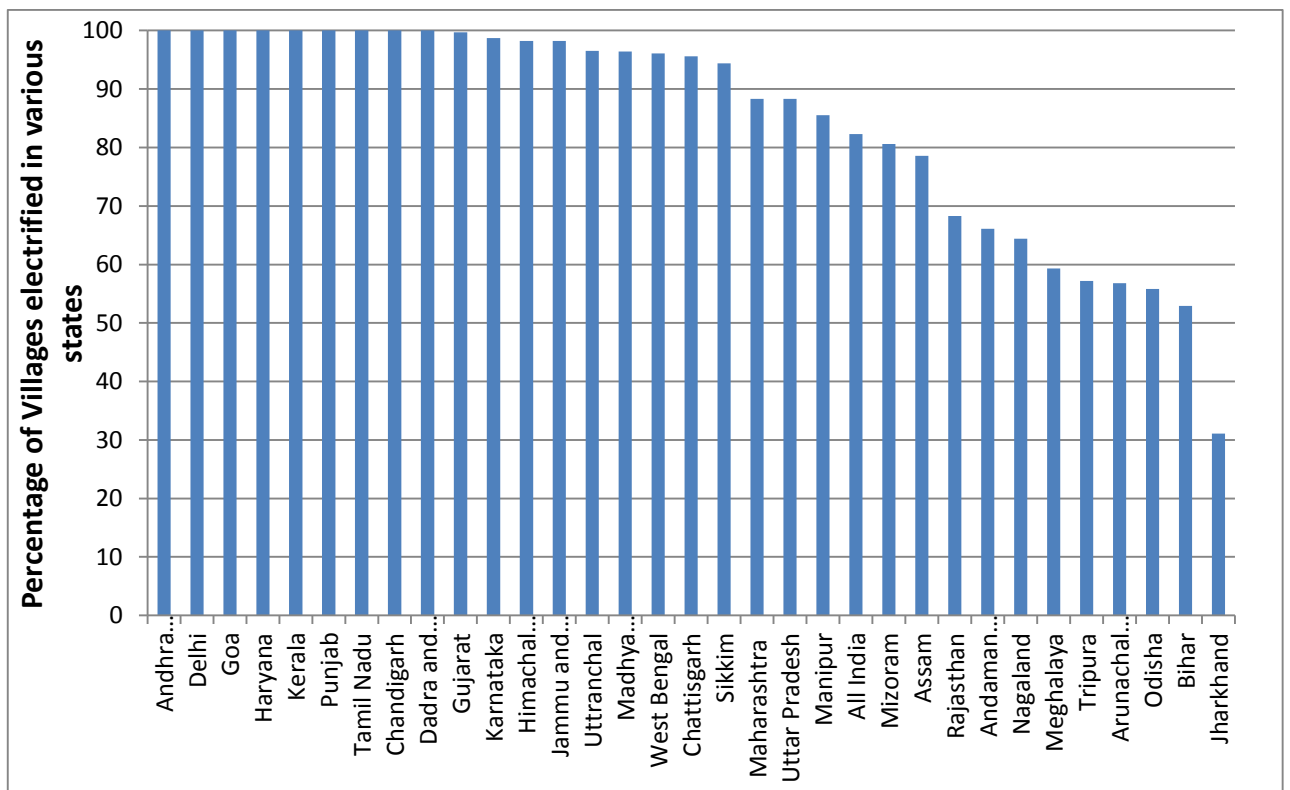
State → Year ↓	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	NER*	India
Nutritional status among children (2005-06) (figures in parentheses are the respective figures for 1998-99) (per cent)										
% 6-35 months with anaemia	66.3 (54.5)	76.7 (63.2)	52.8 (45.2)	68.7 (67.6)	51.7 (57.2)	-	56.9 (76.5)	67.9 (61.8)	-	79.2 (74.2)
% with BMI <18.5 kg/m ²	30 (22)	36 (35)	20 (20)	43 (29)	14 (20)	24 (19)	17 (16)	35 (37)	-	40 (43)
Nutritional status among adult women (2005-06) (figures in parentheses are the respective figures for 1998-99) (per cent)										
% 6-35 months with anaemia	50.6 (62.5)	69.6 (69.7)	39.3 (28.9)	49.6 (48.0)	40.7 (48.0)	-	58.5 (61.1)	67.4 (59.0)	-	56.2 (51.8)
% with BMI <18.5 kg/m ²	16.4	36.5	14.8	14.6	14.4	17.4	11.2	36.9	-	35.6
Nutritional status among adult men (2005-06) (per cent)										
% 6-35 months with anaemia	27.4	44.6	14.1	34.2	19.5	-	18.1	39.8	-	4.3
% with BMI <18.5 kg/m ²	15.2	35.6	16.3	14.1	9.2	14.2	12.2	41.7	-	33.7
Road Density (per 100 sq. km.)										
1979	13.82	72.59	39.47	16.04	13.82	35.06	-	74.63	-	48.90
2004-05	17.12	47.77	38.73	35.12	19.21	73.24	-	150.49	-	76.84

Notes: ^a Compound annual growth rates calculated at 1980-81 constant price. ^b Compound annual growth rates calculated at 1999-00 constant prices ^c The compound annual growth rate for Nagaland has been calculated for the period 1980-81 to 1993-94 ^d The compound annual growth rate for Sikkim has been calculated for the period 1980-81 to 1991-92 ^e The compound annual growth rate for NER excludes the figures for Mizoram as data are not available at constant prices. The NER figure excludes the figures for Nagaland for the period 1994-95 to 1996-97 and the figures for Sikkim for the period 1992-93 to 1996-97 ^f The compound annual growth rate for Nagaland has been calculated for the period 1999-2000 to 2005-06 ^g The compound annual growth rate for NER excludes the figure for Nagaland for the year 2006-07 * population-weighted average ** Tendulkar Methodology

Sources: Government of Meghalaya, 2006; RGI (1951, 1971, 1991, 2011); NSSO (various rounds); www.mospi.gov.in; IIPS (2007)

there has been some increase in this variable overtime, there remains a substantial gap between the North-eastern states and the average consumption levels in the country (not to mention that among the more developed states of India). Remarkably, rural electrification (the percentage of villages having electricity) has registered considerable progress among the states of the region, but even here we find that these states are among the remaining few that have yet to reach full rural electrification in India (Fig. 3).

Fig. 3 Percentage of Villages Electrified, various states of India, 2008



Source: Government of Meghalaya, 2009

Given the rather tardy progress of both the primary and the secondary sectors in NER, it should come as little surprise that the growth of real per capita incomes has been sluggish over the past decades. In fact, as can be seen from Table 1.2, the

compound annual rate of growth of per capita net state domestic product (NSDP) was a meager 1.54% per annum (p.a.) for NER during the period 1981 to 1997, while the same for all-India was 3.22% p.a. on average. However, the growth rate of per capita income recorded an increase in later periods, especially after the 1990's. Indeed while between 1996 and 2006, per capita incomes grew by 3.37% p.a., growth rates escalated further to 5.25% p.a. in NER between 2004 and 2012. Nevertheless, the growth rates were still considerably lower than the all-India figures for the respective periods. Indeed, at least up to 2005, all the states of the region (barring Tripura) evinced lower growth rates than the national average. In fact, the relatively higher rates of growth evinced lately by a few states of the region, viz., Meghalaya, Nagaland and Tripura, has been primarily fuelled by the growth in the service sector, and especially through expansion of public administration (Srivastav, 2006)⁶. Hence, even the economic growth of the aforementioned states remain uncertain in the future, unless there is adequate thrust on the development of the agricultural and manufacturing sectors in these states, and of course, in the region as a whole.

The situation of employment (or rather unemployment) presents another area of concern in NER. Even as per capita income growth rates were rising in the region (however slowly), unemployment did not show any clear trend of decline at least after the 1990's, as can be seen from the various (and any of the) indicators of unemployment (Table 1.2). In fact, a remarkable feature among the various states of NER, which stands in contrast to the all-India pattern, is the lack of significant difference between the short-term [as measured for instance by the Current Daily

⁶ Of late, the manufacturing sector of Meghalaya has shown some signs of growth and it has been contributing substantially to the growth of per capita incomes since at least the middle of the 1990's (Srivastav, 2006; Sinha, 2010).

Status (CDS)] and long-term unemployment rates [as measured by the Usual Status (US)], signifying the structural nature of the problem in the region (Government of Tripura, 2007).

Not surprisingly, between 1993 and 2000, there was increase in the percentage of unemployed males and females among most of the states of NER according to both the CDS and US measures and, in rural as well as urban areas. However, the only exception to the usual pattern was Tripura, and to some extent Assam, that evinced moderate decline in unemployment during the aforesaid period. Interestingly, from 2000 to 2005, there was very little change in the unemployment rates in NER but for Nagaland and Tripura, the latter two states revealing a huge increase in both male and female unemployment. It should also be mentioned that overall, among the various states of this region, the situation of employment seems better in Meghalaya and Mizoram (and to some extent Arunachal Pradesh) as these states reveal lower employment rates over most of the period covered here as compared to the all-India average. In this context, it is interesting to note that the proportion unemployed, as perhaps expected, is many times higher among the educated group as compared to the population average among the North-eastern states. Not surprisingly, the latter two states perform better in this respect too, but the situation of educated females in both rural and urban areas appears worrisome even here (Government of Tripura, 2007:181-182).

Given the history of relative socio-economic backwardness of the region, it would be rather interesting to look into the progress in poverty reduction among the states of NER (Table 1.2). Official poverty estimates are available at least since the early 1980s, but are based on a methodology of estimation that has been modified quite

a few times. To keep the discussion simple, we focus here on the changes in headcount poverty rate between 1993 and 2010, for which we have estimates based on a uniform methodology (Tendulkar methodology), thus helping us dodge many of the problems of interpretation of estimates thrown up by dissimilar methods of estimation. More importantly, the Tendulkar methodology provides estimates based on a wider and more comprehensive definition of poverty, which includes education, shelter and clothing in addition to food requirements.⁷

A look at the level and trend of poverty decline in NER, reveals several interesting patterns in the data. First, even though there has been a tendency towards decline, poverty rates show considerable variation among the states of NER. Second, during 1993-94, NER had one of the highest poverty rates in India and while only a single state- Mizoram- evinced lower poverty as compared to the national average, three states- Arunachal Pradesh, Assam and Manipur-evinced vastly higher poverty compared ranging from around 51 percent in Assam to 65 per cent in Manipur (Table 1.2). However, all the states, including the three mentioned above, witnessed substantial reduction in poverty in later years, and in fact, at a faster rate vis-à-vis all-India, so that all of them (with the sole exception of Tripura) evinced lower poverty as compared to the national average figures during 2004-05. Third, during the period 2004 to 2010, poverty rates *increased* in as many as five states of the region- Assam, Manipur, Meghalaya, Mizoram and Nagaland- and in fact, lead to the reversal of poverty decline experienced earlier by Meghalaya and Mizoram. Thus, in the latter two

⁷ However, according to the Planning Commission, the Tendulkar methodology has to be put to disuse as there have been several recent economic changes not accounted for by it. Indeed, a new committee headed by C. Rangarajan is already underway with a new methodology and as a result new estimates of poverty, even as we write this.

states headcount poverty was higher in 2010 as compared to their levels in 1993! Indeed, in 2010 all the states of the region, with the exception of Meghalaya and Sikkim, revealed higher headcount poverty as compared to the national average. Overall thus, the performance of the North-eastern states in poverty reduction cannot be said to have been consistently satisfactory since the early 1990s at least.

The last observation is however, intriguing. In fact, the North-eastern states were the only to reveal rise in poverty since 2005 and this deserves some explanation and verification. As an explanation, it is quite simply possible that there has been poor implementation of State sponsored programmes aimed at the generation of employment among the poor in rural (and urban) areas. For instance, it has been claimed that the lower rural unemployment rates in Tripura as compared to the all-India average after 1990 can be directly attributed to the serious implementation of rural employment programmes in this state compared to other regions of the country (Government of Tripura, 2007). This obviously has positive implications for the reduction of poverty. Hence, it is conceivable that administrative failure in terms of poor implementation of poverty reduction/employment generation programmes in most of the states in NER have been contributing to the high levels of poverty, and perhaps even the sudden rise in poverty among the aforesaid states.

Indeed, the evaluation of the State sponsored poverty reduction programmes such as the National Rural Employment Guarantee Act (NREGA)/ Mahatma Gandhi National Rural Employment Guarantee Act (MG-NREGA) by several scholars, reveal that there are more serious administrative problems in the implementation of these programmes in NER as compared to many other states of India (see for instance, Rengasamy and Sasi Kumar, 2011). Moreover, several researchers have also noted that

states that have performed better in the reduction of poverty rates within the region such as Meghalaya and Tripura (recently), have also performed better in several ways in the implementation of poverty reduction (and employment generation) programmes as compared to others such as Assam, which has performed poorly in both respects (see for instance Feroze et al., 2012; Panda et al., 2009; Roy, 2010 among others).

It is interesting to note that evidence on the change in the nutritional status of children and adults, also suggests that improvements in the standard of living in the recent past in NER have been sluggish at best. For example, between 1999 and 2005, the percentage of undernourished children- those with anaemia or those who were underweight- showed significant decline in just a single state, viz., Mizoram, while undernourishment actually rose in the remaining states (Nagaland presented a unique case with increase in the percentage of underweight children on one hand and a decline in those with anaemia on the other). In fact, the situation is almost identical in the case of women as well, with the percentage of women experiencing nutritional deficiencies actually rising between 1999 and 2005 among two of the states of the region, viz., Manipur and Tripura. It is perhaps noteworthy that regardless of current trends, the nutritional status of men, women and children appears to be much better among the tribal dominated states of the region. Indeed, the percentage of undernourished population in these areas is lower as compared to the average of the region as well as all-India, reflecting the healthy lifestyle followed by the tribals- at least till recently.

Despite several disadvantages related to economic growth in NER, many states of the region still stand ahead as far as several social development indicators are concerned (Table 1.2). Majority of the population of NER is literate, and the region as a whole, as well as all the states, except Arunachal Pradesh, evinced higher literacy

rates vis-à-vis all-India in 2011 (Assam evinced comparable literacy rates with the all-India level). Interestingly, even though it is generally held that the growth in literacy, especially that among females, in NER has been huge achievement, it appears only partially true in the light of evidence. No doubt, female literacy rates among most of the states of NER, and especially the tribal majority states, was substantially higher than that attained at all-India level for instance during 2011. However, it cannot be forgotten that these states had a higher female literacy rate to begin with (Table 2.2). In fact, between 1981 and 2011, female literacy rates have increased faster at the *all-India level* as compared to most of the states of NER- notable exceptions being the states of Arunachal Pradesh and Sikkim.

Be that as it may, the overall progress in NER along various dimensions of social development has been noteworthy, at least since the beginning of the 1990s. Indeed, the human development index (HDI), for instance, shows that the absolute value of HDI in most of the North-eastern states was higher than the national level in 1991.⁸ While, the relative ranking among the 32 states and union territories of India placed NER at the lower end of the development spectrum, the India Human Development Report 2011 nevertheless reveals that the position of the North-eastern states has been steadily improving since the 1990s. Whereas the North-eastern states (excluding Assam) occupied rank 9 (which is itself commendable) during 1999-2000, the states climbed the ladder further to position themselves at number 6 during 2007-08 (Government of India, 2011).

⁸ The HDI, as is well known, is a composite measure of the relative progress of a region/country/state along set benchmarks of consumption, longevity and educational attainment. And even though we have seen that the growth of income and consumption has not been impressive in NER, the purpose of studying the HDI is that it is a useful summary measure of the overall social progress of a population.

Further, NER has historically evinced far more balanced sex ratios vis-à-vis India. Indeed, the sex ratio (female/male) in this part of the country started to look up much earlier than that at the all-India level, commensurate with the decline in immigration since the beginning of the 1970s. Indeed, it can be reasonably argued that the higher proportion of females in the population in NER (among both children and adults) is a direct outcome of the higher proportion of tribes in the population.

Tribals everywhere have been known for far more egalitarian gender relations in their societies compared to their non-tribal counterparts. The situation in NER is broadly in harmony with this larger picture. In addition to the relatively favourable female to male ratios as compared to the all-India average scenario, we find that the female singulate mean age at marriage among the North-eastern states has been, and still is, considerably higher compared to all-India average levels (Maharatna, 2005). Moreover, recent data from standard sample surveys [National Family Health Survey (NFHS)] find that women's participation in decision-making regarding their own health care, household purchases and physical mobility was highest among the North-eastern states, and actually even higher than the Southern states (IIPS and ORC Macro, 2007) (but more on this in subsequent chapters).

Unfortunately, there is evidence that the situation may be fast changing in NER. Even as sex ratios have been rising in NER since 1971/81, the JSR has registered continuous decline especially since 1981 (Ramaiah et al., 2011). There is a growing discomfort that tribal societies may in fact, be emulating the culture of discrimination against females characteristic of large parts of 'mainstream' India, leading to an intensification of gender bias among them. Interestingly enough, recent estimates indicate that gender discrimination could actually be on the rise in NER; rolling back

the earlier trend of relative female *advantage* in nutritional and mortality outcomes among most of the states of the region. As an illustration, we present changes in the gender disparity indices of mortality, nutrition and childcare for the period 1998 to 2005, constructed from NFHS data in Table 1.3 below. These indices, based on Sopher's method (Sopher, 1974), measure the disparity between male and female children along any particular dimension of well being. For instance, the index of gender disparity in childcare reflects the extent of discrimination against the girl child in receiving full immunization. A positive value indicates bias against females, while a negative value would indicate a relative female advantage. When there is no discrimination between the sexes, the index assumes the value zero. (See Appendix 1 for a full description of the method and the calculation of the various indices).

As far as these indices lead us, none of the states of the region exhibited any form of gender bias during the late nineties. In fact, what we come across is a relative female advantage in nutrition, childcare and mortality, which is especially pronounced in the case of the tribal dominated states of Arunachal Pradesh, Meghalaya, Mizoram and Nagaland. Surprisingly, the situation is altogether reversed in many states of the region during the following period.

During 2005-06, in around half of the states, the nutritional status of girls was found to be relatively worse as compared to boys, and in nearly all the others, the relative advantage of girls had declined significantly. In fact, the picture is remarkably consistent with regard to the reversal of female advantage in each of the three indicators of gender disparity. Surprisingly, we find a relative male advantage even in the case of immunization. This is especially alarming as the vaccination and immunization campaigns are sponsored by the Government and do not involve any

Table 1.3: Gender Disparity Indices along Various Dimensions of Well-Being among Children Aged 0-6, NER: 1998-99 and 2005-06

State	Index of Gender Disparity In Nutrition		Index of Gender Disparity In Childcare		Index of Gender Disparity In Mortality	
	1998-99	2005-06	1998-99	2005-06	1998-99	2005-06
Arunachal Pradesh	-0.40	-0.04	-0.63	0.36	-0.10	-0.04
Assam	-0.01	0.10	1.04	-0.17	-0.22	0.10
Manipur	-0.01	0.04	-0.22	0.44	-0.22	0.04
Meghalaya	-0.02	-0.04	-0.11	-0.01	-0.34	-0.05
Mizoram	-0.26	0.04	-0.49	0.41	-0.30	0.04
Nagaland	-0.51	-0.16	0.04	0.03	-0.13	-0.16
Sikkim	-	-	-	0.52	-	-
Tripura	-0.10	0.04	0.95	0.30	-0.62	0.04

Source: Author's calculations from NFHS data [IIPS (2007)]

direct monetary cost on the part of the family. Indeed, it may not be long before gender bias against females manifest itself in many other forms in this region as well.

Before concluding this section, we briefly discuss the political situation in the region and its states, Indeed, any discourse on the society of NER is incomplete without reference to the socio-political turmoil that has been going on in the region for a considerably long time now, and which has rather wide-reaching consequences in several contexts within the region, as shall be evident during the course of this thesis.

1.1.3 Socio-Political Situation in NER: The Contemporary Picture

It is perhaps well-known that the ongoing conflicts (especially the armed conflicts) between various tribal groups and the State in NER, are primarily driven by either of the two goals: (a) political autonomy within the Indian nation (b) secession from the Indian nation (see for instance Upadhyay, 2006), which suggests that the process of nation building is yet to reach conclusion, at least as far as the North-eastern region of India is concerned. It goes without saying that the process of nation-building in pluralistic societies (such as India) is universally fraught with such fears and the progression towards the idea of a single nation cannot be expected to be a smooth and quick process. However, the fact that such a situation has come to pass as the mainstay of the politics and polity of NER, is something that deserves special attention. Not surprisingly then, this issue has received considerable thought from all sections of society including researchers, and several theories have been put forth towards explaining the emergence and continuation of conflicts in NER. Among these, a particularly dominant perspective is the one that suggests that incorrect/misdirected policies of the Centre towards the (peripheral) North-east, which, it is claimed, is a continuation of the colonial policy towards NER, have been the root cause of the socio-political unrest in NER (for instance Baruah, 1989; Haokip, 2010; Upadhyay, 2006). However, this is perhaps not entirely correct.

As will be remembered from the discussion presented in the first section of this chapter, the British followed the policy of ‘non-interference’ in the internal affairs of the tribal communities of NER driven primarily by their lack of commercial interest in these areas. The separate policies adopted by the British towards the Assam plains on

the one hand and the hill areas on the other, advertently or accidentally, also led to the physical and psychological isolation of the tribal-dominated areas of NER from the Assam plains and the rest of India as well. It cannot be denied that the government of independent India adopted a socio-political position similar to that of the colonial rulers by granting a great degree of autonomy to the hilly/tribal-dominated areas of NER, as embodied in the provisions for self- governance in the Sixth Schedule of the Constitution of India for the tribal- dominated areas of NER. A critical component of these provisions has been the extensive legislative as well as executive powers to protect land and tribal traditions in the scheduled areas (occupied primarily by tribes) through the system of autonomous district and regional councils. In fact, these are the very areas that were accorded the position of Excluded and Partially Excluded areas under the British administration. But, this is perhaps where the similarities end.

In fact, although the strong resemblance between the colonial policies and those adopted by independent India towards the political administration of NER cannot be denied, there is possibly also a huge difference in the *spirit* with which such administrative mechanisms were introduced in the region by the former and the latter. Indeed, the implementation of the Sixth Schedule in NER reflected a standpoint that was almost diametrically opposed to that of the British. Whereas the former was aimed at the development of the tribes, the latter had no such connotation. Specifically, the Sixth Schedule was introduced in NER within the broader 'Nehruvian policy framework' that sought adequate protection and freedom to the relatively socio-economically backward and culturally distinct tribes of the North-east. Within this framework, the idea was to gradually *integrate* the tribes within the mainstream, as distinct from efforts towards the *assimilation* of the tribal minorities in the Indian

society (Haokip, 2010).⁹ However, the results of the intervention were not satisfactory, mainly due to problems with structural translation of the idea. Nonetheless, it would not be correct to view the Centre's policy towards NER as a colonial legacy in the context of the region, even if the former were influenced by the latter to a certain extent.

Having said this, it needs to be pointed out that in the aftermath of the Chinese aggression of 1962, there was a drastic change in the Centre's overall policy towards NER; a shift from the integrationist approach followed earlier to one that broadly resembled the policy of assimilation as defined earlier. Indeed, it is during this phase that the policy of the Centre could be said to have been analogous to the one followed during the British rule. In fact, from that point on, the policies were driven more by a 'security' perspective as compared to a 'development' perspective; the execution of which brought about drastic changes in the society and politics in NER. The focus now was the development of the territory of NER, as distinct from the development of the tribes, and the earlier policy was replaced by an aggressive regime of politico-economic and cultural integration of the tribal people to speed up their socio-economic development (Das, 2001; Haokip, 2010). The overall idea was to pacify any possible discontent through various means (including even force perhaps) in order to maintain the territorial integrity of India.

⁹ Even though the terms 'integration' and 'assimilation' are generally used loosely and often interchangeably, in this context, the difference between them formed the defining feature of the Centre's policy towards North-east India as envisaged under the Nehruvian or Nehru-Erwin framework. Whereas, the former (and the one adopted by Nehru) meant political, economic and administrative integration of the tribes *without* the loss of linguistic, religious or cultural features, the latter implied loss of ethnic attributes of tribes and their absorption into the dominant group, possibly resulting in increasing alienation and antagonism (Haokip, 2010).

What followed was the Balkanization of Assam beginning with the formation of Nagaland in 1963. Indeed, the re-organization (or rather fragmentation) within the region has been a continuous process, the discontinuation of which does not appear to be any time soon at present. In fact, there are two interrelated issues at work here. First, while most of the states of India were organized on linguistic grounds after based on the States Reorganisation Commission constituted in 1953, those in NER were formed on ethnic grounds, thus sowing the seeds of ethnic determinism of Statehood (Haokip, 2012b). Second, the security perspective adopted by the Centre towards the region led to the rather uncritical granting of political autonomy to minorities, which in several instances took the form of the creation of new states along ethnic lines. These two factors taken together resulted in the proliferation of demand for separate states, and in extreme cases, the demand for separate nations, by various ethno-cultural groups who perceived them to have been wronged in some sense.

Indeed, several scholars are of the opinion that the efforts of the Centre in the direction of maintaining peace in the region were largely of a stop-gap kind and could not be expected to deliver the goods in the sense of either sustained economic development or lasting peace in the region. In fact, the strategy of granting Statehood to ethnic groups that was adopted by the Centre for dealing with armed conflicts in the region, has led to the creation of a periphery within a periphery. The ethnic minorities *within* these new-formed states in NER claim that their rights and resources are being impinged upon by the ethnic majorities, and have thus been demanding political autonomy of their own, paving the way for further divisions of the existing territories of the states of the region (Baruah, 1989; Barbora, 2002; Roy, 2002; Shimray, 2004). Thus, this policy seems to have failed, at least till now. However, there is little doubt

that the Centre has not taken the repercussions of its 'minority' policy into full cognizance. Indeed, what is perhaps very much lacking from the side of the Center is a holistic strategy for the development of NER. It would be useful to quote from Baruah in this context who argues that "[T]o deal with the troubled north-east region, India has a counter-insurgency strategy, an economic development strategy and even a vacuous nation-building strategy. What it sorely lacks is a thoughtful *state-building strategy* - one that could link state and society in a way that harmonises the interests, cultural values and aspirations of the peoples of the region with the agendas of the national state" (Baruah, 2002: 4178, emphasis added).

However, this is hardly all, so far as the ramifications of the ethno-centered political struggles in the region are concerned. Indeed, in the democratic set-up of the Indian state, it is hard to miss the development consequences of demographic power (or the power of numbers) in any region, and especially in NER, where political supremacy yet remains a contested issue, as should be clear from the discussion in the preceding few sections. The fates of the various communities of the region are in fact, inextricably tied to political representation, the lack of which spells economic, social and cultural marginalization. Indeed, this is what has led sections from many minority groups to engage in armed conflict with the State in the first instance. For instance, the socio-political unrest over the issue of migration into the states of NER could be explained within this framework. Once it is made clear that political power/autonomy is directly linked to ethno-cultural aspirations (rather agitation in many instances), the strategy that ethnically larger groups would adopt towards the ethnically dissimilar and numerically weaker migrants perhaps becomes clear. Indeed, the fear of being driven down to a minority and the consequent decline of political voice, or in extreme cases,

demands for complete autonomy by the migrants, has resulted in the ethnic majorities resorting to constitutional (and in many cases unconstitutional) remedies in order to maintain their socio-cultural hegemony.

A related issue concerns the fear of identity loss among the ethnic minorities in NER, and in some cases even among the majorities within a particular State, when threatened by large and incessant inflow of migrants, as exemplified by the case of Meghalaya (see for instance, Saikia, 2005). In fact, there is evidence to suggest that a cultural assimilation of a different kind has also been going on in the North-east, whereby, the ethnic majorities are forcing the ethnic minorities to adapt to and accept the former's language, culture and way of life in general (Shimray, 2004). Not unexpectedly then, in many of these instances, the response has been in the form of stricter adherence to traditional laws including those that support large family size (Saikia, 2005). However, we discuss this issue in greater depth in a later chapter.

Overall, the discussion till now indicates that the society of North-east India has been troubled with social, political and economic maladies at least since the British occupation of Assam in 1826, which resulted in unfavourable changes in socio-political and economic relations in the region during the colonial era. The experience of the region in the post-Independence, though not equally depressing, has been largely one of dealing with profound challenges, the ongoing ethno-political struggles being the most important among them. Needless to say, the socio-political crisis in NER has severely crippled the prospects of economic and social growth in the region. NER remains largely a backward agrarian economy with dire consequences as far as employment and livelihood opportunities for the masses are concerned. Also, equally important are the contemporary changes in the socio-cultural milieu of the tribes

inhabiting NER, as indicated by the deteriorating position of women, manifested for instance, in anti-female bias in several areas including health and nutrition as mentioned earlier. Indeed, gender bias among tribes in general and among those of NER in particular has been hitherto unknown, and its emergence in NER is particularly distressing.

With this attempt to provide a brief but detailed review of what is relatively better known about the North-eastern region and its states, we now come towards such issues that have received very little attention from researchers historically as well as currently, but nevertheless remain such important facets that can shed useful light on the society and gender relations in NER. Indeed, politics has held the spotlight in NER for so long now, that other issues have been, much to the dismay of many, relegated (rather buried) to the background for too long now. One could even argue that it is in fact, ironical that while emphasizing the need to look beyond the ‘politics’ of the region, most research on NER has in fact, failed to do so.

Specifically, among many aspects and dimensions of inquiry and research on the region, its demography – for almost obvious reasons – is central to a deeper understanding of its problems and possible remedies. Unfortunately, the existing literature on the demographic trends and characteristics in this region is conspicuously thin. In fact, it is only recently that a few academic attempts at the examination of some specific demographic indicators e.g. reproductive behaviour, mortality, status of women, and migration – albeit mostly in the context of some specific locations and/or tribes of the contemporary states of NER have been made (e.g. Deb, 2010; Nayak, 2010; Saikia, 2005; Tyagi, Chowdhury and Banerjee, 2000; Dass, 1980; Mishra, 1999).

In this context, the primary object of the present thesis is to look into the fertility¹⁰ transition in NER and its constituent states from a long –term comparative perspective vis-à-vis India.¹¹ In fact, it would not be incorrect to say that this research is one of the very few (if any) that deals with the complexities of the process of fertility transition in the tribal-dominated NER, and in fact, adds to the existing literature on regional differences and determinants of fertility in India. Although the importance of research on fertility can hardly be overemphasized, it could be mentioned here that the total fertility rate (TFR), per se, as an indicator of reproductive ‘output’ of a population, has important demographic and gender implications. Apart from the widely acknowledged facts that first, the TFR is itself an indicator of social development (with regions and populations with a higher levels of human development, typically posing lower fertility rates), thereby implying that research on the levels and trends in fertility in a population deserve attention in their own right, and second that higher fertility impedes economic growth in various ways, it has been argued of late that reduction in fertility or a change in the demographic regime from one with high fertility to one with low fertility, is a pre-requisite for “gender transition” (broadly referring to transformation of unequal social and institutional structures) (see for instance, Mason, 1995). Interestingly, this issue is also inextricably linked with much of what has been

¹⁰ The term fertility or fertility rate, as used in this thesis, and unless specified otherwise, refers to the total fertility rate, generally understood as the average number of children born to a woman in any specified population. Formally, the total fertility rate is defined as the average number of children that would be born to a woman by the time she ended childbearing if she were to pass through all her childbearing years conforming to the age-specific fertility rates of a given year (Haupt, Kane and Haub, 2011).

¹¹ Even though mortality studies on the region are also relatively scarce as compared to other states and regions of India, its determinants are relatively well-known and hence our decision to focus on fertility in this research. Further, we also do not take up the issue of migration, which even though remains a germane issue, has received ample academic attention as any scholar aware of research on NER would perhaps know.

discussed in this section relating to the economy, society, and politics in the region, as will be argued in much of the remainder of this thesis. Besides, as much as the latter helps us to understand demographic processes in NER, the demographic perspective on the region and its states, on its part, informs us on the nature and changes in the socio-cultural and socio-political aspects of the region. With this perspective, we now move towards the approach and methodology of the present research for answering the various issues related to fertility transition in NER.

1.2 Research Questions, Methodology, and Structure of the Thesis

As mentioned above, the primary aim of this thesis is to examine and explain the process of fertility transition in North-east India. However, before moving ahead, it is imperative to mention here that in clubbing the eight states of the region together, we adopt a position that is arguably insensitive to the diversity of the sub-national cultures within NER to a great extent. In fact, it has been pointed out by several scholars that the very idea of a North-eastern region is a misconception, an artificial construct, born out of administrative requirements that cannot be used in a meaningful way for academic or policy purposes (Haokip, 2012a; Hussain, 2004 among others). However, there are others who point out that there *is* in fact, a pan- North-East identity (and commonality) in the minds of both- the people of NER and others outside the region, and that, more importantly, it could actually be *useful* to approach the region as a whole from an analytical standpoint in several cases, thereby attaching greater weight to the similarities as compared to the diversities among the people of NER (see for example Ngaihte, 2013). Indeed, one could argue that the relative parity in the nature

and extent of economic development of the states of NER, the distinct socio-cultural moorings of its peoples, especially when compared to ‘mainstream’ India, and most remarkably, the shared experiences of its inhabitants in the historical past and indeed, to a great extent in the present, as indicated during the course of the discussion in the previous section, justifies its treatment as one distinct region. It is specifically from this perspective that it becomes meaningful also to discuss the pattern and determinants of fertility transition in NER as a well-defined entity in its own right, especially in a comparative perspective vis-à-vis other regions or all-India for that matter.

However, this does not preclude us from the analysis of the constituent states (or for that matter, the districts) of the region. Contrariwise, the analysis of fertility transition in a region can hardly be conducted without analysis of its constituent units (states, districts, villages etc). In fact, what we are essentially trying to argue is that it is rather unnecessary to focus on the dissimilarities within NER to such an extent as to discard the very notion as untenable, thus ending all possibilities of such discussion that would throw useful light on various issues facing the North-eastern region as a whole.

Coming back to the objective of this research, we begin by asking ourselves several questions such as, what do we know about the demographic regime of NER in the past? Did the region and its constituent states evince a higher population growth as compared to the rest of India in the past? If so, was it due to immigration or was the fertility rate of the region higher then? What is the contemporary situation in NER and its constituent states pertaining to fertility, mortality and migration, especially as compared to the all-India scenario? What explains the relatively higher fertility rates in NER? Is it that the people have a higher fertility preference or do they lack access to

family planning methods? How do economic, socio-cultural and socio-political factors influence the fertility outcome in the region? And finally, what policy relevant conclusions can one arrive at from the analysis of the process of fertility transition in NER?

With the intention of finding the answers to the above, we begin by searching for relevant literature in the form of books and published journal articles. As already noted, we find very little (indeed, practically negligible) information on fertility in NER and its constituent states, especially for the historical/colonial period. What we come across for the colonial period on the North-east that comes closest to our field of research, is basically ethnographic literature on the larger tribes of NER, primarily penned by British anthropologists (Allen, 1902; Gurdon and Lyall, 1914; Reid, 1942 among a few others), which though precious in terms of the information they contain, can hardly be expected to illuminate us on the issue of fertility in the region.¹² Surprisingly, even when information on demographic variables such as fertility was available for the more recent period, we hardly find any analytical discourse on the issue to inform the present inquiry (but more on this in Chapter 3).¹³

The tasks before us then, was to first collect (and in several cases construct) and then analyze the available information on fertility in the region and its states, which was found to be especially challenging for the pre-Independence period. Moreover, it

¹² However, we do come across one such study by Ghosh (1956) that discusses the demography of colonial Assam, and proves to be of immense value to us. It has been discussed in the following chapter.

¹³ Indeed, a search through some of the highly esteemed social science journals leaves one distressed with the discovery that is hardly any reference on North-east India. For instance, upon hunting for fertility related literature in the *Economic and Political Weekly*, we learn that while there are more than four dozen articles on fertility in India and its major states for the post-Independence period itself, that on fertility issues of the states of NER is practically non-existent.

was clear by now that dictated by the nature of the central question posited in the thesis (and available resources), we would be relying mostly on standard secondary sources for this study, viz., the Census, Civil Registration System, Sample Registration System, National Family Health Survey and District Level Household Survey. However, we would like to quickly add here that an analysis of the nature and quality of the data from these various sources has not been discussed here, but has been taken up in the individual chapters, as and when they are introduced for the purpose of the analysis.

As regards the theoretical framework of the thesis, given the breadth of the research questions we set out to answer, it was difficult to settle on a single theoretical framework that could fit all the strands together. In fact, for the same reason, there is no single chapter devoted to a ‘Literature Review’, but a thematic approach is taken to the issue and relevant literature is discussed alongside each topic. However, for the latter part of the thesis that discusses the fertility transition in the post-Independence period in NER and its states, our framework broadly *resembles* that developed by Easterlin and Crimmins (1978) generally, in that we begin with an examination of the proximate determinants of fertility among the states of NER, and then continue with the investigation of background or contextual factors (economic, social, cultural political) influencing fertility decline in NER. Each substantive chapter is devoted to answering a particular or particular set of questions and we employ suitable methods in order to answer the specific questions raised therein as discussed briefly below. The general method applied to the thesis is one of examining the issues from multiple approaches loaded with the notion that “No single analysis will tell the entire story” (Fricke, 1997: 21).

Chapter 2 of the thesis examines long-term demographic trends in NER and its constituent states, from 1901 to 2011, in a comparative perspective vis-à-vis India. In fact, this chapter has two major sections; the first one discusses fertility, mortality and migration during the colonial period beginning 1901, while the second major section traces the changes in these variables over the post-Independence period (till 2011), and compares the performance between the former and the latter periods in terms of these demographic indicators.

The construction of the demography of NER during the British period is largely based on Census reports, supplemented to some extent by the work of earlier researchers on the topic, which though scarce proves to be immensely useful. In addition, we use our own estimates of the TFR using indirect estimation procedures based on census data to complement existing information on fertility differentials between the region and all-India during the pre-Independence era. The second part, yet again, relies on official sources- the Census and the SRS. In the process, we discuss the quality of the data sources (primarily the Census and SRS) specifically in relation to the effect of under-registration and misreporting on reported vital rates.

A particularly remarkable finding from the colonial period is that of a differential in reproductive performance of the region vis-à-vis all-India. In fact, our own calculation of the TFR for Assam and all-India for the years 1911 and 1931 using Rele method shows that it might have been higher in the former region as compared to the latter by nearly a child. This is indeed a significant finding, especially in view of the fact that previous research on the subject has largely focused on immigration into NER as possibly the lone cause of its relatively higher population growth vis-à-vis India. However, our analysis finds that comparatively higher fertility of NER possibly also

had a role to play in it. The rather lower levels of socio-economic development and higher infant mortality rate (IMR) of the region compared to all-India provide clues as to why such differentials might have existed during that time.¹⁴

The post-Independence period presents us with some larger surprises. While relatively higher birth rates among the major states of NER coupled with heavy immigration flows, continued to push population growth rates above the national average throughout this period, there was a dramatic change in the destination of the primarily non-tribal immigrants from the tribal-minority regions in the pre-Independence period to the tribal-majority states after Independence¹⁵. Indeed, the ramifications of these developments have been the motivation behind extensive academic debates and writings on the socio-political turmoil and its possible solutions and resolutions in NER.

Chapter 3 analyzes fertility levels, trends and differentials among the states of NER from the early 1970 to late 2000s. Data from three consecutive rounds of the National Family Health Surveys (NFHS) found that none of the states experienced a steady decline in fertility for the entire period from 1990 to 2005, which was marked by statistically significant slowdown, and in some cases even reversal of the fertility decline witnessed during the preceding decades in these states. Indeed, fertility trends constructed from indirect estimates for the concerned period substantiate the finding of a stall, and lead us to conclude that even though fertility had started declining in the region and its constituent states at nearly the same time as the rest of India, NER

¹⁴ The infant mortality rate is defined as the number of deaths of infants below one year, per thousand live births in a population in a given year.

¹⁵ The term birth rate or crude birth rate (CBR) is defined as the number of live births per thousand population in a given year.

witnessed a stalling in fertility decline at considerably higher levels than replacement level fertility from the middle of the 1990s. We also find substantial rural-urban differences in fertility among the states of NER, as also by socio-economic categories such as wealth and education.

We begin the investigation into the determinants of fertility in NER with an examination of its intermediate determinants utilizing Bongaarts' Aggregate Fertility Model in Chapter 4. Among the various proximate determinants, the index of noncontraception is found to be the most important factor influencing fertility. Interestingly perhaps, nuptiality is also found to be an important determinant of fertility- and especially important in determining its decline- among the states of NER. However, we find very little change in most of the proximate determinants during the period 1990 to 1998, and in fact, our estimate of the combined index- measuring the joint influence of the indices of proportion married, noncontraception and postpartum infecundability- shows practically no change or even a slight rise overtime among the concerned states confirming the existence of a fertility stall.

Stepping closer towards the contextual factors influencing fertility, we also examine the relative influence of fertility preferences, and family planning programmes in determining fertility trends among the states of the region in this chapter. We carry out the analysis utilizing state-level data drawn from the NFHS. Interestingly enough, we find that in most cases of a rise in fertility, it is some deficiency in the family planning programme and the associated rise in unwanted fertility that has an overriding influence, reversing the effect of the change in fertility preferences towards a smaller number of children. Among various indicators of socio-economic development that influence fertility preferences in our model, we find that

the stall in fertility decline is associated with increases in infant and child mortality. Interestingly perhaps, states that did not experience a stalling in fertility decline went through relatively rapid increases in female literacy rate.

In the final analytical chapter, Chapter 5, we move further with our search into the socio-economic and cultural correlates of fertility, and introduce a panel data model to explain district level variations in fertility in NER for the period 1991 and 2001. While most of our explanatory variables have been gleaned from standard secondary sources like the census, comparable estimates of the TFR at the district level for 1991 and 2001 were unavailable for the concerned period. Hence, we use our own indirect estimates of fertility based on the Arriaga-Arretx method (which can be considered as a refinement over the original Brass P/F method of estimation in relaxing the assumption of constant fertility). In fact, ours is perhaps the first instance of an attempt towards quantifying the various social, economic and cultural influences on fertility in NER, and the results prove that the effort has possibly been worthwhile.

Remarkably, while variables capturing overall levels of economic growth, like urbanization, are found to be of little consequence in determining fertility in NER, those that are more closely associated with socio-cultural factors are found to be of greater consequence. In line with several other studies on the determinants of fertility in India, and indeed, several countries throughout the world, we find that female literacy contributes significantly to lowering fertility in NER, thus confirming the near universal positive impact of female education on fertility decline. As partial evidence of change in the socio-cultural mores of the tribes of NER, we find that a higher proportion of Scheduled Tribes leads to higher fertility in NER. This finding is again of crucial significance as it reflects, at least to a certain extent, a tearing away from

past cultural practices related to lower fertility among tribes, a conclusion reached by several painstaking inquiries on the subject in the past. Interestingly, we do not find support for the generally held view that adherence to Christianity has a fertility enhancing effect in NER. Interestingly, we also find evidence in support of the hypothesis that in certain situations, such as the one we encounter in the newly formed tribal-majority states of NER, ethnic clashes triggered by demographic imbalance due to huge in-migration, and the accompanying perceptions of marginalization in the State's political processes, can lead to pro-natalist proclivities in the concerned groups under circumstances where political representation is linked to the size of population, and the society is passing through a stage where political supremacy remains a contested issue.

Chapter 6 concludes the thesis and provides a few suggestions. From a policy perspective, improvement in the family welfare programme with a thrust on its IEC (information, education and communication) component has the potential of reducing fertility primarily by reducing unwanted fertility. The study also brings out that greater effort has to be made towards bringing down the infant and child mortality rates and increasing the female literacy rate in the North-eastern states of India if there has to be sustained fertility decline in the region in the coming years. Importantly perhaps, this thesis makes a case for a deeper understanding of the basic issues of socio-political organization, not only in their own right, but as they affect myriad dimensions of people's lives- both personal and social. The silent but significant changes confronting the peoples of the region, as for instance, in socio-cultural practices governing fertility behavior, calls for greater attention and a holistic approach to the various demographic, economic and social issues facing NER to-day.

CHAPTER TWO

LONG-TERM DEMOGRAPHIC TRENDS IN NORTH-EAST INDIA, 1901-2011:

A HISTORICAL AND COMPARATIVE ANALYSIS

2.1 Introduction and Background

As pointed out in chapter 1, among many aspects and dimensions of inquiry and research on NER, its demography – for almost obvious reasons – is central to a deeper understanding of its problems and possible remedies, apart from the necessity to understand the demographic processes in their own right. Unfortunately, the existing literature on the demographic trends and characteristics in this region is conspicuously thin. Systematic studies on long-term trends in the key demographic indicators and behaviour at the state and region levels are pitifully rare, betraying a sound understanding of the patterns/directions of changes in the key demographic processes across NER and its states in comparison with those of India as a whole and other regions and states. Therefore, we begin with the analysis of trends in fertility, mortality and migration in NER and its constituent states, beginning 1901.

In this connection, it is remarkable that there is a near absence of studies, especially on the *historical* demographic of NER – a region which thus continues to remain comparatively obscure and virtually aside the Indian mainstream society, culture and politics. In fact, the scope for, and usefulness of, further research in India's historical demography in various Indian locations is so immense that Tim Dyson – a leading authority on India's contemporary and historical demography – recently made

even a ‘call to arms’ of the Indian demographers in promoting and furthering serious research in the country’s historical demography (Dyson, 2008).

Thus, the chief object of the present chapter is to identify patterns and features of long-term trends of NER’s population over a span of more than a century i.e., 1901-2011, which could even provide clues to many of the existent (and potent) problems facing the economy, society, and people of the region and beyond. The chapter is divided into two broad parts. The first part deals with the historical demography of NER from 1901 to 1941. In the second part of the chapter, we would attempt at capturing key features and major directions and dimensions of NER’s demographic evolution over the post-independence period.

2.2 Trend of Population Growth in NER, 1901-1941

Table 2.1 contains information on the population of the North-eastern states and India as a whole for about fifty years preceding Independence. Total population of NER increased from around 4,331 thousands in 1901 to 8,741 thousands in 1941. While the decadal rate of population growth at the all-India level remained below 15 percent during 1901-11 to 1931-41, it was much higher in NER. Though population growth rates over this period show a rising trend at the all-India level, the corresponding figures for NER (while conspicuously higher than the former) do not evince any distinct trend (although it increases marginally). However, among the individual states within NER there was substantial variation in the rates of population growth during this period (Table 2.1).

**TABLE 2.1: POPULATION TRENDS IN NORTH-EASTERN
REGION AND ALL-INDIA, 1901-1941***

State/Region	Population ('1000)					Decadal growth rate (%)			
	1901	1911	1921	1931	1941	1901-11	1911-21	1921-31	1931-41
Arunachal Pradesh**	-	-	-	-	-	-	-	-	-
Assam	3,290	3,849	4,637	5,560	6,695	16.9	20.5	19.9	20.4
Manipur	284	346	384	446	512	21.7	10.9	16.0	14.9
Meghalaya	341	394	422	481	556	15.7	7.2	13.8	15.5
Mizoram	82	91	98	124	153	41.9	7.9	26.4	22.8
Nagaland	102	149	159	179	190	46.7	6.5	12.6	6.0
Sikkim	59	88	82	110	122	48.9	-7.0	34.4	10.7
Tripura	173	230	304	382	513	32.5	32.5	25.8	34.1
NER	4,331	5,147	6,086	7,282	8,741	18.8	18.2	19.6	20.0
India	2,38,396	2,52,093	2,51,321	2,78,977	3,18,661	5.7	-0.3	11.0	14.2

Notes: * The population sizes of the states are estimated according to the present political boundaries. With the exception of Manipur and Tripura, the remaining states of the region were part of the Assam province during the pre-Independence period.** Arunachal Pradesh was censused for the first time in 1961.

Source: Government of India, 2006

It is of interest that whereas at the national level population growth rates fluctuated substantially during 1901-11 to 1931-41, the extent of variation was relatively less in NER. This is in large part the reflection of a relatively lesser variation in the population growth rates in Assam, Tripura and Manipur (three of which together

constituted nearly 90 per cent of the NER population). The latter in turn, the possibility of data errors aside, could be (at least partially) an outcome of relatively lesser incidence and intensity of epidemics, famines, and similar crises in these regions vis-à-vis other parts of India.

Prior to the 1920s, the decadal population growth rate at the all-India level never exceeded 6 per cent, resulting largely from frequent occurrences of natural calamities, epidemics, diseases, and wars that kept mortality rates very high. During 1871-81 decade there occurred the great Indian famine of 1876-78; in the 1890s two major famines that of 1896-97 and 1898-99, occurred in quick succession; again in the 1911-21 decade, the great influenza epidemic of 1918 struck large parts of India. Each of the former crises killed millions of human lives [see for example Maharatna (1996) for the estimated magnitudes of ‘excess deaths’]. Kingsley Davis in his classic study notes that “[i]n the decades of negligible growth the trouble lay in one or the other of these catastrophes.... Indeed these calamities were largely responsible for the lack of growth of population in the decade during which they occur, because the provinces and states most affected by them were precisely those that showed the lowest growth rates (1951: 28).” In contrast, the overall demographic scene of NER (at least) prior to the 1920s had been somewhat different in that it had experienced much lesser fluctuations of population growth, reflecting, and/or indeed resulting from, a *relatively lesser* infliction of natural calamities and crises, epidemics, and perhaps wars than other regions of India did during this period (Census of India, 1921, Vol. III, Assam Part I Report: 4). Moreover, particularly high rates of population growth were recorded in the Hills (comprising of the present day states of Mizoram, Meghalaya, Nagaland and Manipur). Although part of the increase was due to relative improvement in the

coverage of enumeration during 1901-11 decade, higher natural increases of population was also an important factor (Assam Census Report, 1911: 22).

It is notable that the difference in population growth between NER and India as a whole became relatively pronounced during the 1911-21 decade, within which had occurred the great influenza pandemic of 1918 across India – albeit in varying intensity. That the pandemic did not take a very severe proportion in Assam was noted in the Sanitary Commissioner’s Report of 1919. To quote from the former: “[t]he epidemic reached its greatest intensity in the central, northern and western parts of the Indian empire. In comparison with these regions the provinces of Bengal, Burma, Bihar and Orissa, Madras and Assam were only slightly attacked. There was a gradual diminution of intensity toward the east” [Public Health Reports (1896-1970), Vol. 34, No. 30: 1624]. As *The Assam Manipur and Tripura Report of 1951 Census* also notes, in 1921-31 decade there was no violent epidemic in the region, and public health was at normal level and the population growth in Assam, though the highest recorded till then, was chiefly due to natural increase.

Differential population growth rates between NER and all-India had begun to get narrowed since 1921-31 when the process of growing control over major communicable and non-communicable diseases took off, leading to secular declines in mortality across the subcontinent over the following decades (Visaria and Visaria, 1994). However, the fact of higher population growth in NER than the average level for the whole subcontinent throughout pre-Independence period is of interest, and it does deserve a deeper investigation and fuller explanation.

2.2.1 Fertility and Mortality Trends in North-East India, 1901–1941

Population change in a region is a result of interplay of fertility and mortality rates when the region is closed to migration. The latter can assume importance in a situation of substantial movements of people across boundaries (national or international). In NER, migration has indeed been relatively important in shaping population change during much of the pre-Independence period (we shall return to this later). However, it would be useful to begin by examining natural increases of population in NER in comparison with those in all-India. In particular, it is of interest as to whether natural rate of population increase had been higher (with commensurately higher CBR and/or lower death rate¹⁶) in NER vis-à-vis all-India during the pre-independence period under consideration. However, since birth and death rate estimates for NER as a whole are unavailable for the period, we use Assam's respective estimates as proxy for NER during 1901-1931 (Table 2.2). [Assam used to constitute nearly 80 per cent of the total population of NER.].

As Table 2.2 shows, while the registered CBR at the all-India level declined from around 37 per thousand in 1901-11 to 34 in 1931-41, Assam recorded a much larger drop from 35.7 to 20.9 during this period. The lower levels of registered CBR in Assam vis-à-vis all-India in the first half of the twentieth century could reflect (at least partly) a larger degree of under-registration of births in the former. Indeed, there exist some alternative and more reliable estimates of the vital rates for this period. One of the widely acknowledged CBR estimates at the all-India level for the colonial period is provided by Davis (1951). The latter estimates show a (meagre) decline from 49.2

¹⁶ The death rate or the crude death rate (CDR) is defined as the number of deaths per thousand population in a given year.

TABLE 2.2: CBR, CDR AND IMR: ASSAM AND INDIA, 1901-1941

Period	Crude Birth Rate					Births per 1000 married women aged 15-50 (GMFR)		Crude Death Rate			Infant Mortality Rate		
	India			Assam		India	Assam	India	India	Assam	India	Assam	Assam
	Registered ^	Davis	Mari Bhat	Registered @	Ghosh	(Ghosh)	(Ghosh)	(Registered) ^	(Davis)	(Registered) @	(Chaudhuri)	(Chaudhuri)	(Ghosh)
1901-11	37	49.2	46.8	35.7	-	-	-	33	42.6	29.6	-	-	-
1911-21	37	48.1	46.0	32.3	50.3	237	284	34	47.2	31.3	212**	-	330
1921-31	33	46.4	46.4	27.4	51.3	217	290	25	36.3	21.2	228	235	-
1931-41	34	45.2	46.6	20.9	59.8	228	334	23	31.2	17.4	207	236	236

Notes: 1. The birth rate at the all-India level has been estimated by Davis by “taking the children at each age from 0-9 in the census and, with the survival rates in the life table working back to the births that must have occurred to give rise to each cohort. Adding up the births estimated for the ten cohorts we can calculate an annual average birth rate for the decade in question” (Davis 1951).

2. Ghosh arrives at the adjusted birth rates by scaling up the registered births in each decade by a correction factor. To correct the records for initial omission and increase due to fixed coverage in an increasing population for each decade, the author applies the formula $(P_1 * b_1) / (p_0 * B_1) = b_0 / B_0$, where (b_0 / B_0) is the correction factor to be estimated for a particular decade (b_0 is the registered births in a particular decade, B_0 is the actual births). P_1 is the ratio of female population in 1941-51 to that in 1911-21 (the arbitrary initial period) and p_0 is the ratio for a specific decade. b_1 / B_1 is the actuarial estimate of the rate of omission for the decade 1941-51 and is assumed to be known and correct.

3. Mari Bhat’s estimates of the Crude Birth Rate are derived by combining the birth rate estimates of the beginning of 1960s [obtained from information on probability of death before fifth birthday from NSS 1965-66 data and estimate of b_{x15} (birth rate multiplied by probability of dying before fifth birthday) as average of South Model and Indian Standard life table] with the trend of birth rate estimated from standardization for each decade from 1881-1961. The birth rate estimates allow for decline in fertility during the 1960s. For details of the estimation of the standardized trend using a regression model refer to Bhat (1989).

Source: @ Assam, Manipur and Tripura Report, Census of India 1951 Davis (1951) Chaudhuri (1982) Ghosh (1956) ^Chandrasekhar (1959) Mari Bhat (1989)

births per thousand in 1901-11 to 45.2 in 1931-41. Although the CBR estimates by Davis for this period have been considerably higher than those based on registration data, the pace of *decline* in CBR during 1901-11 to 1931-41 is strikingly similar. Overall, the all-India level estimates by Davis suggest that the decline in CBR was very gradual during the decades prior to Independence.

Registration data for erstwhile Assam province are notoriously deficient for the period under consideration. The data are afflicted by biases due to migration, apart from possible/common errors of registration coverage. As per estimates by Kingsley Davis (1951), percentage of total births registered during 1926 to 1930 was only 54.4 per cent in Assam, as against the national average of 74.7 per cent. Also, there are signs of deterioration of the registration coverage during this period. As the Report of the Census 1951 notes, “[t]he migration-cum-registration error was as high as 11.8 in 1921-30, falling to 8.8 for 1931-40 and again rising to 12.9 for 1941-50” (Assam, Manipur and Tripura Report, Census 1951:100).

There exists, if at all, very little or even almost negligible body of academic/demographic research on the estimation of the vital rates of Assam for this period, except perhaps one study by Ghosh (1956), which seeks to provide reliable estimates of fertility and mortality indicators (e.g. IMR) for Assam in the pre-independence period¹⁷. As suggested by the study, the CBR in Assam was considerably and consistently higher than that at the all-India level. In 1911-20 the CBR turned out to be as high as 50.3 per thousand in Assam as compared to 45.5 at the

¹⁷ The estimates by Ghosh could be considered relatively reliable, as his estimates of under-registration of births appear close to those arrived at by Kingsley Davis for the period 1926-30. The details of the methodology are contained in the notes to Table 2.2.

all-India level. This also happens to find corroboration from the estimates by J. McSwiney, the Census Commissioner of Assam, in the 1911 Report (Census of Assam, 1911). As against a decline observed at the all-India level, there was an increase of the CBR in Assam by nearly 10 births per thousand population; from 50.3 in 1911-21 to 59.8 in 1931-41, and there has been no sign of downward movement of CBR in Assam between 1911 and 1941. Similarly, data on the General Marital Fertility Rate (GMFR) indicates that it was higher in Assam compared to the all-India average for the entire period from 1901 to 1941 (Table 2.2), and whereas it showed a decline from 237 per thousand in 1911-21 to 228 in 1931-41 at the all-India (a decline by nearly 4 per cent), it recorded an increase (from 284 per thousand to 334) in Assam (an increase of around 18 per cent).

Even though estimates of the TFR are unavailable for Assam for the period under consideration, we use indirect estimation methods based on the age distribution data from census for the region. Specifically, we employ the Rele method (Rele, 1987) to work out fertility levels of Assam and India for 1911 and 1931 and arrive at two fertility rates; the first using data on children ages 0 to 4 and women belonging to the age group 15 to 44 (TFR1), and the second using children ages 5 to 9 and women 20 to 49 (TFR2) (Table 2.3). Due to the relative underestimation of children in the age group (0-4), researchers believe that the latter measure could provide more reliable estimates of fertility compared to the former. However, we also provide a simple average of the two estimates as this could be a reasonable solution in many cases.

Remarkably, as the table shows, the TFR of Assam is found to be higher than all-India average, irrespective of the measure used, and for both time periods. For example, the estimate of TFR2 indicates that while fertility at the all-India level was

between 6 and 6.5 children per woman during 1911 and 1931, the same for Assam was higher by slightly more than one child. The difference between the fertility rates between Assam and India narrows down slightly when we look at TFR1 and hence also the average fertility rates. Overall, however, these figures confirm the existence of a relatively higher fertility in Assam vis-à-vis all-India during the aforementioned period.

**TABLE 2.3: FERTILITY ESTIMATES USING RELE METHOD:
ASSAM AND INDIA, 1911 AND 1931**

Fertility Estimate	1911			1931		
	Assam (1)	India (2)	Difference (3)= (1)-(2)	Assam (1)	India (2)	Difference (3)= (1)-(2)
TFR1 (children ages 0-4/ woman ages 15-44)	4.95	4.33	0.62	5.77	4.70	1.07
TFR2 (children ages 5-9/ woman ages 20-49)	8.09	6.75	1.34	7.33	6.14	1.19
Average (TFR1+TFR2)/2	5.9	5.1	0.80	6.3	5.1	1.2

Note: TFR1 in fact, provides estimates for five years prior to the survey and TFR2 provides estimates for five to ten years prior to the survey. Hence, the 1901 census figures provide estimates roughly corresponding to 1905, and that from the 1931 census, for 1925.

Source: Author's calculations

There are several reasons as to why such differentials could have existed during the colonial times. While it is true that during that time, the fertility level among different populations in India must have been close to their respective natural fertility,

some interregional variations in fertility can be expected along the existing socio-cultural and even socio-economic diversity among the various regions.

**TABLE 2.4: BROAD INDICATORS OF SOCIO-ECONOMIC DEVELOPMENT
AND THEIR VARIATIONS: ASSAM AND INDIA, 1901-1941**

Year	Average female age at marriage		Population literacy rate		Percent urban population		Percent of working force in primary sector*	
	India	Assam	India	Assam	India	Assam	India	Assam
1901	13.14	14.59	5.30	4.17	10.84	2.34	-	83.9
1911	13.16	14.86	5.90	5.59	10.29	2.41	72.3	86.9
1921	13.67	15.30	7.20	7.11	11.18	2.74	73.0	89.5
1931	12.69	14.26	9.50	8.57	11.99	2.92	70.2	87.1
1941	-	-	16.10	13.14	-	-	-	-

Notes: * primary sector workers include cultivators, agricultural labourers, and plantation workers.

Source: Agarwala, 1967; Census of India, relevant issues.

Table 2.4 brings together some broad indicators of socio-economic development in India and Assam for the first half of the twentieth century. Due to well-known reasons, the female age at marriage is considered to be a crucial determinant of fertility and its differential among populations. Assam evinced a higher female age at marriage (by about one and a half years) compared to the national average for the entire period from 1901 to 1931. Naturally then, this does not explain the relatively higher fertility in Assam, and indeed, predisposes the population towards lower fertility. This said

however, the remaining indicators point towards a relatively lower level of socio-economic development in Assam vis-à-vis all-India, that doesn't bode well for fertility decline. First, the percent of urban population was conspicuously lower (even negligible) in Assam compared to the national average for the entire period, and never exceeded 3 percent of the population. Along with that, as shown in the table, compared to the national average, the population literacy rates were lower in Assam during 1901 to 1941 (even if only marginally). Finally, and perhaps most importantly, we come across a substantially higher proportion of workforce engaged in the primary sector in Assam during 1901 to 1931. Indeed, all this is actually something one could deduce (and expect), given the situation of the society in Assam during the colonial period as already discussed in the previous sections.

Not surprisingly perhaps, research on the fertility differentials by occupation in India (for instance Driver, 1963; Agarwala, 1967) found that among all the occupational categories, cultivators had the highest fertility rates (barring labourers). In fact, whereas Driver (1963) found that the fertility of cultivators (7.37 live births per woman) was higher than those belonging to the professional and services category (6.63) by more than half a birth, Agarwala (1970) estimated the difference to be nearly one child per woman. In fact, the proportion of primary sector workers in Assam was higher than the national figures by nearly 17 to 20 percent during that period. Surprisingly, as against a decline (though small), observed for the all-India level, Assam showed signs of a slight increase in the proportion of primary sector workers from around 84 percent in 1901 to 87 percent in 1931. Overall, the evidence points towards the existence of a far more traditional society in Assam during the first half of the earlier century. The upshot of the argument is that the near complete absence of

modernization in the Assamese society for the most part of the colonial period had probably been the basis for the relatively higher fertility levels in the region, through the operation of standard factors. For instance, the higher fertility in Assam vis-à-vis all-India is compatible with the relatively higher IMR experienced by the former as compared to the latter (as can be seen from Table 2.2)

We now turn to the temporal movements of CDR in Assam/NER vis-à-vis all-India (Table 2.2). The CDR for India, as estimated by Davis, shows a somewhat secular decline between 1901-11 and 1941-51, except for an increase in 1911-21 decade due to an enormous number of excess deaths in the wake of the great influenza pandemic of 1918. That the CDR declined by nearly 11 points between 1911-21 and 1921-31 from 47.2 per thousand to 36.3 could be seen as a precursor to India's entering into the so-called 'second phase' of demographic transition. A secular decline in the CDR, which had commenced at the all-India level since around 1911-21, seems discernable for Assam too even from its grossly underestimated registration-based CDR (Table 2.2), as under-registration does not necessarily preclude reasonably reliable indications about time trends. For example, the registered CDR in Assam recorded a decline from nearly 31 per thousand to 17 between 1911-21 and 1931-41, and it continued falling – albeit at somewhat slower pace as observed at the all-India level. In addition, the trend in IMR during this period confirms a declining trend in CDR in Assam. Thus, it can be said that a mortality transition that had set in at the all-India level by the late 1940's, had also begun in Assam prior to the Independence. However, differences in levels and trends of IMR between India and Assam are indicative of possibly higher mortality in Assam compared to all-India (Table 2.2).

In sum, the various pieces of evidence examined above strongly point to a higher rate of natural increase of population in NER vis-à-vis all-India in the pre-independence decades. CBR in Assam/ NER had been higher than that at the all-India level throughout this period. While it is difficult to be absolutely sure of the exact differentials in CDR, the evidence of relatively higher IMR is suggestive (at least) of mortality levels of this region being no lower (or perhaps even higher) than the respective all-India levels during this period. Furthermore, the indirect estimates show a higher TFR in NER than in the country as a whole during the pre-Independence decades. In the following section, we would examine the role of migration in shaping higher population growth in NER, given that migration (especially immigration) could hardly have any significance in population changes at the all-India level.

2.2.2 Migration into North-East India, 1901-1941

Population movements and migration flows have been an important component of the population dynamics of the NER in the entire pre-Independence period under consideration, although they – both internal and international - could hardly have any perceptible influence on India's national population growth. Most of the in-migration into the NER during this time has been into the plains of the Assam province. Assam Hills and Manipur State had been relatively unattractive to in-migrants. However, Tripura experienced in-migration of considerable magnitude, especially during a few decades prior to the independence, so much so that in-migrants in Tripura constituted around 36 per cent of the total population in 1951 (Assam, Manipur, Tripura Census Report, 1951).

Historically, migration into the relatively fertile and sparsely populated Assam had been encouraged by British colonial administration in its efforts to exploit untapped possibilities of augmenting agricultural production and revenue in general and supply of migrant labour in the tea estates of the state in particular. Since the commencement of Labour Laws around early 1860s, which allowed the importation of ‘coolies’ on contract from other parts of the continent, immigration into Assam province has been a steady and uninterrupted process. It is difficult to be precise about the exact timing of the onset of in-migration into Assam. However as has been pointed out in the Census Report of Assam (Assam Report, Part 1, Vol. 4, Census of India, 1901: 13) a considerable influx of people had commenced from 1891. [It is reasonable to presume that a sizeable immigration into Assam commenced since the establishment of its tea estates as early as 1840s.] Indeed, during the decade 1891-1901, more than one-tenth of the population had been imported under provisions of the Labour Law. To quote from the Assam Report of the 1901 Census (pp.13):

“In most other provinces of India the migrations of the people are spontaneous, and do not depend in any way upon the direct action of the Government, individuals crossing the boundaries of districts or provinces in search of land or grazing ground, or not infrequently, husbands or wives; but in Assam, the growth of the population largely depends upon the introduction of a number of people, who are brought up at the expense of European capitalist.”

Assam had historically experienced four broad types of immigration prior to India’s Independence (Devi, 2007). First, with the growth of tea industry since 1855 and the subsequent shortage of local labour, the industry had started bringing in large number of labourers from Benares, Ghazipur, Chhota Nagpur and Bihar. In 1901, the

total number of tea garden labourers was 6, 54,000, constituting about one-tenth of the population of Assam. The second flow of immigration consisted chiefly of farm labourers from East Bengal (now Bangladesh) from around 1900 onwards. The third group of immigrants was from Nepal. Although up to the 1921 Census, the volume of Nepali in-migrants into Assam was relatively small [Devi 2007, pp.7], the number of Nepali-speaking people swelled to 1, 25,320 as per the 1951 census enumeration. The last group of immigrants consists of the people coming from the rest of the Indian subcontinent.

Whatever might have been the initial trigger to in-migration in Assam, the large-scale migration of a *voluntary* nature became well underway by the end of the 1901-11 decade (Census 1921 report). This went hand in hand with the reduction in the number of indentured labourers into the Brahmaputra valley in subsequent decades. There was a major influx of tea garden labourers into Assam during 1901-11 and even more so during 1911-21 decade (Chaudhuri, 1982). The pace of influx of tea garden labourers had, however, slowed down by 1931, culminating in its almost complete stoppage by 1941 as noted by Chaudhuri (1982: 32-33). Nevertheless, the inflow of migrants continued – albeit with declining magnitude - from East Bengal and Nepal, together with the importation of tea garden labourers well into the 1950s.

Although it is difficult to be certain about the exact magnitude of migration, census data are indicative of swelling of population size of Assam as a consequence, in large part, of the volumes of in-migration being persistently in excess of out-migration during the period under consideration (Table 2.5). Indeed, based on the census data for NER, a study by Bandyopadhyay and Chakraborty (1999) shows that in-migration into NER increased in absolute numbers from 1901 to 1931 and declined thereafter.

It is thus clear from the foregoing discussion that immigration played a major role in the swelling of population size in the pre-Independence NER. However, as noted earlier the natural rate of increase of population had been higher too in NER.

This said, there had been an increasing *relative* contribution of immigration to the higher population growth of NER during 1901-1931 followed by a tapering off in the growth of population net of immigration in 1931-41 (Table 2.5). Although higher levels in both NRI and immigration flows in NER appear to have been two major forces for its higher population growth rates vis-à-vis all-India during the pre-Independence period, it is hardly possible – with the data constraints noted already - to ascertain the exact magnitude of the *relative* contribution of each. With this, we turn to the demographic trends in NER in the post-Independence period.

2.3 Trend of Population Growth in NER, 1951-2011

Table 2.6 presents information on decadal population change in NER and its constituent states since 1951. It is interesting that population growth rate jumped up in NER immediately after the independence (around 41 per cent during the 1951-61). This was at least partly a result of a surge in population influx into NER from the newly formed East Pakistan in the wake of the partition of India at the time of Independence in 1947. Although population growth rate in NER never touched the 1951-61 level in the subsequent decades, it remained generally higher than the pre-Independence levels (Tables 2.1 and 2.6). Indeed, as Table 2.6 shows, the decadal population growth rate has been comparatively higher in NER vis-à-vis all-India during entire post-Independence period, with virtually all the states of NER experiencing higher rates of population increase than the national averages. Arunachal

TABLE 2.5: MIGRATION IN NER AND INDIA, 1911-1931

State	Number of in-migrants (percentage to total population)				Number of out-migrants (percentage to total population)				Net Inflow=In-migration minus Out- migration (percentage to total population)			
	Assam	Manipur	Tripura	Total	Assam	Manipur	Tripura	Total	Assam	Manipur	Tripura	Total
1911	882,068 (13.4)	7,995 (2.3)	NA	890,063 (20.1)	79,748 (1.2)	6,258 (1.8)	NA	86,006 (1.9)	802,320 (12.2)	1,737 (0.5)	NA	804,057 (18.2)
1921	1,290,157 (17.3)	8,416 (2.2)	NA	1,298,573 (24.4)	75,896 (1.0)	7,434 (1.9)	NA	83,330 (1.6)	1,214,261 (16.3)	982 (0.3)	NA	1,215,243 (22.8)
1931	1,317,850 (15.3)	7,625 (1.7)	113,849 (29.8)	1,439,324 (22.5)	73,223 (0.8)	11,091 (2.5)	NA	84,314 (1.3)	1,244,627 (14.4)	-3,466 (-0.8)	NA	1,241,161 (19.4)

Note: Data on in-migrants (except for the year 1931) and out-migrants not available for Tripura.

Source: Census of Assam, 1931

Pradesh, Mizoram and Nagaland have experienced the highest population growth rates particularly in the 1970s and 1980s. [Meghalaya witnessed relatively low population growth rate]. During 1991-2001 decade, Tripura, Assam and Manipur evinced the lowest population growth rates within the NER.

In so far as the *trend* in population growth in NER is concerned, it has been – like India as a whole - declining (except perhaps a marginal increase in the 1981-91 decade). In fact, a declining trend of population growth had set in NER somewhat earlier during 1961-71 than it did at the all-India level around 1981-91. However, the downward trend in population growth rate has not been discernible in all states of NER except in only three relatively larger states, namely, Assam, Manipur and Tripura.

Apropos the *relative pace* of decline of population growth in NER vis-à-vis all-India (Table 2.6), it has clearly been faster in the former for the entire period from 1961-71 to 1991-2001 (However, the region evinced lower population growth rate as compared to the all-india average, even though marginally, for the first time during 2001-11). This seems consistent with the initially higher levels of population growth in NER. However, this aggregate feature of NER has not been shared uniformly by its constituent states. In fact, all states within NER have not shared the decline of population growth rate. More specifically, between 1961-71 and 1991-2001, there have been *increases* in the growth rates of population in Mizoram, Nagaland and Sikkim, with Meghalaya showing a relative stability of population growth. Tripura, Assam and Manipur in that order have experienced largest pace of declines of population growth rate. It should also be perhaps mentioned here that among all the states of NER, Nagaland has experienced the largest degree of volatility/fluctuations in the growth of

population. Indeed, even as the state registered the highest population growth rate between 1991 and 2001, it actually showed a negative growth rate of population in the subsequent decade (2001 to 2011).

Putting aside the data-related deficiencies or distortions, a higher growth rate of population in NER (at least until 1991) with its concomitant divergences from the all-India patterns is of interest and deserves a deeper investigation and understanding. In the following two sections we examine consecutively the role and/or relative contribution of the two major demographic components of population growth, namely, the rate of natural increase (NRI) and net migration flows in the post-Independence period.

2.3.1 Trends in Birth Rate and Death Rate in NER, 1971-2011

As is well-known, there are two principal direct sources of registration data for India and its states, namely, the Civil Registration System (CRS) and the Sample Registration System (SRS)¹⁸. Of these, the latter is generally considered 'superior', as the former is afflicted by massive under-registration and incompleteness of coverage. [In fact, CRS data have not been published since 1994.] The Office of the Registrar General initiated the scheme of sample registration of births and deaths under the SRS

¹⁸ SRS, a dual record system, consists of continuous enumeration of births and deaths in a sample of villages/urban blocks by resident part-time enumerator, and an independent six monthly retrospective survey by a full time supervisor. The data obtained through these two sources are matched. The unmatched and partially matched events are re-verified in the field to arrive at an unduplicated count of correct events. The revision of SRS sampling frame is undertaken every ten years with the results of a new census. The sample design adopted for SRS is a uni-stage stratified simple random sample without replacement (except in stratum II, larger villages) of rural areas. In urban areas, the categories of towns/cities are divided into four strata based on the size classes.

TABLE 2.6: POPULATION TRENDS IN NORTH-EASTERN REGION, 1951-2011

State/Region	Population Size (in thousands)							Decadal growth rate (per cent)					
	1951	1961	1971	1981	1991	2001	2011	1951-61	1961-71	1971-81	1981-91	1991-01	2001-11
Arunachal P	-	337	468	632	865	1,098	1,383		38.91	35.15	36.83	27.0	25.92
Assam@	8,029	10,837	14,625	18,041	22,414	26,656	31,169	34.97	33.95	23.36	24.24	18.92	16.93
Manipur#	578	780	1,073	1,421	1,837	2,294	2,722	34.95	37.53	32.46	29.29	24.86	18.65
Meghalaya	606	769	1,012	1,336	1,775	2,319	2,964	26.90	31.50	32.04	32.86	30.65	27.82
Mizoram	196	266	332	494	690	889	1,091	35.71	24.96	48.55	39.70	28.82	22.78
Nagaland	213	369	516	775	1,210	1,990	1,981	73.24	39.88	50.05	56.08	64.53	-0.47
Sikkim	138	162	210	316	406	541	607	17.39	29.38	50.77	28.47	33.06	12.36
Tripura	639	1,142	1,556	2,053	2,757	3,199	3,671	78.72	36.28	31.92	34.30	16.30	14.75
NER	10,399	14,662	19,792	25,068	31,954	38,986	45,588	40.99	34.99	26.66	27.47	22.01	16.93
India@***#	3,61,088	4,39,235	5,48,160	6,83,329	8,46,303	1,02,87,37	1,21,01,93	21.64	24.8	24.66	23.87	21.54	17.64

Notes: @ The 1981 Census could not be held in Assam. The population figures for Assam for 1981 have been worked out by interpolation.

** The 1991 Census could not be held in Jammu and Kashmir. The population figure for 1991 for Jammu and Kashmir has been worked out by interpolation.

India and Manipur figures estimated figures for three sub-divisions viz. Mao Maram, Paomata and Purul of Senapati district of Manipur as census results of 2001 census were cancelled in these three sub-divisions due to technical and administrative reasons.

Source: Government of India, 2006; Census of India, 2011, Provisional Population Totals, Paper-1 of 2011

on a pilot basis during 1964-65 and on a regular basis in all Indian states (except smaller states of NER) since 1970, with a view to providing reliable fertility and mortality indicators. Since then, the SRS is *the* official source on vital statistics on an annual basis and hence we would rely on it in our present analysis pertaining to post-independence period. SRS annual time series on vital rates are not available prior to 1971 in several Indian states including Assam, Manipur and Tripura, while SRS estimates for the remaining states of NER are unavailable prior to 1981.

It is fairly well-known that the SRS data are far from perfect, as they are particularly inflicted by incompleteness of registration – albeit in varying degree across states. A major source of defects in SRS data seems to lie in the outdated sampling frame in most of the states. In addition, these data are prone to be deficient in states with poor administrative machinery and/or with financial constraints. In this context, it is worth quoting what Wells et al. (1967) wrote:

“[m]ost of the problems are operational or administrative rather than statistical: (1) For various reasons, some states are slow in agreeing to assume financial and other responsibilities for the scheme. (2) In many states even after the scheme has been accepted there are delays in recruiting the staff, training and so forth. (3) The *most serious problem* in the whole project is maintaining control of field operations well enough at each stage *to insure that prescribed instructions and methodology are being followed.*” (italics added) (Wells et.al., 1967: 374).

However, incompleteness of registration coverage under SRS had probably been diminishing over time, particularly for the period 1970 to 1990 (see RGI, 1984a, 1988;

Retherford and Mishra, 2001). But, as noted by Mahapatra (2010), there has been distinct deterioration in the accuracy of the SRS estimates for the period beginning 1991. Various evaluative studies on the relative levels of under-registration in the different states of India, found that under-registration has been a more serious problem among the North-eastern states of India (Narsimhan et al, 1997; Mari Bhat, 1994). The indirect estimates of CBR by P.N. Mari Bhat (1994) for the NER states turned out to be generally higher than the unadjusted SRS-based estimates, with the per cent difference being as high as 41 in case of Nagaland in 1981 and around 12 per cent in the remaining states. This *differential*, however, appears to have narrowed in almost all states of the NER with the passage of time, reflecting possible improvements in the quality/coverage of SRS data by the late 1980s.

Table 2.7 presents alternative estimates of CBR and their changes for the states of NER both on the basis of SRS information and indirect technique applied to the census data (using the reverse survival method) for a comparable period of around twenty years from 1977 to 1997. On the whole, both the SRS and census-based CBR estimates show a distinct long-term trend of decline between 1974 and 2000, both in NER and India, except for a slight increase in the census-based CBR for NER over the late 1980s to the late 1990s. However, despite some discrepancy in NER's CBR trend for the period 1977 to 1987, assuming greater reliability of the census-based estimates of CBR, it appears that although the CBR in NER had been somewhat lower than that of the all-India average (i.e. during the late 1970s), the difference almost disappeared by the late 1990s.

Almost half of the states of NER experienced a higher CBR vis-à-vis that of all-India during the entire post-independence period if we go by the Census-based estimates.

Specifically, Arunachal Pradesh, Meghalaya, Assam and Sikkim evinced higher CBR than the all-India average during all three periods viz. 1974-80, 1984-90, and 1994-2000. According to the SRS-based estimates, the CBR in most of the states of NER has been lower than that of all-India during these periods. Nevertheless, if we consider the entire period from 1971-80 to 1994-2000, going by the unanimity of their comparative levels vis-à-vis India by SRS as well as Census estimates suggests that Assam, Meghalaya and to some extent Arunachal Pradesh have had relatively higher CBR than the national average. Similarly, it appears almost certain that Manipur, Tripura and Nagaland had comparatively lower level of CBR than all-India. Interestingly however, the most recent SRS estimates (of 2010) find a considerably higher CBR in Manipur compared to the all-India average and indeed, several all the states of NER barring Mizoram. Finally, it is difficult to be certain about Mizoram, as SRS has started providing estimate only the recently. However, it is probable that this state had also experienced higher CBR than India during this period, as even though the SRS and Census estimates disagree, the latter can be considered more reliable as far as the magnitude of the CBR is concerned. Indeed, the 2010 SRS estimates suggest that Mizoram could have one of the highest CBR in the region presently.

Apropos the pace of decline in the CBR, there is a wide divergence between SRS data and census-based estimates of the comparative experience of NER vis-à-vis all-India (Table 2.7). For example, whereas SRS data show a larger decline in CBR in the NER vis-à-vis all-India between 1977 and 1987, the Census data suggest that there had been a slight increase in the CBR of the former. Among the individual states, as per census estimates, we find that the CBR in Manipur, Mizoram and Sikkim declined faster than did India as a whole, while in the majority of states of the NER during this period did

not decline as fast as that at the all-India level. But interestingly according to the SRS estimates, the pace of decline in all the states of NER, with the sole exception of Nagaland, had been higher than the all-India level.

Although SRS information is scanty for most of the NER states in the 1971-81 decade, one could still glean patterns of trends in death rates in NER in this period on the basis of the information available for the *larger* states of Assam, Manipur and Tripura, which together constitute nearly 85 per cent of its population (Table 2.7). First, although SRS data show that the CDR in NER as a whole had been higher in 1971 compared to the all-India average, but since 1981 the CDR in this region became almost similar to the all-India level (with an suggestion of being slightly lower in the former). It is notable that except Assam and Arunachal Pradesh all the states have experienced comparatively lower CDR from 1971 to 2011 (the registered CDR in Arunachal was lower than the all-India average in both 2001 and 2011, whereas that of Meghalaya was marginally higher in the respective years).

Death rate in NER, as in the case of CBR, has shown a persistent decline over the period 1971 to 2011. While the pace of decline in CDR had been lower in NER than in the national average during 1981-91, it became marginally higher in the former vis-à-vis India in the 1991-2001 decade. However, for the entire period 1971-2001, the decline in CDR has been marginally higher in NER than the national average. The fastest decline in CDR in NER was achieved during the period 1991-2001. It is interesting that all the states in NER except Manipur and Meghalaya experienced faster decline in CDR than the national average during this period. The largest states in NER i.e. Assam and Tripura are also the states that experienced fastest decline in CDR during the period 1971-2001. However, it is interesting to note that CDR increased,

TABLE 2.7: BIRTH RATE AND DEATH RATE ESTIMATES FOR NORTH-EASTERN STATES, 1977-2010

State/Region	BIRTH RATE											DEATH RATE				
	Census-data based (indirect estimates)					SRS-based (direct estimates)						SRS-based (direct estimates)				
	1977	1987	1997	Change (%) (1977- 1987)	Change (%) (1987- 1997)	1977	1987	1997	2010	Change (%) (1977- 1987)	Change (%) (1987- 1997)	1971	1981	1991	2001	2010
Arunachal	39.4	39.1	29.9	-0.8	-23.5	33.3	35.2	23.2	15.8	5.7	-34.1	-	15.9	13.5	5.5	5.9
Assam	-	35.1	27.0	-	-23.2	32.9	30.9	28.2	22.0	-6.1	-8.7	17.8	12.6	11.5	9.5	8.2
Manipur	31.2	27.3	21.0	-12.5	-23.1	27.6	25.6	19.6	22.9	-7.2	-23.4	6.9	6.6	5.4	5.1	4.2
Meghalaya	37.4	38.3	33.6	2.4	-12.3	32.4	35.4	29.4	15.8	9.3	-16.9	-	8.2	8.8	9	7.9
Mizoram	36.7	31.5	27.3	-14.2	-13.3	-	-	16.0	24.2	-	-	-	-	-	4.4	4.5
Nagaland	31.2	29.6	24.1	-5.1	-18.6	22.0	21.6	16.0	11.9	-1.8	-25.9	-	6.3	3.3	2.3	3.6
Sikkim	36.9	32.5	23.7	-11.9	-27.1	-	31.7	21.6	15.3		-31.9	-	8.9	7.5	5.1	5.6
Tripura	31.5	31.1	21.2	-1.3	-31.8	29.6	26.8	18.5	13.0	-9.5	-31.0	15.3	8	7.6	5.6	5.0
NER#	33.8	34.3	26.0	1.5	-24.2	34.3	29.2	25.9	20.3	-14.9	-11.3	16.9	11.5	10.3	8.2	7.3
India	34.9	31.6	25.9	-9.5	-18.0	33.8	32.0	27.2	18.0	-5.3	-15.0	14.9	12.5	9.8	8.4	7.2

Note # weighted average of the individual states, weights being respective proportions of population to total NER for the nearest Census year

Source: Mari Bhat (1994); Guilmoto and Rajan (2001); Registrar General (1999, 2011)

even if marginally, among four states of the region- Arunachal Pradesh, Mizoram, Nagaland and Sikkim between 2001 and 2011. Indeed, the decline in death rates during the last decade (2001 to 2011) was slower in NER as compared to the pace of decline experienced at the all-India level.

No less noteworthy however, is the comparatively lower CDR in predominantly tribal states of NER such as Meghalaya, Mizoram, and Sikkim (Table 2.7). As discussed earlier, the possibility of a larger degree of death under-registration in the predominantly tribal states of NER is pretty strong. This said, the hypothesis of historical advantage in tribal mortality, as has been noted recently by some scholars (e.g. Maharatna, 2011), could loom no less large. Of course, settling over these alternative possibilities is pretty difficult especially in view of the extremely limited empirical data for these historical periods, and it is of course beyond the scope of the present chapter.

Overall, evidence on the CBR and CDR estimates indicate that the comparatively higher population growth rate in NER vis-à-vis India cannot be accounted for by higher natural rate of increase in the former, suggesting that migration flows have remained highly significant across this region during the entire post-Independence period. In the following section we explore the nature and trend of the migration in NER during this period.

2.3.2 Migration into North-east India, 1961-2001

Census data on migration pertaining to the states of NER are considerably flawed due to heavy and continuing ‘illegal’ in-migration into the region, as was pointed out

earlier. Illegal migration by its very nature is difficult to measure to a reasonable degree of accuracy, although some researchers have pointed out its possible dimension in NER. Weiner (1983), for example, observes that there has been continuing in-migration, primarily of an illegal nature from Bangladesh into Assam. In particular, according to his estimates, in 1971 the census-enumerated Muslim population in Assam were approximately 4, 24,000 excess over what could be accounted for by the natural population increase, thereby indicating the possible extent of illegal migration. Based on the SRS data which are assumed to be fairly accurate indicator of the natural rate of population increase in Assam, Weiner estimated that between 1971 and 1981 the in-migration, mostly of illegal nature, was of the order of 1.8 million. The other states in the region had also been receiving in-migrants to varying degree in the post-Independence period. As the then Chief Minister of Assam claimed ‘...[o]ver one million ‘illegal Pakistani infiltrators’ had entered eastern India between 1951 and 1961, and of which 220,961 were in Assam, 459,494 in West Bengal, 297,857 in Bihar and 55,403 in Tripura...In Mizoram, migration from Bangladesh and Myanmar has become a serious issue... [T]he number of such immigrants in the state is estimated to be about 10,000. In 2003, the Nagaland government estimated approximately one lakh illegal immigrants who had settled in the foothills of the state bordering Assam’ (Singh, 2009). Hence, illegal migration into North-east India has been a continuous process unlike the other states of India where considerable migration took place only during certain specific periods, particularly during the partition of India and hence of Bengal. The author further points out that those illegal migrants have been moving out from Assam (perhaps as a result of anti-immigrant movements) to neighbouring states in North-east, viz., Nagaland, Mizoram, Arunachal Pradesh and Manipur.

Migration into NER has continued in the post-Independence period keeping with the broadly same pattern as the pre-Independence period. The immigrants have come from neighbouring Bangladesh, Bhutan, Burma, and Nepal and to some extent even from China and Pakistan. In addition, there has also been in-migration from other states of India during this period. It is perhaps interesting to note that the volume of in-migration into NER has been, at least up to 1991, greater from neighbouring nations compared to the numbers coming from other states within India. Among the states of NER, Assam and Tripura have experienced immigration mostly from Bangladesh (Pakistan prior to 1971). In fact, Bangladesh and Nepal ranked highest as exporters of immigrants into entire NER during 1961-1991.

As per census data on migration (Table 2.8 above), there has been net in-migration into NER from 1961 to 2001, with the volume of net in-migration showing a rising trend in the region till 1981. Net in-migration increased in Arunachal Pradesh, Nagaland, Meghalaya, Mizoram and Sikkim till 1981 and declined thereafter. However, it started declining in Manipur and Tripura since the earlier decade. Although migration data are not available for Assam for 1981, net in-migration in this state experienced a decline between 1971 and 1991. It is interesting to note that the ranking of the states within NER according to the magnitude of in-migrants showed practically no change from 1961 to 1991, (that is, the states that had attracted the largest number of in-migrants in 1961 also attracted the largest numbers in 1991). The volume of net in-migration has been highest in Assam and Tripura throughout the period 1961 to 1991 (Table 2.8).

Remarkably, we find a drastic change in the volume and pattern of migration in NER during 1991 to 2001. In fact, as against net in-migration into the region till 1991,

there was actually net out-migration from the region between 1991 and 2001 according to census figures (Table 2.8). Even as the declining trend of net in-migration continued into the 2000s, there was in fact, a complete reversal of the trend in Assam and Nagaland, with these two states experiencing a net outflow of population. Indeed, four out of the eight states of NER witnessed net-outmigration during 1991 to 2001- Assam, Manipur, Mizoram and Nagaland. However, among the larger states of the region, Tripura continued to experience increase in population through net in-migration. Thus, the evidence is suggestive of a relative importance of in-migration in fuelling population growth in NER and its states at least till 1991. Although, as per census data, the net in-migration has shown a declining trend after the 1980s in NER, it is difficult to be sure about this in view of the 'illegal migration' that has been (allegedly) continuing in this region. The higher population growth rates in NER than in all-India, however, tend to reaffirm that the former has been experiencing considerable in-migration. Even as data indicate that there has been considerable out-migration from many of the states of NER between 1991 and 2001, population growth in all the states of the region (barring Assam) was found to be higher than the national average during the corresponding period (Tables 2.6 and 2.8). This said, the pace of declines in birth and death rates has been somewhat identical between all-India and NER during this period. This seems consistent with a significant reduction in net in-migration flows into NER during post-Independence period, and this should have contributed to a comparatively *faster pace of decline* in NER's population growth rate vis-à-vis the country as a whole. In the following two sections, we would focus on ramifications of above-noted long-term trends in the population movements and growth in NER respectively for ethnic composition in general and in particular the proportion of tribal

TABLE 2.8: NET INMIGRATION, NER AND ITS STATES, 1961-2001

State	Net In-migration					Net In-migration as % of total population				
	1961 [Rank]	1971	1981	1991 [Rank]	2001	1961	1971	1981	1991	2001
Arunachal	30,075 [3]	67,544	1,23,542	1,08,385 [3]	62,213	8.9	14.4	19.5	12.5	5.7
Assam	12,36,155 [1]	1,3,29,110	-	5,21,882 [1]	-154,654	11.4	9.1	-	2.3	-0.6
Manipur	10,770 [5]	25,954	21,971	-14,736 -	-26,156	1.4	2.4	1.5	-0.8	-1.1
Meghalaya	-	86,218	1,16,602	42,418 [4]	14,430	-	8.5	8.7	2.4	0.6
Mizoram	-	-	33536	-7385 -	-704	-	-	6.8	-1.1	-0.1
Nagaland	13,477 [4]	42,279	78,384	32,578 [5]	-16,511	3.7	8.2	10.1	2.7	-0.8
Sikkim	3762 [6]	12,933	53,585	-15273 -	23,936	2.3	6.2	17.0	-3.8	4.4
Tripura	3,98,273 [2]	5,24,847	4,85,236	3,90,731 [2]	27,970	34.9	33.7	23.6	14.2	0.9
NER	16,92,512	20,88,885	9,12,856	10,58,600	-69,476	11.5	10.6	3.6	3.3	-0.2

Source: Census of India, various years

population in the region vis-à-vis all-India and also for the trends in sex composition of populations in this region.

2.4. Long-Term Trends in the Proportion of Tribal Population in NER and States, 1901-2011

The concerns for tribal identity and sustained migration flows of non-tribal people into NER have combined to give rise to a protracted (and even continuing) ethnic conflicts and tensions across NER. Of course there are many complex issues – definitional and practical - involved in the identification and enumeration of tribal people of India. Major problems and difficulties in census enumeration of tribal population and of temporal comparability of their size in the British India are discussed by Davis (1951). However since the first census of independent India in 1951, the census enumeration of tribes has been based on official schedules of tribes – so-called Scheduled Tribes, or ST – prepared by an independent commission and legislated in the Indian parliament.

Putting aside specific regional problems, if any, of the enumeration of tribal peoples in NER, Table 2.9 presents trends in their proportion in NER and all-India from 1901 to 2011. As can be seen, the percentage of tribal population in NER had been more than six-fold larger than that at the all-India level prior to 1951 census. However, this enumerated proportion shot up – both in NER and all-India – in 1951 in the wake of the introduction of schedules for identifying and enumerating tribes across the country (see Maharatna 2005, 2011). For example, the proportion of tribal population in Assam jumped to as much as one-third in 1951 – partly because of the

introduction of official schedules for tribal identity and partly due to the truncation of the state following partition. However, owing to subsequent divisions of Assam into several small tribal-majority states such as Meghalaya, Nagaland, Mizoram, the tribal proportion of Assam declined to a little more than 12 percent by 2001.

That the overall proportion of tribal population of NER declined dramatically during a couple of decades following the 1951 census tallies with the increases in in-migration of non-tribal people into NER from around the neighbouring regions including East Pakistan (now Bangladesh). Of late, however, the tribal proportion of NER has recovered quite a bit (albeit not fully) towards catching up the 1951 level, signifying inter alia increasing conflicts, consolidation, and resistance against the protracted infiltration of non-tribal people into the region. In any case, it is notable that the broad patterns of movements in the tribal proportion across NER seems to have corroborated with the major regional patterns of population growth shaped, as elucidated above, inter alia by population movements and particularly in-migration within NER.

2.5. Trends in Population Sex Ratio in NER, Constituent States, and All-India, 1901 to 2011

Sex ratio of a population is an outcome of complex interactions amongst various types of factors – biological, social, and demographic. For example, age-sex differentials in mortality are influenced both by intrinsic physiological/biological differences between sexes and by such social/cultural forces as gender biases and discrimination. Indeed, the population sex ratio (females per thousand males) is widely

TABLE 2.9: PROPORTION (%) OF TRIBAL POPULATION, NER, ITS STATES, AND INDIA, 1901-2011

State	1901 ^(a)	1911 ^(a)	1921 ^(a)	1931	1941	1951	1961	1971	1981	1991	2001	2011
Arunachal Pradesh**	n.a	n.a	n.a	n.a	n.a	n.a	88.59	79.02	69.82	63.66	64.2	68.7
Assam	17.43	17.56	15.72	10.73	n.a	33.9	17.47	12.84*	n.a	12.82	12.4	12.4
Manipur	36.31	37.58	34.32	34.74	n.a	29.8	31.93	31.18	27.30	34.41	34.2	35.1
Meghalaya ^{&}	n.a	n.a	n.a	n.a	n.a	n.a	83.07	80.48	80.58	85.53	85.9	86.1
Mizoram [@]	n.a	n.a	n.a	n.a	n.a	n.a	98.10	n.a	93.55	94.75	94.5	94.4
Nagaland	n.a	n.a	n.a	n.a	n.a	n.a	93.09	88.61	83.99	87.70	89.1	86.5
Sikkim	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	23.27	22.36	20.6	20.6
Tripura	15.4	0.18	NA	n.a	n.a	30.1	31.53	28.95	28.44	30.95	31.1	31.7
NER [©]	17.34	16.65	n.a	n.a	n.a	33.6	25.80	21.96	n.a	26.02	26.9	27.2
India #	2.88	3.17	2.97	2.26	2.26	5.29	6.87	6.94	7.83	8.08	8.2	8.6

Notes: For 1901-1951: (i) Assam includes Manipur state; Manipur state; Hill Tippera; (ii) there has been a change in the terminology in classifying population by religion from 1931. Prior to 1931, the religion of the aboriginal population was classified under the heading of 'Animists'. From 1931, such population was classified under 'tribal' religion. However, it is important to note that the population of the tribals is under-represented by these figures to the extent that there has been conversion of the tribal people to other religions. There is some evidence (see for instance the Assam Report of 1911) that there was significant conversion of tribals to Hindu religion during 1901-1911 and possibly beyond in the Assam province; ^(a) All figures in the census tables pertaining to tribal population were presented as proportion per ten thousand population and have been converted to per cent for the sake of comparability.

* Assam includes Mizoram ** In 1961, Arunachal Pradesh was named as North East Frontier Agency; @ referred to as the Mizo Hills in 1961 Census document; & the proportion of Scheduled tribes for Meghalaya has been arrived at by adding the figures for Garo Hills and United Khasi and Jaintia Hills for 1961; © NER excludes Sikkim from 1961-1981. Assam includes Mizoram for 1961 and 1971. The proportion of Scheduled Tribes (ST) in NER = ST population summed over all states of NER/total population of NER; # Excludes Assam in 1981 where Census was not conducted for that year @ Excludes Jammu & Kashmir in 1991; \$ The figures excludes Mao-Maram, Paomata and Purul sub-divisions of Senapati district of Manipur.

Source: Census of India 1961 *Demographic and socio-economic profiles of the hill areas of North East India* New Delhi, 1970; Census of India 1971 Series I Part II A (ii) Union Primary Census Abstract; Census of India 1981 Series I Part II B (iii) Primary Census Abstract Scheduled Tribes; Census of India 1991 India Vol. 1 Part II B (i) Primary Census Abstract General Population PCA 2001 (Census CD); Maharatna 2005: 18-19

accepted as a summary measure of gender bias and discrimination in a society, with a low f/m ratio reflecting generally anti-female discrimination in the distribution of food, nutrition, and health care expenditures. On this count, India has earned an unenviable (or rather shameful) distinction of having a large (and growing) deficit of females – particularly in childhood years as indicated elsewhere.

Table 2.10 presents data on the sex ratio (f/m) in India and North-east India from 1901 to 2011. India is the only country in the world that has evinced a secular decline of the f/m ratio in total population since the beginning of the twentieth century. There has been a sign of this trend beginning to get reversed in 2001. (There was a slight increase in f/m ratio in 1981 arguably due to relatively better enumeration of females in that particular census as compared to the previous ones. See for instance Dyson, 1994; Srinivasan, 1994). In fact, population sex ratio in India had been found to be unfavourable for females ever since the Census was first conducted for the country in 1871 (see for instance Mayer 1999). While there could be various possible causes of the declining trend in India's aggregate population f/m ratio (e.g. higher undercounting of females, anti-female bias in allocation of food and medical facilities, and more recently, sex-selective abortions on the basis of pre-natal sex determination technology), the anti-female gender bias/discrimination is widely agreed upon as its single root cause, given that India has not experienced international male-selective labour migration on a massive scale during this entire span of hundred years. However, the same cannot be said of particular regions of the country like NER, where migration played an important (if not dominant) role in shaping demographic outcomes.

Sex ratios in NER, much like rest of the sub-continent, followed a declining trend from 1901 to 1961, but its reversal began in NER from 1971, much earlier than it did at the all-India level. While sex ratio during the pre-independence period (1901-1941) had been declining in both India and NER, the latter not only evinced significantly lower sex ratios compared to the former, the difference had been increasing during this period as well. It is here that immigration, which had little to do with sex ratio at the all-India level, could have had considerable influence on the determination of overall sex ratio of NER. Among the states of the region, the lowest sex ratios during the pre-Independence period were those in Assam, Sikkim and Tripura, the states that constituted more than eighty per cent of the population of the entire NER. As already noted, these were also the states that had witnessed persistent flows of immigration during the entire pre-Independence period. This is corroborated by the data on net immigration (of mostly non-tribal people) into Assam and Tripura (as noted above in more detail) and is affirmed by rapid declines in the share of tribal population in these states during the pre-independence period (Table 8). It is highly plausible that these immigration flows of labourers into these two major states of NER consisted disproportionately of males, with its concomitant influence in lowering the f/m ratio in these states and hence in the entire NER. Additionally, these states comprised of a dominant non-tribal population and it could be responsible for the lower sex ratio (at least against the hill states), a point to which we turn now.

Interestingly, during the pre-independence period, there had been practically no immigration into the Hills and Manipur (the difficult terrain precludes settled agriculture and deterred the colonialists to establish plantations as well). The hill states

TABLE 2.10: SEX RATIO (FEMALES PER 1,000 MALES), NER, ITS STATES, AND INDIA, 1901-2011

State	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001	2011
Arunachal Pradesh#	NA	NA	NA	NA	NA	NA	894	861	862	859	893	919
Assam	919	915	896	874	875	868	869	896	910	923	935	953
Manipur	1037	1029	1041	1065	1055	1036	1015	980	971	958	978	987
Meghalaya	1036	1013	1000	971	966	949	937	942	954	955	972	985
Mizoram	1113	1120	1109	1102	1069	1041	1009	946	919	921	935	975
Nagaland	973	993	992	997	1021	999	933	871	863	886	900	931
Sikkim	916	951	970	967	920	907	904	863	835	878	875	889
Tripura	874	885	885	885	886	904	932	943	946	945	948	961
NER	939	935	919	901	899	891	890	906	915	925	937	956
India	979	975	970	966	965	965	963	930	934	927	933	940

Notes: The sex ratio of NER has been calculated as a weighted average of the sex ratios of the individual states of the region. The weights assigned are the respective proportions of population of each state to the total population of NER in the respective census years.

Arunachal Pradesh was censused for the first time in 1961.

Source: Registrar General (1971, 1981, 1994, 2004, 2011)

(comprising of present day tribal-dominated states of Meghalaya, Mizoram, and Nagaland) and partly Manipur evinced higher sex ratios vis-à-vis India as well as the other states of the region during the pre-independence period. This indicates a relative dominance/prevalence of the socio-cultural practices less discriminatory against females, particularly female infants and girls in tribal population. While gender bias and female autonomy phenomena have been generally highlighted in the context of India's North-South divide, the former is similarly applicable to the socio-cultural differences between tribal and non-tribal groups (a discussion on these issues has been presented in Chapter 5). Indeed NER's tribes-majority hill states vis-à-vis others of the region provide a good opportunity for verifying the robustness of a connection between gender relations and kinship on the one hand and sex ratios as reflections of gender biases and discrimination on the other hand.

Gender bias, in so far as it is captured by the population sex ratio, seems to be virtually absent in the hill states of NER. This is generally true of the tribal population of India as well. For example, the report to the 1931 census writes that “[t]he general conclusion as to the sex ratios of India proper is therefore that in the aboriginal tribes the number of the two sexes is approximately equal, whereas in the rest of the community males exceed females” (quoted in Maharatna, 2000, pp. 200). The reasons for relatively balanced or even more favourable sex-ratio in tribal population have often been traced to a less patriarchal kinship structure and generally higher female autonomy and status with respect to access to and distribution of resources within households and communities (for details see Maharatna, 2005. and the literature cited

therein). All this is consistent with overall more balanced gender relations in much of NER.

There have been opposing trends in the sex ratio between the non-tribal dominated states of Assam and Tripura on the one hand and the remaining tribal-dominated states of the region including Manipur on the other during the post-independence period. Among the latter states sex ratios turned to be distinctly unfavourable to females from 1961/71 onwards, though the trend got somewhat arrested in 2001. Sex ratio started to increase in Assam around 1961 and even earlier in Tripura, i.e. from 1951. This coincides broadly with declining male-selective immigration into these states. Although data on immigration are rather imperfect because of the significant presence of illegal migration, one can say with a reasonable level of confidence that the declines in sex ratio in the latter group of states have been shaped by patterns of migration flows to a considerable extent. For example, while during the pre-Independence period, the Hill states had higher sex ratio than the all-India average, the sex ratio in all states of NER except Manipur and Mizoram turned out to be unfavourable by larger extent than that of all India during the post-Independence period, especially during 1971 to 1981.

2.6 Discussion

The present chapter finds that the NER has had somewhat distinct experience in the realm of its demography and related long-term trends. This revelation is important because demographic phenomena and processes and their trends/movements over time

are well nigh central to a clear understanding of the region's major problems – social, economic and political.

For example, while the population growth in the Indian subcontinent as a whole had been during the colonial period, and has remained even today, practically unaffected by international migration, both internal and international migrations have played a significant role in shaping the distinct patterns of growth and other major characteristics of NER's population, intra-regional variations notwithstanding. Indeed, there have been significant, if not dramatic, changes in the volume, pattern, and directions of migration flows in NER during the past hundred years under the consideration of the present chapter. More specifically, during the colonial rule, immigration had been largely a feature of the plains, with importation and employment of 'coolies' in the tea estates of Assam province and voluntary movement of agriculturists from neighboring over-populated areas of the Bengal Province. During the post-Independence period, one observes a wide extension of the areas witnessing immigration, and this includes much of the hills region now (i.e., the primarily hilly states of NER comprising Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, Sikkim). Additionally, as pointed out elsewhere, significant intra-regional migration has now become a trait of the states in the region. Although of late there have been clear indications of slowing down of immigration into the region from outside, the porous nature of the borders of the region with its neighbouring nations has great potential of compounding the problem of population movements, with substantial 'illegal' migration continuing till date. This has arguably created a potentially volatile situation particularly in some states of the region. Indeed, a lot of damage to human

lives and property has already taken place, perhaps as a reaction to the changing ‘demographic balance’ due to protracted phenomenon of in-migration.

No less significant is the effects of such demographic trends on the socio-cultural mores of the original inhabitants, particularly the tribal population, of NER. It is interesting that high proportion of tribal population, though population-wise smaller than many major tribes put together outside NER, brings in some dilemmas. For example, an apprehension of being outnumbered might lead some tribes or communities to identify themselves with the dominant socio-cultural/ethnic groups in search of social security and peaceful survival. However, there might be others who would tend to cling rather strongly to their own traditional socio-cultural practices and life styles so that with a starker identity of their own their individuality and independence could not get undermined. Both forms of ‘adjustments’ or responses should have ramifications in turn on the demographic variables i.e. on fertility, mortality and nuptiality.

For instance, assimilation might lead to increasing adoption of non-tribal mainstream socio-cultural practices by tribal peoples, causing unwelcome consequences in the form of percolation of gender biases and inequalities among the latter (for details refer to Maharatna, 2000, 2005). On the other hand, the tribal groups that wish to maintain their identities might resort to pro-fertility proclivities (these trends are manifest, as we have seen, in the recent slowdown in pace of fertility decline in some states of NER). Of course, the exact mechanisms through which the envisaged symbiosis between demographic and socio-cultural forces thickens and takes shape are indeed complex and do deserve further meticulous research.

CHAPTER THREE

FERTILITY LEVELS, TRENDS AND DIFFERENTIALS IN NORTH-EAST INDIA, 1971-2011

3.1. Introduction

Owing to the large and growing body of research on fertility in India, it is now largely known that Indian fertility rates began their downward journey at least since the beginning of the 1970s. It is perhaps also well-recognized that there are significant differentials in both the level and pace of fertility decline among the various regions and states of India. Interestingly, recent fertility estimates from national level surveys draw attention to the fact that NER, along with the proverbially backward Hindi-speaking belt of North India, has demonstrated great resistance to fertility decline in the recent past, and indeed, the states of the region evince the highest fertility rates in the country presently [International Institute for Population Sciences (IIPS) and Macro International, 2007: 82-84]

In this context, it is quite remarkable that one finds relatively little investigation on the subject of fertility in NER, not merely from the historical standpoint as indicated in the previous chapter, but surprisingly in the contemporary sense as well. Indeed, most of the inquiries into fertility transition in India (national and international) have been practically silent on NER barring of course, a few instances involving Assam (some notable examples being Guilmoto and Rajan, 2001; Manna,

1998; Preston and Bhat, 1984; Rele, 1987; Retherford and Mishra, 2001; Visaria and Visaria, 1994; Visaria, 1999 among others). In fact, in so far as the subject of fertility (or for that matter even most other demographic variables and processes) is concerned, the North-eastern region appears literally as a *terra incognita* on the map of the Indian subcontinent.

Of course, one of the primary reasons behind the lack of demographic research on the region, as mentioned earlier, has been the paucity of data on most of the states till recently. Even when such data were available, there were serious doubts on their reliability. For instance, fertility and mortality statistics from official sources such as the Civil Registration System (and that from the Sample Registration System to a certain extent), were found to be severely flawed in case of most of the Indian states and particularly so for the states of NER. This necessitated the treatment of these data with utmost caution (but more on this in the following section). Needless to say, such problems presented huge (but perhaps not insurmountable) obstacles in the analysis of demographic processes in India and obviously for the states of NER. However, research on the subject has shown a distinct tendency to move forward in the Indian context even with the aforesaid drawbacks. This has often taken the form of supplementing existing sources with data from censuses and surveys. But NER remained an exception to the trend and we find that such efforts have been largely non-existent for the states of the region.

In fact, as is well-known, the census has been the primary source of information for demographers throughout the world, who have had to deal with inadequate/non-existent population statistics; a situation that is perhaps not uncommon in developing countries. Indeed, data from the Census of India provides an opportunity to both

determine levels and trends of demographic variables of interest *and* establish the veracity of information on vital statistics from the direct sources mentioned earlier. The Census of India started to collect information on fertility since 1971 (two questions, one on the age at marriage and the other on children born during the last year to currently married women were canvassed during 1971) and the task of indirect estimation of demographic indicators such as fertility was rendered even more easier (and reliable) since 1981, when the Registrar General's office added two more questions to the fertility schedule, viz., children ever born and children surviving (classified by the age-group of the mother). Whereas these opportunities for investigation have been exploited to a large extent for India and many of its larger states, they were ill-used as far as the North-eastern states of India are concerned. Indeed, a review of existing literature on fertility in the Indian context, finds very little reference to NER; a situation that certainly needs to be redressed.

However, it would be only fair to mention that the volatile socio-political climate of the region for most of the period following Independence has been a further source of the deficiency in statistics and research on the region. In fact, the imagination of researchers (both inside and outside of the region) has largely been caught up by the ongoing socio-political turmoil and politics in NER. Alongside with this, and due to similar reasons, the capacity of individual scholars and even national (and international) organizations to carry out investigations on the region has been fairly limited till the recent past (see for instance, Chakravarti, 1998). This has also been certainly aggravated by the sensitivity of the people of the region towards divulging demographic information as perhaps a lot of the politics in NER has been inextricably linked to demographic issues. Surprisingly however, even the avenues opened up by

the availability of the NFHS data since the early 1990s did not stir up research on NER, at least to the extent one would have expected.

In this context, the principal object of the present chapter is to draw together and analyze fertility levels and trends in the North-eastern region from available (official) sources for the period beginning early 1970s to the present. As mentioned in the previous chapter, data from the NFHS suggest the possibility of *stalling* fertility decline among several states of the region during the 1990s. In fact, according to these statistics, there has even been a reversal of the earlier trend and consequently several states of the region have witnessed a rise in fertility during the aforementioned period. However, it is not entirely clear that such a phenomenon has indeed transpired in NER. First and most importantly, there is a lack of consensus among the different data sources regarding fertility *trends* in the region. Also, a few researchers (e.g. Singh, 2006) have argued that the recent rise in fertility suggested by the NFHS for one of the states of NER, viz., Manipur is not real and is largely a result of overestimation. Thus, an examination of alternative (i.e. indirect) estimates of fertility becomes imperative for establishing the ‘actual’ trend in fertility in the recent past in NER. For this purpose, we employ some indirect estimation procedures based on census data to calculate fertility levels in NER for the 1990s, and results largely support the lack of fertility decline among several states of NER. Second, it also needs to be verified that the rise in fertility (if at all) is not of a pre-transitional nature, which is inherently different from the possibility of a *stall* we just mentioned.¹⁹

¹⁹ The examination of the stall in fertility decline has been explained in greater detail later in this chapter. In fact, as we shall see in the following chapter, the trend in the proximate determinants reveal that commensurate with the stalling fertility decline among the majority of

Further, it would be of interest to see whether and to what extent fertility differentials exist within the states of NER. Indeed, fertility transitions in developed countries [that have already reached replacement levels (and are indeed moving towards below-replacement fertility rates)] have shown that fertility differentials typically diverge during initial stages and converge again at near replacement levels (even though some differentials could persist). In the context of the states of NER, while it is quite certain that differentials would exist by socio-economic categories, we cannot be definite about the extent to which such differences might have narrowed overtime, provided they have moved in that direction at all. Indeed, in view of the possibly rising fertility rates in the region, it is well-nigh possible to encounter further divergences in fertility among different social and even cultural categories. With these questions in mind, we move ahead to examine fertility trends and differentials among the states of NER.

3.2 Fertility Trends in the North-eastern Region: 1971-2011

This section traces the fertility trends in North-east India in a comparative perspective over the span of nearly four decades from 1971 to the present. However, before we begin the discussion on fertility trends in NER, it would be useful to discuss the nature and reliability of the various sources of information on fertility.

the states in NER there has been very marginal change in the proximate determinants during this period.

3.2.1 Data Sources and their Limitations

The principal source of direct estimates of the TFR over a relatively long period is the SRS that provides data at the national and state level since the beginning of the 1970s. However, such data for smaller states of North-east India have been made available only since the beginning of 1990s.²⁰ The other major source, which is also based on large-scale sample survey like SRS, is the NFHS, which made such data available (at national and state level) since the beginning of the 1990s. The Sample Registration data for Indian states are however far from perfect as the data suffer from incomplete registration, and as expected, the extent of under-registration varies over the states. A major source of error in SRS data seems to be the outdated sampling frame in most of the states. In addition, these data are prone to be particularly deficient in states with poor administrative machinery and/or financial constraints (see for instance, Wells, 1967). It has been held by some researchers that perhaps the incompleteness of registration in the SRS has been diminishing over time (at least over the period from 1970 to 1990 and among the major Indian states). While the 1972 Fertility Survey conducted in a 25 per cent subsample of the SRS found SRS under-registration of births by about 8 per cent, two subsequent inquiries (RGI 1984a; 1988) indicated decline in the extent of under-registration of births to 3.2 per cent in 1980-81 and further to only 1.8 per cent in 1985 (Retherford and Mishra, 2001). However, there are less optimistic estimates, for instance, those by Narsimhan et al. (1997), suggesting that the actual level of under registration could be closer to 10 per cent.

²⁰ This is partly because the majority of the smaller states of the region were part of Assam, until as late as 1987. The details on the formation of the present day states of NER are contained in Chapter 1.

There is hardly any reason why the extent of under-registration in SRS would be relatively less for the North-eastern states especially when these states have been late in initiating the programme. In fact, Narsimhan et al. (1997) noted that the 1980-81 SRS evaluation study found the level of birth under-registration in Assam to be as high as 9 per cent. Some researchers (for instance Mari Bhat, 1994) have also argued that levels of under-registration of births under SRS are much higher in NER as compared to the major states of India.

However, it is interesting that, as pointed out by Mahapatra (2010), the RGI did not conduct any study to assess the performance of the SRS since the 1990s, which leaves a doubt about the quality of the SRS data during the 1980s into the 1990s and beyond. To fill in this lacuna, Mahapatra assessed the extent of registration/under-registration under the SRS for the 1990s. He finds that the completeness estimates suggest that registration of *deaths* within sample areas by the SRS worsened during 1990s up until 2007. The all India estimate of SRS completeness ranged from 77 per cent to 99 per cent and was around 82 per cent in 2007. Thus, it is clear that although there might have been some improvement in the SRS during the 1990s, it has definitely not been carried into the following years.

Similar problems of operational and administrative nature however, are also likely to present themselves in the NFHS. As a matter of fact, it was mentioned in the NFHS 1 Report for the Northeastern states (IIPS, 1995) that data collection in these states was troubled due to lack of proper approachable roads in the primary sampling units located in hilly areas as well as due to unseasonal heavy rains. These problems manifest themselves broadly as omission and misreporting of events and cast doubt on the reliability of the statistics generated by the NFHS.

Commenting on the relative deficiencies of the two sources of information, Retherford and Mishra (2001) point out that while SRS suffers primarily from the under-registration of births, the NFHS data is infested primarily by misreporting of events. Specifically, NFHS data would likely be contaminated by backward displacement of births from the first five years preceding the survey to earlier years and omission of births at the time of the survey, as the data are retrospective in nature. The implication is that while both the sources would be providing lower than actual estimates of fertility, the NFHS would be *overestimating* the pace of fertility decline.

The Census, which was the primary source for indirect fertility estimation prior to the advent of the SRS, remains an important alternative source, primarily for the indirect estimation of fertility in view of the deficiency in the above-mentioned sources. In fact, as pointed out by the Committee on Population and Demography (Bhat, Preston and Dyson, 1984) some specific questions on fertility and mortality had been included, albeit on a sample basis for certain states, as early as the Census of 1911, but the data did not lend themselves to any meaningful analysis due to poor quality, incomplete coverage and irregular tabulation categories. In addition, sample information has been collected ever since 1971 Census on the number of births to women in the reproductive age group during the last year, which provides an opportunity to directly calculate current fertility. However, we find that the in general and throughout the developing world, these data are severely affected by recall errors, lending it unsuitable to estimate fertility, for all practical purposes. The chief problem that arises on the part of the respondent while reporting births during a specified period in the past is that of locating the event on a time-scale, especially when no written record is available. The average length of time covered by the reports may span more

or less than the intended 12-month period by a margin of several months. Thus, the age-specific fertility rates (ASFR), and hence the TFR, calculated from such statistics, would misreport the fertility rate (Shryock et al, 1976). In the case of Indian data, the same problem lies in under-reporting of the TFR to a considerable extent (see for example Registrar General, 2004).

A related piece of information contained in the Indian censuses since 1981, as mentioned earlier, is that on children ever born recorded by parity and age-group of the mother, which have been more widely used by researchers for the indirect estimation of fertility. However, such data are yet again likely to be affected by misreporting, particularly under-reporting, due to memory lapses, omission of dead children, or children who have left home (Shryock et al, 1976)²¹. Nevertheless, they have proved to be very useful in establishing as well as verifying direct fertility estimates, and have been widely used in the Indian context, albeit with necessary qualifications (and corrections). It could be mentioned in passing that the problems encountered when dealing with census data are likely to present themselves to a considerable extent in the NFHS statistics as well and needless to say, in most other sources that construct estimates based on retrospective questions. With the above mentioned shortcomings within each of the data sources on fertility in the Indian context, we now examine the alternative estimates of TFR and attempt to establish the trends in fertility in NER.

²¹ Indirect estimates of fertility based on Census data for India and several of its major states have been presented and discussed in Chapter 5.

3.2.2 Alternative Estimates of the Total Fertility Rate of NER and States, 1990-92 to 2003-05

Table 3.1 contains the estimates of TFR from two direct principal sources viz., the SRS and the NFHS, along with our own estimates obtained using the Arriaga-Arretx method based on census information. We begin with a discussion on the available estimates from the SRS and NFHS, pointing out the discrepancies in the fertility trends as indicated by these two sources.

Fertility data on the North-eastern states for the period following Independence are available solely from the SRS since early 1970s and indeed, primarily for Assam until the beginning of the 1990s. The NFHS provides estimates for the period 1990 to 2005 for all the North-eastern states, whereas the SRS estimates for the 2000s are again available just for Assam (Table 3.1). According to the SRS, Assam evinced a somewhat higher fertility as compared to the all-India average during the beginning of the 1970s. It is interesting to note here that fertility in the urban as well as rural areas of Manipur, Meghalaya and Tripura was found to be lower than that for Assam as well as below the corresponding national averages during this period. Even though these statistics should indeed be taken with a pinch of salt (given the varying accuracies of SRS data over states as indicated in the earlier section), nevertheless, they indicate that much like the rest of India, fertility transition had begun among the North-eastern states somewhere between the late 1960s and early 1970s. Arunachal Pradesh had the highest fertility in the region during the early 1970s that surpassed that of the other states and the national average by at least two and a half children per woman.

The fertility in Assam pertaining to the period 1981 to 2010 has been remarkably close to, and perhaps slightly lower, than the all-India average figures. Data indicate that from early 1970's to late 1980's, fertility has been around four children per woman in Assam, whereas it was around half a child higher at the all-India level. There has been a decline of nearly 1.5 children per woman in Assam from early 1970s until the end of the 1980s, much like it has been at the all-India level. Between 1972 and 1992, the fertility in the remaining states of the NER has also followed a downward trend. In other words, fertility seems to have followed a distinct downward trend in NER during the post-Independence period at least up to the beginning of the nineties. This is a rather important observation discarding doubts about pre-transitional rise in fertility in NER during the 1990s.

Now, for the period 1990-92 for NER, the two sources do not seem to disagree significantly for the region taken as a whole, with the SRS and NFHS providing comparable estimates of TFR during this period. Indeed, it is quite remarkable that in the case of the largest state in the region, viz., Assam, the estimates from the two sources are in fact, identical. It is notable however that except for Tripura and Meghalaya, TFR estimates from the NFHS in the remaining states of the region are higher (*howsoever* slightly) than the corresponding SRS estimates (as against the situation at the all-India level, where the SRS estimates have been relatively higher). In the case of the former two states, SRS estimates of fertility are vastly higher than the corresponding NFHS ones. In fact, in the case of Tripura, the SRS fertility estimate is about 3 children per woman higher than the corresponding NFHS estimate and much higher than the all-India level fertility for the same period. Nevertheless, as far as the relative ranking of the states of NER vis-à-vis all-India are in question, we find

**TABLE 3.1: TOTAL FERTILITY RATE IN INDIA AND INDIVIDUAL STATES IN INDIA DURING
THE POST-INDEPENDENCE PERIOD, VARIOUS SOURCES**

Year	India	NER*	Assam	Arunachal	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
Total Fertility Rate (SRS)										
1970-72	5.2	5.7	5.7	-	-	-	-	-	-	-
1972	5.8 (4.3)		5.7 (4.1)	7.0	4.5 (3.5)	4.7	-	-	-	4.3 (3.2)
1981	4.5	4.1	4.1	-	-	-	-	-	-	-
1982	4.5	-	4.2	-	-	-	-	-	-	-
1987	4.1	-	4.0	-	-	-	-	-	-	-
1990-92**	3.6	3.6	3.5	4.1	2.5	4.1	-	2.3	3.0	5.9
1996-98**	3.3	3.0	3.2	2.8	2.4	4.0	-	1.5	2.5	2.1
2003-05**	2.9	-	2.9	-	-	-	-	-	-	-
2010	2.5		2.5							
Total Fertility Rate (NFHS)										
1990-92	3.4	3.4	3.5	4.3	2.8	3.7	2.3	3.3	-	2.7
1996-98	2.9	2.6	2.3	2.5	3.0	4.6	2.9	3.8	2.8	1.9
2003-05	2.7	2.6	2.4	3.0	2.8	3.8	2.9	3.7	2.0	2.2
Total Fertility Rate (Arriaga-Arretx Method)^										
1992	3.9	4.2	4.1	5.0	3.9	4.9	4.5	5.1	4.6	3.4
2000	3.5	4.4	4.3	5.8	3.5	4.9	4.8	5.5	4.1	2.4

Note: * Weighted average of the individual states in the case of SRS and NFHS, with weights being the proportion of state population to total population in NER during the respective years ** Three year moving averages ^ Author's calculations (the method of estimation has been described in the succeeding section) figures in parentheses are urban fertility rates.

Source: Registrar General 1976, 1982, 2009; IIPS and ORC Macro, 2007

agreement among the two sources in nearly fifty per cent of the cases. Specifically, both indicate that fertility had been relatively lower than national average in the case of Manipur and Nagaland and higher than the national average in Arunachal and Meghalaya during 1990-92.

The situation seems to be one of increasing discrepancy between the data sources between 1990-92 and 1996-98. Overall, for NER as a whole, fertility estimates from the SRS have been higher than the corresponding NFHS estimates during 1996-98 (as in the case of all-India) by about half a child. Nevertheless, as during 1990-92, TFR estimates from the NFHS are higher in majority of the states (except Assam, Tripura and Arunachal Pradesh), indicating the possibility of greater under-registration in the SRS. The NFHS estimates have been higher to the extent of nearly two children per woman in Nagaland and slightly more than half a child per woman in Manipur and Meghalaya than the corresponding SRS estimates during this period. Again during 1996-98, as for the earlier period, there is considerable consensus in the relative position of the states of NER apropos India. Specifically, both the sources indicate that fertility in Assam, Tripura, Arunachal and Sikkim was relatively lower than the all-India level, whereas it was higher in Meghalaya. However, in the case of Manipur and Nagaland, the SRS estimates indicate comparatively lower level than the national average, whereas NFHS shows relatively higher fertility in these states than the all-India level.

As far as fertility *trends* are concerned, we find rather more disagreement than consensus between the SRS and the NFHS. Overall, however both sources indicate that there has been decline in fertility during the 1990s in the region as a whole, but there are

serious discrepancies in the data for the individual states. For instance, while the SRS data show that there has been marginal decline in fertility in Assam, Manipur and Meghalaya and significant decline in the remaining states, the NFHS data find that there has been significant decline in fertility in Assam, while there has been *rise* in fertility in Manipur and Meghalaya and for that matter even in Nagaland and Mizoram. Apart from Assam, the other states that have experienced decline in fertility during the 1990s are Arunachal Pradesh and Tripura.

For the period 1996-98 to 2003-05, as already noted, data are available from the NFHS alone (and for Assam from the SRS too). According to NFHS, for the region as a whole, data indicates that there has been probably no change in the TFR, which remained at 2.6 children per woman from the late 1990s to mid 2000. Apart from Meghalaya and Sikkim, there has been no significant decline in the remaining states. In fact, there was substantial rise in fertility in Arunachal Pradesh and perhaps Tripura. In Assam, for which fertility estimates are available from both sources, we find that whereas SRS indicates a marginal decline, NFHS shows practically no change in fertility during this time. On the whole, both sources show that several states of the region, experienced sharp decreases in the pace of fertility decline, which is especially true of the tribal majority states of NER. However, it is indeed remarkable that Assam has perhaps also not been an exception to the general trend observed in the region.

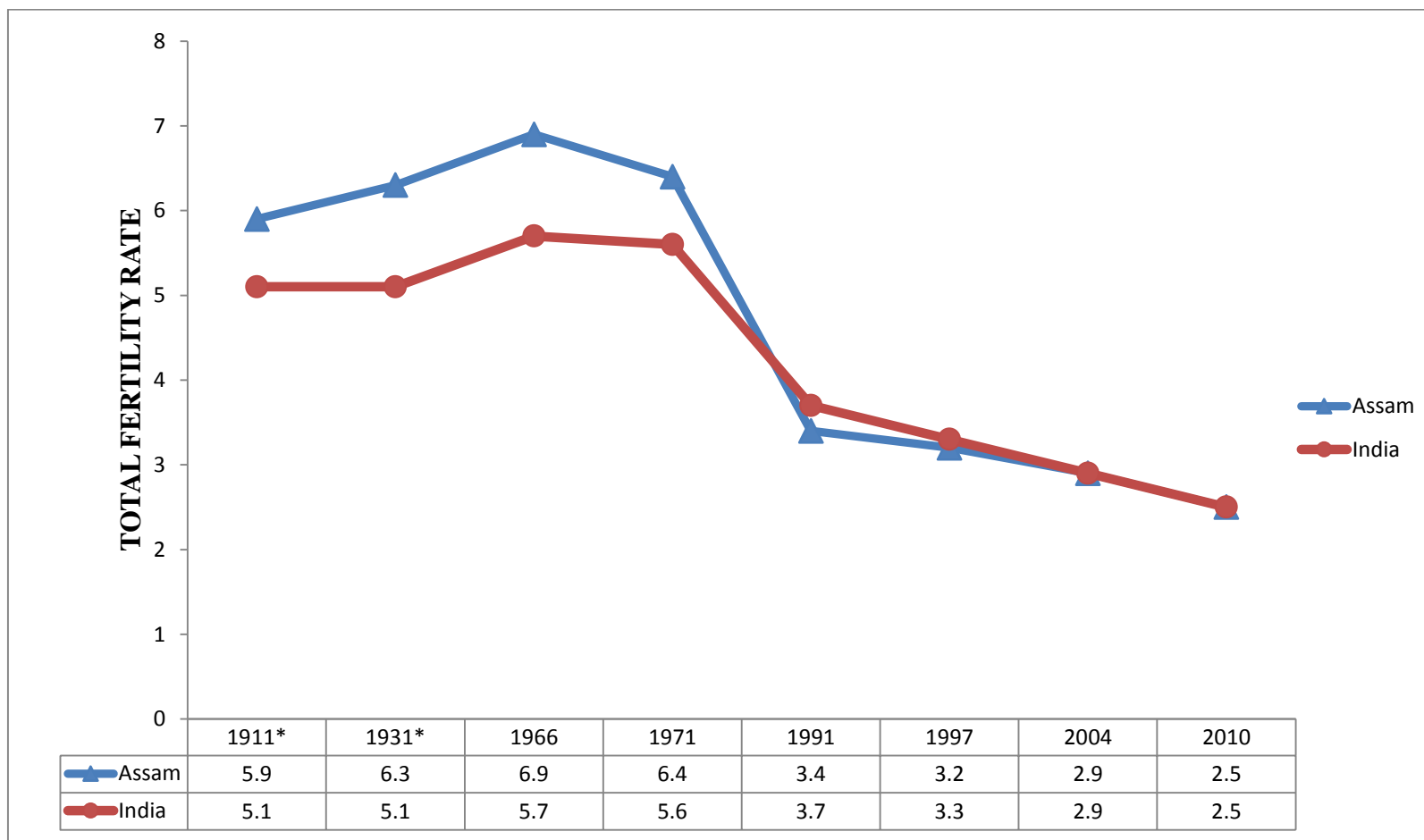
Fig. 4 presents long-term trends in fertility for Assam and India covering the entire period from 1911 to 2010. As discussed earlier, the TFR has been historically higher in Assam vis-à-vis all-India for most of the colonial period and in fact, most of the period following Independence as well. It is interesting to note that the TFR showed a rising trend in Assam as well as all-India from at least the beginning of the 1900s till

the middle of the 1960s. Significant downward movement in fertility occurred during the late 1960s, marking the onset of the third phase of fertility transition in both the former and the latter regions (Fig. 4). Interestingly, SRS data reveal that at the point of downturn, fertility rates in Assam were among the highest in India. While the all-India fertility during 1966 was nearly 5.7 children per woman, Assam evinced a fertility of around 6.9 children per woman; which was slightly more than one child per woman as compared to the national average. Nevertheless, the TFR in Assam declined substantially during the following three decades, and by early 1990s, Assam evinced comparable fertility with all-India, though it was still above replacement level.

It is quite remarkable that most of the fertility decline in Assam had in fact, been achieved prior to the 1990s. In fact, as can be seen from Fig. 4, fertility declined relatively more sharply between 1966 and 1991 (at the average rate of around 0.14 children per year), whereas the decline was much smaller (and indeed, less than half that of the former period, at around 0.05 children a year on average) between 1991 and 2010. In fact, Assam's TFR was slightly *below* the national average during 1991. However, fertility decline could not continue with the same velocity thereafter so that during 2004, the Indian average fertility rate caught up with that of Assam. In other words, fertility decline in Assam, as in the remaining states of the North-east also probably suffered a setback after the 1990s.

Overall, official statistics from the NFHS, as also from the SRS to a certain extent, suggest a slowdown in the pace of fertility decline in NER, and the former in fact, suggests the possibility of a rise in fertility among several states of NER during 1990 to 2005. However, there remains some confusion regarding the real trend in the case of these states. Indeed, while it is easy to overlook this finding as a possible short

FIG. 4: TRENDS IN TOTAL FERTILITY RATES IN ASSAM AND INDIA, 1911 TO 2010



Note: * TFR estimates derived by author using Rele method for respective years.

Source: Bhat, Preston and Dyson, 1984; Registrar General (various years)

term fluctuation or a data error (partly due to the reason that population-wise, these states are among the smallest in the Indian subcontinent),²² it would be unwise to do so without a deeper investigation. In the following section, we undertake the indirect estimation of fertility for NER and its constituent states for the period following the 1990s.

3.2.3 Indirect Fertility Estimates Based On Census Data: NER and States

Census information on children ever born to women tabulated by age groups can be used for the indirect estimation of fertility, primarily through the Brass method (Brass, 1968) with its various modifications [such as the Arriaga-Arretx method, Arriaga (1983)] and the Own-children method (Grabill and Cho, 1965 etc). Among the indirect methods of fertility estimation for India from Census data, the more commonly used have been the Brass's P/F method (1968) and its various modifications (Registrar General, 1984b; 1997), the method of reverse survival (Bhat, 1994; Guilmoto and Rajan, 2001) and the Rele method (1987). In addition to this researchers have also applied the own children method of fertility estimation (Retherford et. al. 1997). It should however be noted that as opposed to the Brass method and Own children method, which estimate current fertility, the reverse survival method generates estimates of the CBR, and thus the latter has to be necessarily combined with some regression based method, which would predict the relationship between the CBR and the current fertility rate.

²² Indeed, it would be rather difficult to explain why such an error in data should be manifest only in the case of the NER and not the other states of India.

The TFR estimates generated by the Brass method (1968) are generally used to check the accuracy of the estimates generated by direct methods, like those from the NFHS or SRS. This method is based on the assumption that fertility has been constant in the past, that the pattern (although, of course, not the level) of the recorded age-specific fertility rates (ASFR) is correct, and that the level of lifetime fertility of the younger cohorts provided by the children ever born (CEB) is correct. The recorded ASFR data are cumulated and graduated to be in the form of CEB. Under the assumption of constant fertility, these transformed data (F) are comparable to the recorded CEB. The ratios of CEB/ F for the younger age groups are assumed to provide possible adjustment factors to be applied to the recorded fertility rates.

Arriaga (1983) later modified the method and extended it to the situation of changing fertility. Rather than transforming the recorded ASFP figures to CEB-type figures, he suggested transforming the recorded CEB data into estimates of age-specific fertility. The method is better suited to cases where children ever born data are available at two points in time (for instance two consecutive Census enumerations). The approach of Arriaga can be described in the following steps (i) to obtain average number of children ever born for women exact age x at the time of the first and second enumeration [$CEB_x(t_1)$ and $CEB_x(t_2)$] through graduation by a ninth degree polynomial, on the data on children ever born in five-year age groups recorded in each enumeration; (ii) to estimate children ever born at exact age x for the year after the first census [$CEB_x(t_1+1)$] and the year before the second census [$CEB_x(t_2-1)$] by linear interpolation between $CEB_x(t_1)$ and $CEB_x(t_2)$ for every age x ; (iii) to calculate single-year ASFR for the one-year period following the first census as $f_x^1 = CEB_{x+1}(t_1+1) - CEB_x(t_1)$ and for the one-year period preceding the second census as $f_x^2 = CEB_{x+1}(t_2) -$

CEB $x(t_2-1)$; (iv) to ensure that the ASFR at older ages decrease monotonically and exponentially to zero at age 50, adjust the estimated single-year ASFR at ages 40 and over by assuming that $f_x^i = f_{39} + (1 - f_{39})^{(x-39)/11} - 1$; and, finally, (v) to calculate ASFR in conventional five-year age groups for each time period by taking the arithmetic average of the single-year ASFR within each five-year age group. These two sets of ASFRs are then cumulated by age, and the ratios of these cumulated figures provided possible adjustment factors. According to Arriaga, this modification not only has analytical and diagnostic advantages but leads to extension of the method to conditions of changing fertility (Arriaga, 1983: 3-8). If the children ever born (CEB) and fertility pattern data (ASFP) are available from two census enumerations, ASFR can be estimated for the one-year period following the first enumeration and the one-year period preceding the second enumeration (United Nations, 1988).

Here, we use data on children ever born tabulated by age-group of the mother from the 1991 and 2001 Censuses for NER and its constituent states for the indirect estimation of TFR using the Arriaga-Arretx approach.²³ Table 3.1 contains the

²³ Researchers (for instance Mari Bhat, 1996) have used the Reverse survival method (RSM) for the estimation of TFR of India and major states. However, we abstain from using this method as the RSM requires estimates of child mortality which are of doubtful quality (perhaps more so for NER where sample size are smaller). Further, the estimated regression that predicts TFR from estimates of birth rate using RSM might not be particularly suited for NER as these states deviate from the generally observed correspondence between the former and the latter at the all-India level [See Bhat (1996) for further reservations in using RSM]. However, it might also be mentioned here that although the *Arriaga-Arretx* method assumes a closed population, in-migration does not cross six percent of the total population in any of the states of the region in either 1991 or 2001 and hence is very unlikely to disturb our results for all practical purposes.

Also, it is pertinent to mention here that even though we have not corrected the census data for possible age misreporting, visual inspection of the data did not largely reveal any irregularities such as zero parity at older age groups, or fluctuating trends over the various age groups for women. Also, evidence for age concentration (Whipple and Myer's index) for the states of NER suggest tolerable levels of such errors, and in fact, age reporting seems to be much better

Arriaga-Arretx (A-A) estimates of fertility for the North-eastern states for the years 1992 and 2000. Let us begin by examining the level and trend of these estimates over the 1990s. The A-A estimates for the period 1992 for the region as a whole are slightly higher than the national average. Among the individual states we find the highest fertility in Nagaland (slightly more than five births per woman) followed by Arunachal Pradesh (five births per woman) and Meghalaya (slightly less than five births per woman). All the states in NER except Tripura (which had lower fertility) and Manipur (comparable fertility) had higher fertility vis-à-vis India. The relative position of the states in terms of fertility did not change during 2000. However, the fertility rate in NER *increased* slightly during this period while that at the all-India level declined. This resulted in a gap of nearly one child per woman between NER and India during 2000 according to the A-A estimates.

Fertility decline in NER appears to have been stalled during the 1990s both at the aggregate level and at in the majority of the states in the region according to the A-A estimates. In fact, these estimates suggest an increase in fertility during this period in all states except Manipur, Sikkim and Tripura. This seems to reaffirm the finding from the NFHS that there has indeed been a stalling in fertility decline in majority of the states of the region during the 1990s. A careful look at the various estimates shows that the A-A estimates are in greater agreement with the NFHS estimates than the SRS for this period as far as relative ranking of states within NER in terms of fertility is concerned (Table 3.1). In fact, despite some difference in the reference period of the

than the all-India level and closer to advanced states like Kerala (where age misreporting is tolerable) in Manipur, Meghalaya, Nagaland, Sikkim and Tripura (Registrar General, 2001; Borkotoky and Unisa, 2014). More importantly, there is practically very little chance for age reporting to have changed significantly for the period between 1991 and 2001. Hence, we largely ignore such errors and do not expect them to affect our results significantly.

NFHS and the indirect fertility estimates, there is congruence between the two sets of estimates regarding the trend of fertility decline in more than fifty per cent states of the region during this period, thus largely dispelling concerns of an artificial rise in fertility in NER stemming from data problems.

In the remainder of this chapter, we continue our analysis of fertility patterns and trends in NER with existing evidence on related indicators, primarily, the cohort fertility rates. As we shall see presently, fertility decline was in progress in all the states of the region at least since the beginning of the 1980s, dispelling any lingering confusions regarding the possibility of a pre-transitional fertility rise, especially among the tribal majority states of NER after the 1990s. In fact, an examination of changes in the distribution of children by birth order supports a slowdown in the pace of fertility decline in NER during this period. However, before going into that and in the subsequent section, we discuss the issue of stalling fertility decline in NER within the larger context of a global decline in the pace of fertility decline, and especially that witnessed in most of the developing world during the 1990s.

3.2.4 Fertility Stall in NER during the 1990s: A Closer Look

The stall in fertility decline in the North-eastern states can be seen in the wider perspective of a global decrease in the pace and the stall in fertility decline observed among a number of countries in Asia, Latin America, Middle East and Sub-Saharan Africa during the 1990s (Garenne, 2007). While there has been significant decline in fertility in the developing world since the 1960s, after the initial phase of rapid decline, its pace has been slowing down over time (United Nations, 2002). That said, in the

majority of the countries, the pace of decline has been slower for those that had attained relatively lower levels of fertility and faster among those that did not. Overall, the developing countries including India have been undergoing the process of fertility transition for almost the past quarter of a century- albeit at varying paces and under different circumstances. The TFR of the developing countries dropped from 6 births per woman in the late 1960s to 2.9 births in 2000-2005 (Bongaarts 2008). It is interesting to note that among the population-wise largest countries with intermediate fertility levels (i.e. TFR between 5 and 2.5 children per woman) viz. Bangladesh, Brazil, India and Indonesia, fertility decline was relatively slow in India during the period 1970 to 1997, remaining slightly above 3 per woman in 1997.²⁴

The stalling of fertility decline can be considered a relatively recent phenomenon (perhaps not least due to the availability of data for monitoring fertility trends at relatively shorter intervals through the Demographic and Health Surveys). Although it is not difficult to presume that fertility transition is not a smooth and uninterrupted process, it is worrisome when such stalls occur at relatively high levels of fertility. The issue of stalling fertility decline among countries that have begun the transition but are to reach replacement level fertility (the mid-transition countries or those with intermediate fertility level) has been recently brought into sharp focus by Bongaarts (2006). In fact, prior to the 1990s fertility decline had stalled in a handful of countries and investigations into the reasons for fertility stall precede Bongaarts' concern.

Notably, fertility stalls and their explanations (primarily for regions outside the African continent) have been studied by Hirschman (1986) in the context of the Malays

²⁴ In fact it has been argued by researchers (for instance Chaurasia, 2006) that there has been stalling in marital fertility decline in India in the period following the adoption of the target-free approach to family planning after 1995-97.

(one of the major ethnic groups of Malaysia), by Aghajanian for Iran (1991), by Khawaja (2000) for Palestine and by Nahmias and Stecklov (2004) for the Moslems of Israel. Since then, as noted by Bongaarts (2008), the number of countries experiencing fertility stall has increased considerably and currently it is more than a dozen. Of late, quite a few researchers have investigated the phenomenon largely in the context of Sub-Saharan Africa (Garenne, 2007; Moultrie et al., 2008; Shapiro and Gebreselassie, 2007; Schoumaker, 2009) as well as other regions of the developing world (Bongaarts 2008; Eltigani, 2003; Menken, et. al. 2009).

Although researchers are broadly speaking, in consensus with the notion of a stall (absence of a *significant* decline in fertility between two points in time), there is lesser unanimity on the operational definition of a stall. Gendell (1985) listed at least four criteria for identifying a fertility stall- (i) Least Developed Countries (LDCs) where fertility fell from a high level (TFR>5) by at least 20 percent, (ii) rapid decline (0.2 births per year) for a period of at least five years prior to the stall, (iii) failure of fertility to decline at all or at least a decline at half the speed as compared to the period of rapid decline earlier and for a period of at least five years even if the stall subsequently ended, (iv) cases where the stall brought the fertility close to the replacement level should be excluded.

Bongaarts (2006:5) adopted a relatively simple though strict condition of fertility stall. "A country is considered to have stalled if its TFR failed to decline between two DHS surveys while the country was in mid-transition". Thus, this definition of a stall excludes countries where decline in TFR might have been slower compared to earlier periods, and encompasses those where the TFR might have increased during the intervening survey period. Bongaarts (2008) later modified the definition of a stall to

include all mid-transitional countries where the *pace* of fertility decline has been statistically *insignificant* between the last two fertility surveys. Thus, even countries that have experienced slight reduction in fertility would be identified as stalling if the decline has been insignificant. Many researchers in the field have broadly relied (usually implicitly) on the earlier definition of stall as given by Bongaarts²⁵ (Eltigani 2003; Schoumaker 2009; Shapiro and Gebreselassie, 2007; Menken et. al. 2009). However, we have utilized the criterion of insignificant fertility decline in an inter-survey period to identify a stall (naturally, countries or states that have not witnessed a decline at all but a rise in fertility qualify within this definition).

To operationalize the above criterion we employ a one-tail t-test of significance of the difference between sample means for identifying fertility stall. The results are provided in Table 3.2. The significance ratios associated with the decline/stall for the period 1990-92 to 1996-98 indicate that whereas Assam, Arunachal Pradesh and Tripura witnessed significant decline in TFR during this time, Meghalaya and Mizoram had significant rise in their fertility. During this period, there was insignificant change in fertility in Manipur and Nagaland. Thus, four out of seven states experienced fertility stall in NER during the early part of the 1990s. During the period 1996-98 to 2003-05, we find that all the states experienced fertility stall with the exception of Meghalaya.

²⁵ Moultrie (2009) defines stalling in a way similar to Bongaarts, as one where the difference between fertility decline between the stalling period and prior period is significant. Garenne (2007) defined stalls as “periods during which the slope changed from negative (fertility decline) to nil or positive, the change in slope being significant at the $P < 0.05$ level”.

TABLE 3.2: FERTILITY CHANGE AMONG THE NORTH-EASTERN STATES: 1990-92 TO 2003-05

Year	1990-92 (1)	1996-98 (2)	2003-05 (3)	Change (2-1)	Change (3-2)
Arunachal	4.3	2.5	3	-1.8 (-3.24)	0.5 (0.32)
Assam	3.5	2.3	2.4	-1.2 (-10.51)	0.1 (2.66)
Manipur	2.8	3	2.8	0.2 (0.97)	-0.2 (-1.06)
Meghalaya	3.7	4.6	3.8	0.9 (3.44)	-0.8 (-2.05)
Mizoram	2.3	2.9	2.9	0.6 (3.17)	0.0 (0.00)
Nagaland	3.3	3.8	3.7	0.5 (1.52)	-0.1 (-0.36)
Sikkim	-	2.8	2	-	-0.8 (-5.79)
Tripura	2.7	1.9	2.2	-0.8 (-4.15)	0.3 (1.82)

Note: figures in parentheses are the respective values of the t-statistics.

Source: IIPS and ORC Macro, 1995; 2000; 2007

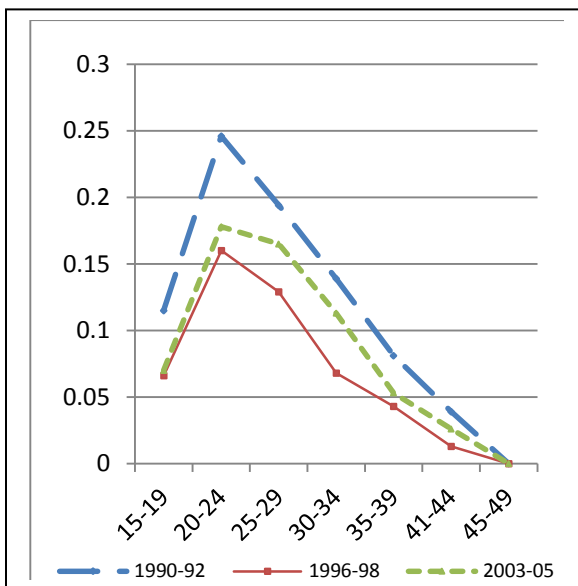
Interestingly, among the states where fertility stalled, it was insignificant in all but Arunachal Pradesh, where it increased during 1996-98 to 2003-05.

During the period 1990-92 to 1996-98, as noted above, fertility declined in Arunachal Pradesh, Assam and Tripura and the decline was observed uniformly across all age-groups (Fig. 5). However, the largest percentage drop was experienced by the older age-groups (41-44 and 35-39) in all the states.²⁶ Among the states that

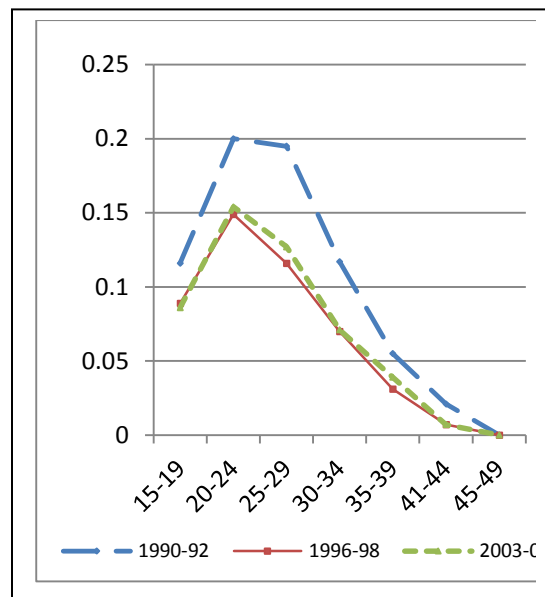
²⁶ This is perhaps not surprising if the decline in fertility has been brought about (as we shall see presently) by the increased use of contraception. In that case, the older cohorts would be able to meet their latent demand for family planning as they may have already attained their desired family size.

Fig 5: AGE-SPECIFIC FERTILITY TRENDS IN NORTH-EASTERN STATES: 1990-92 to 2003-05

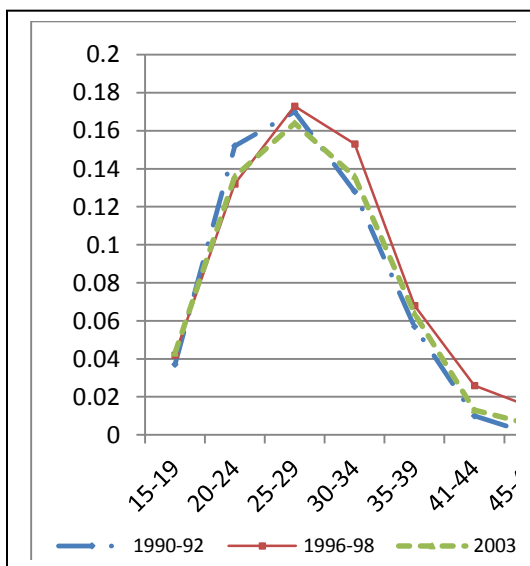
5(a) Arunachal Pradesh



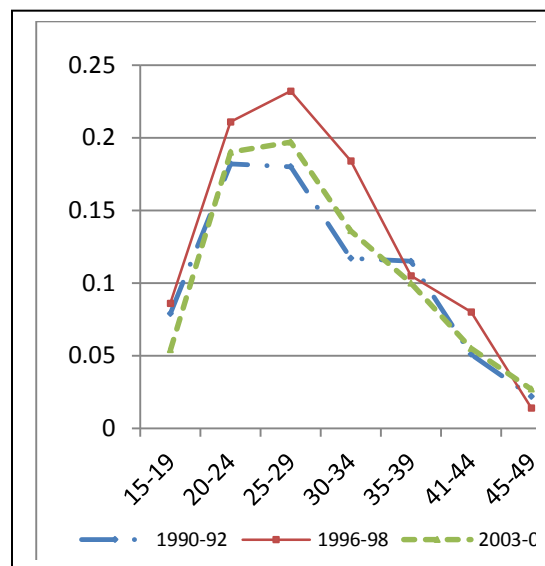
5(b) Assam



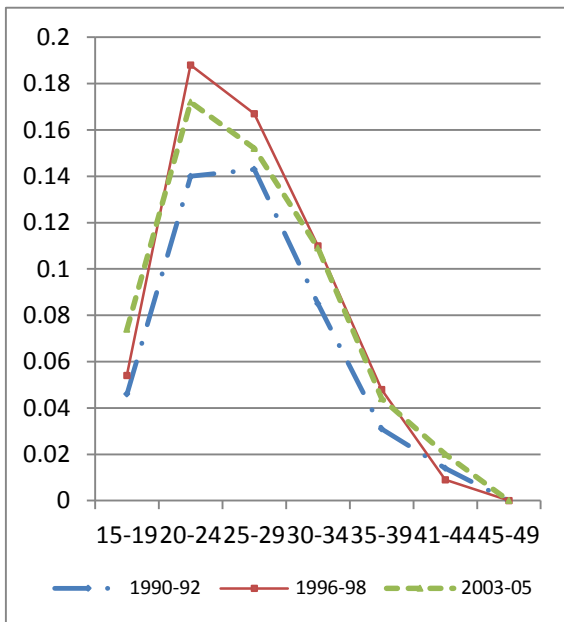
5(c) Manipur



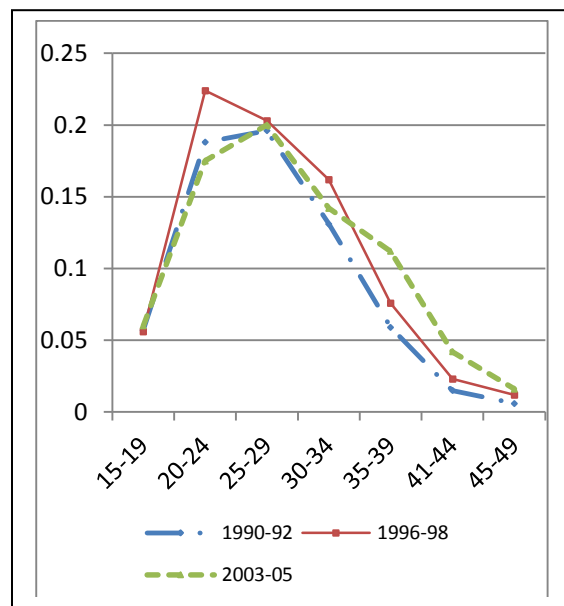
5(d) Meghalaya



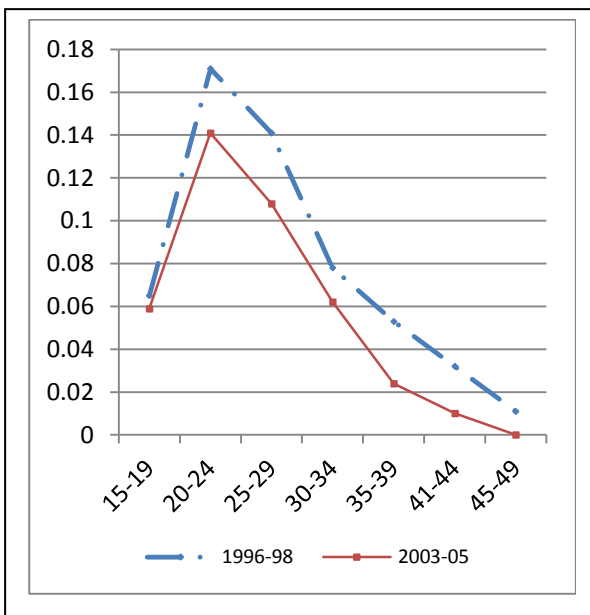
5(e) Mizoram



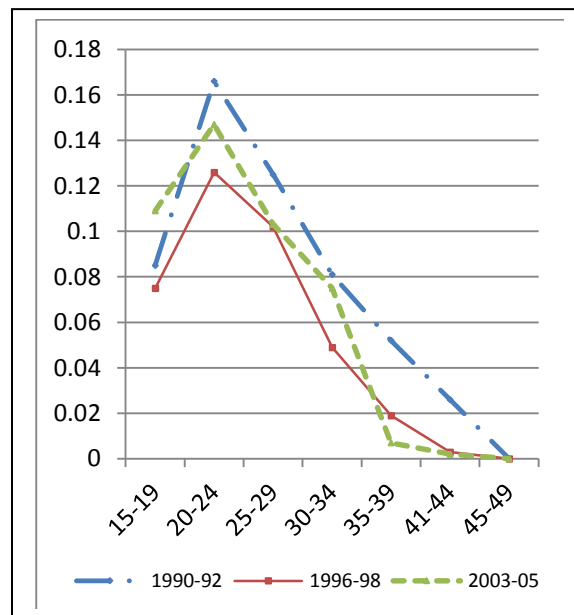
5(f) Nagaland



5(g) Sikkim



5(h) Tripura



Source: IIPS and ORC Macro, 2007

experienced a rise in fertility viz. Meghalaya and Mizoram, there has been no significant decline in any age-group.²⁷

As noted, there has been insignificant decline in fertility during this period in Manipur and Nagaland. In both the cases, the increase in the ASFR between 1990-92 and 1996-98 according to NFHS seems to be a data artifact (in the sense that these are not significant)²⁸. In the subsequent period too (1996-98 to 2003-05), we find that fertility stall, at all age-groups, characterizes the states of NER except Meghalaya that witnessed decline in fertility. Overall, it appears that fertility stall, in whichever states it has occurred is not confined to any particular age-group during both periods. Likewise, the decline in fertility has also occurred across different cohorts among the North-eastern states.

3.3 FERTILITY TRENDS IN NER: A FURTHER EXPLORATION

The period measures of fertility, such as the TFR, are the most frequently used variables for the analysis of fertility patterns and trends, as these capture recent effects on fertility in a given population. However, the cohort fertility measures also contain information that could throw useful light on the (historical) process of fertility transition in NER. Indeed, in contrast to the experience of a synthetic cohort, such as

²⁷ We have tested for the significance of the age-specific fertility rates using the t-test, where data shows minor decline in ASFR that turned out to be insignificant at the five percent level.

²⁸ As expected, there is bound to be some arbitrariness in the selection of the significance level and the rise in fertility in Nagaland, though insignificant at the five percent level, turns out to be significant at the ten percent level. However, for reasons of maintaining comparability of significance level, we stick to the uniform five percent level for all states and both periods. Interestingly, whereas it is theoretically possible that there might have been decline in fertility at some age-groups and increase in others, and the latter compensated for the former, we do not observe any such pattern in Manipur and Nagaland.

the TFR, the cohort fertility measures, such as the children ever born to women aged 45-49, also known as cohort-completed fertility rate (CCFR) or simply the cohort fertility rate (CFR), capture the reproductive experience of a real cohort (birth cohort) of women who have reached the end of their reproductive career. In this sense, an analysis of the trends in CFR overtime inform changes in fertility that are probably closely associated with shared changes in socializing experiences or overall social change as distinct from those emanating from changes in recent socio-economic circumstances and for that matter contemporary changes in the State sponsored family planning programmers (Kye, 2012; Ryder, 1965; Pullum, 1980).

Table 3.3 below presents the CFR measures for the period 1990-92 to 2005-06. Data reveal that the CFR declined marginally for the region as a whole from 1990-92 to 2005-06, suggesting a decline in fertility between women who started their reproductive career during the early 1960s and those during the middle to late 1970s. However, there was a slight rise in the completed fertility estimates for NER between 1990 and 1998, suggesting that no clear declining trend in fertility was discernable at least till the late 1960s. Not surprisingly perhaps, Assam, the largest state of the region, revealed broadly the same pattern as the regional average, though the decline in CFR between 1990 and 2005 was slightly more in the former as compared to the latter. Interestingly, all this is broadly in line with the observations made earlier based on period fertility estimates for the corresponding period from the SRS, suggesting that fertility decline was well underway in Assam by the middle of the 1970s.

More importantly perhaps, the CFR estimates help us in identifying fertility trends among the remaining states of NER, for which we have little information from other sources (even if in a less specific way). Especially interesting is the finding that

TABLE 3.3: COHORT FERTILITY RATE AMONG THE NORTH-EASTERN STATES, 1990 TO 2005

Year	1990-92	1996-98	2003-05
Arunachal	-	4.1	4.7
Assam	4.2	4.3	3.9
Manipur	4.5	4.6	4.1
Meghalaya	4.5	5.5	4.9
Mizoram	4.1	3.9	3.8
Nagaland	3.7	5.2	4.8
Sikkim	-	-	3.4
Tripura	-	3.9	3.8
NER*	4.2	4.4	4.0

Notes: * population-weighted average of individual states. Sikkim has not been included in the CFR estimates of NER for any of the time periods.
Source: Compiled from IIPS and ORC Macro, 1995; 2000; 2007

along with Assam, fertility decline was well underway among the states of Manipur and Mizoram by the middle of the 1970s, as revealed by the negligible rise CFR in the former and indeed, decline in CFR in the latter state between 1990 and 1998. Though we do not have the estimates for Arunachal Pradesh and Tripura for 1990 and hence are unable to gauge the quantum of fertility for these states for the early 1950s, it seems reasonable to assume that fertility decline had perhaps even begun in the latter state during the same time as Assam, Manipur and Mizoram. Hence, overall it appears that among all the states of NER, Meghalaya and Nagaland (and perhaps even Arunachal Pradesh) are the ones that experienced the longest delays in the onset of

fertility decline in NER and that substantial declines in fertility in at least the former two states were evident only during early to mid 1980s.

3.4: An Exploration of Fertility Differentials among North-Eastern States by Demographic and Socio-Economic Characteristics: 1990-2005

Table 3.4 presents fertility differentials by background characteristics for the North-eastern states over the period 1990 to 2005. The emergence and continuation of rural-urban fertility differentials within a population is one of the most widely studied areas in demography. Theoretically speaking, the emergence of such a differential (with urban areas typically evincing lower fertility), has been broadly attributed to the socio-economic changes accompanying urbanization, viz., decline in the net benefits of having a large number of children, as well as the diffusion of the idea of a small family size and more importantly perhaps, the methods to do so (but more on the relationship between urbanization and fertility in Chapter 5). Not surprisingly perhaps, rural fertility is found to be higher than urban fertility among all the states and over the entire period. As noted earlier none of the states of the region experienced continuous decline in fertility for the entire period from 1990 to 2005. Interestingly however, in Meghalaya, Mizoram and Nagaland the rise in fertility between 1990 and 1998 was concentrated in the rural areas, while the urban areas continued to experience fertility decline. As expected, Arunachal Pradesh, Assam and Tripura-the states where fertility declined during the aforementioned period- witnessed a decline in rural fertility alongside urban fertility. Similarly, for the following period (1998 to 2005), we find again that the rise in fertility (among the states that experienced it, of course) was

mainly concentrated in the rural areas. However, there were some indications that even urban fertility rates might have been rising as suggested by the experience of some states such as Arunachal Pradesh and Tripura.

Three more points related to rural –urban fertility (differentials) are perhaps worth mentioning here. First, rural fertility rates are not uniformly high everywhere in NER. For instance, even as early as 1990, rural fertility rates in Assam were near (and in fact, slightly below) replacement level fertility. Indeed, during 2005, rural fertility rates in at least three North-eastern states, viz., Assam, Sikkim and Tripura hovered around replacement level (Table 3.4). Second, there is considerable variation in rural fertility rates among the states of NER and the variation has increased during the period 1990 to 2005, probably suggesting uneven socio-economic growth among the rural areas of NER during this period. Third, the difference between rural and urban fertility rates were relatively speaking, very small during the beginning of the 1990s, but have been increasing overtime, as exemplified by the case of Meghalaya. In fact, there was hardly any difference between rural and urban fertility rates in Meghalaya during the early 1990s. However, by mid 2000s the rural fertility rates were higher than the urban by least two children per woman. The movement of rural and urban fertility rates in Nagaland almost mirrors that of Meghalaya. The developments in the latter two states are however, not entirely unexpected. In fact, the divergence between rural and urban fertility rates in Meghalaya and Nagaland could be explained in terms of the delayed onset of fertility transition in Meghalaya and Nagaland, as mentioned earlier.

TABLE 3.4: FERTILITY BY SOCIO-ECONOMIC CHARACTERISTICS, NORTH-EASTERN STATES: 1990 to 2005

State	Residence		Educational level				Wealth Index				
	Urban	Rural	Illiterate	< middle school	Middle school complete	High school and above	Lowest	Second	Middle	Fourth	Highest
NFHS 1 (1990-92)											
Arunachal Pradesh	2.6	3.2	3.5	2.2	2.1	1.7	-	-	-	-	-
Assam	1.5	1.9	2.1	1.9	1.4	1.0	-	-	-	-	-
Manipur	3.1	3.5	4.0	3.5	2.8	2.4	-	-	-	-	-
Meghalaya	3.1	3.2	3.5	3.2	2.5	2.2	-	-	-	-	-
Mizoram	2.9	3.2	3.6	3.4	2.6	2.2	-	-	-	-	-
Nagaland	3.1	3.2	3.5	3.3	2.8	2.5	-	-	-	-	-
Sikkim	-	-	-	-	-	-	-	-	-	-	-
Tripura	2.7	3.4	4.1	3.3	2.2	1.6	-	-	-	-	-
India	2.7	3.7	4.0	3.0	2.5	2.2	-	-	-	-	-
NFHS 2 (1996-98)											
State	Residence		Educational level				Wealth Index				
	Urban	Rural	Illiterate	< middle school	Middle school complete	High school and above	Low	Middle	High		
Arunachal Pradesh	1.8	2.7	3.1	3.0	2.0	1.6	3.51	2.42	1.96		
Assam	1.5	2.4	2.8	2.4	1.8	1.3	2.96	1.95	1.39		
Manipur	2.4	3.4	3.9	3.2	2.9	2.4	3.79	2.86	2.01		
Meghalaya	2.8	5.2	5.4	5.4	3.7	1.5	6.02	4.10	1.18		
Mizoram	2.4	3.5	4.4	3.4	2.3	2.2	4.62	3.05	1.67		
Nagaland	2.7	4.1	4.5	4.3	3.5	1.8	4.81	3.67	2.32		
Sikkim	-	-	-	-	-	-	-	-	-		
Tripura	1.4	2.0	2.5	2.2	1.3	1.2	2.45	1.62	1.16		
India	2.3	3.1	3.5	2.6	2.3	1.9	3.37	2.85	2.10		
NFHS 3 (2005-06)											
State	Residence		Educational level				Wealth Index				
	Urban	Rural	Illiterate	< middle school	Middle school complete	High school and above	Lowest	Second	Middle	Fourth	Highest
Arunachal Pradesh	2.5	3.2	3.9	-	-	1.8	-	3.91	2.76	2.01	1.98
Assam	1.4	2.6	3.4	2.9	2.1	1.3	4.06	2.86	2.01	1.42	1.21
Manipur	2.3	3.1	3.7	3.4	2.9	2.5	-	3.87	3.14	2.29	2.07
Meghalaya	2.3	4.4	5.2	-	3.5	1.8	-	5.78	4.60	2.64	1.30
Mizoram	2.5	3.3	-	-	2.9	2.1	-	-	3.85	2.91	2.09
Nagaland	2.7	4.2	5.4	-	3.5	2.2	-	6.23	3.75	2.69	1.65
Sikkim	1.3	2.2	-	-	1.9	1.2	-	-	-	2.04	1.12
Tripura	1.7	2.3	3.4	2.1	2.0	-	-	2.68	1.97	1.42	-
India	2.1	2.9	3.5	2.4	2.1	1.8	3.89	3.17	2.58	2.24	1.78

Source: Compiled from IIPS and ORC Macro, 1995; 2000; 2007

Nevertheless it comes as a surprise that even in these states, the divergence has been almost entirely brought about by *rising* rural fertility rates as indicated earlier. Therefore, one cannot escape the conclusion that there is perhaps something more to the pattern of fertility transition among the states of NER, which differentiates it from the ‘regular’ transitions experienced in the majority of populations elsewhere.

Turning now to fertility differentials by the level of female education, it has been generally found that fertility declines with increase in female education, though the relationship is not necessarily monotonic. In the context of India, though there are a few studies that report that women who have completed primary education may in fact, have slightly higher fertility than those who are illiterate, the relationship between education and fertility has usually followed the inverse pattern (see for instance Parasuraman et al., 1999). NFHS data for the North-eastern states for the period 1990-92 to 2003-05 too finds an inverse relationship between female education and fertility at all levels of education. There is substantial difference between the fertility levels of the various educational categories, with that between illiterate women and those with a primary education also being considerable. Among the states that experienced fertility rise during the period 1990-92 to 1996-98, in Meghalaya and Nagaland, fertility increased at every level of education, except for those who had had attained high school or higher education. In Mizoram, fertility increased among the illiterate women during this period, and remained unchanged for other categories. In sum, fertility rise has been a feature of the lesser educated women from 1990-92 to 1996-98 and fertility decline continued among those who had attained higher education. Interestingly, among the states where fertility declined during this period, in Arunachal Pradesh, even as fertility declined among women from various educational categories, it

increased among those with a primary education. However, in Assam and Tripura, fertility decline was evident across educational categories. Surprisingly, for the following period (i.e. 1998 to 2005), we do not find the pattern observed during the earlier period and in fact, there was an increase in fertility across all educational categories among states that failed to evince a decline in fertility. Remarkably, in Meghalaya (one of the two states that registered a decline in fertility during this period, the other one being Nagaland) fertility declined primarily among the illiterate women during this period. Overall, however, it appears that fertility decline has generally *not* been a feature of the lesser educated women at least as far as the states of North-eastern region of India are concerned.

Fertility differentials according to the wealth index from NFHS data are available from the second round (1996-98), precluding analysis of change in fertility during the earlier half of the nineties. Data for both 1996-98 and 2005-06, suggest that fertility has been invariably higher among those who were placed on the lower rungs of the wealth ladder. Interestingly, fertility differed sharply between the lowest and the middle wealth categories in all the states of NER (except Meghalaya) and moderately between the middle and high wealth categories. For the subsequent period, although the wealth categories are not strictly comparable, we can see that whereas in Arunachal Pradesh there has been rise in fertility among those who are poorer, in Meghalaya, the reduction in fertility is concentrated in the aforementioned category. Among the remaining states of the region, fertility changes, as expected, is not significant among the various categories for which data are available.

Overall, the examination of the process of fertility decline among the states of NER in the post-Independence period reveals that even though fertility had started to

fall in the region and most of its states beginning the early 1970s, much like in the rest of India, it suffered a setback from at least the beginning of the 1990s. Indeed, the rate of reduction in fertility in Assam was higher than the all-India average for at least two decades (from the beginning of the 1970s till the end of the 1980s), and even though the tribal dominated states of the region (primarily Meghalaya and Nagaland) were slow in beginning the transition to low fertility, all the states NER, without exception, had begun the process of fertility transition at least from early to mid 1980s.

Even though there has been some discrepancy in reported fertility trend among the North-eastern states, especially for the period following the 1990s, between the SRS and the NFHS, our indirect fertility estimates using the Arriaga-Arretx method for the concerned period, fail to show a significant decline in fertility among most of the states of NER, thus confirming the stalling of decline fertility in NER, as indicated by the NFHS.

Interestingly, the slowdown in pace of fertility decline in NER has been relatively concentrated in the rural areas. However, the possibility of urban stalling cannot be ruled out as shown by the experience of Arunachal Pradesh and Tripura, where urban fertility rates have registered a rise. Also, an examination of fertility differentials by socio-economic characteristics show that female education (especially at secondary and higher levels) has been associated with fertility decline, even in cases where the reference population group has evinced a stall in fertility decline. Overall, however, it appears that fertility decline has generally *not* been a feature of the lesser educated women at least as far as the states of North-eastern region of India are concerned, thus pointing towards the importance of female education in fertility decline in NER. Finally, and perhaps not surprisingly, fertility is invariably higher

among those in the lower wealth categories as compared to the others. Particularly interesting has been the finding of sharp decline in fertility among populations belonging to the poorest and the middle wealth categories in NER.

With this background, in the following chapter we turn towards an examination of the determinants of fertility in NER and constituent states.

CHAPTER FOUR

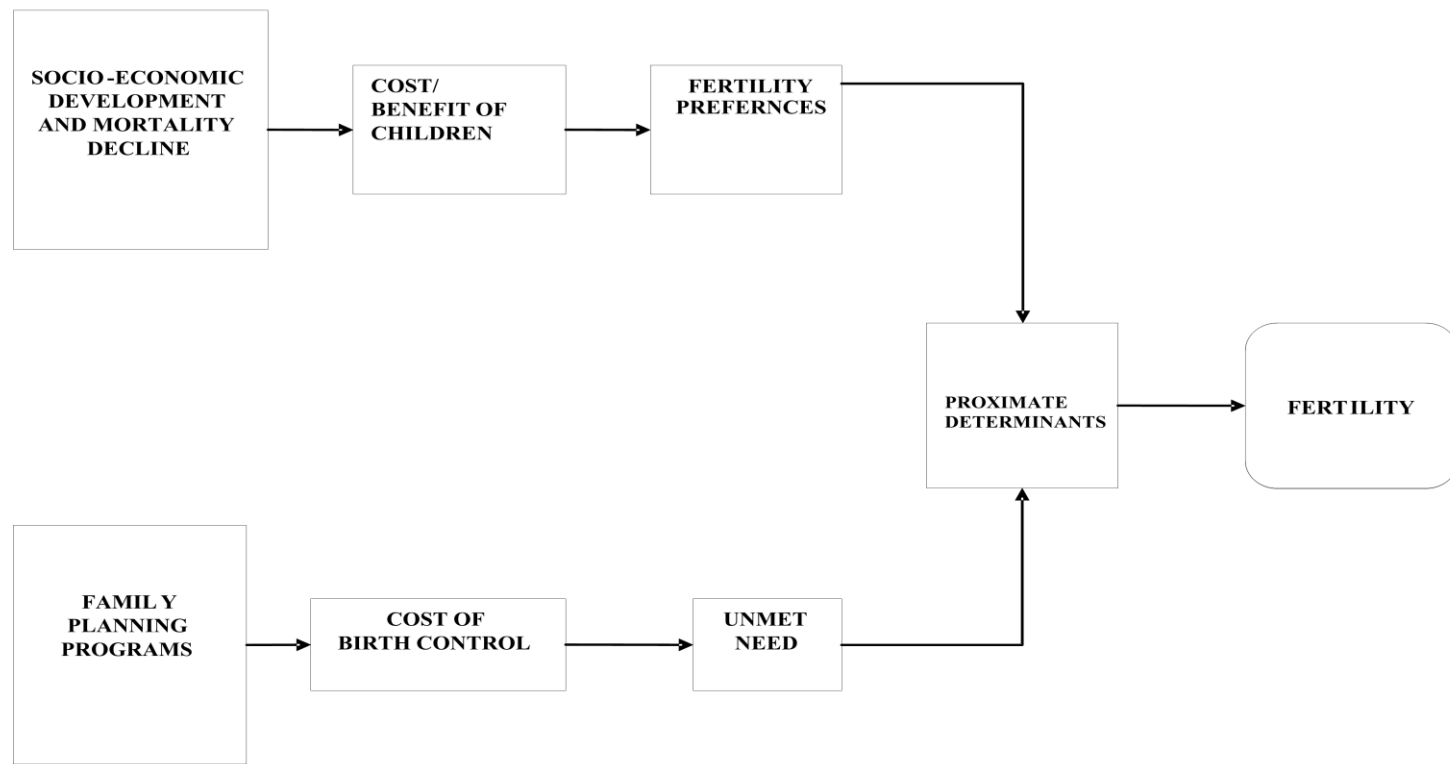
THE PROXIMATE DETERMINANTS AND CORRELATES OF FERTILITY CHANGE AMONG THE NORTH- EASTERN STATES OF INDIA, 1990 to 2005

4.1 Introduction

In this chapter, we carry out a detailed investigation of the proximate determinants of fertility among the North-eastern states using Bongaarts Aggregate Fertility Model, and thereby examine the effects of nuptiality, induced abortion, contraception and postpartum infecundability on fertility. As pointed out in the previous chapter, many of the North-eastern states witnessed a stall in fertility decline during the 1990s. In this context, a parallel objective of this analysis is to find out whether and to what extent, the stall in fertility has been captured within the proximate determinants model. A priori, we expect to observe very little change in the total effect of the proximate determinants towards reducing fertility for any state that evinced fertility stall during the concerned period.

Following this, we make an attempt to explain the causes behind the particular changes observed in the proximate determinants for the states of NER, in terms of the background or the contextual factors. The analysis of the effect of the contextual factors as they affect the proximate determinants has been conducted at the state-level (district-level analysis of contextual factors affecting fertility, being the subject of the following and final analytical chapter). Specifically, we look into changes in fertility preferences and the improvement/deterioration in the family planning program of the

Fig. 6: Schematic Representation of Analytical Framework of Determinants of Fertility



Source: Modified from Bongaarts (2006)

State, using a modification of the analytical framework developed by Bongaarts (2006) (Fig. 6).

The framework presented in Fig 6, basically spells out the channels through which socio-economic factors and family planning measures affect fertility, working through the various proximate determinants. At the heart of this model is the idea that the ultimate determinants of fertility are the socio-economic factors facing individuals and households, echoing the proposition of the classical demand theories of fertility (the latter is discussed more fully in the next chapter). Therefore, improvements in the socio-economic condition, bringing about such changes in the family calculus that renders children relatively expensive than before, leads to lower demand for children, and the fertility rate will tend to decline.

Similarly, an improvement in the family planning programme (FPP) can also lead to a reduction in the fertility rate, through meeting the existing demand for family planning methods. Even though, FPP can also reduce fertility through affecting the desire for children, along with meeting the demand for family planning methods, the former effect has been found to be relatively small as compared to the latter. Hence, in a sense, socio-economic determinants remain central to fertility transition in this model.

It would be also be useful to mention here that within the general analytical framework to analyze the correlates of fertility stall, we have adopted a comparative approach, comparing the states that have witnessed fertility stall with those that have experienced a decline in fertility. This exercise, we believe, will shed useful

light on the primary correlates of fertility decline (and equally, those of fertility stall) among the states of NER.

4.2. Changes in the Proximate Determinants of Fertility in the North-eastern states: 1990-92 to 2003-05

The biological and behavioral determinants of fertility that are most closely associated with it are called its proximate determinants; any change in fertility could be immediately traced to changes in one or more of these proximate factors. The proximate determinant framework as expounded by Bongaarts (1983) provides an analytical tool to examine the relative impact of the immediate or proximate determinants on fertility. As such, any change in fertility over a period, is necessarily brought about by the interplay of these factors. Hence, as pointed out earlier, we hypothesize that a stalling of fertility decline would also be reflected in the proximate determinants in that the net effect of the proximate determinants on fertility would remain unchanged in those states that have witnessed no change in fertility and decrease in states have witnessed a rise in fertility. Hence, in the present section we look into the levels and trends of the proximate determinants of fertility in the North-eastern states during the 1990s and thereafter in an attempt to discover the proximate routes through which pattern of changes in the fertility level and trend have been shaped among the North-eastern states during the period 1990-92 to 2003-05.

4.2.1 Bongaarts Proximate Determinants Model: Theory and Facts from North-eastern States

Davis and Blake (1956) suggested eleven proximate or intermediate variables through which economic, social, cultural and environmental and other factors influence fertility.²⁹ The commonly encountered proximate determinants in fertility models ever since have been the proportion married among females, use and effectiveness of contraception, induced abortion, duration of postpartum infecundability, frequency of intercourse, spontaneous intrauterine mortality and permanent sterility. Bongaarts (1983), on the basis of the analysis of fertility differentials and variation in the proximate determinants among 41 developed and developing countries, found that around ninety-six per cent of the variation in fertility among populations is explained by four proximate determinants- nuptiality, the prevalence of contraception, the duration of post-partum infecundability and induced abortion. This however, does not mean that the other proximate determinants are unimportant. For instance, a large part of fertility level can be explained by permanent sterility in a population with high prevalence of venereal diseases.

The twin criteria that Bongaarts applied to select the most important proximate determinants were the sensitivity of fertility to variations in the different intermediate variables and its variability among populations. Table 4.1 presents the

²⁹ Davis and Blake (1956) proposed the following set of intermediate fertility variables: I. *Factors affecting exposure to intercourse* (age at entry into sexual union, permanent celibacy, amount of reproductive period spent after of between unions, voluntary abstinence, involuntary abstinence, coital frequency) II. *Factors affecting exposure to conception* (fecundity or infecundity; as affected by involuntary causes, use or nonuse of contraception, fecundity or infecundity as affected by voluntary causes) III. *Factors affecting gestation and successful parturition* (fetal mortality from involuntary causes, fetal mortality from voluntary causes).

seven proximate determinants and their rankings based on these criteria. Fertility is found to be least sensitive to levels of intrauterine mortality and most sensitive to changes in proportions married and prevalence of contraception. The proportion married, contraceptive use, prevalence of abortion and postpartum infecundability has the highest variability among populations. Spontaneous intrauterine abortion and permanent sterility have the

TABLE 4.1: RATING OF INTERMEDIATE FERTILITY VARIABLES

Intermediate Fertility Variables	Sensitivity of Fertility to intermediate variable	Variability among populations	Overall Rating
Proportions married	+++	+++	+++
Contraceptive use	+++	+++	+++
Prevalence of induced abortion	++	+++	+++
Postpartum infecundability	++	+++	+++
Fecundability	++	++	++
Spontaneous intrauterine mortality	+	+	+
Permanent sterility	++	+	+

++++= high +++= medium ++=low or absent
 Source: Table taken from Bongaarts (1982)

least influence on fertility and can explain very little variation of fertility among populations. Fecundability (or the frequency of intercourse) was found to have moderate influence on fertility levels and moderate variability among populations. Overall, nuptiality, the prevalence of contraception, the duration of post-partum

infecundability and induced of abortion were found to be the most significant determinants in explaining fertility differentials.

The remaining proximate determinants viz., the waiting time to conception, the risk of intrauterine mortality and the onset of permanent sterility are generally found to be less important causes of variation in fertility. In Bongaarts Aggregate Fertility Model, the four proximate determinants together determine the extent to which fecundity is reduced from its biological maximum. Four different fertility levels are produced by the impact of the proximate determinants:

i) Total Marital Fertility (TM): If the effect of delayed marriage and marital disruption were removed without changes in the other proximate determinants, i.e. in other words, marriage was universal and marital dissolution absent so that women spent their entire reproductive period in conjugal union, fertility would rise from the observed level (measured as the total fertility rate) to TM.

ii) Total Natural Marital Fertility Rate (TN): In addition to the effect of delayed marriage and marital disruption, if the effect of contraception and induced abortion were to be removed, fertility would increase and would be as high as TN.

iii) Total Fecundity Rate (TF): Additionally, if women were not to breastfeed their infants and couples did not practice postpartum abstinence, fertility would rise to the level of total fecundity.³⁰ Thus total fecundity rate is the fertility that results in the absence the fertility inhibiting effect of the four proximate

³⁰ The total fecundity rate is the *biologically* maximum fertility that could be achieved in a population given the fertility inhibiting influence of the waiting time to conception, the risk of intrauterine mortality and the onset of permanent sterility, which usually cause modest changes in fertility. TF has been found to vary from 13 to 17 among populations, with the average being around 15 children per woman.

determinants- non-marriage, contraception, induced abortion and lactational amenorrhea.

iv) Total Fertility Rate (TFR): The observed fertility in a population reduced from the level of TF upon the fertility inhibiting influence of the four proximate determinants mentioned above.

In the Bongaarts model, the effect of these four proximate determinants are measured by four indices; the index of marriage (C_m), the index of noncontraception (C_c), the index of induced abortion (C_a) and the index of postpartum infecundability (C_i). The indexes can assume values between 0 and 1. When there is no fertility inhibiting effect of a particular proximate determinant it assumes the value of 1 and when the fertility inhibiting effect is complete it assumes the value of 0. Each index by definition equals the ratio of the fertility levels in the presence and absence of the inhibition caused by the particular proximate determinant of fertility. The following equations summarize the basic structure of the model and show how the fertility measures are related to the proximate determinants:

$$C_m = TFR/TM$$

$$C_c \times C_a = TM/TN$$

$$C_i = TN/TF$$

Rearranging the above,

$$TFR = C_m \times TM$$

$$TM = C_c \times C_a \times TN$$

$$TN = C_i \times TF$$

Thus,

$$TFR = C_m \times C_c \times C_a \times C_i \times TF$$

Estimation of the indexes of the proximate determinants require data preferably from a single source as pooling data from different sources can lead to errors due to differences in sampling design, reference period and geographical coverage of the surveys³¹. The NFHS collects information on the proximate determinants and thus makes it possible to estimate the indexes from a single source. However, although we have estimated the index of noncontraception and postpartum amenorrhea from NFHS data pertaining to the periods 1990-92 and 1996-98, the calculation of the index of marriage for the same period is based on SRS data, as marital fertility rates are not available from NFHS. The index of abortion could not be calculated due to lack of data. For the purpose of our present analysis, following Bongaarts we have assumed that this index does not change over the period and hence has no effect on change in fertility during this period.

In addition, while data for the calculation of the various proximate determinants are available for the period 1990-92 to 1996-98 for most of the North-eastern states, information for the period 1996-98 to 2003-05 permits the calculation of the index of contraception alone. Hence, the application of Bongaarts proximate determinants model is limited to the period 1990-92 to 1996-98. Nevertheless, though not for a strictly comparable period, information on the mean age at marriage and induced abortion are available from the District Level Household Survey (DLHS) for 2000-2002 to 2005-07 and have been utilized for analyzing the

³¹ In the subsequent discussion on the proximate determinants in the Northeastern states, we have not included Mizoram and Sikkim due to the unavailability of data for these states.

trends in the proximate determinants of fertility during the period 1996-98 to 2003-05.

4.2.1.1 NUPTIALITY

Nuptiality or the pattern of marriage (proportion married and timing of entry into marital union) has been recognized as a crucial proximate factor influencing fertility. “Age at marriage identifies the onset of exposure to the risk of socially sanctioned childbearing, and as such, it is a principal determinant of the number of births a woman will have.” (Bongaarts and Potter, 1983: 57). The time spent by women in marital unions determines the length of the period for which they are at the risk of pregnancy and childbirth. Thus, greater the proportion of women in marital unions in a population and lower the age at first marriage, higher would be the fertility of that population, other things remaining the same. Cultures that ensure nearly universal and early marriage of females, as in India, predispose its population towards higher fertility. That the practice of remarriage of widows is not socially allowed in many societies including India may partly mitigate the effect of early entry into marital union. However, historical evidence points out that the early entry into union and the universality of marriage (features that generally concur), are perhaps relatively more important factors as against the dissolution of unions. For instance, data on the fertility of European and Indian population in the past suggest that whereas the former had higher rate of permanent celibacy as well as remarriage than the latter, the natural fertility rate in the former was much lower compared to the latter (see for instance Weir, 1984; Watkins, 1987).

In theory, marriage refers to all stable sexual unions, including both formal marriages and consensual unions, but in practice, the latter are numerically insignificant in the context of India. Women who adopt permanent celibacy are atypical and rare in India and this is true of diverse regions as well, notwithstanding regional differences along other dimensions of socio-cultural features. However, there have been considerable differences in the age at first marriage among the various regions and social groups. It is notable that in the historical past, the age at marriage of the tribal population had been higher than that of the non-tribals (Maharatna 2005). For instance, the singulate mean age at marriage of females (SMAM) in Assam, for the entire period 1901-1931, had been higher than the national average, and this was particularly so for its tribal population.³² The female SMAM of tribals for the year 1931 was 18 years in Assam as against 14.3 years for the Hindu population of the Province, much higher compared to the 15.8 and 13.6 years for the tribal and Hindu female population at the all-India level respectively (see Maharatna, 2005). Indeed, Gopinath (2005) observed that “[T]his proximate determinant of fertility is, (however), closely linked to long-term cultural practices embedded in demographic conditions, material life and ideology. Marriage postponement can be forced through legislative fiat but past practices will largely determine the pace and intensity of these changes” (Gopinath, 2005: 84).

There has been a secular-albeit gradual- rise in the female age at marriage at the all-India level as captured by the singulate mean age at marriage during the post-

³² Hajnal (1953) devised a method to estimate the age at marriage of males and females in the absence of direct record of marriages for the population concerned, called the singulate mean age at marriage (SMAM). It is defined as the average length of single life expressed in years among those who marry before age 50.

Independence period at least up to 1991 (Table 4.2). This has been generally true of the North-eastern states as well. Not surprisingly, the regional differentials, as noted earlier, in the age at marriage have persisted. The SMAM for the North-eastern states according to the Census data has been higher than that at the all-India level since 1961. The NFHS estimates of age at marriage confirm the upward trend in the age at marriage among the North-eastern states.

TABLE 4.2: SINGULATE MEAN AGE AT MARRIAGE OF FEMALES: NORTH-EASTERN STATES, 1961-2001

State	Census					NFHS			
						SMAM		Median age at first marriage	
	1961	1971	1981	1991	2001	1990-92	1996-98	1990-92	1996-98
Arunachal Pradesh	-	19.6	-	20.1	19.6	20.0	21.6	18.2	18.7
Assam	18.6	18.7	-	20.9	19.7	21.6	21.7	16.9	18.3
Manipur	19.9	22.2	23.4	24.7	21.5	25	25.4	20.8	21.7
Meghalaya	-	20.2	21.0	21.5	20.5	21.2	23.0	19.0	19.1
Mizoram	-	-	-	22.4	21.8	22.9	24.1	21.0	22.0
Nagaland	22.2	24.0	24.8	25.0	21.6	22.7	23.0	20.1	20.1
Tripura	16.3	18.4	20.3	20.8	19.3	21.2	22.0	17.2	18.3
India	15.9	17.2	18.4	19.3	18.3	21.5	19.7	16.1	16.7

Source: IIPS, 2002, National Family Health Survey Northeastern states, 1998-99, RGI, 2008

However, the decline in the female age at marriage after 1991 in the North-eastern states of India as well as at the national level, as revealed by census data is rather striking (Table 4.2). It is remarkable that after nearly nine decades of secular

rise since 1901, the female age at marriage at the all-India level showed a decline by nearly a year in 2001.³³ There has been commensurate decline in the SMAM among the North-eastern states as well. In fact, the decrease in the female age at marriage during the period 1991 to 2001 had been sharper in four states in NER, viz., Assam, Manipur, Nagaland and Tripura than that at the all-India level. There has been marginal decline in the female SMAM in Arunachal Pradesh and Mizoram during the same time. The decline in the female mean age at marriage would tend to increase fertility by increasing the duration of exposure to the risk of pregnancy, unless offset by commensurate increase in contraceptive prevalence.

However, the female age at first marriage in all the North-eastern states in 2001 remained higher than the all-India level. As can be seen from Table 4.2, this trend is not captured in the NFHS data, which show an increase in female SMAM both in the North-eastern states and India. However, data on the median age at marriage from the NFHS for the period 1990-92 to 1996-98 suggest that the increase had been marginal and perhaps insignificant in Arunachal Pradesh, Meghalaya and Nagaland; in fact, there was practically no change in the median age at marriage in the latter states during the period 1990-92 to 1996-98.

Early marriage of females is still not a prominent feature of the tribal majority region of the North-east. The percentage of married female adolescents was higher at the all-India level compared to any State in the region. The percentage of married female adolescents is, on the average, found to be lower in the tribal majority states

³³ A fuller discussion on the trends in the mean age at marriage at the all-India level and in the major states in the pre-Independence period is contained in Agarwala, 1957.

TABLE 4.3: PERCENTAGE OF WOMEN 15-19 YEARS MARRIED IN NORTH-EASTERN STATES AND INDIA: 1991-2001

State	Percentage married (15-19) 1991	Percentage married (15-19) 2001
Arunachal Pradesh	25.8	17.6
Assam	23.8	20.6
Manipur	9.3	8.8
Meghalaya	18.0	15.6
Mizoram	10.5	10.9
Nagaland	7.9	8.4
Sikkim	18.2	16.6
Tripura	25.0	20.7
India	31.3	24.9

Source: RGI 1991, 2001

of NER than the states of the region with comparatively lower proportion of tribals. Consequently, we find that Nagaland and Mizoram had distinctly lower adolescent marriages compared to other states within NER during 1991 to 2001. Manipur too evinced lower adolescent marriages during the same period. Notably, the percentage of adolescent girls (15-19) married declined between 1991 to 2001 among all the North-eastern states except Mizoram and Nagaland, which experienced a marginal increase during this period (Table 4.3).

The Index of Proportion Married

The index of proportion married is calculated as:

$$C(m) = \frac{\sum m(a)g(a)}{\sum g(a)}, \text{ where}$$

$m(a)$ = Age specific proportions of married females and

$g(a)$ = Age specific marital fertility rates

This formulation takes into account the fact that the fertility impact of marriage in addition to the proportion married also depends on the age-distribution

of women. Married women in the prime childbearing years contribute more to fertility than those at extremes. Hence, C_m is calculated as a weighted average of the proportion of age-specific females married, with the weights being the age-specific marital fertility rate.

We have calculated C_m as the ratio of the TFR and the total marital fertility rate (as the numerator of the equation equals TFR and the denominator equals TMFR). As pointed out earlier, the data on TFR and TFMR have been taken from the SRS. The value of the index of marriage for the early 1990s (1990-92) ranged from 0.88 (in Tripura) to 0.27 (in Nagaland) (Table 4.4). This suggests that a significant reduction in fertility in Nagaland from the biologically feasible maximum can be attributed to the fact that a substantial proportion of women in the reproductive ages had not entered conjugal union. On the contrary, since a large proportion of women in the reproductive age bracket had been married in Tripura, fertility would depart to a lesser extent from biological maximum due to this factor. For the subsequent period (1996-98), C_m ranged from 0.36 in Nagaland to 0.65 in Arunachal Pradesh, indicating that non-marriage had the highest fertility inhibiting effect again in Nagaland, while it had the least fertility inhibiting effect in Arunachal Pradesh.

During the period 1990-92 to 1996-98, the index of marriage increased in two states within NER- Arunachal Pradesh and Nagaland, and decreased in the remaining states. Thus, in Arunachal and Nagaland, the proportion of women remaining unmarried declined during this period, encouraging higher fertility. However, in the remaining states, the fertility inhibiting effect of nuptiality was

strengthened. Nevertheless, the change in the index was marginal in most states of NER.

TABLE 4.4: VALUES OF SELECT FERTILITY INDICES FOR NORTH-EASTERN STATES: 1990-92, 1996-98, 2003-05

State	1990-92	1996-98	2003-05	1997/1991
Arunachal Pradesh				
C(m)	0.62	0.65	-	1.05
C(c)	0.77	0.64	0.57	0.83
C(i)	0.78	0.69	-	0.88
Assam				
C(m)	0.59	0.56	-	0.95
C(c)	0.62	0.60	0.50	0.97
C(i)	0.68	0.66	-	0.97
Manipur				
C(m)	0.43	0.41	-	0.95
C(c)	0.67	0.63	0.58	0.94
C(i)	0.72	0.71	-	0.99
Meghalaya				
C(m)	0.55	0.52	-	0.95
C(c)	0.80	0.81	0.77	1.01
C(i)	0.76	0.72	-	0.95
Nagaland				
C(m)	0.27	0.36	-	1.33
C(c)	0.87	0.70	0.72	0.81
C(i)	0.74	0.79	-	1.07
Tripura				
C(m)	0.88	0.51	-	0.58
C(c)	0.49	0.46	0.40	0.93
C(i)	0.75	0.64	-	0.85

Source: Author's calculations

During the period 1996-98 to 2003-05, fertility stall occurred in six out of the eight states of NER, viz. Arunachal Pradesh, Assam, Manipur, Mizoram, Nagaland and Tripura. Among these states, we find that the female mean age at marriage increased in Arunachal Pradesh and very marginally in Assam and

Mizoram. Hence, nuptiality had a tendency to reduce fertility in these states (due to reasons as discussed earlier), and possibly cannot be responsible for the observed stall. However, the female mean age at marriage declined in Manipur and Tripura and had a fertility enhancing effect in these states during the concerned period.³⁴ In Meghalaya, where fertility declined during this period, there was a commensurate increase in the female mean age at marriage.

4.2.1.2 CONTRACEPTION

We know that historically, populations with lower fertility have been using traditional methods such as rhythm method, withdrawal, abstinence, and various traditional methods of abortions for limiting family size (see for instance Frejka 2008). That said, the introduction of modern contraception and its diffusion among populations has been the biggest innovation in reproductive technology. Since its introduction and spread, couples have found it increasingly easy to translate their desire for fewer children into reality. Unsurprisingly, this proximate determinant has been found to have the highest correlation with fertility levels (see for instance Bongaarts and Potter 1983), and this is true of the North-eastern states as well.³⁵

India officially adopted the family planning programme in 1952, and though the use of contraceptives did not spread widely in the following two decades, the couple protection rate increased from a meager 13 percent in 1970 to nearly 45 percent in the mid 1990s according to official statistics (Visaria, 1999). The trend

³⁴ Data on nuptiality for the period 2000-02 to 2005-07 are not available for Nagaland.

³⁵ In fact, our calculations of the simple correlation coefficient between the fertility rate and the use of modern contraceptives reveal that the magnitude of the correlation lies between 0.7 and 0.9 for the period 1990-92 to 2003-05. Interestingly, the correlation between these two variables increased from 0.7 to 0.8 from 1990-92 to 1996-98 and further to 0.9 from 1996-98 to 2003-05.

shown by NFHS is again one of increasing use of contraceptives at the all-India level (and in nearly all the states of India) since the early 1990s (IIPS and ORC Macro, 2007:125). However, the percentage of women using contraceptives has remained unchanged during the 1990s in Assam and Tripura. There was a slight decline in the percentage of women using contraceptives in Meghalaya but it was accompanied by significant reduction in female sterilizations (Appendix 2). The remaining states experienced increase in contraceptive prevalence during this period.

Contraceptive prevalence is found to vary with socio-economic differentials among the North-eastern states (Table 4.5). Interestingly, data on rural-urban differentials show that in the states where there was marginal or no change in the contraceptive prevalence, it was true of both urban and rural areas. In NER, contraceptive use is significantly and invariably higher in the urban areas vis-à-vis the rural areas in all the states. Education remains a deciding factor in the use of contraceptives. The proportion of illiterate women using contraception was lower than that of literate women in all the states of NER. Although in the majority of the states, contraceptive use increased with increasing level of education, there are a few states where women with secondary and higher education were found to be using lesser contraception compared to women with lower educational levels (Mizoram during 1992-93, Manipur during 1998-99). However, in spite of the official family planning programmes providing access to contraceptives, it is found that the extent of contraceptive use has also varied with the difference in the standard of living. Women with higher standard of living adopt contraception in larger numbers as compared to women with a lower standard of living among all the

TABLE 4.5: SOCIO-ECONOMIC DIFFERENTIALS IN CURRENT USE OF CONTRACEPTION*, NER, 1992-2005

NFHS (1992-93)											
State	Residence		Education				Standard of living index				
	Urban	Rural	Illiterate	<middle school	Middle school complete	High school and above	Low	Medium	High		
Arunachal Pradesh	39.5	20.8	19.9	26.4	27.5	46.9	-	-	-		
Assam	62.3	40.1	32.1	51.7	63.7	69.3	-	-	-		
Manipur	44.3	30.3	30.4	35.3	40.8	41.0	-	-	-		
Meghalaya	31.9	18.0	17.0	20.1	30.8	32.0	-	-	-		
Mizoram	57.1	50.5	35.4	58.5?	49.4	51.5	-	-	-		
Nagaland	20.6	10.9	6.6	16.0	17.8	20.8	-	-	-		
Tripura	71.1	52.4	45.0	61.0	66.9	67.8	-	-	-		
India	51.0	36.9	33.9	50.4	50.8	54.7	-	-	-		
NFHS (1998-99)											
State	Residence		Education				Standard of living index				
	Urban	Rural	Illiterate	<middle school	Middle school complete	High school and above	Low	Medium	High		
Arunachal Pradesh	47.3	33.3	31.5	33.9	43.9	47.9	22.6	33.8	55.9		
Assam	53.4	42.3	39.5	42.0	50.2	55.6	34.8	48.1	56.2		
Manipur	44.9	35.6	38.8	38.3	40.6	37.4	36.9	37.5	48.7		
Meghalaya	45.3	13.8	12.1	20.0	31.6	39.8	8.6	26.1	55.4		
Mizoram	65.1	49.7	33.3	57.9	64.4	63.7	26.3	60.8	69.7		
Nagaland	46.7	26.1	20.0	32.1	40.0	46.0	15.5	32.0	49.5		
Sikkim	-	-	-	-	-	-	-	-	-		
Tripura	70.0	51.8	48.8	54.5	65.0	62.1	48.8	58.3	63.5		
India	58.2	44.7	42.9	55.5	52.2	57.0	39.5	48.4	61.2		
NFHS(2003-05)											
State	Residence		Education				Standard of living index				
	Urban	Rural	Illiterate	<middle school	Middle school complete	High school and above	Lowest	Second	Middle	Fourth	Highest
Arunachal Pradesh	47.3	41.6	37.5	43.9	46.3	58.8	26.8	31.6	48.0	53.5	60.8
Assam	66.0	54.5	51.2	53.2	59.9	65.2	43.6	49.5	64.8	66.0	67.3
Manipur	54.5	46.0	43.2	48.6	50.8	51.9	16.2	40.2	51.4	51.4	50.7
Meghalaya	43.7	18.4	17.1	18.0	25.6	43.7	9.6	13.3	18.4	35.9	45.9
Mizoram	64.3	54.8	37.0	56.7	62.4	64.6	22.6	38.8	48.6	61.0	70.6
Nagaland	41.9	24.8	17.0	25.5	34.1	43.0	14.7	12.4	26.3	39.7	50.8
Sikkim	63.1	56.4	54.2	53.2	58.0	66.6	-	46.6	50.9	59.4	63.9
Tripura	66.8	65.5	58.1	72.0	66.0	70.8	54.9	62.1	67.4	69.4	72.7
India	-	-	52.1	63.0	58.5	62.3	42.2	51.1	56.8	62.5	67.5

Note: *Percent distribution among currently married women with reference to use of both traditional as well as modern methods

Source: Compiled from IIPS 1995, 2002

states of the region. One possible reason for it could be the declining share of the public sector in the provision of contraceptives (more on this presently) The demand for contraceptives would thus remain unsatisfied among the poor, who cannot afford the higher costs of procuring it from the private sector.³⁶

The Index of Non-contraception

The index of noncontraception is calculated using information on method-specific contraceptive prevalence rates among currently married women in the reproductive age group, and on the use effectiveness of the various methods. If contraceptive prevalence is absent or completely inefficient, the value of the index equals one and with increasing prevalence and effectiveness, it approaches zero. The equation used to calculate this index is as follows:

$$C_c = 1 - (1.08 \times u \times e)$$

Where, u = proportion currently using contraception among currently married women of reproductive age and

e = average use effectiveness of contraception

The methods considered for the calculation of the index were sterilization, IUD, pill and others including condom and following Bongaarts the use effectiveness of these methods was taken as 1.00 for sterilization, 0.95 for IUD, 0.90 for pills and 0.70 for others including condoms. Data on proportion using the various methods of contraception in the reproductive age group was taken from NFHS 1 and NFHS 2.

³⁶ Another reason why contraceptive prevalence would tend to be higher among the wealthier segment of the population even if all contraceptives were provided by the public sector is that, there are additional costs such as transportation costs and information cost that are likely to deter the use of contraception among the poor.

In all the states of the North-eastern region, the method most prevalent during the 1990s was female sterilization (Appendix 2). In addition, with the exception of Meghalaya, there has been increase in the proportion of females sterilized in the North-eastern states during this period. The proportion of males sterilized declined during the same time though the proportion itself was insignificant during the entire 1990s. However, total number of sterilizations increased during this period because of increase in female sterilizations. During the late 1990s, between IUD and the pill, the latter was found to be more popular. Overall, this reflects that the responsibility of contraception largely lies with the females in NER. This is perhaps not surprising in light of the fact that the thrust of Government policies in the area of family planning over the years has been on female sterilization (see for instance Santhya, 2003).

During 1990-92, the fertility inhibiting effect of contraception was highest in the state of Tripura and lowest in Nagaland (please refer back to Table 4.4). However, it is interesting that the fertility inhibiting effect of contraception was comparatively low in nearly all the states of NER during the early 1990s. The relative situation of the states with respect to contraception did not change significantly until the end of the nineties, although there was increase in contraceptive prevalence and its effectiveness and nearly all the states except Meghalaya, where the value of the index increased marginally during this period. The greatest increase in contraceptive prevalence was experienced in Nagaland followed by Arunachal Pradesh. Again, as in the case of nuptiality, the change in the index was *not* substantial in the remaining North-eastern states.

For the period 1996-98 to 2003-05, the changes in C_c suggest that the effect of contraception has been such as to lower fertility in all the states during the period

except for Nagaland. However, the change in the index in Nagaland has been very marginal, affecting fertility change only slightly. Thus, fertility stalls in the states of Arunachal Pradesh, Assam, Manipur, Mizoram, Nagaland and Tripura cannot be attributed to a commensurate leveling off or reduction in the use of contraception. Nevertheless, the decline in fertility in Meghalaya over this period has been, to a certain extent, brought about by increase in contraceptive prevalence.

Interestingly, with respect to the distribution of contraceptive use by various methods data suggests that there has been a shift from terminal to non-terminal methods during this period (Appendix 2). In fact, among all the states that experienced fertility stall during 1996-98 to 2003-05, there was a decline in the percentage of female sterilizations, except Arunachal Pradesh, where there was a small increase. In the case of male sterilizations, again we find a reduction in it among all the North-eastern states except Arunachal Pradesh, where there was no change. The percentage of women using pill and men using condom increased significantly during this time in all the states. Remarkably, the use of the IUD declined in all the states. It is possible that since this non-terminal method is more cumbersome compared to the pill or condom, couples have shifted their preferences increasingly away from the former and towards the latter methods of contraception. Overall, even though the index of non-contraception suggests otherwise (Table 4.4), there is a strong possibility that the fertility stall witnessed in the majority of the states of NER can be attributed to the increasing use of non-terminal methods whose effectiveness is less compared to male and female sterilizations.³⁷ Thus, for the period 1996-98 to 2003-05, the fertility stalls

³⁷ Here, it should also be mentioned that the effective rates of the various non-terminal methods of contraception have been derived from those experienced in developed countries and there may be

observed in the various states of the region have been probably brought about by changes in the method mix of contraception from terminal to non-terminal methods. The decline in the female age at marriage in Manipur and Tripura has also probably contributed to the fertility stall during this period.

4.2.1.3 BREAST FEEDING AND POSTPARTUM AMENORRHEA

Postpartum amenorrhea is another important proximate determinant of fertility. It is generally observed that the timing of the resumption of ovulation after childbirth nearly coincides with the onset of menstruation. In the large majority of women, the first ovulation takes place a few weeks before or after the first postpartum menses. Thus, the mean duration of amenorrhea is a good indicator of the mean duration of anovulation (Bongaarts and Potter, 1983). It is well established now that there is a direct relationship between breastfeeding and the duration of amenorrhea in women. The longer the duration of lactation and the greater its frequency, the longer is the delay from parturition until the resumption of ovulation. Without lactation, the duration of amenorrhea is around 1.5 to 2 months (Leridon, 1977 cited in Bongaarts and Potter, 1983). Studies on several populations and among subgroups among populations have shown that long durations of breast-feeding increases the length anovulation, but by less than the duration of lactation. The length of postpartum amenorrhic period could range from nearly two months to two years, depending on the duration and intensity of lactation (Bongaarts and Potter, 1983: 26).

such differences that affect the index of noncontraception to hide the real effect of the change in the method mix in favour of the non-terminal methods.

TABLE 4.6: DURATION OF POSTPARTUM AMENORRHEA, ABSTINENCE AND NONSUSCEPTIBILITY IN NORTH-EASTERN STATES: 1992-93, 1998-99

(duration in months)

State	Year	Mean postpartum amenorrhea	Mean postpartum abstinence	Mean postpartum nonsusceptibility
Arunachal	1992-93	11.0	4.9	12.1
	1998-99	7.5	5.7	10.1
Assam*	1992-93	12.5	5.9	13.7
	1998-99	11.4	6.6	13.7
Manipur	1992-93	10.0	5.2	11.2
	1998-99	9.6	5.2	10.4
Meghalaya	1992-93	9.9	11.7	15.8
	1998-99	8.4	6.3	12.5
Mizoram	1992-93	7.5	4.3	9.6
	1998-99	8.0	3.8	9.8
Nagaland	1992-93	7.2	12.0	14.5
	1998-99	8.9	6.7	12.1
Tripura	1992-93	10.8	5.7	11.9
	1998-99	8.7	7.5	10.7
India	1992-93	9.5	5.4	11.1
	1998-99	10.7	6.2	12.2

Note: * the figures for Assam are the percentage of births during the three years preceding the survey whose mothers are amenorrhic, abstaining and nonsusceptible to contraception.

Source: IIPS, Northeastern states 1995, 2002; IIPS Assam, 1995, 2000

Among the North-eastern states, the mean duration of amenorrhea has declined in the majority of the states during the 1990s, except Mizoram and Nagaland that experienced an increase (Table 4.6). This has the effect of increasing fertility in the concerned population, the influence of other proximate determinants remaining unchanged. The mean duration of postpartum amenorrhea ranged from nearly a year to nearly 7 months during both 1990-92 and 1996-98 within the North-eastern states. Thus, there seems to be variation, though not large, among the states in this proximate determinant of fertility. The length of the nonsusceptible period is further prolonged by sexual abstinence after childbirth imposed by various social norms and cultural taboos on coitus during a certain period after parturition. However, among the majority of the states in NER it was found that the period of sexual abstinence was far shorter than that of postpartum amenorrhea, except in Meghalaya and Nagaland during the early 1990s.

Nevertheless, even in these states, the situation changed during the late 1990s, and the period of sexual abstinence was shortened than that of postpartum amenorrhea by a few months. Overall, the duration of postpartum abstinence seems to have declined during the 1990s in NER and, postpartum nonsusceptibility is governed primarily by lactation and postpartum amenorrhea in these states.

Interestingly, the duration of postpartum amenorrhea in the beginning of the 1990s was longer among the states of the North-eastern region (except for Mizoram and Nagaland) vis-à-vis the national average. By the late 1990s, the situation changed and (except for Assam), the duration was shorter in all the states of the region vis-à-vis the all-India level. It is notable that whereas at the all-India level there was an increase in the duration of postpartum amenorrhea, most of the North-eastern states registered a decline suggesting a decrease in duration and/or intensity of lactation in all these states during the 1990s. Coming to the average period of postpartum abstinence, we find that it was higher among all the states in NER vis-à-vis all-India level during early 1990s with the sole exception of Mizoram. However, during the late 1990s, there was no significant difference between the North-eastern states and the all-India average levels (except for the much shorter duration in Mizoram) suggesting that there has been gradual transformation of the social norms in favour of early resumption of sexual relations between spouses in NER. The implication of this for fertility is that it would tend to rise (unless otherwise compensated by higher use of contraception).

The Index of Postpartum Infecundability (Amenorrhea)

The index of postpartum infecundability equals the ratio of total natural fertility (TN) in the presence and absence of postpartum infecundability caused by lactation

and abstinence. Postpartum infecundability influences fertility through its impact of the length of the birth interval. Hence, the ratio of natural fertility in the presence and absence of postpartum infecundability becomes the ratio of the birth interval in the presence and absence of postpartum infecundability. In the absence of lactation and postpartum abstinence, the average duration of the birth interval has been approximated to be about 20 months. This is the outcome of 1.5 months of minimum postpartum anovulation, 7.5 months of waiting time to conception, 2 months of time added by spontaneous intrauterine mortality and 9 months of full gestation period. In the presence of breastfeeding and postpartum abstinence, the average birth interval equals approximately 18.5 months (7.5+ 2+ 9) plus the duration of postpartum infecundability. Thus, the index C_i is calculated as:

$$C_i = 20 / (18.5 + i)$$

where,

i is the average duration of postpartum infecundability.

NFHS data on duration of postpartum amenorrhea (PPA) have been used for the calculation of C_i for the period 1990-92 and 1996-98 (Table 4.4). There is little variability among the North-eastern states in the duration of postpartum amenorrhea and hence the value of the index C_i does not differ significantly among the states. Postpartum amenorrhea had the greatest fertility inhibiting effect during 1990-92 in Assam and the least in Arunachal Pradesh. In 1996-98, there was only slight difference among the states with respect to C_i . It had the greatest fertility inhibiting effect in Tripura and the least in Nagaland. The fertility inhibiting effect of this proximate determinant changed marginally in most of the states of NER during the 1990s, except

Arunachal Pradesh and Tripura, where the fertility inhibiting effect increased significantly.

Thus, as seen from Table 4.4, the decline in the indexes of proximate determinants was marginal during the period 1990-92 to 1996-98 in almost all the states. However, there was increase in the index of marriage in Arunachal Pradesh and Nagaland as well as increase in the index of contraception in Meghalaya. The index of postpartum infecundability increased in the state of Nagaland.

4.1.2.4 INDUCED ABORTION

Induced abortion or the deliberate termination of pregnancy before the fetus is capable of independent survival outside the womb, is another proximate determinant of fertility whose influence is the most difficult to quantify. Induced abortions are permissible in certain cases viz., the pregnancy is life threatening to the mother, is the result of forced sex, is unwanted or malformed etc. As Visaria notes, “In India, induced abortion has been legal since 1972 and yet there are no firm estimates of the number of such abortions performed in the country. The lack of information stems from the fact that, besides the governmental facilities, many women use private facilities for abortions. Abortions in these facilities are often performed by unqualified health practitioners and are rarely recorded” (Visaria, 1999: 3036). However, the recent trend in India and among the majority of the states is the termination of pregnancy with the ‘wrong’ (female) sex and is arguably the major reason for abortion in India. This being declared illegal in India as well as in most other countries, data on induced abortions are difficult to get and where they present themselves, are of dubious reliability. As Visaria (ibid) notes, Chabra and Nuna (1993) estimated that 11 million abortions

occurred in India annually in the early 1990s, of which 60 per cent were probably induced and the remaining were spontaneous. The NFHS 1 reported the outcome of all lifetime pregnancies from ever-married women and found that as against 4.5 per cent of pregnancies ending due to spontaneous abortion, the percentage reported of induced abortion was as low as 1.3 per cent. This suggests that on the one hand, as noted above, such data are difficult to get and even where available, are unlikely to have much significance for examining fertility differentials.

As Bongaarts (1978) observes, even in cases where good estimates of induced abortions are available it is difficult to determine the extent of fertility reduction attributable to it. However, an induced abortion always averts less than one birth and its effect on fertility strongly depends on the use of contraception after abortion. The reason for this is twofold. First, an induced abortion may have been unnecessary, as the pregnancy might have ended in spontaneous abortion or a stillbirth. Secondly, women would resume ovulation much sooner after the abortion than if the pregnancy would have carried to its full term followed by the postpartum nonsusceptible period (Bongaarts and Potter, 1983).

Data on the percentage of pregnancies that end in an induced abortion are available for the period 2000-02 to 2005-07 from the District Level Household Surveys for the corresponding period. Though we do not have enough information to construct the index of induced abortion, we can make an educated guess about the effect of this proximate fertility on fertility for the closest corresponding period (i.e. 1996-98 to 2003-05). In fact, we find that there was an increase in the percentage of induced abortions increased among all the states (except Sikkim) of NER (IIPS, 2006, 2010). This suggests that induced abortion is not likely to have contributed to the fertility stall

observed among the North-eastern states during the period 1996-98 to 2003-05. However, the fertility decline in Meghalaya and Sikkim is commensurate with the rise in the percentage of induced abortions in these states.

4.2.1.5 The Combined Index of Proximate Determinants and its Change over the 1990s

The value of the combined indexes ($C_m \times C_c \times C_a \times C_i$) captures the total fertility inhibiting effect of all the proximate determinants taken together. As noted above, the index of induced abortion is not available and hence we assume that there has been no change in this intermediate variable during the period 1990-92 to 1996-98 and set its value equal to one. Table 4.8 presents the values of the combined indexes for 1990-92 and 1996-98. In the early 1990s, the fertility inhibiting effect of the three proximate determinants C_m , C_c , and C_i was greatest in Nagaland and the least in Arunachal Pradesh followed by Meghalaya. In 1996-98, the fertility inhibiting of the proximate determinants was highest in Tripura, followed by Manipur and Nagaland. Interestingly, the values of the combined indexes for the different states did not change significantly in most of the states between 1990-92 and 1996-98.

**TABLE 4.7: COMBINED INDEX FOR THE NORTH-EASTERN STATES:
1990-92 TO 1996-98**

State	COMBINED INDEX 1990-92	COMBINED INDEX 1996-98
Arunachal Pradesh	0.36	0.27
Assam	0.23	0.21
Manipur	0.20	0.17
Meghalaya	0.33	0.30
Nagaland	0.17	0.19
Tripura	0.30	0.13

Source: Author's calculations

The trend in the combined index, points towards a decline in fertility in Arunachal Pradesh and Tripura during the period 1990-92 to 1996-98. In Arunachal Pradesh, the index of noncontraception and postpartum amenorrhea worked towards reducing fertility during 1990-92 to 1996-98, while the index of marriage had the opposite effect. However, the former two indexes together exerted a stronger effect than the latter on fertility change leading to significant decline in fertility in the state. Between the two, the index of noncontraception had a greater effect on reducing fertility compared to postpartum amenorrhea in Arunachal Pradesh. In the case of Tripura, changes in all the three indexes tend to reduce fertility. Among the three, the index of marriage had the greatest fertility inhibiting effect, followed by the index of postpartum amenorrhea and index of noncontraception.

Overall, the movement of the proximate determinants points out that a stall in fertility decline is indeed a possibility in Manipur and Nagaland during the 1990s. However, as we have seen, there has been significant decline in fertility in Assam but the proximate determinants suggest a fertility stall in this state. Significant increases in induced abortion in Assam during this period could be a plausible explanation for it, though data are far from conclusive.

Table 4.9 presents data on percentage of induced abortion among youth (ages 15-19 and 20-24) in the North-eastern states and India for the period 1990-92 to 1996-98. Among all the states of NER, we find that the percentage of induced abortions (taking into account both age groups) was highest in Assam both in 1990-92 and in 1996-98. The percentage increase in induced abortion for adolescents (15-19 years) was largest in the latter as well. Thus, even though it cannot precisely explain the

decline in fertility in Assam, there are indications that substantial increase in induced abortion may have been responsible for the decline.³⁸

TABLE 4.8: PERCENT OF PREGNANCIES ENDING IN INDUCED ABORTION AMONG ADOLESENTS (15-24) IN NORTH-EASTERN STATES: 1990-92 TO 1996-98

State	15-19 Years		20-24 Years	
	1990-92	1996-98	1990-92	1996-98
Arunachal Pradesh	0.0	0.0	0.6	0.3
Assam	2.4	5.1	2.1	4.1
Manipur	-	2.4	0.9	4.1
Meghalaya	0.0	0.0	0.0	0.8
Mizoram	-	0.0	0.0	1.5
Nagaland	0.0	0.0	0.4	0.4
Sikkim	-	0.0	-	0.8
Tripura	2.5	0.0	3.4	6.5

Source: IIPS 1995, 2000

In Manipur, the change in the various indexes during this period has been very marginal. In Meghalaya, the small changes in the index of marriage and that of postpartum amenorrhea tended to reduce fertility, while there was a slight increase in the index of noncontraception, signifying the possible fertility-raising impact of contraception during this period. Thus, the reduction in contraception is perhaps the most important proximate reason for the rise in fertility in Meghalaya. In Nagaland, the change in the index of marriage and postpartum amenorrhea has a quite strong effect towards reducing fertility, which was offset by the almost matching, but opposite influence of the index of noncontraception towards reducing it.

³⁸ As noted elsewhere, there is significant under-reporting of abortions, especially that of induced abortions in NFHS data. Hence, theoretically it is possible that the extent of under-reporting has been the highest in Assam, resulting in underestimation of the extent of fertility decline due to this factor. In addition, the data on the other proximate determinants are not sacrosanct as well. Thus, some bias would be introduced by the latter factor as well.

In the next section, we explore the contextual or background factors behind the fertility stall among the states of NER.

4.3 CHANGES IN FERTILITY PREFERENCE AMONG THE NORTH-EASTERN STATES, 1990-92 TO 2003-05

The NFHS provides information on several indicators of fertility preference, such as wanted fertility, mean ideal number of children, and the desire to limit childbearing (i.e. the percentage of currently married women who want no more children). Whereas, the meaning of the latter two measures can be gauged from their nomenclature, that of the former requires some explanation. “A birth is considered wanted (in the DHS) if the number of living children at the time of conception of the birth is less than the ideal number of children as reported by the respondent.” (Rutstein and Rojas, 2006: 90). In this connection, researchers, for instance Bongaarts (1990) point out that both the wanted fertility rate, as well as the mean ideal number of children are likely to be biased leading to over-estimation of wanted fertility. Bongaarts mentions the following reasons that might lead to this outcome in the case of the former measure: respondents’ tendency to rationalize previously unwanted births as wanted, couples’ limiting fertility voluntarily before reaching their desired family size, their preference for a particular combination of male and female offspring, and the tendency of some respondents to give non-numeric responses to structured survey questions. Similarly, the response to the question on the ideal number of children may be biased due to the fact that couples may not reveal *their* ideal number of children, but rather respond with what is considered ideal for the society at large (Bongaarts, 1990). Nevertheless, it has been shown by researchers (for instance Kodzi et al., 2010; Roy

2008) that fertility preferences as measured by the various indicators of the DHS are meaningful indicators of future fertility trends.³⁹

In line with the foregoing discussion, we now examine the change in fertility preferences among the North-eastern states over the period 1990-92 to 1996-98, followed by that during 1996-98 to 2003-05. For gaining a comprehensive understanding of the possible changes in fertility preference among the North-eastern states during this period, we analyze trends of three indicators of fertility preference of the North-eastern states- the wanted fertility rate, the percentage of women who want no more children and the mean ideal number of children.

TABLE 4.9: WANTED FERTILITY, PERCENT OF WOMEN WHO WANT NO MORE CHILDREN, AND MEAN IDEAL NUMBER OF CHILDREN: NORTH-EASTERN STATES, 1990-92 TO 2003-05

State	Wanted Fertility Rate			Percent of women who want no more children			Mean ideal number of children (women)		
	1990-92	1996-98	2003-05	1990-92	1996-98	2003-05	1990-92	1996-98	2003-05
Arunachal Pradesh	3.84	1.74	2.26	34.7	47.0	63.8	4.7	3.2	3.1
Assam	2.52	1.75	1.80	62.6	59.7	69.0	3.2	2.9	2.3
Manipur	2.29	2.50	2.32	55.2	52.0	62.5	3.7	3.6	3.1
Meghalaya	3.39	3.83	3.08	27.0	38.5	40.3	4.7	4.7	3.6
Mizoram	2.09	2.66	2.69	54.7	57.7	57.6	4.3	4.1	4.0
Nagaland	2.95	2.98	2.67	41.5	47.3	63.7	4.1	4.0	3.5
Sikkim	-	1.65	1.22	-	76.0	81.3	2.2	1.9	1.9
Tripura	1.98	-	1.64	69.9	70.9	74.2	2.6	2.3	2.1

Source: Compiled from IIPS and ORC Macro, 1993; 1999; 2007

³⁹ For a brief discussion of the various indicators of fertility preferences and their relative strengths and weaknesses, one may also refer to Bongaarts (2006) and the literature cited therein.

During the period 1990-92 to 1996-98, as noted earlier, fertility failed to decline in four out of the seven states of NER, viz., Manipur, Meghalaya, Mizoram and Nagaland and declined among the remaining three - Arunachal Pradesh, Assam, and Tripura. Interestingly, whereas there was indeed a decline in the wanted fertility rate among the states that witnessed fertility decline during this period, there was in fact, a rise in wanted fertility among those states where fertility stalled (Table 4.9). However, the rise was marginal in the case of Manipur and Nagaland and hence, these states can be considered to have experienced no change in wanted fertility during this period. In Meghalaya and Mizoram, on the other hand, there was considerable increase in wanted fertility. However, this increase was less than the actual increase in fertility in these states. Thus, the trend in the wanted fertility rate during 1990-92 to 1996-98, points towards the distinct possibility of a shift in fertility preference towards increasing the number of children among those states in NER that experienced rise in fertility. Overall, the trend in the wanted fertility rate over this period has been matched by the trend in actual fertility.

Now, the percent of women who want no more children, shows increase for the period 1990-92 to 1996-98 in Arunachal Pradesh and Tripura, commensurate with the decline in fertility in these states (Table 4.9). In Assam however, (the other state that witnessed fertility decline during this period) there was practically no change in the percentage of women who want no more children during this period. In Manipur and Nagaland, corresponding to the fertility stall there was little change in the percentage of women wanting no more children. However, the change in this indicator of fertility preference does not agree with the rise in fertility experienced by Meghalaya and

Mizoram during this period. In fact, there was significant increase in the percentage of women wanting no more children in the former state. In the case of the mean ideal number of children for women for the North-eastern states during the period 1990-92 to 1996-98, interestingly, there was a decline across all the states of NER during this period with the sole exception of Meghalaya, where there was no change during this period. Nevertheless, compared to the states that experienced fertility decline, the reduction in the mean ideal number of children was insignificant in the case of those states that experienced fertility stall (Table 4.9).

Taken together, the three indicators point towards change in fertility preference to larger number of children, where fertility increased during the period 1990-92 to 1996-98, and practically no change in the preferred family size among the states that experienced no change in fertility during this period. It is perhaps worth mentioning here that among the various indicators of fertility preference, the wanted fertility rate was found to be most closely associated with the fertility trend among the North-eastern states. Also, the unchanging mean ideal number of children among the states that witnessed fertility stall and the increases, albeit marginal, in the percentage of women who want no more children, point towards the distinct possibility of a worsening of the family planning services in these states (more on this presently).

The explanation of the fertility stall among the North-eastern states in terms of fertility preferences, for the following period 1996-98 to 2003-05 from available data, is slightly tenuous in the case of a few states. During this period, whereas fertility showed no significant change in Assam, Manipur, Mizoram, Nagaland and Tripura, it increased in Arunachal Pradesh and declined in Meghalaya and Sikkim. The wanted fertility rate correspondingly increased in Arunachal Pradesh and declined in

Meghalaya and Sikkim. Wanted fertility showed marginal increase in Assam and Mizoram and can as well be taken to have stalled in these two states. The trend in fertility and wanted fertility do not correspond to each other in Manipur and Nagaland where there was a stall in fertility but a decline in wanted fertility during this period.

The percentage of women who do not want any more children, increased considerably in all the states of the region during 1996-98 to 2003-05 with the exception of Mizoram where there was no change in this indicator (Table 4.9). Hence, even in most of the states that witnessed fertility stall during this period, there was increase in the percentage of women who wanted no more children. However, this could possibly be the outcome of incorrect responses from the women as pointed out earlier. Coming now to the trend in the mean ideal number of children, we find practically no correspondence between this indicator of fertility preference and the trend in actual fertility among most of the states of NER. Among the states that experienced fertility stall, there was in fact, significant decline in the mean ideal number of children in Assam, Manipur, Nagaland and Tripura. On the other hand, in Arunachal Pradesh and Sikkim, where there was significant rise in fertility, there was insignificant decline in the mean ideal number of children. The only exceptional states, where the trend in fertility matched that in the mean ideal number of children were Mizoram and Meghalaya.

Overall, as was the case with the period 1990-92 to 1996-98, among the various fertility preference indicators, the trend in wanted fertility rate is most closely associated with the trend in fertility during 1996-98 to 2003-05 (Table 4.9). However, the other two indicators of fertility preference viz., the percentage of women who want no more children and the mean number of ideal children for women, hardly tally with

the increase or no change in fertility preference among the North-eastern states. In fact, taken together, these two indicators would lead to the conclusion that there have been such changes in fertility preference that should lead to fertility decline among the majority of the states of this region during this time. For example, the stalling in fertility is not captured by any of the indicators of fertility preference in the case of Manipur and Nagaland. In both these cases, fertility preferences changed in a manner that should, in the presence of a well-functioning family planning system, lead to a decline in fertility in these states, an issue to which we turn next.

4.4. THE IMPACT OF FAMILY PLANNING PROGRAMS ON FERTILITY

While the general conclusion of a number of studies on the impact of family planning programs (FPP) on fertility is that, there is a frequent and often strong fertility reducing effect associated with FPP in the context of developing countries (see for instance Bongaarts et al 1990; Mauldin and Ross 1991; Freedman 1987; and Simmons and Young 1996), there have also been researchers who have questioned the role of family planning programs in reducing fertility (see for instance Pritchett, 1994). According to Pritchett, the effect of family planning programs on fertility is very small compared to that of fertility preferences which in turn are primarily shaped by socio-economic factors. One of the major criticisms of Pritchett against those studies that found a statistically significant and large effect of family planning programs on fertility (Bongaarts, 1993; Bongaarts, Mauldin, and Phillips, 1990; Lapham and Mauldin, 1984; Mauldin and Ross, 1991) is that, in the multiple regression analyses employed, the socio-economic indicators had been clubbed together into a single index, which diminished the effect of individual socio-economic variables and attached none to

those that were not considered in the index. However, a perusal of these studies reveals that even the index of family planning had been included as a composite index of several variables that reflected the strength of family planning programs. Thus, the relative size of the coefficients of socio-economic development and family planning are, to say the least, not misleading in these studies as far as the impact of family planning programs on fertility is concerned. The other major criticism of Pritchett is that empirical research on the subject has not considered the possibility of endogeneity in the measure of family planning programs; that acceptance of the family planning programs is itself influenced by fertility preferences. That is, as fertility preference shifts towards smaller families, people start to adopt family planning methods to a greater extent as compared to the past. However, this is perhaps the very issue that family planning programs address. In fact, researchers in the area have consistently pointed out the primary role of the family planning programs is meeting the unmet need for contraceptive methods. Although theoretically, family planning programs can affect fertility directly through the provision of information and access to contraceptives and indirectly through its influence on the fertility preferences of households, most of the literature on the subject shows that whereas the direct effects are important as far as their fertility reducing influence are concerned, the indirect effects are small or insignificant in many of the cases (see for instance Angeles et al 2001).⁴⁰ Bongaarts (1990, 1994) argues that family planning programs reduce fertility

⁴⁰ Freedman (1987) however points out that a strong family planning program (involving mass media campaigns, home visits and incentives) can be expected to have a stronger effect on fertility preferences as compared to weak or practically nonexistent ones. In addition, the effect of family planning programs might have 'multiplier' effects, in the sense that those who adopt the program may serve as role models for others who gradually adopt the small family norm through social learning (ibid).

primarily through enhancing the *access* to contraceptives, thus reducing the unwanted fertility among couples. Thus, in addition to providing low-cost contraceptive methods, effective family planning programs also reduce the non-economic impediments to contraceptive use such as the lack of knowledge, fear of side effects, and social and familial disapproval.

In our analysis, we have incorporated unwanted fertility, public sector share in the provision of contraceptives and the exposure of women to family planning programs in NER, in an effort to capture the trend in the program strength overtime in the North-eastern states. It is hypothesized that a reduction in program strength would have negative consequences for the access to and thus use of contraception and family planning methods, which might be reflected in increasing unwanted fertility, and possibly in the reduction of exposure of women to family planning messages on mass media. The public sector provides contraceptives free of cost and hence a reduction in the share of the public sector in its provision, though may not affect the wealthier households, could lead to lower access to contraception for the poorer households leading to stalling in fertility decline.⁴¹

Tables 4.11 present information on the various indicators on the performance of the family planning program among the North-eastern states. We begin with the examination of the trend in the various indicators for the period 1990-92 to 1996-98. As already noted, fertility stall occurred among four states of the region during this period- Manipur, Meghalaya, Mizoram and Nagaland. Among these four states, at the

⁴¹ Here, it should be mentioned that this argument finds strength in our observation in the earlier part of the chapter that contraceptive use varies directly with the wealth of the household, with women from richer households exhibiting greater contraceptive prevalence compared to their counterparts belonging to poorer households.

onset of the stall, unwanted fertility ranged from 0.2 children per woman in Mizoram to 0.5 in Manipur. Thus, in all these states, unwanted fertility was quite low during the beginning of the 1990s. Whereas, there was no change in the unwanted fertility rate in Manipur and Mizoram, there was considerable increase in unwanted fertility in Meghalaya and Nagaland from 1990-92 to 1996-98. Among the states that witnessed fertility decline during this period, the unwanted fertility declined in Assam but increased in Arunachal Pradesh (data on Tripura for this period is not available).

TABLE 4.10: UNWANTED FERTILITY, PERCENT SHARE OF PUBLIC SECTOR IN PROVISION OF MODERN CONTRACEPTIVES, AND PERCENT OF WOMEN (15-19) EXPOSED TO ANY MEDIA, NORTH-EASTERN STATES, 1990-92 TO 2003-05

State	Unwanted Fertility Rate			Percent share of public sector in provision of modern contraceptives			Percent of women (15-19 years) exposed to any media		
	1990-92	1996-98	2003-05	1990-92	1996-98	2003-05	1990-92	1996-98	2003-05
Arunachal Pradesh	0.5	0.8	0.7	85.7	72.2	63.5	29.9	67.9	60.1
Assam	1.0	0.6	0.6	72.0	63.7	45.8	23.7	60.8	59.1
Manipur	0.5	0.5	0.5	82.3	76.8	52.2	63.3	80.8	86.8
Meghalaya	0.3	0.8	0.7	68.2	47.3	42.9	35.4	62.8	55.5
Mizoram	0.2	0.2	0.2	90.6	81.0	84.6	50.8	77.7	65.2
Nagaland	0.4	0.8	1.0	70.7	57.7	47.6	38.6	64.4	36.8
Sikkim	-	1.2	0.8	-	-	66.5	-	-	53.0
Tripura	0.7	-	0.6	75.3	71.4	54.5	38.1	88.0	69.0

Source: Compiled from IIPS and ORC Macro 1993; 1999; 2007

The percentage of women exposed to family planning messages through mass media and the share of the public sector in the provision of health and family welfare

services are relatively direct measures of the performance of the family planning machinery of the state (Table 4.10). Interestingly, the percentage of women exposed to family planning messages on mass media increased during the period 1990-92 to 1996-98 among all the states of NER but the percentage increase in the states that experienced fertility stall was smaller than those that experienced fertility decline. This lends further support to the observation that fertility stall during the 1990s occurred in states where the family planning programs had faltered to some extent. However, the share of the public sector, in the provision of contraceptives declined among all the states of the region from 1990-92 to 1996-98, and there is no significant difference in the decline between the states that experienced fertility decline and those that witnessed a stall during this period. The examination of the impact of this decline on the ability of poorer households to have timely and adequate access to contraceptives would have been revealing, but this cannot be undertaken due to the lack of data. Nevertheless, insofar as the poorer households are concerned, they would naturally have a greater reliance on the Government for the provision of family welfare services. Hence, any fall in the share of the public sector could lead to a shortage of contraceptives and rise in unwanted fertility among them.

For the following period, 1996-98 to 2003-05, fertility stalled in all the states of NER except Meghalaya and Sikkim. Among the states that experienced no significant change in fertility, there was no change in unwanted fertility in Assam, Manipur and Mizoram and slight increase in the unwanted fertility in Nagaland. In Arunachal Pradesh, where fertility increased significantly during this period, we find that there was in fact, a marginal decline in the unwanted fertility rate. In Meghalaya and Sikkim unwanted fertility declined during this period, as did their fertility.

Furthermore, there has been a reduction in the percentage of women exposed to family planning messages among all the states in the region, except Manipur, where there was a small rise. In Arunachal Pradesh, where there was significant rise in fertility during this period, we find that commensurate with that there was an increase in unwanted fertility as well. The percentage of women exposed to family planning messages on mass media as well as the share of public sector in the provision of contraceptives declined in this state. On the contrary, Meghalaya (that experienced significant decline in fertility during this period), as already noted, witnessed a reduction in unwanted fertility. However, the percentage of women exposed to family planning messages as well as the public sector's share in the provision of contraceptives declined. Nevertheless, the fall in the latter was much smaller than that experienced by the other states during this period. Overall, there seems to be a slackening in the Government's commitment to the family planning programs among the North-eastern states that experienced fertility stall as far as these indicators lead us. The case of Manipur remains slightly hazy as neither the indicators of fertility preference nor particularly that of family planning programs could explain the fertility stall in the state for the period 1996-98 to 2003-05.

4.5. THE SOCIO-ECONOMIC CORRELATES OF FERTILITY AMONG THE NORTH-EASTERN STATES

While the role of socio-economic factors in fertility decline is well understood, it is particularly interesting to examine the part played by these variables in the situation of a fertility stall. In this context, the present section examines various indicators of socio-economic development in the North-eastern states for the period

1990-92 to 2003-05, in an effort to uncover the differences (in any) among the states that experienced fertility stall and those that witnessed a decline in fertility.

Bongaarts (2006) argues that a lack of progress on the socio-economic front is capable of bringing about a momentary lull in the process of fertility decline among the mid-transitional countries. While the classical (socio-economic) and diffusion perspectives, are both important, their roles change during the course of the transition. "...diffusion and the social interaction processes accelerate the decline early in the transition. Once this process has largely run its course, fertility late in the transition becomes more closely tied to level of socio-economic development" (Bongaarts, 2005:12). Thus, we may expect that fertility stall would take place in those states in NER where there has been a slowdown in the socio-economic development in the recent past. Although we do not attempt to test the proposition that ideational changes have largely accounted for the initial phase of fertility decline among the North-eastern states, data permit us to examine whether there has been, of late, stagnation in the socio-economic development indicators among the North-eastern states where fertility failed to decline. The analysis of most of the socio-economic variables is limited to the 1990s.

The compound annual growth rate of per capita gross state domestic product had been higher in NER during the period 1980-81 to 1990-91, but showed a distinct decline in the post liberalization period at least up to the end of the 1990s (Table 4.11). Among the states that experienced fertility stall during early to mid 1990s- Manipur, Meghalaya, Mizoram and Nagaland (referred to as Group A collectively in this discussion for simplicity of exposition), we find slower growth in per capita GSDP than the average of the *region* in all the states except Meghalaya during the

**TABLE 4.11: PER CAPITA GROSS STATE DOMESTIC PRODUCT GROWTH
IN NER AND STATES. 1980-81 TO 2005-06**

State	1980-81 to 1990-91	1980-81 to 1995-96	1993-94 to 2000-01	1999-00 to 2005-06
Arunachal Pradesh	5.5	5.7	1.0	6.1
Assam	1.9	1.7	0.7	3.5
Manipur	2.4	2.5	2.3	5.1
Meghalaya	3.0	2.4	4.1	4.2
Mizoram	-	-	-	-
Nagaland	3.3	-	3.0	-
Sikkim	8.2	-	2.8	5.7
Tripura	2.6	3.3	7.7	7.0
NER*	3.8	3.1	3.1	5.3
India	3.1	2.7	4.1	4.8

Note: the value of the per capita gross state domestic product is the simple average of that for the individual states.

Source: Electronic data obtained from www.mospi.nic.in

corresponding period (1993-94 to 2000-01). Among the states that witnessed declining fertility (viz., Arunachal Pradesh, Assam, Sikkim and Tripura- the Group B states) per capita income growth was low in Assam and Sikkim but substantially higher than the average for NER in Tripura during the same period. However, the *group average* for the states that witnessed fertility stall was not different from that of the other group where fertility declined during the period 1990-92 to 1996-98 (Table 4.12). Nevertheless, over the longer period preceding the stall (i.e. 1980-81 to 1995-96), we find that the average per capita income growth had been mostly higher in the states where fertility declined vis-à-vis those where fertility stalled during early to mid 1990s

(Table 4.11). The observation supports the view that there was stagnation in the purely economic indicators of development in the states where fertility stalled as against those where it declined during the 1990s.

Data on the remaining socio-economic variables and their changes over the period 1971-2001 are contained in Table 4.12.⁴² The growth of urbanization, as that in the growth of per capita GSDP, has been slower in those states where fertility stalled vis-à-vis those where it did not during the period of the stall and it is also true of the entire period from 1981 to 2001.⁴³ The other socio-economic indicator, where the states that experienced fertility decline seemed to have fared better than those where it stalled, is the female literacy rate. The female literacy rate increased much slowly during the period 1991-2001 (as well as over the longer period from 1971 to 2001) among the states that experienced fertility stall during 1990-92 to 1996-98 (Table 4.12).

However, the same cannot be claimed when we consider other development indicators. Surprisingly, the reduction in poverty for the period 1983 to 1993-94 (the period preceding the fertility stall), had been faster among the Group A states as compared to those Group B. However, for the period 1990-92 to 1996-98, there had been no significant difference in the decline in poverty between the two groups of states in NER, though the decline in poverty was marginally higher in the states that experienced fertility stall during that period (Table 4.12).

⁴² We should mention here that the variables mentioned above have actually been already encountered in the context of analyses elsewhere in the thesis. However, for the present purpose of comparison, we present them again, but arranged differently.

⁴³ That said, the percentage of urban population was higher during the period 1981 to 2001, among the states where fertility stalled compared to those where it declined.

TABLE 4.12: CHANGES IN SOCIO-ECONOMIC INDICATORS OF DEVELOPMENT 1990-2005

Year	Group A States	Group B States
<i>Per capita gross state domestic product (compound annual growth rate)</i>		
1980-81 to 1995-96	2.5%	3.6%
1993-94 to 2000-01	3.1%	3.1%
<i>Female Literacy Rate</i>		
1971	27.4	15.7
1991	56.5	40.8
2001	67.1	54.3
% change 1991 to 2001	18.8%	33.2%
% change 1971 to 2001	145%	245%
<i>Percent of urban population</i>		
1981	21.2	9.1
1991	27.5	13.0
2001	28.2	16.8
% change 1991 to 2001	2.5%	28.5%
% change 1981 to 2001	33.2%	82.5%
<i>Population below poverty line</i>		
1983	37.8	40.5
1993-94	33.8	39.7
1999-00	28.6	34.7
% point change 1993-94 to 1999-00	5.5	5
% point change 1983 to 1999-00	9.2	5.8
<i>Per capita Consumption Expenditure</i>		
1993-94	144.0	107.03
1999-2000	176.9	118.4
% change 1993-94 to 1999-00	22.8%	10.6%

Table 4.12 concluded

Year	Group A States	Group B States
<i>Nutritional status among women (% anaemic)</i>		
1996-98	46.7	63.7
2003-05	43.2	62.5
% point change 1996-98 to 2003-05	3.5	1.2
<i>Nutritional status among children (% anaemic, % thin)</i>		
1996-98	56.7, 23.0	59.8, 31.3
2003-05	57.7, 25.7	70.3, 33.7
% point change 1996-98 to 2003-05	-1, -2.7	-10.5, -2.4
<i>Female unemployment rate (usual principal status)</i>		
1993-94	6	77.3
1999-00	16.8	61.0
% change 1993-94 to 1999-00	179.2%	-21.1%
<i>Male unemployment rate (usual principal status)</i>		
1993-94	14.8	41.0
1999-00	19.3	31.3
% change 1993-94 to 1999-00	30.5%	-23.6%
<i>Social Sector expenditure ratio</i>		
1980-81	25.9	26.9
1990-91	29.5	29.4
1998-99	32.2	29.5
% change 1990-91 to 1998-99	9.1%	0.3%

Source: RGI (1951, 1971, 1991, 2011); NSSO (various rounds); www.mospi.gov.in; IIPS (2007)

Among the individual states (data not shown in table), the increase in fertility in Mizoram is associated with a large drop in poverty. The decline in poverty, in Meghalaya (the other state that witnessed an increase in fertility) is however not large. Not surprisingly, poverty also declined among those states where fertility declined during this period.

Commensurate with the larger decline in poverty, the increase in per capita consumption expenditure had also been higher in the states where fertility stalled. In fact, those states that witnessed fertility stall during the period 1990-92 to 1996-98 experienced a greater increase in both male and female employment. Even the social sector expenditure ratio (including expenditure of the Government on education, health, amenities i.e. water supply & sanitation, housing and urban development, and other social service including welfare of SC, ST & OBC; social security and welfare etc) had been better in Group A states (Table 4.12).

Interestingly, during the period 1990-92 to 1996-98, when fertility failed to decline in the four North-eastern states of Manipur, Meghalaya, Mizoram and Nagaland, there was in fact, a rise in infant and child mortality in all these states (the increase in the latter being stark), except Manipur. Even though, there was also a rise in infant and child mortality in Arunachal Pradesh, where fertility declined during this period, (data on Sikkim and Tripura not available), the increase was much smaller than those states where fertility stalled. The reason for lack of decline in infant and child mortality might be the deterioration of health facilities for mothers and their children during the concerned period (Appendix 3).

Curiously, this is not reflected in the provision of health services for infants, as there has been, in fact, an increase in the percentage of children 12 to 23 months of age, receiving all basic vaccinations in the states where fertility stalled and reduction in it in those states where fertility declined during the period 1990-92 to 1996-98. However, the percentage of children less than four years of age suffering from diarrhoea increased among the states that experienced fertility stall during this period as compared to those where fertility declined. Thus, there is some reason to believe

that health and sanitary conditions might have deteriorated among the states that experienced fertility stall during this period (Appendix 4).

Overall, as far as the relation between economic growth and fertility among the North-eastern states during the period 1990-92 to 1996-98 is concerned, the states experiencing fertility stall had a relatively poor performance in terms of growth in income, urbanization and the female literacy rate but performed better in terms of poverty reduction (at least over the longer run) and increase in per capita consumption expenditure as well as employment. Thus, there appears to be no strict correspondence between socio-economic indicators and fertility stall among the North-eastern states.

For the following period 1996-98 to 2003-05, as we saw earlier, fertility stalled among all the states of the region *except* Meghalaya and Sikkim, which witnessed decline in fertility during this period. Among the various socio-economic indicators, for this period we have data on per capita GSDP, infant and child mortality, percentage vaccinated and percentage suffering from diarrhoea among children and the nutritional status among women and children. Data on the former for the period 1993-94 to 2004-05 is not available for Mizoram, Nagaland and Tripura. However, data on the remaining states shows that among the states where fertility declined during this period, the annual compound growth rate of per capita GSDP was higher than the average for the region in Sikkim but lower in Meghalaya. Among the states where fertility stalled during this period, it was higher than the average in Arunachal Pradesh and Tripura and lower than the average in Manipur and Assam (Table 4.11). The nutritional status among adult women, while showing some improvement among the majority of the states, does not show much difference between the two groups of states (though the states where fertility stalled seem to have fared slightly better) . On the

contrary, there was significant deterioration in the nutritional status among children (measured in terms of percentage anaemic as well as percentage underweight) in all the states of the region, but the deterioration was lower in the states where fertility stalled during this period. The sole exception has been Mizoram, where there has been improvement in the nutritional status of children among states that experienced fertility stall during this period. However, the decline in infant and child mortality had been higher in the states where fertility declined during this period. In fact, the states where fertility stalled during this period also showed lesser improvement in percentage of children 12 to 23 months who had received all the basic vaccinations (Appendices 4.1, 4.2).

Overall, to put it briefly (at the expense of losing the details) it appears that purely economic indicators are poor predictors of fertility stall or its decline among the North-eastern states. The two factors that stand out as significant from the analysis for both periods, 1990-92 to 1996-98 and 1996-98 to 2003-05, are the female literacy rate and infant and child mortality. The states where fertility stalled, had lower female literacy as well as higher infant and child mortality on average as compared to the states that experienced decline in fertility in NER.

4.6 DISCUSSION

In this chapter, we examined the proximate determinants as well as the contextual factors behind the fertility stall observed among the North-eastern states over the period 1990-92 to 1996-98 and 1996-98 to 2003-05. It is clear that even though the various proximate determinants- marriage, induced abortion, contraception and postpartum amenorrhea, have been influential in shaping the fertility trends in the

various North-eastern states, contraception stands out as an especially important proximate determinant in several instances. For instance, in Arunachal Pradesh contraception played a major role in fertility decline and in Nagaland, it was primarily responsible for the stall in fertility decline. Interestingly, nuptiality was also found to be a proximate determinant of much importance and its effect had been mostly towards reducing fertility as was seen in the case of Tripura and Nagaland.

Interestingly, the study on the proximate determinants of fertility in India during the early 1990s by Visaria (1999), also found contraception to be the primary driver of fertility decline, especially in states such as Punjab and Kerala, which achieved rapid and sustained declines in fertility from the 1970s. Even though the underlying factors that precipitated the decline were very different in these two states, the provision of family planning services facilitated the transition from a high to a low fertility regime.

Among the states that witnessed fertility stall during either 1990-92 to 1996-98 or 1996-98 to 2003-05, there was deterioration in the performance of the family planning program in all the states, but the stall in fertility cannot be attributed to it in all the cases. Specifically, in Assam and Meghalaya, the fertility stall was associated with an increase in wanted fertility. Hence, change in fertility preference in these states lead to the observed increase in fertility. However, in Arunachal Pradesh, Manipur, Nagaland and Tripura, the fertility stall had taken place in all probability, due to a lapse in the family planning programs in these states. Remarkably, among the states that experienced fertility decline during this period, there was reduction in the wanted fertility (i.e. change in fertility preference towards fewer number of children) as well as improvement in the family planning program of the state.

Among the various indicators of socio-economic development, we find that the states where fertility stalled especially during the period 1990-92 to 1996-98, were associated with increases in infant and child mortality. As noted earlier, female literacy rate was associated with fertility reduction among the states of NER. Thus, greater emphasis on such socio-economic variables as female literacy and improvement in the health facilities for women and children, together with improvement in the efficiency of the family planning programs can lead to the cessation of the fertility stall observed among the states of the region.

CHAPTER FIVE

THE CONTEXTUAL DETERMINANTS OF FERTILITY IN NORTH-EAST INDIA: A DISTRICT-LEVEL ANALYSIS

5.1. INTRODUCTION

In the previous chapter, we examined the proximate as well as the background determinants of fertility in NER using state-level data. A key finding from the earlier chapter was the possibly greater importance of *socio-economic* factors (indicated for instance by female literacy rate and early childhood mortality rates) than that of purely economic ones (such as per capita state domestic product or the degree of urbanization), in shaping the process of fertility transition. However, given the almost universal knowledge but relatively lesser use of contraception (and high *wanted* fertility) evinced by a few states in the region, one cannot but wonder if socio-cultural or even political factors might also possibly be at work here. Which set of factors-economic, social, cultural or political, might be influencing fertility largely during this stage of the fertility transition in NER? With the aim of unraveling the answer to this question, we embark on an in-depth investigation of the various contextual factors influencing fertility in NER using district level panel data for the period 1991 and 2001.

This chapter is organized as follows. In the subsequent section, we briefly outline the various (and sometimes contending) perspectives on fertility transition and explore the evidence on the factors behind the fertility decline (or its lack thereof) from

research on India and its major states. Section 5.3 examines the relevance of these perspectives and their variants in the specific context of NER, and discusses the pertinent issues in the context of fertility transition in the region. In Section 5.4, we outline the method of analysis adopted and briefly explain the various statistical models (regression models) used in the analysis together with a description of the variables used in the study. Section 5.5 presents the findings from the data analysis. Section 5.6 is devoted to a discussion on the principal implications of the results and concludes.

5.2. THE DRIVERS OF FERTILITY DECLINE: PERSPECTIVES AND EVIDENCE FROM INDIA

5.2.1 Theories of Fertility Decline: An Overview

A rather intriguing feature of the subject area of fertility is an unmistakable lack of consensus on a single theory that can explain the phenomenon of fertility transition, with a level of generality that would make it applicable to all regions and all times. To a large extent, this is attributable to the fact that fertility is a subject matter that lends itself to interpretation from the perspective of diverse disciplines such as economics, sociology, anthropology, biology, psychology and history. Hence, an examination of the empirical literature on the subject reveals numerous studies that have utilized factors drawn from these various (and sometimes competing) explanations in explaining fertility transitions.

Perhaps the broadest (if not the most comprehensive) theory in terms of incorporating the possible factors explaining the process of demographic transition, is

the '*demographic transition theory*'.⁴⁴ Notestein (1945) is credited for the formulation of the theory in its most explicit form, though the idea can be found in the work of earlier writers (Carr-Saunders 1922, 1964/1936; Davis, 1945; Thompson, 1929). Although in the initial formulation (for instance, in that by Notestein), it was perhaps not so much of a *theory*, but an exposition of the regularities observed in the population transitions of historical Europe, it gradually assumed the position of a theory that would possess universal applicability and hence some measure of predictive power. The classical demographic transition theory places socio-economic development at the centre of the changes that lead to a reduction in fertility among various populations. In traditional agricultural societies, fertility is high to offset the high mortality rates and thus ensure the survival of the species. However, with socio-economic development in the form of urbanization, increasing education, and increasing role of the State in the provision of various basic services including health and social security, there occurs a two-fold change. On the one hand, the decline in mortality and the increase in child survival lead to a downward revision of the desired number of children, while on the other, increasing incomes as well as employment opportunities (especially for women) together with other alternatives to old-age security to children, lower the benefit and increase the cost of additional children, thus strengthening the desire for lower number of offspring. This change in attitude among

⁴⁴ This also necessarily means that the demographic transition theory does not examine the nuances of the various factors determining fertility mentioned, but provides a broad sketch of the possible factors and the ways in which they might be influencing fertility. It was left for later researchers to clarify and point out the various finer details of the mechanisms operating on reproductive behaviour. These attempts have resulted in formulation of hypotheses that can be easily subjected to empirical verification and testing.

couples, leads to increase in the demand for family planning services and with its adequate supply, fertility begins to decline.

However, Notestein (1945) observed that, as compared to mortality, fertility was much less responsive to the process of modernization. He noted that societies that have experienced high mortality in the recent past are ingeniously arranged to obtain the requisite births. Their religious doctrines, moral codes, laws, education, community customs, marriage habits, and family organizations are all focused towards maintaining high fertility and concluded that reduction in fertility requires a shift in social goals from the survival of the group to those directed toward the welfare and the development of the individual.

Even though, the demographic transition theory is infused with ideas of ideational and institutional changes as indicated by the conclusion of Notestein with respect to fertility transition, these factors were perhaps not emphasized as much as the socio-economic changes when explaining the actual process through which fertility transition would transpire. It is also true that the focus of this theory is on factors that operate largely at the level of the individual and the household. Hence, the empirical formulations and testing of the theory has tended to include factors that clearly belong to the socio-economic category, and primarily are micro-economic in nature.

Perhaps the purest strain of theory that attaches overwhelming importance to socio-economic determinants of fertility is the 'demand' theory of fertility decline. It is based on the presumption that the theory of the demand of consumer durables can be used as a framework for analyzing the demand for children. The earliest formulation of this theory can be found in the work of Leibenstein (Leibenstein, 1957). Among others, the development of what came to be known as new home economics of the Chicago

school is most prominently associated with the work of Gary Becker (Becker, 1960; Becker and Lewis, 1973). The demand/economic theory of fertility have been succinctly summarized by de Bruijn (2006) “This micro-economic approach not only involves the traditional variables of income and prices, but also the quality of children and budget constraints in terms of allocation of time and opportunity costs. Given these variables, households are assumed to produce a bundle of consumer commodities—including children—in accordance with the maximization of household utility. The model thereby links fertility decisions to other household decisions, including labor force participation and consumption. The notion of child quality became a key factor in Becker’s work to account for the inverse relation between income and number of children as experienced in the fertility transition.” (de Bruijn, 2006: 555).

Other model specifications of similar inclination have tried to elaborate on the relationship between fertility and various other dimensions of socio-economic change such as increase in the real wages of women, rise in the real income of men and increase in the proportion of women in the labour force. However, attempts to establish a link between the preferences for children and child-rearing in the context of preferences for consumer goods, other goods, the use of time for work and leisure, and parents’ aspirations, can also be considered to be extensions of the economic approach to fertility (Cleland and Wilson, 1987; van de Kaa, 1996).

The economic approach to fertility has been challenged on several grounds. Perhaps the strongest criticism levied is its non-applicability for developing countries, where fertility decisions might have not entered the ‘calculus’ of choice of the households and fertility might be, to a considerable extent, guided by supply-side considerations (Simmons, 1985). Hence, the demand-side theories were not completely

capable of explaining fertility behaviour in societies where industrialization and modernization were yet to begin. The Easterlin synthesis (1975, 1978), which combines the demand and supply side factors affecting fertility (as expressed in the proximate determinants framework of Davis and Blake, 1956 and Bongaarts, 1978), has been an important and influential step forward towards addressing the shortfalls of the pure demand theory of fertility. The incorporation of the supply side factors introduced the need for family planning programmes and easy access to contraceptives in reducing fertility. A major contribution of this framework is that it clarifies the pathways through which social development captured by public health, education, and urbanization affect the demand for children. Only when the supply for children would be in excess of demand, a desire to control family size would arise. Depending on the cost of fertility regulation, the couple would limit their family size.

These subsequent perspectives on fertility transition retained within them one crucial element of the demographic transition theory, namely, the emphasis on socio-economic factors in determining the timing and pace of the transition. However, later developments in the area challenged that very building block of this genre of theories. Alternatives to the economic/demand-centered theories can be broadly classified into social, ideational, and institutional theories of fertility decline.

Caldwell's social theory of intergenerational wealth flows (1982) has been considered by some researchers as the only demographic theory that can conceptually rival the conventional transition theory, particularly in the setting of less developed countries. The principal tenet of this theory is that fertility transition would take place when net flow of wealth, which is in the direction of children to parents in traditional societies, is reversed. Essentially, the flow will be reversed if the economic and

emotional primacy is withdrawn from the grip of broader family ties and is focused on the conjugal family. Most importantly, according to this theory, “the transition from high to low fertility is a product of social change with economic implications, rather than economic change alone” (de Bruijn, 2006: 561). Although, Caldwell’s theory met with some success, verifying its conclusions empirically, proved to be very difficult.

However, during the 1980s, the ideational/diffusion theories of fertility decline emerged as the strongest rival of the demand/economic theories of fertility decline. The European Fertility Project, led by Ansley Coale and colleagues, set out to empirically test the conclusions of the demographic transition theory with data from European provinces covering the nine decades (1870-1960), during which most of the fertility transitions had taken shape in Europe. The main conclusions of the study have been that (1) socio-economic conditions are weakly predictive of fertility decline, and transitions started at widely differing levels of development and (2) once a country or a region had begun transition, neighbouring countries or regions with the same language or culture followed after short delays even if they were less developed [Watkins (1986, 1987) quoted in Bongaarts, 2006]. The second proposition, which emphasizes ideational changes or diffusion of the idea of small family size, as the primary reason behind fertility declines, has been the conclusion of various other researchers on the subject as well, most rigorous among them being John Cleland and Christopher Wilson. The processes through which ideational change occurs are referred to, in the demographic literature, as social learning (that is the acquisition of information from others) and social influence, the power that individuals exercise over each through authority, deference, and pressures for social conformity (Montgomery and Casterline, 1998).

To illustrate, Cleland and Wilson (1987) found that at the societal level, fertility transition is strongly influenced by cultural boundaries (which implies that fertility transition is a function of diffusion) and associated more closely with indicators of social development (for instance parents' education), rather than economic factors such as the mode of production or women's employment.⁴⁵ Within culturally homogenous populations, the pervasive nature of fertility transition testifies to the diffusion of new ideas rather than micro-economic forces, which may well nigh act in different directions at the household and community level. Thus, the authors' conclude that based on the evidence of weak association between economic structure and fertility at both the micro and macro level, stronger links with culture and education (both factors facilitating spread of ideas) and the acceptance of birth-control within societies, it is the ideational and not structural changes (as emphasized in the demand theories) that are the root cause of the onset of fertility transition. Overall, it appears that based on inconclusive evidence in favour of the economic/ demand theory, the ideational theories of fertility transition emphasize that development alone is insufficient to account for the observed variations in the timing and pace of fertility transitions and social interaction has to be taken into consideration.⁴⁶

⁴⁵ It should however be noted here that the economic aspect of variables, such as women's employment cannot be completely disassociated from their socio-cultural counterpart. Similarly, the variables classified as social such as education can have their roots in the economic structure of society as well. To elucidate the point, though women's employment has been classified here as an economic variable, it is perhaps well-known that even if there are prospects for the employment of women, their productive role outside the household could be curtailed to a significant extent by social sanctions for deviation from the "ideal" role of a woman in society, which limits the utility of women to household work and child-bearing.

⁴⁶ As a specific example, the theory argues that the fertility-education relationship can indeed be caused by 'cognitive changes' rather than 'micro-economic realities'. This is borne out by the observation from a multi-national WFS study that in most of the countries, a few years of

Even though till recently, the research inclinations in fertility led to a relative abundance of micro/household level studies as compared to the ones that emphasize the wider political and institutional influences on fertility, the latter cannot be any less important than the former.⁴⁷ Notably, the ‘*demographic transition theory*’ (which is perhaps the most widely acknowledged theory in demographic literature) is itself infused with notions of socio-cultural and institutional changes that have to occur for the process of fertility transition to set in.

The socio-political institution theories of fertility transition find recognition primarily in the discourses of Susan Greenhalgh (1988, 1990) and Geoffrey McNicoll (1997, 2001), though the roots of this hypothesis can be traced to Malthus (McNicoll, 2001). Both authors emphasize changes in socio-political institutions, but while Greenhalgh posits that the idea of a single demographic transition (and hence fertility transition) is not tenable, demographic transitions being necessarily, temporally, culturally and institutional specific, McNicoll argues that perhaps the underlying cause of fertility transitions are the much neglected “political transitions”.⁴⁸ The basic argument of the author around which the hypothesis builds itself is that polity (the political-administrative structure that is the institutional manifestation of the State, which is itself a legacy of any society, along with its economy, social institutions and

women’s schooling has been sufficient towards a shift in their preferences towards a smaller family size and it has not necessarily been associated with increased employment opportunities.

⁴⁷ A possible explanation as put forth by van de Kaa (1996) is that, changes in the amount and character of the demographic information available and the trends in demographic measures were (also) influential. It is also easily overlooked that the funding agencies exerted considerable pressure on the direction of research.

⁴⁸ McNicoll puts forth this perspective to fertility transition in the following phrase, “There is a complementary view of fertility that, in contrast (to the family and individual behaviour), has been relatively neglected. This is fertility seen as part of the core generic problem of societal management.....of how a society organizes and governs itself” (McNicoll, 2001:129).

cultural patterns), provides the overall regulatory regime (including the demographic regime) within which individuals function. McNicoll notes how the various socio-economic, cultural and ideational influences on fertility can be themselves predisposed directly and indirectly by the actions of the government. This theory explicitly recognizes that all transformations in individual behaviour, including changes in reproductive choices, are molded by the immediate social environment and that any existing social organization is itself a function of the overall administrative structure. The state has a part in determining access and opportunity in the society—social mobility, returns to effort, distributional equity—particularly through the social stratification and gender systems, thereby affecting the fertility calculus of individuals and families (McNicoll, 1998).

More importantly, the State is the vehicle for the ideological creation of its authority over various spheres of individual life. “The cultural counterpart of the centralization of authority in the early part of political development is the ideological creation of the nation-state...the state attempts to monopolize the symbols of nationhood. The state thus constructed wields these various symbols to create a potent source of identity that overlay and may eventually all but extinguish local and kin-based loyalties” (McNicoll, 2001: 149). McNicoll recognizes two exceptions to this development pattern of the state (whereby the State at one and the same time establishes itself as an indispensable part of society and designs policies for its material improvement). In one case, the State may consciously exclude many of the concomitants of development and force neo-traditional religious values. In another, ethnic or cultural groups may proclaim their desire for nationhood, “*often with acute awareness of demographic relativities within State boundaries*” (McNicoll, 2001: 149,

italics added). The relevance of the second exception then perhaps lies in the cultural frame of reference of these communities, and this necessarily extends to their reproductive choices as well.⁴⁹

Interestingly enough, these competing perspectives and hypotheses have each been accepted for some population at some point in time, and sometimes even disparate theories have been tested on the same population and accepted after empirical investigation! While on one hand, each theory has its ardent supporters and a clear ‘winner’ among them is yet to emerge, on the other, the appearance of a unifying/overarching theory remains an elusive dream. Nevertheless, the result of this rather protracted debate has been the accumulation of a huge body of knowledge on the determinants of fertility, together with development of new methods of analysis as well as greater efforts towards collection of relevant data in the field. Most importantly, alongside developments on theoretical lines, there has been continuing thrust on the identification and empirical verification of such factors that are at once implied by theory and have strong policy implications. Ongoing research on the primary determinants of fertility in regions experiencing very high (or low) as well as ‘deviant’ (for instance stalled) fertility has contributed enormously to this field. Even though, providing a complete review of the empirical body of literature is beyond the scope of the chapter, in the following section, we provide a brief review of the research on the determinants of fertility decline in India and its states, thus situating the North-eastern states in its broader national context.

⁴⁹ We would like to mention here that perhaps an additional outcome of the segregative proclivity of ethnic communities might be the inclination to derive utility from the welfare of the group. This may be so because various welfare and social functions of the State have to be increasingly met by the group. This has direct consequences for the fertility decisions of these communities.

5.2.2 Determinants of Fertility Decline: Evidence from India

Developing countries including India have been undergoing the process of fertility transition for almost the past quarter of a century-albeit at varying paces and under different circumstances. The TFR of the developing countries dropped from 6 births per woman in the late 1960s to 2.9 births in 2000-05 (Bongaarts, 2008). However, among the population-wise largest countries that are yet to reach replacement level fertility, the decline was relatively slow in India during the period 1970 to 1997, remaining slightly above 3 per woman in 1997 and declining to 2.7 births per woman in 2005.

India (the most populous country in the world, second only to China, with a population of 1.21 billion in 2011) embarked on its journey to low fertility from the latter half of the 1960s. Even though direct fertility estimates are not available for the period prior to 1967 (the year of commencement of the Sample Registration System), indirect estimates based on age data derived from the decennial censuses reveal that the period 1966-71 marked the beginning of the fertility transition in India (Adlakha and Kirk, 1974; Rele, 1987). The TFR remained stable at around 6 births per woman during the 1950s and first half of the 1960s. Thereafter, there was a relatively fast decline in fertility rates, from 5.78 during 1966-71 to 5.37 during 1971-76 and further to 4.65 during 1976-81 (Rele, 1987). These figures are in concordance with the estimates provided earlier by the Panel on India (Bhat, Preston and Dyson, 1984).

Rele (1987) argues that the fertility decline in India witnessed from 1966 onwards, might have been a result of the major shift in the focus of the national family

planning programme (introduced in 1952) from a clinic based to an extension approach in 1963, and the greater emphasis on family planning as indicated by the establishment of a full-fledged Department of Family Planning within the Ministry of Health and Family Welfare in 1966. This was accompanied by significant increases in expenditure on the programme itself. Based on their analysis of the proximate determinants of fertility, Jain and Adlakha (1982) found that for the period 1972 to 1978, fertility decline was primarily caused by changes in age-specific fertility rates. Whereas, the reduction in fertility in the younger age groups reflected the effect of rising age at marriage, substantial declines in fertility among women over 25 years of age were brought about by increased use of contraceptive methods. Visaria (1999) using data from the first round of the NFHS (1992-93), as noted earlier, similarly concluded that greater use of contraception was the primary reason behind the fertility decline at all-India level as well as the major southern states where the decline was well underway and had already reached replacement level in a couple of states. However, given the huge demographic, socio-economic and cultural diversity within the subcontinent, a far greater volume of research exists on fertility differentials and their explanation at the regional and state level in India.

One of the remarkable features of India is the presence of a broad north-south differential in demographic performance since at least the beginning of the 1960s that, though tapering, seems to have persisted overtime. One of the earliest studies aimed at explaining the north-south demographic differentials in India was conducted by Dyson and Moore (1983). On the basis of examination of the differences in kinship patterns, especially those that relate to property inheritance and marriage, the authors concluded that the South-Indian culture, which accorded a relatively higher degree of autonomy

to females vis-à-vis their counterparts in the north, could be largely responsible for the comparatively lower fertility evinced by the states belonging to the former region.

Specifically, in the patriarchal societies that characterize most of North India, family descent is traced through the males of the family, and so is property inheritance. This reduces the economic as well as social value of daughters to their natal families, who are seen more as a social and financial liability. A conglomeration of fertility-enhancing factors are at work here, viz., the low average age of marriage of females, strong pronatalist pressures within the family (especially to produce a large number of sons) and the practice of exogamous marriages. Such marriage patterns ensure the subordinate position of women (especially the young brides), due to the loss of social contact of the bride with her natal relatives thus making her economically and socially dependent on the husband and his family. These features, though not altogether absent, are less pronounced in south India, which is characterized by endogamous marriage patterns and generally speaking, more egalitarian gender relations. With a relatively greater degree of autonomy within the family, women are far more empowered to take decisions regarding their personal welfare and those of their dependents, and this extends to reproductive decisions, including the adoption of family planning measures.

The study by Malhotra, Vanneman and Kishor (1995), which used maximum likelihood estimation method to model the determinants of fertility in India, found partial verification for the findings of Dyson and Moore (1983). Based primarily on district level data from the 1981 census, the authors found that among all factors, measures of patriarchy (as measured for instance by sex ratio of mortality, female share of total literates, proportion of women 15-19 unmarried, female share of labor force) and development, especially social development (male literacy rate, male child

mortality, population/physician ratio) went a long way in explaining the regional variations in fertility in India.

The importance of social development, particularly the overwhelming role of female literacy (an indicator of women's autonomy/status) in effecting lower fertility was also brought out by a careful study by Dreze and Murti (2001). Using district level panel data from the 1981 and 1991 censuses, the authors find that "even after controlling for district effects, women's education and child mortality emerge as the most important factors explaining fertility differences across the country and overtime.... By contrast, general indicators of modernization and development such as urbanization, poverty reduction, and male literacy rate bear no significant relation with fertility decline" (Dreze and Murti, 2001: 35). Interestingly, this study also found a significant negative effect of 'south' regional dummy, even after controlling for all other socio-economic and cultural variables. Other studies utilizing district level data (for example Bhat 1996; Guilmoto, 2000) have reached similar conclusions regarding the primary determinants of fertility differentials in India.

In contrast to the predominantly socio-cultural explanations, spatial/geographic diffusion theories have recently been put forth to explain the fertility transition in India (Guilmoto 2000; Guilmoto and Rajan, 2001). Based on cartographic analysis of the pattern of fertility decline among the regions of India for the period 1951 to 1991, Guilmoto and Rajan (2001) concluded that spatial variations in fertility are not random, and suggest that diffusion processes at the micro level could be largely responsible for fertility decline in India. However, further research is perhaps required to explain the exact mechanisms through which geographical diffusion may be taking place in the Indian context.

Research among the individual states of India, while broadly supporting the ‘social development’ view, offer a greater diversity of explanations for fertility decline. Kerala, with fertility and mortality levels matching those of developed countries today, was the first state in India to reach replacement level fertility (2.1 children per woman) by the end of the 1980s. Kerala began its fertility decline during the early 1960s, under conditions of low per capita income, high incidence of poverty, and low economic development, but a higher level of human development (literacy and health) vis-à-vis all-India as well as its more prosperous states (Bhat and Rajan, 1990; Krishanan, 1976; Zachariah, 1984). Remarkably, the fertility decline in the state took place at a time when the family planning programme was yet to gain momentum and arguably, some kind of societal adjustment had perhaps transpired that had fundamentally altered the social norms favoring a small family size. Indeed, a few studies indicate that social justice brought about by equitable distribution of land through land reforms, and increased wages of the poorer sections (especially the agricultural labourers) might have had an important role to play in lowering the demand for children and reducing fertility through providing a measure of economic and social security (see for example Ratcliffe, 1978). On the other hand, some researchers have also argued that the fertility reduction in Kerala might indeed have been ‘poverty induced’ (Basu, 1986; Mencher, 1980). However, high female literacy and improvement in child survival has been put forth as the leading explanation behind the spectacular fertility decline of Kerala.

Fertility decline in the neighbouring state of TamilNadu, (one of the largest states in India with respect to population size), took place under conditions of far lower levels of literacy and higher levels of mortality (especially infant mortality), as compared to Kerala. In contrast to the emphasis on social development in the context

of Kerala, the efficiency of the family planning programme has been put forth as one of the primary reasons behind Tamil Nadu's success in fertility decline (Anthony, 1992; Srinivasan, 1995). However, as rightly pointed out by several scholars, family planning methods could gain popularity among the masses because the gap between rising aspirations and limited resources to meet them, arising from agrarian modernization, strong rural-urban linkages, spread of mass media and social reform movements in the state, had already created the requisite demand for limiting family size in the first place (Bhat, 1998; Kulkarni et al., 2002; Nagaraj, 1997).

The other southern state to have achieved remarkable reduction in fertility since the middle of the 1980s is Andhra Pradesh, which again as in the case of Tamil Nadu, was successful in reducing fertility in the absence of substantial improvement in socio-economic development indicators like female literacy or infant and child health. It is now widely accepted that reduction in poverty rates primarily through the efficient implementation of the government's poverty alleviation programmes, along with other factors such as diffusion and acceptance of the idea of a small family, had a large part to play in the fertility decline in this state (Dev, James and Sen, 2002; James, 1999).

Punjab, an exception among the states in North India in having demonstrated fairly early declines in fertility (and in fact, at least as early as that in Kerala), did so in an environment characterized by relatively poor social indicators but rapid and *sustained* economic growth and security of livelihood (Das Gupta, 1999). Similarly, West Bengal evinced a relatively faster pace of fertility decline vis-à-vis its neighbours in eastern India, and reached near replacement fertility levels by the end of the 1990s.

Though the issue of fertility decline in West Bengal has received far less attention as compared to the other states discussed above, its achievement in fertility

decline has in fact, been quite remarkable, especially given its relatively modest achievement in both economic growth and social development, at least since the beginning of the 1970s (Maharatna, 2007). It is generally believed that historical factors had a major role in shaping the fertility transition in West Bengal. Specifically, Basu and Amin (2000) suggest that the ‘elite’ in this state were among the earliest to accept modern contraception as a means of limiting family size, suggesting openness to innovations, brought about by the peculiar set of historical conditions in the state that entailed an early exposure to the larger world. The authors argue that the diffusion of the idea of a small family as the ideal family might have taken place from the elites to the masses. However, as Maharatna (2007) observes, there is little evidence to suggest that top to bottom diffusion might have actually transpired in West Bengal. In fact, according to the author, fertility decline in the rural areas of the state *was* associated with diffusion, but of a separate kind. The diffusion of the small family norm was a by-product of the Left Front’s government’s grassroots mobilization network, which “.. contributed to a distinct rise in the social standing, dignity, self confidence of hitherto low-ranking groups ... All this is very likely to have augmented their aspirations, alertness and awareness pertaining to key aspects of well-being (including family size/fertility)” (Maharatna, 2007: 1402). Of course, the political stability in the state ensured the continuation of its various policies, leading to the successful transformation of the society in West Bengal.

The experience of fertility decline among the Indian states, points towards the crucial role of declining *desired* family size in reducing fertility, brought about, of course, by diverse set of conditions in the various regions and states. In this connection, Kulkarni (2011) notes that, “A common thread seen in the findings of

various studies is that the aspirations of all sections of the population about their children have risen over time...In a way, there is diffusion of the aspirations for such life (i.e. better life) for children. But the pace of this diffusion has varied across regions.” (Kulkarni, 2011: 18). While it is difficult to miss the underlying change in preferences towards a smaller family size brought about by rising aspirations for children, it is perhaps equally hard to deny the role of the Government (or governance, defined in a broad way) in providing the requisite conditions for the germination of fertility decline.

While it is almost certain, at least in the context of India, that the State sponsored family planning programmes had at best played the role of facilitating the decline (as against setting it on), it appears that there is another sphere where the role of the State has been crucial- its role in providing the necessary conditions, whether through economic development or through social development, which enabled people to plan under conditions of relative certainty about the future. Thus, Das Gupta (1999) reflecting on the similarities in the experience of Punjab (where fertility decline has been closely associated with economic development), and Kerala (where fertility decline was induced by significant human development), notes that, “[T]he most rapid fertility decline has been in those parts of the country characterized by more egalitarian economic and political institutions, and better governance as reflected in development outcomes and a stable legal order” (Das Gupta, 1999: 7).

Overall, despite differences in methodology, coverage (in terms of both area and time period) and variables considered, research points towards the importance of socio-economic and cultural factors in shaping fertility transition in the subcontinent. Particularly striking is the unanimity among the various studies on the role of women’s

autonomy/status (female literacy, female work force participation, son preference) and health infrastructure (as reflected in survival of infants and children) in reducing fertility rates. Along with it, and perhaps more importantly, review of the existing studies underlines the crucial function of the State in providing the requisite security of life and livelihood/resources. In fact, as we shall see in the following sections all these factors, and specifically, the issue of political governance among the states of NER could be particularly relevant, among other concerns, in the context of fertility decline (or its lack thereof) in NER, as discussed in the following section.

5.3 FERTILITY DECLINE IN NORTH-EAST INDIA: ISSUES AND HYPOTHESES

5.3.1 Socio-cultural Influences and Fertility

As noted in the foregoing discussion, Dyson and Moore (1983) observed the existence of a broad north-south cultural dichotomy in the subcontinent, with the North sunk in a deeply patriarchal mindset (thus according a low social status to women), and the South exhibiting more favourable gender relations (and a relatively higher status of women). The authors noted that women's status was a critical factor in influencing the outcome in many matters including fertility. Subsequent studies have repeatedly stressed the pivotal role of women's status/autonomy in shaping fertility and mortality differentials between these two regions, and the relatively lower status of women in North India has been held as one of the important determinants of the relatively higher fertility rates in that region (e.g. Basu 1992; Mari Bhat, 1998; Sopher, 1980 among others).

Female education, female work force participation (FWP), son preference and age at marriage, have been considered as imperfect, but acceptable indicators of women's status, in the majority of studies that have investigated the relationship between women's status and fertility (Dreze and Murti, 2001; Satia and Jejeebhoy, 1991; Malhotra, Vanneman and Kishor, 1995; among others). Interestingly, several researchers (for instance, Balk, 1994) have argued that in many cases, it is perhaps better to conceptualize status in *relative* terms, i.e. status of women as compared to other women or men, rather than in the absolute sense. Hence, we could talk about, for instance, gender difference in educational attainment, or the gap measured in terms of years of education between women and men as compared to the absolute educational levels or literacy of women, and so on for other indicators. In addition to these relatively regular measures of women's status, the availability of information on women's decision making in households made available recently has been utilized as an additional indicator of women's status in several household level studies in the Indian context.⁵⁰

The role of female education in bringing about a decline in fertility has been recognized in every major theory of fertility transition, albeit the explanation behind *how* it does so, has differed somewhat. For instance, the economic/demand theories of fertility propose that the quantity-quality trade-off for children, increases in intensity

⁵⁰ Notwithstanding the important role played by FWP in reducing fertility, we do not discuss its role in reducing fertility at length in this section for the simple reason that, until now, it is not entirely clear that there may not be bidirectional causality between fertility and FWP, thus precluding us from including it in any kind of statistical analysis of fertility in NER. In fact, it is for the same reasons that we do not incorporate infant mortality or age at marriage as fertility determinants. However, the discussion on the effect of the latter two variables on TFR has already been done in the previous section, and should not be a concern in the sense of not being examined in the present research at all.

with the education of the mother, leading to greater substitution of quantity for quality, thus tending to depress fertility. Further, education by way of raising the wages of women tends to raise the opportunity cost of women's time spent in household activities like child-care and hence tends to reduce fertility (Becker 1960, 1981; Leibenstein, 1957).

On the other hand, the ideational theory of fertility change (Cleland and Wilson, 1987) argues that the inverse fertility-education relationship can be caused by 'cognitive changes' rather than 'micro-economic realities'. This is borne out by the observation from a multi-national WFS study that in most of the countries, a few years of women's schooling has been sufficient towards a shift in their preferences towards a smaller family size and it has not necessarily been associated with increased employment opportunities. Thus, according to this theory, it is not absolutely necessary that only higher levels of education would be associated with declining fertility. Indeed, literate women could evince significantly lower fertility as compared to their illiterate counterparts. Indeed, a study conducted by the United Nations (1993) in rural Maharashtra found that the perceived as well as actual cost of children increases with the level of education of the mother. Even women with *primary* education reported significantly higher perceived and actual cost of children compared to those with no education. This could be so because in developing countries such as India (and especially in rural areas), foregone employment opportunities might not be a crucial factor for women, but schooling may change women's *perceptions* about the amount of maternal time and attention needed by children, thereby making children more time-intensive (see for instance Levine et al., 1991; Oppong, 1983).

Leaving aside the differences among the various perspectives, overall evidence from research has found female education (and literacy) to be a crucial determinant of fertility decline. In this connection, it would be useful to quote from Cleland and Jejeebhoy (1996), who have succinctly summarized the various routes through which female education might influence fertility:

“Schooling sets off changes in several dimensions of women’s situation which then account for changes in pathways affecting fertility. Notable among these is the evidence that schooling enhances women’s knowledge of the world around them, including knowledge of contraceptives, where to obtain them and how to use them accurately; that schooling enhances women’s say in family decisions including decision on contraception, marriage and health seeking; that it increases women’s interaction with the outside world, although it’s link to seclusion is context-specific; that it enables more intimate relations between women and husbands; and that it enhances women’s economic and social autonomy and self-reliance, including a shift away from a reliance on children for old age security or for legitimizing the woman’s position in her husband’s home (Cleland and Jejeebhoy, 1996: 87)”

In the present study, we incorporate female literacy and gender gap in literacy as proxies for the education dimension of women’s status. However, it must be mentioned here that in doing so, we lose the opportunity of differentiating between the various direct and indirect ways in which female education might be influencing fertility. For instance, as pointed out by Dreze and Murthi (2001), the female literacy variable would capture the total effects of an increase in female education on fertility, and thus, in our study, we cannot distinguish the relative impact of say, reduction in fertility

arising from increase in age at marriage, from that arising from an increase in knowledge about and use of contraception.

However, while most of the studies on the impact of female education and fertility have found an inverse relationship between them, it is quite possible that female education, at least that below secondary level (or less than five years) of schooling, can lead to an increase in fertility, primarily by reducing the duration of post partum nonsusceptibility to conception (through early weaning of infants) (Jain and Nag, 1986). This said, as noted by the author, any increase in fertility is likely to be short-lived because there is no reason to believe that eventually the increase in age at marriage and contraceptive use associated with increased female education, would not offset the effect of reduced lactation. This argument largely holds when we consider the effect of female education on fertility at the aggregate population level, as is the case in our study. As the average level of female education increases in a society and/or a larger number of women attain literacy, the fertility-inhibiting effects of female education become relatively more pronounced compared to the fertility-enhancing ones.

Gender bias or son preference, has shown itself to be a particularly stable feature of the socio-cultural fabric of India. One of the chief indicators of son preference, especially in the context of South Asian countries (and of course, India), is the active discrimination against females in access to basic necessities like nutrition and health care, the total effect of which is reflected (at least partially) in the relative survival of females as compared to males, or the sex ratio of the population (Dreze and Murthi, 2001; Kishor, 1993). Son preference has been identified as a major obstacle in reducing fertility in several instances in India, and it can keep fertility rates

significantly higher as compared to situations where parents did not have a specific preference for children of a particular gender (usually male) (Arnold, Choe, and Roy, 1998; Mutharayappa et al. 1997). To illustrate:

“if the probability of a newborn child reaching adulthood is, say, 0.75 (a plausible value for states such as Uttar Pradesh), a mother who, in effect, wants the risk of ending up without an adult son to be lower than 0.05 has to give birth to three sons; this would require six births on average. By contrast, if sons and daughters are considered equally valuable (so that the predicament to avoid is that of ending up with no adult offspring regardless of sex), three births are enough. If the probability of survival to adulthood rises from 0.75 to 0.8, two births are enough” (Dreze and Murthi, 2001: 38).

Indeed, in the context of India, we find that regions such as North India, which are characterized by a strong patriarchal mindset, exhibit both lower sex ratios and higher fertility rates, as compared to, for instance, the Southern region, where the states exhibit relatively better sex ratio and lower fertility rates.

However, since the sex ratio is susceptible to influence from demographic factors, such as migration (where the general pattern is a relatively higher male as compared to female immigration in the receiving population), we employ the child sex ratio (ratio of girls below six years to that of boys of the same age group) as the indicator of son preference. Indeed, as noted in the first chapter, gender bias against female children is on the rise in NER, and it would be interesting to see if this hitherto unknown factor has been playing a part in keeping fertility rates high in the region.

A variant of the socio-cultural explanation, which tries to explain the historical and contemporary divergence between tribal and non-tribal fertility, relates such fertility differentials to differences in the culturally accorded status to women in these two basically diverse societies, at least as far as their social and economic organization is concerned (for instance Maharatna, 1998, 2005). In fact, the role of culture in fertility change is particularly located in this feature of transferring *values* and information within a culturally identifiable group” (Lesthaeghe, 1977). The relatively higher status accorded to women in such societies, finds reflection in various ways, including delayed female marriage, greater acceptance of female celibacy, greater female autonomy, and use of indigenous means of birth control and abortion, all of which could work towards reducing fertility among the tribes (Maharatna, 2005). Remarkably, there are striking similarities between the Dravidian (southern) population and India’s tribal population (including North-east India) in several cultural aspects, especially relating to and reflecting the higher status of women in both societies. In fact, “the south Indian mainstream people historically (and even now) evince several socio-cultural features (e.g. marriage patterns and payments including cross-cousin marriage and bride price) that have traditionally characterized tribal societies in much of India too” (Maharatna, 2005: 27). The bottom line is that, a priori, there is reason to expect lower fertility among populations that are dominated by tribes within NER.

Having said that, contemporary evidence on tribal versus non-tribal fertility differentials in India suggest a reversal of the earlier pattern of fertility differentials between the former and the latter, and relatively higher fertility among the tribes as compared to non-tribes (IIPS, 2007). This has been largely attributed to the

phenomenon of ‘*Sankritization*’ of the tribal communities, whereby they emulate the socio-cultural practices of their socio-economically advanced non-tribal counterparts, leading to outcomes like early marriage of females and dowry payments and overall, an increase in preference for sons. Indeed, such tendencies towards increasing son preference could result in higher fertility *especially* among tribes, whose societies still remain lagging in nearly every sphere of socio-economic development.

In the context of the North-east specifically, there is an additional reason why tribal communities might elicit higher fertility levels. As mentioned in the first chapter, one of the crucial demographic developments in the region has been the large volume of immigration in nearly all the states of NER. This has resulted in demographic imbalance in the region, with the possibility that with continuing immigration of non-tribals into the region, the tribals would be reduced to a minority. The fear of being ‘outnumbered’ as also an associated anxiety about a ‘loss of identity’ eventually, may spur the tribal communities towards a larger family size as a possible solution to the problem. Indeed, this phenomenon has been examined in detail in the case of the Khasis of Meghalaya by Saikia (2005), and results largely show that the fear of identity loss has been a major factor behind the relatively higher fertility rates among the Khasis. Overall, given the contradictory influences of tribal socio-cultural practices on fertility in contemporary times, the impact of this factor on fertility in NER remains a matter of empirical verification.

Particularly interesting in the context of North-east India has been the concern over the fertility-enhancing impact of religious conversion to Christianity. It is oft-claimed that the Church, with its distinctive anti-contraception stance, has been responsible for the relatively higher fertility in NER (for instance, Saikia, 2005). In

fact, we propose that adherence to Christianity may well-nigh have a fertility inhibiting effect, in view of the fact that these populations would be exposed to influences from a larger (or even global) community, and hence have an earlier exposure to the idea of a small family as a better choice. A second and more important reason for expecting lower fertility among the Christians is their higher age at marriage as compared to populations of other religious groups in NER (see for instance Kar, 2002).

In this context, it would be also interesting to study the interplay between adherence to Christianity and belonging to the category of Scheduled Tribes. In fact, this particular constellation could indeed elicit higher fertility, primarily because religious doctrines (including those regarding the morality of using family planning methods) would have a greater hold over decisions regarding fertility among the tribes due to the particular set of circumstances that surround these communities today, including socio-economic underdevelopment and the fear of identity loss, as mentioned in the previous paragraph. In fact, several scholars (for instance, Hirsch, 2008) have noted that the relationship between the ideological doctrines of Christianity and contraceptive use/fertility is context-specific, and even when women (and men) continue to remain 'religious', they may adopt modern contraception in situations where there have been substantial improvements in their overall social and economic condition.

Hence, there is no gainsaying that the fear of identity loss and the felt need for cultural revival among these communities, could lead its members to a stricter adherence to their established customs and traditions- of which the Church and its preaching, would no doubt, be an integral part. In such a scenario it is difficult to envisage significant decline in fertility in the concerned population.

With this, we now turn towards the role of socio-political factors, and the State in determining fertility differentials in NER.

5.3.2 Socio-political Influences and Fertility

The political dimension of fertility has been an under-researched area, especially in the Indian context. Nevertheless, the discussion of its possible role in affecting social outcomes like fertility, assumes special importance in the case of NER, where the society is still undergoing a process of political transition, as revealed by the protracted socio-political unrest in the region throughout the post-Independence period.

Indeed, apart from the power struggles among the ethnically dominant groups in the new-formed/tribal dominated states of NER, the ethnic minorities *within* these states claim that their rights and resources are being impinged upon by the ethnic majorities, and thus they have been demanding for political autonomy or even secession from the existing states, paving the way for further divisions of the existing territories of the states of the region (Baruah, 1989; Barbora, 2002; Roy, 2002; Shimray, 2004).⁵¹ In fact, if the frequency of election, as a proxy for political stability, in the various states of NER is anything to go by, data show that on average, while Assam, Manipur and Tripura have witnessed elections every four and a half years, the other states (tribal majority states) have experienced it more frequently, at around every four years on the average (for details on each state see Appendix 5).

⁵¹ All this, it must be remembered has its roots in the socio-economic and administrative policies adopted towards the region during the colonial period, and continued to some extent life in the Independent era as well, that resulted in a distinctly backward socio-economic structure in NER, with ramifications for economic and human development, as discussed in the first chapter.

The idea that fertility might have socio-political roots has already been noted in the literature on the subject elsewhere, and its role in maintaining high fertility rates has been emphasized particularly in the context of sub-Saharan African countries (Janus, 2013; Kokole, 1994).⁵² The importance of this factor in determining fertility outcomes primarily arises from the fact that in societies (such as NER) which are still undergoing the process of political transition, population size has a direct relation to the distribution of economic (and social) resources among the various ethnic communities engaged in the struggle. In this connection, Janus (2013) identifies at least two ways in which fertility might be related to redistribution of resources among the various ethno-cultural groups, “First, individuals in diverse societies tend to vote for co-ethnic political candidates, who then reward them with transfers, jobs, or local public goods. Fertility should therefore increase an ethnic group’s voting power and gains from political office. Second, if ethnic groups allocate society’s resources via conflict or bargaining in the shadow of conflict, then fertility might increase their combat strength” (Janus, 2013: 2).

In this connection, it is important to note that sharp differences exist between the newly created states of NER (Nagaland, Meghalaya, Mizoram) and others especially, Assam, Manipur and Tripura, in that the process of cultural assimilation of ethnic minorities in the latter three states has been already accomplished to a large extent. “In these three states, the minor ethnic groups (tribals) are forced to learn the dominant

⁵² In fact, the similarities in the fertility trajectories of sub-Saharan African and NER are quite remarkable. As noted in the previous chapter, both regions have been experiencing extremely slow fertility decline or even stalled fertility, at least since the beginning of the 1990s, and what is more both societies have been undergoing socio-political turmoil capable of influencing social outcomes such as fertility.

language in order to embed the dominant's interest. For instance, the tribals of Manipur are compelled to learn and speak Meitei's language Manipuri, the Bengali language is introduced among tribals in Tripura and Assamese in Assam" (Shimray, 2004: 4642). Thus, efforts at securing a larger share of resources through the twin strategies of engaging in conflicts with the State, and increase in population size, can be expected to be relatively weaker among the latter, as compared to the newly formed states, where political supremacy of any particular group can be, and is still being questioned by the others.

Therefore, in the context of NER, we hypothesize that the presence of relatively few but ethnically large groups within a defined region would lead to a stronger tendency towards using the aforesaid methods as instruments for obtaining socio-economic and political power. In other words, we expect that larger the number of numerically *smaller* groups in a state or the greater its ethnic diversity, *lower* would be the fertility rate, *ceteris paribus*.

Finally, institutions could also affect the returns to fertility, and in fact, the aforesaid outcomes of ethnic diversity are more likely in situations where the State has failed in delivering the goods, crucial among which is safety of life and property. Put differently, conflict as a means of attaining a larger share of resources, can be expected to pay off only in situations where the State is administratively weak, or shows signs of institutional weakness. Therefore, we also try to account for the effect of institutional weakness on fertility in its own right, and as it interacts with ethnic diversity.

It should also be mentioned here that even though there are reasons to expect that weaker State institutions would encourage higher fertility, we believe, the opposite possibility cannot be ruled out. In fact, in the case of NER, where socio-political

turmoil and loss of lives arising from ethnic clashes has become the order of the day, weaker institutions could also reduce the number of children, for instance in cases where there has been an increase in widowhood for the reason of conflict (for instance, Schindler and Brück, 2011).

5.4 MATERIAL AND METHOD OF STATISTICAL ANALYSIS

5.4.1 Variables and Data sources

In this study, we have carried out a district level cross-sectional and panel data analyses of the determinants of fertility in NER, for the year 1991 and 2001. We should mention at the outset however, that there have been some debates regarding the usefulness of fertility analysis at aggregate level as carried out here. Critics have mostly argued that since fertility is an individual choice, its determinants must be found at the individual level. However, borrowing the argument from Dréze and Murthi (2001) regarding the usefulness of such analyses at the district level, we propose that fertility is as much a social outcome or a collective choice, as it is an individual choice, and social influences on fertility are difficult to capture at the individual or household level. To that extent then, the results of the analyses using the latter type of data could be biased. However, if TFR were mainly affected by household and individual characteristics alone, the results of the present study would be affected by aggregation bias, i.e. of treating the district as an aggregate of its smaller units (households/individuals). Be that as it may, it seems best to think of these two

types of analysis as complementary rather than competing in nature, and that taken together they provide a more holistic understanding of the issue.⁵³

Table 5.1 contains information on the mean and standard deviation of all the variables included in the study. As mentioned earlier, the response variable is the district level TFR. Estimates of fertility at the district level are not available from standard large scale surveys like the Census or the SRS, or the NFHS. However, as indicated in chapter 3, it is possible to derive indirect estimates of fertility from census data on children ever born classified by the age group of the mother. We have arrived at indirect estimates of TFR for the districts of NER, using the aforesaid information from the Census and have used the Arriaga-Arretx method for estimation (please see chapter 3 for details of the method). We should also mention here that district level fertility estimates for India for the years 1991 and 2001, have been arrived at earlier by Mari Bhat (1996) and Guilmoto and Rajan (2001) respectively, using the reverse survival method. However, there were differences in the details of the estimation procedure between 1991 and 2001, so that the estimates were not strictly comparable between the said periods. Given our primary need for *comparable* estimates for 1991 and 2001, we opt for arriving at our own fertility estimates. It should perhaps also be mentioned here that despite differences in the method of estimation, our estimates correspond reasonably well with that arrived at by the authors. In fact, the coefficient

⁵³ It should perhaps be mentioned here that a resolution of this issue has in several cases taken the form of using a different statistical approach for modelling the determinants of fertility change, viz., multilevel modelling. Indeed, even though there remains an element of subjectivity in choosing the independent variables at different levels of aggregation- generally, individual, household, and community levels- there is a possibility of lesser confusion among the various effects as they impact fertility, and more importantly, the effects can be parceled out over the different aggregation levels. Unfortunately, multilevel modelling is ruled out in the case of NER due to the lack of data at the required levels of aggregation.

of correlation between our estimates and the reverse survival estimates for each period is around 0.6, which can be considered reasonably good, given the differences in the estimation procedures. Also, it should be mentioned here that there was a change in the number of districts between 1991 and 2001, with the number of districts increasing from 63 to 77 during this period. We have made the necessary adjustments in all the variables (as required for the panel data analysis) by merging data on the newly formed districts to create variables for the original districts that existed during 1991. This has sometimes resulted in the loss of some data points, and hence reduction in the sample size.

Most of the information on the independent variables shown in Table 5.1, except for the crime rate, has been gleaned from the Census of India. Data on the crime rate has been derived from the publication ‘Crime in India’, for the respective years. Our indicators of/proxies for female status are female literacy rate and gender gap in literacy. Female literacy rate measures the percentage of literates in the female population aged 7 and above, and gender gap is defined as the difference in the literacy of males and females (male literacy rate minus female literacy rate). Child sex ratio has been used here as the indicator of son preference. The social composition of the districts is captured by the proportion of Scheduled tribes and Christians in total population. Crime rate is used in the analysis as an indicator of institutional weakness. However, we must admit here that crime is just one of the indicators of State’s inefficiency (or institutional weakness), and an index covering other aspects would have been ideal. Data limitations do not allow us to construct such an index for the districts/states of NER. Hence, we rely on the crime rate, however crude, as an indicator of institutional weakness.

TABLE 5.1 DEFINITION AND SAMPLE MEANS OF VARIABLES: NER 1991, 2001

Variable	Definition	Mean (Standard Deviation)		1991-2001 Standard Deviation	
		1991	2001		
Total fertility rate	The average number of children that would be born to a woman between ages 15 and 49.	4.3 (0.9)	4.0 (1.4)	Overall	1.2
				Between	1.2
				Within	0.3
Female literacy rate	Percentage of females above 7 years, who can read and write with understanding.	43.4 (12.7)	55.4 (12.7)	Overall	14.0
				Between	12.4
				Within	6.6
Child sex ratio	No. of females 0-6 years per 1000 males of the same age group.	978.9 (18.2)	965.6 (18.5)	Overall	19.5
				Between	14.0
				Within	13.9
Gender gap in literacy	Difference between male and female literacy rates (Male literacy rate minus Female literacy rate).	17.9 (5.6)	15.8 (5.8)	Overall	5.8
				Between	5.5
				Within	1.7
Urbanization	Percentage of population residing in urban areas.	13.2 (11.6)	15.7 (12.5)	Overall	12.1
				Between	11.6
				Within	3.5
Christian	Percentage of population adhering to Christianity.	29.9 (38.2)	27.0 (36.6)	Overall	37.4
				Between	37.7
				Within	4.5
Scheduled Tribes	Percentage of scheduled tribe to total population of district.	48.8 (36.5)	48.9 (37.1)	Overall	36.7
				Between	36.8
				Within	1.2
Crime	Number of IPC crimes per lakh population in a district.	1500.4 (684.5)	1221.5 (738.8)	Overall	723.0
				Between	628.1
				Within	362.5
Ethnic diversity	Measured as the score on the Herfindahl-Hirshman index for 2001, reflecting concentration of ethnic groups in each state.	0.8 (0.13)		Overall	0.16
				Between	0.16
				Within	0

The variable measuring ethnic diversity has been created using information on the number and population size of the ST groups in the states of NER, as provided in the 2001 census. Diversity has been defined as the Herfindahl-Hirshman index,

$$D_j = 1 - \sum_{i=1}^{N_j} s_{ij}^2 ;$$

Where, N_j is the number of Scheduled Tribe groups in a state and s_{ij} is the population share of a particular tribal group in total population of the state. Thus, with a few numerically large ethnic groups, $D_j \rightarrow 0$, and with numerous smaller groups, $D_j \rightarrow 1$. In the case of NER, we find that the value of the ethnic diversity index, as expected, is closer to zero for the states of Meghalaya, Nagaland and Mizoram and closer to 1 for Assam, Manipur and Tripura (see Appendix 6 for the values of the index for all the states of the region). Including state level controls for ethnic diversity may be important since a few regions/states of NER (viz., Meghalaya, Nagaland and Mizoram) have historically evinced both high ethnic diversity as well as fertility. We therefore impose the state level index on all the districts belonging to that state in our analyses. Further, we employ the ethnic diversity index of 2001, for the 1991 cross-sectional regression analysis as well.⁵⁴ We should also mention here that we have not included the female work participation rate and infant mortality rate as explanatory variables in the analyses, as there is a strong possibility of bidirectional causality

⁵⁴ This has been done keeping in view that there has been very slight changes in this variable between 1991 and 2001, which means that variation in these values over the aforesaid period is unlikely to be an useful determinant of fertility changes. Further, we also experimented with a variant of this index, by creating a dummy that assumes a value of 0 for states where ethnic diversity as measured by the Herfindahl-Hirshman index is below 0.5, and assumes the value of 1 otherwise. The inclusion of the dummy instead of the index does not change the results of the analyses.

between TFR and the aforesaid variables, leading to possibly biased estimates from the regressions.

Table 5.1 reveals that there is considerable cross-sectional variability in the data set. During the period of the study, the TFR declined marginally from 4.3 children per woman in 1991 to 4 children per woman in 2001 in NER. The female literacy rates increased considerably during the same period. The decline in the gender gap in literacy suggests that even though there was also an increase in male literacy during this period, female literacy rate increased at a relatively faster *rate* between 1991 and 2001. There has been a rather striking decline in the child sex ratio, suggesting possible intensification of son preference during this period. The growth of urbanization in the region was rather slow during the period 1991 to 2001, and even in 2001, nearly 85 percent of the total population continued to reside in rural areas. There has been practically no change in the proportion of tribes in the total population, and nearly 51 percent of the population belonged to one or other of the tribal groups in 2001. Interestingly, we find a small but significant decline in the percentage of Christians in NER, suggesting the possibility of relatively slower population growth in this community. Finally, we find an overall reduction in the crime rate in NER, and an examination of the data shows that the reduction has been spread over nearly all the districts of the region.

A particularly interesting possibility with panel data is that of differentiating between the cross-sectional (between units) and time (within individual units) dimensions of the data. As can be seen from Table 5.1, TFR varied relatively more between the districts as compared to variation overtime, as expected (given the short nature of the panel). Likewise, we find greater between-units variation as compared to

within variation in nearly all the independent variables. Remarkably however, we find almost comparable variation along these two dimensions in the case of the child sex ratio, suggesting substantial reduction in this variable in NER during the period 1991 to 2001, as mentioned earlier. Also significant has been the overtime variation in the female literacy rate, and to some extent that in crime rate (which we know has been in the direction of falling rates of crime in NER).

5.4.2 Empirical Model

The main method of statistical analysis involves the estimation of a panel data model for the period 1991 and 2001 that assumes the form:

$$\text{TFR}_{dt} = \alpha_d + \beta X_{dt} + \varepsilon_{dt}$$

Here, TFR_{dt} is the total fertility rate for district d at time t , α_d is the district-specific effect, β is a vector of the coefficients, X_{dt} is a vector of explanatory variables, and ε_{dt} is the error term. The explanatory variables include female literacy rate, gender gap in literacy, child sex ratio, urbanization, Christians, Scheduled Tribes, Crime and ethnic diversity, along with interactions terms of ST and Christian and crime and ethnic diversity.

There are two ways of estimating the district specific effects, α_d . The first is the fixed effects approach, which amounts to estimating α_d as a coefficient of the dummy for every district using Ordinary Least Squares Regression method. The dummy captures all time-invariant factors affecting the response variable, measured and unmeasured, within the district specific effect. The second is the random effects approach, which assumes that the district specific effect can be treated as an additional (and an addition to the) error term, and has no correlation with the explanatory

variables included in the model. The composite error term ($\alpha_d + \varepsilon_{dt}$) allows estimation by the method of Generalized Least Squares. The foremost advantage of employing the fixed effects method is that it provides unbiased coefficient estimates by controlling for unobserved heterogeneity across units. However, there is a price to pay for it, and it lies in losing many degrees of freedom in the estimation of the unit specific dummies. Hence, the fixed effects method uses data rather less efficiently (Hsiao 1986). The alternative method, i.e. random effects, appears attractive in this regard. However, the estimates from the latter type of analysis could be misleading if there are reasons to suspect that the district specific effects may be in fact, correlated with the explanatory variables. A formal test for confirming the orthogonality between the former and the latter, and selecting between the two methods of estimating panel data models has been devised by Hausman (1978), and provided routinely by most statistical packages⁵⁵.

5.5 MAIN FINDINGS

Table 5.2 presents the main results of the analyses. It should be mentioned at the outset that the selection of the independent variables has been constrained by the availability of data at district level. However, post-estimation checks suggest that the overall the models are reasonably good and specifically, do not show any strong omitted variable bias (that assumes special significance in the case of the cross-sectional OLS regressions for 1991 and 2001) (please see Appendix 7 for various post-estimation regression diagnostics). More importantly, a particular concern in statistical analysis of this kind is the possible contamination of the results introduced by the

⁵⁵ All regression analyses have been carried out using STATA version 9.1.

presence of spatial dependence in the data (where the value of a variable observed in a particular region is influenced by its value in neighbouring areas).

Specifically, in our case it could happen that the value of TFR in a particular district is influenced by the independent variables associated with that district *as well as* that in neighbouring districts (known as spatial lag, and which can be assumed to reflect diffusion over space) and/or, there may be some spatially correlated factors/variables omitted from the analysis, which influence TFR across the various districts, leading to correlated error terms in OLS regression (known as spatial error). The overall implication is that in the presence of unaccounted spatial dependence, the coefficient estimates are likely to be biased and inconsistent or inefficient, and the solution is to take this factor directly into account.

In our case however, we did not find any significant presence of spatial dependence in the data (either spatial lag or spatial error). In fact, the coefficient of spatial dependence (ρ) turned out to be insignificant in the regressions for both 1991 and 2001 (please see Appendix 8). Also, the goodness of fit (R-squared) remains practically unchanged after including the spatial dependence term in the regressions, which is another way of saying that spatial dependence does not have any significant effect on TFR in our case. Finally, basic standard diagnostics for spatial dependence, viz., Moran's I (spatial error), Lagrange Multiplier (spatial error), robust Lagrange Multiplier (spatial error), Lagrange Multiplier (spatial lag), robust Lagrange Multiplier (spatial lag), largely show the absence of any form of spatial dependence.

**TABLE 5.2 RESULTS FROM CROSS-SECTIONAL AND PANEL ANALYSES:
NORTH-EAST INDIA, 1991-2001**

	1991: OLS	2001: OLS	PANEL 1991-2001	
	(1)	(2)	GLS-RE (3)	OLS-FE (4)
Constant	7.522 (1.59)	0.735 (0.08)	2.512 (0.57)	0.6608 (0.16)
Female literacy rate	-0.030*** (3.19)	-0.054*** (3.52)	-0.026*** (3.96)	-0.023** (2.18)
Gender gap in literacy	-0.023 (1.31)	-0.029 (0.69)	0.003 (0.16)	0.055** (1.89)
Child sex ratio	-0.001 (0.11)	0.009 (1.09)	0.004 (0.91)	0.005 (1.20)
Urbanization	-0.019** (2.57)	0.004 (0.30)	0.018 (1.48)	0.049 (0.88)
Scheduled Tribes	0.011*** (2.79)	0.024** (2.54)	0.015** (2.55)	-0.041 (1.05)
Christianity	0.028 (1.13)	-0.089* (1.72)	-0.057** (2.10)	-0.104* (1.76)
Crime	0.0002 (1.09)	-0.001 (1.56)	-0.0007*** (3.28)	-0.001*** (3.91)
Ethnic diversity	-1.520** (2.63)	-3.434*** (3.91)	-1.954*** (3.11)	-
Christianity and Scheduled Tribe interaction term	0.0002 (0.86)	0.001 (1.57)	0.0006** (2.01)	0.0013* (1.92)
Ethnic diversity and crime interaction term	-0.0002 (0.67)	0.001 (1.24)	0.0008*** (3.28)	0.001*** (3.16)
R ²	0.68	0.68	0.56	0.52
F statistic (p value)	10.24 (0.0000)	23.42 (0.0000)	-	4.75 (0.0002)
Wald, χ^2 (10) (p > χ^2)	-	-	97.96 (0.000)	-
Sample Size	61	52	113	113
GLS vs. FE χ^2 (9) (p > χ^2)	-	-	47.12 (0.000)	

Notes: (a) OLS = ordinary least squares, GLS = generalized least squares, FE = fixed effects, RE = random effects

(b) * significant at 10 percent level, ** significant at 5 percent level*** significant at 1 percent level

(c) Absolute t-ratios in parentheses

(d) All standard errors are heteroscedasticity robust

(e) The F test and the Wald test are tests of the hypothesis that all coefficients (except for the error) are equal to zero

(f) The GLS vs. FE χ^2 is the Hausman test for selecting between the random and fixed effects

(Appendix8).⁵⁶ Thus, having satisfied ourselves that there are no major problems in the modelling of TFR in the analyses, we proceed to discuss the results of our analyses.

The first column contains the OLS regression results for 1991. Overall, the explanatory variables explain around 68 percent of the total variation in TFR. The female literacy rate shows up with a negative sign and is highly significant. Likewise, urbanization contributes to a decline in fertility. However, the Schedule Tribe variable is positive and significant, implying a possible erosion of the fertility-inhibiting socio-cultural practices among the tribes, and a strengthening of pro-fertility features such as earlier marriage of females and an overall increase in fertility preference.

In fact, this is an important finding, especially in view of the fact that earlier studies (for instance Dreze and Murthi, 2001) had found an inverse relationship between tribal status and fertility. Indeed, data shows that contraceptive prevalence rates are especially low among the ST and significantly lower as compared to non-tribes in NER (Appendix 9). However, the lower use of contraception could be a result of poor performance of the family planning programme and/or a higher fertility preference among the tribes. Data shows that the second possibility cannot be ruled out in the case of the tribes of the North-east. Also, the percentage of men who want more sons as compared to daughters (an indicator of son preference) shows that tribes as compared to non-tribes have a stronger son preference in NER. However, it is particularly true of the states where tribes are a minority. Finally, information on infant

⁵⁶ Since, we do not perform spatial regression in our analyses, we refrain from a full discussion of the issue and hence on the various diagnostics tests for spatial dependence. However, we could mention that while the simple Lagrange Multiplier (LM) measures the existence of spatial lag or spatial error, as the case may be, the robust LM for spatial error checks for the error dependence in the presence of missing *lagged* dependent variable, while robust LM lag is the other way round.

and child mortality reveals huge differentials between the tribes and others, with the former evincing substantially higher infant and child mortality rates as compared to the latter (Appendix 9). This could be a crucial reason behind the relatively higher fertility preferences and resulting higher fertility among the ST in the region, especially after controlling for ethnic diversity in the present analysis.

Not unexpectedly perhaps, greater ethnic diversity leads to lower fertility. This suggests among other things, larger the number of ethnically smaller groups, lesser is the probability of engaging in (armed) conflicts with the State and hence using population strength as a combat strategy as explained earlier. Gender gap in literacy and child sex ratio do not show any significant impact on fertility. The indicator of institutional weakness, i.e. the crime rate also turns out to be insignificant in the 1991 regression. Evidence also does not suggest the possibility of a fertility-enhancing outcome for the joint effect of Scheduled Tribe and Christianity.

The results of the 2001 regression are broadly similar to the 1991 OLS regression. Remarkably, female literacy and Scheduled Tribe turn out to be significant yet again and the same signs as earlier. Hence, there seems to be a strong relationship between these two factors and fertility among the districts of NER. Likewise, we again find that the index of ethnic diversity is significantly negative. However, urbanization is no longer significant during 2001. Christianity, that was not a significant determinant of fertility during 1991, turns out to be significant during 2001, and has an inverse relationship with fertility. This is in contrast to a few studies (e.g. Saikia, 2005) that showed Christianity to a possibly fertility-enhancing factor (among tribes) in NER. However, our results support the findings of a few recent studies on the inverse relationship between Christianity and fertility (e.g. Khongsdier, 2002), and largely

favour the hypothesis that the diffusion of the idea of a smaller family might have transpired earlier among the members of this community and/or that the higher age at marriage may have led to lower fertility rates among them. In fact, the apparent positive relationship between Christianity and fertility (as for instance reported in the NFHS data for the North-eastern states) is the result of the strong correlation between Christianity and ST. For instance, running the OLS on 1991 data without including the ST variable, results in a significant and *positive* coefficient of Christianity on fertility. However, putting back the ST variable reverses the sign on Christianity while still keeping it a significant determinant of fertility in the analysis (results not shown in table). The remaining variables are not significant in explaining fertility differentials within NER in 2001.

Columns 3 and 4 present the random effects and fixed effects results respectively. The Hausman test indicates significant correlation between individual (district) specific effects and the independent variables in the model, leading to possible bias and inconsistency in the random effects estimators in our case. Hence, in the next few paragraphs we concentrate on the results of the fixed effects estimation, which provides the variable estimates after controlling for district-specific effects.

Overall, the fixed effects results are broadly consistent with the individual cross-sectional regressions for 1991 and 2001 (Table 5.2). Remarkably, both the indicators of female status/autonomy are highly significant and show that while increase in female literacy leads to a decline in TFR, increase in the gender gap in literacy is related to a rise in fertility. These effects are found to be significant even after controlling for other socio-economic and cultural attributes, such as caste/class (ST), religion, and urbanization. Hence, an increase in women's status (at least to the extent

captured by these two dimensions), independently of other factors can be expected to lead to a decline in fertility in NER.

Numerous studies at both the international (see for instance Akin, 2005; Bulatao and Lee, 1983; Cleland and Wilson, 1987; Subbarao and Raney, 1995) and national level (see for instance Basu, 1992; Dreze and Murthi, 2001; Jain and Nag, 1986; Sharma and Retherford, 1990), find that increase in female education drives down fertility. Indeed as noted by Dreze and Murthi (2001), the significance of female education in reducing fertility in each of the model specifications, and especially in the panel data model, dispels any lingering doubts about a 'spurious' relationship between the former and the latter caused by an omitted third variable. Thus, sustained thrust on female education can be considered a crucial determinant of continued fertility decline in the future.

A rise in the proportion of Christians in the population is found to have a depressing effect on fertility, thus refuting the hypothesis that the Church has had a fertility-enhancing role in the region. Quite to the contrary, Christianity, after accounting for other factors (especially the percentage of ST in the population) is associated with lower fertility, possibly due to a wider world view (or a modern world view) leading to such cognitive changes that are associated with reduction in fertility or even higher age at marriage of the Christians as mentioned earlier. Also, the interaction term between Christianity and ST is significant and works in the direction of raising fertility. Thus, Christianity is associated with higher fertility to the extent that it is associated with ST status.

Interestingly, the coefficient of the crime variable is significant and negative, suggesting that in fact, an increase in institutional weakness (to the extent captured by

the crime rate) leads to a reduction in the fertility rate. In fact, as we noted earlier, crime can affect fertility in two ways- it can lead to a (short-term) rise in fertility when families want to replace lost children, or it can lead to a decline in fertility due to marriage-market effects (breakup of marriages and widowhood, displacement, separation of spouses, loss of financial capacity to support more children, maternal mortality) (Schindler and Brück, 2011). In this case, the replacement effect seems to be less important than the dissolution of marital bond (possibly due to death of the spouse) resulting in the decline in fertility. In this context, it is also interesting that the interaction term of institutional weakness (crime) and ethnic diversity has been found to have a significantly positive effect on fertility, suggesting that increased social insecurity among the numerically smaller groups (such as under conditions of conflict) has the potential to raise fertility rates among the concerned populations.

Remarkably the variables capturing son preference, the extent of urbanization, or the proportion of ST in the population, do not show any significant effect of fertility in NER. That urbanization and ST would not have any impact on fertility in the fixed effects regression, is however, not completely unexpected, as there has been very slight change in these variables between 1991 and 2001. However, we cannot rule out the possibility that the insignificance of the indicator of son preference could be an outcome of choice of the variable itself (i.e. child sex ratio as an indicator of son preference), and we could have obtained other results had we used other refined measures of son preference. Nevertheless, it is perhaps also possible that even though there are signs of increasing son preference in NER (as indicated in Chapter 1), it has yet not assumed such proportions as to influence reproductive decisions (specifically towards increasing the number of children) in the region and its states.

5.6 DISCUSSION

The examination of district level determinants of fertility in NER presents useful insights into the forces affecting reproductive decision making (at least as far as fertility is concerned) in the region and provides a deeper understanding into the regional fertility differentials in India.

Indeed, perhaps the most significant finding flowing from this analysis is the fundamental role of women's status and women's agency in bringing about fundamental changes in society. In fact, female literacy rate has been consistently found to have a significant fertility reducing effect in NER, in the present analysis as well as that in the earlier chapter. There is no denying the fact that in NER as in other regions of India, empowerment of women, for instance, through increase in their education, and though not investigated in the present chapter, through related factors such greater participation in economic, social and political spheres, as pointed out by several studies, holds the key to faster fertility declines in demographically lagging regions including NER.

This analysis also makes a case for a careful re-examination of the alleged links between religious affiliation and fertility/fertility decline in India. As shown here, although Christianity has been sometimes understood as having a negative impact on the adoption of contraception and hence on fertility reduction, the effect of this factor is in fact, highly context specific, and in NER at least, it has been found to have a positive effect on the fertility decline. Indeed, it can be reasonably expected that the effect of religion on fertility in various parts of India, may not have stemmed from the doctrines of the religion *per se*, but from the interconnectedness of this factor with

several other factors such as poverty, lack of socio-economic security and even the provision of health facilities in the particular religious communities, giving rise to the apparently straightforward relationship between religious affiliation and fertility.

A particularly interesting finding in the case of NER has been the relationship between ethnic diversity and fertility. The results of our analysis show that ethno-political conflicts do not necessarily have demographic consequences (even though they may have demographic roots, such as continuing non-tribal in-migration into NER), but only in situations where the benefits are tangible in terms of further access to political power and autonomy. In the context of NER, we find that the existence of numerically smaller but a larger number of ethnic communities actually leads to a lower fertility. This is so because, as argued earlier, these smaller communities have been already assimilated to a great extent in terms of language and culture into the larger ones, with the result that there are no considerable conflict of interests between the former and the latter, so that following set norms of the dominant groups on personal behaviour such as fertility, is not questioned.

In this context, it is rather remarkable that the study of the regional demography of NER highlights the importance of local or contextual factors in fertility transition. In fact, it is in this connection that Greenhalgh notes, “that the closer we get to understanding specific fertility declines, the further we move from a general theory of fertility transition” (Greenhalgh, 1990: 85). Indeed, earlier studies on fertility differentials within India, for instance, that in South India, note the presence of specific historical factors, which played a determining role in shaping the course of the fertility transition in the states of the region.

However, as this study shows there are some factors, such as women's autonomy/status that are universal in the sense that they have been found to influence fertility irrespective of the particular regional context or perhaps even time. Indeed, as various regions convergence on socio-economic and socio-political dimensions, local or context specific factors may be expected to assume a lesser role in determining fertility. However, till such time, studies on regional demography, as also on specific communities such as the tribes or the so-called lower castes will continue to remain important in their own right as and more importantly, to inform population and development policies.

CHAPTER SIX

CONCLUSION TO THE THESIS

The study of the regional demography of India is incomplete without reference to the socio-culturally (and ethnically) distinct North-eastern region of India. Almost in contrast to the academic interest received by demographic (and especially, fertility) issues worldwide, resulting in the accumulation of a massive volume of literature on the subject; we find that research on fertility issues of NER has remained largely neglected until now. Indeed, a rather singular focus on the ongoing ethno-cultural struggles and socio-political unrest in the region and its states has perhaps led to a relegation of its prime demographic questions to the background. There is little gainsaying that a deeper understanding of the demography of the region is not only justified in its own right, but can illumine hitherto unexplored aspects of the society of NER. In this context, the primary aim of this thesis is to construct, and examine the process of fertility transition in India's North-east in a historical and comparative perspective vis-à-vis India, using available secondary sources of information on the region and its states.

NER currently has one of the highest fertility rates in the country, and fertility transition in the region and its states is far from over. In fact, as far as demographic indicators such as fertility, infant mortality, and maternal mortality is concerned, NER can be clubbed with the proverbially backward Hindi-speaking belt of North India. The stalling of fertility decline in the region, and especially among its tribal-majority states, during the 1990s, has been a rather remarkable feature of its fertility transition,

especially in view of the fact that other regions of India have been undergoing a rather smooth decline in fertility at least since the beginning of the 1970s. Indeed, this latter event led to various surmises- from the possibility of significant errors in the data, to the possibility of an early transition rise in fertility in NER. However, our findings suggest that fertility trends from official estimates may not have led us astray after all, nor is the recent stalling of fertility pre-transitional in nature.

In fact, the construction of long term trends in fertility for NER beginning 1900s, reveals that even though fertility rates were considerably higher in the region, as compared to the all-India average for most of the colonial period, the states of the region (especially Assam) experienced relatively faster fertility declines vis-à-vis the all-India average starting 1970s till the beginning of the 1990s. Although the tribal majority states of NER, primarily Meghalaya and Nagaland, were late in commencing fertility decline, even these states revealed significant reduction in fertility from at least the beginning to middle of the 1980s.

In this context, one of the significant findings from the analysis of fertility for the colonial period has been the existence of a reproductive differential between NER and all-India; with the former exhibiting somewhat higher fertility as compared to the latter. In fact, using information contained in the census for the indirect estimation of the fertility rate for Assam and all-India for 1911 and 1931, we find that TFR of the former region was higher by nearly a child than the latter. However, in line with previous research in the field, we find that in-migration, which had little role to play in shaping population growth trends at the all-India level, had a huge impact and lead to substantially higher population growth in NER and its states during the entire pre-Independence period.

It is also interesting to note that during the colonial rule, immigration had been largely a feature of the plains, with importation and employment of ‘coolies’ in the tea estates of Assam province and voluntary movement of agriculturists from neighboring over-populated areas of the Bengal Province. However, during the post-Independence period, we find a wide extension of the areas witnessing immigration, and this includes much of Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, and Sikkim. Additionally, significant intra-regional migration has now become a trait of the states in the region. The latter development is, to no small extent, an outcome of the anti-immigrant protests in Assam during the 1970s. This, as has been argued in the thesis, has been fuelled in large part by the Centre’s policy of ethno-cultural determinism of political autonomy in NER. Not surprisingly, the movement of the migrants into the tribal-majority states has led to similar fears of demographic ‘imbalance’ and that of ‘identity loss’ in these new receiving areas, with severe ramifications impinging on both personal and social choices of these communities including reproductive decisions (but more on this presently).

While the aforesaid aspects of the demography of NER are in sharp contrast to the experience in other regions of India, an examination of the proximate determinants of fertility in particular, demonstrates a fair degree of resemblance to the experience of the other regions/states of the country. For instance, contraception remains the foremost proximate determinant of fertility in nearly each state and region of India, NER being no exception to it. For instance, in Arunachal Pradesh contraception played a major role in fertility decline and in Nagaland, it was primarily responsible for the stall in fertility decline. Interestingly, nuptiality was also found to be a proximate

determinant of much importance and its effect had been mostly towards reducing fertility as was seen in the case of Tripura and Nagaland.

However, a most remarkable finding is the change in fertility preference towards a *larger* number of children in most of the states of NER during and following the 1990s. In fact, no other state in India evinced such an increase, and the wanted fertility rate of the states of North-east during the mid 2000s were not only higher than the all-India average, but also higher than that in Bihar, Uttar Pradesh, Madhya Pradesh and Rajasthan. Thus, the rise (or lack of decline) in fertility among the states of NER (and especially its tribal dominant states) during most of the period following the 1990s, cannot be attributed solely to the poor performance of the family planning programme in this region, as there are indications of a change in underlying preferences among these states.

Our analysis of the determinants of fertility in NER using district level data from the 1991 and 2001 census, throws useful light on the socio-economic, cultural and political dimensions of fertility in the region. Not surprisingly perhaps, female literacy has a significant negative effect on fertility, and in fact, turns up to be significant in the cross-sectional as well as fixed effects panel analysis. Indeed, among all the socio-economic determinants, female literacy has been found to have the most robust association in a fall in fertility rates. While researchers have passionately debated about the *absolute* as well as *relative* importance of female education, vis-à-vis other factors in achieving social goals like reduction in fertility, it is hard (if not impossible) to deny that female education irrespective of the region or the time period considered has been found to have a significant fertility-reducing effect.

It is notable that a few studies in the recent past (e.g. Mari Bhat, 2002) have noted that fertility decline and the use of contraception has been relatively faster among the uneducated women vis-à-vis their educated counterparts. However, to conclude from this that female education is no longer important for fertility is not correct. Even if one were to agree that the strict correspondence between education and fertility is waning overtime, female education at the societal level actually could be influencing the fertility decision of the uneducated women. Cleland and Jejeebhoy (1996) by examining interstate differences in the relationship between female (maternal) schooling and fertility find that “overall levels of schooling in a *society* may constitute as powerful an influence on reproductive patterns of individuals as their own length of schooling. A logical extension of this conclusion is that, low educational attainment, at the individual level, does not necessarily imply a high level of fertility” (Cleland and Jejeebhoy, 1996: 83). Similarly, McNay *et. al.* (2003) using multilevel statistical analysis of the determinants of fertility decline in India note that “even when fertility decline is driven by the behaviour of uneducated women , female education remains an important explanatory factor....It involves externality or spillover effects to the uneducated” (McNay *et. al.*, 2003: 4505) and conclude that “the key role of education in India’s fertility decline may now be masked by the nature of the contemporary transition, it has by no means disappeared” (McNay *et. al.* 2003: 4506).

Nevertheless, as our research shows, in the relatively socio-economically backward areas, female education holds the potential to reduce fertility rates significantly. Indeed, our study finds that indicators of women’s status/autonomy in general, have a strong fertility reducing impact. More importantly, sustained thrust on female education is the key to continuing fertility transition in the future. As pointed

out in Jain and Nag (1986), "... although advancement in female education cannot be used as a primary means to reduce fertility during the next decade, changes in current education policies can substantially contribute to reduction in fertility in the long run" (Jain and Nag 1986: 1607).

The impact of tribal culture and status on reproductive decisions, and particularly that on fertility, has been a vital concern in the context of India. Apart from the fact that these communities have remained relatively backward, both economically and socially, there is a growing concern over the fact that the assimilation of the tribes into the mainstream, have led to the emergence of formerly unknown socio-cultural features, that are detrimental to women's status in general and for the process of fertility transition in particular. In fact, as noted in this thesis, and as least as far as NER is concerned, there seems to have been a transformation in the socio-cultural moorings of the tribes, leading to increased son preference and possibly changes in the marriage system, with negative consequences for the decline of fertility among them.

Interestingly enough, the increasing prominence of 'love marriage' in the social milieu of NER has led to increasing distance between the bride and her natal family and introduction of patriarchal values in these societies. For instance, Deshorjit and Nabakumar (2010), based on a field study on the Phayengs of Manipur, found decline in the incidence of consanguinity coupled with increase in marriage distance during the last decade and a half. This clearly indicates that the custom of territorial endogamy is being gradually replaced in NER, implying the possibility of strengthening of son preference among the communities.

Marriage endogamy and exogamy are fundamentally related to the relative value of daughters among the various socio-cultural groups as well as the relative value of

sons over daughters. Territorial endogamy is intrinsically opposed to certain features of social organization that lead to preference of sons over daughters (son preference). Specifically, since the distance (both physical and emotional) of married daughters from their natal families is typically much smaller as compared to exogamous marriages, the value of daughters to their natal families can be expected to be relatively higher. Indeed, it has been noted by researchers (see for instance, Das Gupta et. al., 2003) that parents continue to rely on their daughters for support in times of need under such a system, whereas in the case of exogamous marriages, it is neither morally endorsed nor practically feasible to do so. Therefore, as noted earlier, the changing marriage pattern among the tribes of NER could be depleting the relative value of daughters.

Among the various indicators of female status related to marriage in tribal societies, the custom of bride price and post-marriage residence deserves special mention. As against the custom of dowry payment in non-tribal societies, the payment of the bride price among tribals is recognition of the economic value of women to their natal families. The primary reason for the existence of such a custom can be argued to be the practice of shifting cultivation among tribals that demands considerable input of female labour. However, as noted in the study published by the National Commission for Women (Fernandes, Pereira and Khatso, 2007) on the customary laws of NER, this feature is fast disappearing from the marriage scene. In fact, Fernandes (1990), found evidence that tribals and Dalits have been switching over to dowry payment as a method of gaining upward social mobility. Even among the tribes of NER, for instance the Adivasi, this practice is gradually waning away. A primary reason for the disappearance of bride price or its replacement with dowry could be the changing

socio-cultural mores of tribal societies, land management and ownership being most important of them. Overall, changes in marriage patterns and the associated increase in son preference among the tribes could be a durable hurdle in the path of fertility decline.

Particularly interesting in the context of North-east India has been the concern over the fertility-enhancing impact of religious conversion to Christianity. It is oft-claimed that the Church, with its distinctive anti-contraception stance, has been responsible for the relatively higher fertility in NER (for instance, Saikia, 2005). However, we find that adherence to Christianity has a fertility inhibiting effect, possibly due to the fact that these populations have been exposed to influences from a larger (or even global) community, vis-à-vis their non-Christian counterparts, and hence have an earlier exposure to the idea of a small family as a better choice. A second and more important reason could be the higher age at marriage among Christians as compared to populations of other religious groups in NER (Kar, 2002).

In this context, it could also be mentioned that an examination of the interplay between adherence to Christianity and belonging to the category of Scheduled Tribes, has been particularly rewarding. In fact, this particular constellation has been hypothesized to elicit higher fertility, primarily because religious doctrines (including those regarding the morality of using family planning methods) would have a greater hold over decisions regarding fertility among the tribes due to the particular set of circumstances that surround these communities today, including socio-economic underdevelopment and the fear of identity loss. There is no gainsaying that the fear of identity loss and the felt need for cultural revival among these communities, could lead its members to an austere adherence to their established customs and traditions- of

which the Church and its preaching, would no doubt, be an integral part. Indeed, we find that this has been exactly the case in NER, and fertility is higher where the proportion of tribes as well as Christians is higher in the population.

One of the most fruitful directions of investigation in the context of NER has been that of the relationship between socio-political factors (especially as related to ethno-cultural movements) and its impact on fertility. Indeed, this particular aspect has been relatively unexplored in the Indian context, but if the experience of NER is anything to by, political transitions may have an important role to play in the fertility transition in the various states and regions of India. However, this does not mean that socio-political factors have been altogether neglected in the Indian context. Indeed, as we noted during the course of the thesis, the impact of socio-political movements as they effect changes in existing social structures thereby facilitating fertility decline, has been noted by scholars in the context of the South India as well as West Bengal.

Nevertheless, the role of ethnic diversity per se, which has hitherto received considerably lesser attention, assumes an important role in the fertility transition in NER. As we argue in the thesis, the presence of a few dominant (population-wise large) ethnic groups in the region could lead to a strong tendency towards using demographic power as an instrument for obtaining socio-economic and political power. In other words, we expect that larger the number of numerically *smaller* groups in a state or the greater its ethnic diversity, *lower* would be the fertility rate. This is especially the case in NER, because the numerically smaller ethnic groups have been almost completely assimilated into the larger tribal groups, with the result that the possibility of divergence of interests between the former and the latter are rather weak.

While we have strong theoretical and empirical reasons to include the selected variables in the regression analyses, it is pertinent to mention here that incorporation of other factors such as poverty, or per capita income, or for that matter more refined measures of women's status and autonomy such as dowry and bride price, and inheritance patterns, or for that matter political participation of women, especially over a considerably long period of time, would have greatly enriched the results of this study. However, lack of data, especially at the desired level of aggregation at the macro level precluded us from such an undertaking. Nevertheless, we hope that these limitations do not take away from the important findings from this research, and the determinants of fertility in NER have been unearthed to a significant extent.

In this connection, it is interesting to note that even though there are signs of accentuation of gender bias in these societies in many forms, very little research exists on these issues, and especially in the manner in which they may be affecting reproductive decisions within these communities. In fact, very little research exists on the issue of gender discrimination in NER, perhaps as a consequence of the general notion of a high status enjoyed by women in tribal societies as such. Of course, the idea of higher female status in tribal societies is not baseless, and indeed founded on earlier painstaking research of several scholars. However, as the present study brings out, even if these 'impressions' are true to a certain extent, considerable changes in gender relations may be underway in this region too. A careful analysis of the various factors affecting gender discrimination in child survival reveals that the situation in NER may not be after all, very different from the rest of India today, even though physical (and perhaps psychological) isolation had kept NER away from 'mainstream' culture till the recent past. Even though cultural features of tribals do offer added

protection to the social position of women in this region, it too has its limitations. In fact, tribal status is associated with higher fertility in NER, as indicated by the results of our analyses. What is more, data from the latest round of the NFHS (2005-06) found a stronger son preference among the *tribes* of NER compared to their nontribal counterparts, in terms of the proportion of men who want more sons as compared to daughters in their family.

Even though hard data are difficult to come by, there is some evidence to suggest that land management and ownership patterns in the region could also be changing, leading to increasing corrosion of the socio-economic foundation of the relatively higher status of women in NER. For instance, in an in-depth analysis of the civil society and gender relations in the state of Meghalaya in NER, McDuire-Ra (2007) noted that among the matrilineal Khasi tribes there has been a shift from common land to private land with a simultaneous change in ownership in favour of males in a large number of cases. ‘As women undertake the majority of the labour in the cultivation of common land, especially through *jhumming* (shifting cultivation), the privatization of common land and relegation of *jhumming* to poor quality land has been a major cause of insecurity’ (McDuire-Ra 2007: 184). It is perhaps important to understand the traditional pattern of land ownership in the region and any changes therein have to be sensitive to the special requirements of females for maintaining their sustenance and not the least, their social position. Indeed, future research on fertility transition in the region needs to look closely into the nature and effect of changing land ownership and management on the status of women and hence their decision making power, including fertility choices.

The present analysis falls just short of incorporating the influence of a distinct aspect of the contemporary society of North-east India viz. the effect of prolonged social unrest and ethnic conflicts on gender relationships and the status of women. Due to difficulty in procuring the relevant data, we had to leave out this issue from the present investigation, and to that extent at least, the present analysis remains incomplete. It is perfectly possible that the situation of ongoing social unrest in NER is influencing gender relations considerably and we would have reached at a finer understanding of the various issues involved, could we have considered it. Indeed, there is considerable scope for further research on various aspects of gender relations and fertility in NER, and investigations along new directions, such as the one suggested above can prove to be rewarding areas for future research.

Nevertheless, this thesis makes several interesting points. From a policy perspective, improvement in the family welfare programme with a thrust on its IEC (information, education and communication) component has the potential of reducing fertility primarily by reducing unwanted fertility. The study also brings out that greater effort has to be made towards bringing down the infant and child mortality rates and increasing the female literacy rate in the North-eastern states of India if there has to be sustained fertility decline in the region in the coming years. Importantly perhaps, this thesis makes a case for a deeper understanding of the basic issues of socio-political organization, not only in their own right, but as they affect myriad dimensions of people's lives- both personal and social. However, without a comprehensive, and most importantly, sustained policy focus on the overall development of the region, with a special focus on resolution of the ethno-cultural unrest in the region, fertility decline in NER and its states, perhaps cannot be expected to gain the required momentum.

Specifically, we find that there may be direct, and not so direct, channels through which ongoing conflict and duress along with the forces of modernization in NER (that may entail emulating many mainstream socio-cultural practices) may be affecting fundamental aspects like gender relations in the region. The silent but significant changes, confronting the peoples of the region, as for instance, in socio-cultural practices governing fertility behavior, calls for greater attention and a holistic approach to the various demographic, economic and social issues facing NER to-day.

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APPENDIX 1

CALCULATION OF THE GENDER DISPARITY INDICES

The various indices of gender disparity presented in this analysis are based on Sopher's method of measuring disparity in the possession any given characteristic between two groups (Sopher, 1974). The two groups in our case, obviously, are males and females in the age group 0-6 years. Mathematically, the disparity index (D_i) can be expressed as:

$$D_i = \log (X_2/X_1) + \log [(P-X_1)/P-X_2] \quad (1)$$

In this equation, X_2 is chosen such that it greater than X_1 , and P is a constant which generally assumes the value of 100, as the method is especially useful in situations where the variables have been expressed as percentages. This has been mostly the case in our calculations, except for the calculation of the gender disparity index in mortality where P has been taken as 1000, since mortality variables are measured in terms of the number of occurrences per thousand population.

The particular feature of this index which makes it very useful for our analysis is that it is additive in nature and a composite index can be derived from individual indices as follows:

$$Z = (1/n) \sum D_i \quad (2)$$

where, i runs from 1 to n (total number of indices included), and refers to the individual disparity indices.

Specifically, the NFHS presents several measures relating to each of the health related indicators selected in this analysis. Using Sopher's method, we could thus

incorporate the information on all these separate measures together usefully to form the following indices:

(a) The index of gender disparity in nutrition: This index includes the percent of children (males or females) underweight, percent stunted and percent wasted.

(b) The index of gender disparity in childcare: This index has only a single component- percent of children (12-23 months old) who have received full vaccination. Even though other indicators of childcare, like the percent of children who have received medical attention during specific ailments (diarrhoea or ARI), are available from NFHS, they vary according to the time of the year that the surveys have been conducted and hence are not comparable overtime (IIPS, 2007).

(c) The index of gender disparity in mortality: This includes the infant mortality rate (deaths between ages 0 and 1) and the child mortality rate (deaths between ages 1 and 4).

APPENDIX 2

TRENDS IN CONTRACEPTIVE USE (PERCENTAGE) AMONG CURRENTLY MARRIED WOMEN, 15-49 YEARS: 1992-2005

State	Any method	female sterilization	male sterilization	IUD	pill	Condom
Arunachal						
1990-92	23.6	10.3	0.4	4.6	3.2	0.7
1996-98	35.4	20.6	0.1	4.2	7.3	0.7
2003-05	43.2	22.5	0.1	3.4	8.1	2.8
Assam						
1990-92	43	12.2	2.4	0.9	2.8	1.7
1996-98	43.3	15.7	1	1.9	6.3	1.8
2003-05	56.5	13	0.2	1.3	10.3	2.3
Manipur						
1990-92	34.9	10.9	2.9	6.7	2.4	1.2
1996-98	38.7	14.4	1.1	6.8	2.2	1.3
2003-05	48.7	8.2	0.5	5.3	5.3	4.1
Meghalaya						
1990-92	20.7	9.4	0.6	2.2	2.4	0.5
1996-98	20.2	6.5	0	3.3	4.5	1.3
2003-05	24.3	9.5	0.1	1.5	4.9	2.4
Mizoram						
1990-92	53.8	44.5	0.1	5.1	2.5	0.7
1996-98	57.7	45.2	0.1	5.4	5.4	0.9
2003-05	59.9	42.9	0.0	4.7	10.6	1.4
Nagaland						
1990-92	13	6.3	0.1	2	2.1	2.1
1996-98	30.3	12.3	0	7.7	2.5	1.8
2003-05	29.7	9.9	0	5.2	4.7	2.6
Sikkim						
1990-92	-	-	-	-	-	-
1996-98	53.8	22.4	2.4	5.6	9.5	1.5
2003-05	57.6	21.2	4.5	3.0	12.8	4.1
Tripura						
1990-92	56.4	16.9	2.4	1.5	6.4	1.6
1996-98	55.5	26.1	0.6	1.9	13.5	1.4
2003-05	65.7	17.6	0.5	0.9	21.8	3.2

Source: Compiled from IIPS and ORC Macro, 1995; 2000; 2007

APPENDIX 3

INFANT MORTALITY AMONG THE NORTH-EASTERN STATES, 1990-92 TO 2003-05

State	INFANT MORTALITY			CHILD MORTALITY		
	1990-92	1996-98	2003-05	1990-92	1996-98	2003-05
Arunachal Pradesh	40.0	63.1	60.7	33.3	37.4	28.8
Assam	88.7	69.5	66.1	58.7	21.4	20.2
Manipur	42.4	37.0	29.7	20.2	19.9	12.6
Meghalaya	64.2	89.0	44.6	24.3	36.2	27.1
Mizoram	14.6	37.0	34.1	14.9	18.4	19.5
Nagaland	17.2	42.1	38.3	3.6	22.7	27.5
Sikkim	-	43.9	33.7	-	28.4	6.7
Tripura	75.8	-	51.5	31.2	-	8.2
India	78.5	67.6	57.0	33.4	29.3	18.4

Source: Compiled from IIPS and ORC Macro, 1995; 2000; 2007

APPENDIX 4

PERCENTAGE VACCINATED AMONG CHILDREN 12-23 MONTHS AND PERCENTAGE OF CHILDREN LESS THAN FOUR YEARS OF AGE SUFFERING FROM DIARRHOEA, NORTH-EASTERN STATES, 1990-2005

State	Percent vaccinated among children 12-23 months			Percent of children less than four years suffering from diarrhea		
	1990-92	1996-98	2003-05	1990-92	1996-98	2003-05
Arunachal	22.5	20.5	28.4	17.6	23.4	14.9
Assam	19.4	17.0	31.4	6.3	8.2	8.1
Manipur	29.1	42.3	46.8	12.4	16.6	9.9
Meghalaya	9.7	14.3	32.9	8.3	21.8	5.7
Mizoram	56.4	59.6	46.5	22.3	23.0	11.0
Nagaland	3.8	14.1	21.0	11.2	21.7	6.4
Sikkim	-	47.4	69.6	-	31.0	16.5
Tripura	19.0	-	49.7	3.6	-	8.3
India	35.4	42.0	43.5	10.0	19.2	9.0

Source: Compiled from IIPS and ORC Macro, 1995; 2000; 2007

APPENDIX 5

STABILITY OF ELECTED GOVERNMENTS (POLITICAL STABILITY) IN NORTH-EASTERN STATES OF INDIA

States	Years for which Legislative Assembly elections were conducted	Average tenure of elected government* (years)
Arunachal	1978, 1980, 1984, 1990, 1995, 1999, 2004, 2009	3.87
Assam	1951, 1957, 1962, 1967, 1972, 1978, 1983, 1985, 1991, 1996, 2001, 2006, 2011	4.62
Manipur	1967, 1972, 1974, 1980, 1984, 1990, 1995, 2000, 2007, 2012	4.09
Meghalaya	1972, 1978, 1983, 1988, 1993, 1998, 2003, 2008	4.5
Mizoram	1972, 1978, 1979, 1984, 1987, 1989, 1993, 1998, 2003, 2008	3.6
Nagaland	1964, 1969, 1974, 1977, 1982, 1987, 1989, 1993, 1998, 2003, 2008	4.0
Tripura	1967, 1972, 1977, 1983, 1988, 1993, 1998, 2003, 2008	4.56
Assam, Manipur and Tripura (Combined)		4.42
Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, Sikkim (Combined)		3.99

Note: *(Total number of years between first and most recent State Legislative Assembly election) / (Number of times elections were held during this period).

Source: Election Commission of India, various years.

APPENDIX 6

VALUES OF THE INDEX OF ETHNIC DIVERSITY (HERFINDAHL- HIRSCHMAN INDEX) FOR THE NORTH-EASTERN STATES

State	Value of the Ethnic Diversity Index
Arunachal	0.97
Assam	0.99
Manipur	0.98
Meghalaya	0.67
Mizoram	0.46
Nagaland	0.16
Sikkim	0.97
Tripura	0.96

Source: Author's calculations based on number and relative population sizes of ST groups in respective states.

APPENDIX 7

Appendix 7.1: Regression Diagnostics for 1991 OLS Regression

1. Omitted Variable Test (ovtest and linktest)

Ramsey RESET test using powers of the fitted values of TFR, 1991

Ho: model has no omitted variables

F(3, 47) = 1.32

Prob > F = 0.2783

Linktest for Specification Error, 1991

tfr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
-----+-----						
_hat	1.867212	.9533424	1.96	0.055	-.0411099	3.775534
_hatsq	-.0983896	.1076814	-0.91	0.365	-.3139374	.1171582
_cons	-1.866272	2.078132	-0.90	0.373	-6.026105	2.293561

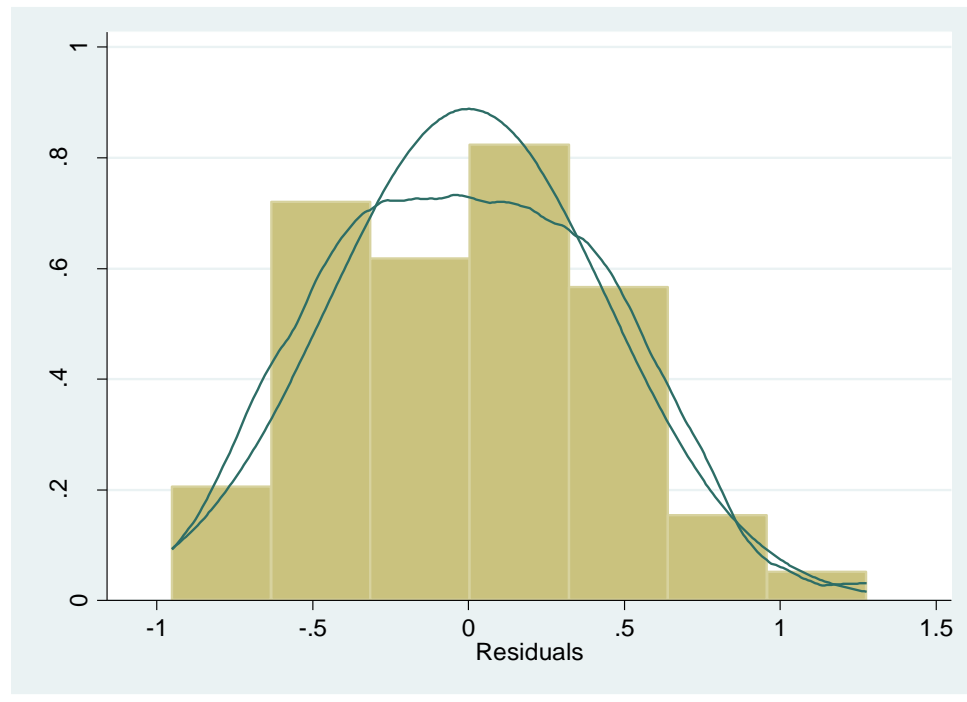
RESULT: No significant specification error or omitted variables in estimated OLS model for 1991.

2. Test for normality of residuals (Shapiro-Wilk W test for normal data and Kernel density plot of residuals)

Shapiro-Wilk W test for normal data, 1991

Variable	Obs	W	V	z	Prob>z
-----+-----					
e	61	0.98585	0.780	-0.537	0.70436

Kernel Density Plot of Residuals, 1991



RESULT: Residuals for 1991 OLS are normally distributed.

Appendix 7.2: Regression Diagnostics for 2001 OLS Regression

1. Omitted Variable Test (ovtest and linktest), 2001

Ramsey RESET test using powers of the fitted values of TFR, 2001

Ho: model has no omitted variables

F(3, 38) = 1.53

Prob > F = 0.2223

Linktest for Specification Error, 2001

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
tfr						
hat	-.1104569	.7375566	-0.15	0.882	-1.592632	1.371719
hatsq	.1310676	.0863163	1.52	0.135	-.0423915	.3045266
cons	2.167005	1.477795	1.47	0.149	-.8027349	5.136745

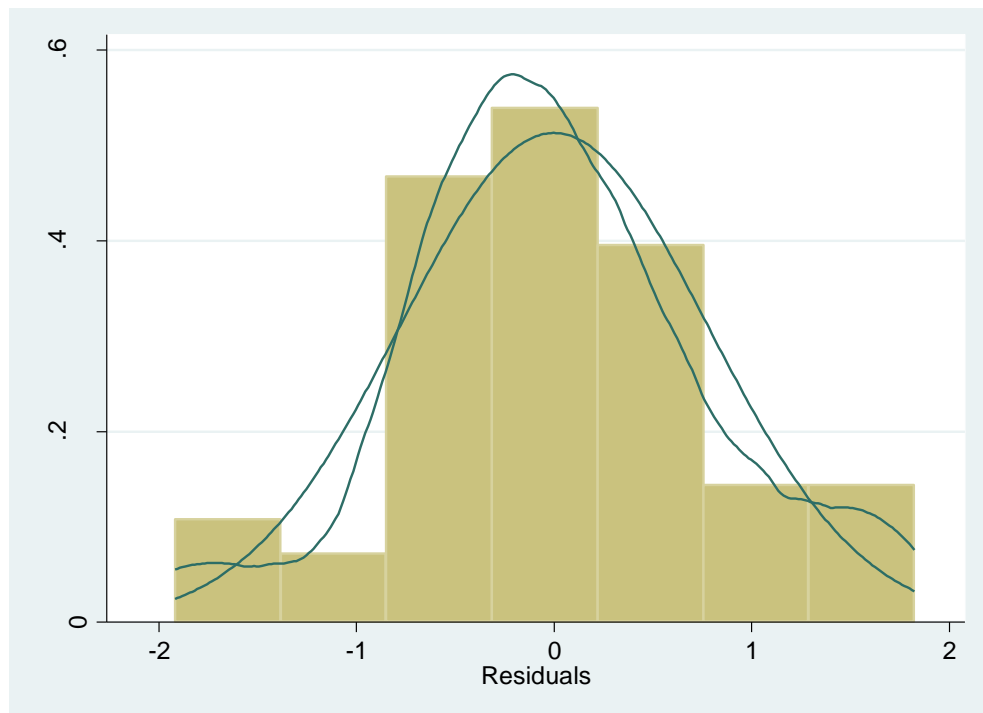
RESULT: No significant specification error or omitted variables in estimated OLS model for 2001

2. Test for normality of residuals (Shapiro-Wilk W test for normal data and Kernel density plot of residuals)

Shapiro-Wilk W test for normal data, 2001

Variable	Obs	W	V	z	Prob>z
e	52	0.97171	1.372	0.677	0.24927

Kernel Density Plot of Residuals, 1991



RESULT: Residuals of 2001 OLS are normally distributed.

APPENDIX 8

RESULTS OF ESTIMATION OF SPATIAL LAG MODEL FOR 1991 and 2001

Variables	1991	2001
Constant	0.788* (1.85)	-0.237 (0.04)
Female literacy rate	-0.031*** (4.25)	-0.039*** (3.15)
Gender gap in literacy	-0.027* (1.96)	-0.026 (0.89)
Child sex ratio	-0.001 (0.22)	0.009 (1.62)
Urbanization	-0.019*** (2.67)	0.005 (0.44)
Scheduled Tribes	0.011*** (3.00)	0.024** (2.54)
Christianity	0.014 (1.05)	-0.063** (1.99)
Crime	0.0001 (1.10)	-0.001 (1.42)
Ethnic diversity	-1.502*** (2.99)	-2.579*** (3.51)
Christianity and Scheduled Tribe interaction term	0.0000 (0.52)	0.001 (1.58)
Ethnic diversity and crime interaction term	-0.0001 (0.63)	0.001 (1.35)
rho	-0.0525 (0.10)	-0.218 (0.38)
R ²	0.68	0.68
Sample Size	62	52

Note: (a) Figures in parentheses are the absolute z ratios.

(b) * significant at 10 percent level, ** significant at 5 percent level*** significant at 1 percent level

(c) All standard errors are heteroscedasticity robust

Diagnosics for Spatial Dependence, 1991

Test	Statistic	df	p-value
Spatial error:			
Moran's I	2.158	1	0.031
Lagrange multiplier	0.430	1	0.512
Robust Lagrange multiplier	1.528	1	0.216
Spatial lag:			
Lagrange multiplier	0.006	1	0.940
Robust Lagrange multiplier	1.103	1	0.294

Diagnosics for Spatial Dependence, 2001

Test	Statistic	df	p-value
Spatial error:			
Moran's I	1.624	1	0.104
Lagrange multiplier	0.068	1	0.794
Robust Lagrange multiplier	0.755	1	0.385
Spatial lag:			
Lagrange multiplier	0.074	1	0.786
Robust Lagrange multiplier	0.761	1	0.383

Overall Result: Insignificant spatial dependence in the data.

APPENDIX 9

SOCIO-ECONOMIC AND REPRODUCTIVE DIFFERENTIALS BETWEEN SCHEDULED TRIBES AND OTHERS: 2003-05

States	Teenage pregnancy (percent who have begun child bearing)		Gender preference (men who want more sons than daughters)		Unmet need for FP		Current use of Contraception (any method)		IMR		UD5 Mortality	
	ST	OTHERS	ST	OTHERS	ST	OTHERS	ST	OTHERS	ST	OTHERS	ST	OTHERS
Arunachal Pradesh	12.3	22.9	35.9	23.6	17.3	18.5	41.2	49.4	67.6	48.7	100.9	78.6
Assam	11.9	20.3	19.0	18.8	12.8	10.9	56.6	55.5	59.0	74.0	83.2	100.9
Manipur	8.7	6.7	40.3	34.2	16.3	11.3	30.7	54.6	51.2	25.8	71.4	37.9
Meghalaya	8.4	7.4	20.3	24.1	25.7	12.8	20.1	43.5	-	-	-	-
Mizoram	10.1	-	-	-	-	-	-	-	-	-	-	-
Nagaland	4.7	24.7	28.7	25.8	26.4	23.2	31.6	33.4	45.8	33.8	-	-
Sikkim	12.2	5.0	16.4	15.3	15.7	20.7	60.1	49.0	28.9	48.7	35.9	59.9
Tripura*	24.4	18.7	22.4	11.9	17.8	9.7	53.7	33.4	44.8	29.0	-	-

Note: * refers to neonatal mortality

Source: IIPS, 2007