An Examination of Recent Fertility Decline in Orissa

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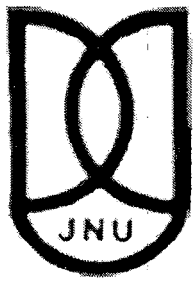

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LIST OF ABBREVIATIONS

ASDR	Age Specific Death Rate
ASFR	Age-Specific Fertility Rate
ASMFR	Age-Specific Marital Fertility Rate
BPL	Below Poverty Line
CBR	Crude Birth Rate
CDR	Crude Death Rate
CMR	Child Mortality Rate
CPR	Contraceptive Prevalence Rate
IIPS	International Institute for Population Sciences
IMR	Infant Mortality Rate
IUD	Intra-Uterine Device
MMR	Maternal Mortality Rate
MoHFW	Ministry of Health and Family Welfare
NFHS	National Family Health Survey
NIHFW	National Institute of Health and Family Welfare
NSSO	National Sample Survey Organization
OBC	Other Backward Classes
PFI	Population Foundation of India
PPA	Post Partum Amenorrhea
PPPR	Period Parity Progression Ratio
PPR	Parity Progression Ratio
RGI	Registrar General of India
SAARC	South Asian Association for Regional Co-operation
SCs	Scheduled Castes
SLI	Standard of Living Index
SRS	Sample Registration System
STs	Scheduled Tribes
TA	Total Abortion Rate
TF	Total Fecundity Rate
TFR	Total Fertility Rate
TM	Total Marital Fertility Rate
TMFR	Total Marital Fertility Rate
TN	Total Natural Fertility Rate
UE	Use- Effectiveness

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Chapter 1
Introduction

Introduction

1.1 Introduction:

An unprecedented rise in population has been considered a serious challenge to the development efforts by the less developed world. To control population growth, India became the first country in the world to officially announce family planning programme in 1951. But even after about half a century the population growth is continuing at a rapid pace. The growth rate is the result of birth and death rates at the national level. Over the last few decades, both fertility and mortality rates fell, but the decline of fertility was not large enough to offset that of mortality until recently. The declining fertility trend is more visible since the mid 1980's. There are considerable improvements in the area of population control which ensures this declining level and trend. But the rate of decline is very slow, therefore the country has still a long way to go to attain post transitional low fertility as the Total Fertility Rate (TFR) in 2002 is still 3.0 per woman. Therefore, it can be argued that India is now in the second phase of fertility transition when birth rates decline but remain significantly higher than death rates, resulting in a continued population growth. Fertility has declined throughout the country at a varying level and at different speeds from state to state. Some states are more advanced in their decline in population growth rates, especially the southern states; Kerala reported 0.9 percent of annual growth rate, followed by Tamil Nadu (1.1 percent) and Andhra Pradesh (1.3 percent) while Bihar and Rajasthan show 2.5 percent of annual growth rate of population. With respect to fertility, the TFR varies from 1.8 in Kerala to 4.4 in Uttar Pradesh in 2002 (Table 1.1).

Fertility is the variable which may have to be manipulated by policy interventions in order to reduce population growth (United Nations, 1973). Thus the problematic factors in determining the course of population have been levels and conditions of fertility and the prospects for their change (United Nations, 1979). The specific nature of the determinants of fertility is intricate. While fertility behaviour influences population growth, which has crucial consequences towards pressure on resources, employment situations, health and other social facilities and saving and investment, in turn such

consequences have great bearing on the socio-economic and demographic factors that affect fertility behaviour. However, the factors that are perceived to influence fertility are highly interrelated among themselves, the conceptualization of the determinants of fertility involves a multitude of factors that vary greatly in intensity and direction of force they exert on fertility (Ahmed, 1980).

Human fertility is responsible for the biological maintenance of society. Man is a social animal who is actively concerned in the creation of the society in which he lives. Human reproduction is determined to a large extent by social factors, beliefs and attitudes towards sex and procreation, the structure of family, economic and political consideration. Fertility refers to the actual bearing of children, the reproductive performance and is measured in terms of live births (Potts and Selman, 1979). It has been observed that the levels and patterns of fertility vary considerably across the different societies. A high level of fertility persists among the developing countries while it is low in the developed countries. An understanding of the factors associated with high and low fertility levels is indispensable to regulate the high fertility level in the developing countries. Such differential may be based on social and economic status in terms of educational attainment, occupation, income, family type etc. The study of the differentials in fertility in various sub-groups in a population has a greater significance in understanding the mechanism of fertility decline.

Demographic processes such as fertility and mortality are intimately related to socio-economic condition and cultural practices. Therefore, the forces affecting fertility would not be unilinear and are likely to vary from society to society depending upon their socio-economic condition, exposure and access to health services. The lowering fertility rate can stem from shift from social and economic structure as a response of the couples. Hence scholars held the view that interlocking effects of economic and social security, value of children, poor health conditions, high mortality risks and low level of maternal educational attainment lead to high fertility. Control of fertility through contraception is an important measure to slow down the rapid growth of population in developing countries. Most countries with national family planning programmes also have a general

objective to improve the state of health and total well-being of the people (United Nations, 1966). Therefore, the declining fertility trend has been seen as a major success of the family planning programmes. It has been articulated as an integrated approach of the government's field based population policy which positions itself in the context of the larger socio-economic development programmes.

Many scholars are of the view that, large population and high rate of growth are impediments to economic development. Therefore demographic variables now form an integrated part of development policy and planning and most of the developing countries are making sincere efforts to achieve low level of fertility and deliberate family size limitation. Though India has developed a vast network of health infrastructure yet the goal of small family as a way of life could not be achieved (Singh and Singh, 1996). However, a mere availability of modern contraceptives is not sufficient for initiating fertility transition and for bringing about planned family size and population control. There is need to focus attention on determinants of fertility and to better understand the linkages between fertility and several socio-economic variables, e.g., educational level, family type and size, occupation, religion, son preference and attitude towards children.

Though the variations in fertility are generally examined and understood in terms of socio-economic factors, still it has been recognized that socio-economic factors can affect fertility only through intermediate variables which determine the exposure to intercourse, to conception and carrying the pregnancy resulting in live birth. Davis and Blake (1956) developed their framework of "Intermediate Variables" affecting fertility. They said that there are 11 intermediate variables only through which socio-economic and cultural factors would affect fertility. But later Bongaarts refined the list of intermediate variables suggested by Davis and Blake to come out with a list of 8 variables and termed them as the "Proximate determinants of fertility" through which all the socio-cultural economic processes have to interact with fertility. These are marriage, use or non-use of contraception, induced abortion, lactational infecundability, coital frequency, spontaneous intrauterine mortality, sterility, duration of fertile union (Bongaarts and Potter, 1983). Bongaarts identified that a major variance in the fertility levels among

societies is explained by the four proximate determinants of regulated fertility, such as the proportion of females married, the prevalence of contraceptive use, the incidence of induced abortion and the fertility inhibiting effect of breastfeeding. So there is a need to estimate the values of such determinants for examining the available evidence and variations in these factors.

1.2 Rationale for the study:

India is one of the developing countries experiencing high rates of natural increase. Several studies on Indian fertility have been undertaken for a proper understanding of fertility behaviour and its determinants. However, most of these studies still lack in specific determinants like exposure to mass media, women's autonomy, spousal communication about the number of children and family planning, age at first birth, infant and child death and so on. Also not much attention has been paid to such determinants with respect to a socio-economically backward state of India, i.e. Orissa. Hence the present study is being undertaken to bridge the gaps in our knowledge.

1.3 Why is Orissa of special interest?

The uneven growth rate of population among various states has been attributed as one of the major causes of high population growth. On the one extreme, the states like Kerala and Goa have reached the replacement level whereas Bihar, Rajasthan, Madhya Pradesh and Uttar Pradesh are growing at a faster rate. However, Orissa, one of the extremely backward states of India, has shown a diversified demographic structure (Table 1.1).

The fertility decline in Orissa seems to be a paradox because of various reasons. The level of infant mortality rate (IMR) at 87 in Orissa is very high while the CBR at 23.2 is slightly less than the national average (25.0), the CDR at 9.8 is significantly higher than the national level. The literacy rate in Orissa is 63 which is near the national level. Near about half of the population (47.1 percent) is living below poverty line in contrast to 26.1 percent at the national level. The proportion of tribal population living in Orissa is 22.1, substantially higher than India's average of 8.2 percent. The unmet needs for contraception are about 15.5 percent which is near to the national average of 15.8 (Table

1.3). The performance of the state on the family planning front (46.8 percent) in recent years is not promising. The state population policy is still under formulation.

Table 1.1: Growth Rate (1991-2001) and Fertility Rate (2002) among Major States of India

States	Annual Growth rates (In Percent)	Decadal growth rate (In Percent) [1]	TFR[2]
Andhra Pradesh	1.30	13.9	2.2
Assam	1.73	18.8	3.0
Bihar	2.50	28.4	4.3
Gujarat	2.03	22.5	2.8
Haryana	2.47	28.1	3.1
Karnataka	1.59	17.2	2.4
Kerala	0.90	9.4	1.8
Madhya Pradesh	2.18	24.3	3.8
Maharashtra	2.04	22.6	2.3
Orissa	1.48	15.9	2.6
Punjab	1.80	19.8	2.3
Rajasthan	2.49	28.3	3.9
Tamil Nadu	1.06	11.2	2.0
Uttar Pradesh	2.30	25.8	4.4
West Bengal	1.64	17.8	2.3
India	1.93	21.3	3.0

Source: [1] India, Registrar General (2001)
[2] India, Registrar General (2004b).

Therefore the question arises: why do couples in Orissa opt for lower fertility when chances of child survival are lower, when the contribution of infant mortality to total mortality is higher, when health facilities in terms of health manpower and infrastructure are not so developed, when per capita income is lower than the national average and when female literacy is low? These call for an in-depth understanding of the fertility pattern of the state, that is, what are the factors that bring about change in fertility despite low probability of child survival, wide spread poverty and low socio-economic development. Therefore, the issue of Orissa Paradox is one of the areas of special interest.

1.4 The setting:

Orissa became a linguistic province in 1936. During the decade 1991-2001, a number of districts in the state were sub-divided to create new districts and thus the number of districts has increased from 13 to 30. Orissa is situated in the east coastal region of India, bordered in the east by the Bay of Bengal. The state is bounded by Jharkhand in the North, Chhattisgarh in the west, West Bengal in the north-east and Andhra Pradesh in the south. The population of the state stood at 10.3 million in 1901, it doubled by the 60's and it had increased to 26.3 million in 1981 and 31.5 million in 1991. According to the latest census (2001), Orissa had a population of 36.8 million, accounting for 3.6 percent of India's population with 4.74 percent land area. For a better understanding of Orissa's fertility situation compared to other states and Uts of India, i.e., Crude Birth Rate and Total Fertility Rate have been presented in Map 1 and 2 respectively.

The population had grown at an average of 0.7 percent per annum during 1901-51; the growth was slow since mortality was quite high presumably on account of frequent floods, famines and epidemics. Thereafter it got momentum due to reduction of mortality. The growth rate increased to 1.98 percent (average annual exponential growth rate) during 1961-71. However, the pace of increase was 1.85 and 1.70 which was relatively slower during 1971-81 and 1981-91 respectively, whereas it was 2.22 and 2.11 for the country as a whole during the same period. With a population of 36.8 million in 2001, it has attracted the attention of population scientists in recent years due to very low growth rate of population during 1991-2001. The rate of growth of population of Orissa during the decade 1991-2001 has been only 1.48 percent as against 1.93 percent for all India and the fourth lowest growth rate of population among the major Indian states (higher than Kerala, Tamil Nadu and Andhra Pradesh). This had occurred not because of a normal process of demographic transition as in case of Kerala, Tamil Nadu and Andhra Pradesh but due to a peculiar nature, a faster decline in birth rate and a relatively slower decline in the death rate (Table 1.2).

Table 1.2: Trends in CBR, TFR, CDR and IMR in Orissa and India, SRS, 1971-2001

Years	Orissa				India			
	CBR	TFR	CDR	IMR	CBR	TFR	CDR	IMR
1971	34.6	4.7	15.4	127	36.9	5.2	14.9	129
1976	34.8	4.7	15.8	127	34.4	4.7	15.0	129
1981	33.1	4.3	13.1	135	33.9	4.5	12.5	110
1986	32.5	4.2	13.0	123	32.6	4.2	11.1	96
1991	28.8	3.3	12.8	124	29.5	3.6	9.8	80
1996	27.0	3.1	10.8	96	27.5	3.4	9.0	72
2001	23.5	2.6	10.4	91	25.4	3.1	8.4	66
2002	23.2	2.6	9.8	87	25.0	3.0	8.1	63

Sources: For 1971-96, India Registrar General (1999)
For 2001, India Registrar General (2004a)
For 2002, India Registrar General (2004b)

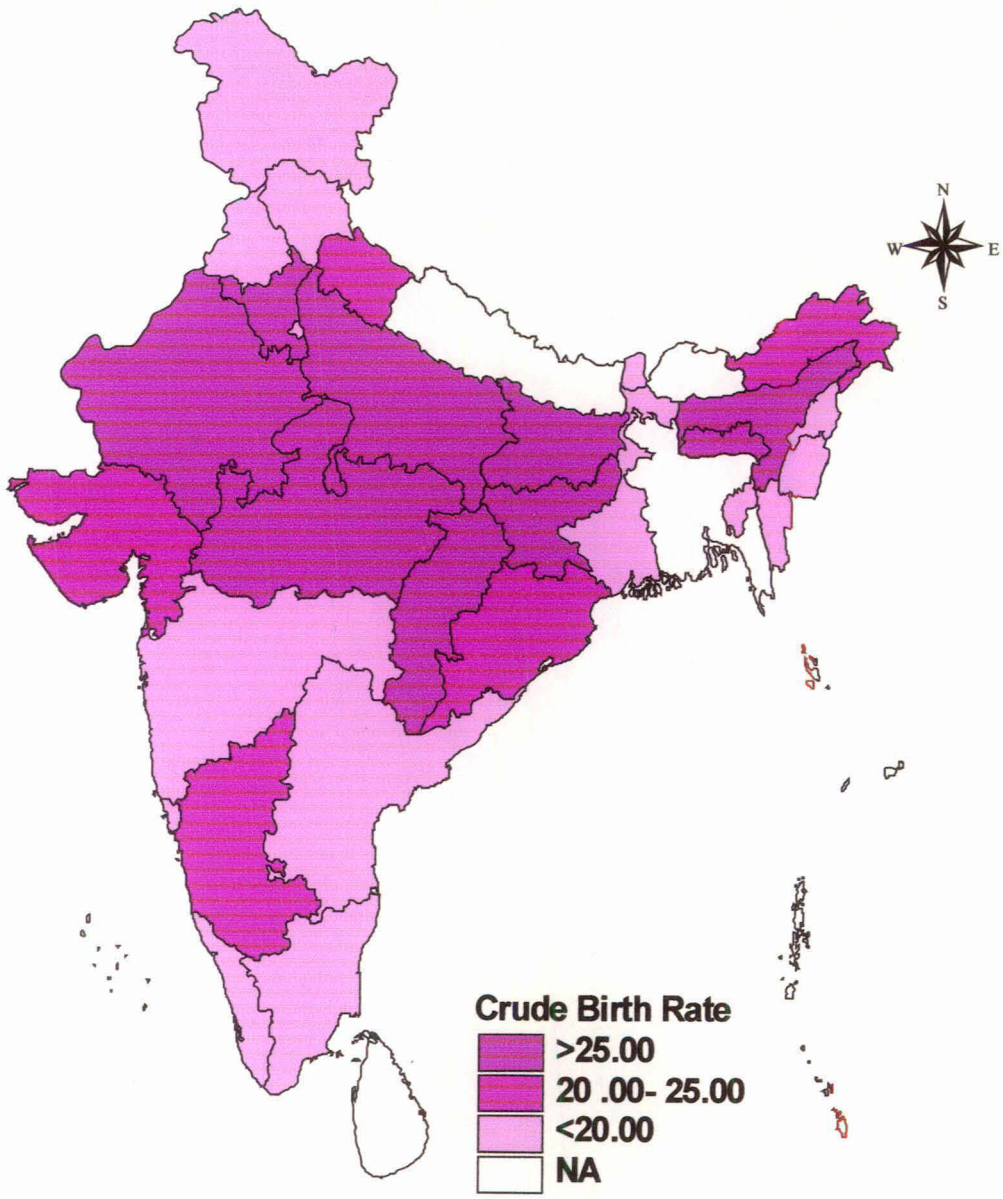
The percent of literate population is 63.1 (75.3 for males and 50.5 for females) in Orisa. As per 2001 census, there were 51, 349 villages in the state, out of which 47, 529 were inhabited villages. Only 15 percent population of the state live in urban areas compared to 28 percent at the national level. Orissa is one of the most backward states in India noted for its economic backwardness, high infant mortality rate and poor conditions of KBK (Kalahandi, Balangir and Koraput) districts. The proportion of population that is designated as Scheduled Tribes is much higher in Orissa that is (22 percent) than in all India (8 percent).

Table 1.3: Socio-Economic and Demographic Indicators in Major States of India

Major States	Census of India, 2001[1]					SRS[2]				NSSO[4]	NFHS II[5]		
	% of Population to total	% of Urban Pop.	% of SC Pop.	% of ST Pop.	Literacy rate (7+)	CBR (2002)	CDR (2002)	IMR (2002)	MMR (1997)[3]	Poverty (1999-2000)	Unmet need for contraception	CPR	Median Age at first marriage
Andhra Pradesh	7.4	27.3	16.2	6.6	60.5	20.7	8.1	62	154	15.77	7.7	59.6	15.1
Assam	2.6	12.9	6.9	12.4	63.3	26.6	9.2	70	401	36.09	17.0	43.3	18.1
Bihar	8.1	10.5	15.7	0.9	47.0	30.9	7.9	61	451	42.6	24.5	24.5	14.9
Gujarat	4.9	37.4	7.1	14.8	69.1	24.7	7.7	60	29	14.07	8.5	59.0	17.6
Haryana	2.1	28.9	19.3	-	67.9	26.6	7.1	62	105	8.74	7.6	62.4	16.9
Karnataka	5.1	34.0	16.2	6.6	66.6	22.1	7.2	55	195	20.06	11.5	58.3	16.8
Kerala	3.1	26.0	9.8	1.1	90.9	16.9	6.4	10	195	12.72	11.7	63.7	20.2
Madhya Pr.	5.9	26.5	15.2	20.3	63.7	30.4	9.8	85	498	37.43	16.2	44.3	14.7
Maharashtra	9.4	42.4	10.2	8.9	76.9	20.3	7.3	45	135	25.02	13.0	60.9	16.4
Orissa	3.6	15.0	16.5	22.1	63.1	23.2	9.8	87	361	47.15	15.5	46.8	17.5
Punjab	2.4	33.9	28.9	-	69.7	20.8	7.1	51	196	6.16	7.3	66.7	20.0
Rajasthan	5.5	23.4	17.2	12.6	60.4	30.6	7.7	78	677	15.25	17.6	40.3	15.1
TN	6.1	44.0	19.0	1.0	73.5	18.53	7.7	44	76	21.12	13.0	52.1	18.7
UP	16.2	20.8	21.1	0.1	56.3	1.6	9.7	80	707	31.15	25.1	28.1	15.0
WB	7.8	28.0	23.0	5.5	68.6	20.5	6.7	49	264	27.02	11.8	66.6	16.8
India	100.0	27.8	16.2	8.2	64.8	25.0	8.1	63	408	26.10	15.8	48.2	16.4

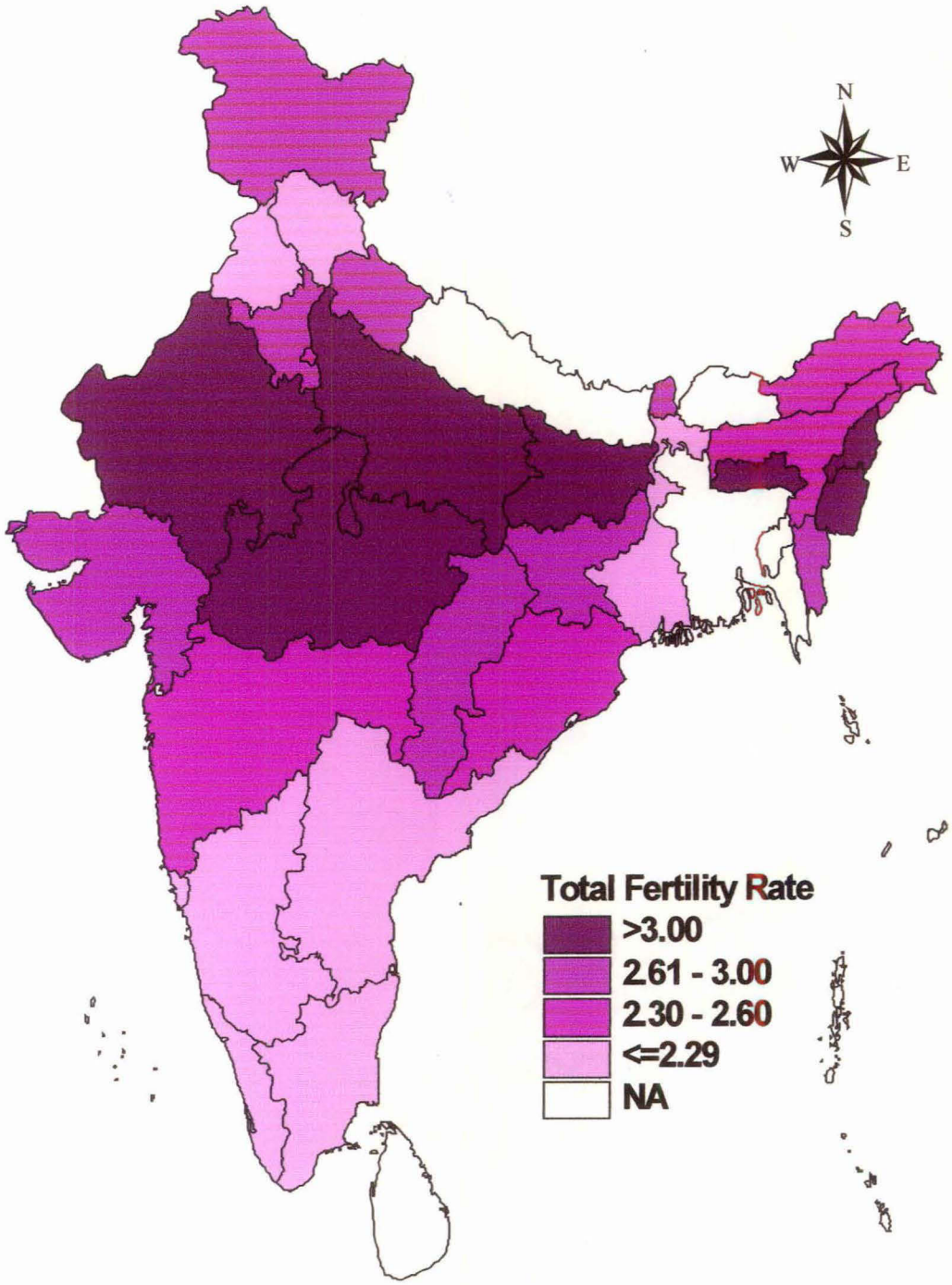
Sources: [1] India, Registrar General, (2004c)
[2] India, Registrar General, (2004b)
[3] India, Registrar General (1999)
[4] Government of India, (2001)
[5] IIPS and ORC Macro (2000a)

Map 1: INDIA
Crude Birth Rate, States, SRS, 2004



Source: India, Registrar General (2006)

Map 2: INDIA
Total Fertility Rate. States. NFHS II



Source: IIPS and ORC Macro (2000a)

1.5 Objectives:

The pace and levels of fertility transition in Orissa are relatively unexplored and have received very little attention compared to other eastern states of India. Therefore, this study attempts to take stock of the fertility patterns, differentials and family building processes in Orissa. With this general background, the specific objectives for the present study are as follows:

1. To study the fertility trends and proximate determinants in Orissa.
2. To study the dynamics of family building process in Orissa.
3. To understand the nature of fertility differentials by background characteristics in Orissa
4. To examine the gap between opinion about ideal number of children and actual number of living children among the ever married women aged 40 and above.
5. To analyze the determinants of contraceptive use for couples in Orissa.

1.6 Chapterization:

The dissertation consists of seven chapters. Chapter I is an introductory chapter. It describes the rationale for the study, study area and also includes the objectives of the study. Chapter II presents the review of literature and related findings in earlier studies. Chapter III deals with the conceptual framework, data sources, analytical methods and the variables included in the study. Chapter IV shows the trends in fertility and proximate determinants of fertility in Orissa. Trends in family building process and its differentials by place of residence are discussed in Chapter V. Chapter VI describes the differentials and determinants of fertility and contraceptive use by background characteristics. Chapter VII presents the summary and conclusions of the study.

Chapter II
Review of Literature

Review of Literature

A large number of studies have examined the nature of relationship between fertility and socio-economic factors. A brief review of the findings from significant research studies carried out in the past in developing countries from the point of view of their relevance to the present study is given in this chapter.

2.1 Theoretical Issues in Fertility Transition:

Demographic transition theory is an attempt to distill from the historical experience of western countries, which have moved from a condition of high mortality and high fertility with consequent slow growth of population to conditions of low mortality and low fertility once again leading to a slow growth of population. The society moved from a traditional, agrarian based economy to a largely industrial and urbanized base. Therefore, aspects of economic development and social modernization are most closely associated with the transition of fertility from high to low levels. The decline of birth rate in modern West was achieved because of the widespread acceptance of contraception under the influence of the new idea of the small family, which is common in any urban industrialized society (Notestein, 1953).

Davis (1963) by studying Japan and Ireland propounded the theory of change and response, which attempted to explain the decline in birth rates in developed countries. Even before the decline in birth rates in the industrialized countries, mortality rates had started declining as a result of which the rates of natural increase had gone up. People started feeling the burden of large family, therefore people began to change their reproductive behaviour by postponing of marriage, rising age at marriage, celibacy, use of contraceptives and to some extent migration which are known as "multiphasic responses". Thus the connecting link between the stimulus and the response was the fear of the loss of status.

Leibenstein (1957) formulated a theory which is based on the assumption that people make rough calculations about the number of children they desire based on the utilities

(production, consumption and security) and disutilities (direct cost for bringing up a child and indirect cost – opportunities foregone due to having an additional child) of children. According to him, rise in income which occurs during the course of economic development affects utilities and costs of an additional child. Consumption utility of the children does not change with an increase in income while the productive utility of the additional children to parents decreases as income level increases. This is because of the fact that at higher income level the family wants to have quality children and the expectation of income from children is almost non-existent. Security utility also declines as parent's income increases. However, the direct and indirect costs of an additional child are likely to increase with the rising per capita income.

Becker (1960) applied the micro consumption theory to fertility. He stated that the choice of purchase of durable goods by a consumer with a given taste is considered to be made after a careful evaluation of the utilities derived from the concerned goods and the costs to be incurred as well as his income. Becker considered children to be like household commodities and argued that the household choice of fertility is made in the same manner as in the case of the purchase of durable goods. A couple's decision to have an additional child, according to Becker, depends on the balance of its preferences, the constraints of its income and the costs of child. According to him, as poorer families do not know or have access to contraception thus are forced to have more children. The richer families tended to have fewer children because of quantity-quality trade off. Quality is enhanced by an increase in the inputs of time and goods spent on children.

Easterlin (1975) emphasized that the determinants of fertility operate through three basic components. Firstly, the demand for children (Cd) which is the number of surviving children parents would want if fertility regulation were costless. Secondly, the potential supply of children (Cn) which is the number of surviving children if parents made no deliberate attempt to limit family size. Thirdly, the cost of fertility regulation (Rc) which includes both subjective and economic costs of contraception. Parents consider their family size desire along with their reproductive ability to achieve it. There is no motivation to contraceptive if the potential supply of children falls short of the couple's

desired family size. If the potential supply exceeds demand, then there is scope for contraception to be practiced. Sometimes even though a motivation to use contraceptive exists, couple may not use them because of the couple's reluctance due to the costs (monetary as well as subjective) attached to regulate fertility. Thus ultimately couples balance their motivation to control fertility with the costs of fertility control. According to him, in the early stage of modernization, demand for children exceeds the supply, therefore the surviving children corresponds to the supply. When modernization occurs supply exceeds demands and there is scope for fertility control. However, the motivation to control fertility is low and cost is high, leading to a situation where the number of children continues to correspond to supply. As modernization progresses, the motivation to contraception increases and the cost of regulation decreases as a result contraception is practiced and the number of children born corresponds to the demand.

Intergenerational wealth flow theory was developed by Caldwell (1976). According to him, life-time net intergenerational wealth flow would determine the fertility of the population. In a society fertility is high if children are economically useful to parents and low if children are economically not beneficial to parents. This flow of wealth in all traditional societies has been from younger generation to the older generation. The direction of wealth flow changes when the family is nucleated both emotionally and economically by importing a different type of culture – Westernization. In many developing countries this import has already started through the two important aspects of modernization namely, mass education and mass communication.

2.2 Major Studies in the Developing World and in India:

Shapiro and Tambashe (1997) examined the fertility behaviour of women in Kinshasa, Zaire, using data from a survey of reproductive age women. They found that modern contraception and abortion are alternative fertility control strategies in Kinshasa. Abortion appears to play an important role in contributing to the observed fertility differentials by education and employment. The dramatic increases that have taken place in women's access to secondary and higher education are likely to have reduced fertility, even when the effects of Zaire's economic and political situations were uncertain.

Rising living standards and aspirations along with the increase in capital-intensive methods of production, reduces the utility of children and rises the relative cost of upbringing. The poor are always responsible for producing more with the assumption that they are governed by "irrationality". The "irrationality thesis" held that the poor do not know that what is good for them and they had no concern for long term effects of population increase on society or for that matter even on themselves. They are weighed down by hoary tradition, by fatalism and by an irrational pride in their over fecundity (Godelier, 1972).

In a traditional society every child is considered as an economic asset. According to this view poor reproduced more because of the poor quality of health services that lead to very high infant mortality rates. Therefore, to make sure that a sufficient number of children survive, the poor often ended up with many more (Chain, 1983).

Islam and Abedin (2001) observed that education is a stronger determinant in rising age of marriage of females of Bangladesh and evidently considered to be the significant threshold associated with lowering fertility in Bangladesh. This indicates that higher education of women has a depressing effect on fertility.

Muhammad (1996) conducted a study to establish trends, patterns and differentials of fertility among different ethnic groups (on the basis of language spoken) in Pakistan by using the data from the Pakistan Demographic and Health Survey (1990-91). The study explores the major variations for different fertility behaviour among different sub-groups. This is because there are variety of languages spoken throughout the country having distinct norms, traditions and other customs which directly or indirectly influence fertility and fertility related decisions. The study attributed the high fertility levels among some ethnic groups to low level of education, lower age at first marriage, higher demand for children and greater value placed on number of children. He also found that fertility levels are high among those ethnic groups who have little knowledge and less use of contraception.

Goni and Imon (2005) tried to see the effect of infant mortality, per-capita income, life expectancy and urbanization on the fertility rates of SAARC countries. They found that, for almost all the SAARC member countries life expectancy is the key factor to keep the total fertility rate down. Similarly infant mortality rate has a positive bearing on total fertility rate, which means the TFR of SAARC countries is expected to fall when IMRs of these countries decline.

Siddiqui (1996) conducted a cross country analysis by taking 39 developing countries and found that the impact of socio-economic factors differs across different age cohorts, particularly the negative impact of improvements in female status on the fertility rates is higher among the younger age cohorts. The result also indicates that the improvement in female literacy is the most effective tool to control population growth.

Some studies have shown that the number of children that a couple will have is determined by many factors, including health, religion, culture, economic status and the ability to have the number they wish to have. Many of these factors relate the status of women to the social, economic and cultural circumstances of women in society. In a study by Satri and others (1990) on Brazilian women, it has been found that women are not willing to give up employment despite its often-modest rewards since it has allowed them greater independence and negotiating power in their households. Even when they desire to have children, they may end up deciding to have less or no children at all. This is especially true for young women because they have more education than previous generations, more information about sexuality and contraception, more opportunities in the labour market and more chances of obtaining economic independence. They observed that the number of children died, husband's and wife's sex preferences and perceived economic benefit from children were positively associated with children ever born and completed family size.

Alam *et al.* (2004) attempted to identify the intensity of the effects of various socio-economic and demographic factors on fertility in Bangladesh using nationally

representative data from Bangladesh Demographic and Health Survey (BDHS), 1999-2000. They have used multivariate technique such as path analysis to find out the direct, indirect, joint and implied effects of the selected socio-economic and demographic factors on fertility. The study revealed that age at marriage, husband's approval of family planning and duration of breast feeding have significant direct negative effects on fertility while the contraceptive use and ideal number of children have significant positive effects on fertility. The observed effect of contraceptive use however is likely to be in the reverse direction, that is, greater use at higher number of children.

Zafar (1996) found that preferences for smaller families and contraceptive use are consistently associated with modern attitudes and behaviour towards the husband and wife relationships in Pakistan. Cultural setting and tradition exerts an important influence on reproductive behaviour.

In any analysis of fertility, an understanding of son preference is equally important because son preference increases family size. Couples who prefer sons and daughters are likely to continue having children even after they have exceeded their desired family size if they have not yet had the desired number of sons (Freedman *et al.* 1965).

In order to achieve the goal of two children per couple, more emphasis has been given to the use of family planning methods and Reproductive and Child Health care. India's future population size largely depends on its prospect for fertility decline linked to the success of family planning programmes. The use of temporary methods for limiting births has not gained wide acceptance among Indian couples and these methods are mostly used for spacing births (Zachariah, 1993; Jain *et al.* 1992). So in a country where temporary methods are not frequently used for limiting the births, couples adopt sterilization to achieve the small family norm.

Poverty may also act as a spur to limit family size. The combined role of stagnant real wages, shrinking farm sizes, chronic underemployment and deepening poverty may provide the condition for a radical downward reassessment of desired number of children.

Adnan (1998) argues that "there does not appear to be any unique relationship between the incidence of poverty and the direction of fertility trends. It is perhaps more useful to view fertility trends as changing between one poverty regime and another depending upon the specific combination of factors obtaining at particular conjectures" (p. 1347).

Zachariah (1995) noted that there is no evidence of a negative relationship between fertility and economic indicators in Kerala. He stated that the family planning programme provided free services where demand existed, strengthened demand where it was weak through educational programmes and publicity through the media, group discussions, individual counseling etc. and through incentive created demand especially among poor where no demand existed previously. Therefore, the poor tend to accept sterilization more readily than the rich. If at all there is a causal factor, it is the incentive and not poverty and incentives are part of the programme. Therefore, it is not the socio-economic factor, i.e., the poverty but the programme component incentives which caused the demand for family planning.

Mukherji (1999) analyzed the causal linkages between poverty and high fertility in India by using the NFHS I data (1992-93). Though NFHS did not collect and provide economic and poverty data, he has taken female illiteracy as the "proxy" indicator of poverty data. The result shows that widespread poverty and very high incidence of female illiteracy are the main "causes" and high fertility and high infant mortality are the "effect".

Rising educational attainment and age at marriage of rural wives tend to decrease fertility. The prevalence of higher fertility among rural wives belonging to higher income group is due to the fact that they possess land property and require more hands for agricultural works (Verma, 1996).

Educational differentials in fertility are much wider in developing countries in comparison to developed countries. Mishra *et al.* (1999) found that educational differentials in progressions up to the second parity are small, since the progressions are almost universal in all educational classes in Uttar Pradesh. But from the third parity

onwards differentials by education are conspicuous. While the tendency to go for the fourth birth continues to be high among illiterate women and to some extent among women who have primary/middle school education, the high school educated women show some sign of limiting after the second or the third birth. Generally, the upper classes are the leaders in the adoption of innovative behaviour and due to diffusion, others follow after some time. Though there would be a lag, in the case of Uttar Pradesh this appears to be too long.

Manna (1998) attempted an inter-state comparison by taking ten important variables recognized as potential determinants of fertility based NFHS I data and found that there is a high degree of association between wanted fertility and actual fertility as well as a strong association between fertility and female education and mother and child health.

In India the estimates of fertility from various sources indicate that among major religious groups, Muslims have experienced the highest fertility and Sikhs the lowest. Alagarjan and Kulkarni (1998), after analyzing the NFHS, Kerala data stated that the tendency to go for the third and higher order births has considerably declined through the 1970s and 1980s in Kerala. But the decline has not been uniform at least across the three major religions in the state – Hindu, Muslim and Christian. In particular, the fall among the Muslims has been relatively modest. As a result while by the end of the 1980s a majority of Hindu and Christian couples stopped childbearing after the second child and only a small proportion went on to have the fourth, a majority of Muslims tended to continue childbearing at least up to the fourth child. Thus two or three child family appears to have become the norm among Hindus and Christians but not among Muslims.

Alagarajan (2003) found that the religion effect on fertility is not constant across levels of other socio-economic factors in Kerala. Couples at different socio-economic settings may make different decisions in spite of belonging to the same religion. The fact that at higher levels of socio-economic status, fertility of Muslims is low and not much different than the fertility of other religions, suggests that the observed fertility gap between Hindus/Christians and Muslims is a passing phenomenon and this gap would be closed with an improvement in socio-economic conditions.

Gandotra *et al.* (1998) analyzed fertility differentials by socio-economic and demographic characteristics for all India and for individual states, based on data from India's NFHS I. They found that total fertility rate tends to be higher among rural women, less educated women, Muslim women and SC/ST women than their counterparts. The multivariate analysis indicates much higher parity progression ratios among women who have experienced one or more child deaths, among rural women and among less educated women. Parity progression ratios are much lower among women who have a living son and among women who are exposed to the mass media.

A study conducted by Srivasthav and Nauriyal (1997) on the household fertility behaviour of Jaunsari tribe inhabiting Indian central Himalayas, found that the engagement of the mother in productive and household activities tends to have positive impact on the fertility decision of the household and the marriage age of mother has the negative relationship with the fertility level of a household.

Status of women at the household level plays a vital role in the reduction of fertility. A study was conducted by Audinarayan (1997) on 300 (randomly selected) currently married couples – both husbands and wives (wives aged between 15-44 years) who had at least one living child at the time of the survey of Sulur Town of Coimbatore district, Tamil Nadu. By employing cross-tabular, hierarchical and Multiple Classification Analyses he found that various dimensions of the status of women, i.e., consultation of women for finalizing their marriage, control over jewels bought from natal family, extent of sex segregated interaction, extent of restrictions imposed on women by husbands to do certain activities, extent of women's participation in decision making on household affairs have played a crucial role in influencing their cumulative fertility (children ever born).

There are many evidences which suggest the existence of strong preference for sons over daughters in India. The important advantage of having son is their socio-cultural utility. In the Indian context, with patrilinial and patriarchal family system, having at least one son provides an additional status to family (Caldwell *et al.* 1989; Dyson and Moore,

1983). Also adult sons are expected to provide economic support to their parents (Lahiri, 1984). In contrast, daughters may represent a substantial economic burden in places where their parents provide dowry. Finally, the utility of having a son arises from the important religious functions that only a son can perform. According to Arnold (1987), the prevalence of sex preference attitudes is likely to blunt the success of family planning programmes and to act as an important barrier to rapid fertility decline. Couples with fewer sons are more likely to continue having children, are less likely to use contraception and have shorter birth intervals (Raju and Bhat, 1995). So the sex composition of children in the family also affects subsequent fertility behaviour up to a great extent.

Kalita *et al.* (2002) attempted to quantify the intensity of preference for sons over daughters in terms of their effect on the probability of having additional children among currently married women of Assam with the database of NFHS I and found that the number of surviving sons and daughters emerged as the most influential factors, followed by women's education and their current age in making decision about having additional desired fertility.

Larsen *et al.* (1997) explored that in Korea, total fertility declined from 6.0 in 1960 to 1.6 in 1990, in spite of strong preference for male offspring. Their study addresses the notion that son preference hinders fertility decline and examines the effect of patriarchal relations and modernization on fertility using the 1991 Korea National Fertility and Family Health Survey. They found that women who have a son are less likely to have another child and those women with a son who do progress to have another child, take longer to conceive the subsequent child. This pattern prevailed for women of parity one, two and three and become more pronounced with higher parity. Multivariate analysis shows that preference for male offspring, patriarchy and modernization are all strong predictors of second, third and fourth conceptions.

The literature also indicates various conceptualizations on the preferred number of children, including "ideal family size", "desired family size". If a respondent stated fertility preferences are related in some way to her eventual fertility, then information on

fertility preference should have a predictive value in forecasting the future course of fertility (United Nations, 1982). Family size preference which is measured in several ways as a generalized ideal, i.e., for a woman in the society; as projected ideal; or as a personal ideal, i.e., for her own family size creates another conceptual issue (Pullum, 1983). Theoretical considerations identify that actual family size and desired family size should develop through a combination of two mechanisms: one is implementation, where actual family size will be less than or equal to desired family size and the other is rationalization of actual family size, i.e., adjustment of desired family size in accordance with actual family size, which is also known as rationalization bias. Pullum (1980) and Hanser (1967) argued that the concept of family size preference is a meaningful notion in society, where the number of children is determined by nature, spirits or God. Thus it is often argued that women in developing countries have an irrational tendency, which is not often found in western society, to have children according to fate (Rasul, 1993).

2.3 Studies on Orissa:

Using the large scale baseline sample survey data in the state of Orissa, Pathak and Pandey (1993) found that the force of progression until parity two was high in the urban than in rural areas in Orissa indicating a high level of sub fecundity among rural women. An abrupt decline in the parity progression ratios after parity three especially among urban women shows that there was greater acceptance of family limitation among urban couples as compared to their rural counterparts. Birth spacing practices were also evident only after parity three. Long average birth intervals for Orissan women especially in rural areas were observed possibly due to the practice of prolonged breastfeeding. While the tempo of fertility in Orissa seems to be low on account of sub fecundity among rural women, in the urban areas, this is due to the accelerating acceptance of contraception.

Basu and Kshatriya (1997) conducted a study to see the demographic features and health care practices among Dudh Kharia tribal by taking 451 Dudh Kharia nuclear families from randomly selected villages of Borgan and Subdega blocks of Sundargarh district of Orissa. They found that the Kharias have higher fertility rate and infant mortality rate compared to the national average. While the Kharias are more literate, prefer nuclear

families, have small land holding, are more mobile as far as opportunities are concerned, positive in their attitudes towards many Government programmes (specially the immunization programme), more aware under the influence of Christian Missionaries, yet, their knowledge and attitudes regarding competitive economy, personal hygiene, modern medicine, family size, child birth, maternal care during and after pregnancy, child care practices are not quite satisfactory. Nevertheless based on the above observations it can be said that the Kharias are in the process of transition and first acculturating with neighboring non-tribal groups with modern based value system and their demographic profile is strongly associated with the prevalent health care practices as well as their socio-economic and cultural traditions.

Nanda and Sureender (1997) using the data of NFHS I stated that in Orissa women's economically productive work within the house has a positive influence on the number of children born. Further, women engaged in work outside the home had fewer children than both those who earned by working at home and non-working women. This is attributed to their exposure to the outside world which, in turn, affects their lifestyle and decision-making capabilities.

Another study shows that the decline in the crude birth rate in Orissa during 1971-81 was primarily due to a reduction in marital fertility which is considered as an impact of the family planning programme. Though the programme effect was more pronounced, the effect of delayed marriage has been increasing (Kumar, 1994). Mohanty (1995) found that the decline of fertility in Orissa is attributed to change in marital status and change in marital fertility. The changing marital status is due to educational as well as economic impact whereas change in marital fertility is due to family planning programme.

2.4 Research Gaps:

The above studies have focused on the trends, patterns and differentials on fertility. Various authors have examined the socio-economic factors influencing fertility. Many have also examined reasons for variations across the country. Moreover, changes over time have also been studied and factors responsible for those are investigated. But very

little attention has been paid towards a socio-economically backward state of India, i.e., Orissa. The existing literature does not show a clear picture about the current fertility patterns and its differentials in Orissa. The fertility decline in Orissa despite the low level of socio-economic development, received wide attention. Its fertility pattern and demographic scenario attracts demographers to explore the reasons of low fertility in the midst of adverse conditions. Therefore this study is an attempt towards these directions.

Chapter III
Conceptual Framework and Methodology

Conceptual Framework and Methodology

3.1 Conceptual Framework

3.1.1 Transition in Fertility:

It is generally accepted that the demographic transition is closely associated with the levels of socio-economic development and so also in case of fertility transition as it is one of the aspects of overall demographic transition. Fertility transition refers to a particular pattern of change from a high fertility to a low fertility. Female literacy, better health and educational facilities, widely available contraceptive methods are some of the factors responsible for fertility transition. Education, industrialization, modernization, social mobility, decline in mortality and so on are all postulated to have a causal relationship with fertility decline.

3.1.2 Proximate Determinants:

Davis and Blake (1956) had developed a framework of 11 intermediate variables only through which socio-economic and cultural factors affect fertility. But Bongaarts refined the Davis and Blake's intermediate variables and come out with a list of variables termed them as proximate determinants of fertility through which all the socio-cultural and economic processes have to interact with fertility. The proximate determinants of fertility are the biological and behavioural factors through which social, economic and environmental variables affect fertility. The principal characteristic of proximate determinants is "its direct influence on fertility" (Bongaarts and Potter, 1983). Bongaarts identified that the major variance in the fertility levels among societies is explained by four proximate determinants of regulated fertility such as the proportion of females married, the prevalence of contraceptive use, the incidence of induced abortion and the fertility inhibiting effect of breastfeeding.

3.1.3 Family Building Process:

While transition refers to a population or society and is at the macro level, it can come about only if couples or women change fertility behaviour. Family building process refers to the study of the couples and particularly women who are engaged for reproduction and

to understand how they are moved from having a particular number of children to the next. Each and every woman attains a specific number of parities. A woman's parity is defined as the number of children she has ever borne and a parity progression ratio is defined as the proportion of women of a specified parity who eventually move on to the next parity. Therefore, the parity progression ratio helps us to study the family building process of any society. In particular, it provides an understanding of the stage at which couples regulate fertility.

3.1.4 Individual Factors Influencing Fertility and Contraceptive Use:

Reproductive behaviour in human population is the result of a complex web of socio-economic, biological and behavioural factors in which the factors themselves are intricately related to one another. There are several pathways influencing fertility. These pathways are affected by some other factors, which may be interrelated. The study is based on broadly two sets of variables: (a) Background variables- socio-economic and demographic Factors (b) Dependant variables- Contraceptive use and children ever born.

The socio-economic and demographic characteristics provide a description of the respondents selected for the study and the socio-cultural characteristics of users and non-users identified by reference to the main study variables. The socio-cultural factors such as caste, religion, education, place of residence, standard of living, her work status influence perceived costs/benefits of children, in turn family size desires, contraceptive behaviour and ultimately fertility. Besides, age at marriage also influences fertility in societies in which fertility is primarily within marriage, Perceptions of child survival naturally have a bearing on decisions on fertility regulation.

The exposure variable and women's role in the household assess the effect of different domestic and social dimensions on contraceptive behaviour which include women's contact with mass media, women's role in decision making, freedom of movement and access to money that they can spend as they wish and communication between husband and wife about family planning methods. Socio-economic and demographic characteristics of women, her exposure to outside world, spousal communication towards

family planning affect fertility behaviour. The socio-economic factors not only indirectly affect fertility behaviour through cultural variables but they also have a direct influence on fertility behaviour. Furthermore we can say that various direct as well as indirect determinants of fertility are also interrelated among themselves. For instance, socio-economic characteristics of women, i.e., level of education, place of residence, caste to which they belongs etc. affect women's status, i.e., the extent of women's exposure to outside world, spousal communication towards family planning and so on.

Socio-economic factors:

Caste:

Scheduled Castes and Scheduled Tribes are castes and tribes that the government of India officially recognizes as socially and economically backward and in need of special protection from injustice and exploitation. Other Backward Classes are castes and communities that have been designated by the Government of India as socially and economically backward and in need of protection from social injustice. Generally SC/ST people are traditionally bounded by customs. After having a large family size very few of them go for family planning, leading to a high number of children.

Religion:

Religious affiliation as a determinant of demographic behaviour was once at the forefront of demographic research, especially in studies of fertility differentials (McQuillan, 2004). Religion plays a significant role among the various socio-cultural factors that influence the acceptance of family planning methods and the resultant fertility behaviour toward the entire issue and programme of population control.

Education:

Education especially among women plays an important role lowering fertility. It provides an opportunity to acquire new knowledge, new outlook and creates a desire to be free from traditional beliefs, thinking and superstition. Education has a specific value of its own as literate people are more likely to adopt birth control measures than illiterate ones. It also affects fertility in several indirect ways, like delayed age at marriage, reduction in

the desired family size, greater exposure to knowledge of family limitations. Education provides "new look" towards quality of life and seems to have an effect on the practice of contraception and also on the fertility behaviour.

Place of residence:

Place of residence is considered as an important social variable which affects fertility and fertility related matters. The place of residence usually in the rural-urban dichotomy has generally been regarded as an important area where meaningful differentials in fertility can be observed. Fertility rate varies substantially between rural and urban areas because urban residents are relatively better off than their rural counterparts in terms of their economic conditions as well as their access to health care and educational facilities. Easterlin (1975) mentioned that the expected relationship between urbanization and GFR is expected to be negative as both direct and indirect costs of raising children are higher in urban areas.

Standard of Living Index (SLI):

Standard of living of the household is expected to be positively associated with the adoption of family planning methods. Generally women from higher standard of living have the power of affordability for family planning methods. Besides they also desire quality children by adopting small family size. Therefore, the quality-quantity trade off allows women/couples to go for small family size. Besides, there is also the possibility of pure income effect that is with the increase in standard of living, the number of children would also increase. Therefore, standard of living is known as a good variable to examine in the context of Orissa.

Work Status of Women:

Work status not only gives women an opportunity to earn income, but also exposes them to the outside world. It has also the empowering effect for women in terms of the nature of work, whether they earn and control income and so on. Therefore, work status of women is considered as an important variable which determines the extent of family size that a woman desires. If the woman is engaged in non-agricultural activities, then there is

the possibility that the women would have greater knowledge about the contraceptive methods and would go for small family size. Apart from this the opportunity cost of childbearing in terms of mother's inability to work also plays a vital role.

Number of Sons:

In the Indian context, with patrilinial and patriarchal family system, having at least one son provides an additional status to family (Dyson and Moore, 1983). Therefore the sex preference attitude is a blunt in the success of family planning programme and an important barrier to fertility decline.

Status of Women:

Demographic literature has increasingly recognized the role of an improvement in the status of women and specifically female autonomy in fertility regulation (Kulkarni et al., 2002). The National Population Policy 2000, of the Government of India identifies the low status of women in India, typified by factors such as discrimination against the girl child and female adolescents, early age at marriage and high rates of maternal mortality as an important barrier to the achievement of population and maternal and child welfare goals (MoHFW, 2000). Women's autonomy is likely to have a significant impact on the demographic and health seeking behaviour of couples by altering women's relative control over fertility and contraceptive use.

Exposure to Mass Media:

In a country like India where a large majority of women are illiterate or have little formal education, informal channels such as mass media play an important role in bringing about modernization. Therefore, it is pertinent to examine the effect of mass media on the adoption of family planning programmes and its role on family limitation.

Spousal Communication:

Discussion regarding family planning with husband has an important bearing for the acceptance of family planning method. Therefore, inter-spousal communication towards family planning is considered as a very effective variable in fertility analysis.

Demographic Variables:

Age at First Marriage:

Marriage patterns have been one of the most important factors where fertility is mostly within marriage. Age at which a woman enter into a marital union, the percentage of women who never marry, the duration for which marital union remains intact, the incidence of widowed, divorce and marriage – all are significant factors in determining the fertility levels of a country. India is a country with almost universal marriage, low age at marriage and marriage stability contribute to enormously high levels of fertility.

Infant Death:

A high infant mortality rate (IMR) is expected to keep fertility high. This is because a higher level of child mortality would require a larger number of births to have the desired as family size. The parents may want to have more children to replace a lost child. Besides this the biological effect and insurance effects of the lost child forces couples to have additional number of children. Therefore, this is an important variable to examine in case of Orissa.

3.2 Data Sources:

The study is based on well known existing data sets: Census, Sample Registration System (SRS), Family Welfare Year Book and the National Family Health Survey (NFHS). The data through census is available on a decennial basis. SRS gives annual series of data on demographic indicators like fertility and mortality. There have been two rounds of NFHS in 1992-93 and 1998-99. Both these surveys give enormous amount of information on the demographic, health and social indicators. NFHS II is the latest of these, becomes the major source of data for most of the analysis.

The Ministry of Health and Family Welfare (MOHFW) designated the International Institute for Population Sciences (IIPS), Mumbai as the nodal agency to initiate the National Family Health Survey II (NFHS II). NFHS II collected data from a representative sample of 90303 ever married women of age group 15-49 years spread across 92, 486 households in India. The survey area represents 99 percent of population

living in India and covered 26 states including Delhi. The survey has used three types of questionnaires: Household, Women and Village. The household questionnaire provides basic socio-economic and demographic information on households. The women's questionnaire covers the ever married women of reproductive age (15-49 years) and collects information about their background characteristics, reproduction, quality of health care, contraception, ante-natal, natal and post natal care, immunization and health, fertility preferences, status of women, husband's background, knowledge about AIDS and also on anemia. The village questionnaire provides information on the availability of various facilities in the villages, especially education and health facilities. The NFHS II has published descriptive reports and has provided household, individual and village level electronic data to the researchers for all the aforesaid issues for each states and all India level separately. The present study delineates the fertility patterns in Orissa and examines the impact of socio-economic and demographic factors on the level of fertility performances in Orissa. Therefore the study makes use of data of Orissa. The survey was conducted from March 1999 to June 1999 in Orissa. The number of households and women interviewed by residence in Orissa has been presented in Table 3.1.

Table 3.1: Number of Households and Women Interviewed by Place of Residence in Orissa, 1999

Place of Residence	No. of HHs	No. of ever married women (15-49 years)
Urban	932	868
Rural	3757	3557
Total	4689	4425

Source: IIPS and ORC Macro (2000b).

3.3 Analytical Methods:

Bongaarts' proximate determinants of fertility are used to estimate the values of the proximate determinants of fertility and total fecundity rate. Period Parity Progression Ratio (PPPR) is applied to study the dynamics of family building process in Orissa.

In order to understand the nature of distribution of variables, univariate descriptive statistics in terms of percentage distribution of ever married women aged 15-49 years for

predictor variables was obtained (Appendix Table 1). The bi-variate analysis has been used to see the gross effect of predictor variables on response variable.

For the multivariate analysis, the statistical techniques used in this study are Multiple Classification Analysis (MCA) and logistic regression. MCA is applied to show the differentials in mean children ever born after adjusting for certain predictor variables. Logistic regression technique is employed to explore the net influences of various variables on contraceptive practice after controlling for other relevant predictor variables. The detailed descriptions of these statistical techniques are given below.

3.3.1: Trends in Fertility:

Sample Registration System introduced in India in the second half of the 1960s provide fairly large information on the levels of fertility. The trends in fertility have been shown directly by taking data from SRS and also from NFHS I and II. Trends in Crude Birth Rate, Age Specific Fertility Rate, Total Fertility Rate and also Marital Fertility Rate have been presented to depict a clear picture of transition of fertility in Orissa. Regional variations in the state have also been discussed. First, rural-urban differences are presented followed by inter-districts variations. Socio-economic determinants of fertility at the district level have been examined with the help Multiple Linear Regression. The TFR has been regressed on infant mortality, literacy, percent of workers outside agriculture and urbanisation.

3.3.2 Proximate Determinants of Fertility:

In the formulation provided by Bongaarts model the TFR is expressed as the product of four indices measuring their fertility inhibiting effect and the total fecundity rate (TF). The total fecundity rate is the average number of live births expected among women who during their entire reproductive period remain married, do not use any contraception, do not have any induced abortion and do not breastfeed their children. In such a hypothetical situation the value of TF is found to vary between 13 and 17 but Bongaarts has suggested the mean value of 15.3 births while testing this model. According to the model,

$TFR = C_{(m)} * C_{(c)} * C_{(a)} * C_{(i)} * TF$

where, TFR= Total Fertility Rate

$C_{(m)}$= Index of marriage

$C_{(c)}$= Index of Non-contraception

$C_{(a)}$= Index of induced abortion

$C_{(i)}$= Index of lactational infecundability

TF= Total Fecundity Rate

Further,

$C_{(m)} = TFR/TM$

$C_{(c)} * C_{(a)} = TM/TN$

$C_{(i)} = TN/TF$

where, TM= Total Marital Fertility Rate, and TN= Total Natural Marital Fertility Rate,

It follows that,

$TFR = C_{(m)} * TM$

$TM = C_{(c)} * C_{(a)} * TN$

$TN = C_{(i)} * TF$

$TFR = C_{(m)} * C_{(c)} * C_{(a)} * C_{(i)} * TF$

$TM = C_{(c)} * C_{(a)} * C_{(i)} * TF$

$TN = C_{(i)} * TF$

$C_{(m)} = TFR/TMFR$

$C_{(c)}$= 1-1.08*u*e, where u= Proportion of married women using modern contraception (ΣUi),

e = Average use effectiveness of contraception $[(\Sigma e_i * u_i)/ \Sigma u_i]$

where, u_i = Prevalence rate of contraceptive method i,

e_i = Use-effectiveness of contraceptive method i.

$C_{(a)} = [TFR/(TFR+0.4(1+u)TA]$, where u= Proportion protected by contraception,

TA= Total abortion Rate is defined as "the average number of induced abortions per woman at the end of the reproductive period if current age specific induced abortions remain at prevailing levels throughout the reproductive period" (Bongaarts and Potter,

1983). It is calculated by multiplying TFR by the ratio of total induced abortions to total live births.

$C_{(i)} = [20/ (18.5+i)]$, where i = Duration of post partum infecundability.

Percent Changes in an index (proximate determinant) can be computed as:

$((C_{1998\text{-}9}/ C_{1992\text{-}3})\text{-}1)*100$

3.3.3 Parity Progression

To study whether the family building process varies over time in Orissa, Period Parity Progression Ratio (PPPR) analysis has been carried out. National Family Health Survey (NFHS) provides information about the fertility histories for all the women in the sample, that make it possible to analyze the family building process. Women's parity is defined as the number of children that she has ever borne and a Parity Progression Ratio (PPR) is defined as the proportion of women of a specified parity who eventually move to the next parity during their lifetime. Though the concept of parity is normally defined in terms of birth events, it is extended here to include the event of women's own birth which enables us to analyze parity transition from women's birth to first birth as well as transition from first birth to second birth and so on. These are generally computed by cohorts of women or cohorts of birth. However, there is a problem encountered by truncation because some women who have had a birth recently, say during a period of ten years before the survey, may possibly have the next birth after the survey. Such information is not available in the survey. As a result, progression from births in a period of about ten years before the survey can not be studied. This makes it difficult to study recent changes. The Period Parity Progression Ratio (PPPR) approach overcomes this problem involving the computation of synthetic parity progression ratios for a time period of one year or five years from duration specific parity progression during the period (Feeney and Yu, 1987). The idea is similar to a synthetic cohort Life Table obtained from age-specific death rates (ASDR).

Suppose a group of women have their K^{th} birth in calendar year t. Let the proportion who have the next $(K+1)^{th}$ birth in the same year be denoted by q_E (t). Symbolically,

q_E = Number of women who had both K^{th} and $(K+1)^{th}$ birth in year t / Number of women who had K^{th} birth in year t

Of the remaining women, proportion who have the $(K+1)^{th}$ birth in year t+1 be denoted by $q_0(t+1)$. Of the remaining women, proportion who have the $(K+1)^{th}$ birth in year (t+2) be denoted by $q_1(t+2)$ and so on. Thus q_E (t), $q_0(t+1)$, $q_1(t+2)$ ..... give a series of duration specific PPRs for the cohorts who had the K^{th} birth in year t. If duration specific PPRs can be computed for various birth cohorts, a matrix $\{q_i (u)\}$ where i stands for duration (i = E, 0,1, 2, ...) and u for calendar year, can be obtained. From the synthetic PPR, called Period Parity Progression Ratio (PPPR) from K^{th} to $(K+1)^{th}$ parity for various calendar years can be computed. The Period Parity Progression Ratio from K^{th} to $(K+1)^{th}$ parity for calendar year t is computed as:

$$1- \{(1- q_E (t)) (1- q_0(t)) (1- q_1(t)) .....\} \qquad I$$

More specifically, PPPR for calendar year t,

$$PPPR(K \text{ to } K+1) = 1- (1- q_E) (1-q_0) (1-q_1)..... \qquad II$$

For the computation of Parity Progression ratios from women's own birth to first birth (Parity 0 to 1), any first birth beyond the age of 30 and below the age of 15 years are ignored because of their negligible proportion. Therefore, the Period Parity Progression Ratios relates to the probability of having the first birth from the age of 15 to the age of 30 years. Therefore q_E, q_0, ...q_{14} would be zero for the progression to the first parity. Therefore the equation I is then modified to,

$$PPPR (0\text{-}1) = 1- \{(1- q_{15}) (1- q_{16}) (1- q_{17}) .....(1- q_{30})\} \qquad III$$

Since the chance of having the succeeding birth after 10 years is very negligible, therefore for PPPR beyond the first parity, the product chain in equation I is modified to:

$$PPPR (K \text{ to } K+1) = 1- \{(1- q_E) (1- q_0) (1- q_1) .....(1- q_9)\} \qquad IV$$

Parity Progression Ratios can be computed either for currently married women or for all women. Computing PPPR for all women is more useful for relating to total fertility rate (Feeney and Yu, 1987). In India fertility outside marriage is negligible, the progression from first to the second parities and subsequent progressions for ever married women would not be different from all women. Therefore PPPR have been obtained from NFHS data files for ever married women. For the progression to first parities that is for progression from women's birth to first birth PPPR (0-1), it is necessary to have data on all women, ever married as well as never married. The household files of sample household provide data on all persons. These could be in principle be used to obtain proportions of ever married women by single years of birth. However not all of those who are ever married in the selected households could be interviewed. The number of interviewed ever married women by year of birth was divided by respective proportion ever married in that year of birth. For example, in Orissa 145 (n) ever married women born in the year 1964 have been interviewed. But the proportion ever married at that age (25 in 1989) is 0.976 (p). Therefore the estimated number of women of that age is:

$N = n/p = 145/0.976 = 149$

Assumptions:

However two important assumptions for the computation of PPPR have been taken into account:

1. Fertility is only within the marriage.
2. Timing of births are reported accurately.

3.3.4 Multiple Classification Analysis (MCA):

MCA is a technique for examining the interrelationship between several predictor variables and a dependent variable within the context of an additive model (Retherford and Choe, 1993). The statistical model signifies that a co-efficient should be assigned to each category of each predictor and the dependant variable should be treated as the sum

of the coefficients assigned to categories characterized plus average for all classes plus an error term. Symbolically,

$Y_{ijk}= Y+a_i+b_j+.....+e_{ijk}$

where,

Y_{ijk}= Score (on the dependant variable) of a particular individual variable who falls into the ith category of predictor A, jth category of predictor B, etc.,

Y= Grand mean of the dependant variable,

a_i= The effect of the membership in the ith category of predictor a,

b_j= The effect of the membership in the jth category of predictor b (=difference between y and the mean of the jth category of predictor b),

e_{ijk}= Error term of individual.

Through this technique we are not only able to explain how each predictor variable is related to the dependent variable but also how well all the variables taken together explain variation in the dependent variable.

In the absence of the effect of other predictors the impact of a predictor variable on response variable is called unadjusted effect and the effect of a predictor variable controlling the effect of other predictor variables constant is called adjusted effect. In addition to the adjusted and unadjusted effects, the eta (ή) coefficient is the correlation ratio, which shows how well a given predictor can explain the variation in the dependant variable; whole the eta square ($ή^2$) coefficient indicates the proportion of the variation explained by the predictor alone. These statistics are applicable to the unadjusted means. On the other hand, the beta (β) coefficient measures on the basis of the adjusted means, the ability of a given predictor to account for variation in the dependant variable whereas the $β^2$ coefficient shows the proportion of the variation that is explained by the predictor, after taking into account the proportion explained by the other predictors.

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

predictors would explain if used in an additive model applied to different but comparable set of data cases.

3.3.5 Logistic Regression:

Logistic regression is a more appropriate technique to analyze the relationship between a set of predictor variables and a dependant variable which is dichotomous. The predictor variables may be either categorical or in interval scale. Though ordinary regression approach can be adopted to analyze such dependant variables, the assumptions of linearity in the relationship between it and the predictors and homoscedasticity are likely to be violated. To overcome this problem, we assume that the probability of occurrence of an event P is related to the independent variables (x) in the form of logistic function instead of a linear function. Then we assume that:

$P = 1/ (1+e^{-(a+bx)})$ ---------- I

Where, a and b are constants that are fitted to the data. It can be obtained from the above equation that,

$1-P = 1/ (1+e^{(a+bx)})$ ----------II

From equation I and II we can get that,

$(P/ 1-P) = e^{a+bx}$ ----------III

Taking the natural logarithm (base e) on both sides of equation III, we obtain:

$Log (P/1-P) = a+bx$ ----------IV

The quantity (P/1-P) is called the odds and the quantity log (P/ (1-P)) is called the log odds or the logit of P (Retherford and Choe, 1993). In a logistic regression we assume that logarithm of the odds is a linear function of the independent variable. In case we have K independent variables, X_1, X_2,.....X_K, the relationship can be extended as:

$$\text{Log } (P/(1-P)) = a + b_1x_1 + b_2x_2 + \ldots\ldots\ldots + b_kx_k \qquad V$$

In the case of logistic regression, the co-efficients are estimated using maximum likelihood method.

3.4 Measurement of variables:

The variables selected for the study can broadly be categorized into two, i.e., Response Variable and Predictor Variable. The measurement of response and predictor variables and the notations used to represent each of these variables are given below.

3.4.1 Response Variable: There are mainly two response variables have been considered for the present study.

1. **Total number of Children Ever Born** which is numeric, with 0, 1, 2..... as possible values.
2. **Current use of contraception**, which is dichotomous in nature. It is categorized as:

   0 = Not Using any contraception

   1 = Using any method of contraception (at survey date)

3.4.2 Predictor Variables: The following predictor variables are used in the study.

1. Caste: Women are categorized into four categories, as Scheduled Caste, Scheduled Tribe, Other Backward Classes, Others.

2. Religion: Women belonging to different religious groups are broadly categorized into two i.e. Hindu and Others. Because of the very few number of cases belonging to Muslim, Christian and other religious group excluding Hindu, so all these are clubbed into the category "Others".

3. Education: The educational level of women is categorized in terms of their level of education as no education, Primary school (grades I-V), Secondary school (grades VI-X), Higher (Above Xth grades).

4. Place of residence: The place of residence of women is classified in terms rural and urban areas (Dichotomous Rural and Urban).

5. Standard of living: In NFHS II, data related to household amenities and possession of some selected household items reflecting economic statuses were collected. The NFHS II has computed a standard of living index (SLI), based on specific scores assigned to different amenities and items. The scores related to response categories for each variable have presented in Appendices (Appendix Table 2). The total of the scores may vary from the lowest of 0 to a maximum of 67. On the basis of total scores, households are divided into three categories as:

Low: If score is less than or equal to 14

Medium: If total score is greater than 14 but less than or equal to 24

High: If total score is greater than 24.

6. Work Status of Women: Work status of women is categorized into three. Those who do not work categorized as "not working", those who are engaged as agricultural self employed, agriculture employee and household and domestic activities are grouped as "agricultural" and those are engaged in professional, managerial and technical activities, clerical, sales, services, skilled and unskilled manual are categorized as "non-agricultural".

7. Number of Sons: Number of sons a woman have which is numeric with 0, 1, 2, ... as possible values have been categorized as 0, 1, 2, and more than 2.

8. Age at first marriage: The age at which these women got first marry is categorized as: 12-14 years, 15-19 years and greater than 19 years.

9. Marital Duration: Marital duration refers to the gap (in completed years) between the dates of marriage to the date of survey. The duration is categorized as: 0-4 years, 5-9 years, 10-14 years and greater than 14 years.

10. Infant Death: The variable states whether she had experienced any infant death by the time of the survey. So the variable is dichotomous; no infant death and infant death.

11. Status of women in the household: NFHS II asked about women's participation in household decision making, their freedom of movement and access to money that they can spend as they wish. Such idea helps us to know their status in the household. Therefore the index of the status of women in the household has been computed by assigning specific scores to different response categories which is presented in appendices (Appendix Table 4). The total of the scores may vary from the lowest of 7 to a maximum of 21. On the basis of total scores, households are divided into three categories as:

Low: If score is less than or equal to 11

Moderate: If total score is greater than 11 but less than or equal to 15

High: If total score is greater than 15.

12. Exposure to Mass Media: In NFHS II, women were asked questions about whether they read a newspaper or magazine, watch television or listen to the radio at least once a week, and whether they visit the cinema or theatre at least once a month. If any one or more of the responses is yes, then she is treated as exposed to mass media, otherwise not exposed to mass media. Therefore the variable is dichotomous; Not Exposed and Exposed.

13. Spousal Communication towards Family Planning: Spousal Communication towards family planning is measured from whether the woman has ever discussed with her husband regarding family planning. Therefore, the two groups are, never discussed and ever discussed.

3.5 Limitations of Data:

More often, the progression from women's birth to first birth is computed with the progression from women's birth to marriage and from marriage to first birth. This requires accurate information on the date of marriage. But the NFHS data files provide only the age at marriage and not the calendar year of marriage. As a result PPPR could not be computed for women's birth to marriage and then to first birth. Migration of any of the couple tends to lower the propensity to have a child. But as NFHS does not provide any clue to capture such data, therefore the variable has not been taken into account.

Chapter IV
Trends in Fertility and Proximate Determinants in Orissa

Trends in Fertility and Proximate Determinants in Orissa

A significant decline in mortality rates without a commensurate drop in fertility rates has resulted in an accelerated rate of population growth in most of the developing countries. Though these societies are characterized by good deals of cultural diversity yet many of them aim at the same goal of low fertility and low mortality. Therefore, the study of trends of fertility and its proximate determinants is very essential to understand how the levels of fertility of a population and related proximate determinants change over time.

4.1 Fertility Trends:

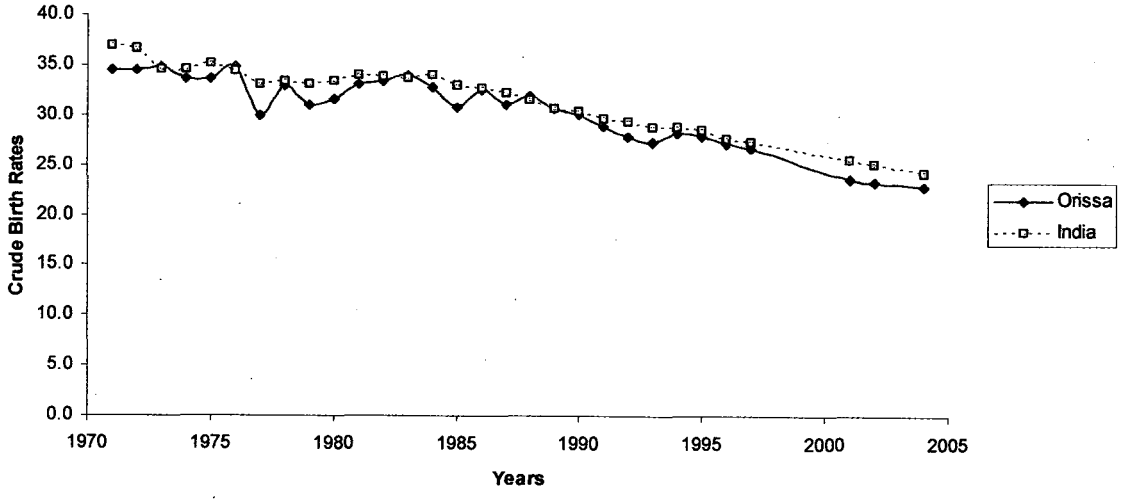
Prior to the introduction of Sample Registration System, data on fertility was scanty. Therefore indirect estimates of fertility are obtained by different scholars. The estimates of birth rates by using reverse survival method for Orissa shows that during 1951-61 Orissa's birth rate (36.9) was lower than the all India figure (41.7) but the subsequent decade (1961-71) registered an increase of 4.4 points in the former while the later declined by 0.5 points (Premi, 1991). Trends in birth rate in Orissa as well as in India since 1971 have been shown in Table 4.1, which are obtained from Sample Registration System. Since the Civil Registration System in India does not have a good coverage, many events are missed. The Sample Registration System with dual recording and verification gives fairly satisfactory results and enables an assessment of levels and trends. The results show that the birth rate of Orissa was lower than the all India figure by above 2 points in 1971. But during 1976 to 1986 the birth rate of Orissa was more or less the same with the birth rate of India. Again after 1990, the pace become faster in Orissa than that of India as the gap increases to 2 points by 2001 (Figure 4.1).

Table 4.1: CBR in Orissa and India since 1971

Years	CBR	
	Orissa	India
1971	34.6	36.9
1976	34.8	34.4
1981	33.1	33.9
1986	32.5	32.6
1991	28.8	29.5
1996	27.0	27.5
2001	23.5	25.4
2004	22.7	24.1

Source: For 1971-96: India, Registrar General (1999)
For 2001: India, Registrar General (2004a)
For 2004: India, Registrar General (2006).

Figure 4.1 Birth rates in Orissa and India since 1971



Source: For 1971-97, India, Registrar General (1999),
For 1997-2004, SRS Bulletins.

To understand the changes in fertility in Orissa more clearly, changes in age-specific fertility rates from the NFHS I to NFHS II are examined. Table 4.2 shows that the fertility decline in Orissa is clearly visible in all the age groups. The remarkable change was found in 40-44 age groups. Fertility decline in rural Orissa was steep at all ages except 15-19 where the change was negligible. The highest decline was registered in 40-

44 age group followed by the 35-39 age groups while in urban Orissa, the 35-39 age group registered an increase of fertility. But the rate has been quite low and sampling error, especially in urban areas, could be large. The highest fertility decline is found in 30-34 age group followed by the 15-19 and 40-44 age groups. But the reduction in fertility is very negligible in the age group of 20-24 where fertility declined by 9 percent probably due to a reduction in the interval between marriage and first birth caused by delayed marriage.

Table 4.2: Percentage Decline in ASFR, TFR and CBR in Orissa by Place of Residence in NFHS I and II

Age Group	Rural			Urban			Total		
	1992-93	1998-99	% decline	1992-93	1998-99	% decline	1992-93	1998-99	% decline
15-19	89	81	9.0	70	57	18.6	86	79	8.1
20-24	209	175	16.3	182	166	8.8	204	174	14.7
25-29	166	140	15.7	147	123	16.3	163	138	15.3
30-34	89	73	18.0	84	59	29.8	89	71	20.2
35-39	36	23	36.1	12	23	-91.7	31	23	25.8
40-44	10	6	40.0	11	9	18.2	10	6	40.0
45-49	0	1	-	0	0	-	0	1	-
TFR	3.0	2.50	16.7	2.53	2.19	13.4	2.92	2.46	15.8
CBR	27.0	22.4	17.0	23.9	20.1	15.9	26.5	22.1	16.6

Source: IIPS (1995b), IIPS and ORC Macro (2000b).

The difference between total marital fertility rate (TMFR) and total fertility rate (TFR) can be considered as mainly due to delayed marriages in a population where the numbers of births outside marriage are negligible (Nag, 1989). This difference has increased from 1.4 in 1985 to 1.7 in 2003 in Orissa while from 1.3 in 1985 to 1.7 in 2003 in case of India, indicating that the effect of the increase in age at marriage on marital fertility is on the rise (Table 4.3) (Figure 4.2 and 4.3). But such rise is very slow. Therefore, we can say that the increase in the age at marriage during 1985-2003 was not marked in Orissa. Though the census result shows that the Singulate Mean Age at Marriage (SMAM) for females in Orissa has increased from 17.5 years in 1961 to 20.2 years in 1991 and from 20.7 years to 21.2 years during NFHS I to NFHS II, not much increase is found in the 90's (IIPS and ORC Macro, 2000b). However, if the age at marriage for females in

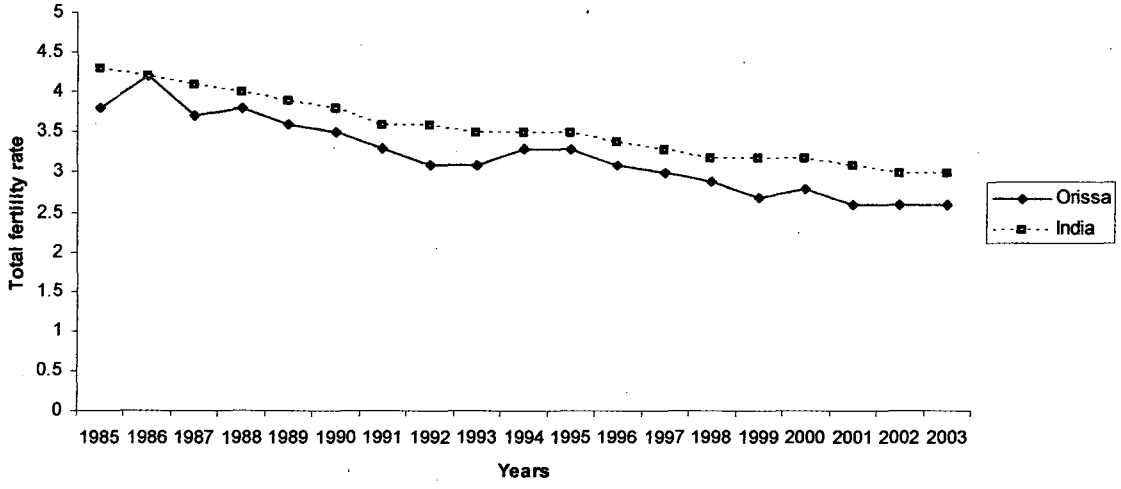
Orissa were to increase, the effect of delayed marriage on marital fertility would also increase (Kumar, 1994).

Table 4.3: Total Fertility (TFR) and Marital Fertility Rate (TMFR) in Orissa as well as India Since 1985

Years	Orissa			India		
	TMFR	TFR	Difference	TMFR	TFR	Difference
1985	5.2	3.8	1.4	5.6	4.3	1.3
1986	5.7	4.2	1.5	5.5	4.2	1.3
1987	5.2	3.7	1.5	5.5	4.1	1.4
1988	5.4	3.8	1.6	5.4	4.0	1.4
1989	5.1	3.6	1.5	5.3	3.9	1.4
1990	5.1	3.5	1.6	5.2	3.8	1.4
1991	4.9	3.3	1.6	5.1	3.6	1.5
1992	4.9	3.1	1.8	5.1	3.6	1.5
1993	4.7	3.1	1.6	4.9	3.5	1.4
1994	5.0	3.3	1.7	4.9	3.5	1.4
1995	4.8	3.3	1.5	4.7	3.5	1.2
1996	4.7	3.1	1.6	4.7	3.4	1.3
1997	4.7	3.0	1.7	4.7	3.3	1.4
1998	4.6	2.9	1.7	4.6	3.2	1.4
1999	4.4	2.7	1.7	4.7	3.2	1.5
2000	4.6	2.8	1.8	4.8	3.2	1.6
2001	4.5	2.6	1.9	4.7	3.1	1.6
2002	4.3	2.6	1.7	4.6	3.0	1.6
2003	4.3	2.6	1.7	4.7	3.0	1.7

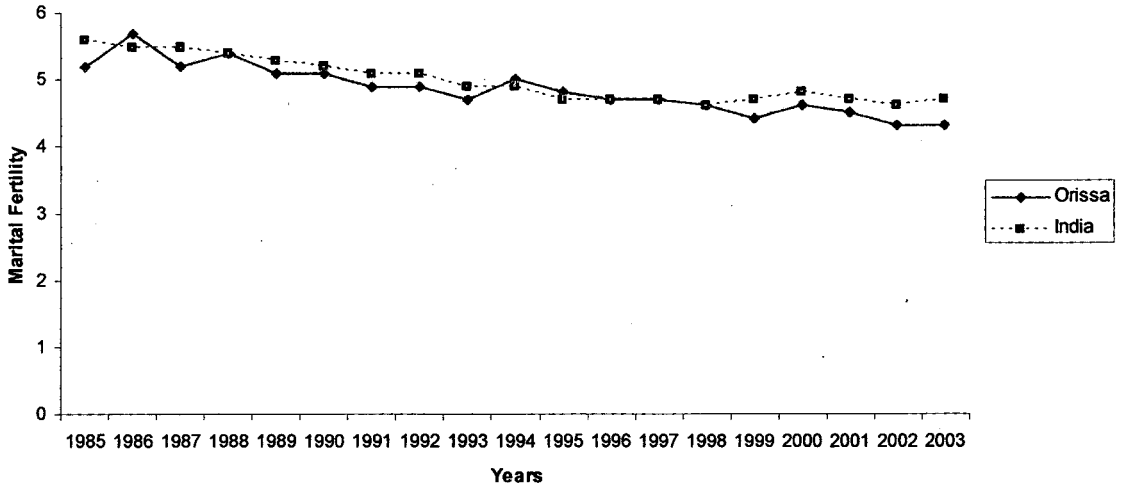
Source: SRS Bulletins of different years.

Figure 4.2 SRS Estimates of Total Fertility Rate in Orissa and India since 1985



Source: Table 4.3

Figure 4.3: SRS Estimates of Marital Fertility in Oissa and India since 1985



Source: Table 4.3

4.1.1 Regional Variations:

The unavailability of data on fertility at the district level was the main hurdle for planning and intervention to reduce fertility at the grass-root level. Therefore, scholars have obtained the district level indirect estimates of fertility. Here the district level indirect estimates of fertility through the reverse survival method have been presented for the period of 1974-80, 1984-90 and 1994-2000 (Table 4.4). The variation in fertility ranges from 3.6 in Kandhamal to 2.3 in Jagatsinghpur during 1994-2000. The districts of coastal Orissa namely Cuttack, Khurdha, Puri, Jagatsinghpur, Kendrapara, Jajpur, Bhadrak, Baleshwar, Ganjam show lower fertility levels. The most backward districts of Orissa, nationally known as KBK districts namely Kalahandi, Nuapada, Balangir, Sonepur, Koraput, Malkangiri, Rayagada, Nawarangpur, show very high fertility ranging from 3.4 in Nawarangpur to 2.8 in Balangir and Sonepur in 2001 (Map 3). However the decline in fertility was experienced in all districts between the late 1970 and the late 1990s.

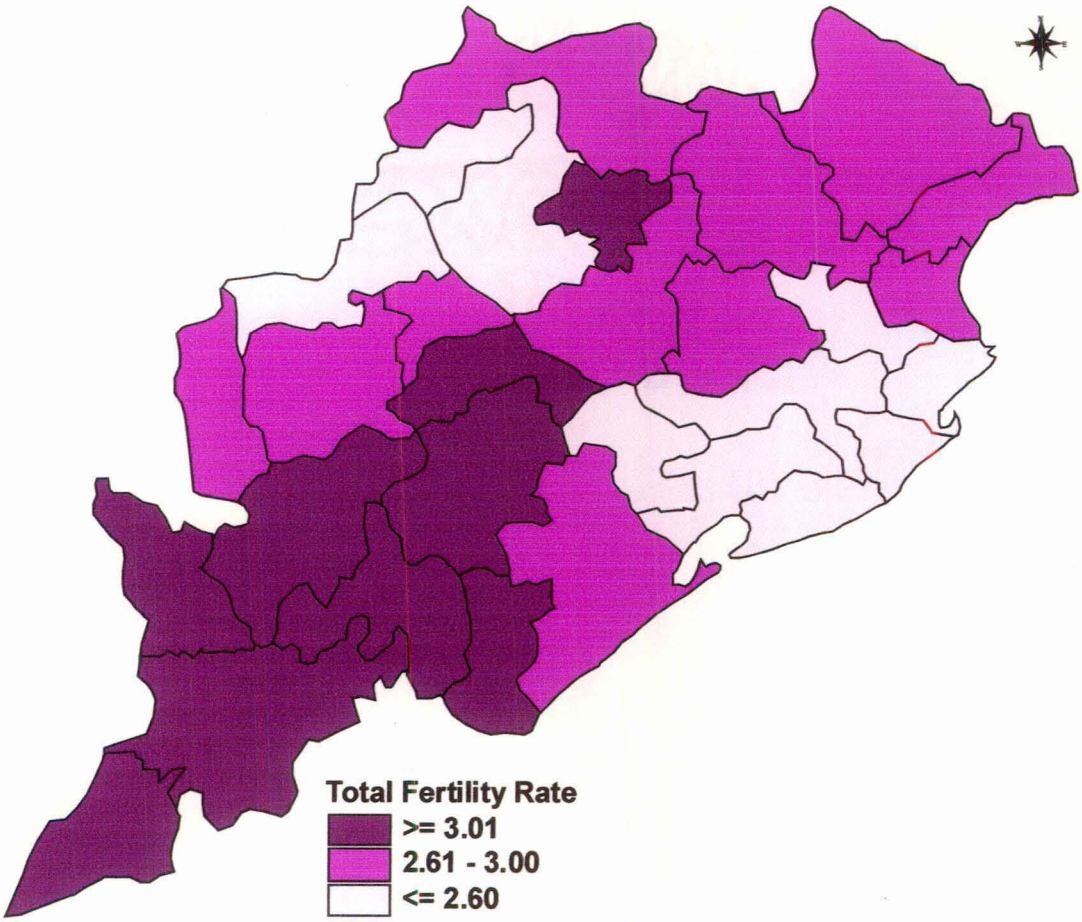
Table 4.4: TFR and IMR in Different Districts of Orissa in the Recent Decades

Districts	Total Fertility Rate			Infant Mortality Rate		
	1974-80[1]	1984-90[1]	1994-2000[2]	1981[3]	1991[3]	2001[4]
Anugul	-	-	2.9	-	-	69
Balangir	4.5	3.7	2.8	183	101	103
Baleshwar	5.1	4.3	2.9	190	123	61
Bargarh	-	-	2.5	-	-	61
Baudh	-	-	3.2	-	-	74
Bhadrak	-	-	2.9	-	-	54
Cuttack	4.8	3.8	2.4	197	112	39
Debagarh	-	-	3.1	-	-	48
Dhenkanal	5.1	4.0	2.7	176	105	46
Gajapati	-	-	3.3	-	-	121
Ganjam	4.8	4.2	2.9	152	133	80
Jagatsinghpur	-	-	2.3	-	-	83
Jajpur	-	-	2.6	-	-	71
Jharsuguda	-	-	2.6	-	-	48
Kalahandi	4.5	3.7	3.2	169	137	76
Kandhamal	4.5	4.6	3.6	-	-	85
Kendrapara	-	-	2.6	-	-	97
Kendujhar	4.6	4.2	3.0	187	99	90
Khordha	-	-	2.4	-	-	64
Koraput	4.3	4.2	3.1	133	118	72
Malkangiri	-	-	3.3	-	-	117
Mayurbhanj	3.7	4.3	3.0	105	91	62
Nabarangpur	-	-	3.4	-	-	63
Nayagarh	-	-	2.5	-	-	55
Nuapada	-	-	3.0	-	-	71
Puri	4.6	3.5	2.4	170	151	38
Rayagada	-	-	3.3	-	-	102
Sambalpur	4.4	3.6	2.6	122	103	48
Sonepur	-	-	2.8	-	-	62
Sundargarh	4.5	3.6	2.7	121	101	81
Orissa	**4.5**	**3.9**	**2.8**	**163**	**125**	**76**

Source: [1] Bhat, (1996)
[2] Guilmoto and Irudaya Rajan (2002)
[3] India, Registrar General (1997)
[4] Ram *et al.* (2005).

It would be quite interesting to look at district wise variations in infant mortality in Orissa (Table 4.4). The infant mortality ranges from 38 in Puri district to 121 in Gajapati district in 2001. As far as the infant mortality is concerned some of the coastal districts like Kendrapada, Ganjam, Jajpur do not seem to have any advantage over some of the KBK

Map 3: ORISSA
Total Fertility Rate, Districts, 1994-2000



Source: Guilmoto and Irudaya Rajan (2002)

districts like Kalahandi, Nuapada, Sonepur, Koraput, Nawarangpur in 2001. The decline in infant mortality is also taking place across all the districts. Nabarangpur shows a peculiar picture where though the fertility level is quite high at 3.4 but with respect to infant mortality it is only at the national average.

To determine how literacy level, urbanization, non-agricultural activities, infant mortality is related to variations in total fertility rates at the district level, a linear regression analysis has been carried out. The explanatory variables that are considered here are infant mortality rate, percent of workers (main and marginal) engaged in non-agricultural activities, proportion of population living in urban areas and the literacy rate. The results of regression analyses of total fertility rate on these variables for all the 30 districts of Orissa are presented in Table 4.6.

Based on the adjusted R square value, the explanatory variables collectively explain 66.6 percent of the variation in total fertility rate. The standardized coefficient for the infant mortality rate suggests that in the presence of other variables in the analysis, it has the lowest standardized coefficients and its relation with TFR is insignificant. In contrast, the literacy rate has the highest standardized coefficient and its direct correlation with TFR is significant. Therefore, the literacy rate is the most important variable in explaining total fertility rate. None of the other variables, percentage of workers engaged in non-agricultural activities and percentage of population living in urban areas show a significant effect on fertility. Thus it is clear from the regression analysis that, literacy is the most critical variables related to fertility.

Table 4.5: Indicators of Key Socio-Economic Factors in Different Districts of Orissa, 2001

Districts	Percentage of workers in non-agricultural activities[1]	Percentage of urban population[2]	Literacy rate[3] (Percent in age 7+ literate)
Anugul	41.95	13.90	68.8
Balangir	28.75	11.55	55.7
Baleshwar	32.99	10.88	70.6
Bargarh	24.51	7.69	64.0
Baudh	21.89	4.82	57.7
Bhadrak	32.09	10.58	73.9
Cuttack	56.87	27.41	76.7
Debagarh	21.61	7.33	60.4
Dhenkanal	40.15	8.70	69.4
Gajapati	21.91	10.18	41.3
Ganjam	36.86	17.16	60.8
Jagatsinghpur	45.55	9.87	79.1
Jajpur	44.08	4.49	71.4
Jharsuguda	53.27	36.40	70.7
Kalahandi	20.00	7.51	45.9
Kandhamal	30.54	6.81	52.7
Kendrapara	32.54	5.69	76.8
Kendujhar	30.67	13.64	59.2
Khordha	69.72	42.97	79.6
Koraput	27.05	16.82	35.7
Malkangiri	16.31	7.21	30.5
Mayurbhanj	33.58	6.99	51.9
Nabarangpur	17.04	5.82	33.9
Nayagarh	37.74	4.29	70.5
Nuapada	22.27	5.66	42.0
Puri	39.95	13.60	78.0
Rayagada	24.62	14.02	36.1
Sambalpur	46.34	27.37	67.3
Sonepur	22.58	7.41	62.8
Sundargarh	40.62	34.38	64.9
Orissa	**35.27**	**14.97**	**63.1**

Source: [1] Directorate of Census Operations (2001b), [2] Directorate of Census Operations (2001a), [3]Directorate of Census Operations (2004).

Table 4.6: Results of Regression Analysis of Total Fertility Rate on Socio-Economic Indicators in Orissa: District Level Analysis

Variables	Coefficients	Std. Error	Std. Coefficients	t	Sig.
Constant	3.917	0.284	0.000	13.810	0.000
Infant mortality Rate	0.001	0.002	0.040	0.318	0.753
% in non-agri. Activities	-0.006	0.007	-0.227	-0.886	0.384
% Urban	-0.001	0.006	-0.022	-0.120	0.905
Literacy	-0.015	0.004	-0.629	-3.264	0.003

Dependent Variable: TFR, No. of Cases: 30, R: 0.844, R Square: 0.712, Adjusted R Square: 0.666, Std. Error of the Estimate: 0.197

Source: Computed from Table 4.4 and 4.5.

4.2 Trends in Proximate Determinants of Fertility

In India, National Family Health Survey (NFHS) for the first time provided data on marriage, use of contraception, length of post partum amenorrhea and outcome of pregnancies which helped us to estimate the values of proximate determinants of fertility and to understand transition from natural to controlled fertility.

A) Index of Marriage (Cm):

The value of the index of marriage (Cm) measures the effect of proportions married on fertility estimated from the information on total fertility rates (TFR) and total marital fertility rates (TMFR). The values for Orissa for both the periods of NFHS I and II are shown in Table 4.7. As is evident the TFR has declined from 2.92 to 2.46 in Orissa over the period while in case of TMFR it has slightly increased from 4.59 to 4.71. The estimated values of Cm or the index of marriage during 1990-92 in the state was 0.635 which came down to 0.523 during 1996-98 suggesting that the fertility inhibiting influence of late marriage has risen.

B) Index of Contraception (Cc):

Cc, the index of contraception is estimated from the information on method specific contraceptive prevalence rates and use-effectiveness of various methods. The average effectiveness is assumed to be 1.0 for sterilization, 0.95 for IUD, 0.90 for pills and 0.7 for all other methods. It measures the fertility inhibiting effect of contraceptive use. A high value of Cc is associated with low use of contraception. In case of Orissa it is found that there is the decline in index from 0.617 to 0.522 showing a greater increase in the acceptance of family planning methods. A large proportion of women in Orissa go for sterilization.

Table 4.7: Proximate Determinants of Fertility in Orissa, NFHS I and II

Determinants	NFHS I	NFHS II
Marriage		
TFR[1]	2.92	2.46
TMFR	4.59	4.71
C(m)	0.635	0.523
Contraception		
Contraceptive Use by Method		
Sterilization	0.316	0.356
IUD	0.015	0.008
Pills	0.009	0.030
Other methods	0.023	0.074
CPR(u)	0.363	0.468
Use Effectiveness(e)	0.976	0.945
C(c)	0.617	0.522
Abortion		
Ratio of Induced Abortions to live births	0.010	0.016
TA	0.028	0.043
C(a)	0.995	0.990
Post Partum Infecundability		
Median No. of months of Amenorrhea[1]	8.5	8.7
Median No. of months of Abstinence[1]	4.7	4.4
Post Partum Non-susceptibility[1]	10.2	11.1
C(i)	0.697	0.676

Source: [1] IIPS (1995b), IIPS and ORC Macro (2000b).

C) Index of Abortion (Ca):

The index of Ca is estimated from the reported life time experience of induced abortions, contraceptive use and total fertility rate. Total abortion rate (TA) is defined as "the average number of induced abortions per woman at the end of the reproductive period if current age specific induced abortions remain at prevailing levels throughout the reproductive period" (Bongaarts and Potter, 1983). To estimate the total abortion rate, data are not available in NFHS. Therefore information on the outcome of all lifetime pregnancies is used to derive approximate estimates of total abortion rate. However TA is calculated by multiplying the total fertility rate by the ratio of induced abortions to all live births (Visaria, 1999). The estimated values of Ca show that there is a very insignificant improvement as the index declined from 0.995 to 0.990. Therefore, it is

evident that there is an insignificant fertility inhibiting effect of abortion in Orissa as very negligible proportions of women go for induced abortion. Apart from this, the reliability of survey data on induced abortion is questionable as there is the greater possibility of under-reporting. Many women do not feel comfortable to tell about the induced abortions as there is the social stigma attached to it. Hence, it must be acknowledged that the effect of this determinant can not be studied with accuracy.

D) Index of Post partum infecundability (Ci):

The index of post partum infecundability Ci is estimated from the information of post partum non-susceptibility which is defined as the net duration of post partum amenorrhea or abstention or both. The period of post partum infecundability is demographically important as it operates on fertility through changes in birth interval. If the breast feeding and post partum abstinence are not in practice, the birth interval comes out, on an average, about 20 months in the absence of contraception for spacing (the sum of 1.5 months of minimum post partum of an ovulation, 7.5 months of waiting time to conception, 2 months of time added by spontaneous intrauterine mortality and 9 months associated with live birth/ for a full term pregnancy). However, with post-partum infecundability on account of breast feeding and abstinence, the average birth interval is approximately equal to 18.5 months (7.5+2+9) plus the duration of post partum infecundability. The index Ci is therefore estimated as 20/(18.5+i). The duration of post partum infecundability in Orissa shows a very small increase from 10.2 months to 11.1 months over the period of NFHS I and II. The estimated values of Ci show that the index of post-partum infecundability has declined only slightly over the period from 0.697 to 0.676.

Values of Fertility indices:

Values of the fertility inhibiting effects of the proximate determinants and the estimates of the total fecundity rates for Orissa for the period 1992-93 and 1998-99 are presented in Table 4.8. It is evident that if the fertility inhibiting effect of delayed marriage (as well as widowhood/divorce) is removed, without any other changes in fertility behaviour, fertility level will increase to a level TM (Total marital fertility rate). It also reflects that,

if the practice of contraception and induced abortion are eliminated, the fertility will rise further to a level of TN (Total Natural Marital Fertility Rate). Again if we remove the practice of lactation and post partum abstinence, fertility will further rise to a level of TF (Total fecundity rate). So, in a population, if all women married early and if breast feeding and post partum abstinence, contraception and induced abortion are not practiced, the total fecundity rate (TF) is the expected number of children a woman will have during her reproductive life span. Bongaarts has empirically shown that the TF of most populations fall within the range 13 to 17 births per woman with an average of 15.3. For Orissa, the total fecundity rate in 1992-93 is estimated to be 10.7 births which is much lower than the Bongaart's average of 15.3. Again in 1998-99 the estimated TF is 13.5 which is also about two children lower than the Bongaart's average. One can say that there is an improvement in the fecundability over the period mainly because of the improvement in health care services and nutritional status of women. But such a large increase in a short time can also be questioned. This has happened possibly due to the errors in reporting of various indicators like age at marriage, duration of breastfeeding and so on. The contribution of use of contraception to depressing the total fecundity was 2.9 during 1992-93 which has increased to 4.4 during 1998-99. Contraception inhibits TF by 27 and 33 percent in Orissa in NFHS I and II respectively. The fertility inhibiting influence of delayed marriage on total fecundity is much less than that of contraception (16 and 17 percent in NFHS I and II respectively). It was 1.7 births in NFHS I while 2.3 births in NFHS II. The fertility inhibiting effect of post partum infecundability is much higher in case of Orissa. It is 31 and 33 percent in NFHS I and II respectively. This shows that women in Orissa breastfed their child to a longer period which is a great inhibiting effect on fertility.

Table 4.8: Values of Fertility Indices for Orissa, NFHS I and II

Fertility Indices	NFHS I	NFHS II
TFR	2.92	2.46
C(m)	0.635	0.523
C(c)	0.617	0.522
C(a)	0.995	0.990
C(i)	0.697	0.676
TF	10.7	13.5
TM	4.59	4.71
TN	7.5	9.1
TM – TFR	1.7	2.3
TN – TM	2.9	4.4
TF – TN	3.3	4.4

Source: Computed from Table 4.7.

Table 4.9: Percent Change in Proximate Determinants from NFHS 1 to NFHS II for Orissa

Determinants	Values
$TFR_{1998-9}/TFR_{1992-3}$	0.84
Cm_{1998-9}/Cm_{1992-3}	0.82
Cc_{1998-9}/Cc_{1992-3}	0.85
Ca_{1998-9}/Ca_{1992-3}	1.00
Ci_{1998-9}/Ci_{1992-3}	0.97
TF_{1998-9}/TF_{1992-3}	1.25
Percent Change	
TFR	-15.75
C(m)	-17.64
C(c)	-15.40
C(a)	-0.50
C(i)	-3.01
TF	25.16

Source: Computed from table 4.8.

Changes in Proximate Determinants of Fertility from NFHS I to NFHS II:

The ratios of the values of fertility inhibiting effects of proximate determinants and the estimates of the total fecundity rates and also the percent changes in these values over the period are shown in Table 4.9. It is evident that, in Orissa there is a decline of 18 percent in proportion married over the period of NFHS I and II. The net effect of decline in the proportion married is obviously due to the rise in the age at marriage. Similarly, the decline in the proportion of non-contraceptors is found to be 15.4 percent in Orissa. This

reflects that the prevalence of contraceptive rate is in upward direction. In case of induced abortions, there is an increase in the abortion rate but the improvement is very negligible. There is an improvement of 3 percent in the duration of post partum infecundability in Orissa over the period of 1992-93 and 1998-99. The results show that there is an improvement of 25 percent in the fecundity rate which reflects that there may be the improvement in the nutritional status or due to higher secondary sterility needs to be explored. But such a large increase within a short span makes the result questionable. This has occurred may be due to the errors in data.

4.3 Conclusions:

Therefore, to conclude, the analysis demonstrated that, fertility has declined in Orissa since the 1970's. Such decline in an extremely backward state is quite remarkable. The regression analysis shows that, literacy level is the most critical variable related to fertility in Orissa. The decline in the value of Cm in Orissa over the period of NFHS I and II is largely due to an increase in the age at marriage. With the spread of education and some of the urban values through mass media, we can expect the age at marriage of women to go up in the near future. Post partum infecundability and contraceptive use are the key major determinants which have a greater inhibiting effect on fertility in Orissa. Fecundability among Orissan women seems to be low which calls for further investigation.

Chapter V
Family Building Process in Orissa

Family Building Process in Orissa

There are various ways of studying and measuring fertility. Fertility differentials are conventionally studied with the help of cumulative fertility (children ever born) or current fertility (using a measure like crude birth rate or total fertility rate). Both these indicators, i.e., Total Fertility Rate and Crude Birth Rate have been used for long by the planners and programme managers. However, such indicators do not provide an understanding of fertility trends in an effective manner. A more promising approach for the study of dynamics of human fertility is Period Parity Progression Ratio (PPPR). This approach enables one to study trends in family building process and to understand how a society is progressing towards destabilization of high fertility (Feeney and Yu, 1987). The study of family building process is important not only for scientific reasons but also for evaluating the existing population policies and programmes, which tend to have goals formulated in terms of parity progression, e.g., stopping at two. (Gandotra *et al.,* 1998). Therefore, the principal measure used here is the Period Parity Progression Ratio (PPPRs). A woman's parity is defined as the number of children she has ever borne and a parity progression ratio is defined as the proportion of women of a specified parity who eventually move (progress) on to the next parity (on to have one more child).

The Period Parity Progression Ratios (PPPRs) have been computed for Orissa for periods of single calendar years during 1984-98 for progressions up to the 6^{th} parity. Progressions beyond the 6^{th} birth are not computed since very few women had seven or more births and the denominators for progression become quite small. Only 4 percent women have had 7 or more births and only 2 percent women have 8 or more births and so on. Therefore, it is not possible to study changes in Period Parity Progression Ratios at higher parities using NFHS data as it covers women below the age of 50 years. Since the survey was conducted during 1999, the PPPRs have been computed up to and including the year 1998.

5.1 Trends in Period Parity Progression Ratios:

The Period Parity Progression Ratios for Orissa during 1984-98 are presented in Table 5.1. For the sake of better understanding the PPPR is shown in Figure 5.1. The notation P_0 refers to the progression from women's birth to her first birth, P_1 refers to the progression from first birth to second birth and so on. The results show that the progression to the first birth has an irregular trend and the PPPR generally below 0.9. As in Orissa births outside marriage are quite negligible and progression from women's birth to her marriage has not been explored because of the non-reliability of data, therefore it may be due to the lower proportion of ever marrying women (Gandotra *et al.* 1998 found that, the proportion ever marrying is comparatively low in Rajasthan, Orissa, West Bengal, Assam, Goa and Kerala) or may be due to primary sterility. The PPPR from the first to the second parity has remained more or less steady with values from 0.9 to 0.98 and generally higher than 0.95 indicating near universal progression to the second birth.

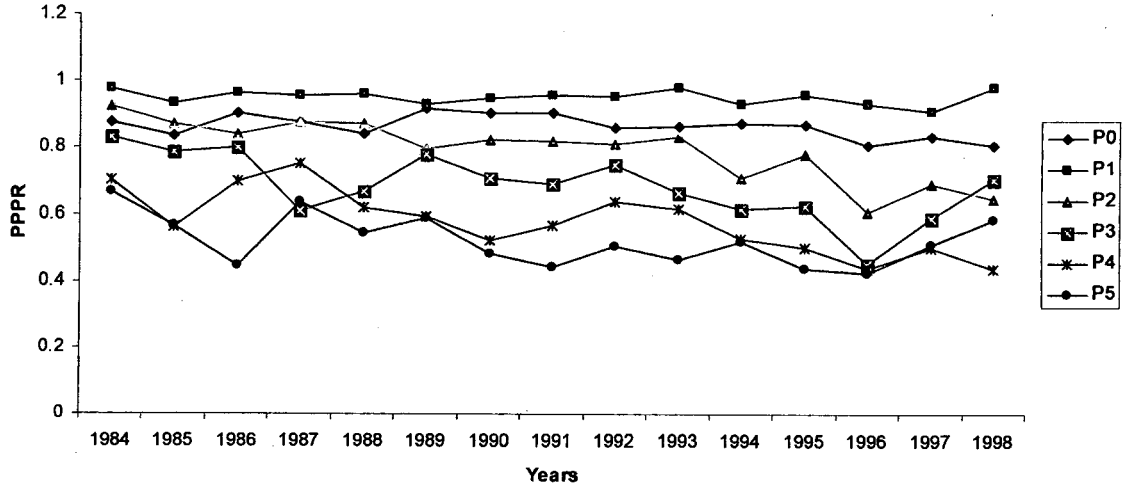
For the PPPR from the second to the third parity (P_2), a clear declining trend is visible from about 0.9 in the mid 80's to below 0.7 in the late 90's. In other words, the proportion of women moving to the third parity ranges between 927 per 1000 women in 1984 to 644 per 1000 women in 1998 showing a clear cut decline. Similarly, the PPPR to the fourth birth also shows a decline from over 0.8 in the mid 80's to about 0.7 in the late 90's. The PPPR values have fallen substantially for fourth, fifth and sixth parities as well. A close look at the third and higher order birth progressions reveal that, the tendency to go for the third and higher order births has declined, though the decline is not steep while most continue to go for the second child.

Table 5.1: Period Parity Progression Ratios, Orissa, 1984-98

Year	P_0	P_1	P_2	P_3	P_4	P_5
1984	0.8772	0.9805	0.9274	0.8332	0.7059	0.6706
1985	0.8369	0.9327	0.8703	0.7863	0.5608	0.5677
1986	0.9018	0.9667	0.8429	0.8000	0.7010	0.4460
1987	0.8769	0.9580	0.8772	0.6125	0.7532	0.6387
1988	0.8393	0.9590	0.8713	0.6681	0.6190	0.5462
1989	0.9163	0.9285	0.7985	0.7795	0.5929	0.5885
1990	0.9040	0.9487	0.8223	0.7083	0.5206	0.4836
1991	0.9025	0.9561	0.8208	0.6921	0.5655	0.4434
1992	0.8579	0.9514	0.8092	0.7462	0.6368	0.5038
1993	0.8635	0.9805	0.8325	0.6626	0.6173	0.4656
1994	0.8730	0.9315	0.7066	0.6143	0.5280	0.5160
1995	0.8675	0.9586	0.7798	0.6229	0.4985	0.4395
1996	0.8040	0.9289	0.6087	0.4497	0.4390	0.4244
1997	0.8320	0.9065	0.6894	0.5891	0.5010	0.5071
1998	0.8072	0.9772	0.6445	0.7048	0.4404	0.5848

Source: Computed from NFHS II data files.

Figure 5.1 Period Parity Progression Ratios , Orissa, 1984-98, Annual Series



Source: Table 5.1

It is seen that there are some fluctuations over the period as a result of which the trend is not steady. This can be attributed by two plausible reasons:

1. For single years, the number of women at specified duration may not be large.
2. Misdating of births might have caused fluctuations due to reporting errors, which often occurs due to digit preferences.

5.2 Differentials in PPPR by Place of Residence:

To avoid such shortcomings, a five year period was considered to be appropriate for computing the Period Parity Progression Ratios. The five year periods considered here are 1984-88, 1989-93 and 1994-98. The PPPRs for these five year periods by place of residence are shown in Table 5.2. The results show that PPPR to the first parity is declining comparatively slowly among rural women from 0.88 to 0.86 than urban women from 0.83 to 0.76 through the 15-year period under consideration. Somewhat large decline is found in 1994-98. The PPPR to the second parity shows a fairly steady level over the period of observation. The PPPR to the third and higher parities are smaller for urban women compared to rural women. Further though the PPPR to the third parity shows a decline through 1994-98 for both urban and rural, the fall is quite steep among urban women from 0.78 to 0.60 to the third parity, from 0.73 to 0.59 to the fourth parity and from 0.69 to 0.38 to the fifth parity. The decline is also visible among rural women but not to the extent as urban. Clearly it shows that, a significant decline is found after second parity which means that, one-fourth of the women from rural area and two fifth of women from urban area do not go for the third births in the more recent period.

For progression from the fourth to the fifth parity, the ratio has declined since 1984-88 onwards but much faster during 1994-98. In Orissa, the PPPR from fourth to fifth parity was below 0.7 even during 1984-88 and thus appears to have been low even before the mid 80's but over the next 15 years, the PPPR declined from 0.68 to 0.49.

Thus it is clear that, two-fifth of women in urban areas stop at the third parity while the same proportion of women stops at the fourth parity in rural areas. The decreases in progression to third and higher order births are faster in urban areas than in rural areas.

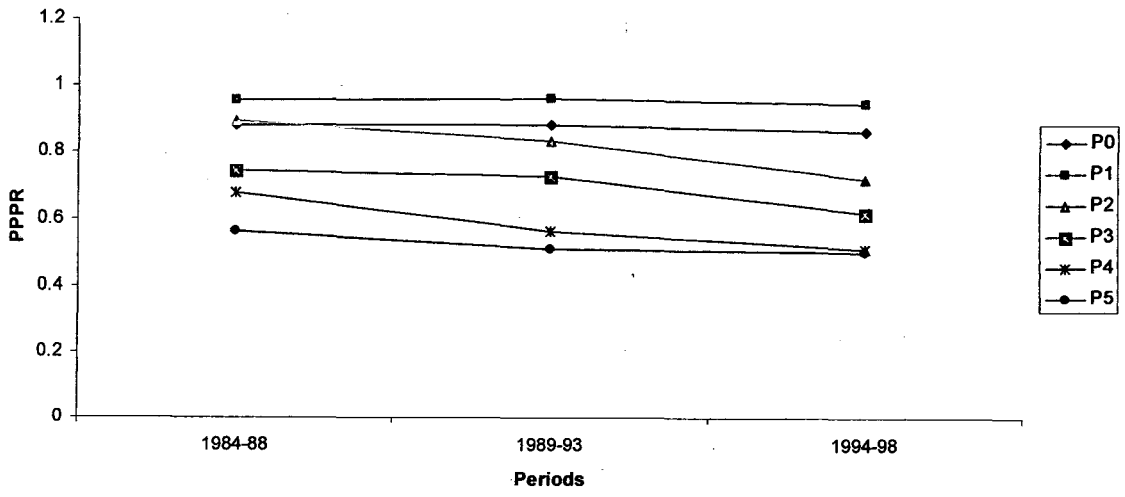
The parity progression for rural areas is naturally closer to the state averages because 85 percent of the population of Orissa lives in rural areas.

Table 5.2: Period Parity Progression Ratios by Place of Residence, Orissa, 1984-98

Period	P_0	P_1	P_2	P_3	P_4	P_5
			Rural			
1984-88	0.8824	0.9547	0.8926	0.7442	0.6753	0.5630
1989-93	0.8816	0.9596	0.8305	0.7272	0.5645	0.5110
1994-98	0.8571	0.9423	0.7166	0.6153	0.5071	0.4983
			Urban			
1984-88	0.8297	0.9586	0.7787	0.7303	0.6858	0.5682
1989-93	0.8330	0.9329	0.7583	0.6852	0.6960	0.4460
1994-98	0.7594	0.9330	0.6021	0.5938	0.3828	0.5004
			Total			
1984-88	0.8681	0.9550	0.8705	0.7410	0.6770	0.5653
1989-93	0.8712	0.9539	0.8154	0.7199	0.5904	0.5808
1994-98	0.8352	0.9407	0.6901	0.6111	0.4862	0.4952

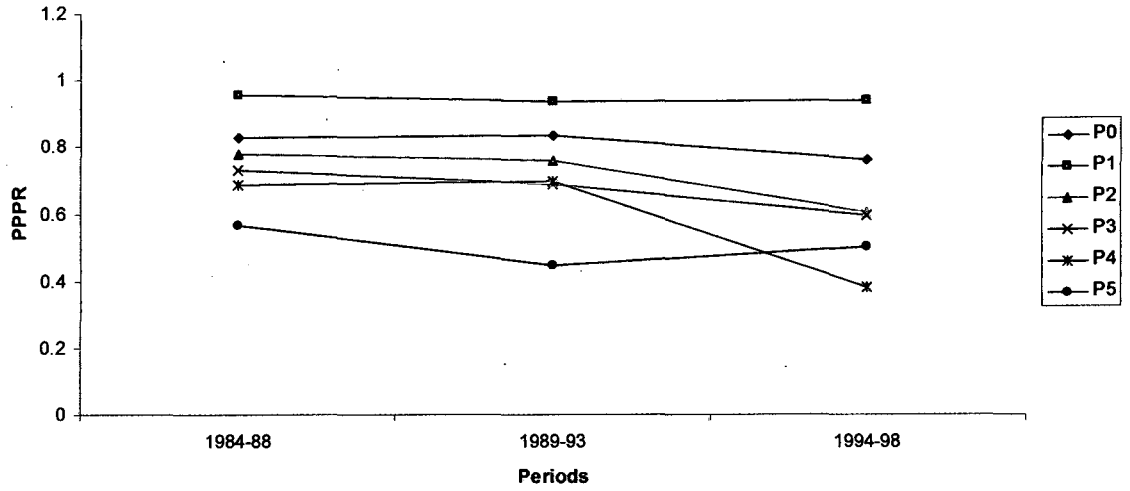
Source: Computed from NFHS II data files.

Figure 5.2: Period Parity Progression Ratios, Orissa, Rural, 1984-98



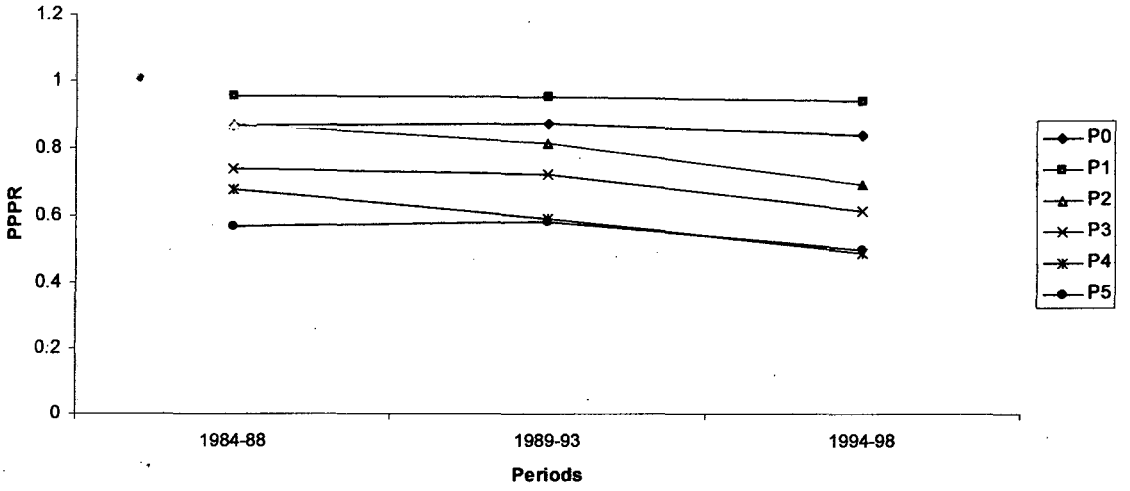
Source: Table 5.2

Figure 5.3: Period Parity Progression Ratios, Orissa, Urban, 1984-98



Source: Table 5.2

Figure 5.4: Period Parity Progression Ratios, Orissa,1984-98



Source: Table 5.2

5.3 Conclusions:

From the above analysis, we can infer that, the progression to the first two parities is still high, and very little decline is visible through the period under study 1984-98. It is only at the third birth that the decline in PPPR is seen. We can infer that there are broadly two groups of people in Orissa, i.e., one group who stop at second birth and the other group who continues till fifth or higher births. The more surprising observation is that still there are about fifty percent of women in Orissa who move on to the fifth birth. In rural areas the remarkable decline is visible from fourth order births. Parity progression has comparatively declined more in urban areas compared to rural areas. This is to be expected as the practice of family planning is higher in urban areas (54 percent) than rural areas (46 percent). The availability, accessibility and affordability for family planning services are much wider in urban areas compared to rural areas. So, there is a further scope for the decline in fertility in Orissa by giving more emphasis to the rural population who go for the third and higher order parities.

Chapter VI
Determinants of Fertility and Contraceptive Use in Orissa

Determinants of Fertility and Contraceptive Use in Orissa

6.1 Fertility Differentials:

An important aspect of fertility research is the study of fertility differentials among population groups classified in terms of various socio-economic and cultural characteristics such as caste, religion, education, place of residence, standard of living and so on. Information about such differentials is necessary to identify the factors and assess the prospects for change. It is also useful for identifying the major determinants of the fertility level of the population.

Total Fertility Rate:

A good measure to assess the magnitude of fertility decline is the total fertility rate. The total fertility rate in Orissa has been fallen from 4.0 births per woman in 1980 to 2.6 by 2003. That means a decline of 1.4 births per woman during the 24 years period. The estimate of fertility by NFHS is slightly lower than the SRS estimate. The NFHS estimate of TFR is 2.46 during 1996-98 periods with rural areas having higher fertility (2.50) than urban areas (2.19). Particularly all the socio-economic groups have experienced this decline in fertility in the state. A comparison of NFHS I and II shows that there has been decline in fertility in all the groups (Table 6.1). Considerable decline in fertility is observed in Muslims and Christians. Their fertility has declined by about one child. Similarly, quite a remarkable fertility decline is also observed among scheduled castes. This is crucial in a state where two-fifth of the population belongs to SC and ST. Any significant decline in fertility for the state depends on the fertility decline among these socio-economically backward sections of the society.

Table 6.1: Total Fertility Rate[1] by Background Characteristics for the three years Preceding the Survey, Orissa, NFHS I and II

Background Characteristics	NFHS I	NFHS II
Place of Residence		
Urban	2.53	2.19
Rural	3.00	2.50
Education		
Illiterate	3.17	2.82
Literate, <Middle school complete	3.08	2.42
Middle school complete	2.59	1.96
High school complete and above	1.63	1.62
Religion		
Hindu	2.90	2.45
Muslim	4.25	3.01
Christian	3.36	2.43
Caste		
SC	3.68	2.85
ST	2.90	2.66
OBC	} 2.82	2.47
Others		2.07
Standard of Living Index (SLI)		
Low	-	2.69
Medium	-	2.40
High	-	1.77
Total	2.92	2.46

Source: IIPS and ORC Macro (2000b).
[1] Rate for women age 15-49

Mean Children Ever Born:

For studying the levels of fertility, the mean children ever born has been considered as the key indicator. Table 6.2 shows the mean of total children ever born as well as both male and female children ever born by background characteristics of women. The average number of children ever born to all ever-married women in the reproductive age group is 2.83. With respect to ethnicity, it is clear that women belonging to SC/ST have comparatively higher CEB than the women belonging to general and OBC category. Religion is also one of the main factors which influence the fertility differentials. Mean CEB is higher among other religious group, in which majority belongs to Muslims.

Among the Muslim women there is a tendency to have more children compared to Hindu women, possibly due to the fact that they have cultural or religious opposition to use family planning methods. Educational level of women has a strong bearing on the mean number of CEB. Illiterate women have 3.1 mean CEB while those with educational level higher secondary and above have only 1.4 mean CEB. So it may be argued that illiterate women are less conscious and do not realize the importance of small family size than those of women with higher educational level. Place of residence of women does not make any difference in the number of mean CEB as for those who are living in rural areas as well as urban areas, the mean CEB is 2.8. With respect to standard of living, those belonging to low, medium and high standard of living have experienced 2.9, 2.8 and 2.5 mean CEB respectively. Therefore, standard of living shows a negative impact on the women having the mean number of CEB. It is anticipated that, increases in the standard of living leads to the quantity-quality trade off that is as living standard increases the women tend to have lesser number of children but of better quality. By work status of women, it shows that those women who are engaged in agriculture and household activities have higher mean CEB (3.0) than those who are not working and those who are engaged in non-agricultural activities (2.8).

The completed fertility, i.e., the mean CEB to women of age 40-49 years is much higher (4.2) than those who are below 40 years of age (2.5). Those women who got married at an early age show a higher mean CEB than those who married at a later age. Women who married in the age group of 12-14, 15-19 and 20+ have 3.6, 3.0 and 1.9 mean CEB respectively. As marital duration increases, the mean children ever born also tend to increase. It increased from 0.8 among women with marriage duration of 0-4 years to 2.1 among women with 5-9 years of marriage duration and 3.9 among women with 15 and above years of marital duration. As the marital duration increases, desired family size tends to be achieved leading to the higher mean CEB to women. Those women who have experienced infant death show higher (4.4) number of mean Children ever born than their counterparts (2.4). When there is infant death, women prefer to go for another child and that leads to higher mean CEB. Low status of women in the household leads to lower number of mean CEB which needs a detailed study for exploring the reason behind it.

Those women who are not exposed to any mass media show a higher number of mean CEB (2.98) than those who are exposed (2.67). Similarly, those women who have ever discussed about family planning with their husband show a lower (2.7) mean children ever born than that of their counterparts (2.9). This shows that, when inter-spousal communication towards family planning is there, the possibility for the acceptance of contraception is higher leading to the lower number of children to have.

Table 6.2: Mean Children Ever Born by Background Characteristics

Background Characteristics	N	Mean Children Ever Born (for women 15-49		
		Male	Female	Total
Caste				
SC	918	1.53	1.34	2.87
ST	818	1.47	1.41	2.88
OBC	1377	1.47	1.34	2.82
Others	1312	1.42	1.37	2.79
Religion				
Hindu	4257	1.46	1.35	2.81
Others	168	1.68	1.60	3.28
Women's education				
No education	2375	1.62	1.52	3.14
Primary	915	1.53	1.41	2.94
Secondary	938	1.15	1.08	2.23
Higher	197	0.81	0.63	1.44
Place of Residence				
Urban	868	1.48	1.35	2.83
Rural	3557	1.46	1.37	2.83
Standard of living				
Low	2267	1.50	1.42	2.92
Medium	1593	1.47	1.36	2.83
High	565	1.32	1.15	2.47
Work status of women				
Not working	3111	1.45	1.33	2.79
Agriculture	678	1.59	1.46	3.05
Non-agriculture	636	1.42	1.40	2.82
Age group				
15-39	3457	1.26	1.19	2.45
40-49	968	2.20	1.98	4.18
Age at first marriage				
12-14	607	1.79	1.76	3.55
15-19	2957	1.52	1.42	2.95
20+	861	1.04	0.88	1.93
Marital Duration				
0-4	776	0.41	0.36	0.77

5-9	895	1.07	1.05	2.13
10-14	792	1.56	1.48	3.04
15+	1962	2.03	1.86	3.88
Infant Death				
No	3506	1.24	1.17	2.41
Yes	919	2.32	2.10	4.42
Status of women				
Low	1247	1.40	1.28	2.68
Moderate	2322	1.48	1.39	2.87
High	856	1.53	1.43	2.96
Exposure to mass media				
Not exposed	2327	1.53	1.45	2.98
Exposed	2098	1.40	1.27	2.67
Spousal Communication				
No	3389	1.50	1.38	2.87
Yes	1036	1.38	1.32	2.70
Total	4425	1.47	1.36	2.83

Source: Computed from NFHS II individual data file.

6.1.1 Determinants of Children Ever Born: Results of Multiple Classification Analysis (MCA)

Table 6.3 shows the results of the multiple classification analysis (MCA) which gives the information on the mean number of children ever born to women under study in the two forms – Unadjusted and Adjusted. Along with the category of means, the table also provides an Eta (ή) value, which is a common correlation ratio associated with the set of unadjusted category effects. The Eta ($ή^2$) indicates the proportion of variance as experienced by a given predictor variable (all categories combined). Associated with the adjusted category effects for each independent variable, there is a partial correlation ratio, which is represented by beta (β) in the table. These beta (β) values can be valued as standardized partial regression coefficients. Finally the Multiple Classification Analysis provides a multiple "R" value, which is a multiple correlation between the dependent variable and all factors and the covariate.

Here the analysis has been restricted to currently married women who have been married only once. Currently married women have been taken because their marital status effectively controls for variation in birth histories and in the use of contraception which are of interest to policy makers and programme managers. Marital duration has been

included as a covariate. The results reveal that, religion has a substantial effect on the number of CEB. The unadjusted values show that, Hindu women have less number of children (2.84) than those who belong to other religious group (3.41). But this indicates that even after making an adjustment for all the variables and covariates used in the model, the explanatory power of religion in determining the CEB is more or less constant and very high. Thus the results indicate that Hindu women are more satisfied with fewer numbers of children than other religious groups. The unadjusted category of means reveal that the educational level of women has a significant negative influence on their fertility that is higher the educational level lower the number of children. The average number of CEB to those women who have been categorized as illiterate, primary, secondary and higher are found to be 3.21, 2.98, 2.23, 1.44 respectively. Even after controlling other predictor variables and covariate, the predictive power of women's educational level has the negative influence on children ever born. Unadjusted means by place of residence do not show significant difference. However, after being adjusted the predicted mean of urban women shows a higher value (2.98) than the rural women (2.83).

Standard of living has a substantial negative effect on the number of children ever born. The unadjusted values shows that those women who have been categorized as low, medium and high SLI are found to have 2.99, 2.82 and 2.49 mean number of CEB respectively. This also shows that after controlling the effect of other predictors, standard of living has a negative effect on mean number of CEB. As the standard of living increases women tend to have lesser number of children but of better quality. With respect to work status of women, the unadjusted means reveals that, higher average number of children is found among those women who are engaged in agriculture and household related activities than those who are not working and engaged in non-agricultural sectors. But after controlling the other predictors, the work status of women does not show significant effect. The age at marriage of women has a negative influence on children ever born in both the cases, i.e., unadjusted and adjusted. But the differences in adjusted means are small, because most of the effect of age at marriage would be via marital duration, but once the latter is a co-variate, the residual effect is small.

The number of children is also strongly influenced by experiencing infant death. After controlling the other predictors, it is found that a difference of (3.88 – 2.59 = 1.29) over one child, is found between those women who have experienced infant death and those who do not. Therefore infant mortality significantly increases fertility with the expectation that most parents try to replace a dead child by having another one. There is, of course, some biological effect, due to curtailed breastfeeding on account of infant death as well as possibly insurance effect, well recognized in demographic literature. The unadjusted category of means shows that the women's exposure to mass media has a significant negative effect on their fertility, that is, those who are exposed to mass media show lower mean CEB (2.68) than those who are not exposed to mass media (3.03). But such effect becomes negligible after controlling the other predictors. Again the unadjusted effect of spousal communication towards family planning on children ever born shows that those who have discussed have lower (2.70) mean CEB than those who have not discussed (2.92). But such effect reverses direction when other variables are controlled. The plausible explanation may be given that women who are experiencing more number of child births are discussing more about family planning to reduce their family size.

Table 6.3: Multiple Classification Analysis of Children Ever Born on Background Variables, NFHS II, Orissa

Background Variables	N	Unadjusted Deviations	Eta	Deviations Adjusted	Beta	Unadjusted Predicted Mean	Adjusted Predicted Mean
Caste			0.031		0.027***		
SC	840	0.07		-0.02		2.93	2.84
ST	717	0.09		0.10		2.95	2.96
OBC	1301	-0.04		-0.05		2.82	2.81
Others	1233	-0.05		0.01		2.81	2.87
Religion			0.055		0.045***		
Hindu	3946	-0.02		-0.02		2.84	2.84
Others	145	0.55		0.45		3.41	3.31
Women's education			0.262		0.088***		
No education	2132	0.35		0.12		3.21	2.98
Primary	854	0.12		0.00		2.98	2.86
Secondary	912	-0.63		-0.17		2.23	2.69
Higher	193	-1.43		-0.55		1.44	2.31
Place of Residence			0.007		0.030**		
Urban	800	-0.03		0.12		2.83	2.98
Rural	3291	0.01		-0.03		2.87	2.83
Standard of living			0.086		0.019**		
Low	2024	0.13		0.03		2.99	2.89
Medium	1517	-0.04		-0.01		2.82	2.85
High	550	-0.37		-0.08		2.49	2.78
Work status of women			0.063		0.018		
Not working	2978	-0.07		0.02		2.79	2.88
Agriculture	590	0.27		-0.06		3.13	2.80
Non-agriculture	523	0.07		-0.05		2.93	2.81
Age at marriage			0.263		0.029***		
12-14	529	0.76		0.08		3.62	2.95
15-19	2736	0.13		0.01		2.99	2.87
20+	826	-0.91		-0.10		1.95	2.76
Infant Death			0.424		0.272***		
No	3243	-0.41		-0.27		2.45	2.59
Yes	848	1.58		1.02		4.44	3.88
Exposure to mass media			0.091		0.008		
Not exposed	2095	0.17		0.01		3.03	2.88
Exposed	1996	-0.18		-0.02		2.68	2.84
Spousal Communication			0.050		0.100***		
No	3065	0.06		-0.11		2.92	2.75
Yes	1026	-0.16		0.33		2.70	3.19
Multiple R=0.709		R^2=0.502		N=4091		Grand Mean = 2.86	

Level of Significance: ***P<0.01; **P<=0.05; *P<=0.01

Note: Marital duration is used as a covariate. This analysis has been carried out only for currently married women.

Source: Computed from NFHS II individual data file.

6.1.2 Differentials in completed Fertility:

Table 6.4 shows the mean number of children ever born to ever married women aged 40-49. The average number of CEB for those women who are at the end of their childbearing is 4.18. This shows that substantial decline in fertility in Orissa over time is evident from the difference of 1.71 children between TFR (2.46) and Completed fertility (4.18). In almost every case, the pattern of differentials in the completed family size parallels the pattern of differentials in mean children ever born for currently married women. The mean CEB is higher among other religious group than Hindus. Higher the educational level, higher standard of living and higher age at marriage lead to lower average number of children ever born. Mean completed family size is found to be higher in rural areas compared to women residing in urban areas. Women residing in urban areas are more aware and can access more family planning services and also the cost of child bearing is high compared to rural areas. Those women who have experienced infant death show higher mean number of CEB (5.36) than those who have not experienced infant death (3.59). Similarly higher status of women in the household leads to lower number of mean CEB. Women exposed to mass media show less number of mean CEB than those not exposed. Again, spousal communication towards family planning does not show a difference in a desired direction probably due to the fact that those women who discussed about family planning have already experienced higher number of CEB.

Table 6.4: Mean Number of Living and Ideal Children among Ever-Married Women aged 40 and above by Background Characteristics

Background Characteristics	CEB		*Mean number of			
	N	Mean	N	Living Children	Ideal Children	Gap (Living-Ideal)
Caste						
SC	184	4.04	178	3.19	2.93	0.25
ST	144	4.31	131	3.40	3.22	0.18
OBC	327	4.21	321	3.48	2.88	0.60
Others	313	4.17	299	3.35	2.69	0.66
Religion						
Hindu	934	4.15	899	3.35	2.87	0.47
Others	34	4.94	31	4.00	2.97	1.03
Women's education						
No education	556	4.33	528	3.34	3.06	0.27
Primary	237	4.18	228	3.49	2.82	0.67
Secondary	148	3.89	147	3.48	2.46	1.02
Higher	27	2.56	27	2.44	2.04	0.41
Place of Residence						
Urban	199	4.05	191	3.45	2.74	0.71
Rural	769	4.21	739	3.35	2.91	0.44
Standard of living						
Low	421	4.14	400	3.13	2.99	0.14
Medium	392	4.36	378	3.61	2.91	0.70
High	155	3.81	152	3.39	2.49	0.90
Work status of women						
Not working	694	4.29	670	3.54	2.87	0.67
Agriculture	130	3.99	123	2.89	2.90	-0.01
Non-agriculture	144	3.81	137	2.98	2.89	0.09
Age at first marriage						
12-14	166	4.67	157	3.57	3.30	0.27
15-19	680	4.17	653	3.38	2.86	0.52
20+	122	3.53	120	3.06	2.41	0.65
Infant Death						
No	646	3.59	623	3.32	2.77	0.55
Yes	322	5.36	307	3.47	3.10	0.37
Status of women						
Low	215	4.26	204	3.31	3.04	0.27
Moderate	489	4.32	469	3.49	2.88	0.61
High	264	3.86	257	3.21	2.75	0.46
Exposure to mass media						
Not exposed	484	4.25	459	3.27	3.06	0.21
Exposed	484	4.11	471	3.47	2.70	0.77
Spousal Communication						
No	884	4.14	849	3.33	2.91	0.42
Yes	84	4.55	81	3.74	2.53	1.21
Total	968	4.18	930	3.37	2.88	0.49

* Those women who could not give the numerical response about the ideal number of children are excluded from the analysis.

Source: Computed from NFHS II individual data file.

6.1.3 Differentials in Ideal Family Size:

Literature on fertility has examined various linkages between the nature of fertility decision making and actual performance in the family building process. In some cases, the notion of individual decision making is ignored and societal decisions on the basis of norms and values are overemphasized. That may be the reason why a difference between ideal family size and actual family size occurs. Therefore, it is important to study the gap between actual and ideal family size by background characteristics of women who are about to complete their family size (40-49 years of age).

To assess women's ideal number of children, NFHS II collected information by asking questions to each woman about the number of children she would like to have if she could start over again. The information is presented in the Table 6.4. Results show that the overall mean ideal number of children is 2.88. The ideal family size is higher among women belonging to ST (3.22) followed by SC, OBC and general caste. Similarly, it is also higher among women belonging to other religious group (2.97) including Muslims than Hindus. Women's educational level and their standard of living make a negative influence on the ideal number of children. Women residing in rural areas show a higher number of ideal children. The ideal family size ranges from 2.41 children for women who had married at 20 and above years to 3.30 children for women who had married within the age group of 12-14 years. Similarly, higher the status of women in the household lower is the number of ideal children which varies from 2.75 children among high status of women to 3.04 children among low status women. Similarly, exposure to mass media and inter-spousal communication has a negative bearing on the average number of ideal children. An attempt has been made to study the gap between actual number of children women have and the ideal number of children they want to have. It is evident that ideal family size varies with the actual family size in all the socio-economic and demographic categories. Again the mean number of children born is higher than the ideal children in all the cases. The reporting about the ideal number of children is women's own personal preferences while decision on whether to bear a child depends on the societal, familial and also personal preferences. Therefore, it is clear that the stated ideal family size is not

completely implemented in Orissa and treated as an indicator of a comparatively lower extent of rationalization.

Actual number of children that women have and the ideal number of children that the women wanted to have depends on two different time references. The number of children born is over her reproductive period; spread over a period of about 30 years prior to the survey while the ideal number of children refers to the time of the survey. As the ideas change from time to time, so there is the possibility of changing the ideal number of children as well. So drawing any conclusions from this information has serious limitations.

6.2 Contraceptive Use:

India has officially accepted a nationwide family planning programme since 1952. But after five decades of government initiated family welfare programmes, the increase in prevalence of contraceptive methods in India has been slow. Family planning is being recognized as one of the most important issues not only as a population number problem but as an issue which affects the health and lives of women and children. Having fewer children and spacing them apart also gives the women a chance to improve own quality of life. Therefore, the increasing use of contraception is indisputably the main proximate determinant of the fertility decline and improves quality of life of a woman and her baby. Table 6.5 shows that the contraceptive prevalence rate in Orissa as well as in India since the 80's. During the 80's only about one fourth of the couple was using contraception in Orissa which was slightly higher than that of the national average. But due to the slow pace in the increase in the prevalence rate in Orissa, India crossed Orissa during 90's. After mid 90's there is fall in the contraceptive prevalence rate both in Orissa and in India. During 2000 a large gap (8 percent points) between Orissa and India is visible due to the lower contraceptive acceptance rate in Orissa.

Table 6.5: Contraceptive Prevalence Rate (Percent of couples of reproductive age effectively using a modern contraception) Orissa and India Since 1980

Years	Orissa	India
1980	29.9	22.3
1985	32.8	32.1
1990	40.7	43.3
1995	40.6	45.8
2000	37.6	46.2

Source: Ministry of Health and Family Welfare (2003).

Table 6.6: Percentage of Currently Married Women Currently Using Different Methods of Contraception and having Unmet Need in Orissa by Place of Residence in NFHS I and II

Methods	NFHS I			NFHS II		
	Rural	**Urban**	**Total**	**Rural**	**Urban**	**Total**
Any Method	34.2	47.4	36.3	45.9	54.0	46.8
Any modern method	32.7	45.1	34.6	39.7	45.2	40.3
Pills	0.6	2.5	0.9	2.6	6.4	3.0
IUD	1.2	3.2	1.5	0.5	3.0	0.8
Condom	0.3	2.2	0.6	0.7	3.0	0.9
Female Sterilization	27.3	33.1	28.2	34.2	30.9	33.9
Male Sterilization	3.3	4.1	3.4	1.7	1.8	1.7
Any Trad. Method	1.5	2.3	1.6	5.4	7.6	5.6
Rhythm	0.9	1.2	0.9	3.7	5.0	3.8
Withdrawal	0.2	0.7	0.3	1.7	2.6	1.8
Other method	0.5	0.4	0.5	0.8	1.2	0.9
Unmet Need	22.3	22.8	22.4	15.5	15.4	15.5
For spacing	12.8	12.3	12.7	8.9	6.5	8.7
For Limiting	9.5	10.5	9.7	6.6	8.8	6.8
Total demand	56.6	70.2	58.6	61.5	69.4	62.3

Source: IIPS and ORC Macro (1995b, 2000b).

Information on method specific contraceptive users for currently married women in Orissa by place of residence in both NFHS I and II is presented in Table 6.6. It is seen that there is an improvement of 22.4 percent in the use of contraception in Orissa over the period of NFHS I and II. Remarkable improvement is found in case of rural Orissa (25.5 percent) compared to urban Orissa (12.2 percent). A vast majority, 86 percent, of the current users are using a modern method in NFHS II. Only female sterilization accounts for 78 and 72 percent of current contraceptive prevalence in NFHS I and II respectively. Only 8 and 10 percent of currently married women are currently using any of the officially sponsored spacing methods (IUD, Pills and Condom) in NFHS I and II

respectively. Nearly 16 percent of currently married women in Orissa have an unmet need for family planning in NFHS II. The unmet need for spacing is a little higher than the unmet need for limiting. Not any difference is found in unmet need in Orissa with respect to place of residence.

Increasing contraceptive prevalence rate is one of the steps needed to reduce fertility in India. Learning, motivation, intention formation in a socio-cultural context contributes to the adaptation of contraceptive behaviour. Such a behaviour generally depends on socio-economic and demographic characteristics at the individual as well as societal level. Among the demographic characteristics, the number of living children a woman have is obviously highly likely to affect on the use of contraception. The desire for additional children decreases with the increasing number of living children. In other words, desiring no more children tends to increase with an increase in number of living children in most societies. Therefore it is pertinent to study the determinants of contraceptive use for women with a given number of living children.

As there is hardly any contraceptive use among women with no living children, the analysis has been restricted only to women with one, two, three and more than three living children. Here the study restricts the analysis to only currently married women as in India fertility occurs mostly within marriage and by implication, contraceptive practice is relevant for married women and men. To study the gross effect of background characteristics on contraceptive use percentage of currently married women using contraceptive has been presented separately for one, two, three and four or more living children by various relevant socio-economic and demographic factors (Table 6.7).

6.2.1 Differentials in Contraceptive Use:

It is evident that the use of contraception increases with an increase in the number of living children. Among women with one living child, contraceptive prevalence is the highest among women of other castes (30.8 percent) followed by women belonging to ST, OBC and SC. For women with two, three and more than three living children, other castes show the higher use of contraception followed by OBC, SC and ST. By religion,

contraceptive prevalence among Hindus is higher than among other religious groups among women with three and more than three living children. Contraceptive use among currently married women with two, three and more than three living children generally increases with education. There is, however, little difference in contraceptive use between literate women with primary level and illiterate women with one living child. The gap in the use of contraceptive use by the educational level of women substantially decreases with increase in number of living children. A similar pattern is observed among women in urban and rural areas but urban women are more likely than rural women in the use of contraception in all the cases of number of living children. Urban women with one living child show 14 percentage points higher user of contraception than their rural counterparts while this is only five percentage points in case of women with 3 living children. This reflects that urban women start using contraception at low parities than rural women.

By the standard of living (SLI), the use of contraception ranges from 13.5 percent among women with low SLI to 44 percent among high SLI at one living child. This reflects that higher use of contraception among women living in households with high SLI even at the lower parities. As the number of living children increases contraceptive prevalence also increases among different SLI groups and the gap between low, medium and high groups narrows. Work status of women does not make a significant effect on the use of contraception. Number of living sons makes a significant difference in the use of contraception. Women with one son show a little higher proportion in the use of contraception (21.0) than those having one daughter (18.6). A substantial difference by sex composition is found among women with two children, i.e., women having one son and one daughter shows a higher proportion (55.7 percent) in the use of contraception. Again such percentage increases to 61.3 for women having two sons. This pattern is also seen in case of women with 3 and more than 3 living children. Thus it is evident that the women having higher number of sons, a greater proportion go for the adoption of family planning method. This suggests the existence of strong preference for sons over daughters in Orissa.

Age of the women is an important demographic variable that influences women's contraceptive behaviour. As the age of the woman increases with the increasing number of living children, the use of contraception also increases as they are more close to complete their desired family size. With respect to age at marriage, women who got married between 12-14 and having two living children, a very low proportion are using contraception than those married in age group 15-19 and 20 and above. This may be due to the fact that those women who marry at an early age generally suffer from illiteracy and lower economic condition and are not satisfied with two living children.

Longer marital duration leads to higher the number of living children and the use of contraception is also high which is clearly evident from women with two, three and more than three living children. For women with one living child the marital duration does not make a difference in the use of contraception mainly because of the anticipation of more children. By infant death, it is evident that, for a woman with one living child, infant death does not show much influence on contraceptive use. Such gap in the use of contraception is higher among women with two living children. Those women who do not experience any infant death tend to use contraception more than those who have experienced infant death. This is so in case of women with two, three and more than three living children. Status of women in the household makes a large difference in the use of contraception. Among women with two, three and more than three living children, the use of contraception is higher at the higher status of women in the household. There is a significant effect of the exposure to mass media on the contraceptive use among women with number of living children. If the women with two living children are exposed to any mass media, the use of contraception is 62.3 percent which is 20 percentage points higher than those who are not exposed to any mass media. Similar trend continues in case of women with three and more than three children. Therefore, exposure to mass media and especially exposure to the family planning messages in mass media is an important factor. Inter-spousal communication regarding family planning is one of the prime determinants for the use of contraception among women with one living child. Again this effect declines as the number of living children increases.

Table 6.7: Percent of currently married women with given number of living children using contraception by background characteristics

Background Characteristics	1 living child	2 living children	3 living children	Four or more living children
Caste				
SC	13.4	46.6	63.8	62.6
ST	17.1	37.7	56.3	54.4
OBC	16.7	52.2	68.7	70.0
Others	30.8	61.9	78.7	70.6
Religion				
Hindu	20.0	52.1	68.9	66.8
Others	19.2	51.6	50.0	48.3
Women's education				
No education	14.8	43.9	63.7	62.2
Primary	9.0	49.8	69.2	72.5
Secondary	26.0	63.0	79.2#	70.5#
Higher	47.1	75.8	-	-
Place of Residence				
Urban	31.1	62.4	72.2	63.9
Rural	17.3	49.3	67.5	66.2
Standard of living				
Low	13.5	45.7	61.8	60.8
Medium	19.7	49.2	74.6	69.2
High	43.6	74.5	77.9	78.4
Work status of women				
Not working	19.1	51.3	69.7	68.7
Agriculture	21.8	49.0	65.1	58.1
Non-agriculture	22.6	59.6	65.7	59.1
No of Living Sons				
0	18.6	25.0	33.8	33.3
1	21.0	55.7	61.4	63.0
2	-	61.3	78.2	70.7
2+	-	-	76.5	65.6
Age group				
15-39	18.6	50.1	66.7	62.4
40-49	38.0	63.9	74.7	70.3
Age at first marriage				
12-14	23.3	40.8	67.7	59.0
15-19	14.3	53.0	68.8	67.5
20+	30.2	55.1	67.6	65.9
Marital Duration				
0-4	16.7	23.5	-	-
5-9	18.9	37.2	44.6@	45.9@
10-14	17.7	63.6	69.0	56.2
15+	33.6	68.3	77.3	69.1
Infant Death				
No	20.1	54.6	71.3	67.3
Yes	19.0	41.8	59.4	61.8
Status of women				
Low	18.0	46.7	64.6	60.9
Moderate	18.1	51.3	69.4	67.1
High	33.3	62.1	71.6	68.9
Exposure to mass media				
Not exposed	13.7	41.2	59.9	60.5
Exposed	26.6	62.3	77.5	72.5

Spousal Communication				
No	14.0	52.2	70.4	65.3
Yes	34.0	52.0	61.7	67.4
Total	19.9	52.1	68.5	65.8
Number of Women	712	1070	872	1005

#Secondary and higher educational level are clubbed together due to very small number of frequency
@The category of marital duration of 0-4 and 5-9 years are also clubbed together due to small frequency.
Source: Computed from NFHS II individual data file.

6.2.2 Determinants of contraceptive use:

To study the net effect of different background variables in the contraceptive practice by the number of living children after controlling for relevant socio-economic and demographic variables, logistic regression analysis have been carried out. As the dependant variable (Contraceptive use) is dichotomous, logistic regression is adopted to understand the effects on contraceptive use. The odds ratio showing the probabilities of contraceptive use for women belonging to specified categories to the probability for the reference category are presented in Table 6.8. The analysis is done separately for women with one, two, three and more than living children.

It is evident that for those with one living child, the ethnic factor does not matter much in the use of contraception. As the number of living children increases, women from OBC and other castes are more likely to use contraception than SC/ST women. For women having 3 or more living children non-Hindus are much less likely (the odds ratios are 0.30-0.42) to use contraceptive method compared to Hindu women. The probability of using contraception is lower in other religious group, especially Muslims, as it is known that there is some religious opposition to birth control. However, this does not imply that contraception is not at all accepted. As can be seen from table 6-7, about half of couples of other religions (mostly Muslims) with 2 or more children use contraception. Educational level of women makes a significant difference in the use of contraception. As the educational level increases, she becomes more likely to plan her family size through deliberate use of birth control methods. She is more informed of contraceptive methods and is able to participate in the decision making process of her life and her family (Mandelbaum, 1974). Place of residence does not make a significant difference in the use

of contraception after holding other predictor variables constant. Standard of living does not show a significant influence except for women with one living child.

Women with one living child and engaged in agriculture and household activities are 2.3 times more likely to use contraceptive method compared to not working women. Similarly, for women with two living children and those engaged in non-agricultural activities, the probability of using contraception is 1.7 times higher than for those who are not working. This suggests that the working women are more inclined towards the adoption of small family norm than the non-working women. The effect of number of sons in the use of contraception shows a highly significant result after controlling the other predictors. Women with 2 living children and those having one son are 3.8 times more likely to use contraception than those who do not have any son and that with 2 sons the odds of using contraception are 5 times higher than those who do not have any son. Similar situation also persists in case of women with 3 and more than 3 living children. Higher numbers of sons leads to higher probability of using contraception. It has been observed earlier that, couples with fewer sons are more likely to continue having children and less likely to use contraception (Raju and Bhat, 1995). Therefore the sex composition of the children in the family affects subsequent fertility behaviour to a great extent. With respect to age at marriage, for women with 2 living children those who have married above 15 years of age are more likely to be the users of contraception compared to women who have married below 15 years of age.

Longer duration of marriage leads to higher probability of using contraception in cases of women with 1, 2, 3 and above three living children. So, marital duration has a very good bearing on the use of contraception. A substantial effect has been found among women who had experienced infant death. The probability of using contraception is lower among women who have experienced infant death than those who do not have infant death. This shows that the infant death significantly increases the tendency of progressing to the next birth to replace to the old one. This may also be due to the insurance effect. After controlling the other predictor variables, status of women in the household does not show a uniform pattern of influence on contraceptive use. The

probability of using contraception among women who have been exposed to any mass media is significantly higher among women with two, three and more than three living children. So the exposure to mass media has a definite bearing in taking decision on family limitation. Similarly, the inter-spousal communication regarding family planning is one of the important determinants to regulate the adoption of family planning methods and it is seen that among women with one living child those who have ever discussed family planning are about 4 times more likely to use of contraception than those who have not discussed. However, it must be noted that this could also be a reciprocal effect, that is the user couples are more likely to have discussed family planning.

Table 6.8: Determinants of Contraceptive Use: Results of Logistic Regression Analysis

Background	Women with 1LC		Women with 2LC		Women with 3LC		Women with 3+LC	
Characteristics	N	Exp(B)	N	Exp(B)	N	Exp(B)	N	Exp(B)
Caste								
SC®	172		193		188		214	
ST	129	0.552*	167	1.011	160	0.886	182	0.778
OBC	210	0.749	356	1.285	252	1.117	327	1.221
Others	201	0.653	354	1.258	272	1.760**	282	1.299
Religion								
Hindu®	686		1039		852		947	
Others	26	0.958	31	1.572	20	0.307**	58	0.423***
Women's education								
No education®	330		512		474		633	
Primary	122	0.468*	203	1.210	201	0.805	240	1.152
Secondary	192	1.646	289	1.845***	197#	1.539	132#	0.949
Higher	68	1.639	66	2.237*	-	-	-	-
Place of Residence								
Urban®	135		229		176		191	
Rural	577	0.963	841	1.040	696	0.961	814	1.281
Standard of living								
Low ®	362		501		448		518	
Medium	249	1.136	377	0.822	311	1.187	390	1.077
High	101	2.436**	192	1.347	113	0.594	97	1.509
Work status of women								
Not working®	519		780		624		713	
Agriculture	87	2.277**	149	1.350	146	1.266	155	0.749
Non-agriculture	106	1.168	141	1.668**	102	1.031	137	0.899
No of Living Sons								
0®	322		184		71		39	
1	390	1.092	568	3.885***	306	2.587***	219	3.746***
2	-	-	318	5.081***	376	5.344***	389	5.633***
2+	-	-	-	-	119	4.826***	358	4.673***
Age at first marriage								
12-14®	73		120		130		188	
15-19	427	0.436**	714	1.767**	603	0.836	735	1.383*
20+	212	0.795	236	1.589*	139	0.832	82	1.278
Marital Duration								
0-4®	347		85		-	-	-	-

5-9	196	1.870**	401	2.324***	175@		37@	
10-14	62	1.924	225	7.911***	239	2.995***	194	1.587
15+	107	7.881***	359	13.948***	458	4.238***	774	2.566**
Infant Death								
No®	591		863		665		725	
Yes	121	0.887	207	0.445***	207	0.489***	280	0.655***
Status of women								
Low®	250		287		237		271	
Moderate	375	0.773	580	0.983	494	1.193	554	1.200
High	87	1.343	203	1.061	141	1.068	180	1.226
Exposure to mass media								
Not exposed®	366		517		446		562	
Exposed	346	1.218	553	1.668***	426	1.700**	443	1.316
Spousal Communication								
No®	500		741		679		781	
Yes	212	3.933***	329	1.347*	193	0.849	224	1.281
Constant		0.117***		0.019***		0.195***		0.096***
Number of Cases	712		1070		872		1005	
-2 log likelihood		571.869		1182.987		920.259		1200.910
Pseudo R^2 (Nagelkerke)		0.282		0.325		0.244		0.119

Note: This analysis has been carried out only for currently married women.*, **, *** shows 10%, 5% and 1% level of significant respectively. 1= currently using, 0= Not using. #Secondary and higher educational level are clubbed together due to very small number of frequency, @The category of marital duration of 0-4 and 5-9 years are also clubbed together due to small frequency and taken as reference category. ®: Reference Category.
Source: Computed from NFHS II individual data file.

6.3 Conclusions:

From the foregoing analysis it may be concluded that the analysis of different socio-economic and demographic variables suggests that late marriage, educational development are some of the probable causes of fertility decline in the state. Accelerating acceptance of contraception among Orissan couples (47 percent) is also another cause of fertility decline. Despite the high IMR and CMR the state has experienced reduction in fertility. So further reduction in IMR and CMR would bring down fertility to further lower level. Therefore, the nutritional status of mothers and children also needs to be improved and girl's education should be given more priority. Besides though many have a low ideal family size, they have not been able to regulate fertility as desired. Those women who are having more than ideal number of children, underlying causes should be identified to take the necessary steps to regulate the fertility outcome. There is obviously large need for fertility regulation that is yet to be met (15.5 percent).

In Orissa, only one-fifth of the women having one living child use contraception. Such proportion goes to 52 percent, 68.5 percent, and 65.8 percent for women with two, three and more than three living children respectively. Clearly spacing is not very common; most of the contraceptive use is for family limitation. Sterilization is the most commonly used method as noted earlier. Though the fertility level has declined in Orissa with the effect of contraceptive use still there is the possibility of further improvement in the acceptance of family planning method and bringing down the fertility to reach the replacement level. In Orissa, poverty, poor communication network and the lack of a proper infrastructure make the implementation of programmes difficult. Educational levels of women, sex preference, marital duration, infant death, exposure to mass media, spousal communication have a significant effect on the use of contraception. Therefore, while framing family planning programme these aspects should be given more priority and efforts should be made to make people aware about the benefit of small family norm. According to NFHS II, (IIPS, 1995b), though there is a latent demand of contraception (62.3 percent) for controlling fertility but people lack the knowledge and the facilities. It has been commonly assumed that in a backward economy all that is needed to bring about population control is to inform people of modern contraceptive techniques and make these services available to them. More attention should be given on use of spacing methods to delay the age of childbearing as well as to increase the birth interval.

Chapter VII
Conclusions

Conclusions

Earlier literature has indicated that high fertility persists in societies with illiteracy, lower standard of living and poor chances of the survival of the child. But in Orissa, sustained fertility decline has occurred even at high infant mortality, low standard of living, and low female literacy. This reflects that the desire for smaller families has developed in spite of seeming unfavourable conditions. In this context, an attempt has been made to study the process of fertility transition in Orissa.

The analysis of fertility transition in Orissa brings out several interesting dimensions of the transition for the present and the future. The achievement of the state is commendable as far as the fertility reduction is concerned. This reduction does not conform to the classical theories which thought fertility reduction necessitates considerable improvement either in economic or social development. During the 1980's and 1990's the state has experienced a considerable reduction in fertility. Latest SRS estimates indicate that the Crude Birth Rate (CBR) is 22.7 in 2004. The NFHS II (1998-99) shows that fertility in urban areas in the state is now about to reach replacement level, although the fertility in rural areas has yet to reach such level, it has shown notable decline (Table 4.1).

The knowledge of the values of proximate determinants of fertility and total fecundity rate is most important in fertility analysis as it helps to understand the transition from natural to controlled fertility. Therefore, an attempt has been made to estimate the four proximate determinants of fertility and total fecundity rate by using the Bongaarts model. The results show that, in Orissa the total fecundity rate was estimated to be 13.5 births (1998-99) which is lower than the Bongaarts average value of 15.3 by about two births. This lower fecundability among Orissan women needs to be explored. This may be due to various reasons: lower nutritional status, higher secondary sterility due to cultural practices, separation of spouses due to migration and so on. It may happen that frequency of intercourse among Indian couples is significantly reduced when a son is married and a daughter-in-law is present in the house (Visaria, 1999). It is also evident that the transition from natural to controlled fertility in Orissa is accompanied by an increase in

the use of contraception and post partum infecundability. The contribution of use of contraception and post partum infecundability to depressing the total fecundity rate was 4.4 each in 1998-99. The changes in the proximate determinants of fertility from NFHS I to II show that there is decline in almost all the proximate determinants of fertility over the period. We can say that the lower fertility in Orissa is due to the lower fecundity rate and longer duration of post partum infecundability. There is marginal decline in the index of breastfeeding and post partum infecundability. If such a decline continues without accompanied by an increase in the use of contraception, fertility can go up. Therefore, steps should be taken for encouraging women to breastfeed their children for a relatively longer duration and also in increasing use of reversible methods of contraception.

To study the dynamics of fertility and family building processes in Orissa, Period Parity Progression Ratio (PPPR) analysis is used. It is evident from the analysis that the progression from woman's birth to her first birth centers around 80 percent in 1998 implying that 20 percent of women do not go to the first birth either because women never marry or are primarily sterile. Again transition from first birth to second birth is quite high, not much decline is found over the period from 1984 to 1998. Though a considerable decline is found at higher order parities through 1984 to 1998, a large chunk of women (around 50 percent) in Orissa go for fourth and fifth parity even in the late 90's. Rural-urban differentials in parity progression up to the second parity are small since the progressions are almost universal whether in rural or urban areas. But from the third parity onwards, the differentials by place of residence are substantial. While the tendency to go for the third birth continues to be high among rural women, the urban women show some sign of limiting after the second birth. This also suggests that fertility is higher in rural areas. So, there is a scope for the further reduction in fertility in Orissa by giving more priority to rural areas particularly through effective service delivery system in the remote villages.

A multivariate analysis (Multiple Classification Analysis) has been carried out with the objective of answering two specific questions: (1) What factors could be causing higher number of children ever born (2) Do the specific socio-economic and demographic

variables affect children ever born when other variables are controlled. Regarding the first, higher mean CEB was found among women of SC/STs, other religious group, lower educational level, rural women, lower standard of living, women engaged in agricultural and household activities, lower age at marriage, who have experienced infant death, those who are not exposed to mass media and those who do not have spousal communication regarding family planning as compared to the other categories of the respective variable. Regarding the second, higher number of mean CEB is seen among ST, even after the effect of other covariates including the marital duration are controlled. Tribal populations are traditionally bound by customs. Similarly, other religious group shows higher number of CEB than Hindu women when all other predictors are controlled. Educational level of women, standard of living, age at marriage, survival status of infant, exposure to mass media have a negative bearing on the number of CEB. Therefore, measures should be taken to raise the age at marriage of females and to improve female education. Non-working women show a higher number of CEB when other variables are controlled. Higher mean CEB is found among rural women than urban women but this difference virtually disappears when other predictors are controlled. The adjusted effects of spousal communication towards family planning on CEB show that those who had discussed have higher (3.19) mean CEB than those who had not (2.75). This may be due to the fact that, those women who are experiencing more number of child birth are discussing more about family planning to reduce their family size. As the SC/ST women are traditionally bound by customs and go for more number of children, therefore there is a need for strong motivational government policy for family planning.

The ideal family size varies with the actual family size in all the socio-economic and demographic variables. The mean number of actual children is higher than the ideal children across variables. Therefore, it is clear that, the stated ideal family size is not completely implemented in Orissa. For those women who are having more than ideal number of children, underlying causes should be identified to take the necessary steps to meet the demand for regulation.

Increasing use of contraception is regarded as the main proximate determinant of the fertility decline. The use of contraception depends on the number of living children. Therefore, the determinants of contraceptive use for women with a given number of living children in the context of Orissa are examined. The proportion using of contraception increases with an increasing number of living children. The results of logistic regression analysis show that the use of contraception is higher among women belonging to castes other than SC, ST and OBC. After controlling the effect of other variables, ST women are likely to have lower user of contraception than others. Educational level of women makes a significant difference in the use of contraception in all the categories of living children. When the educational level increases women are more likely to plan family size through deliberate use of birth control methods. With respect to standard of living, the influence is unclear. Among women with two living children and those engaged in non-agricultural activities, are more likely to use contraception than non-working women. Higher number of sons a couple has leads to higher probability of using contraception. Therefore the sex composition of the children in the family affects fertility behaviour to a great extent. Infant death significantly increases the percentages progressing to the next birth which reflects the lower use of contraception. Therefore, it is found that the probability of using contraception is lower among women who have experienced infant death. The policy intervention for lowering the infant mortality should be prioritized. This is a highly desirable goal in itself and also would have an additional effect of raising contraceptive acceptance. For women exposed to mass media the probability of using contraception is higher. The exposure to mass media has a definite bearing in taking decision on family limitation. Again spousal communication regarding family planning is one of the important determinants to regulate the adoption of family planning methods. Therefore, the educational level of women, religion, caste, survival status of the infant, work status of women, standard of living exposure to mass media, place of residence, sex composition of children in the family influence the fertility behaviour and must be considered in formulating and implementing the programme of family planning and welfare.

The evidence unambiguously shows that Orissa has progressed well into fertility transition. Substantial fertility decline has occurred and a large proportion of couples have begun to regulate fertility. The idea of regulation has been well accepted and modern contraceptives adopted. An interesting feature is that such a change in behaviour has occurred in seemingly unfavourable conditions. In particular, child survival continues to be poor with poverty fairly widespread and overall development of the state not of a high order. Unlike what happened in Kerala and Tamil Nadu, Orissa experienced no remarkable change in social and economic development. Does this convey that socio-economic development is not a necessary condition for fertility transition? Or, have the socio-economic thresholds of fertility decline become quite low?

While it is true that an impressive fertility decline has occurred in Orissa at an admittedly low level of socio-economic development, there are clearly variations by socio-economic factors at the regional and more clearly at the individual level. Fertility in more literate districts is lower than in less literate districts. Further, individual factors especially education show very clear fertility depressing effect. Besides, child survival also shows a prominent effect at the individual level. On the other hand, preference for sons does impede contraceptive acceptance. Thus, even in the overall less developed state like Orissa fertility is influenced by key socio-economic factors.

Yet the question remains on occurrence of transition in such a setting. There are various possibilities. As noted earlier, thresholds could have fallen due to changing tastes and quality-quantity considerations for the entire state. Such changes could occur because of speedier diffusion of ideas. It is also possible that the government family planning programme has been successful in modifying norms and popularizing fertility regulation and contraceptive use. In a negative way poverty might have induced fertility decline as some demographers have argued in similar contexts. It is difficult to provide answers to these questions from the secondary data that are available. Understanding changes and tastes, attitudes and behaviour is a difficult task. It requires in-depth investigation into the processes that shape individual behaviour on highly personal and complex matter such as childbearing. Further research on Orissa's demography needs to address these issues.

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Appendices

Appendices

Appendix Table 1: Background characteristics of Respondents (column wise Percentage): NFHS II, Orissa

Background Characteristics	Urban		Rural		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
Caste						
SC	144	16.6	774	21.8	918	20.8
ST	75	8.6	743	20.9	818	18.5
OBC	282	32.5	1095	30.8	1377	31.1
Others	367	42.3	945	26.5	1312	29.6
Religion						
Hindu	795	91.6	3462	97.3	4257	96.2
Others	73	8.4	95	2.7	168	3.8
Women's education						
No education	297	34.2	2078	58.4	2375	53.7
Primary	162	18.7	753	21.2	915	20.7
Secondary	296	34.1	642	18.0	938	21.2
Higher	113	13.0	84	2.4	197	4.5
Place of Residence						
Urban	-	-	-	-	868	19.6
Rural	-	-	-	-	3557	80.4
Standard of living						
Low	230	26.5	2037	57.3	2267	51.2
Medium	363	41.8	1230	34.6	1593	36.0
High	275	31.7	290	8.2	565	12.8
Work status of women						
Not working	676	77.9	2435	68.5	3111	70.3
Agriculture	39	4.5	639	18.0	678	15.3
Non-agriculture	153	17.6	483	13.6	636	14.4
Age group						
15-39	669	77.1	2788	78.4	3457	78.1
40-49	199	22.9	769	21.6	968	21.9
Age at first marriage						
12-14	116	13.4	491	13.8	607	13.7
15-19	514	59.2	2443	68.7	2957	66.8
20+	238	27.4	623	17.5	861	19.5
Marital Duration						
0-4	140	16.1	636	17.9	776	17.5
5-9	176	20.3	719	20.2	895	20.2
10-14	167	19.2	625	17.6	792	17.9
15+	385	44.4	1577	44.3	1962	44.3
Infant Death						
No	721	83.1	2785	78.3	79.2	79.2
Yes	147	16.9	772	21.7	20.8	20.8
Status of women						
Low	191	22.0	1056	29.7	1247	28.2
Moderate	436	50.2	1886	53.0	2322	52.5
High	241	27.8	615	17.3	856	19.3
Exposure to mass media						
Not exposed	201	23.2	2126	59.8	2327	52.6
Exposed	667	76.8	1431	40.2	2098	47.4
Spousal Communication						
No	623	71.8	2766	77.8	3389	76.6
Yes	245	28.2	791	22.2	1036	23.4
Total	868	100.0	3557	100.0	4425	100.0

Source: Computed from NFHS II individual data file.

Appendix Table 2: Standard of Living Index (SLI)

Sl. No.	Variable	Categories	Scores
1	House type	1. Pucca	4
		2. Semi-pucca	2
		3. Kachcha	0
2	Toilet facility	1. Own Flush toilet	4
		2. Public or shared flush toilet or own pit toilet	2
		3. Shared or public pit toilet	1
		4. No facility	0
3	Source of lighting	1. Electricity	2
		2. Kerosene, gas or oil	1
		3. Other source of lighting	0
4	Main fuel for cooking	1. Electricity, liquid petroleum gas or biogas	2
		2. Coal, charcoal or Kerosene	1
		3. Other fuel	0
5	Source of drinking water	1. Pipe, hand pump or well in residence/yard/plot	2
		2. Public tap, hand pump or well	1
		3. Other water source	0
6	Separate room for cooking	1. Yes	1
		2. No	0
7	Ownership of house	1. Yes	2
		2. No	0
8	Ownership of agricultural land	1. =>5 acres	4
		2. 2.0-4.9 acres	3
		3. <2 acres or acres not known	2
		4. No agricultural land	0
9	Ownership of irrigated land	1. Household owns at least some irrigated land	2
		2. No irrigated land	0
10	Ownership of livestock	1. Own livestock	2
		2. Does not own livestock	0
11	Ownership of durable goods	1. Car	4
		2. Tractor	4
		3. Moped/Scooter/Motorcycle	3
		4. Telephone	3
		5. Refrigerator	3
		6. Colour television	3

	7. Bicycle	2
	8. Electric fan	2
	9. Radio/transistor	2
	10. Sewing machine	2
	11. Black and white television	2
	12. Water pump	2
	13. Bullock cart	2
	14. Thresher	2
	15. Mattress	1
	16. Pressure cooker	1
	17. Chair	1
	18. Cot/bed	1
	19. Table	1
	20. Clock/Watch	1

Source: IIPS and ORC Macro (2000a).

Appendix Table 3: Correlation Matrix: Demographic and Socio-economic Variables at the District Level, Orissa

Variables	TFR	IMR	NON_AGRI	PROP_URB	LITERACY
TFR	1				
IMR	0.477**	1			
NON_AGRI	-0.726**	-0.430*	1		
PROP_URB	-0.404*	-0.225	0.738**	1	
LITERACY	-0.825**	-0.532**	0.740**	0.327	1

N=30, ** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Source: Computed from Table 4.4 and 4.5.

Note: TFR: Total Fertility Rate
IMR: Infant Mortality Rate
NON_AGRI: Percent of workers engaged in non-agricultural activities
PROP_URB: Percent of population living in urban areas
LITERACY: Percent of population of age 7+ literate

Appendix Table 4: Index of the Status of Women in the Household

Sl.No.	Variable	Categories	Scores
(A)	**Decision Making**		
1	What to Cook	1. Respondent	3
		2. Husband	1
		3. Jointly with Husband	2
		4. Others in household	1
		5. Jointly with others in household	2
2	On obtaining heath care	1. Respondent	3
		2. Husband	1
		3. Jointly with Husband	2
		4. Others in household	1
		5. Jointly with others in household	2
3	To purchase Jewelry	1. Respondent	3
		2. Husband	1
		3. Jointly with Husband	2
		4. Others in household	1
		5. Jointly with others in household	2
4	Staying with family	1. Respondent	3
		2. Husband	1
		3. Jointly with Husband	2
		4. Others in household	1
		5. Jointly with others in household	2
(B)	**Permission needed**		
1	To go to market	0. No	3
		1. Yes	2
		2. Not allowed to go	1
2	To visit relatives or friends	0. No	3
		1. Yes	2
		2. Not allowed to go	1
(C)	**Access to money**		
1	Allowed to have money set aside	0. No	1
		1. Yes	3

Appendix Table 5a: Determinants of Contraceptive Use for Women with One Living Child by Background Characteristics: Results of Logistic Regression Analysis

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
V131			4.008	3	.261	
V131(1)	-.595	.325	3.350	1	.067	.552
V131(2)	-.289	.372	.604	1	.437	.749
V131(3)	-.427	.287	2.210	1	.137	.653
RELIGION(1)	-.043	.585	.005	1	.942	.958
V106			9.765	3	.021	
V106(1)	-.759	.418	3.304	1	.069	.468
V106(2)	.498	.365	1.864	1	.172	1.646
V106(3)	.494	.502	.969	1	.325	1.639
V025(1)	-.038	.274	.019	1	.890	.963
SLI			6.170	2	.046	
SLI(1)	.128	.304	.176	1	.675	1.136
SLI(2)	.890	.409	4.745	1	.029	2.436
WORK_STA			5.269	2	.072	
WORK_STA(1)	.823	.359	5.256	1	.022	2.277
WORK_STA(2)	.155	.322	.232	1	.630	1.168
LIVSON_1(1)	.088	.218	.163	1	.687	1.092
AGE_FMAR			8.904	2	.012	
AGE_FMAR(1)	-.831	.354	5.515	1	.019	.436
AGE_FMAR(2)	-.230	.405	.322	1	.570	.795
MARI_DUR			35.695	3	.000	
MARI_DUR(1)	.626	.283	4.898	1	.027	1.870
MARI_DUR(2)	.655	.434	2.278	1	.131	1.924
MARI_DUR(3)	2.064	.349	34.941	1	.000	7.881
INFANTDE(1)	-.120	.302	.158	1	.691	.887
STA_WOM			3.479	2	.176	
STA_WOM(1)	-.257	.242	1.124	1	.289	.773
STA_WOM(2)	.295	.342	.744	1	.388	1.343
EX_MASS(1)	.197	.301	.429	1	.512	1.218
V630A(1)	1.369	.245	31.114	1	.000	3.933
Constant	-2.142	.785	7.453	1	.006	.117

Note: V131: Caste: 1: ST, 2: OBC, 3: Others, Ref: SC
RELIGION: I: Others, Ref: Hindu
V106: Education of Women: 1: Primary, 2: Secondary, 3: Higher, Ref: Illiterate
V025: Place of Residence: 1: Rural, Ref: Urban
SLI: Standard of Living: 1: Medium, 2: High, Ref: Low
WORK_STA: Work Status of Women: 1: Agriculture, 2: Non-Agriculture, Ref: Not Working
LIVSON_1: Number of Son: 1: 1, 2: 2, 3: 3 and more, Ref: 0
AGE_FMAR: Age at First Marriage: 1: 15-19, 2: 20+, Ref: 12-14
MARI_DUR: Marital Duration: 1: 5-9, 2: 10-14, 3: 15+, Ref: 0-4
INFANTDE: Infant Death: 1: Infant death, Ref: No infant death
STA_WOM: Status of Women: 1: Moderate, 2: High, Ref: Low
EX_MASA: Exposure to Mass Media: 1: Exposed, Ref: Not exposed
V630A: Spousal Communication: 1: Yes, Ref: No

Source: Computed from NFHS II individual data file.

Appendix Table 5b: Determinants of Contraceptive Use for Women with Two Living Children by Background Characteristics: Results of Logistic Regression Analysis

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
V131			1.954	3	.582	
V131(1)	.011	.253	.002	1	.965	1.011
V131(2)	.251	.213	1.390	1	.238	1.285
V131(3)	.230	.229	1.001	1	.317	1.258
RELIGION(1)	.453	.466	.945	1	.331	1.572
V106			7.662	3	.054	
V106(1)	.190	.211	.815	1	.367	1.210
V106(2)	.612	.230	7.059	1	.008	1.845
V106(3)	.805	.430	3.500	1	.061	2.237
V025(1)	.039	.198	.038	1	.844	1.040
SLI			4.421	2	.110	
SLI(1)	-.197	.181	1.176	1	.278	.822
SLI(2)	.298	.293	1.031	1	.310	1.347
WORK_STA			5.599	2	.061	
WORK_STA(1)	.300	.222	1.830	1	.176	1.350
WORK_STA(2)	.511	.232	4.853	1	.028	1.668
LIVI_SON			52.440	2	.000	
LIVI_SON(1)	1.357	.213	40.649	1	.000	3.885
LIVI_SON(2)	1.625	.232	49.224	1	.000	5.081
AGE_FMAR			6.127	2	.047	
AGE_FMAR(1)	.570	.232	6.047	1	.014	1.767
AGE_FMAR(2)	.463	.281	2.714	1	.099	1.589
MARI_DUR			114.382	3	.000	
MARI_DUR(1)	.843	.303	7.737	1	.005	2.324
MARI_DUR(2)	2.068	.327	40.033	1	.000	7.911
MARI_DUR(3)	2.635	.332	63.158	1	.000	13.948
INFANTDE(1)	-.810	.187	18.764	1	.000	.445
STA_WOM			.148	2	.929	
STA_WOM(1)	-.018	.168	.011	1	.917	.983
STA_WOM(2)	.059	.227	.067	1	.795	1.061
EX_MASS(1)	.512	.183	7.794	1	.005	1.668
V630A(1)	.298	.168	3.166	1	.075	1.347
Constant	-3.971	.504	62.002	1	.000	.019

Note: For Explanation of Variables refer the note of Appendix Table No: 5a
Source: Computed from NFHS II individual data file.

Appendix Table 5c: Determinants of Contraceptive Use for Women with Three Living Children by Background Characteristics: Results of Logistic Regression Analysis

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
V131			7.521	3	.057	
V131(1)	-.121	.250	.234	1	.629	.886
V131(2)	.111	.232	.226	1	.634	1.117
V131(3)	.565	.254	4.947	1	.026	1.760
RELIGION(1)	-1.180	.504	5.476	1	.019	.307
EDU_LOG			5.505	2	.064	
EDU_LOG(1)	-.216	.225	.928	1	.335	.805
EDU_LOG(2)	.431	.282	2.341	1	.126	1.539
V025(1)	-.039	.234	.028	1	.867	.961
SLI			5.077	2	.079	
SLI(1)	.171	.212	.652	1	.419	1.187
SLI(2)	-.521	.350	2.218	1	.136	.594
WORK_STA			1.000	2	.607	
WORK_STA(1)	.236	.239	.972	1	.324	1.266
WORK_STA(2)	.031	.273	.013	1	.910	1.031
LVSON_3			37.973	3	.000	
LVSON_3(1)	.951	.307	9.577	1	.002	2.587
LVSON_3(2)	1.676	.307	29.738	1	.000	5.344
LVSON_3(3)	1.574	.359	19.231	1	.000	4.826
AGE_FMAR			.609	2	.737	
AGE_FMAR(1)	-.179	.234	.587	1	.444	.836
AGE_FMAR(2)	-.184	.301	.374	1	.541	.832
MAR_3_4			42.978	2	.000	
MAR_3_4(1)	1.097	.232	22.454	1	.000	2.995
MAR_3_4(2)	1.444	.223	42.060	1	.000	4.238
INFANTDE(1)	-.715	.190	14.080	1	.000	.489
STA_WOM			.902	2	.637	
STA_WOM(1)	.177	.193	.842	1	.359	1.193
STA_WOM(2)	.066	.261	.063	1	.801	1.068
EX_MASS(1)	.530	.211	6.334	1	.012	1.700
V630A(1)	-.163	.199	.676	1	.411	.849
Constant	-1.635	.466	12.320	1	.000	.195

Note: For Explanation of Variables refer the note of Appendix Table No: 5a
Source: Computed from NFHS II individual data file.

Appendix Table 5d: Determinants of Contraceptive Use for Women with more than Three Living Children by Background Characteristics: Results of Logistic Regression Analysis

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
V131			5.889	3	.117	
V131(1)	-.251	.216	1.344	1	.246	.778
V131(2)	.199	.201	.984	1	.321	1.221
V131(3)	.262	.222	1.391	1	.238	1.299
RELIGION(1)	-.861	.302	8.112	1	.004	.423
EDU_LOG			.784	2	.676	
EDU_LOG(1)	.142	.192	.543	1	.461	1.152
EDU_LOG(2)	-.052	.264	.038	1	.845	.949
V025(1)	.248	.194	1.628	1	.202	1.281
SLI			1.579	2	.454	
SLI(1)	.074	.177	.177	1	.674	1.077
SLI(2)	.412	.329	1.564	1	.211	1.509
WORK_STA			1.975	2	.372	
WORK_STA(1)	-.289	.206	1.963	1	.161	.749
WORK_STA(2)	-.106	.215	.244	1	.621	.899
LVSON_4			22.751	3	.000	
LVSON_4(1)	1.321	.387	11.671	1	.001	3.746
LVSON_4(2)	1.729	.377	21.005	1	.000	5.633
LVSON_4(3)	1.542	.380	16.484	1	.000	4.673
AGE_FMAR			3.297	2	.192	
AGE_FMAR(1)	.324	.179	3.294	1	.070	1.383
AGE_FMAR(2)	.245	.301	.663	1	.416	1.278
MAR_3_4			11.517	2	.003	
MAR_3_4(1)	.462	.382	1.460	1	.227	1.587
MAR_3_4(2)	.942	.367	6.604	1	.010	2.566
INFANTDE(1)	-.423	.158	7.150	1	.007	.655
STA_WOM			1.377	2	.502	
STA_WOM(1)	.183	.165	1.225	1	.268	1.200
STA_WOM(2)	.203	.225	.820	1	.365	1.226
EX_MASS(1)	.275	.184	2.241	1	.134	1.316
V630A(1)	.248	.177	1.960	1	.162	1.281
Constant	-2.346	.580	16.390	1	.000	.096

Note: For Explanation of Variables refer the note of Appendix Table No: 5a
Source: Computed from NFHS II individual data file.