FERTILITY TRANSITION IN A LOW INCOME COUNTRY: THE CASE OF NEPAL

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DECLARATION

I, Ramesh Babu Kafle, hereby declare that the thesis entitled **"FERTILITY TRANSITION IN A LOW INCOME COUNTRY: THE CASE OF NEPAL"** submitted by me for the award of the degree of **DOCTOR OF PHILOSOPHY** of Jawaharlal Nehru University is my bonafide work and that it has not been submitted so far in part or in full, for any other degree or diploma of this University or any other University.

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List of Acronyms

AHW	Auxiliary Health Worker
ANM	Auxiliary Nurse Midwife
ASFR	Age Specific Fertility Rate
ASMFR	Age Specific Marital Fertility Rate
BCC	Behaviour Change Communication
BP	Blood Pressure
CBR	Crude Birth Rate
CBS	Central Bureau of Statistics
CDR	Central Development Region
CDR	Crude Death Rate
CMW	Currently Married Women
CWR	Child Women Ratio
EDR	Eastern Development Region
FCHV	Female Community Health Volunteer
FGD	Focus Group Discussion
FLFPR	Female Labour Force Participation Rate
FLR	Female Literacy Rate
FM	Frequency Modulation
FPAN	Family Planning Association of Nepal
FWDR	Far Western Development Region
GDP	Gross Domestic Product
GNI	Gross National Income
HP	Health Post
ICPD	International Conference on Population and Development
IEC	Information, Education and Communication
IMR	Infant Mortality Rate
IUD	Intra Uterine Device
MCHW	Maternal and Child Health Worker
MDG	Millennium Development Goals
MOHP	Ministry of Health and Population
MSI	Marie Stopes International

MWDR	Mid-Western Development Region
NDHS	Nepal Demographic and Health Survey
NGO	Non Governmental Organization
OECD	Organization for Economic Cooperation and Development
ORC	Outreach Clinic
POA	Programme of Action
PPP	Population Perspective Plan
PPPR	Period Parity Progression Ratio
PSI	Population Service International
PSU	Primary Sampling Unit
SHP	Sub-Health Post
SMAM	Singulate Mean Age at Marriage
SMAMF	Singulate Mean Age at Marriage for Females
TF	Total Fecundity Rate
TFR	Total Fertility Rate
TMFR	Total Marital Fertility Rate
TV	Television
UN	United Nations
VDC	Village Development Committee
WDR	Western Development Region
WFS	World Fertility Survey
WHO	World Health Organization

Chapter-I

Introduction

1.1 Background of the Study

Fertility transition can be perceived as the change from the state of high natural fertility regime to a regime of low fertility. The process is invariably manifested by fertility regulation. This term appeared in literature since the second half of 20th century and is being extensively used till the date. Fertility transition took off in different countries at different points of time. Fertility decline was first initiated in France in late 18th century (Caldwell 1998) and a sustained fertility decline was first ever evidenced there in 1830 (Van De Kaa 1996). It did not spread much to other countries at that time; however, onset of fertility decline gradually appeared and spread to other parts of Europe and the whole region was in the process of fertility transition by 1900; whereas in majority of the developing countries it began in the 20th century, starting at various time points (Caldwell 1998). In some less developed countries fertility decline started even after 1970. A vast majority of the countries in the less developed region are going through a continued fertility decline (UN 2013a). Globally, fertility level was at TFR of 2.53 in 2005-2010 but high variation exists among countries. For example, in 2010, TFR varies from values as low as 1.17 in Latvia, 1.25 in Hungary and 1.27 in Bosnia-Herzegovina to as high as 5.8 in Gambia, 5.9 in Mozambique and 6.2 in Uganda (ibid.).

Fertility in any society is collectively influenced by a constellation of socioeconomic factors, which includes education, economic status, occupation, women's position and many more. Historical and cultural factors are important to influence reproductive change (Basu and Amin 2000). Societal norms and values regarding reproduction also play a vital role to shape fertility. Moreover, behavioural factors like readiness, willingness and ability to adopt fertility control measures have a bearing on the fertility level. Procreative decisions are also affected by the material conditions in which a couple lives and makes the choice, and social policies are also a component of these material conditions (Overall 2012). Therefore, population policies and programmes also influence fertility. Health and mortality status of the society considerably influences fertility. Mortality decline has been often considered as a driving force for fertility decline (Caldwell 1998) and ignoring it as a precondition of fertility decline would be an error (Mason 1997). Perceived value of

children and aspirations for children are other factors that shape demand for children and affect fertility.

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Social scientists, researchers and demographers have made significant contributions to explain the process of fertility transition. They are mostly focused on seeking the underlying causes of fertility decline. Different approaches of explanations are provided for the reason of fertility transition. A classical model of demographic transition considers socioeconomic development and modernization as the prime causes of fertility decline (Hirschman 2001). 'Socioeconomic', 'demand' and 'adjustment' theories of fertility decline argue that the main force of fertility transition is the changes in social and economic conditions that gives couples incentives to limit their fertility whereas, 'diffusionist', 'ideational' and 'innovation' theories highlight the appearance and spread of new techniques for limiting fertility, or new ideas about the desirability of limiting fertility as the main reason (Bryant 2007).

Social and economic development is clearly associated with fertility decline (Bongaarts 2013). In addition to this, some scholars view that diffusion of new ideas about childbearing is an essential precondition of fertility decline. Therefore, two factors: 'economic and social development' and 'diffusion of idea of birth control' are responsible

for fertility transition in which the first factor acts through a complex mechanism and the second is independent of development (Retherford and Palmore 1983). This argument emphasizes 'development' as more fundamental than the 'diffusion' in explaining fertility transition and asserts that an advanced stage of development is a sufficient condition of fertility transition but only the spread of knowledge of birth control and its service is not.

One classical view is that the fertility has declined as a response of changes in the socioeconomic status of a society (Davis 1963). According to this view, industrialization and urbanization that took off in Western Europe in the 17th century made a significant improvement in the life style of people through betterment of their nutritional status and adoption of more hygienic life style. This change caused mortality to decline and later on, fertility started to decline as the response of mortality decline to adjust the population growth. The new opportunities provided by emerging economy coupled with declined mortality acted as 'stimulus' that led families to 'respond' in a multiphasic way by every demographic means possible to maximize the use of their family resources and to avoid relative loss of status and controlling fertility was one of such responses**.**

The new ideal of the small family arose first in urban industrial society after advancement of new opportunities for individuals in the course of rapid technological and economic development (Notestein 1953). Fertility decline started as a conscious choice, first from the urban centres and from among the affluent society; which, later on, disseminated to the other sections of society through the process of diffusion. Therefore, there is always a time lag in the course of fertility decline in different sections of society. Not only the time lag; there are differences in the tempo of fertility decline as well. The differences in the trajectories of the socioeconomic development along with prevailing societal norms cause the differences in the trajectories of fertility decline.

In explaining fertility transition, the notion of quantity-quality trade-off of children focuses on the nature of relationship between increase in income and the number of children a couple would have. This approach argues for a dynamic adjustment between standard of living and child quality and asserts that secular rise in income causes an increase in the quality of children thereby rising per child expenditures, which tends to diminish the quantity of children demanded, and the inverse relation between income and fertility establishes in long run (Becker et al. 1960; Becker and Lewis 1974). Economic development implies and is accompanied by conditions that induce fertility decline to a sufficient degree and a sustained fertility decline is consequence of development

(Leibenstein 1975). This approach suggests that economic prosperity leads to fertility decline in long run.

Theories of 1960s and 1970s explaining fertility decline are usually entrenched in underlying socioeconomic changes (Caldwell 2001). The demand supply framework proposed by Easterlin (1975) linked economic variables with the sociological variables and explained fertility transition in the process of socioeconomic transformation in terms of demand for children, supply of children and the cost of fertility regulation. This theory has described 'motivation' to fertility control as a precondition, which is developed if supply exceeds demand for children and this motivation should overcome the cost of fertility regulation for fertility to be under the control of couples. In summary, this theory asserts declining fertility in the course of socioeconomic development. However, Cleland and Wilson (1987) put iconoclastic views on demand theory of fertility decline and emphasized that 'ideational forces' played crucial role in diffusion of birth control knowledge and ideas by creating worldwide concern on population growth. Easterlin's framework is also criticized on the ground that it contains few ideas about the institutional determinants of fertility decline (Mason 1997).

The innovation and diffusion of means of fertility control played important role in fertility decline. Historical fertility reduction is an innovation followed by diffusion, where, diffusion acted as an active agent in promoting or retarding practice of birth control and influenced the process (Kirk 1996). Those means were first innovated and adopted in more developed world and gradually diffused to the less developed world. The less developed countries therefore have a shorter history of fertility decline as compared to that of developed countries. The idea that means of birth control are new innovation is challenged by Carlsson who argued that birth control was practiced earlier before the secular decline of fertility began and there was only a shift in a stimulus balance between old-style and new-style ideals, and the consequent shift in the equilibrium level of adoption, or in the fertility targets of controlling parents (Carlsson 1966). However, it is acceptable that innovation and diffusion are necessary elements to be taken into account in explaining fertility transition (Van De Kaa 1996).

A large number of socioeconomic factors have direct or indirect influence on one or more of the proximate determinants of fertility and create differential impacts on it. Inference can be drawn that there is not a single factor or cause that fully explains fertility transition. Research literature shows that there is wide variation in the pre-transitional

fertility level and the mechanism of fertility decline although there are some common factors contributing to it. Fertility transitions do not follow a similar path and that the same causal variables are not present everywhere (Mason 1997; Hirschman 2001).

Socioeconomic development can be considered one of the major forces that influence demographic processes in the present context, but it is not the only source of pressure (Hirschman 2001). Mass scale family planning programmes also have a substantial effect on fertility decline independent of the influence of socioeconomic factors (Mauldin 1983). Diffusion of idea of controlled fertility and the means to achieve it are equally important. Family planning programmes facilitate diffusion of idea of birth control as well as supply the means of contraception. Despite some degree of independence between diffusion and socioeconomic development, the two processes are complementary and additively provide the most comprehensive theory of fertility decline (Cleland 2001**)**. "The structural transformation of societies is the engine of demographic change and the diffusion is the lubricant" (ibid.; 45).

After the establishment of the United Nations (UN), a forum was created where countries could discuss and make a world view in different issues; and population growth in the world was realized as one of such issues of global interest. Mid-twentieth century models of economic growth developed a consensus in development policy circles that high rate of population growth in developing countries hinders economic growth and there is a necessity to reduce population growth (Gupta et al. 2011). It was hypothesized that rapid population growth constrains the economic growth of low income countries with poor policy environment and family planning programmes were started to be taken as measures (ibid.). UN also argued about the threshold hypothesis that a certain minimum level of socioeconomic development is required for fertility decline to take off and once the condition is met, fertility decline continues until it reaches much lower level. However, facing the criticism of this hypothesis, UN has pointed out the importance of national culture and value systems as factors in analyzing the influence of social and economic development on fertility (Bhende and Kanitkar 2003).

Economic development is the driving force of the demographic transition and the time lag in fertility decline in classical demographic transition model is due to the fact that fertility decline depends more strongly on the alteration of long-established customs and institutions (Coale and Hoover, 1958). During the course of time, increasingly lower socioeconomic threshold has been found to be required for fertility decline to take off

(Bongaarts and Watkins 1996; Caldwell and Caldwell 2001). As compared to those countries whose fertility declined longer ago, countries that have undergone recent fertility transition have done so at relatively lower level of socioeconomic development (Caldwell and Caldwell 2001; UN 2014). Increasingly more number of low income countries started joining the group of countries witnessing fertility transition over time. Therefore, scepticism by Coale and Hoover (1958) regarding the applicability of classical demographic transition model to exactly describe the likely course of fertility decline in low income areas is noteworthy. They argued that improvement in public health made it possible to substantially reduce death rates without major restructuring of an agrarian economy thus creating a prospect of rapid population growth in low income areas where small changes in economic organization or nominal rise in income may cause a reduction in fertility.

The West perceived thought of 'population explosion' after 1950s, brought idea of small families and encouraged development of new and more effective methods of contraception to meet the needs of developing world (Caldwell 2001). Search for the means to curb the population growth lead to the spread of the state intervened family planning programme. Such programmes are guided by the neo-Malthusian initiative of fertility regulation, which aims to provide information on contraception and its service to the people in mass scale and influence fertility to decline by controlling conception. However, there is considerable variation among countries in terms of accepting, adopting, and the way of implementation and many other aspects of family planning programme which has created a mixed type of effect of family planning programme to reduce birth rates.

Now, the family planning programme has become one of the important means of fertility control and hence to contribute in reduction of population growth. In many developing countries, the family planning programme has been spread mainly in the last quarter of the 20th century and implemented as a part of overall socioeconomic development programme. Demographic variables are now integrated with the development policy and planning as most of the developing countries put thrust on it to achieve low level of fertility.

Generally, such programmes are nowadays funded by multi-stakeholder donors so that common people in many developing countries get the service either free of cost or at a subsidized cost. In this endeavour, India was the first country to start family planning

programme from government sector in 1951. Nepal also followed it by starting family planning programme in 1959, though in the private sector first. Nepal introduced the programme in government sector from the third five year plan period 1965-1970 and the programme is in effect till now as one of the most prioritized government programmes.

Fertility transition in developing world is largely the outcome of mortality decline, cultural context, changing socioeconomic conditions as well as family planning programmes. Most of the research on fertility transition has focused on identifying the major factors responsible directly or indirectly for influencing fertility behaviour and explaining the process of fertility transition. Such studies have found interplay of multiplicity of factors acting in the process of fertility transition in different regions. It is difficult to mention certain sets of conditions to be necessary for fertility to decline. Mortality decline is a precondition for fertility decline in developing countries and some countries have responded quickly and some others with delay so that the timing and course of fertility transition differed among countries thus creating fertility differential among countries (Cleland 1998). Complexity of fertility transition does not allow an easy generalization (Caldwell et al. 2002). It should be accepted that different fertility declines will have different causes and to understand the circumstances under which the different causes are likely to operate should be the goal studying fertility transition (Mason 1997). Fertility decline in different historical contexts are found to be diverse in terms of origin, speed and correlates, rather than a simple theory that would predict the change (Hirchman 1994). Therefore, there remains lack of a generalized theory of fertility transition (Hirschman 2001). Although fertility transition is a widely covered area of social science research, due to the complexity of the process itself, many aspects are yet to be unfolded. Developing a common theoretical framework to accommodate diverse historical paths of fertility transition is a challenge (Hirchman 1994). Therefore, there is always a scope of furthering the understanding of fertility transition.

1.2 Rationale of the Study

Nepal has witnessed a high exponential population growth rate of more than two percent from 1961 to 2001 which has now declined to 1.35. The life expectancy at birth increased from a low of 41years in 1971 to 67 years in 2011, though this is less than world average (Table-1.1). Total fertility rate has declined from over 6 in the 1960s to 2.6 in 2011 (MOHP et al. 2012) which is close to the world average level but above the Asian average. Infant mortality rate is 46 per 1000 live births, which is similar to the South

Asian average, but higher than the world average. Nepal is characterized by a low level of urbanization with only 17 percent of population living in urban areas in 2011 and very low level of per capita income. The World Bank has listed Nepal as one of the low income countries (World Bank 2014).

About one fourth of the population (25.2 percent) lives below poverty line (CBS 2011). Literacy rate is 66 percent; 75 percent for males, 57 percent for females; 62 percent for rural population and 83 percent for urban population (CBS 2012a). Nepal is a multiethnic and multilingual country where 125 caste/ethnic groups and 123 languages spoken as mother tongue are recorded in census 2011 (ibid.).

The onset of fertility decline in Nepal dates back to the early 1980s (Das Dangol et al. 1997; Karki 2003). In Asia, fertility transition spread even in countries with low socioeconomic levels, basically due to grass-roots communication, especially among women; and Nepal, which has joined this group, has also been characterized as one of the poorest countries (in terms of per capita income) whose fertility decline started (Caldwell 1998). According to Caldwell (1998), mass education might have played a crucial role in the diffusion process of most probably two things: either the idea of small family and its justification or the contraception or the justification of its use and made onset of fertility decline possible.

Table-1.1: Nepal in the world: Some demographic and economic indicators around 2011

Indicator	World	Asia	South Asia	Nepal
Rate of natural increase of population (%)	1.2	1.1	1.6	1.35[#]
Infant mortality rate	40	35	47	46[@]
Total fertility rate	2.5	2.2	2.6	2.6[@]
Life expectancy at birth	70	71	67	66.6[#]
Life expectancy at birth (Male)	68	69	65	65.4[#]
Life expectancy at birth (Female)	73	73	68	67.9[#]
Urban population (%)	52	46	32	17[#]
Contraceptive prevalence rate (%)	62	65	53	49.7[@]
Population density (per sq. Km.)	52	135	261	180[#]
GNI PPP per capita US$ (2012)	11690	7800	3830	1500
Percent share of income of poorest fifth	6.7	7.3	9.0	8.0
Percent share of income of richest fifth	45.8	44.3	42.5	41.0

[#] CBS, 2014a (based on census 2011); [@]MoHP et al. 2012 (based on NDHS 2011).
Source: Adapted from Population Reference Bureau (2013)

TFR in Nepal declined from 6.3 in 1971 to 2.6 in 2011, by around one child per women per decade. Now, some particular sections of the country like urban area and highly educated group have fertility below replacement level (MoHP et al. 2012). But, there is still a long way to go to achieve replacement level fertility in the all sections of population of Nepal. Population is predominately rural with 83 percent people residing in rural area (CBS 2012a). Most of the socioeconomic indicators including education are poorer in rural area. But still, fertility in the rural areas has also declined by perceptible amount (4.8 in 1996 to 2.8 in 2011) (Pradhan *et al.* 1997; MOHP et al. 2012).

It is evident that in spite of a lack of a prosperous economy or rapid industrialization and urbanization, fertility has declined by sizeable amount in Nepal. Moreover, fertility decline has occurred where infant mortality is moderately high. But, there is massive change in the availability and accessibility of different mass media like FM Radio, TV, Newspaper, Mobile phone and even internet in the recent past. People's mobility has increased creating more chances of exchange as well as diffusion of ideas. Mass media have become easy channel for government family planning programme to disseminate information on contraceptives as well as benefits of small family. Similarly, increased access to education has brought about changes in people's perceptions on existing value system regarding life, spurred rational point of view and challenged existing societal norms. Nepal is therefore transiting through immense social changes coupled with sluggish economic growth. Moreover, there is difference among the three geographical regions of the country in terms of infrastructure development, availability and accessibility of health and education services. Since the livelihood in the three different geographic regions of Nepal is different and the pace of socio-economic transformation there is also different, the mechanism and pace of their transition to low fertility may also differ. Differences in the pace of socioeconomic changes might have led to different trajectories of fertility transition in the three geographic regions. Caldwell and Caldwell (2006) argue that Asian fertility decline is a part of global fertility decline which can be understood as a part of globalization of industrial revolution. But, Nepal may not precisely be covered by this generalized result, where fertility has substantially declined in spite of low level of industrialization and urbanization. Therefore, a study of fertility transition in Nepal is advantageous as a case of a multicultural developing country with a low level of income that witnessed fertility transition in relatively lower level of development.

1.3 Review of Literature

This section presents a systematic review of literature in the field of fertility transition, focusing on different theoretical frameworks explaining fertility transition and some relevant empirical evidences from different countries including Nepal. The review helps in identifying gap in literature.

1.3.1 Theoretical considerations in fertility transition

According to Mukherji (1983), demographic field is an aggregate system comprising of three interrelated components: the structure of geo-socio-economic-cultural attributes of the population, structure of population policy prevailing in that particular society and the resultant pattern of demographic behaviour. Fertility of a geographic area is a component of the vector representing demographic behaviour which is dependent on geo-socio-economic-cultural attributes as well as population policy prevailing in any population at any time (ibid.). Different population scientists have formulated frameworks to study the linkage between socioeconomic context and fertility in human population. Davis and Blake (1956) proposed 'Intermediate Variables Framework' which clearly identified 11 intermediate variables that affect human reproduction and declared that any socioeconomic or cultural variables operate through one or more of these 11 variables to have positive or negative influence on fertility. Due to difficulties in the operationalization of all these variables, Bongaarts (1978) suggested 'Proximate Determinants Framework' for fertility analysis. This framework identified seven proximate variables to influence fertility, among which age at marriage or entry into sexual union, use or non use of contraception, the length of postpartum amenorrhea and postpartum abstinence and use or non use of induced abortion were regarded as the principal proximate determinants of fertility. In this framework too, all the socioeconomic and other variables affecting fertility operate through the channel of these proximate variables.

The 'Demographic Transition Theory' is an explanation primarily based on the western experience and attempts to explain the transition from condition of high fertility and high mortality with lower rate of natural increase to low mortality and low fertility again with a low rate of natural increase of population. This explanation incorporates fertility transition within it. Changes in macro-developmental variables are regarded as causal factors for fertility decline. According to Notestein (1953), industrialization enhanced the mobility of young people and urban life style favoured reduced pressure towards

traditional behaviour of a person. Prosperous economy and rapidly growing technology opened opportunities for new skills and favoured individual advancements. The importance of education and rational point of view led to increased cost of child-rearing and economic contribution of children declined. Women also got new economic roles less conducive for child-rearing. Declined mortality also created pressure through increased family size to be supported. As a result, fertility decline became inevitable.

In spite of some counterexamples, it is generally evidenced that mortality declines first and fertility decline follows as a response to it with a time lag. According to Cleland (1998), there are two ideas for explanation for the sequence 'mortality first'. The first is 'modernization thesis', which states that technological advancement first impinges mortality and no society resists the prospects of better survival. But, reproduction is a much more complex matter, subject to a set of beliefs and social sanctions many of which act for sustenance of high fertility and the impact of technological advance is initially blunted by opposing forces, thus creating a lag. The second is the 'direct influence' which acts through changes in child insurance effect, child replacement effect and pure physiological effect.

This classical model of demographic transition is criticized even in case of European experience because observed patterns of developmental conditions actually associated with fertility decline were found to be quite varied and culturally similar regions moved together in declining fertility, without prime reference to socioeconomic developmental indicators (Freedman 1979). Though the theory is plausible in centennial scale, it seems contradicted in decadal scale because of the fact that there is weak correlation between level of urbanization or industrialization with the first experience of fertility transition (Mason 1997). Moreover, it is only weakly predictive of observed fertility trends in developing countries (Bongaarts 2013).

In a line of argument similar to that of Notestein (1953), Davis (1963) in 'The Theory of Change and Response in Modern Demographic History' argued fertility transition to be the result of a multiphasic response to the demographic stimulus caused by mortality decline and sustained natural increase of population. According to this theory, the families' tendency to maximize their new opportunities given by the industrialization and economic prosperity and to avoid relative loss of their status in the society favoured changed fertility behaviour. This behavioural change was achieved through postponement of marriage, practicing celibacy, practicing contraceptive means, going for abortion and

out migration, which all but the last led to decline in fertility. This argument of fertility transition is also based on the ground of economic prosperity due to industrialization and technological development.

Other economic theories of fertility transition are based on the central assumption of changing balance between costs and benefits of childbearing which results in decreased demand for children; and this acts as the fundamental force of fertility decline (Becker et al. 1960; Easterlin 1975). Becker and Lewis (1974) discussed about the quality-quantity trade-off which states that increase in quality of children is more expensive if there are more children; increase in quantity is more expensive if the children of high quality are required because a high quality child costs more. So, if couples desire high quality children, they will compromise in the number for maximum utilization of their family resources. These explanations consider fertility as a rational and conscious choice of couples where the decision is made on the evaluation of costs and benefits. The arguments put forth by economic theories are challenged by Cleland and Wilson (1987). They argued that the absence of conscious birth control measures in pre-transition period did not justify high demand for children and the fertility differentials in pre transitional populations were largely unrelated to the economic factors. Rather than economic factors, they argued for social factors, especially education to be associated with fertility decline. Moreover, they also credited the role of diffusion of birth control in fertility transition. Not only education, communication and transportation links to global world are also considered to be other major factors for fertility decline (Caldwell 1973; Freedman 1979; Caldwell 1980).

Caldwell (1973) in the 'Theory of Intergenerational Wealth Flow' asserts that fertility declines when the net flow of wealth (money, goods and resources) reverses its direction from children to parents; and emotional and economic nucleation of family are the two main forces to create such effect. However, the idea that family nucleation leads to reversal of intra-familial wealth flow and then to fertility decline is criticized on the ground that, family nucleation was existing far before fertility decline in Europe (Mason 1997). But Caldwell (1973) argues that mass education is the triggering force to bring in such effect. Provision of mass education affects family economy and brings changes in the direction of wealth flow (Caldwell 1980). Discussing how mass education brings in fertility transition, Caldwell (1980) has postulated five mechanisms. First, education reduces child's potential work inside and outside home due to time spent for study on one

hand and due to parents' positive discouragement of their children to do traditional work. Parents may feel that children should retain all efforts to succeed in school and traditional familial work does not suit for such children who are to be successful in outside world. Second, education increases costs of children making them more costly and less productive in family and society. Third, schooling creates dependency whereby children become more dependent as they are perceived as a 'future' rather than a current producer requiring more familial and societal protection. They no longer share responsibility for families' survival at present. Fourth, schooling creates cultural changes and build up new culture, which favours middle-class, capitalists and not supportive of family production and the morality that sustained that production. Fifth, schooling in developing world teaches Western middle-class values, not those of their locality and makes traditional familial morality irrelevant. These all mechanisms favour lower fertility through changes in values of children occurring due to changed social and economic relationships within the family due to mass education.

A secular fertility decline begins only when couples realize that there is an advantage to having fewer children and become motivated enough to lower fertility. In this context, Coale (1973) has proposed three preconditions for sustained fertility decline. These are: fertility must be within the calculus of conscious choice, reduced fertility must be advantageous, and effective techniques of fertility reduction must be available. The extent to which the preconditions prevail in a population, fertility decline would follow accordingly. According to the 'Demand Supply Framework' due to Easterlin (1975), motivation to fertility control persists only when couples perceive that supply of children exceeded their demand. Development plays a vital role to bring changes in demand for children and also multiplies the channels of social interaction which facilitate exchange of ideas regarding advantages and disadvantages of having fewer children (Bongaarts and Watkins 1996). Once the couples get motivated to control fertility, specific methods of family limitation and their cost act as additional causal force that help to determine the timing of realization of motivations for lower fertility and its rate (Easterlin, 1975; Freedman 1979). Although Easterlin's demand supply framework combined microeconomic variables with sociological variables in explaining fertility transition, it failed to fully incorporate idea of institutional determinants of fertility decline (Mason 1997).

Since fertility decline started at various time and proceeded at different rate in different parts of the world, concern was raised regarding the linkage of development and status of fertility transition. In this endeavour, analysing in terms of GDP per capita, Bongaarts (2013) found that the GDP per capita in the year of onset of fertility decline varied widely across countries, the later the onset occurred the lower the GDP per capita in the year of onset was found. Similarly, Bongaarts and Watkins (1996) in a cross country analysis found an increasingly lower socioeconomic threshold required for fertility decline to take off as the time proceeded. Moreover, countries that entered the transition at low levels of development tended to move relatively slowly toward lower fertility and countries entering the transition later after having reached relatively high levels of development experienced the most rapid declines. They argued that pace of fertility transition is independent of the changes that are ongoing in socioeconomic development. Potter and colleagues (2002) criticize this idea and state that social interaction is more closely tied to and dependent on the accompanying process of development. In case of fertility transition in different regions within a country, Potter et al. (2010) give a counterexample of Brazil in which they did not find it necessary that the development threshold for transition onset declines over time. This indicated that there is not a straightforward relationship between onset of fertility transition and level of development and development alone cannot explain the observed variations in timing of onset and the pace of fertility transition.

'Diffusion' is one of the widely used concepts in analyzing fertility transition. Once the innovative fertility behaviour is adopted by a group of people, it is diffused through social interaction. Explaining 'Blended Theory of Innovation-Diffusion', Cleland (2001) strongly argues that the history of fertility decline of the past two centuries is largely conditioned by the diffusion process and the spread of the new ideas of fertility control. He also asserted that reproductive behaviour of individuals is influenced by the perceived behaviour of others but such influences are impossible to identify and articulate. Thus "the evidence for social influence in the reproductive domain rarely takes the form of direct testimony but has to be inferred indirectly from observed patterns of behaviour" (ibid.; 56).

The notion of 'diffusion' or 'ideational change' supports for active evaluation and transformation of new ideas by peers through horizontal and vertical social interaction within community and greater is the extent of social interaction, more accelerated will be the diffusion (Bongaarts and Watkins 1996). Social interaction and influence play a major

role in diffusion of fertility transitions (Mason 1997). In developing countries, though social and economic conditions pave the way for fertility decline, the diffusion effect through social learning and influence may work better in some contexts than in others and help create fertility differentials (Sääväla 2010). Basu and Amin (2000) argue that better diffusion takes place through both homogeneous and heterogeneous channels. Giving example of West Bengal and Bangladesh, they state that these regions have homogeneous culture in terms of language thus facilitating transmission of new ideas; and heterogeneous in terms of socioeconomic setting again facilitating transmission through increased exposure to new ideas that are subsequently diffused.

Conventional innovation-diffusion framework of fertility transition talks about the diffusion of ideas of small family norm and birth control measures. But, diffusion should not be confined to incorporate merely the spread of birth control technology from centre to periphery and must consider wider context of social changes occurring in developing world (Dev et al. 2002). Moreover, diffusion of aspirations is also important for fertility transition. New ideas about the value or valuation of children can diffuse just as rapidly as can new ideas about fertility regulation (Mason 1992). In this line Kulkarni (2011) argues that, in India, instead of diffusion of small family norm *per se*, there was diffusion of the aspirations, which in turn lead to the adoption of the small family norm as rational choice even among poor and uneducated and in rural area too that made fertility transition among these population subgroups possible. He further argues that among the poor and uneducated of rural India, the diffusion occurred of the life style of the upper class, the poor aspired this at least for their children if not for themselves, realized that cost would have to be incurred if these are to be achieved and this caused the lowering family size via quantity-quality trade-off.

The issue whether the diffusion of birth control measures or development is more important for fertility transition is debatable and becomes more complex in the presence of family planning programmes. Discussing the relative importance of birth-control diffusion and development on fertility transition, Retherford (1985) argues that, in the presence of family planning programmes, diffusion of birth control measures becomes rapid and it obscures the effects of development on fertility, because development indicators then change slowly, compared with the fall of fertility. Fertility transition would then be mainly due to diffusion and is influenced by the factors affecting degree of social integration. But, development generates motivation for birth control, which in turn

stimulates the spread of birth-control knowledge and services and so, birth-control diffusion is partly a consequence of development. Also, mortality decline caused by development stimulates governments to promote birth-control diffusion. Therefore, diffusion of birth control can be viewed as a part and parcel of the development process.

In most of the classical theories of fertility transition, changing economic value of children and associated decrease in demand of children is considered a precondition for fertility decline (Gubhaju 2007). In the second half of the 20th century, fertility decline became a globalized phenomenon and this could partly be explained by the need of low-fertility West demanding the control of fertility in the high-growth-rate developing countries, consequently developing economic-demographic theories justifying such a course and promoting modern contraceptives to make it possible (Caldwell and Caldwell 2001). Though fertility transition is now a global phenomenon, all transitions have reasonably different causes, mainly because of the differences in the environment in developed and developing countries during the course of fertility decline (Mason 1997). Three major differences according to Mason (1997) are the following. First, family planning programme was not there in the time of European transitions but its role is accepted now in contemporary developing countries. Next is the role of diffusion of information and ideas of fertility limitation that influences reproductive behaviour in developing world even in the absence of major structural changes. Finally, a huge pre-transitional variation in socio-demographic situation among populations is another reason for the difference. According to Bongaarts and Watkins (1996) populations those experienced fertility transition earlier had undergone through structural changes and were the leaders, whereas, those populations who underwent transition later did so through diffusion from the leaders often before they experienced structural changes that stimulated the transition in the leader country.

After this review, it appears that fertility transition is a complex process, having its association with the level of socioeconomic development to some extent, propagated through channel of diffusion of new ideas regarding family size, birth control measures and aspirations for children, influenced by social interactions of various levels and also promoted by family planning programmes.

1.3.2 Some empirical evidences on fertility transition

1.3.2.1 Differentials and determinants of fertility

Fertility transition is now a globalized phenomenon. Caldwell (2001) argues that there is near-simultaneity on its onset among most of the world's populations. He adds that fertility decline before 1950s in the West, Japan and Australia was achieved over generations and use of traditional methods played a role. Transitions starting during 1950-1960s in the developing world were due to responses to the perception of the developed world of 'population explosion' that was spread to public, which undermined legitimization of large families on one hand and encouraged development of new and more effective methods of contraception to meet the needs of developing world on the other. Before the Second World War, children were not perceived as economic burden, limited methods of birth control available to the west were not available to others and fertility was higher in most of the developing world. Easier-to-use family regulation methods, which were more effective and egalitarian, became available around 1960s and played an instrumental role in fertility transition in developing countries. Developing countries did not experience the mass concern of population explosion but elites there came increasingly to advocate limiting population growth, which helped in effective establishment of family planning programme. Unprecedented economic growth and social change both in developed and developing countries made this change possible. New contraceptive technology promoted the rapidity of transition. Insufficient socioeconomic changes in certain countries during the 1960s and 1970s caused a lag. Fertility decline in both developed and developing countries and the means for it was new material conditions, which brought further socioeconomic changes. In the contemporary developing world, social setting and family planning programme both have influence on shaping fertility. Such a synergistic effect of social settings and family planning programme on fertility was identified in the 1970s and the relationship still holds in the recent context of steady fertility decline in many developing countries **(**Jain and Ross 2012). Data from 40 countries where DHS was conducted during 2003-2010 showed that fertility levels were the lowest in the presence of both good social settings and strong programmes and the highest among those countries with poorer socioeconomic settings or weaker programmes (ibid.).

In Asia, the prime determinants of fertility decline lie in socioeconomic development, particularly in women's education and autonomy and a committed family planning

programme (Caldwell et al. 2002). Rise in female education, urban living and non-agricultural employment, as well as the mortality decline and government family planning programmes caused fertility decline in most of the Asian regions after the 1960s (Caldwell and Caldwell 2006). The mainstream Asia's success in fertility transition could be understood only with the effectiveness of policy measures, especially the family planning programme, though the roles of massive social and economic changes like a fast or a slow rise in per capita income, transformation from farm production to market production, provision of mass education for sending children to school and increased urban population should not be overshadowed (Caldwell and Caldwell 2001).

Fertility transition in the East Asian region is the most rapid one. According to Feeny (1994), declined desired family size and ability and action to control fertility are reasons of fast fertility decline in East Asia. Triggering forces of fertility decline were a feeling of excess of surviving children due to declining mortality and changing environment that shifted costs and benefits of surviving children. A set of complex and interrelated factors, like changes in family structure, spread of education and rise of nonfarm employment due to economic modernization that caused development of labour and capital market played a major role in bringing shifts in costs and benefits of children. The older generation loosened control over family resources causing reduction in labour utility of children and they also inclined to have their children take advantages of emerging educational opportunities of getting jobs in the nonfarm sector of growing economy and increase family income through remittances. Education of children and their increased chance of departure to nonfarm jobs weakened authority of older generation in family. All these led to rapid reduction in desire for children.

Fertility decline in Africa is a bit different from that of other regions. Fertility transition in Africa is achieved due to increase in use of contraceptives, but the motive of use is to increase age at first birth and to maintain and prolong birth intervals rather than limiting births, as has been observed in non-African settings (Ndahindwa 2014). Change in age pattern during fertility decline in Africa is different from that of other non-African settings (Caldwell et al. 1992; Ndahindwa 2014). Fertility declines in early stage of transition occurred almost proportionately across all age groups in Africa, which is largely driven by the need to postpone marriage and first pregnancy, and maintain birth intervals. Caldwell and colleagues (1992) have hypothesized sub-Saharan Africa's experience as a new type of transition in terms of changes in age pattern of fertility during

transition. Another difference of fertility transition in African countries from Asian and Latin American countries is because of the transition that is occurring at lower level of social and economic development and weak family planning programme (Bongaarts and Casterline 2012). Moreover, recent pace of decline there is slower, birth intervals are longer due to longer period of abstinence, the ideal family size is higher and there is a low level of contraceptive use in Africa during transition (ibid.).

The pattern of fertility transition in sub-Saharan Africa is also different from that in other regions of the developing world because it is characterized by slightly higher pre-transitional fertility levels, a much later onset of the transition and a slower pace of decline (Bongaarts 2013). Moreover, there is stagnancy in the process for some time, but it has resumed in the first decade of 21st century (Lesthaeghe 2014). In an analysis of changes in fertility and proximate determinants in 13 sub-Saharan countries, Johnson et al. (2011) found that later age at first union and increasing use of contraception shifted in the direction of fertility reduction; but, postpartum infecundity moved in opposite direction due to less use of breastfeeding, which cancelled out a significant part of fertility inhibiting effect of the other two determinants thus leading to stagnation in fertility decline. This is a bit different and unusual pattern during fertility transition that occurred in sub-Saharan Africa, mainly due to limited and gradual gains in contraceptive use which has nearly been inundated by contrary movement of infecundity.

Schultz (1997) in 'Demand for children in low income countries' acknowledges the fact that both family planning programme and development are associated across countries with lower levels of fertility. However, he argues that different aspects of development create different effects in fertility and a single or an aggregate indicator of development may not explain the relationship. He states that the effect of female education is more negative than that of male education, role of family planning programme is less than conventionally explained, and development itself can be pro-natal or anti-natal depending upon specific mix of sources of growth and development. He concluded that education of women is the dominant empirical factor associated with fertility decline and development programmes increasing the schooling of women, improved child health and nutrition and diffusing family planning methods have all contributed significantly to reduce fertility in low income developing countries.

Abundance of literature is found on the study of socioeconomic determinants of fertility, factors associated with fertility transition and the fertility differentials by socioeconomic

factors. Analyses are made in individual as well as in aggregate level. Relations between fertility and socio-economic factors are often studied in an aggregate level. In a cross country analysis of 39 developing countries, Siddiqui (1996) found that the impact of socio-economic factors on fertility varied on different age cohorts of women, indicating a more negative impact of improved female status on relatively younger women. This research identified female literacy as the most effective tool to reduce fertility. Rutstein (2002) analysed fertility rates, trends and differentials in 43 countries based on DHS data for period 1990-1999. A substantial differential in fertility was found in different regions and by socioeconomic characteristics. Fertility in urban area was much lower than that in rural area; and women with some education have lower fertility than their uneducated counterparts. However, the variations in fertility within country are also studied in terms of the influences of various socioeconomic factors. In this part, Muhammad (1996) studied trends, patterns and differentials of fertility in Pakistan among different ethnic groups. High fertility of some ethnic groups has been attributed to lower level of education, lower age at marriage, greater value of children as well as a high demand for children in that community. That there was little knowledge of contraception was also one of the factors explaining high fertility in those ethnic groups.

According to Caldwell (2001), fertility decline in Sri Lanka started in the late 1950s, in relatively rich, Christian minority, highly educated setting which was colonized for 300 years, was achieved by delaying age at marriage, and assisted by rhythm and withdrawal methods. A rapid social change (especially increased formal education of women), more efficient and legitimized family planning programme and global growth in acceptance of family planning programme are documented as factors associated with fertility decline in some parts of Africa, especially Kenya and Nigeria (Caldwell et al. 1992). Moreover, continuing decline in child mortality, contemporary economic crisis leading to increase in cost of educating and diminishing land holdings are also cited as reasons for fertility decline in some regions (Ndahindwa 2014). In the context of sharp decline in desired and actual fertility in recent years in Rwanda, higher education of women and their belonging to households of upper wealth quintiles are associated with lower fertility (Bongaarts 2013).

In a predominantly rural and poor economic setting of Bangladesh, gradual improvement in child survival providing scope for downward adjustment of fertility, increasing proportion of women drawn into economic activities outside home leading to increase in

age at marriage, increase in male and female literacy supporting increase in age at marriage and child survival, changes in women's position leading to decreased value of sons and increased value of daughters and faster growth of females than males in urban population serving increasing number of women to urban social norms and life styles are causes of fertility decline (Adnan 1998). According to Simmons (1996), the women of Bangladesh perceived that they are undergoing social and economic transition and their interest in family-size limitation has grown, which is strengthened by the family planning programme. In spite of marginal shifts in economic and social circumstances, a powerful force for change in attitudes, ideas, and behaviour among these women regarding fertility was created in conjunction with the strong family planning programme and fertility transition became possible. Another study in Matlab, Bangladesh by Ginneken and Razzaque (2003) shows that fertility decline is due to both supply side factors (effective family planning programme) and many demand side (socioeconomic) factors, mainly women's education. Khuda and Hossain (1996) discussed on positive and negative factors for fertility decline in Bangladesh, where fertility decline has occurred in the absence of socioeconomic environment that is conventionally believed as necessary. They considered poverty led demand for contraception as a negative force, whereas, a motivation to do so due to declined desired family size associated with improved women's education, employment and exposure to mass media as a positive force, both favouring fertility control, where, the positive factors encouraged and the negative factors compelled eligible couples to adopt contraception.

Parrado (2000) compared the fertility transition in Columbia and Venezuela, two different settings in terms of socioeconomic and population policy conditions. Both countries have witnessed a rapid demographic transition but the route was somewhat different. Fertility regulation was innovative behaviour of younger women, and was dependent on educational and occupational characteristics of women, with educated and working women being in the lead. But adoption of this innovation was in response to change in socioeconomic conditions, which altered women's interpretations about the costs and benefits of childbearing and made the practice of fertility regulation more advantageous. Venezuela did not have policies oriented towards fertility control, but Columbia had an effective family planning programme though it was running through non-governmental organizations; the former went through a faster socioeconomic development than the

later. The result was that, the pace of fertility transition was faster in Columbia than in Venezuela.

A study based on DHS data of 2000, 2005 and 2011 in Ethiopia by Hailemariam and colleagues (2013) indicates an uneven and slow decline in fertility in different regions. A negative association of fertility with women's education and wealth status has been found. A differential effect of various proximate factors in different regions and socioeconomic characteristics has been observed. Marriage is the most important factor affecting fertility in urban area, whereas, postpartum insusceptibility in rural area. Contraception is in increasing trend and having the strongest impact in highly urbanized area. Fertility inhibiting effect of contraception is observed to be the highest among educated and wealthy women.

According to Hukin (2014) socioeconomic changes those altered perceptions regarding cost of children, cultural setting conducive to reproductive changes as per changes in socioeconomic changes and a fulfilled latent demand for contraceptives due to increased knowledge and availability of means of birth control are leading causes for fertility decline in Cambodia. Similarly, fertility transition in OECD countries is mainly due to structural changes in the society; that is characterized by higher education and employment for women, changes in patterns of family formation and changing value of younger women towards modern role (d'Addio and d'Ercole 2005). Moreover, the 'education fever' in South Korea exemplifies the notion of 'quality' over 'quantity', by which, average couples cannot have more than one or two children due to a huge investment in terms of time and money required for raising competitive and successful children (Anderson and Kohler 2013). Existence of considerably efficient family planning programme is a major force of accelerated fertility decline in South India and the other underlying forces that reduced the value of unrestricted fertility are declined child mortality, changes in family structure, increase in age at marriage, increased cost of children due to education and decreased economic value of children in the context of changing occupational pattern due to increasing opportunities of non-agricultural employment in growing urban centre (Caldwell et al. 1982).

Shapiro and Tambashe (1997), in a study of fertility behaviour of women of Kinshasa found significant differences in fertility by educational attainment and modern sector employment. Breschi et al. (2013) found that among socioeconomic determinants, women's education was more important than family economic status in shaping fertility

behaviour in Italian populations born between the end of the nineteenth century and the first decade of the twentieth century. They also confirmed that fertility differentials by educational level of women appeared to be wider at the beginning of fertility transition. Education also delays fertility timing. An additional year of education in Kenya is found to reduce the chances of giving birth when still in teenage by at least 10 percent (Ferré 2009). In all these studies, female education is found to be an important factor for fertility differentials within and across countries.

Women's education appears to be the most powerful predictor of fertility differentials in literature. But the negative association between education and fertility is not static and varies in its extent according to the overall level of education and the state of fertility transition. The impact of individual schooling on reproductive behaviour is weak in poor and mostly illiterate societies; grows stronger as societies improve their overall education and advance in their fertility transition; and becomes less prominent once a relatively low level of fertility has been reached (Martin 1995). While at the initial stages of demographic transition, education of females exerts significant negative effect on fertility as the transition progresses this effect tends to weaken (Bhat 2002). 'In low-fertility countries in particular, the relationship between fertility and education is mediated by the other factors associated with the second demographic transition, including income and gender roles' (PRB 2004:19).

The shifting relationship between women's education and fertility is also explained by Bongaarts (2010) in the study of the causes of fertility differentials by education in sub-Saharan Africa. He presented an analytical framework describing the chain of causation linking fertility to its multiple layers of determinants which described that better-educated women marry later and less often, use contraception more effectively, have more knowledge about and access to contraception and are more motivated to implement demand because of the higher opportunity costs of unintended childbearing demonstrating that education levels are negatively associated with fertility and desired family size.

Some studies also explored the reasons of fertility transition of nineteenth and early twentieth century Europe and North America. In this line, Guinnane (2011) has listed six reasons for fertility decline: mortality decline, innovation in contraceptive methods, increase in the direct costs of children, increase in the opportunity cost of childbearing, changes in the costs of and return to child quality and social insurance and old-age

support. In this explanation too, a combination of the reasons related to overall socioeconomic development and the use of contraception has been agreed upon and the reasons cited upon are similar to those of the fertility transition in the contemporary developing world.

A significant negative association between women's education and fertility is confirmed by using NFHS-I, II and III data in India and the other determinants of fertility evidenced were social backwardness, land owned, and religion (Imai and Sato 2014). In West Bengal, India, Paul (2009) found that decline in overall fertility is caused primarily by change in proportion married and contraceptive practices. Moreover, religion, education and household standard of living were significant factors associated with fertility differentials. Supporting the empirical evidences of the western experience, this study showed that fertility transition took place first in urban area, then transmitted to rural area with the difference existing in pace, nature and timing of transition. This study supported role of 'diffusion' in explaining fertility transition in rural area and asserted that diffusion of ideas of small family and change in aspirations about children from urban to rural area contributed to rapid decline in fertility in rural West Bengal.

The changes in values of and aspirations for children are documented to be contributors to fertility decline in India (Bhat 2002; Paul 2009; Sahoo 2010; Kulkarni 2011). As parents become more concerned with better education, health and clothing of their children and emphasize more on enhancing quality of life of their children, there occurs change in the perceived value of children. The primary reason for fertility decline among uneducated women in India is the diffusion of rising educational aspirations rather than effect of educational externalities (Bhat 2002). The choice of low fertility among uneducated women in India is guided by quantity-quality trade-off and maximization of benefits and wellbeing of women and children (Arokiasamy 2009). In Orissa, India, perceived value of children changed due to increasing aspirations of the parents and the rising costs of living (Sahoo 2010). There are evidences that structural changes in socioeconomic conditions helped to bridge the rural-urban gap and motivated rural women to adopt small family (Paul 2009). However, reduction in fertility is found to be independent of the poverty reduction and the association of reduction in poverty and fertility is weak (Mohanty 2011). The possible causes of fertility transition in India are economic development, social changes, diffusion of innovative behaviour of fertility regulation and government population programme (Kulkarni 2011).

Fertility differentials within a country are studied on the basis of many other factors. One of them is the difference in the general level of development among various regions, which creates a situation in which variances exist in the distribution of channels of social interaction that provides partial explanation to observed regional fertility differentials within a country (Bongaarts and Watkins 1996). Next is the rural-urban fertility differential. The rural-urban fertility differences are caused by differences in perceptions regarding family size, value of children and aspirations on children's education of these regions (Sahoo 2010). In spite of some evidences of positive influence of people's religiosity (in terms of religious beliefs) on their fertility behaviour, a shrinking pattern of fertility differences among religious groups has been observed (Zhang 2008). Similarly, mass media exposure is a significant predictor of fertility differentials even after controlling the effects of contraception, place of residence, and mother's educational and employment status (Rabbi 2012). In spite of the commonalities in the timing of fertility change among women of different occupations, some differences in fertility behaviours across occupational classes are observed during fertility transition (Maloney et al. 2013).

1.3.2.2 Age at marriage and its determinants

Age at marriage is one of the proximate determinants of fertility (Bongaarts 1987). But the effect of age at marriage on fertility can be altered by the use of contraception. If birth control measures are practiced before marriage, it obscures the effect of age at marriage. However, Knodel and Prachuabmoh (1974) argue that age at first marriage does have distant association with cumulative fertility even in presence of birth control practices. They have suggested the following channels for such influence. Couples entering marriage at earlier age will complete their desired family size sooner, and then they will be exposed to the risk of unwanted births for longer period till they pass their reproductive age. Postponing marriage to a late age may hamper couples to meet their fertility desire because of declined fecundity with age in general and also due to longer waiting time required to get pregnant for many of them. Moreover, marriages at younger ages are selective, which favour higher fertility desire and socioeconomic conditions supporting for the same. Finally, postponement of marriage for women gives them opportunity to acquire more education, which makes them more career oriented and reduce their desired family size.

Caldwell (2005) argues that increase in age at marriage is associated with social transformation in which the family's central role in decision to marry and also to serve

familial purposes is shifted to that of individual serving the purpose of companionship between relatively equal partners. Jensen and Thornton (2003) argue for demand and supply side factors as determinants of age at marriage for girls. As a supply side factor, a high cost for raising children may create pressure for early marriage of girls. Moreover, another supply side factor is that, if there are situations in which girls are at more vulnerable condition due to a high prevalence of violence, family wants to marry off their daughter at an early age. As demand side factors, younger brides are preferred for reasons related to their longer reproductive period, easiness in controlling and training, and also for purity. Various social and family background characteristics determine the age at first marriage. The strength of the traditional values and ties to the natal family held by the women are also important for determining age at marriage of women, with women having stronger ties having tendency to marry later (Wong 2005). A lower age at marriage results in higher fertility and child loss (Acharya 2010). Age at first marriage has a strong negative relationship with cumulative fertility (Knodel and Prachuabmoh 1974).

Age at first marriage is largely determined by cultural and socioeconomic factors. Evidences based on WFS shows that age at first marriage is lower in more rural societies, at lower levels of education for men and women and when the women worked outside home before marriage less frequently (Mcdonald 1985). Women's education is the most important factor for increasing age at marriage (ibid.). The differences in the educational attainment and empowerment status of women cause different nuptiality regimes between populations and regions (Ayiga and Rampagane 2013). In a study of 40 countries with DHS data, Singh and Samara (1996) found that women's education and age at first marriage are strongly associated, both at individual level and at societal level. Marriage during adolescence is significantly less likely for women who attained secondary school and proportion of women who married in their adolescence is lower for those countries where proportion of women with secondary education is higher. This study found three most relevant factors associated with women's age at first marriage: female labour force participation, women's formal education, and urbanization.

Education and ethnicity are significant factors associated with age at first marriage in sub-Saharan Africa (Ayiga and Rampagane 2013). Women's education, their household wealth status and place of residence are significant covariates of age at marriage in Bangladesh; where, better educated women from better household wealth status and from urban residence are more likely to marry after the age of 20 years (Goni and Rahman

2012). According to Mostafa Kamal (2011), among tribal groups of Bangladesh, only higher education is associated with higher age at marriage and delayed marriage of educated women is not only due to prolonged time of schooling, but also due to delay in finding a suitable job after education. In a study of Rajasthan and Tamil Nadu, Acharya (2010) found a positive association between socioeconomic conditions and age at marriage. Age at marriage is found to be higher in urban residence, among educated women, and women from better household standard of living.

In an urban setting of Addis Ababa, Gurmu and Mace (2013) found that women's engagement in marital life is mainly a function of economic situation of prospective couples and for this reason women always look for an economically sound mate. They found that a high unemployment rate and increased cost of living in urban area caused delay in family formation. Pursuing of education goals causes delayed marriage but once educated, women have greater chance of getting married. Similarly, in Malawi, hazard of early marriage significantly falls when level of education increases both for males and females (Stephen and Palamuleni 2013) and education, ethnicity, region and age are important determinants of early marriage in Malawi (Palamuleni 2011; Stephen and Palamuleni 2013). Another study in Hong Kong found that delayed marriage among women is associated with higher educational attainment and stronger career commitment (Wong 2005). Moreover, skilled employment is associated with delayed marriage in Malaysia (Anderson et al. 1987). Most of the studies found education as one of the most crucial socioeconomic factors that determines age at first marriage. But, the link between age at marriage and women's education does not operate in isolation and is conditioned by broader cultural and socioeconomic context (Singh and Samara 1996).

1.3.2.3 Contraceptive use and its determinants

Since effective use of contraception is the most important component for marital fertility decline, study of contraceptive behaviour of couples of different population has also attracted social science researchers. Such studies are mainly based on survey data and have examined relationship of contraceptive use with various socioeconomic and demographic factors. For example, Jayaraman and colleagues (2009) studied contraceptive behaviour of married, non-pregnant women aged 15-49 who had at least one child from Demographic and Health Survey data to examine the relationship of parity and number of sons to reproductive outcomes in Nepal, India and Bangladesh. This study found strongest associations of parity and number of sons with contraceptive in Nepal,

followed by India and Bangladesh even after controlling for socioeconomic and other factors, including education, employment, wealth, media exposure, women's participation in household decision making, and urban or rural residence. Similarly, Gereltuya and colleagues (2007) examined the determinants of current contraceptive use of contraceptives and method choice in Mongolia using data from the 1998 Mongolian Reproductive Health Survey and 2000 Mongolian Population and Housing Census and found that women with higher levels of education were more likely to be current users of contraception, mainly the IUD and traditional methods. This study demonstrated that patterns of contraceptive use and method choice differed considerably by individual characteristics as well as by geographic areas. In Kenya, better-educated, urbanized groups were more likely to use contraception than their counterparts. Contraception was adopted initially by older, high-parity women who wanted to cease childbearing, but, over time, use permeated even to those who wanted to prolong birth spacing (Njogu 1991).

In a similar study done by Khan and Rahman (1996) in Bangladesh, a positive association of contraceptive use was found with home visits of the female family planning field workers. This study indicated differences in method choice by educational status of women and also found that pills, condoms, and traditional methods were used more by the educated women, whereas injectables and the permanent methods were used more by the uneducated women. Another study by Koc (2000) examined determinants of contraceptive use and method choice in Turkey based on individual, cultural, fertility and contextual variables. This study found that choice of modern method depended on the sex composition of living children and woman’s education was found to be a stronger predictor of method use and method choice than that of her husband. It indicates that number and sex composition of living children is a powerful predictor of current contraceptive use. Female education not only promotes contraceptive use but also brings change in the method choice.

Bongaarts (2010) also found positive association between education levels and demand for and use of contraception. But, the relationship between women’s education and contraception use is not straightforward and is dependent on the level of contraception use *per se*. A reduced educational differential in contraceptive prevalence from the relatively backward states to the relatively socio-economically better states in India has been observed (Parasuraman et al. 1999). According to an Ethiopian study, educational effects on modern contraceptive use are fully mediated by attitudes, knowledge and

access to health services and of these, knowledge and access hold the most considerable explanatory power (Gordon et al. 2011). The same study stated that all socio-demographic factors affect women's education, which in turn has effect on economic status, autonomy and relationship with husband, knowledge/access to family planning and other attitudinal factors and finally affect the use of modern contraceptives. It is inferred that association of education with many other socioeconomic factors makes the relationship between women's education and contraceptive use more complex.

Evidences show that even uneducated women of developing world now are using contraceptives with their increased share in total users. A study by McNay and colleagues (2003) used innovation-diffusion model to study variation of the contraceptive use among illiterate women in India and concluded that not only the common socioeconomic determinants, there was also considerable amount of diffusion effect acting in individual, household and community level in progress. They asserted that others' use of contraception and others' education have positive influence on the contraceptive use of uneducated women and mass media is an important channel for the diffusion process. Moreover, increased use of contraceptives has become one of the major contributors for fertility transition among poor in Indian states and equal contribution of contraceptive use in fertility decline is observed among poor and non-poor (Mohanty 2011).

In the context of declining fertility, improved social conditions and increased strength of family planning programmes in the developing world, whether the fertility differences among developing countries is related with family planning programme and social setting has also drawn attentions. Based on Taiwan's experience, Sun (2001) asserted that the promotion of family planning programme has expedited the process of fertility decline. Studying Demographic and Health Survey Data from 40 countries, Jain and Ross (2012) concluded that fertility level was lower among countries with good social settings or strong family planning programme as compared to those countries with poor social settings and weak family planning programme; and it was the lowest in countries with good social settings and strong family planning programme. This finding supports the association between social condition and family planning programme but still does not quantify the extent of each of these two factors to achieve low fertility. In contrast, arguments are also there that family planning programmes are not necessary condition for occurrence of fertility transition, because, birth rate in high income countries declined

without the benefits of family planning extension activities designated to promote adoption of birth control (Schultz 2001).

Role of government supported family planning programme is also ascertained in the increased use of contraceptives and fertility regulation. Sahoo (2010) found that presence of government supported family planning programme partially played a role along with the increased awareness of benefits of small family achieved by expansion of transport and mass media to limit fertility after two or three children in spite of lack of high level of socioeconomic development in the Indian state of Orissa. Presence of such programme also increases the access of contraceptives which not only increases the odds of using them but also ensures more balance among methods (Wang et al. 2012; Ross and Hardee 2013). Enhanced service accessibility provided in a culturally acceptable manner increases the use of contraception even among hard-to-reach group of peoples (Bertrand et al. 2001). Acknowledging the role of family planning programmes, Jayaraman and colleagues (2009) suggested that programmes need to target women on the basis of parity and family sex composition to maximize family planning acceptance, reduce fertility and counter the practice of sex selective abortion. These findings support the positive role of family planning programme to enhance contraceptive use and hence to promote fertility transition.

1.3.3 Fertility transition and contraceptive use in Nepal

This section provides an overview of available literature on previous works done in the area of fertility transition in Nepal. Analysis of fertility trends, differentials and the decomposition of change are addressed in many previous studies of different dates. A number of studies are found which are performed before 2000 (for example: Das Dangol et al. 1997; Retherford and Thapa 1998; Acharya 1998; Aryal 1998; Subedi 1998; Retherford and Thapa 1999) and some others after 2000 (for example: Karki 2003; Retherford and Thapa 2003; Retherford and Thapa 2004; Bhandari 2004; Karki 2008; Bhandari and Ghimire 2013). All these studies confirmed the ongoing fertility decline in Nepal. In fact, Goldman et al. (1979) assessed the quality of 1976 NFS data and found that the data were of reasonably good quality for fertility estimation.

The four studies by Retherford and Thapa (1998, 1999, 2003 and 2004) analysed fertility trends in Nepal for period 1961 to 2000. They used the national level survey data of 1976 Nepal Fertility Survey (NFS), 1991 Nepal Fertility, Family Planning and Health Survey (NFFPHS), and the 1996 Nepal Family Health Survey (NFHS). Studies of 1998 and 1999

noticed that fertility in Nepal was declining with a slow rate and the 2003 and 2004 study added that the rate of decline speeded up in the later period of the study and a secular decline in TFR persisted. They also studied the parity progression ratios and noticed the changes on it. Excess of higher order births were found to be curtailed, while little change was observed for progression from birth to marriage, marriage to first birth and first to second birth. Their study of 2004 also decomposed the changes in TFR and confirmed that change in proportions married during the study period accounted for 25 percent of the total change in fertility and the remaining 75 percent change was accounted for by reductions in the age-specific marital fertility rates. Almost half of the decline in marital fertility was accounted for by changes in population composition by ecological region, development region, urban-rural residence, education, age at first cohabitation with husband, time elapsed since the first cohabitation, number of living children at the start of the five year period and media exposure.

Similarly, Das Dangol et al. (1997) analysed data from Nepal Fertility, Family Planning and Health Survey 1991 and Nepal Living Standard Survey 1996 to describe fertility transition. They found that there was a fertility decline from TFR of 6.68 in 1977 to 4.78 in 1991 in Nepal. They argued that the onset of fertility decline was around 1980, started with a slow rate and was gradually speeding up. However, a slow fertility decline during 1976-1996 was argued by Acharya (1998). This study identified age at marriage and contraceptive use to have significant effect on fertility. The same study confirmed that socioeconomic variables had started to play a significant role in fertility decline in Nepal. Aryal (1998) examined the fertility transition in the capital city Kathmandu by using Coale and Trussell model of marital fertility and confirmed that fertility transition had begun in Nepal; the modernizing factor 'education' played a major role to increase age at marriage and supported fertility transition.

Based on birth interval analysis of three consecutive birth intervals from 1991 Nepal Fertility, Family Planning and Health Survey (NFFPHS) data, Suwal (2001) explored the demographic, socioeconomic and cultural differentials in birth intervals. She found that the first birth was given more importance than the second and third births; highly educated women had more control over their reproductive life; and knowledge of family planning and the availability and acceptability of contraceptives had significant impact on birth intervals.

Regional variation in fertility decline and its association with selected socioeconomic factors was studied by Subedi (1998) using census data of 1971 and 1991. This study indicated that fertility transition was not spread enough to the all regions of the country till 1991. A good association of fertility decline with the level of socioeconomic development of the region was observed. The analysis of this paper threw some light on regional pattern of fertility in Nepal and also suggested further research in regional fertility differentials in the country. Similarly, Karki (2003) studied the trends, patterns and level of fertility in Nepal by using data from Population Censuses of Nepal 1991 and 2001. It was found that the fertility declined in the study period but age pattern of fertility remained almost the same. This study asserted that the differences in the fertility of specific population groups arose mainly from three sources: differences in the number of children which couples in the various population groups wanted, difference in their knowledge, attitude and practice of fertility control which enabled them to achieve their desires, and difference in the demographic characteristics of each population group. Socio-economic change which includes to varying degrees the spread of education, improved health, provision of income to the deprived and exposure to modern ideas that promote fertility decline contributed to fertility transition.

As a bit different effort, Bhandari and Ghimire (2013) used longitudinal panel data from the Western Chitwan Valley of Nepal to examine the impact of the use of modern farm technologies on fertility transition in poor, rural, agrarian settings. They found that use of modern farm technologies reduces subsequent births in farm households after controlling for various community, household, and individual factors. These findings suggest that the demand for farm labour could be the driving force behind persistently high fertility in poor, rural, agrarian settings, and therefore, the use of labour-saving technologies may substitute farm labour causing reduction in demand for labour and speed up fertility transition.

Fertility decline in Nepal seems to be very rapid during the period of 2001 and 2006 DHS. Karki (2008) examined the possible factors underlying the recent declines in fertility from 2001 to 2006. The study concluded that actual TFR in 2006 would be slightly higher than stated in the DHS report; contraceptive use stands out as the most important contributory factor for the fertility decline during this period as well as in the past; and the rise in proportion of unmarried women also had impact on fertility decline.

Literature is available on fertility preferences, contraceptive behaviour and its determinants in Nepal. Fertility limiting behaviour among Nepalese women has been found to be influenced by perceived cost of contraception independent of its actual costs (Emens 2008). Perceived benefits and the risks of practicing contraceptives are the components of perceived cost of contraceptives. People self-consciously weigh the perceived benefits and the risks of practicing contraceptives relative to their environment and adopt strategies to lower contraceptive risks which creates inconsistency between fertility preferences and contraceptive behaviour in rural Nepal (Stash 1999). In the study of family change in Chitwan Valley of Nepal, Ghimire and Axinn (2006) found that exposure to mass media is strongly related to positive attitudes towards contraceptive use and preference for smaller family.

Apart from the perceived costs and benefits of contraceptives, couples' participation in contraceptive decision making is also an important factor and this is influenced by many other factors. Chapagain (2005) found that education, personal income, exposure to psychological assault and physical assault demonstrated significant influence on wives' participation, while no variable showed association with husbands' participation in contraceptive decision-making. He noticed joint involvement in making contraceptive decisions to be common in Nepal. Women's education and the husband's education are most commonly used variables to study contraceptive decision making and the method choice. Gubhaju (2009a) found that although the wife's education level was associated with the type of method used by the couple, the husband's education level had more influence on the use of male sterilization and condoms. The same study evidenced narrowed differences in the use of any method of family planning by education level. Gubhaju (2009b) analysed determinants of contraceptive use dynamics with a particular focus on quality-of-care measures from the perspective of contraceptive user in Nepal and found that non-government source of services, high level of information given, one-to-one counseling, satisfaction with services, and shorter travel time to source are associated with lower odds of contraceptive discontinuation.

Some studies on marriage transition and the effect of age at marriage on fertility are also available. Analyzing data from '2000 Nepal Adolescent and Young Adult Survey (NAYA)' which included both unmarried and married male and female youths of age 14-22, Choe et al. (2004) examined marriage transition in Nepal. They found that, although early motherhood is quite common among rural women, Nepalese society is undergoing a

transition; and modernization factors like urban residence and higher levels of education are associated with a lower probability of early marriage and early motherhood. Maitra (2001) studied effect of age at marriage on fertility in Nepal using data from the Nepal Living Standard Survey 1996 and showed that an increase in the age at marriage significantly reduced total fertility of women; and women's education played substantial role in increasing age at marriage and reducing total fertility. This paper claimed that higher the education level of woman stronger is its effect on the age at marriage and total fertility. Both these studies supported for some threshold level of education that must be attained before it starts affecting these two variables.

The impact of family planning programme on contraceptive use is also studied in Nepal. By using the pooled data from three consecutive nationally representative surveys conducted in 1996, 2001, and 2006, Sharma and colleagues (2011) used limited information related to family planning programme, which is available in the demographic and health survey data and found a varying extent of positive influence of family planning programme on contraceptive use to different ethnic groups.

The literature gives sufficient evidences that fertility transition is continuing in Nepal. There is evidence of the existence of fertility differentials by many socioeconomic characteristics like place of residence, women's education, media exposure, and also by knowledge of family planning, availability of family planning and geographical region. These studies also indicate that fertility transition was slower at first but accelerated later. In the recent past, due to changes in the socioeconomic variables themselves, fertility transition may be differently influenced and the role of these factors might have altered. There is likely to be a complex interplay among several factors involved in any fertility decline and a different mix-up of these factors is involved in each decline (Mason 1992).

1.3.4 Literature gap

The theoretical explanations as well as empirical evidences indicate that reduced mortality, better education, economic condition and standard of living of people and modernized formal economy coupled with industrialization and urbanization are conducive for sustained fertility decline. Similarly, diffusion of not only the means of birth control, but also of the aspirations about children spurs fertility decline. But, in the case of Nepal, a sustained fertility decline has occurred in spite of relatively higher infant mortality, lower level of female education, more informal agrarian economy with low

level of income and low level of industrialization and urbanization. Causes of low fertility in low income regions are still a rich area of future research (Vithayathil 2013).

Reviewing the literature on fertility transition in Nepal, it can be concluded that there are sufficient evidences of continuing fertility transition and that the pace of fertility transition is changed over time. Fertility decline prior to 2000 has been more extensively dealt as compared to post 2000. A substantial analysis describing the mechanism of fertility transition for the last decade appears lacking. In spite of the political instability, Nepal has made considerable changes in socioeconomic conditions including health, education and communication sector in the last decade. Changes must have occurred in value of children and the aspirations for children even in rural setting. Such changes and their linkage with fertility transition are to be systematically studied.

There lacks detailed study to depict the changing scenario of family building process during fertility transition in Nepal. Transitions in women's age at marriage, desired family size and contraceptive use are needed to be further studied. Factors affecting the intermediate variables like age at marriage and contraceptive use are to be dealt in detail. The causes bringing changes in perceived value of children to desire smaller family size are to be further explored. Decomposition of change in fertility in the recent past can throw more light on the current dynamics of fertility transition. Similarly, the enigma of almost stagnancy in the contraceptive use in the recent past in the context of declined desired family size and the more than four decade long family planning programme is to be systematically analysed. Demand and supply side barriers of contraceptive use are required to be understood at micro level. Therefore, there is scope of further work to systematically explain the fertility transition in Nepal.

1.4 Setting

Nepal is a land-locked country, surrounded by India in the east, the south and the west and China in the north. It is located in the northern hemisphere, between 26º 22′ north to 30º 27′ north latitude and 80º 4′ east to 88º 12′ east longitude; having elevation ranging from 68 meters to 8,848 meters and occupying an area of 1,47,181 square kilometers. The country is almost rectangular in shape and stretches east-west. It is divided into three distinct ecological belts: the Mountain in the northern frontier, Hill in the middle part and the *Tarai* or Plain in the southern frontier. The Mountain region covers 35 percent of total land area, the Hill covers 42 percent of it and the *Tarai* occupies 23 percent of total land.

Table-1.2: Selected socio-demographic indicators of Nepal, 1971-2011

Indicators	1971	1981	1991	2001	2011
Total Population	11555983	15022839	18491097	23151423	26494504
Population Growth Rate (% per annum)	2.05	2.62	2.08	2.25	1.35
Sex Ratio (males per 100 females)	101.4	105.0	99.5	99.8	94.2
Median Age of Population	20.3	19.9	18.9	20.0	22.2
Percent of 0-4 Years Population	14.1	15.4	14.6	11.9	9.7
Percent of Population above 60 Years	5.6	5.7	5.8	6.4	8.3
Average Household Size	5.6	5.8	5.6	5.4	4.9
Crude Birth Rate	41.3	39.6	41.6	32.6	22.0
Crude Death Rate	21.4	13.4	13.3	10.3	7.3
Infant Mortality Rate		147	97	64	46
Total Fertility Rate	6.3	5.3	5.1	4.1	2.6
Life Expectancy at Birth (Male)	42.0	50.9	55.0	60.1	65.5
Life Expectancy at Birth (Female)	40.0	48.1	53.5	60.7	67.9
Percent of Population Urban	4.0	6.4	9.2	14.2	17.0
Literacy Rate (All) (percent)	13.9	23.9	39.6	54.1	65.9
Literacy Rate (Male) (percent)	23.6	34.0	54.4	65.5	75.1
Literacy Rate (Female) (percent)	3.9	12.0	25.0	42.8	57.4
Labour Force Participation rate (All) (percent)	59.3	65.1	56.6	63.4	54.2
Labour Force Participation rate (Male) (percent)	82.9	83.7	68.2	71.7	62.5
Labour Force Participation rate (Female) (percent)	35.1	46.2	45.2	55.3	46.8

Source: CBS 2007; CBS 2012a; CBS 2014a

According to the most recent census of 2011, Nepal has a population of 26.5 millions. Because of harsh climatic condition coupled with limited transportation and other facilities due to difficult terrain, the Mountain region is inhabited by only about seven percent of the total population. The Hill region has moderate population density, where, about 43 percent of total population resides. The capital city Kathmandu also lies in this region, which is a densely populated urban centre. Though the terrain is rugged in this region, transportation and communication facilities are relatively better than those of the

Mountains. The *Tarai* region has flat topography where, transportation and communication facility is more developed than other regions and this region is densely populated. More than half of total population now resides in the *Tarai* region.

Nepal has been divided into five development regions, 14 zones and 75 districts for administrative purpose. In each district, there are smaller administrative units called Village Development Committees (VDC) and Municipalities. According to newly promulgated constitution in 2015, Nepal is now declared a federal republic, which constitutes seven states. The institutions required for federal structure are yet to be materialized and functioning. Therefore, in this research, regional analysis wherever done is based on existing development regions, not the proposed states.

As stated in an earlier section, population growth rate in Nepal was quite high (consistently more than two percent per annum) from 1961-1971 to 1991-2001, which has substantially declined to 1.35 percent in 2001-2011 (Table-1.2). It is evident that Nepal is undergoing demographic transition. Median age of population is rising; proportion of population of age 0-4 is declining and that in age 60 and above is increasing. During the period 1971 to 2011, crude death rate declined to almost one third from 21 per thousand and crude birth rate almost halved from 41 per thousand. Faster decline in mortality and relatively slower decline in fertility as evidenced elsewhere is observed. Similarly, precipitated decline in infant mortality rate and a substantial increase in life expectancy at birth are observed. One important feature is a low sex ratio in the most recent census. This is mainly due to migration of men to foreign labour market for earning.

Average household size has declined to less than five. Urbanization is also steadily increasing in Nepal. Literacy status has substantially increased, even for females. Labour force participation has declined in the past decade, both for males and females. Similarly, proportions of households having toilet, using electricity for lighting and having TV increased from 47 to 61, 40 to 67 and 23 to 37 respectively from 2001 to 2011**(**CBS 2003**;** CBS 2012a).

1.4.1 Changes in fertility and other related indicators in Nepal

An outline of fertility decline including changes occurred in other indicators related to fertility evidenced from Nepal Demographic and Health Survey (DHS) is depicted in Table-1.3. A TFR of 6.3 was estimated for 1975-1976 based on WFS data (Goldman 1979, as cited in UN 1980) that declined to 4.6 in 1994-1996 and further to 2.6 in 2008-

2010. But the decline is not uniform throughout the period. Between 1998-2000 and 2003-2005, there was a decline of one birth per women, whereas, a decline of about half a birth per women is observed in the periods 1994-1996 to 1998-2000 and 2003-2005 to 2008-2010. Differentials in TFR by rural-urban residence, geographical region of residence, household economic condition and women's education are consistently observed (Pradhan et al. 1997; MOH et al. 2002; MOHP et al. 2007 and MOHP et al. 2012). Though fertility transition has occurred in all strata, fertility is relatively higher in rural area, in the Mountains, in Mid-Western development region, among less educated and in the lowest household wealth quintile (MOHP et al. 2012). Further analysis of the dynamics of transition is therefore desirable to better understand the fertility transition process in Nepal.

Median age at first marriage has increased only slightly over the time, indicating less contribution of change in age at marriage on fertility decline. Similarly, the age at first birth has remained almost constant over the period 1996-2011 and is hovering around 20 years. Adolescent fertility is also quite high and there is only a marginal decline in it. Indication is that, early fertility schedule is persistent in Nepal. Therefore, more analysis of the family building process is desirable to unfold the process of fertility transition.

Table-1.3: Changes in fertility related indicators in Nepal, DHS 1996 to 2011

Indicators	1996	2001	2006	2011
Total fertility rate[@]	4.6	4.1	3.1	2.6
Median age at first marriage (years)[#]	16.2	16.6	17.0	17.5
Median age at first birth (years)[#]	19.8	19.9	19.9	20.2
Percent of adolescent women who begun childbearing	23.4	21.4	18.5	16.7
Percent of currently married women using contraception	28.5	39.3	48.0	49.7
Mean ideal number of children[$]	2.9	2.6	2.4	2.2

[@]Refers to three years period preceding the survey year, [#]based on women aged 25-49 years; [$]based on currently married women

Source: Adapted from Pradhan et al. 1997; MOH et al. 2002; MOHP et al. 2007 and MOHP et al. 2012

The proportion of currently women adopting any method of contraception has substantially increased over time, indicating that this component has the most significant role in fertility decline. But this proportion is showing reduced pace of increase in the recent past. In the two most recent inter-survey periods, the percent of current users of modern method showed a slight decline from 44.2 in 2006 to 43.2 in 2011, indicating stagnancy in contraceptive use since 2006 (MOHP et al. 2007 and MOHP et al. 2012).

However, ideal number of children as stated by women seems to have declined earlier, and it is still gradually declining over time. In 1996, currently married women stated 2.9 children on average to be ideal for them and in 2011; this has further declined to 2.2. A detailed analysis is desirable to understand the dynamics of fertility preference and contraceptive use in the context of declining fertility in Nepal. A moderate level of contraceptive prevalence rate with a sign of stagnancy in the recent past should be further analysed to better understand the problems that rural people, uneducated people and people of lower economic strata are facing to fully materialize their fertility aspirations. Fertility is now considered a matter of conscious choice, and couples should have the right to get full information and quality service of the means of fertility control so that they can achieve their fertility aspirations.

1.4.2 Family planning programme in Nepal

In 1965, the Government of Nepal established Maternal and Child Health Division at the Ministry of Health and then launched the National Family Planning and Maternal and Child Health Project in 1969 during the third five-year plan period 1965-70 and consciously implemented it with the objective of reducing crude birth rate. The eighth plan 1992-97 prioritized family planning and maternal child health (FPMCH) programme and women's development programme. The ninth plan 1997-2002 was developed as a part of 20 years long term plan and considered population management as one of the major sectors of development endeavour. This plan had a target of bringing down fertility to replacement level in 20 years (by 2017) and emphasized to make quality family planning and maternal child health services easily accessible and available.

After ICPD-1994 brought the paradigm shift towards comprehensive reproductive health services, Nepal, being a signatory of the POA, also adopted national Reproductive Health Strategy in 1997 which included family planning as one of the components of the reproductive health package. The main objective of family planning within this changed context was to assist individuals and couples to space/or limit their children, prevent unwanted pregnancies and improve their overall reproductive health. However, concerns are now rising that other reproductive health programme like safe abortion programme are getting more attention and family planning programme may be overshadowed (Tamang et al. 2012).

The National Population Strategy, 1983 can be considered a landmark in the development of population policy in Nepal which realized the importance of integrating population

concerns into the development activities (Bista 2003). In 2010, a Population Perspective Plan (PPP) was implemented with the aim to address the commitments made by Nepal in endorsing programme of action related to population issues in international forum, especially ICPD-1994 and the MDG 2000-2015. After this, the family planning programme and the population management programme were integrated. Specific population policy in Nepal has been recently formulated in 2014. Population policy of Nepal considers population management as an integral part of overall development to maintain proper harmony between population and development. One of the objectives of the PPP is to facilitate rapid demographic transition through rights based comprehensive reproductive health care, which clearly follows the theme of ICPD-1994. PPP also identified reproductive health as one of the population themes to be integrated with development activities. The newly formulated population policy envisions reproductive health service from the rights based perspective. The current contraceptive prevalence rate of 50 percent coupled with a high unmet need of 27 percent indicates that 'not only should the family planning programme cater towards this unmet need but also work towards increasing demand for the family planning services' (MoHP 2011; 133). Considering the Sustainable Development Goals and the Millennium Development Goals, Nepalese population policy targets that replacement level TFR would be achieved in Nepal by 2034.

Family planning services are designed to 'provide a constellation of contraceptive methods/services that reduce fertility, enhance maternal and neonatal health, child survival, and contribute to bringing about a balance in population growth and socio-economic development, resulting in an environment that will help the Nepalese people improve their quality of life'(MoHP 2011; 74). The family planning programme in Nepal is integrated to broader scope of maternal and child health from the beginning, as a component of the reproductive health after the ICPD and now under the umbrella of the population management programme. Therefore, effective implementation of the programme in Nepal not only helps bringing fertility under couple's choice but also helps promoting health of women and children and overall quality of life of people at large.

The family planning programme provides services through all the levels of health facilities: hospitals, primary health care (PHC) centres, health posts (HP), sub health posts (SHP), PHC outreach clinics (*Gaun Ghar* clinics) and mobile camps (for voluntary sterilization). The national health policy encourages involvement of non-governmental

organizations as well as private practitioners to complement and supplement government efforts in family planning. Distribution of condoms and re-supply of oral pills is done by mobilizing female community health volunteers (FCHVs), who are at the lowest level of service providing unit. Active involvement of FCHVs and mothers groups is also encouraged for IEC/BCC interventions.

It is well accepted that family planning services should be an integral part of maternal and child health. Family planning services are known to promote maternal health by saving women from the burden of frequent and closely spaced pregnancies, to reduce maternal death by saving them from possible complications arising from unsafe abortions of unwanted pregnancies (UN 2013b), as well as to positively influence child health by increased birth spacing. Guided by the Millennium Development Goal-5, Nepal had set a target of achieving contraceptive prevalence rate of 67 percent and reducing the unmet need for family planning to 15 percent by 2015 (NPC, 2011). Based on the achievements made till the date and the rate of changes in these two indicators in recent past, it seems difficult to meet the target.

Reviewing the evidences on current levels of unmet need for contraceptives, fertility preferences, and the non-contraceptive benefits of family planning, Prata (2007) argues for necessity of expansion of family planning programmes in Nepal to provide couples with tools to reach their desired family size because it makes significant impacts on maternal and child mortality by optimizing child spacing and also helps decreasing fertility. Fulfilling unmet need for family planning and better linking of family planning with maternal health has still been envisaged as a challenge (NPC 2011). In Nepal, skewed distribution of health professionals in various regions and shortage of female health care providers are major barriers to access of services and reaching the special groups like adolescents and young women, disadvantaged and poor are other challenges of the programme (Tamang et al. 2012). This situation necessitates identifying bottlenecks of the family planning programme at micro level.

1.5 Objectives

The overall objective of this study is to have a clearer understanding of the fertility transition in the context of changing socioeconomic conditions and presence of family planning programme in a low income country, namely Nepal, for the period 2001-2011. Towards this, the following specific objectives are set:

1. To examine the trends, differentials and the components of change in fertility
2. To analyze the dynamics of the family building process
3. To study fertility preference and contraceptive use
4. To assess perceived values of children and changes in it
5. To examine people's perception of the role of family planning programme in fertility regulation

1.6 Research Questions

This study has framed the following research questions to answer:

1. What are the socioeconomic factors that are responsible for fertility transition?
2. How did family building strategies change during fertility transition?
3. What is the dynamics of fertility preference and contraceptive use during fertility decline?
4. Has couple's perception on values of children changed?
5. Why do couples desire less number of children than before?
6. How do people perceive the role of the family planning programme?

1.7 Organization of Thesis

This thesis is divided into eight chapters. Chapter-I is introductory which incorporates rationale of this research, the research setting, objectives and research questions. This chapter also presents a review of literature which includes theoretical considerations in fertility transition, some empirical findings and previous works in fertility transition in Nepal and identifies literature gaps. The conceptual framework of the study, data sources and methods of data collection and analysis are presented in Chapter-II. Chapter-III deals with the trends, differentials and the components of change in fertility. Chapter-IV presents dynamics of the family building process in terms of changes in age at marriage, age at first birth, progression to higher parity and birth intervals; including their differentials and determinants. Chapter-V presents analysis of changing dynamics of fertility preferences and contraceptive use. Chapter-VI analyses changes in perceived values of children and explores possible causes of fertility decline based on field information. Chapter-VII assesses the role of the family planning programme from people's perspective, based on field information. The last chapter, Chapter-VIII, presents a summary of the results, their synthesis and conclusions.

Chapter-II

Conceptual Framework and Methodology

2.1 Conceptual Framework

It is well known that fertility behaviour of couples is influenced by socio-economic characteristics and cultural context of the population. Davis and Blake (1956) in their analytical framework have described that all these factors influence fertility through a set of 11 variables called 'intermediate variables'; which, later on, are narrowed down to four by Bongaarts (1978) and named as 'principal proximate determinants' of fertility. Hobcraft and Little (1984) also described effects of different socioeconomic factors on fertility by using a similar framework. Socioeconomic factors like education, occupation, economic status of family, place of residence, ethnic background, religion and other cultural factors which influence fertility through marriage, fertility regulation, abortion, and breastfeeding practices are widely used in fertility analysis. Perceived value of children, interplay of 'quantity' versus 'quality', costs and utilities and aspirations for children influence fertility desires which, in turn, lead to fertility regulation by contraceptive use or otherwise. Similarly, spatial factors like regions, physiological and administrative, are also important as certain practices on marriage and contraception are associated with regions. Moreover, diffusion of the idea of small family has a bearing on fertility behavior. The family planning programmes in various countries including Nepal seek to promote small family and create demand for fertility regulation and contraceptive use by providing information, campaigns, and services. Thus, a set of socioeconomic and cultural factors and the family planning programme jointly influence fertility.

2.1.1 Age at marriage

In the Nepalese context, childbearing outside marriage is rare. Age at marriage decides the total years of exposure of women to childbearing in their reproductive period and it is one of the proximate determinants of fertility. Socioeconomic factors like education, economic condition of family and many cultural practices affect age at marriage. Increase in woman's age at marriage reduces her total effective reproductive life span and directly influences fertility. Changes in age at marriage is therefore one of the factors to explain fertility transition.

2.1.2 Perceived value of children

Most of the economic theories of fertility are concerned on the value of children viewing it in terms of utility or disutility and production goods or consumption goods. Children may be valued differently based on the role they play in the household as per the social norms and cultural practices. In many societies, sons are valued more than daughters due to their societal role of perpetuation of family names; especially for power, property and lineage. Patrilocal and patrilineal family systems like in Nepal are conducive for son preference. Interplay of the cost of bringing up of children and the utilities of children decides couples' perceived economic value of children. During socioeconomic transformation, value of children for labour declines when there is change of occupation from agrarian to non-agrarian and cost of raising children increases due to higher importance to educating children. Therefore, rural parents may differ from urban parents in terms of values of children. Rural parents are traditionally concerned more with the labour of children which they contribute since their childhood like helping in various farm activities and later in supporting at old age. Urban parents are more concerned about emotional advantages and more worried about education of children. Moreover, due to increased importance of educating children, costs of raising them might have gone up even in rural areas and children might have become less useful as helping hands in agriculture. Increasing aspirations of parents and the rising costs of living cause change in the perceived value of children (Sahoo 2010). Value of children as perceived by couples influences their demand for children and hence fertility. Less fertility transition has been found to occur where children are more valued for parental comfort and social esteem (Klaus et al. 2007). Therefore, perceived value of children could be one of the important aspects in analyzing fertility transition.

2.1.3 Fertility preference

According to Coale (1973), reduced fertility being advantageous to individual couples due to perceived economic and social circumstances is one of the preconditions for sustained fertility decline. The extent to which this precondition has been met in a society can be evaluated by changing fertility preferences during transition. Couples always want to achieve their fertility goals as per their preferences within the socioeconomic circumstances they are living. Fertility decision is therefore influenced by preference to have children in certain desired number and sex composition. Hence, fertility preference can be viewed as an intermediate factor in analysis of fertility.

2.1.4 Family planning programme

A family planning programme is a set of deliberate interventions of the government with the objective of curbing fertility rates and has direct impact on contraceptive use and hence on fertility. Based on the national priority of the programme, it aims to disseminate information of various means of contraception through different IEC activities to create more demand for contraceptives. Supply and service delivery of contraceptives is made by the programme. The family planning programme in Nepal is one of the top priority government programmes at present.

Use of contraceptives is influenced by many socioeconomic and cultural factors. Education, economic condition, rural-urban residence, religion and access to contraceptives have direct influence on contraceptive use. Similarly, perceived cost of contraceptives, choice of methods, perceived quality of service, spousal communication and power relationship, and general notion of community towards contraceptive use can have bearings on use of contraception. Variation in the access to contraceptives for population of different strata and region also causes differentials in contraceptive use, where greater access ensures more balance among methods and enhances use of contraceptives (Ross and Hardee 2013). Variation in contraceptive use also promotes fertility differentials. In the presence of government family planning programme and the increased awareness of benefits of small family achieved by expansion of transport, communication and mass media, and health and education facilities, fertility decline becomes possible even in low development setting (Sahoo 2010). Therefore, existence of family planning programme is one of the important factors that influences fertility through use or non-use of contraception, which is a principal proximate determinant of fertility.

2.1.5 Socioeconomic and spatial factors

Socioeconomic and spatial factors influence fertility through different proximate determinants. Various factors considered in conceptual framework of the present study are discussed in the following paragraphs.

Urban-rural residence

Type of place of residence is a background factor that influences fertility through different proximate factors. This is not an independent factor; rather it is associated with other factors like education, occupation and economic condition. Fertility differentials

that are observed by rural urban residence may be due to differences in the socioeconomic conditions of these two residential settings or to some extent due to pure residence factor. Weakening effect of pure residence factor has been observed during fertility transition (Paul 2009). Better opportunities of education in urban area as compared to those in rural area make urban women more likely to get a job with regular pay. This increases their opportunity cost of having an additional child and their demand for children falls. They are also more knowledgeable about contraceptive measures, have better access to these and are more capable to materialize their low fertility needs through effective use of contraceptives. Occupational characteristics of urban areas are more non-agrarian thus reducing utility value of children as productive hands. Rather, children are more expensive in urban areas due to high costs incurred for their education. It is not always true that the rural women have high demand for children but they may be less able to materialize their aspirations due to lack of proper knowledge and access to contraceptives.

Spatial factors

Nepal is divided into three ecological belts: Mountain, Hill and *Tarai* and five development regions where each region comprises areas of all three ecological belts. These three ecological belts differ in terms of various development characteristics like road connectivity and access to government services. The *Tarai* region has relatively better road connectivity which is quite scant in the Mountains. Similarly, differences exist among development regions. The Central development region is the most developed region whereas, the Far-Western region is the least developed one. Differences in the general level of development among various regions create a situation in which variations also exist in the distribution of channels of social interaction and create some regional differentials in fertility within a country (Bongaarts and Watkins 1996). Fertility differentials are observed in Nepal by ecological region and development region. There may be some pure regional effect to create fertility differentials. Moreover, differences in socioeconomic and cultural aspects might have played some role in it. Variation in the level of overall socioeconomic development among regions may create differentials in the access to family planning services and also in acceptance of contraceptives. Cultural differences among regions may also create differences in contraceptive use. These all influence fertility through use or non-use of contraception. Therefore, ecological region

and development region are important spatial factors to be considered in analyzing fertility transition in Nepal.

Religious and cultural factors

Each society has some societal norms regarding the family size and sex composition of children and couples generally comply with the societal norms they live in. Some cultural practices and religious beliefs influence fertility behavior of couples mainly through use and non use of contraceptives and also through age at marriage. Religious differences on customs and norms on age at marriage, family size preference and use of contraceptives also cause fertility variations. In some instances, children of particular sex may be differently valued on religious grounds. For example, in Hindu religion, a son is regarded as essential for performing post-life sacraments of parents and adherence to this religious code influences the extent of son preference. Similarly, different ethnic and religious groups may have their own notions regarding fertility behavior and contraceptive use. Sometimes, available contraceptive methods may not match with those of people's choice or approval thus obstructing contraceptive use. There is observed a positive influence of people's religiosity (in terms of religious beliefs) on their fertility behavior coupled with a shrinking pattern of fertility differences among religious groups (Zhang 2008). Among different socio-cultural factors, religion also influences fertility behavior mainly through use of contraceptives.

Women's education

Education is the most powerful agent to influence fertility indirectly through various channels. Women's education has differential effects on the principal proximate determinants of fertility. Though the relationship between education and fertility is not straightforward, a higher education of women is found consistently associated with lower fertility (Jain 1981; Martin 1995; Parasuraman et al. 1999; Basu 2002). However, the relationship is conditioned by socioeconomic development, social structure, and cultural context, as well as by a society's stage in the fertility transition. At the initial stages of demographic transition education of females exerts significant negative effect on fertility and this effect tends to weaken as the transition progresses (Bhat 2002). Some inconclusive arguments are there that women's education is likely to increase fertility in the setting of very low female literacy; but as the overall level of female literacy

increases, women's education lowers the demand for children by altering the perceived cost and benefits, thus establishing a clearly negative relationship (Cochrane 1979).

Education levels are negatively associated with fertility and desired family size in which, better-educated women marry later and less often, use contraception more effectively, have more knowledge about and access to contraception and more motivated to implement demand because of the higher opportunity costs of unintended childbearing (Cochrane 1979; Bongaarts 2010). Fertility inhibiting effect of women's education through increased child survival is another plausible pathway in the relationship between women's education and fertility whereby increased education of women causes increased survivorship of their children thus causing decrease in demand for children (Parasuraman et al. 1999; Soomro and Mahmood 2005). The influence of women's education on fertility is also materialized through increased contraceptive use. Women's education level is positively associated with demand for and use of contraception (Bongaarts 2010). Therefore, irrespective of the developmental and cultural factors, the best educated women are found to bear fewer children than uneducated women do (Jejeebhoy 1995). All socio-demographic factors affect women's education, which in turn has effect on economic status, knowledge/access to family planning and other attitudinal factors and finally affect the use of modern contraceptives (Gordon et al. 2011).

Women's education has differential effects on the principal proximate determinants of fertility. As discussed earlier, educational attainment causes increase in age at marriage, which suppresses fertility. Marital fertility also gets negatively affected through better use of contraceptives by more educated women. But if a woman involves in modern sector job after acquiring high education, she may not fully breastfeed her child, which causes post-partum amenorrhea period to shorten. This will create a positive impact of fertility. Similarly, given the availability of abortion services, more educated women are more likely to use it and thus contribute to fertility reduction. In total, women's education negatively affects fertility, which will be of varying extent depending upon the overall state of socioeconomic development and the stage of fertility transition.

Work status of women

Women's involvement in paid job outside home and especially in non-agricultural sector is expected to have a negative influence in fertility; mainly due to the opportunity cost of bearing additional child. This is materialized through either increased age at marriage or

use of contraceptives. Women's economic independence due to their involvement in modern sector jobs also brings changes in their thinking about traditional norms and values of childbearing. During the course of socioeconomic development, there occurs occupational transformation of women; more women start joining formal sector work force leading to fall in demand for children. Women working in agriculture and outside agriculture may have different perceived value of children. Therefore, it is desirable to consider women's working status as a factor in analysis of fertility transition.

Economic condition of family

It would appear that families with better economic condition would have more children as they can more comfortably rear them; this is the pure income effect. But, the relationship between economic condition of family and fertility is complex. Due to trade-off between quality and quantity of children, higher income favours quality over quantity and the relationship sustains to be negative in the long run (Becker et al. 1960, Becker and Lewis 1974). High aspirations for children's education and quality of life might play a role in escalating investment per child, leading to drastic decline in demand for children among rich families. Also, pooper families might have been inspired from the life of better off families and there might be diffusion of aspirations of affluent life style at least for their children. Therefore, quantity-quality trade-off might have operated not only among rich but also among poor. As evidenced in literature review, fertility transition in contemporary developing world has been found to occur irrespective of the economic status, ranging from poorest to the richest strata of the society and the relationship between poverty and fertility has also weakened. Therefore, economic condition of household is considered necessary to examine fertility transition in the low income setting of Nepal.

Media exposure

Mass media exposure is a significant predictor of fertility differentials even after controlling the effects of contraception, place of residence, and mother's educational and employment status (Rabbi 2012). Easy access to media is one of the common outcomes of development in the developing world. In Nepal, there is massive change in the availability and accessibility of different mass media like FM Radio, TV, Newspaper, Mobile phone and even internet in the recent past. Massive expansion of different mass media acts as an easy channel for diffusion of new ideas regarding family size. The

family planning programme in Nepal extensively uses these media to disseminate information on contraceptives as well as benefits of small family. Exposure to such messages through mass media helps shaping people's ideas regarding life course actions and fertility behavior also gets influenced by such exposure. People's exposure to messages on benefits of small family might help them make up mind for smaller family and hence influences their fertility desire. This might have further helped to increase contraceptive use and spurred fertility transition. Therefore, exposure to mass media is taken as a factor in analyzing fertility transition.

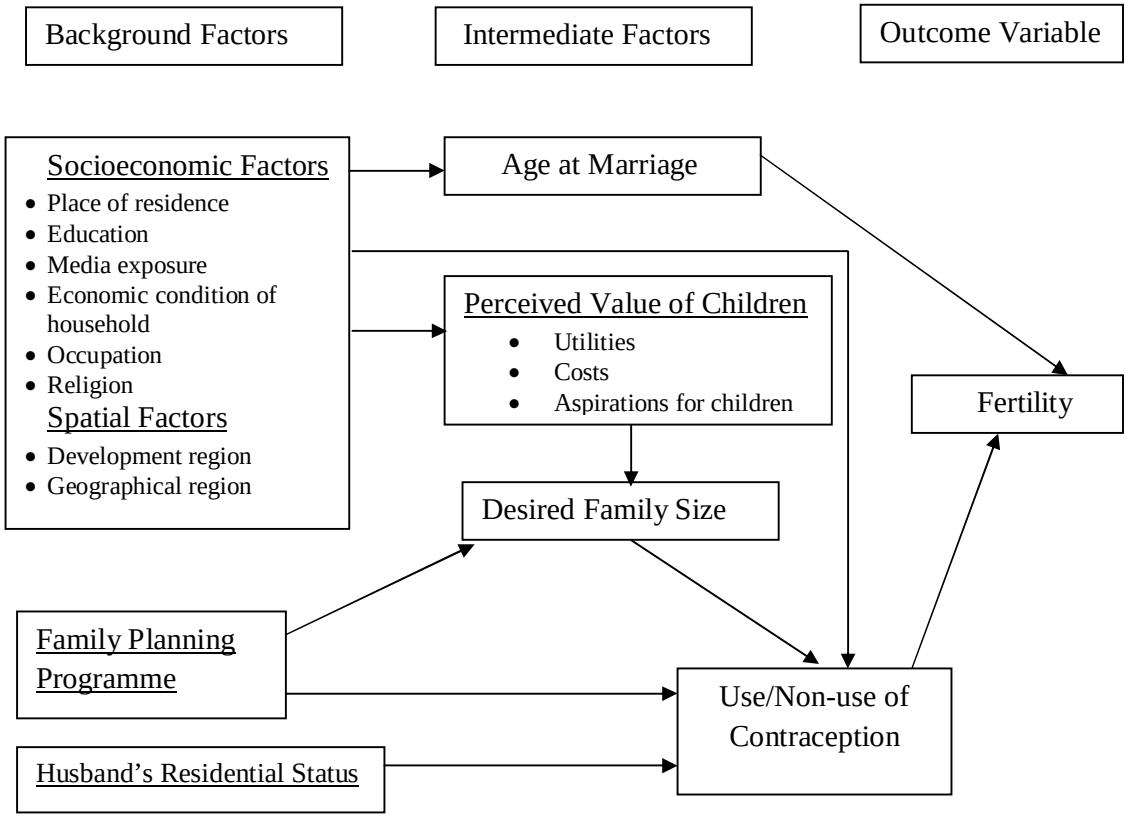
Husband's residential status

In Nepalese context, if husband of a married woman is absent from home for substantial period for whatsoever reason, it would affect her exposure to intercourse and subsequently, the woman either do not use or discontinue to use contraception due to perceived low exposure to pregnancy. Husband's residential status might have an indirect effect on fertility through its possible direct influence on contraceptive use. Therefore, this factor has been used for analyzing contractive behaviour.

Based on the above discussion and the literature review, the following schematic relationship among the study variables has been formulated. The framework is based on the essence of the well known 'Proximate Determinants Framework' due to John Bongaarts. This framework guides the study to meet its objectives. The framework presented in Figure-3.1 shows the way how different background factors operate through intermediate factors to have influence on fertility. Among the socioeconomic factors, women's education, religion, media exposure, occupation, place of residence, household economic condition, geographical region and development region are considered in the analysis. Moreover, husband's residential status is also used as a background factor in analyzing family planning use. Family planning programme has some influence on desired family size too (Sun 2001; Bongaarts 2010, Bongaarts 2011). The presence of family planning programme alters the natural socioeconomic environment by supplying the service of contraceptives as well doing activities to create more demand for it. The programme always motivates couples to promote the use of contraceptives and disseminates the benefits of having small family. The IEC activities of the family planning programme explain the advantages of small families on one hand and the programme also reduces the social, economic and health cost of contraceptive use that helps couples to reaffirm their fertility preferences towards more easily achievable less

number, which would be hardly implemented otherwise (Bongaarts 2010). This way, the family planning programme helps reducing desired family size. On the other hand, all the components of socioeconomic environment influence the use of contraception. Differentials exist in the use of contraceptives by different categories of these selected socioeconomic variables. Apart from the socioeconomic factors, family planning programme also influences contraceptive use (Sun 2001; Sharma et al. 2011; Wang et al. 2012).

Figure-2.1: Conceptual Framework



Socioeconomic environment shapes perceptions regarding costs and benefits of children and this influences desired family size. Once having an idea of certain desired family size that maximizes children's utility of couples, they try to achieve it by adopting the available means. This will decide whether to use and when to use or even not use contraceptives. The decision to use or not to use contraceptives is a complex process and conditioned by cultural factors too.

The age at marriage is also shaped by socioeconomic environment. In general, as socioeconomic development proceeds, the age at marriage increases and negatively

affects fertility. The outcome variable in the framework is fertility and it is shown to be affected by two major intermediate factors: age at marriage and use of contraception as shown in the figure. It is to be noted that only two of the four principal proximate determinants of fertility as suggested by Bongaarts have been presented in conceptual framework and mainly considered for analysis. Lack of detail information on abortion history in survey data is reason of exclusion of induced abortion in analytical framework. Similarly, postpartum infecundability has not been considered assuming nominal change in this factor over time. However, some analysis on changes occurred in Bongaarts' coefficients based on DHS data have been presented.

2.2 Data Sources

This study has used data obtained from different sources; both primary and secondary. The Nepal Demographic Health Surveys and the censuses of Nepal are the major sources of secondary data. Primary source include the field investigation by the researcher, which complements the information from secondary sources.

2.2.1 Sources of secondary data

The secondary data for this study are mainly taken from the latest three rounds of Nepal Demographic and Health Survey conducted in 2001, 2006 and 2011. Demographic and Health Surveys cover a wide range of information regarding fertility, fertility preference and family planning including information on selected background characteristics. Therefore, it has been considered more appropriate to use data from these three episodes of national level surveys for quantitative analysis in fertility transition in Nepal than to create own data set based on far smaller sample.

Each of these surveys covered national representative sample of households selected using two-stage stratified sampling designs. Wards of a Village Development Committee (VDC), which is the lowest level of administrative unit in the local level in rural areas and sub-wards of a Municipality in urban areas, were considered as Primary Sampling Units (PSUs) in all the three surveys. In the first stage, PSUs were selected both from among rural PSUs and urban PSUs following systematic sampling with probability proportional to size strategy. Complete house-listing was done in the selected PSUs. In the second stage, households were selected from the selected PSUs by applying systematic sampling technique in 2001 and 2006, and simple random sampling in 2011. In all these three surveys, oversampling of urban PSUs was made for obtaining statistically reliable

estimates for urban areas. All women of age 15-49 from selected households were interviewed in 2006 and 2011 and only ever married women of the same age group were interviewed in 2001.

A total of 257 PSUs (42 urban and 215 rural) in 2001, 260 PSUs (82 urban and 178 rural) in 2006, and 289 PSUs (95 urban and 194 rural) in 2011 were selected for the survey. In 2001, a total of 8726 ever married women of age 15-49 from 8602 households were interviewed, in 2006, a total of 10793 women of age 15-49 from 8707 households were interviewed, and 12674 women of age 15-49 from 10826 households were interviewed in 2011 survey.

2.2.2 Primary data

Field study was conducted for collecting primary data. Details of selection of the study area, tools for field study, field procedures and some experiences of field are presented in the following paragraphs.

2.2.2.1 Area for field study

The main purpose of the field study was to collect information regarding various issues related to fertility decline and family planning. Qualitative methods, focus group discussions and in-depth interviews, were chosen to gather information. In qualitative methods, the purpose is to collect information from cases that can deepen understanding of the issue under research and prefer non-probability sampling techniques (Monette et al. 2003). Given the resource and time constraints, the field study was decided to conduct in two village settings: one at an advanced stage of fertility transition and the other lagging. For this purpose, in the first stage, two districts were selected out of 75 administrative districts based on certain indicators those reflect the status of overall fertility transition. Two districts were selected on the basis of fertility level, female literacy and female age at marriage. Since district level TFRs were not available, district level child women ratios (CWR) calculated from the census data of 2011 were used as a fertility measure. Female literacy rate (FLR) was calculated from census data of 2011. Since the singulate mean age at marriage for females (SMAMF) from the 2011 census were not available till the time of district selection, the figures from census 2001 were invoked. It has been assumed that SMAMF gradually increased in all the districts in the last intercensal period without substantially changing the spatial pattern.

Based on these three indicators, Ilam and Siraha districts were selected for field study. Ilam is located in Hilly region and Siraha is in Plain (*Tarai*) region. While ranked from the lowest to the highest CWR, Ilam ranks fourth and Siraha ranks 50th among all 75 districts. In terms of fertility transition, Ilam represents one of the best performer districts and leading fertility transition and Siraha represents a district which is relatively lagging behind. Their dissimilarity is also supported by other two indicators. In terms of FLR, Ilam stands at top fifth rank with FLR of 72 percent and Siraha ranks 70th with FLR of merely 39 percent among all districts. Similarly, when SMAMF is ordered from the highest to the lowest, Ilam (21.7 years) ranks seventh and Siraha (17.6 years) ranks 68th SMAMF among all districts. Overall, Ilam represents more forward (leading) district and Siraha represents relatively backward (lagging) district among all the districts, in terms of these selected indicators.

Both of these districts are located in the Eastern Development Region (EDR). Among 16 districts within this region, Ilam ranks the first and Siraha ranks the last in terms of CWR and FLR. Also, in terms of SMAMF, Ilam stands at the third but Siraha still stands at the last within the EDR. Therefore, Ilam and Siraha districts were considered for the field study and these districts capture differences in fertility transition and socioeconomic changes.

Table-2.1: Situation of Ilam and Siraha districts in terms of CWR, FLR and SMAMF

Indicators	Nepal	EDR	Ilam	Siraha	Rank				Way of Ranking
					Ilam		Siraha		
					In EDR	In Nepal	In EDR	In Nepal	
CWR-2011[@]	361	339	246	428	1st	4th	16th	50th	Lowest to highest
FLR-2011[@]	57.4	59.0	72.0	39.2	1st	5th	16th	70th	Highest to lowest
SMAMF-2001[#] (years)	19.5	20.3	21.7	17.6	3rd	7th	16th	68th	Highest to lowest

Note: CWR measured as number of children ages 0-4 per 1000 women of age 15-49 and FLR measured in percent.

Source: [#]Adopted from Chaudhary and Niraula (2003); [@]Calculated from CBS 2012a)

Since Nepal is predominately a country resided by rural population, it was decided to collect information from typical rural setting. There were two municipalities in Siraha and

one in Ilam district. These regions were therefore excluded for field study. Except for these urban areas (which also include district headquarter), there were 48 and 106 VDCs in Ilam and Siraha district respectively. The average population size of VDC and the range are almost the same in both the districts (Table-3.2).

Table-2.2: Total population size and average population in VDCs, Ilam and Siraha, 2011

District	Number of		Population in 2011		Population size		
	VDCs	Municipalities	Total	Rural	Average/per VDC	Minimum of VDC	Maximum of VDC
Ilam	48	1	290254	269299	5610	2456	17324
Siraha	106	2	637328	573526	5410	2488	16400

Source: Computed from CBS 2012b.

The next step was to select one VDC from each of these two districts for field works. It is to be noted that villages within district do not differ much in general features. Therefore, population size was considered a leading criterion for selection of VDC. Of the VDCs with nearly average population size of around 6000, some other criteria were also considered for selection. The selected VDCs would have facility of only the Sub-Health Post (SHP) or Health Post (HP) which is a minimum level of health service centre that provides only three types of contraceptive (Pills, condom and injection) services through the government channel. Similarly, accessibility from nearest urban centre and highway was also considered. The researcher first went to district headquarters and met some key persons from academia who could give information about villages in the district. Their suggestion was also considered in choosing the village. Based on these criteria and consultation with those key persons, Barbote VDC of Ilam and Bastipur VDC of Siraha were selected for field study. Barbote and Bastipur have total population of 6424 and 6361 respectively. Some other indicators of these two VDCs as compared to respective districts are presented in Table-3.3.

The selected VDCs for field study are similar to respective districts in terms of many household and social indicators, especially in terms of literacy. It can be safely considered that the selected VDCs largely reflect respective districts.

In the next step, the researcher first approached school teachers of the selected VDCs to get some idea about geography, wards division, ethnic composition, location of the health

post and other general characteristics of the VDC. Then, a tentative boundary for actual field work was decided. Based on the information on ethnic composition of population, it was best tried to capture that settlement region or village portion which incorporate people from major Caste groups (*Brahmin and Kshetri*), *Janajaati* (indigeneous community) and *Dalits* (marginalized castes). In Barbote DVC, Ilam, there are 50 percent *Brahmin* and *Kshetri*, 39 percent *Janajaati* and eight percent *Dalits* residing (CBS 2014b). Of all *Janajaatis*, half are *Limbu*. So, priority was given to capture *Brahmin* and *Kshetri*, *Limbu* and *Dalit* in the study village.

Table-2.3: Selected household and social characteristics of study VDC as compared to respective districts

Characteristics	Barbote VDC	Ilam District	Bastipur VDC	Siraha Distict
Total Population	6424	290254	6361	637328
Population density (Population per sq. km.)		170		536
Average household size	4.54	4.50	5.49	5.40
Sex ratio	100.9	94.6	96.8	94.8
Percentage of households with				
Absentee population	20	26	21	31
Electricity as source of lighting	93	66	74	67
Toilet facility of any type	99	90	07	21
At least one household facility[#]	92	88	78	78
Firewood/Cow Dung as fuel for cooking[$]	90	90	99	94
Piped drinking water	84	73		
Tube well/Hand Pump			78	84
Literacy Rate				
All	78.7	77.9	51.8	50.3
Male	85.9	72.1	63.8	61.9
Female	71.4	84.2	40.6	39.2
Percentage of houses with				
Mud bound stone/brick	75	59		
Wooden Pillar			78	66

[#]Facilities include Radio, TV, Cable TV, Computer, Internet, Telephone, Mobile Phone, Motor, Motor Cycle, Cycle, Other vehicles and Refrigerator

[$]In Hills, there is no system of using cow dung as fuel for cooking; but it is one of the most important type of cooking fuel in *Tarai* and the values here for Siraha represent the total percentage of households using either firewood or cow dung cakes as fuel for cooking

Source: Calculated from 2011 census data, CBS 2014b

Similarly, in Bastipur VDC, there are 55 percent *Janajaatis*, 35 percent *Dalits* and six percent *Brahmin* and *Kshetri* (CBS 2014b). *Yadav* and *Chamar* are major among *Janajaati* and *Dalit* groups respectively. So, priority was given to include as many different *Janajaatis* as possible and also to include *Dalits* and some *Brahmin Kshetris* in study village. Because of these criteria, the boundary was not necessarily an administrative ward. It was a group of contiguous settlement clusters in Bastipur, Siraha where people are residing in certain settlement units called *Toles*. In Barbote, Ilam, there was scattered settlement, which is the general characteristics in rural Hills; therefore, a boundary was purposively demarked for actual field work. Such boundary or group of settlements would cover at least 100 households so that the FGDs and individual interview could have been done form the selected area. With consultation of local teachers and other key persons of the VDC, actual place for field work was decided.

The major part of Barbote VDC in Ilam is located in east facing slope of Hills from which, almost half parts of ward number six and seven each were chosen for field work. It was a region between two almost parallel rural roads crossing through ward number six and seven and two vertical streams, which were also boundary of these wards in the north and south. The study region is therefore a village area located in the north-western portion of ward number six and the south-eastern portion of ward number seven. On the other hand, Bastipur, Siraha is in the Plains from where the study region consisted of Bastipur Tole, Chamar Tole, Pakki Tole and Saraswati Tole, which are parts of ward number three, six and eight. Maps of study region are shown in the Appendix.

Since the factors associated with use of family planning methods were proposed to be studied through quantitative analysis of national level sample survey data which would cover wide range of issues related to family planning, a small sample for collecting qualitative information was felt to be adequate for the purpose of capturing those components which were not covered in the survey questionnaire. Therefore, individual interview was expected to cover 60-65 currently married women, with 30-35 women from each village. It was assumed that this would cover never users, ever users, and current users of family planning methods and additionally, users of all types of methods. Various issues related to family planning like knowledge of methods, use, choice, perceptions and experiences of side effects, reasons of non use, perceived quality of service were included in interview.

Focus group discussions were planned to be conducted separately for males and females. In both sex groups, one would be of older generation and the other would be of younger generation. Number of FGDs by age group, sex and marital status is depicted in Table-3.4. It was decided to conduct a total of eight FGDs comprising four each in the two villages, four each for males and females and four each for younger and older generations.

Table-2.4: Number of FGDs by age group, sex and marital status

Village	Age	Sex	Marital Status	Number of FGD
Barbote	15-39	Female	Currently Married	1
Barbote	40-64	Female	Ever Married	1
Barbote	15-49	Male	Currently Married	1
Barbote	50-74	Male	Ever Married	1
Bastipur	15-39	Female	Currently married	1
Bastipur	40-64	Female	Ever Married	1
Bastipur	15-49	Male	Currently Married	1
Bastipur	50-74	Male	Ever Married	1

The idea was to more precisely capture views of people from older and younger generation of both the sexes on the changes occurred in socioeconomic conditions, perceived values of children and family planning. Each focus group was expected to consist of 6-10 persons.

A general profile of study village was obtained from discussions with some key persons of each village. Similarly, interviews with local FCHVs, ANM/MCHW and in-charge of the local health service centre were also planned to get information on supply side factors of family planning.

2.2.2.2. Tools for field study

A short house listing schedule was used for house listing and screening. Interview schedules were used for interviewing key persons of village, FCHVs and local health personnel. An interview guideline was prepared for individual interviews of women. A guideline for focus group discussion was also prepared. These tools were first developed in English, then translated into Nepali and used in the field.

The major content of the FGD was perceived changes in socioeconomic and demographic situation (education, health, occupation and employment, communication and media,

infrastructure, age at marriage and child survival), family size and fertility preferences, values of children (costs, economic returns and old age support), aspirations for children, family planning service and other issues (social interaction and diffusion of idea of small family and means of birth control). Similarly, various issues related to family planning like knowledge, attitude and use, service delivery and its perceived quality, method choice, side effects, discontinuation, perceived role of family planning in materializing fertility preferences and political commitments to family planning were discussed during individual interview.

2.2.2.3. Field procedures and experiences

The field work was conducted during the three months of October-2014 to December-2014. It was performed first in Barbote, Ilam and then in Bastipur, Siraha. The researcher sought permission from administrative authority to conduct field work. Application was filed in the District Administration Office, Ilam and the Regional *(Ilaka)* Administration Office, Lahan including an authorized letter from the Jawaharlal Nehru University for field work which also requested concerned authorities for necessary cooperation. The administrative authority in the office verbally consented to the researcher to conduct field work stating that written permission was not required; and also assured the necessary cooperation.

A quick house listing and screening was conducted in the selected villages to collect information on basic demographic characteristics with special interest to find out the presence of any currently married women of age 15-39 years who were eligible for interview. Information on presence of any currently married males of age 15-49 years, ever married males of age above 50 years and ever married females of age above 40 years in the household was also gathered for identifying prospective FGD participants.

In Barbote, Ilam, 112 households were listed in the study area, with 67 households having a total of 69 currently married women of age 15-39 years. Similarly, in Bastipur, Siraha, a total of 102 households were listed, of which, 75 currently married women of age 15-39 years were found in 71 households. Only one eligible woman from each household was considered for interview. Alternate households were selected for interviewing eligible women. In some of the selected households, the eligible woman could not be interviewed due to her absence (gone to natal home) at home during interviewer's visit. Some women told the interviewer to come next time but were unavailable at home in next visit. Some women did not agree to be interviewed. A total of 31 eligible women from Barbote, Ilam

and 32 eligible women from Bastipur, Siraha were interviewed. Participants for FGD of currently married women aged less than 40 years were selected from among those who were not selected for interview. Similarly, participants for other female and male groups were selected from among the listed households. Local person's help was taken to inform potential participants. After informing prospective participants about the objective and matter of discussion and probable time taken for discussion, those who were interested to take part were invited to join the FGDs. Eight to 12 prospective participants were requested for each FGD expecting at least six participants for each FGD. Not all prospective participants showed up at the time of discussion.

Women's interview and focus group discussions were held after house listing and identifying the households for interview. Interviews with key persons of village, FCHVs and local health personnel were simultaneously conducted. The researcher performed house listing, interviewed key persons of village, interviewed FCHVs and local health personnel and moderated FGDs. Since the main content of women's interview was about personal behaviour related to family planning, the researcher hired female interviewer for it. Interviewers were given an orientation to conduct interview. The interviewer also worked as note taker in FGDs of females. A local male was hired for note taking in male FGDs.

In Bastipur, majority of people speak *Maithili* as their mother tongue. Therefore, care was taken in selection of the interviewer. She had good capacity to communicate in *Maithili* as well as in Nepali. She was instructed to ask the respondent for choosing comfortable language for communication out of *Maithili* and Nepali and to have communication in the same language. In FGDs, participants were asked whether they understood the question, and the note taker translated it into *Maithili* if necessary. Participants were also requested to express their views either in *Maithili* or in Nepali, as per their choice. All the interviews and FGDs in Barbote, Ilam were conducted in Nepali language.

The researcher explained the prospective participants of interview and FGD about the objectives of this research and requested for participation. Their participation was confirmed after their verbal consent for it. At the time of interview, the interviewer again explained about the contents of discussion, clearly mentioned about the confidentiality of the information shared and then the respondents were requested to give consent; those who were literate were requested to sign the consent form if they agreed. Similarly, after explaining the content of discussion of FGD and clarifying about confidentiality of the

ideas expressed in discussion, participants were requested to give their consent. Literate participants were also requested to sign consent form if they agreed. Prior information was given to the respondents that the discussions would be recorded and their agreement was sought on this matter. All the individual interviews with women and FGDs were electronically recorded. The researcher interviewed key persons of village and FCHVs in their homes. Health personnel of local health post were interviewed in the health post. Individual women were interviewed by visiting at their home. In most of the cases, interviewee women were available at home, and in some cases of absence, the interviewer had to make second visit to meet her. All the FGDs were planned to conduct in a suitable day, time and location after having a discussion with some of the prospective participants, though a bit of exercise was needed for taking decision. All the meetings were successfully conducted in a friendly environment. FGDs were continued for minimum of one hour and 10 minutes to one hour and 30 minutes. Some participants were found always reluctant to speak which may be their personal characteristics. They always approved other's saying after stimulating them to speak. On the other hand, there were some participants in some of the groups who would always intend to speak at the first, and sometimes continued their speech. In some cases, the researcher had to intervene and stop the participant to bring the discussion in its track. On average, the participation was quite vibrant.

2.3 Analytical Methods

A mixed method approach, a blend of quantitative and qualitative methods, has been adopted in this research. For quantitative analysis, secondary data from three consequent national level surveys: Demographic and Health Survey of Nepal 2001, 2006 and 2011 are mainly used. Similarly, census data of National Population Census 2011 are also used. Some of the aspects not covered by the survey were captured from field study, which was based on a small sample and qualitative methods were adopted for it. For qualitative analysis, focused group discussions and individual interviews have been conducted in the sampled villages. In-depth interview with women of reproductive age group and focused group discussions with men and women of different age group provided information on socioeconomic changes, perceived changes in values of children and aspirations for children and people's perception about family planning services and the demand side factors. Information obtained from stakeholders like FCHVs and local health workers

(local MCHW/AHW) is used to assess the supply side components of family planning programme.

Analysis of secondary data covers trends and differentials of fertility and its components of change, study of the family building process, fertility preferences, and dynamics of use of family planning methods. People's perception of the role of family planning programme has been assessed based primarily on information collected from the field and complemented by some evidences of secondary sources. Apart from the above mentioned survey data, other relevant secondary sources of information like census reports, other government reports, policy and programme documents, and documents published by other national and international organizations have been used.

2.3.1 Fertility trends and differentials

Levels and trends in fertility in Nepal have been assessed by analysing census data of 2011, Demographic and Health Survey data of three rounds: 2001, 2006 and 2011 as well as by using published data from different sources like published research papers, reports of Central Bureau of Statistics and Population Monographs. Trends in Crude Birth Rate (CBR), Age Specific Fertility Rate (ASFR) and Total Fertility Rate (TFR) are presented to depict the fertility decline scenario of Nepal. ASFRs from survey data are calculated for a reference period of three years from the survey date. Direct estimates based on event-exposure concept have been used to obtain ASFRs in which, number of births for women by their age at birth during the three years period from the survey is taken as numerator and the women-years of exposure for all women in the same period for the same age group are used as denominator.

Change in age pattern of fertility has been discussed with the help of changes observed in the ASFRs for the three surveys. Fertility differentials in terms of TFR as well as ASFR have been studied with respect to type of place of residence (Rural, Urban), ecological region (Mountain, Hill and *Tarai*), Development region (Eastern, Central, Western, Mid-Western and Far-Western), household economic status (Wealth quintiles) and women's education. Inter-district variation in fertility has been discussed on the basis of district level CBR, which are obtained from census data by applying reverse survival method. An aggregate relationship of district level fertility with selected socioeconomic factors has been assessed by using multiple regression models.

2.3.2 Proximate determinants model

In proximate determinants model, total fertility rate (TFR) in a population is formulated as the product of total fecundity rate (TF) and four indices representing fertility inhibiting effect of the four principal proximate determinants of fertility (Bongaarts 1978; Bongaarts and Potter 1983). Total fecundity rate refers to the average number of children that is expected to be born to a woman who remains married through her entire reproductive life, do not use any contraception, do not breast feed her children and do not practice abortion. It has also been hypothesized that TF ranges from 13 to 17 and Bongaarts (1978) suggested its average value 15.3 for an empirical testing of this model. Mathematically, the model can be expressed as

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

Where, TFR = Total fertility rate, TF = Total fecundity rate, C_m = Index of marriage, C_c = Index of non-contraception, C_a = Index of induced abortion and C_i = Index of post-partum infecundability.

Fertility effects of proximate determinants can be directly estimated by following procedure. The index of marriage is the weighted average of proportions of age-specific proportions married for females, where, the weights being age specific marital fertility rates and equivalently expressed as $C_m = \frac{TFR}{TMFR}$, where, TMFR is the total marital fertility rate. Next, the index of non-contraception is obtained as $C_c = 1 - 1.08 \times u \times e$, where, u is the proportion of married women of reproductive age who are using contraception at present, e is the average use effectiveness of contraception and 1.08 is the sterility correction factor. Moreover, e can be estimated as weighted average of the method specific use-effectiveness, with weights equal to proportion of women using a given method and mathematically expressed as $e = \frac{\sum e_m \times u_m}{u}$, where, e_m is the use-effectiveness of that method m and u_m is the proportions of users of method m. Similarly, the index of induced abortion C_a is the ratio of observed TFR to the estimated TFR in absence of induced abortion and given as $C_a = \frac{TFR}{TFR + 0.4 \times (1+u) \times TA}$, where, TA is the total abortion rate, which is the average number of induced abortion per woman at the end of reproductive period if she is exposed to prevailing level of induced abortion throughout

her reproductive period. Roughly, it can also be calculated by multiplying TFR by the ratio of total induced abortions to total live births. Finally, the index of post-partum infecundability is defined as the ratio of average birth interval without and with post-partum infecundability. It is given as $C_i = \frac{20}{18.5 + i}$, where, i is the average duration of post-partum infecundability caused by breast feeding or post-partum abstinence.

Percentage changes during time points t_1 and t_2 in any of these four indices can be computed as $\frac{C_{t_2} - C_{t_1}}{C_{t_1}} \times 100$.

2.3.3 Analysis of factors influencing fertility

Factors affecting cumulative fertility have been studied by using the Poisson Regression model, where the regressand is a count variable: 'Number of CEB for currently married women', which takes only a finite number of non-negative values. To apply this model, birth is assumed to be a Poisson process, whose probability of occurrence is constant at any point in time and mean number of children ever born and its variance are equal (Gujarati 2004).

Poisson Regression is a generalized linear model where the response variable is linked with logarithmic function. The natural logarithm of mean CEB is therefore expressed as linear function of a set of predictor variables. The model can be written as

$Y_i = \frac{\mu_i^Y e^{-\mu_i}}{Y!}$, where, Y_i is CEB, μ is mean CEB. The natural logarithm of mean μ is linked to a linear function of predictors as

$\ln(\mu_i) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + ... + \beta_k X_{ki}$, where X's are explanatory variables and β's are parameters to be estimated. This gives rise to $\mu_i = e^{\beta_0}.e^{\beta_1 X_{1i}}.e^{\beta_2 X_{2i}}.....e^{\beta_k X_{ki}}$. The values e^{β_i} give the multiplicative coefficient by which the mean of the outcome (CEB here) of i^{th} category of X_i is different from that of reference category.

2.3.4 Decomposition of change in fertility

At first, changes in TFR from 2001 to 2006, 2006 to 2011 and 2001 to 2011 have been decomposed into two components: nuptiality component and marital fertility component. This will decompose the decline in TFR into two parts: first, due to changes in distribution of age specific proportion of currently married women and the second due to

marital fertility decline. The total change (decline) in this decomposition is sum of the changes due to these two components. The formula used for decomposition is based on Kitagawa (1955) and is given as:

$$\Delta TFR = 5\sum \overline{f_{mx}}.\Delta P_x + 5\sum \overline{P_x}.\Delta f_{mx} \qquad \text{..... (1)}$$

where, ΔTFR is the total change in TFR between two survey periods, ΔP_x is the change in proportions currently married in age x in the same period, Δf_{mx} is the change in age specific marital fertility rate for age x in the same period, $\overline{P_x}$ is the average of the proportions currently married obtained from the two survey periods and $\overline{f_{mx}}$ is the average of the age specific marital fertility rate for age x obtained from the same periods. The first component of equation (1) is the component due to changes in the distribution of proportions of currently married women and the second component is due to changes in marital fertility.

NDHS 2006 and 2011 have included all women of reproductive age-group irrespective of their marital status and the age-specific proportions of currently married women can, in principle, be obtained from women's data file by using information on current marital status. But, not all women from the selected households were interviewed in the survey and this proportion cannot be directly used for further analysis. From the information on marital status of each household member of age 10 years or more given in household data file, age-specific proportions of currently married women have been calculated and used in decomposition analysis.

However, NDHS 2001 has considered only ever married women for interview and household file of this survey gives information on marital status of each household member only in two values: never married and ever married. It has no information on marital status of ever married women. From this ever married sample of women, proportions ever married interviewed women can be obtained by dividing the number of ever married interviewed women by number of ever married women in the sampled households. The number of all women in the sampled households when multiplied with this proportion gives the adjusted number of all women in the sampled households. Now, using number of currently married women from individual women's data file and dividing it by the adjusted number of all women obtained above gives the actual

proportions of currently married women. The calculations are to be done separately for all reproductive age groups.

The age-specific proportions of currently married women for all the three surveys are representative of the survey date. On the other hand, ASFRs for these surveys correspond to the mid-point of the three years period back from respective survey. Therefore, an estimate of age-specific proportions currently married for the time one and half years back from each survey is required. Using the set of three values of the age-specific currently married for each survey, a linear equation is fitted and estimated proportions pertaining to the required time points are obtained by interpolation and extrapolation. Finally, these age-specific proportions of currently married women are used in the decomposition analysis.

Marital fertility change is further decomposed into different socio-economic and demographic factors. Regression-based decomposition method as suggested in Retherford and Thapa (2004) is adopted to decompose the changes in marital fertility. For this, pooled data of base survey year (NDHS 2001) and end survey year (NDHS 2011) are used. The detail of the method is described in the following paragraphs.

The pooled data set consists of currently married women of reproductive age who are married only once. The number of births per woman given by these women in the last five years from each survey is the dependent variable for regression. Five year period is chosen to capture recent fertility behavior from each survey. A new variable: 'Survey Dummy', is created with value '0' for base survey year and '1' for end survey year. The regression is aimed to decompose the average change in the dependent variable observed during the inter-survey period for different socioeconomic and demographic factors.

In the first step, a regression equation $F = a + bZ$ …… (2) is fitted where, F stands for the number of births per woman in the study sample, Z is the dummy with values '0' or '1'; 'a' and 'b' are constants. Here, Z = 0 gives F = a, and Z = 1 gives F = a + b. So, 'b' is the total change in F per woman between two surveys.

Next, considering a set of variables X_1, X_2, X_3, … … X_k as predictors of variation in F, other regression equation can be fitted as $F = c + d_1X_1 + d_2X_2 + ... + d_kX_k + gZ$ … (3)

Where, 'g' denotes the net change in F after controlling for all other variables in the model (i.e. the net change in F that would occur if all other predictor variables were held constant between two surveys). The variables included in this model are the

socioeconomic and demographic variables of interest which are supposed to explain the variation in marital fertility. The coefficients d_i; (i = 1, 2, 3, … … k) denote the amount of change in F due to unit change in X_i; and 'g' is the remaining amount of change in dependent variable net of the socioeconomic and demographic factors and is a pure inter-survey change that is left unexplained by the explanatory factors considered in the model. This unexplained amount of change can be related with the total change as

$$b = (b - g) + g \ldots \ldots \ldots (4)$$

This equation tells us that the component (b-g) of the total change 'b' is the overall change in F which is explained by the changes observed in the socioeconomic and demographic variables and 'g' is the remained unexplained part of change.

Variables X_i are entered adding one at a time, cumulatively to include all the study variables in model and see how much unexplained component of the total change in dependent variable is left over, thus identifying the amount of change due to each variable added in the model as the difference mentioned in equation (3). It should be noted that the sequence in which the set of explanatory factors are added into the model affects the amount of change attributable to certain explanatory variable; because, it is always a component of change net of all other factors already included in the model.

Continuous explanatory variable has been included as it is; but, dummy variables have been created for each categorical variable and group of dummies representing a categorical variable have been added together in the model to see the explained component of change by this variable.

The incremental change in (b-g) is interpreted as the component of change in F that is due to between-survey change in distribution of that variable. Unexplained component of change stems from all those factors not considered in the analysis; which might be measurable or not.

2.3.5 Age at marriage and risk of marriage

Since marriage is entry event for fertility in the Nepalese context, where fertility is mostly within marriage, changes in age at marriage is an important aspect of fertility transition. Singulate Mean Age at Marriage (SMAM) proposed by Hajnal (1953) is the most commonly used indicator of age at marriage, which gives on average the age up to which persons remain single. SMAM are calculated from NDHS data for 2001, 2006 and 2011 to observe recent changes in age at marriage. Trends in age at marriage of females are

further studied by computing proportion ever married for conventional five-year age group and proportion ever married before single years of age for different cohorts of women.

To obtain proportion of ever married women in different age groups and to get its trend, we need data on all women, ever married and never married. The women's data file of NDHS gives information on age at first marriage of ever married women. But, not all ever married women from sampled household have been interviewed. Therefore, we do not know the age at marriage of those ever married women who were not interviewed. On the other hand, the household data file of sampled households gives information on marital status of each individual. So, information on age and marital status from personal information of household file is used to compute proportion of ever married women by age.

$$\text{Proportion ever married by age} = \frac{\text{No. of ever married women of that age in selected households}}{\text{No. of all women of that age in selected households}}$$

Similarly, for computing cumulative proportions of ever married women by age and age at marriage, we need to use adjusted number of all women in the selected households in the denominator, instead of using the number of all women interviewed in the selected households. This adjusted number of all women is obtained in the following way:

$$\begin{aligned}\text{Adjusted number of all women} &= (\text{Proportion of ever married women interviewed}) \\ &\quad \times (\text{Number of all women in selected households}) \\ &= \frac{\text{No. of ever married women interviewed}}{\text{No. of ever married women in selected households}} \times \text{No. of all women in selected households} \\ &= \frac{\text{No. of ever married women interviewed}}{\text{Proportion of ever married women in selected households}}\end{aligned}$$

The risk of marriage by different socioeconomic determinants has been studied by using Cox proportional hazard model or Cox regression. (Detail is given in section 3.2.3.3. below)

2.3.6 Parity progression

The number of children that a woman has ever borne is called her parity and Parity Progression Ratio (PPR) is defined as the proportion of women of a specified parity who eventually progress from one parity to the next higher parity during her life time. This is a useful measure to know the reproductive strategies of couples over time and is a good

indicator of family building process. PPRs are generally calculated for birth cohorts of women and for certain time period. In cross sectional survey data, truncation of observations by survey date occurs for those women who have had their birth in recent past and may possibly have next birth after survey. So PPRs can be computed only for periods sufficiently back from the survey date so that the chances of having the next higher order birth in future are almost nil. Therefore, recent changes in family building strategies cannot be precisely captured in PPR due to truncation.

The Period Parity Progression Ratio (PPPR) approach (Fenny and Yu 1987) overcomes this problem and serves as a good measure of family building process during fertility transition. PPPR involves computation of synthetic parity progression ratios for a time period of desired length (generally taken one year or five years) from duration specific parity progression during the period. The idea is exactly similar to that of constructing synthetic cohort life tables from age-specific death rates. NDHS provides data on fertility history of women of reproductive ages and makes it possible to compute PPPRs.

PPPRs are computed for successive events of births starting from woman's own birth. Starting from woman's own birth enables to study transitions to her first birth; and then to successive higher order births. Let us consider a group of women who have their i^{th} birth in calendar year t. From among these women, suppose that some of them progressed to the higher parity (i+1) in the same calendar year t. Then, duration specific parity progression ratio from parity i to (i+1) in the calendar year t is given by

$$q_E(t) = \frac{\text{No. of women who had both } i^{th} \text{ and } (i+1)^{th} \text{ birth in same year t}}{\text{No. of women who had } i^{th} \text{ birth in year t}} .$$

Of the remaining women of parity i in year t, some will give birth in calendar year (t+1); and the proportion who have the $(i+1)^{th}$ birth in year (t+1) will be denoted by $q_0(t+1)$. Symbolically,

$$q_0(t+1) = \frac{\text{No. of women who had } i^{th} \text{ birth in year t and } (i+1)^{th} \text{ birth in year } (t+1)}{\text{No. of women who had } i^{th} \text{ birth in year t but did not have } (i+1)^{th} \text{ birth until the beginning of year } (t+1)}$$

Similarly, of the remaining women of parity i, $q_1(t+2)$ denotes the proportion of women who have $(i+1)^{th}$ birth in calendar year (t+2); and so on. In this way, a series of duration

specific parity progression ratios for the cohorts who had their i^{th} birth in calendar year t can be obtained.

Looking the other way around, for each year t, those transiting from parity i to (i+1) are due to those women who had their i^{th} birth either in the same year t or in the past years (t-1), (t-2), (t-3) and so on. Symbolically,

$$q_k(t) = \frac{\text{No. of women who had both } i^{th}\text{birth in year } (t-k-1) \text{ and } (i+1)^{th}\text{ birth in year t}}{\text{No. of women who had } i^{th}\text{birth in year } (t-k-1) \text{ but did not have } (i+1)^{th}\text{ birth until the beginning of year t)}},$$

$k = 0, 1, 2, 3.....$

Such duration specific parity progression ratios can be computed for all birth cohorts and a matrix $\{q_k(u)\}$, where k stands for durations (k=E, 0, 1, 2, 3… …) and u stands for calendar year can be obtained for transitions from all i^{th} order birth to $(i+1)^{th}$ order births. Now, for progression from i^{th} to $(i+1)^{th}$ order birth in year t, $(1- q_E(t))$ is the chance that women did not transit to next higher order birth who had given birth in the same year t; $(1-q_0(t))$ is the chance that women who had i^{th} birth in year (t-1) did not transit to $(i+1)^{th}$ birth in year t; $(1-q_1(t))$ is the chance that women who had i^{th} birth in year (t-2) did not transit to $(i+1)^{th}$ birth in year t; and so on.

Since the $(i+1)^{th}$ birth is conditional on i^{th} birth, the product $\{(1-q_E(t)).(1-q_0(t)).(1-q_1(t)).(1-q_2(t)).....\}$ gives the ultimate chance that women do not proceed for $(i+1)^{th}$ parity in year t. Therefore, Period Parity Progression Ratio (PPPR) from i^{th} to $(i+1)^{th}$ parity in year t is given by

$$PPPR_t(i \text{ to } (i+1)) = 1-\{(1-q_E(t)).(1-q_0(t)).(1-q_1(t)).(1-q_2(t)).....\} \ldots \ldots (1)$$

Such ratios can be calculated for single year or group of years prior to survey and for progressions to different parities.

For practical purpose, PPPRs in this study are calculated starting from woman's birth to her first child birth, first to second birth, second to third birth, third to fourth birth, fourth to fifth and fifth to sixth births. Progressions from woman's birth to her first birth could be decomposed into two periods: from her birth to marriage and marriage to the first birth; but this has not been done due to possible errors caused by information of age at marriage which is taken only in completed years (Paul 2009). Since the first births before

13 years and beyond 30 years are rare, age interval of 13-30 years is considered for progression to first birth in the product chain of equation (1); which then takes the form

$$PPPR_t(0 \text{ to } 1) = 1 - \{(1 - q_{13}(t)).(1 - q_{14}(t)).(1 - q_{15}(t)).....(1 - q_{30}(t))\} \ldots \ldots \ldots (2)$$

For other higher order PPPRs, next births after period of 10 years are very unlikely. So the product chain in equation (1) takes the form

$$PPPR_t(i \text{ to } (i+1)) = 1 - \{(1 - q_E(t)).(1 - q_0(t)).(1 - q_1(t)).(1 - q_2(t)).....(1 - q_9(t))\} \ldots (3)$$

PPPRs are calculated for all women since the survey of 2011 has collected birth history information from all women. Duration specific parity progression ratios are not computed for those cases where the number of women exposed to the event of next birth is less than 50 due to possible distortions reflected in PPPRs caused by small vale in the denominator. The calculation of PPPRs assumes that there is no displacement of births due to errors in reporting the timing of birth.

2.3.7 Analysis of birth intervals

The interval between k^{th} birth and $(k+1)^{th}$ birth is called $(k+1)^{th}$ closed birth interval. If women had not given $(k+1)^{th}$ birth by the survey date, this $(k+1)^{th}$ birth interval is called an open birth interval. Analysis of closed birth intervals depicts the tempo of childbearing but cannot reflect parity progression. For this, one should also take into account the open birth intervals. The life table technique used in this research is based on a combination of both closed and open birth intervals and considers the cases of open birth intervals as censored cases in analysis (Lee 1993; Srinivasan et al. 1994). Life tables constructed by pooling open and closed birth intervals and treating open birth intervals as censored cases is a better way of analyzing family building process. Therefore, life table approach of analyzing birth intervals has been used which enables to explain both quantum and tempo aspects of fertility change. Median birth interval indicates the tempo aspect of fertility and the proportion of women who had next child within certain period (parity transition) indicates the quantum aspect of fertility. Second, third, fourth and fifth birth intervals are analysed in this study for selected background characteristics of women.

Monthly life tables are constructed for 10 years duration, because negligible number of births occurs after an interval of 10 years from previous birth. The calculations are made for all currently married women who are married only once. The conditional probability

of giving k^{th} birth between time t_i and t_{i+1} is given by $q_i = \frac{d_i}{n_i}$ with $n_i = n_i^* - \frac{C_i}{2}$ where, n_i^* is the number of women exposed to k^{th} birth at the start of the interval (t_i, t_{i+1}); d_i is the number of women who gave k^{th} birth in the same interval and C_i is the number of women who reached and terminated from the same interval without giving k^{th} birth. Then, $p_i = 1 - q_i$ gives the conditional probability of not giving k^{th} birth in the interval (t_i, t_{i+1}). The product Πp_i gives the proportions not giving k^{th} birth by the end of the interval (t_i, t_{i+1}) and $S_i = (1 - \Pi p_i)$ gives the probability that a woman gave k^{th} birth by the end of the interval (t_i, t_{i+1}). The proportions of women who gave k^{th} birth by the end of 24 months, 60 months and 120 months are tabulated; curve of these monthly proportions are drawn and median birth intervals are also tabulated. Here, median birth interval refers to the length of birth interval in months by which 50 percent women give k^{th} birth.

Determinants of risk of occurrence of birth have been analysed by Cox Proportional Hazard Model. Controlling for a set of background variables, the relative effect of a particular characteristics of women on the risk of next higher order birth has been studied by this technique. The model is semi-parametric and beneficial to be used even when underlying distribution of hazard rate is unknown (Rutherford and Choe 1993). The other benefits of using this model is that it is more flexible, can accommodate time varying covariates and also takes into account censored data (Tarling 2009; 177). In this model, the failure rate (event birth of next higher order in present research) or hazard rate h(t) at any time t is given by

$h(t) = h_0(t) e^{\sum_i b_i x_i}$ where, $h_0(t)$ is the baseline hazard function when the x_i are set equal to zero and indicates the expected risk of failure with the explanatory variables set at 0, x_i are explanatory variables and b_i are the coefficients to be estimated in the model.

The model can be equivalently represented in the following forms:

$$\frac{h(t)}{h_0(t)} = e^{\sum_i b_i x_i} \text{ or } \ln\left(\frac{h(t)}{h_0(t)}\right) = b_1 x_1 + b_2 x_2 + \ldots\ldots\ldots + b_k x_k$$

This model assumes that the hazards h(t) and $h_0(t)$ are proportional. The term $e^{b_i x_i}$ is interpreted as the relative risk associated with characteristic x_i. In absence of all the covariates in the model, h(t) = $h_0(t)$ and equivalently $e^{\sum_i b_i x_i}$ becomes unity. The

component $e^{b_i x_i}$ is the risk associated with the value of x_i relative to a value of x_i=0. Its value greater than unity refers that the relative risk of occurring the event is higher for higher values of x. Similarly, values less than unity indicates reduced risk of occurrence of the event. Here, higher relative risk of subsequent birth is associated with shorter birth interval.

2.3.8 Fertility preference and contraceptive use

Determinants of ideal family size have been analysed by using the Poisson Regression model. The details of this methodology have been presented in Section 2.3.2.

Use of contraception has been measured as a dichotomous variable with outcomes: currently using (coded 1) and not using (coded 0). To study relationship between a set of predictor variables and the binary dependent variable, multiple regression technique is not applicable, mainly because of two reasons: the regression coefficients could not be most effectively estimated from least square method and the model even can predict probability values out of range i. e. [0,1] (Tarling 2009). This problem is overcome by modeling natural logarithm of the odds of event occurring as a linear function of set of explanatory variables. This gives rise to the well known Binary Logistic Regression model. If there are k explanatory factors X_1, X_2, X_3, … … X_k, to influence the probability of contraceptive use (p), then Logistic Regression model can be written as

$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_k X_k$, where, β's are coefficients to be determined.

The coefficients in this regression model are obtained by the maximum likelihood principle. This model is also called Logit model (Retherford and Choe 1993) and written as

$$Logit(p) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_k X_k .$$

This expression gives rise to the Logistic function for the probability p of outcome as

$$p = \frac{1}{1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_k X_k}} .$$

Logistic regression is useful to estimate the net effect of an explanatory variable on the dependent variable after controlling for the influences of other variables. The model is flexible enough to incorporate both categorical and continuous variables in the set of predictors. The results are generally interpreted in terms of either odds ratios or predicted

probabilities. In the case of categorical explanatory variables, the odds ratio for a particular category of predictor indicates the number of times the odds of outcome for that category are as compared to reference category. Predicted probabilities are generally expressed in percentages, indicating the chances of outcome occurring as per the model fitted in given data. For simplicity in interpretation, predicted probabilities are calculated for each category of explanatory variables holding other study variables constant at their mean (average). This idea overcomes the problem of getting predicted probability out of range of observed values when calculated by holding all other variables constant at their respective reference category.

The desire for the next child is also a binary response variable (whether another is desired or not) and its determinants are also examined by using Logistic Regression.

2.3.9 Changes in perceived values of and aspirations for children

The changes in perceived values of children and aspirations for children have been assessed with the help of information obtained from field study on various aspects of perceived values of children and aspirations for children. Since qualitative methods have been used in the field study, inferences are drawn based on the information obtained from in-depth interviews and focus group discussions with the respondents.

2.4 Measurement of Variables

2.4.1 Dependent variables

CBR, ASFR and TFR are used to study current fertility, Number of children ever born (CEB) is used for cumulative fertility, and CEB of women aged 40-49 is used for completed fertility. Number of children born to currently married women in the last five years from survey date is the dependent variable used in decomposition analysis of fertility. Number of CEB to currently married women aged 15-49 is the dependent variable in studying factors influencing fertility by Poisson Regression model.

SMAM, Proportions ever married by age and cumulative proportion ever married by age are used in the study of marriage. Age at marriage is the ‘time’ and ‘marriage’ is the event in studying determinants of risks of marriage by Cox Regression.

Period Parity Progression Ratio (PPPR), Age at first birth (measured in completed years), and birth intervals (measured in months) are used to study family building process. To study determinants of higher order births, the length of birth interval is considered as ‘time’ and occurrence of the next birth is considered as ‘event’ in Cox Regression.

Ideal number of children and desire for the next child are used to study fertility preferences. Ideal number of children is measured in whole numbers. Desire for the next child is measured as categorical variable with categories: 'Desire within two years', 'Desire after two years', 'Desire but unsure about timing', 'Undecided', 'Desires no more', 'Sterilized' and 'Declared infecund'. Further, this variable is made dichotomous for Logistic Regression stating whether these is 'No desire for an additional child', measured as 'Yes' (1) and 'No' (0). Those who stated 'Desires no more' and 'Sterilized' are clubbed in 'Yes' category and 'Desire within two years', 'Desire after two years', 'Desire but unsure about timing' and 'Undecided' in 'No' category. Those who 'Declared infecund' were excluded from analysis. Women stating non-numeric response on questions on desire for additional children and ideal number of children are mentioned as a separate category. In multivariate analysis, women giving non-numeric responses are excluded from analysis. Current use of contraceptives is measured as dichotomous variable with status of current use giving 'Yes' (1) and 'No' (0) responses, where 'Yes' represents use of any method at the time of survey.

2.4.2 Independent variables

Structural variables

As discussed in developing the conceptual framework for the study, place of residence, ecological region and development region are structural variables which have influence on fertility behaviour of people; and therefore they are included in the analysis as independent variables.

Type of place of residence: It is measured as a dichotomous categorical variable with two values: Urban and Rural.

Ecological region: Nepal is divided into three distinct ecological belts for which, categorical variable 'Ecological region' has been used with categories: Mountain, Hill and *Tarai.*

Development Region: For administrative purposes, there are five development regions in Nepal from east to west; for which 'Development Region' is the variable with categories: Eastern, Central, Western, Mid-Western and Far-Western Development Regions.

Socioeconomic variables

From among several socioeconomic factors those influence fertility, the following commonly used variables are considered for analysis as independent variables. The rationale of their selection has been discussed in Section 2.1.5.

Women's education: It is the most important variable in this group, which is treated as a categorical variable with categories: 'No Education', 'Primary' and 'More than Primary' level of education.

Household wealth quintile: Demographic and Health Surveys has developed 'Household Wealth Index' as a good proxy of relative economic status of household. It is measured in well known quintiles, commonly called 'wealth quintiles' having ordinal categories the 'Poorest', 'Poorer', 'Middle', 'Richer' and the 'Richest' indicating the worst to the best economic status of the household. The same variable has been used in this research to indicate woman's economic status. The wealth quintile to which the household of a woman belongs is taken as a background variable in analysis.

Women's work status: Since Nepal is a predominately agrarian society and the overall level of women's education is low, 'Women's Work Status' has been measured in three categories: 'Not Working', Working in Agriculture' and 'Working in Non-agriculture'.

Exposure to media: Exposure to different mass media is another frequently used variable in fertility research. Exposure to Radio, TV and Newspaper has been considered to construct indicator of mass media exposure. Exposed to none of the three stated media for at least once a week is considered a 'Low' level of exposure to media and exposed to at least one of the three stated media for at least once a week is considered 'High' level of exposure to media.

Religion: Due predominance of followers of Hindu religion, it has been measured as a dichotomous variable with categories: 'Hindu' and 'Non-Hindu'.

Demographic variables

Age is the most important factor to be considered in any demographic analysis. Similarly, fertility is influenced by infant and child mortality and son preference. It is also influenced by marital duration and number of children a couple already has. Similarly, presence or absence of husband from home also affects fertility. Therefore, the following factors are considered as independent variables in data analysis.

Age: This is the most important demographic variable; measured in conventional five-year age groups or in single year as per requirement. However, other larger age groups are also created as per need. Age is frequently used for corresponding life course events like marriage, the first birth, other higher order births, use of contraception etc.

Sex of child: This is dichotomous categorical variable measured in terms of 'Male' and 'Female'.

Number of living children: This is measured in whole numbers.

Number of sons: This is measured in whole numbers.

Marital duration: This is measured in completed years.

Survival status of child: This is measured as dichotomous categorical variable with values: 'Survived' and 'Died'.

Husband's residential status: This variable states whether husband of a currently married women is living at home with wife or staying elsewhere at the time of survey. This is a dichotomous variable with responses: 'At home' and 'Elsewhere', representing respectively that the husband is residing at home with wife and he is staying elsewhere at the time of survey.

Temporal factor: When time itself is used as a factor influencing dependent variable, it is measured in terms of years back from survey date.

Chapter-III

Fertility Trends, Differentials and Determinants in Nepal

Fertility transition is a component of overall demographic transition characterized by decline in fertility level and change in its age pattern. The general notion is that the demographic transition occurs along with process of socioeconomic development. During the course of demographic transition, fertility decline takes place with different pace from time to time and is influenced by factors like mortality decline, modernization, industrialization, education, and social mobility. All developing countries now are undergoing demographic transition with varying time of onset and varying tempo so that differential exists in the present state of demographic transition. In spite of a great diversity in terms of geography, culture, and economy, majority of them have a common goal of achieving low fertility and mortality. For better understanding of the perspectives in fertility decline in Nepal, this chapter attempts to analyse fertility trends, differentials, and some of its determinants. Trends in fertility have been discussed on the basis of time series of CBR and TFR. A perspective of socioeconomic and regional variations in fertility in the recent past has also been presented. Change in fertility in the recent past has been decomposed into different components.

3.1 Fertility Trends in Nepal

Although Nepal has a long history of taking census beginning from 1911 on decennial basis, the first four censuses did not meet the requirements of a scientific census and were of little use to have an estimate of fertility. Therefore, no estimates of fertility of Nepal prior to 1950s are available. The census of 1952/54, completed in two episodes in 1952 and 1954, is regarded as a census of certain minimum standard so as to have some demographic estimates. Since then, scholars have tried to obtain some rough estimates of CBR and TFR based on demographic modeling of available data in spite of its poor quality. Subsequent censuses are being regularly conducted with timely improvements in content and data quality and now the census has become a major data source for fertility estimation. Vital registration system has been started in Nepal with a legal basis when 'Birth, Death and Other Personal Events (Registration) Act' was passed in 1976 following the attention paid by the world population conference of 1974. But, it was

implemented from 1977 only in a few districts with no full coverage. Though it has been implemented now in all parts of the country, it is not functioning well and is affected by severe underreporting of the vital events. Therefore, data from vital registration system are rarely used to obtain fertility indicators in Nepal. The National Health Survey conducted in 1966 by the Department of Health was the first major national survey that generated demographic data, but due to its low coverage, derived estimates were of limited quality (Rele 1992). Nepal was one of the countries to participate in the World Fertility Survey project and Nepal Fertility Survey (NFS) was conducted for the first time in the country in 1976. Subsequently, CBS conducted Demographic Sample Surveys for three successive rounds in 1974/75, 1976 and 1977/78, from which fertility estimates were made (UN 1980). However, Goldman et al. (1979) mentioned that WFS of 1976 had quite better quality data as compared to other survey data available then. Nepal Contraceptive Prevalence Survey (NCPS) 1981, Nepal Fertility and Family Planning Survey (NFFPS) 1986, Nepal Family Health Survey (NFHS) 1991 and 1996, and Nepal Demographic and Health Survey (NDHS) 2001, 2006 and 2011 are major national level sample surveys whose data are used to assess fertility level in Nepal. Depending upon the nature of available data and its quality, fertility indicators are found to be obtained either from direct definition or applying various indirect demographic techniques.

The CBR is the simplest fertility indicator which expresses number of births per thousand populations at certain time. Table-3.1 shows series of CBR obtained from different sources in Nepal. A high birth rate of nearly 50 per thousand has been estimated for 1954. Till the 1950s, Nepal was closed to western influence; the process of industrialization-modernization and its simultaneous emphasis on smaller families was just in infancy and therefore, such a high birth rate was not surprising in the context of cultural and social milieu of then Nepal (Vaidyanathan and Gaige 1973). The birth rate declined to around 40 in early 1990s. Some fluctuations are noticed in the 1960s and 1970s. A persistent decline is observed since 1980s. A long time was taken for a decline of 10 points in CBR. Since 1990s, CBR decline seems faster and it took only a decade for further decline by 10 points, with the birth rate falling to around 30 in 2001. In the last decade the birth rate further declined by almost another eight points and has reached around 22 in 2011. This also indicates a consistent faster decline in CBR in the recent past. Based on trend of CBR decline, it can be inferred that fertility transition in Nepal might have started somewhere in the 1980s and has been underway till the date.

Table-3.1: Trends in CBR in Nepal

Year/Period	CBR	Based on	Source
1954	48.7	Census	Vaidyanathan and Gaige (1973)
1961	47.0	Census	Krotki and Thakur (1971)
1971	43.4	Census	CBS (1995)
1976	43.6	Survey	HMG (1977) WFS
1976	46.8	Census	CBS (2003)
1981	45.0	Census	CBS (2003)
1986	39.0	Census	CBS (2003)
1991	41.6	Census	CBS (1995)
1991	39.0	Census	CBS (2003)
1993-1995	37.0	Survey	Pradhan et al. (1997)
1998-2000	33.5	Survey	MOH, New Era and ORC Macro (2002)
2001	30.5	Census	CBS (2003)
2002-2006	28.0*	Census	Present study (Reverse survival method)
2003-2005	28.4	Survey	MOHP, New Era and Macro International (2007)
2008-2010	24.3	Survey	MOHP, New Era and Macro International (2012)
2011	22.4	Census	CBS (2014a)
2007-2011	20.9*	Census	Present study (Reverse survival method)

*Calculated by the researcher using reverse survival method from census data of 2011(CBS 2014c)

Table-3.2 depicts TFR in Nepal for different time periods, calculated by different methods. Retherford and Thapa (1999) developed a smoothed annual series of TFRs for Nepal by using own children method on data obtained from NFS 1976 and NFHS 1996. Selected figures from this series and values obtained from other sources are presented in Table-3.2. Direct estimates are applied only for NFHS and NDHS data. A fluctuation in TFR up to 1981, then a gradual decline up to 1991 and a faster decline thereafter has been observed.

Table-3.2: Trends in TFR in Nepal

Year/ Period	TFR by Methods			Source
	Direct	Own children	Others[#]	
1961		6.10		Retherford and Thapa (1999)
1961			5.74	CBS (2003)
1966		5.96		Retherford and Thapa (1999)
1971		5.83		Retherford and Thapa (1999)
1976		5.69		Retherford and Thapa (1999)
1976	6.33			CBS (2003)
1976	6.30			UN (1980)
1976			6.20	Acharya (1998)
1977		5.80		Retherford and Thapa (1998)
1981			6.39	CBS (2003)
1981		5.55		Retherford and Thapa (1999)
1986		5.38		Retherford and Thapa (1999)
1991			5.13	CBS (2003)
1991		5.14		Retherford and Thapa (1999)
1993-95	4.64			Pradhan et al. (1997)
1993-95		4.96		Retherford and Thapa (2003)
1995		4.95		Retherford and Thapa (1998)
1996			5.10	Acharya (1998)
1998-2000	4.10			MOH, New Era and ORC Macro (2002)
1998-2000		4.69		Retherford and Thapa (2003)
2001			3.80	CBS (2003)
2003-05	3.10			MOHP, New Era and Macro International (2007)
2008-10	2.60			MOHP, New Era and Macro International (2012)
2011			2.52	CBS (2014)

[#]other methods include the stable population method and the Brass P/F ratio method with its modification due to Arriaga

Though onset of fertility decline is an elusive concept at the national level, because it is affected by heterogeneity of national populations (Casterline 2001) and different scholars have set a minimum value of fertility decline to confirm onset of fertility transition; many of them agree on 10 percent decline as a mark of onset of transition (for example, Caldwell et al. 1992; Caldwell 2001; Potter et al. 2010; Bongaarts 2013). As compared to the base TFR of 1955-59, Caldwell (2001) has listed Nepal in the category of countries where 10 percent decline had not occurred till 1980. Rele (1992) also supports for almost unchanging fertility in Nepal until about 1981, with possibly some decline thereafter. A

clear declining trend in TFR obtained from all different methods after 1981 confirms the onset of fertility decline in Nepal somewhere in the 1980s. Amid a set of fluctuating values of TFR in Nepal during 1960s and 1970s and assuming a TFR of six as pre-transitional level, a 10 percent lower TFR of around 5.5 has been achieved in 1981 and a sustained decline in TFR continued thereafter. Therefore, this can be regarded as a marker of onset of fertility transition in Nepal. Existing literature also supports the fact that fertility transition in Nepal begun in the early 1980s (Ross 1986; Rele 1992; Acharya 1998; CBS 2003; Bongaarts 2013). The onset of fertility transition in Nepal is almost five years later than that of Asian average, which is regarded as 1976 (Bongaarts 2013). Similarly, Nepal lags in onset of transition as compared to Sri Lanka and India, where the process begun in 1965-1970 and 1970-1975 respectively (Caldwell 2001).

Demographic transition in Nepal has followed the general pattern of 'mortality first' and fertility decline lagged mortality decline. Estimates of CDR for Nepal from various sources show that there was a substantial decline in these rates during the 1950s and 1960s and a slight decline in the 1970s. The CDR before 1960 was estimated as high as at least 30 per thousand, which declined to around 20 per thousand during the 1970s; life expectancies at birth for males and females were estimated to be 25.6 years and 25.7 years in 1952/54 which increased to 45 years and 42 years respectively in 1974-1976 (UN 1980).

Pre-transitional fertility level in Nepal was not as high as that observed in many other populations. Fertility decline was quite slow in the 1980s; just a decline of around a half child per women is witnessed from 1981 to 1991. However, by the end of the 20th century, TFR fell to 4.1, with a faster decline of around one child per woman per decade. The inter-survey period of NDHS 2001 and 2006 witnessed an unprecedented decline in TFR, showing a decline of one child per woman in the five year period. This is the period of the most accelerated fertility decline in Nepal. From period of NDHS 2006 to 2011, TFR declined by another 0.5 point thus reaching at 2.6. Nepal underwent a political transition in 1990 which transformed the country from a *Panchayet* regime with active monarchy to a democratic kingdom with parliamentary system and constitutional monarchy and made the society more open to the modern world and substantial social changes took place as its consequences. This may have contributed to the accelerated fertility decline after 1990. Similarly, there has been a massive change in information and communication in the recent past. Labour migration to international job market was also

opened for male youths after this political change. At the same time, Nepal witnessed a decade long internal conflict during 1996-2006. In 2006, there occurred another major political change, which made the country a republic state. Opportunities to education and facilities of health were also increased. People's awareness level regarding their rights and obligations has phenomenally increased. All these factors might have spurred fertility transition in Nepal. Now, Nepal stands around world average of lifetime 2.5 children per woman, though it is one of the low income countries.

The current fertility level is not the same across all the regions and sections of population. An attempt has been made here to examine district level fertility variations and an aggregate relationship of fertility with selected socioeconomic factors at district level in Nepal. The CBR obtained from the reverse survival method on census return data of 2011 has been used to study district level fertility variations. As mentioned earlier, CBR of Nepal for 2007-2011 is found to be 20.9 per thousand population from reverse survival method. But, it varies considerably among districts, with a minimum of 11 in Manang to a maximum of around 37 in Mugu district (Table-3.3).

Table-3.3: Classification of districts of Nepal according to CBR range, 2007-2011

Range of CBR	Number of districts	Districts
Less than 18	18	Manang, Mustang, Lalitpur, Bhaktapur, Kathmandu, Ilam, Kabhrepalanchok, Chitwan, Nuwakot, Ramechhap, Kaksi, Syangja, Sindhupalchok, Dolakha, Lamjung, Gorkha, Tanahu, Terhathum
18-22	29	Rasuwa, Jhapa, Dhankuta, Panchthar, Dhading, Nawalparasi, Morang, Parbat, Palpa, Sunsari, Makawanpur, Okhaldhunga, Bhojpur, Solukhumbu, Bardiya, Sankhuwashabha, Rupandehi, Khotang, Bardiya, Taplejung, Saptari, Udayapur, Baglung, Dhanusha, Dang, Kailali, Kanchanpur, Arghakhanchi, Myagdi
22-26	11	Sindhuli, Banke, Siraha, Mhottari, Parsa, Sarlahi, Kapilbastu, Salyan, Surkhet, Bara, Rukum
26-30	7	Rautahat, Dadeldhura, Darchula, Baitadi, Rolpa, Pyuthan, Dailekh
30 and above	10	Achham, Doti, Dolpa, Bajhang, Jumla, Bajura, Jajarkot, Humla, Kalikot, Mugu
CBR of Nepal is 20.9		

Source: Computed by the researcher from census data 2011 by reverse survival method

When classified into different groups, 18 districts out of 75 have CBR less than 18, 29 districts have CBR in the range 18-22, 11 districts have CBR between 22 and 26, seven districts have CBR in range 26-30, and only 10 districts have CBR 30 or more. Districts with lower CBR than national average are in a majority. Including the highly urbanized districts of capital region (Lalitpur, Bhaktapur, Kathmandu), some more developed districts of Hill (Ilam, Kaski, Kabhrepalanchok, Tanahu, Syangja) and *Tarai* (Chitwan) and some other districts of Mountain (Manang, Mustang) region fall in the category of lowest CBR. Most of the districts of Mid-Western and Far-Western Mountain and Hills fall in the category of the highest CBR of at least 30. The district level variation in CBR is also depicted in Figure-3.1.

To analyse aggregate relationship of district level fertility measured by CBR with selected district level socioeconomic characteristics, multiple regression equation has been used. The explanatory variables used are: Per Capita Income (PCI), Female Literacy Rate (FLR), Female Labour Force Participation rate (FLFPR), and Infant Mortality Rate (IMR), all at district level. Values of included variables are mentioned in the Appendix Table-2. The FLR, FLFPR, and IMR are calculated by using data from census 2011. PCI are borrowed from Human Development Report of Nepal 2014 (NPC and UNDP 2014). Instead of taking direct values of PCI, logarithmic values are considered. The regression results are presented in Table-3.4.

Figure-3.1: Variations in CBR at district level, Nepal

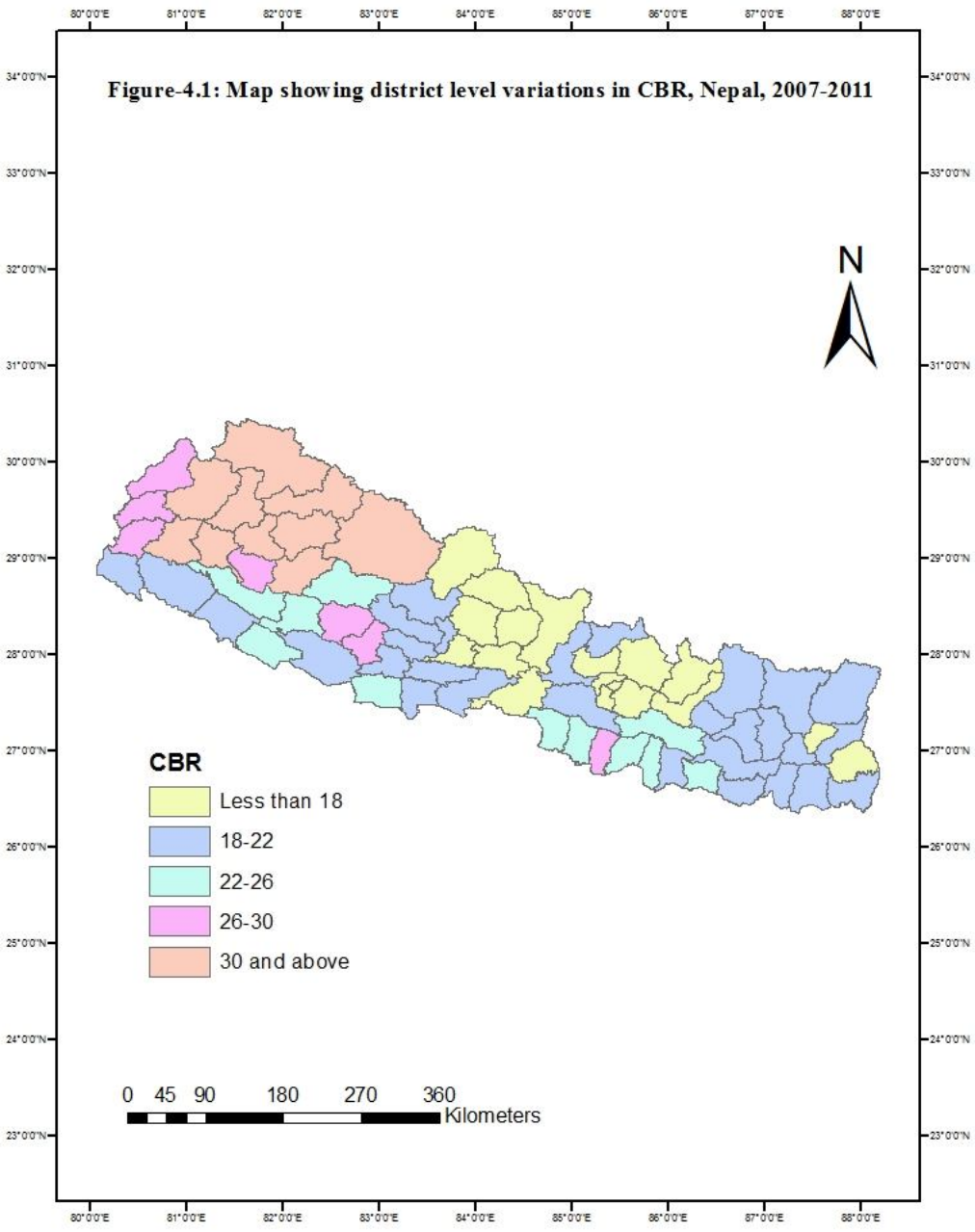


Table-3.4: Results of Multiple Regression of CBR at district level on selected variables

Variables	Coefficients	Standard Error	t-Statistic	P-value
Intercept	59.96	6.32	9.48	0.000
Log PCI	-5.69	0.92	-6.17	0.000
FLR	-0.06	0.03	-1.92	0.059
FLFPR	-0.07	0.02	-3.01	0.004
IMR	0.22	0.02	9.80	0.000
R Square	0.87	**F (from ANOVA)**	**112.29**	**0.000**
Number of data points	75			

Source: Calculated by researcher

The regression model explains 87 percent of district level variations in CBR. The coefficients of all but one variable (female literacy rate) are highly significant in explaining district level CBR. The result indicates a lower birth rate for higher per capita income of the district and higher female labour force participation and a higher birth rate for higher infant mortality rate, when controlled for other factors. It is observed that female literacy at district level doesn't have a strong influence on fertility when controlled for other factors. But other socioeconomic factors namely mortality at early age, women's participation in labour force and income have significant net effect on fertility at district level.

3.2 Fertility Differentials in Recent Past

This section describes the dynamics of fertility change during the last decade. Utilizing data from NDHS 2001, 2006 and 2011, fertility differentials and decline are examined for selected socioeconomic and regional factors. Differentials in TFR and ASFR are studied for urban-rural place of residence, ecological region, development region, women's education and household wealth quintile. Women's education and wealth quintile are taken as proxy for social and economic factors respectively. Changes occurred in age pattern of fertility have also been examined. Similarly, fertility differentials are studied by using life time fertility (cumulative fertility) and completed fertility.

3.2.1 Differentials in TFR

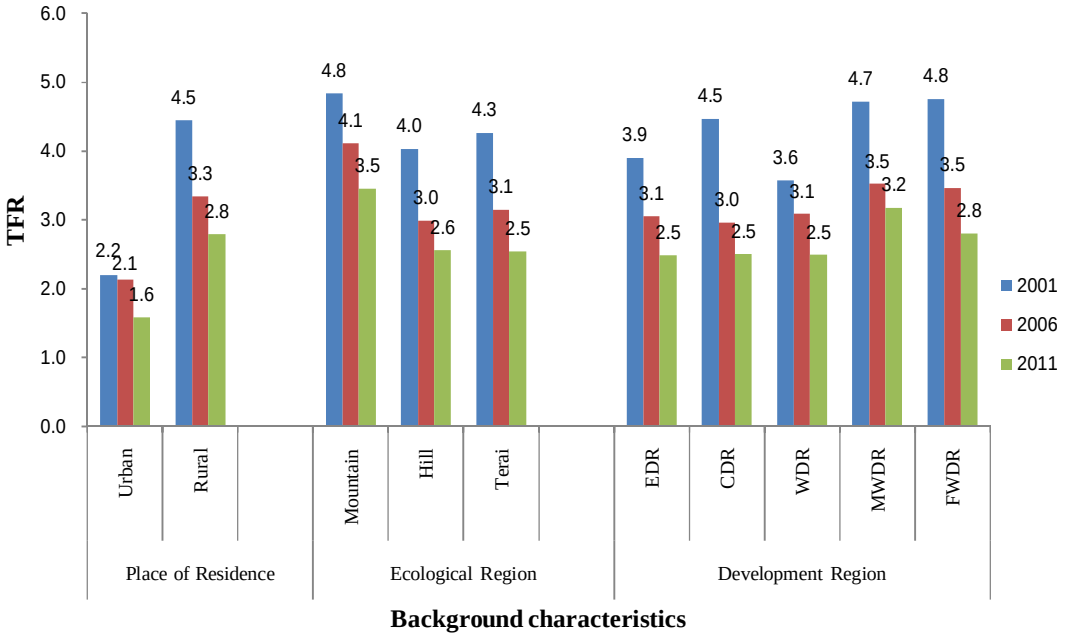
TFR is one of the standardized indicators of current fertility and therefore easily comparable for various time periods, population subgroups and regions. TFR calculated from NDHS data are based on direct measures of events (birth) and exposure (women's years exposed). Results pertaining to NDHS data of 2001, 2006 and 2011 correspond to the periods 1998-2000, 2003-2005 and 2008-2010 respectively.

Figure-3.2a depicts the TFR differentials for the three surveys by place of residence, ecological region and development region. Even before the transition began, rural-urban fertility differentials were evidenced. Urban and rural TFR in 1976 were 6.8 and 7.2 respectively (Rele 1992). Urban rural fertility differential has been persistent but with a declining gap during the study period, with markedly higher rural fertility than urban one. Urban TFR declined from 2.2 to 1.6, that is, by 27 percent whereas rural TFR declined from 4.5 to 2.8, by 38 percent. This differential in the rate of decline is due to the fact that there were fertility inhibiting forces in effect both in rural area and urban area; fertility in urban area had been already declined to a lower level with a limited scope of further decline and fertility in rural area was higher with more scope of decline. Nepal is mainly inhabited by rural population and the fertility decline is mainly due to contribution of rural fertility decline. More convergence in urban-rural fertility is expected when fertility further declines in future.

Nepal has three distinct ecological belts and fertility differentials are observed for these ecological regions too. Of the three regions, TFR in Mountain is the highest in all three surveys. In 2001, TFR in Hills was less than that of *Tarai* but in 2006 and 2011, TFR is almost equal in these two regions. There is substantial decline in TFR in all three regions. There is relatively smaller gap in TFR between Hills and *Tarai* but fertility is relatively higher in the Mountain region which is lagging in fertility transition. This lag can be attributed to the differences in level of socioeconomic development, where Mountain region is relatively backward in terms of infrastructures, road connectivity, health services and other facilities.

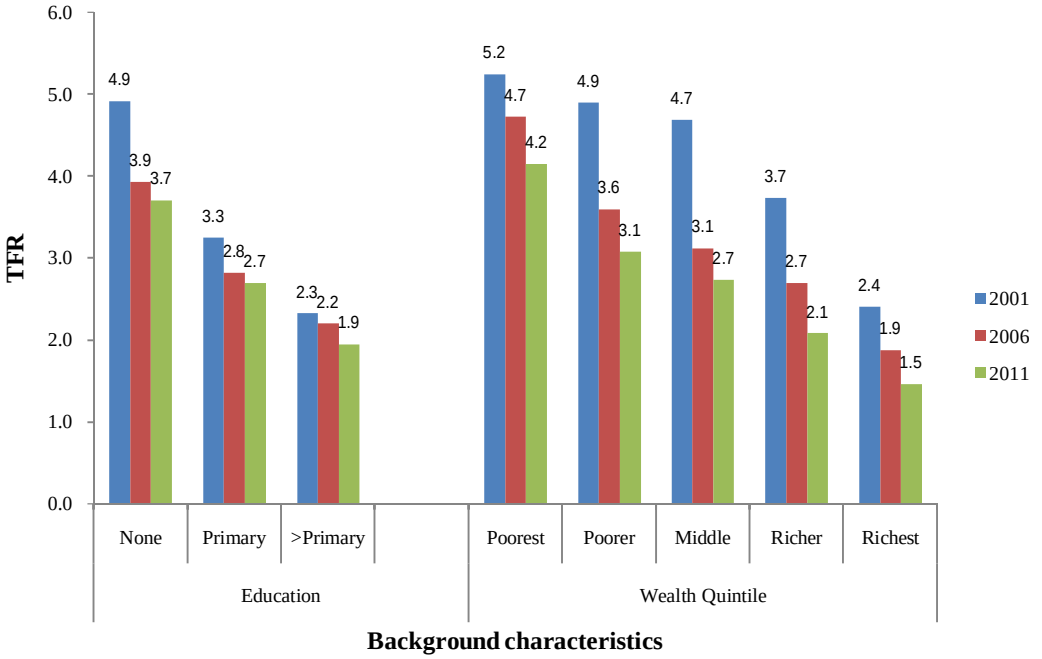
To achieve a regional balance in overall development of the country, Nepal was administratively divided into five development regions. Each of the regions consists of geographical area of all three ecological regions. However, disparity exists in terms of level of development among these development regions. Central development region is the most developed region with the national capital, large urban centres, major industries, better road network and better opportunities for education and health. Eastern and Western development regions follow the Central region and are at relatively lower level of overall development as compared to the Central region. Mid-Western and Far-Western development regions are lagging behind the other regions and are relatively backward.

Figure-3.2a: Differentials in TFR by place of residence, ecological region and development region, NDHS-2001, 2006 and 2011



Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

Figure-3.2b: Differentials in TFR by women's education and household wealth quintile, NDHS-2001, 2006 and 2011



Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

Fertility differential by development region is noticeable to some extent. It is observed that TFR differentials in development regions are narrowing down from over time, as seen from the 2001 to 2011 surveys. TFR in the Western region was relatively lower (TFR 3.6) in 2001 and declined to 2.5 in 2011, whereas in the Central region, it declined from 4.5 to 2.5. Fertility in the Eastern, Central and Western regions is now equal, but a bit higher in the Mid-Western and Far-Western regions. However, the Far-Western region had a high TFR of 4.8 in 2001 and witnessed a substantial decline of 42 percent to a TFR of 2.8 in 2011. But still, TFR in this region is the highest among all regions. Apart from greater scope for decline, rising awareness of people about birth control and expansion and intensification of family planning programme in the region might have played a role.

TFR differentials by women's education and household wealth quintile are presented in Figure-3.2b. Vast educational differentials in fertility were evident even before transition began; TFR was 7.1 for uneducated women and 4.8 for women having seven or more years of education in 1976 (Rele 1992). An expected negative association of TFR with women's education is clearly observed for all the three surveys. The fertility gap between uneducated women and women with at least primary education is declining over time, indicating a faster fertility transition among uneducated women. However, TFR of uneducated women (3.7) is almost double that of women with education above the primary level (1.9) in the most recent survey period. Since TFR of educated women has already reached below replacement level with little scope for further decline and that of uneducated women is declining, narrowing down of fertility differential by women's education is envisaged.

Fertility differentials exist by economic status of the household that is measured in terms of household wealth quintiles. A negative association of TFR with wealth quintile is consistently observed in all the three surveys in Nepal. In different Indian states, negative association of household standard of living with fertility of varying extent has been observed (Roy et al. 1999). Fertility is the highest among women from the poorest household wealth quintile and the lowest among women from the richest quintile. TRF has not declined as much for women of the poorest strata of society (a decline of one child per woman from 2001 to 2011), as for women from second and third quintiles of household wealth (a decline of almost two children per woman in the same period). Relatively high fertility in the poorest strata of the society may be due to their higher perceived economic value of children for subsistence of their family leading to a higher

demand for children. Also, lower access of these women to means of fertility control cannot be ruled out. Similarly, faster decline in fertility among women of relatively better economic condition may be due to decreased demand for children caused by higher aspirations for their children, especially of education which is associated with increased cost of upbringing of children. Fertility among women of fourth wealth quintile has reached replacement level and that of topmost wealth quintile has fallen far below the replacement level. This is mainly due to their low demand for children. Wealthy people nowadays have tendency to invest more on their children and opt for only one or two children so that they can invest more per children. They prefer quality rather than quantity and have very high aspirations for their children. They are also more capable of limiting fertility by using available means of fertility control.

3.2.2 Changes in age pattern of fertility

During the course of fertility transition, fertility decline generally does not take place proportionately in all reproductive age groups. There might be steep decline of fertility in early reproductive ages if there is substantial increase in age at marriage. Limiting child birth by use of contraception causes more decline of fertility in later reproductive ages. There may also be increment in age specific fertility in some middle reproductive ages due to shrinking of effective reproductive life span caused by increased age at marriage and use of contraception to limit childbearing. This type of transition causes changes in the age pattern of fertility. Such change also occurs differently for different subpopulations. Changes in ASFRs for different reproductive age groups can explain changing age pattern of fertility.

The last row of Table-3.5a shows percentage decline in ASFR in different reproductive age groups from 2001 to 2011. There is 38 percent decline in TFR, but the extent of decline greatly varies in different age groups. A maximum decline of 60 percent is observed in age group 40-44, followed by 56 percent in age group 35-39. The lowest decline of 25 percent is observed in age 20-24 group. Differences also exist in rural and urban areas in terms of percentage decline in ASFRs. Higher percentage decline in ASFR in the first reproductive age is evidenced in urban area as compared to rural area, but, the extent of decline is the lowest in age 20-24 in both the areas.

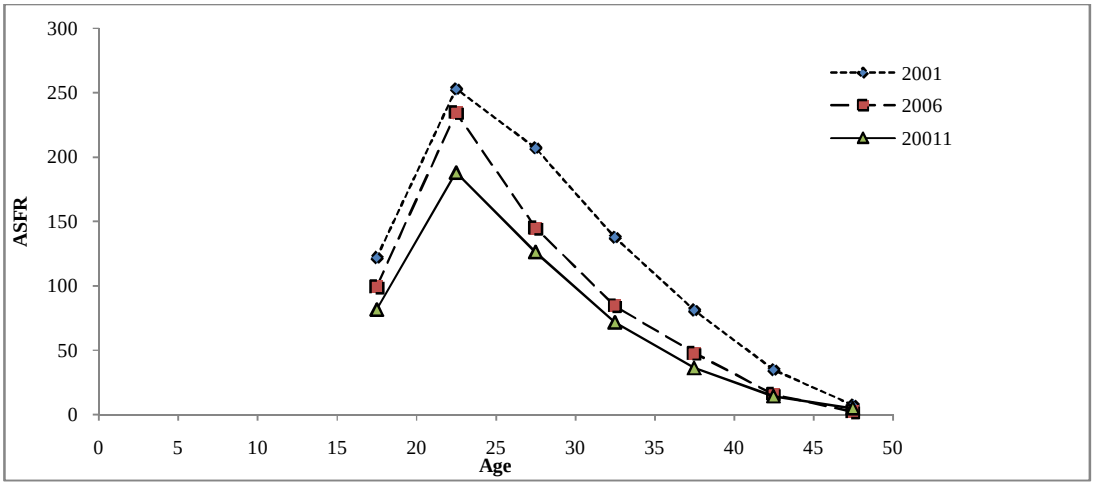
Table-3.5a: Changes in ASFR and TFR by place of residence in Nepal, 2001, 2006 and 2011

Place of residence	ASFR for age group							TFR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
NDHS-2001								
Urban	87	159	103	60	28	3	0	2.2
Rural	126	265	219	147	87	38	8	4.5
Total	117	251	206	137	81	35	7	4.2
NDHS-2006								
Urban	73	168	114	41	24	8	0	2.1
Rural	104	249	152	93	52	17	3	3.3
Total	99	235	145	84	48	16	2	3.1
NDHS-2011								
Urban	42	135	81	38	16	0	5	1.6
Rural	88	197	135	78	39	17	5	2.8
Total	82	188	126	72	36	14	5	2.6
Percent change from 2001 to 2011								
Urban	-51.7	-15.1	-21.4	-36.7	-42.9	-100.0	ND	-27.3
Rural	-30.2	-25.7	-38.4	-46.9	-55.2	-55.3	-37.5	-37.8
Total	-29.9	-25.1	-38.8	-47.4	-55.6	-60.0	-28.6	-38.1

ND= Not defined

Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

Figure-3.3a: Change in age pattern of fertility, NDHS 2001, 2006 and 2011

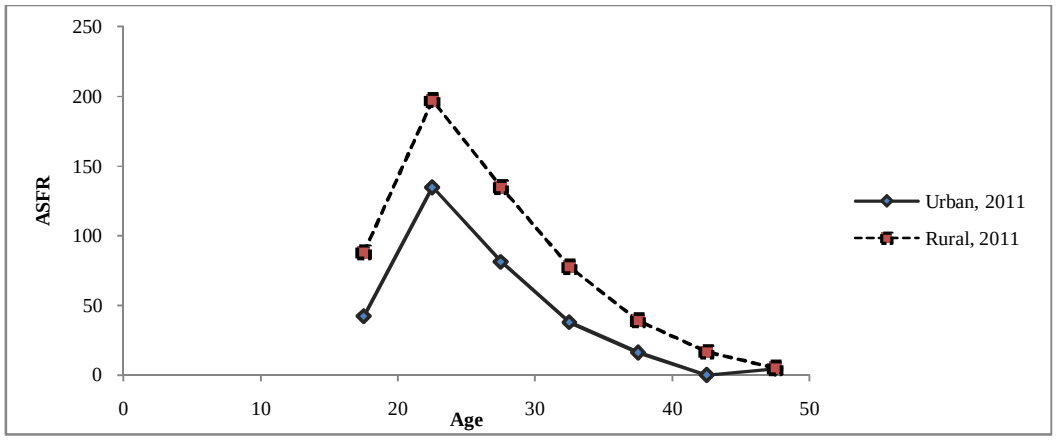


Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

The change in age pattern of fertility is shown in Figure-3.3a. There is some change in the age pattern of fertility schedule. The peak fertility is attained in age group 20-24; but after that, there is steep decline in age specific fertility rates in higher ages. More transition in older ages is observed from 2001 to 2006 and a large decline in the peak is observed

between 2006 and 2011. There is only a little decline in ASFR in the young age group of 15-19. Nepal's fertility pattern is still characterized by early start, early peak and gradual decline after attaining peak.

Figure-3.3b: A comparative view of the age patterns of fertility of urban and rural area, NDHS 2011



Source: Calculated by researcher from NDHS data 2011

Difference in age pattern of fertility in urban and rural area is clear from Figure-3.3b. ASFRs for rural area are higher than those for urban area for all ages (Table-3.5a and Figure-3.4). In both the areas, fertility attains peak in age 20-24 but slightly steeper decline thereafter takes place in urban area as compared to that in rural area.

Table-3.5b: Changes in ASFR by ecological region in Nepal, 2001, 2006 and 2011

Ecological Region	ASFR for age group							TFR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
NDHS-2001								
Mountain	103	247	233	199	107	63	15	4.8
Hill	100	228	206	138	89	36	9	4.0
Tarai	142	275	204	129	71	28	4	4.3
NDHS-2006								
Mountain	103	245	192	127	99	39	18	4.1
Hill	84	213	137	95	53	15	1	3.0
Tarai	112	252	146	71	36	13	1	3.1
NDHS-2011								
Mountain	100	248	159	110	48	28	0	3.5
Hill	70	184	125	79	39	13	4	2.6
Tarai	87	185	124	63	32	14	6	2.5
Percent change from 2001 to 2011								
Mountain	-2.9	0.4	-31.8	-44.7	-55.1	-55.6	-100.0	-27.1
Hill	-30.0	-19.3	-39.3	-42.8	-56.2	-63.9	-55.6	-35.0
Tarai	-38.7	-32.7	-39.2	-51.2	-54.9	-50.0	50.0	-41.9

Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

In the Mountain region, ASFR in ages 15-19 and 20-24 remained almost constant, some decline occurred in age 25-29 and more decline occurred beyond age 30 (Table-3.5b). In contrast, some noticeable decline in ASFR is observed in ages 15-19 and 20-24 in the Hill and *Tarai* regions. ASFR declined by considerable amount beyond age 25 in all regions. Persistent higher TFR in the Mountain region as compared to the other two regions is due to persistent high ASFRs in the first two reproductive ages.

Table-3.5c: Changes in ASFR by development region in Nepal, 2001, 2006 and 2011

Development Region	ASFR for Age groups							TFR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
NDHS-2001								
Eastern	97	223	202	139	78	30	12	3.9
Central	148	263	213	147	84	33	5	4.5
Western	119	221	197	82	64	29	3	3.6
Mid-Western	121	268	221	162	110	51	12	4.7
Far-Western	107	332	203	177	86	41	8	4.8
NDHS-2006								
Eastern	107	211	144	73	48	25	3	3.1
Central	93	230	133	83	39	12	1	3.0
Western	94	230	138	95	51	10	0	3.1
Mid-Western	123	248	147	93	63	25	6	3.5
Far-Western	86	280	186	83	49	5	4	3.5
NDHS-2011								
Eastern	67	173	129	70	31	22	5	2.5
Central	88	188	110	65	37	8	5	2.5
Western	75	178	129	65	29	14	9	2.5
Mid-Western	95	219	149	100	59	15	0	3.2
Far-Western	93	204	139	78	34	13	0	2.8
Percent change from 2001 to 2011								
Eastern	-30.9	-22.4	-36.1	-49.6	-60.3	-26.7	-58.3	-35.9
Central	-40.5	-28.5	-48.4	-55.8	-56.0	-75.8	0.0	-44.4
Western	-37.0	-19.5	-34.5	-20.7	-54.7	-51.7	200.0	-30.6
Mid-Western	-21.5	-18.3	-32.6	-38.3	-46.4	-70.6	-100.0	-31.9
Far-Western	-13.1	-38.6	-31.5	-55.9	-60.5	-68.3	-100.0	-41.7

Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

Decline in ASFR in all five development regions has been observed from 2001 to 2011 (Table-3.5c). In all the three surveys, the highest fertility is attained in the age group 20-24 in all five regions. Apart from some exceptions, ASFR in the Mid-Western and Far-

Western region are higher than those in the other three regions in all the surveys. Fertility pattern in all regions is similar with difference in level only.

Table-3.5d: Changes in ASFR by household wealth quintile in Nepal, 2001, 2006 and 2011

Household wealth quintile	ASFR for age group							TFR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
NDHS-2001								
Poorest	143	281	250	185	116	67	8	5.2
Poorer	126	289	227	185	105	40	8	4.9
Middle	140	281	234	131	95	44	14	4.7
Richer	113	252	181	129	51	14	8	3.7
Richest	73	180	140	55	27	6	0	2.4
NDHS-2006								
Poorest	103	277	216	186	117	41	6	4.7
Poorer	113	258	186	79	60	17	6	3.6
Middle	112	265	142	69	27	10	0	3.1
Richer	95	230	117	70	21	6	0	2.7
Richest	72	165	96	29	8	5	0	1.9
NDHS-2011								
Poorest	104	260	183	140	98	35	10	4.2
Poorer	106	210	152	84	37	23	6	3.1
Middle	95	214	124	74	23	10	8	2.7
Richer	74	173	108	43	13	7	0	2.1
Richest	31	120	87	36	19	0	0	1.5
Percent change from 2001 to 2011								
Poorest	-27.3	-7.5	-26.8	-24.3	-15.5	-47.8	25.0	-19.2
Poorer	-15.9	-27.3	-33.0	-54.6	-64.8	-42.5	-25.0	-36.7
Middle	-32.1	-23.8	-47.0	-43.5	-75.8	-77.3	-42.9	-42.6
Richer	-34.5	-31.3	-40.3	-66.7	-74.5	-50.0	-100.0	-43.2
Richest	-57.5	-33.3	-37.9	-34.5	-29.6	-100.0	ND	-37.5

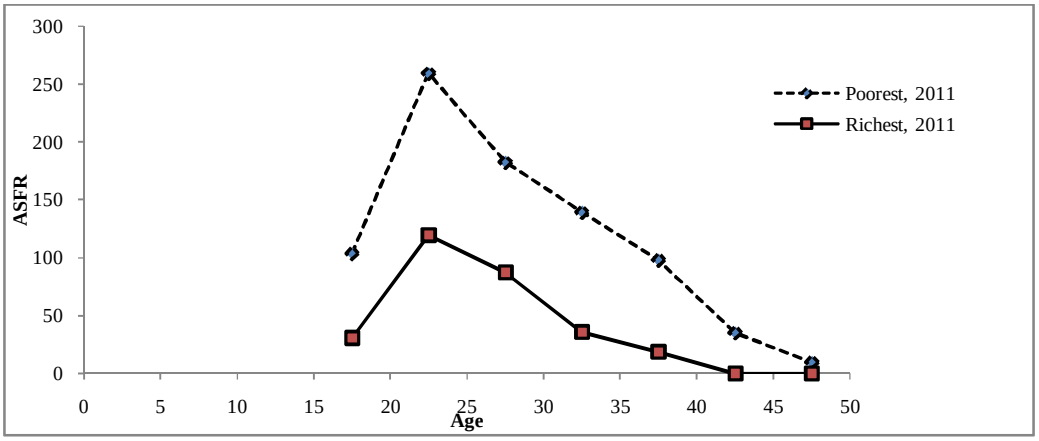
ND= Not defined

Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

In all age groups, a gross negative association of ASFR with household wealth quintile has been found (Table-3.5d). Peak fertility is consistently attained in the age group 20-24 in all economic strata of population. A gradual decline after peak is observed for the first two wealth quintiles, and the decline becomes steeper as we move towards higher wealth quintiles. Women from the topmost wealth quintile now complete their fertility by age 40 and they have a very low TFR of 1.5. Fertility in poorest strata is still high with relatively higher fertility in the age group 15-19 and continuation of childbearing to the last age

group. Figure-3.3c shows a comparative view of the difference in the age pattern of fertility of women between the poorest and the richest wealth quintile in 2011. A higher value at start, steep increase to a high peak that is attained in age 20-24 years, a slow decline and late end is the characteristics of fertility schedule of women in poorest strata; and a relatively lower value at start, slower speed of increase to achieve low peak and a relatively faster decline and earlier completion is the characteristics of fertility schedule of women of richest strata. Gap in ASFR in all ages is noticed with the highest gap in age group 20-24.

Figure-3.3c: A comparative view of the age patterns of fertility of women from the poorest and the richest wealth quintiles, NDHS 2011



Source: Calculated by the researcher from NDHS data 2011

Table-3.5e shows the changes in ASFR of women by their educational status. A negative association of ASFR with educational level is found for all age groups of women. When classified into three groups: uneducated, up to primary education, and beyond primary education, women of all educational categories attain their highest ASFR in age 20-24 in all the three surveys (in the 2001 survey, women with secondary and higher education are pooled to form a single category of 'beyond primary education' as the number of women in the higher education category was small; separate groups of secondary and higher education are shown in the other two surveys but the values for the pooled category are also shown to facilitate comparisons). But, when ASFR of women with more than secondary level of education is also observed for 2006 and 2011, a shift of the peak from age 20-24 to 25-29 is evidenced. Correspondingly, ASFR for ages 15-19 in this group is very small. The fertility pattern of highly educated women is quite distinct than that of

others; characterized by relatively late start, attaining maximum in higher age (25-29 years) and early stopping.

Women with some education complete their fertility by age 45. There is hardly any change in ASFR of uneducated women in the age groups 15-19 and 20-24; only a little decline in the age group 25-29 and fertility decline in this category of women is mainly due to decline in ASFR beyond age 30. Among women with some primary education, ASFR in the age group 15-19 is not changed, a small decline occurred in the age group 20-24 and substantial decline occurred beyond age 25. For women with more than primary level of education, fertility in 2001 was already low, and small amount of decline in ASFR is observed in all age groups.

Table-3.5e: Changes in ASFR by women's education in Nepal, 2001, 2006 and 2011

Education	ASFR for age group							TFR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
NDHS-2001								
None	169	288	234	158	88	38	8	4.9
Primary	118	241	145	86	42	18	0	3.3
>Primary	64	179	151	41	30	0	0	2.3
NDHS-2006								
None	171	271	171	100	55	16	3	3.9
Primary	115	235	116	50	28	21	0	2.8
Secondary	65	207	112	57	16	0	0	2.3
Higher	8	135	97	46	0	24	0	1.5
>Primary	58	192	110	55	14	5	0	2.2
NDHS-2011								
None	175	250	166	89	40	17	6	3.7
Primary	131	202	98	53	41	14	0	2.7
Secondary	56	171	98	47	18	0	0	1.9
Higher	14	100	119	79	26	0	0	1.7
>Primary	50	150	103	53	21	0	0	1.9
Percent change from 2001 to 2011								
None	3.6	-13.2	-29.1	-43.7	-54.5	-55.3	-25.0	-24.5
Primary	11.0	-16.2	-32.4	-38.4	-2.4	-22.2	ND	-18.2
>Primary	-21.9	-16.2	-31.8	29.3	-30.0	ND	ND	-17.4

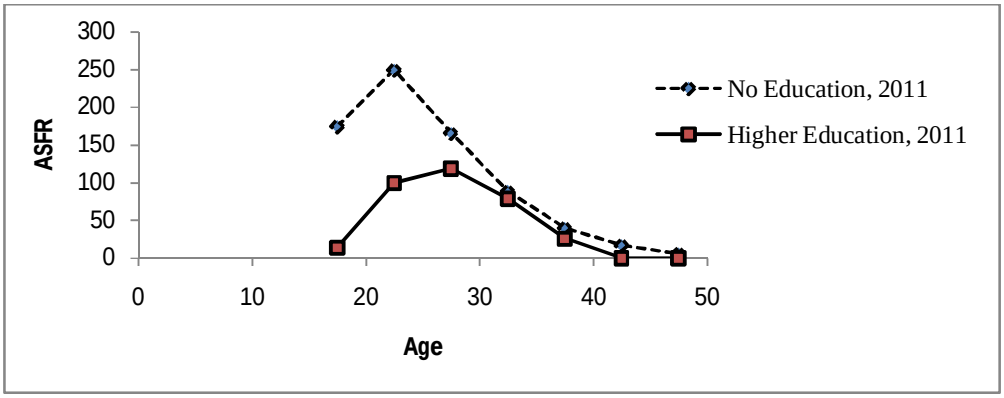
ND= Not defined

Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

Fertility schedules of uneducated women and educated women are quite different at present (Figure-3.3d). There is huge difference in ASFR of uneducated and highly educated women an age 15-19. This is mainly due to girls' schooling, which postpones

their marriage in their early adolescence and favours low fertility in the first reproductive age group.

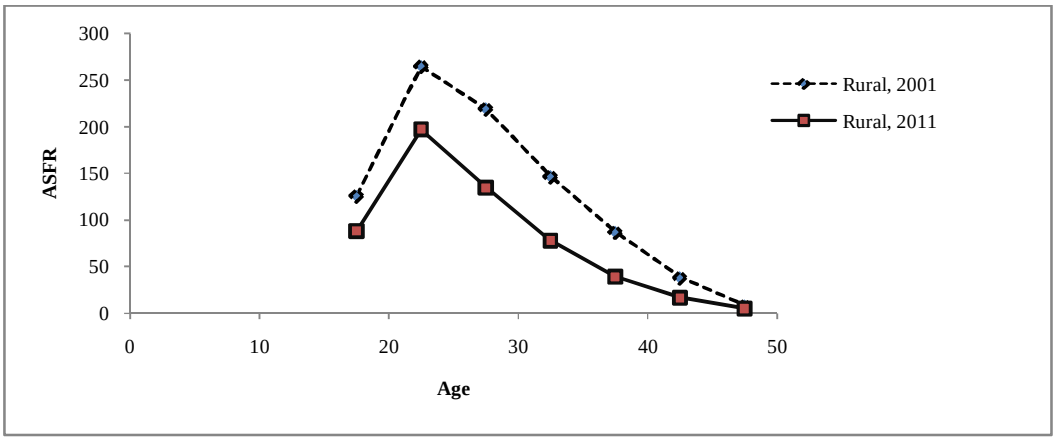
Figure-3.3d: A comparative view of the age pattern of fertility of women with no education and higher education, NDHS 2011



Source: Calculated by researcher from NDHS data 2011

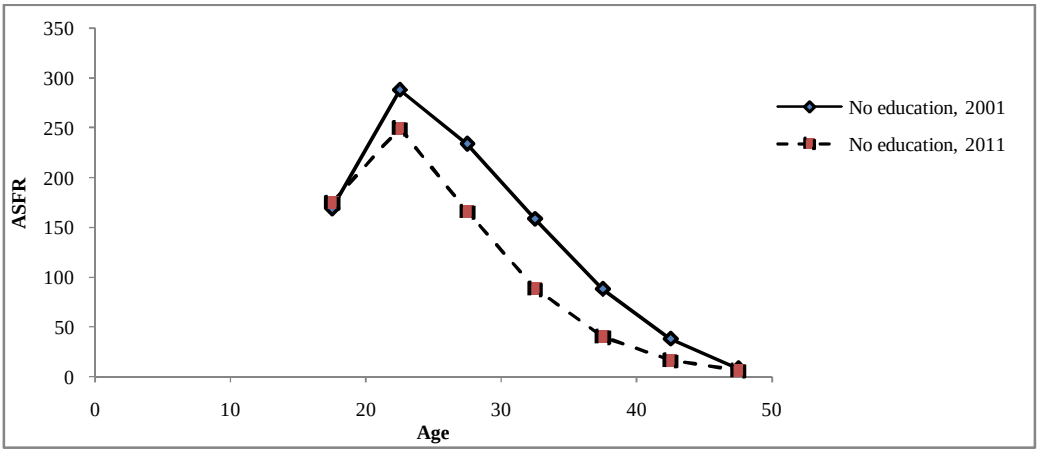
In the recent past, transition has occurred in all geographical area and all sections of the society including women from rural residence, with no education and from the poorest household wealth quintile. Changes in age pattern of fertility from 2001 to 2011 among rural women, uneducated women, and women from the poorest wealth quintile have been depicted in figures (Figure-3.3e, 3.3f and 3.3g).

Figure-3.3e: Change in the age pattern of fertility of rural women, NDHS 2001 to 2011



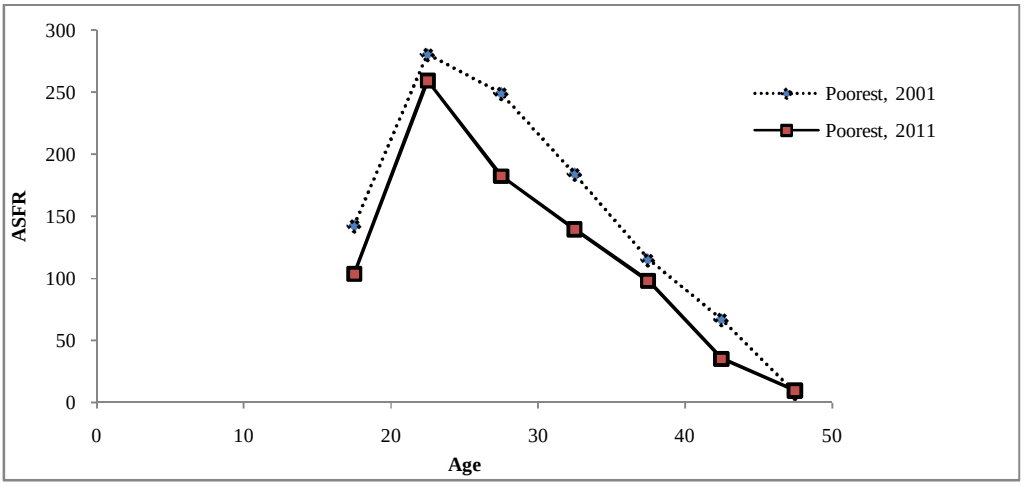
Source: Calculated by researcher from NDHS data 2001and 2011

Figure-3.3f: Change in the age pattern of fertility of uneducated women, NDHS 2001 to 2011



Source: Calculated by researcher from NDHS data 2001and 2011

Figure-3.3g: Change in the age pattern of fertility of women from poorest household wealth quintile, NDHS 2001 to 2011



Source: Calculated by researcher from NDHS data 2001and 2011

Figure-3.3e shows that there is substantial change in the fertility pattern in rural area. A decline in ASFR in all ages has been observed. Decline in age 15-19 is smaller but that in ages 20-24, 25-29 and 30-34 is quite large. This decline in rural fertility naturally contributed a lot in fertility transition in Nepal. Though there is some reduction in ASFR of uneducated women in ages 25-29, 30-34 and 35-39, there is only a little reduction in age 20-24 and none in age 15-19. Any change in fertility schedule among uneducated women is stemmed from stopping births rather than delaying start. Only a little change in fertility pattern has been observed for women from the poorest wealth quintile from 2001

to 2011. The highest ASFR, attained in the age group 20-24, remained almost the same and some decline in adolescent fertility and fertility in ages 25-34 has been found.

3.2.3 Changes in Bongaarts' proximate determinants

The changes that have occurred in the indices of proximate determinants model due to Bongaarts also give some idea about the mechanism of fertility transition. During the initial periods of transition, decrease in proportion of married women and increase in the prevalence and effectiveness of contraception were found to be the two most important proximate determinants contributing fertility decline in Kathmandu Valley (Ross et al. 1986). There must be changes in the respective determinants in the recent past too. This section depicts the changes that occurred in these coefficients during the survey period 2001-2011 in Nepal. Information available in Nepal DHS data enables to estimate these coefficients. The index of marriage reflects the effects of proportion married of women in fertility. Age-specific proportions married and age-specific fertility rates are used to obtain TFR and TMFR and then the index of marriage (C_m) is obtained. The index of non-contraception (C_c) is estimated from information of method specific proportion of current users of contraception and use-effectiveness of respective methods. As suggested in Bongaarts and Potter (1983), use-effectiveness of Pills, IUD and Sterilization are considered to be 0.9, 0.95 and 1.0 respectively; and that for all other methods is taken as 0.7. Here, it is to be noted that, the other methods include relatively less effective methods like condom and more efficient methods like injection and implants, which constitute a large share in contraceptive use in Nepal. It has been assumed that, taking all these methods in a group will not significantly distort the estimated C_c coefficient. Information required for calculating TA is not available in DHS data. Therefore, it is estimated based on information on outcome of pregnancies. TA is therefore estimated as the product of TFR and ratio of induced abortions to all live births (Visaria, 1999) and used to estimate index of abortion (C_a). Information on duration of post-partum amenorrhea or post-partum abstinence or both is used to estimate the index of post-partum infecundability (C_i).

The changes in different indices of proximate determinants are presented in Table-3.6. The results indicate that the Bongaarts model moderately fits because, the estimated TF for 2006 and 2011 from the model fall below the minimum value proposed in the model. A low estimated TF in the model is subject to a prolonged absence of husbands from home (Bongaarts and Potter 1983; Visaria 1999). In an earlier study, the TF for the period

1995-1999 in Nepal was estimated to be 12 (Rutstein 2002). In another study, TF for India as a whole has been estimated to be 11.8 and possible explanations given for such a low value are possible effects of separation of spouses on account of men's migration for work leading to reduced risk of pregnancy, lower nutrition, higher secondary sterility and cultural and religious practices leading to lowering of coital frequency (Visaria 1999**)**. In case of Nepal too, it may be due to increased proportions of currently married women whose husbands are out of home and their real exposure to pregnancy reduced. Similar other reasons as in India cannot be ruled out. A revised model comprising separate coefficients accounting for duration of husband's absence is also used in some studies. In an endeavour to capture the effect of husband's absence and incorporate in Bongaarts' model, Blank (2004) has suggested an alternative algorithm that could only gauze the lower and upper limits of the effect. In fact, the author agrees that, a detail co-residence history is needed for a precise calculation of the role of husband's absence in fertility inhibition, which is not there in available survey data. Therefore, the method suggested by the author has not been implemented here. However, analyzing changes in these coefficients using original Bongaarts' model gives some insights in the changing role of proximate determinants in fertility decline.

Table-3.6 Proximate determinants of fertility, coefficients from Bongaarts' model, Nepal, 2001-2011

Rates/Proximate determinants	Coefficients for			Percent change in coefficients during		
	2001	2006	2011	2001-2006	2006-2011	2001-2011
TFR	4.2	3.1	2.6	-26.2	-16.1	-38.1
C_m	0.750	0.674	0.650	-10.1	-3.5	-13.3
C_c	0.631	0.550	0.538	-12.9	-2.1	-14.7
C_a	0.996	0.985	0.950	-1.1	-3.5	-4.6
C_i	0.669	0.690	0.749	3.1	8.6	12.0
TF	13.3	12.3	10.4	-7.5	-15.2	-21.6

Source: Computed by researcher form MoHP et al. 2012, MoHP et al. 2007 and MoH et al. 2002

Assuming C_a to be one, the other coefficients estimated for Nepal were 0.82, 0.74 and 0.64 for C_m, C_c and C_i respectively for the period 1995-1999 (Rutstein 2002). Table 3.6 shows that the index of marriage declined from 0.75 in 2001 to 0.65 in 2011. These coefficients are relatively higher in magnitude, mainly due to relative universality of marriage consummated at lower ages. The decline in C_m coefficient indicates that fertility inhibiting effects of index of marriage is increased during the period. There is a decline in the index of non-contraception from 0.63 in 2001 to 0.54 in 2011. This supports the

increased role of contraceptive use in shaping fertility. The indices of induced abortion are very close to unity on one hand and there is only a marginal decline in the coefficient over time on the other. This shows that abortion has a nominal role in deciding fertility but its role is gradually gaining importance. At the same time, it should be noted that, the cases of induced abortion on surveys could be underreported due to sensitivity of the event in society. Interestingly, there is increment in the index of post-partum infecundability over time. This is causing a reduction in fertility inhibiting effect of this determinant to some extent, and this has mainly occurred due to reduction in average duration of post-partum abstinence or breastfeeding. This may be an effect of modernization.

3.2.4 Changes in completed and cumulative fertility

This section examines the changes occurred in completed and cumulative fertility from 2001 to 2011 by various background characteristics. Apart from residence, ecological region, development region, wealth quintile, and women's education, changes in fertility are examined on the basis of age at first marriage, exposure to media, women's work status and religion. Mean CEB of ever married women aged 40-49 is considered as an indicator of completed fertility and mean CEB of currently married women is taken as a measure of cumulative (lifetime) fertility.

Table-3.6 gives the mean CEB of ever married women aged 40-49 in NDHS 2001, 2006 and 2011. Mean CEB of ever married women aged 40-49 is quite higher than corresponding TFR, because of faster fertility decline in the recent past than in the distant past. Actually, mean CEB here is the fertility experience of past 25-35 years whereas the TFR refers to the three-year period before the survey. A substantial fertility decline in the recent past is further supported by analysis of completed fertility. Mean CEB for ever married women aged 40-49 declined by 21percent from 5.47 to 4.31 from 2001 to 2011. This decline of about 1.2 children per woman corresponds to the cohorts with age difference of 10 years. The decline is more pronounced in the period 2006 to 2011 than in the period 2001 to 2006. This phenomenon is different from TFR decline where an unprecedented decline of one child per women has been documented for inter-survey period from 2001 to 2006 followed by a decline of 0.5 children per woman in the period from 2006 to 2011. When the older cohort of women with higher fertility exits from the study cohort, the decline in mean CEB is more pronounced.

Table-3.7: Mean CEB of ever married women aged 40-49 by background characteristics, NDHS-2001, 2006 and 2011

Background characteristics	Number of women			Mean CEB			Percent Change in mean CEB		
	NDHS - 2001	NDHS - 2006	NDHS - 2011	NDHS - 2001	NDHS - 2006	NDHS - 2011	2001-2006	2006-2011	2001-2011
Residence									
Urban	195	283	296	4.52	3.84	3.36	-15.1	-12.5	-25.7
Rural	1672	1724	1907	5.58	5.14	4.45	-7.9	-13.5	-20.3
Ecological region									
Mountain	141	141	154	6.12	5.51	4.95	-10.1	-10.1	-19.1
Hill	762	843	930	5.51	4.73	4.31	-14.1	-8.9	-21.7
Tarai	964	1023	1119	5.35	5.07	4.21	-5.2	-16.9	-21.3
Development region									
Eastern	495	444	523	5.00	4.83	4.10	-3.5	-14.9	-17.9
Central	595	732	765	5.42	4.81	4.22	-11.2	-12.2	-22.1
Western	382	371	496	5.37	4.58	4.07	-14.7	-11.1	-24.1
Mid-Western	239	203	214	6.41	5.67	5.04	-11.5	-11.1	-21.4
Far-Western	155	257	204	6.00	5.60	4.94	-6.6	-11.8	-17.6
Education									
None	1639	1756	1650	5.65	5.15	4.61	-8.8	-10.5	-18.4
Primary	162	142	292	4.52	3.99	4.04	-11.6	1.1	-10.6
> primary	66	109	261	3.52	3.15	2.70	-10.4	-14.3	-23.2
Work status of women									
Not working	192	217	332	4.85	4.15	3.92	-14.3	-5.6	-19.1
Agriculture	1537	1593	1529	5.64	5.14	4.59	-8.8	-10.8	-18.7
Non-agriculture	138	197	342	4.48	4.36	3.42	-2.6	-21.4	-23.5
Household wealth quintile									
Poorest	447	384	372	5.98	5.80	5.62	-3.0	-3.0	-5.9
Poorer	325	419	417	5.63	5.38	4.83	-4.4	-10.1	-14.1
Middle	332	442	466	5.92	5.00	4.34	-15.5	-13.2	-26.6
Richer	363	396	483	5.42	4.58	3.97	-15.5	-13.2	-26.7
Richest	400	366	465	4.46	3.96	3.08	-11.1	-22.2	-30.9
Exposure to media									
Low	994	836	932	5.90	5.54	4.90	-6.0	-11.6	-16.9
High	873	1172	1271	4.99	4.54	3.87	-8.9	-14.8	-22.4
Religion									
Hindu	1578	1696	1884	5.33	4.89	4.27	-8.2	-12.7	-19.8
Non-Hindu	288	337	318	6.27	5.31	4.51	-15.3	-15.0	-28.0
Age at marriage									
Less than 15	511	445	473	5.69	5.36	4.84	-5.8	-9.7	-15.0
15-16	631	705	593	5.75	5.23	4.66	-8.9	-10.9	-18.9
17-18	369	411	484	5.38	4.92	4.37	-8.5	-11.1	-18.7
19-20	187	240	298	5.28	4.44	4.03	-15.8	-9.2	-23.6
21 and more	169	206	355	4.20	3.84	3.14	-8.4	-18.3	-25.2
Total	**1867**	**2007**	**2203**	**5.47**	**4.96**	**4.31**	**-9.4**	**-13.2**	**-21.3**

Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

The mean completed family size is consistently lower in urban areas than in rural areas. However, substantial decline has occurred in both the areas over the study period. Mean CEB in urban area declined by 26 percent from 4.52 to 3.36 and that in rural area declined by 20 percent from 5.58 to 4.45 in the period 2001-2011. Higher education for women is associated with lower completed fertility and higher percentage decline over the study period. Decline in mean CEB for uneducated women is 18 percent whereas the same for women with at least primary education is 23 percent.

As expected, higher the age at marriage, lower is the average completed family size. Moreover, decline in average family size is the highest (25 percent) for those women who got married at older age (beyond 21 years) and the lowest (15 percent) if they got married before age 15. Similarly, women with lower exposure to media have higher family size on average than those with higher media exposure; and the latter group experienced more decline in family size than the former.

Mean CEB in the Hill and *Tarai* regions is almost the same but it is relatively higher in the Mountain region. The extent of decline is a bit more (21 percent each) in the Hill and *Tarai* regions than in the Mountain region (19 percent). A decline in mean CEB is observed in all the three regions. Similar is the case for all the development regions. Mean CEB is higher in the Mid-Western and Far-Western regions as compared to the other three regions; but the decline is the highest in the Western region (24 percent). The least extent of decline is observed in the Eastern and Far-Western regions (17 percent each).

Lower average completed family size is associated with higher economic status of family. In 2011, completed fertility of women belonging to the poorest household wealth quintile is 5.6 whereas the same for women from the richest wealth quintile is only 3.1. In the period 2001 to 2011, the percent decline in completed fertility increases for women from the poorest strata to the richest strata from six percent to 31 percent. The highest percent decline is observed for the women from the richest wealth quintile category. Women working in agricultural sector have higher completed fertility with relatively less percentage decline than women who are either not working or working in non-agricultural sector. Hindu women show lower mean CEB than Non-Hindu counterparts and they also have less percentage decline in mean CEB.

Mean CEB for currently married women age 15-49 who are married only once is presented in Table-3.7 for different categories of selected background characteristics. This enables further analysis of the dynamics of fertility decline in the recent past for different subpopulations. A lower mean CEB in urban area with higher extent of percentage decline than in rural area has been found. Similarly, declining CEB in all the religious groups with higher mean CEB and a greater percentage decline among Non-Hindus as compared to Hindu women is observed. The highest life time fertility is among women working in the agricultural sector; the lowest is among those working in the non-agricultural sector and the same group witnessed the greatest extent of decline.

Some regional variation is also noticed for different ecological regions and development regions. The Mountain region has the highest life time fertility and *Tarai* region has the lowest one with the greatest extent of decline from 2001 to 2011. Similarly, mean CEB is the least in the Eastern development region with the greatest percentage decline and the highest in the Far-Western region with the least percentage decline from 2001 to 2011.

As expected, older age and longer marital duration are associated with increase in mean CEB, but it is declining for all ages and marital durations as time elapses, with more percentage decline in higher ages and longer marital durations. Similarly, women married at older age have fewer children on average than their counterparts and the highest percentage (25 percent) decline in life time fertility is observed among women who married beyond age 18 years. Women's experience of child loss (loss of any child) means more average CEB as compared to those whose all children remained alive. The difference is almost of two children per woman. However, more percentage decline in mean CEB occurred among women with child loss experience.

Better the economic condition of household, less is the average CEB a woman has. Women from the poorest household wealth quintile have about 1.5 times more children on average than those from the richest household wealth quintile. Also, a minimum of percentage decline (five percent) in mean CEB is observed among women from the poorest wealth quintile and a maximum of the decline (28 percent) is among women from the richest wealth quintile. Women's exposure to mass media also influences fertility; those who are less exposed to such media have mean CEB almost 1.5 times more than those who are more exposed. But the percentage decline in mean CEB is greater for highly exposed women.

Table-3.8: Mean CEB among currently married women age 15-49 who are married only once by selected background characteristics, NDHS-2001, 2006 and 2011

Background characteristics	Mean CEB			Percent Change in mean CEB		
	NDHS-2001	NDHS-2006	NDHS-2011	2001-06	2006-11	2001-11
Residence						
Urban	2.89	2.43	2.20	-15.7	-9.7	-23.8
Rural	3.29	3.08	2.70	-6.1	-12.4	-17.7
Ecological Region						
Mountain	3.61	3.25	3.01	-10.0	-7.4	-16.7
Hill	3.14	2.83	2.63	-10.0	-6.9	-16.2
Tarai	3.28	3.08	2.60	-6.3	-15.6	-20.9
Development Region						
Eastern	3.16	2.91	2.44	-7.9	-16.1	-22.7
Central	3.26	2.97	2.71	-8.9	-9.0	-17.1
Western	3.08	2.85	2.52	-7.5	-11.7	-18.3
Mid-Western	3.43	3.20	2.78	-6.6	-13.1	-18.8
Far-Western	3.53	3.15	2.97	-10.6	-5.7	-15.7
Education						
None	3.77	3.69	3.54	-2.2	-4.0	-6.1
Primary	2.39	2.25	2.38	-5.7	5.5	-0.5
>Primary	1.80	1.64	1.55	-8.8	-5.5	-13.9
Work status of women						
Not working	2.39	2.20	2.14	-7.9	-2.9	-10.6
Agriculture	3.49	3.25	2.99	-6.7	-8.1	-14.2
Non-agriculture	2.76	2.49	2.15	-9.8	-13.5	-22.0
Household Wealth Index						
Poorest	3.59	3.50	3.42	-2.5	-2.1	-4.6
Poorer	3.39	3.28	2.88	-3.1	-12.2	-15.0
Middle	3.35	3.04	2.63	-9.3	-13.5	-21.5
Richer	3.10	2.88	2.43	-7.3	-15.5	-21.7
Richest	2.81	2.35	2.04	-16.6	-13.0	-27.5
Exposure to media						
Low	3.61	3.65	3.23	1.1	-11.6	-10.6
High	2.89	2.66	2.30	-8.1	-13.3	-20.3
Religion						
Hindu	3.17	2.98	2.61	-6.1	-12.2	-17.5
Non-Hindu	3.71	3.04	2.76	-17.8	-9.3	-25.5
Age						
15-24	1.19	1.15	1.05	-3.2	-8.5	-11.4
25-34	3.31	2.85	2.51	-13.8	-11.9	-24.0
35+	5.25	4.73	4.00	-10.0	-15.3	-23.8
Age at first marriage						
Up to 14	3.90	3.78	3.49	-3.1	-7.5	-10.4
15-16	3.38	3.22	2.94	-4.5	-8.9	-13.0
17-18	2.96	2.78	2.53	-5.9	-9.1	-14.4
19 and above	2.68	2.30	2.00	-14.1	-13.1	-25.4
Marital duration						
0-4	.65	.69	.66	5.6	-3.8	1.6
5-9	2.18	2.04	1.89	-6.4	-7.3	-13.3
10-14	3.40	3.01	2.65	-11.6	-11.8	-22.0
15+	5.06	4.61	3.97	-9.1	-13.8	-21.6
Any child loss						
No	2.39	2.30	2.20	-3.9	-4.2	-7.9
Yes	5.36	5.18	4.67	-3.3	-9.8	-12.8
Total	**3.25**	**2.99**	**2.64**	**-8.0**	**-11.7**	**-18.8**

Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

Higher the women's education lower is the mean CEB and higher is the percentage decline over the three survey periods. It is interesting to note that mean CEB remained almost the same for women who have up to primary level of education. Mean CEB of uneducated women is more than double that of women with more than primary level of education. Note that the mean CEB obviously depends on age of women, marital duration and the observed differentials by socioeconomic factors could, in part, be due to these. This has to be factored in. Hence, multivariate analysis has been carried out.

3.3 Determinants of Fertility

Fertility is a complex phenomenon determined by a complex set of socioeconomic, demographic and cultural factors. Results described in previous sections reveal decline in fertility in all strata of populations and differentials in fertility existing for various socioeconomic and demographic factors. To further ascertain the net influence of these factors on fertility, a multivariate analysis is desirable. Therefore, this section attempts to analyse determinants of fertility for the three surveys based on a multiple regression model. The outcome variable is occurrence of child birth; measured as the number of CEB of a currently married woman age 15-49 who is married only once. Poisson Regression is preferred for analysis because the dependent variable is a count variable. Among the variables used in bivariate analysis, two variables current age and child loss experience are not taken in multivariate analysis. Since current age and marital duration were highly correlated, only marital duration has been taken. Similarly, inclusion of child loss experience as explanatory variable would have some possible reverse causation since having more births raises the risk of child loss. Therefore, it has been excluded from multivariate analysis. The Poisson regression results are given in Table-3.8. Outputs are expressed in terms of Exp(β) which are ratios of means and similar to odds ratios in Logistic Regression.

After controlling for other factors, urban-rural residence has no effect on CEB, indicating absence of pure urban-rural difference in mean CEB in Nepal. The apparent differences are due to interplay of other socioeconomic and cultural factors; not a pure urban-rural difference. Slightly lower mean CEB in the Hills as compared to the Mountains that was observed in earlier surveys disappeared in the most recent survey. But, the Mid-Western and Far-Western region have consistently higher mean CEB over the time as compared to that from the Eastern region.

Table-3.9: Results of Poisson Regression on CEB of currently married women aged 15-49 who are married only once by selected background characteristics, NDHS-2001, 2001 and 2011

Background characteristics	Exp(β) with significance level		
	NDHS-2001	NDHS-2006	NDHS-2011
Residence			
Urban (Ref.)			
Rural	0.97	1.00	1.03
Ecological Region			
Mountain (Ref.)			
Hill	0.95**	0.94**	1.00
Tarai	0.97	1.00	1.00
Development region			
Eastern (Ref.)			
Central	0.98	0.99	1.02
Western	1.00	1.01	0.98
Mid-Western	1.07*	1.05*	1.06**
Far-Western	1.06*	1.02	1.05**
Education			
No education (Ref.)			
Primary	0.89***	0.91***	0.94**
>Primary	0.83***	0.83***	0.84***
Work status of Women			
Not working (Ref.)			
Agriculture	1.08**	1.05*	0.95**
Non-Agriculture	1.06*	1.05	0.97
Household wealth Index			
Poorest (Ref.)			
Poorer	0.98	0.90***	0.86***
Middle	0.98	0.84***	0.79***
Richer	0.95**	0.82***	0.75***
Richest	0.89**	0.76***	0.69***
Media Exposure			
Low (Ref.)			
High	0.92***	0.94***	0.95***
Religion			
Hindu (Ref.)			
Non-Hindu	1.17***	1.05*	1.04*
Age at Marriage			
Less than 15 years (Ref.)			
15-16 years	1.07***	1.03	1.03
17-18 years	1.08***	1.05*	1.04
19 years and more	1.11***	1.04	1.00
Marital Duration	1.06***	1.05***	1.05***
Number of cases	7764	7773	8972

Note: *, ** and *** denote that the ratios are significant at 5%, 1% and 0.1% level of significance respectively
Source: Calculated by researcher from NDHS data 2001, 2006 and 2011

Women's exposure to mass media has small but significant net effect on cumulative fertility throughout the study period. With reference to the mean CEB of women less

exposed to mass media, it is 0.95 times for more exposed women. Women's education is a significant predictor of cumulative fertility after controlling for the other study variables. A negative association of women's education with mean CEB is found throughout the three surveys. In 2011, the mean CEB of women with some primary education and more than primary education are 0.95 and 0.85 times respectively of the reference category of uneducated women. Religion has weak influence on fertility. As compared to Hindu women, mean CEB for Non-Hindu women was 1.17 times higher in 2001 but it is almost same in 2011. Relevance of religion to influence fertility seems to be waning over time.

It is interesting to note that the household economic condition gained significance over time and remained one of the most significant predictors of mean CEB in 2006 and 2011. As compared to women from the lowest wealth quintile, women from the two topmost wealth quintiles only had significantly lower cumulative fertility in 2001, but in 2006 and 2011, increasing wealth quintile is significantly associated with declining mean CEB of women. For example, in 2011, mean CEB of women from the richest wealth quintile is 0.69 times that of women from the poorest wealth quintile. Women's working status has only a little effect on cumulative fertility.

Increasing age at marriage had some positive net effect on fertility in 2001, but now the coefficients gradually lost significance, indicating that the effect of this variable is vanished. Marital duration showed a significant positive effect on mean CEB as generally expected. The positive effect of increasing age at marriage on child birth may appear anomalous. However, the observed effect of age at marriage in this model is not that due to its impact on marital duration, as is commonly seen, but 'net' of marital duration.

3.4 Decomposition of Fertility Decline

Change in fertility stems from two components: changes that have occurred in age-specific proportions of currently married women and the changes occurred in age-specific marital fertility rates. Previous sections evidenced a substantial decline in fertility in Nepal in the recent past. This decline is now decomposed into two components and percentage contribution of each component is calculated. This will further illustrate the share of each component in overall fertility decline.

The change in TFR from the period of NDHS-2001 to 2006, 2006 to 2011 and 2001 to 2011 has been decomposed into two components: due to change in age-specific

proportion currently married and due to change in age-specific marital fertility rates. Of the total decline of one child per woman during survey period 2001 to 2006, one fifth of the decline comes from changes in age-specific proportions of currently married women and remaining four fifths of the decline is due to age-specific marital fertility decline (Table-3.10a). The effect of nuptiality component is most pronounced in the age group 15-19. This is because of low age at marriage for females in Nepal with a gradual increase in it. However, some negative effect of nuptiality component in age 20-29 is also observed. An increment in marital fertility rate in age 15-19 is found, which may be due to increasing age at marriage; those who marry in age group 15-19 get married at relatively higher ages, close to 19 in the recent periods than that at lower ages of the same age group, with the result that the married women in the age group 15-19 are older than in the past, thus pushing marital fertility upward in this age group.

Table-3.10a: Decomposition of fertility changes into nuptiality change and marital fertility change, 2001-2006

	Prop CMW		ASFR		ASMFR				
Age	2001	2006	2001	2006	2001	2006	Nuptiality change	Marital fertility change	Total change
15-19	0.443	0.337	0.117	0.099	0.265	0.294	-0.147	0.056	-0.091
20-24	0.849	0.815	0.251	0.235	0.296	0.288	-0.050	-0.031	-0.082
25-29	0.948	0.933	0.206	0.145	0.218	0.155	-0.014	-0.294	-0.308
30-34	0.924	0.941	0.137	0.084	0.149	0.090	0.010	-0.274	-0.264
35-39	0.912	0.927	0.081	0.048	0.089	0.052	0.005	-0.171	-0.165
40-44	0.910	0.905	0.035	0.016	0.038	0.018	-0.001	-0.094	-0.094
45-49	0.851	0.860	0.007	0.002	0.009	0.003	0.000	-0.026	-0.026
		Total	**4.17**	**3.14**	**5.31**	**4.49**			
				Amount of change			**-0.197**	**-0.834**	**-1.031**
				Percent change			**19**	**81**	

Source: Calculated by researcher from NDHS data 2001 and 2006

As compared to the inter-survey period 2001-2006, TFR decline in the inter-survey period 2006-2011 is half; a reduction of 0.5 in TFR. The percentage contribution in the total decline in TFR in this period is almost similar to that of previous period. Some 22 percent decline in TFR is due to changes in age-specific proportions currently married and remaining 78 percent of decline is due to decline in age-specific marital fertility (Table-3.10b). Unlike in the previous period, there is no increase in the marital fertility in the age 15-19.

Table-3.10b: Decomposition of fertility changes into nuptiality change and marital fertility change, 2006-2011

Age	Prop CMW		ASFR		ASMFR		Nuptiality change	Marital fertility change	Total change
	2006	2011	2006	2011	2006	2011			
15-19	0.337	0.292	0.099	0.079	0.294	0.272	-0.065	-0.035	-0.099
20-24	0.815	0.770	0.235	0.185	0.288	0.240	-0.058	-0.190	-0.248
25-29	0.933	0.920	0.145	0.125	0.155	0.136	-0.010	-0.091	-0.101
30-34	0.941	0.949	0.084	0.071	0.090	0.074	0.003	-0.073	-0.070
35-39	0.927	0.940	0.048	0.037	0.052	0.039	0.003	-0.059	-0.056
40-44	0.905	0.914	0.016	0.013	0.018	0.015	0.001	-0.013	-0.013
45-49	0.860	0.883	0.002	0.005	0.003	0.006	0.000	0.013	0.013
		Total	**3.14**	**2.57**	**4.49**	**3.90**			
				Amount of change			**-0.125**	**-0.448**	**-0.573**
				Percent change			**22**	**78**	

Source: Calculated by researcher from NDHS data 2006 and 2011

Table 3.9c depicts the decomposition in change in TFR from 2001 to 2011 survey. A total fall in TFR of 1.6 children per women in the study period has been decomposed. Decline of three children per 10 women is attributable to the change in proportions currently married during the study period and remaining decline of 13 children per 10 women is due to change in age-specific marital fertility rate. Therefore, 19 percent of TFR decline during the study period is attributable to the change in nuptiality. Decline in age-specific proportions currently married in young ages is the evidence of some increase in age at marriage which caused a clear negative change due to nuptiality component of fertility. Since women ultimately marry, the proportion married at older age groups are little bit increased causing a feeble positive fertility change due to nuptiality component. Increasing age at marriage causes fertility to suppress by reducing the effective time for reproduction in Nepalese setting where, all fertility is within wedlock.

The remaining 81 percent change in TFR stems from marital fertility decline, where many background variables play a role materialized through deliberate fertility control within marriage. The increment by small amount in marital fertility rate in age 15-19 is retained for the period 2001-2011, for which the explanation is given in previous paragraphs. In all other reproductive age group, there is decline in marital fertility rate; the maximum decline being in age group 25-29 and 30-34. This may be attributed to increased use of spacing and limiting methods of birth control in those age groups.

Table-3.10c: Decomposition of fertility changes into nuptiality change and marital fertility change, 2001-2011

	Proportion of CMW		ASFR		ASMFR		Nuptiality change	Marital fertility change	Total change
Age	2001	2011	2001	2011	2001	2011			
15-19	0.443	0.292	0.117	0.079	0.265	0.272	-0.203	0.012	-0.191
20-24	0.849	0.770	0.251	0.185	0.296	0.240	-0.106	-0.224	-0.330
25-29	0.948	0.920	0.206	0.125	0.218	0.136	-0.025	-0.384	-0.409
30-34	0.924	0.949	0.137	0.071	0.149	0.074	0.014	-0.348	-0.334
35-39	0.912	0.940	0.081	0.037	0.089	0.039	0.009	-0.230	-0.221
40-44	0.910	0.914	0.035	0.013	0.038	0.015	0.001	-0.108	-0.107
45-49	0.851	0.883	0.007	0.005	0.009	0.006	0.001	-0.014	-0.013
		Total	**4.17**	**2.57**	**5.31**	**3.90**			
				Amount of change			**-0.309**	**-1.295**	**-1.604**
				Percent change			**19**	**81**	

Source: Calculated by researcher from NDHS data 2001and 2011

It is clear that fertility decline is largely due to deliberate fertility control within marriage. However, changes that have occurred in the population distribution of various socioeconomic, demographic and spatial characteristics have influence on the fertility decline. For example, if urban fertility is lower than rural fertility due to purely the rural-urban nature of the place of residence, simply increase in proportions of urban population causes fertility decline. But, at the same time, fertility decline may occur due to changes in other factors too which are associated with urbanization. To throw some light on this aspect of fertility decline an attempt has been made to decompose the change in current marital fertility and ascertain role of different socioeconomic factors on this process.

Regression based decomposition on number of children born to currently married women in the last five years preceding the survey is performed for pooled survey data of 2001 and 2011 (See Chapter-II, Section 2.3.4 for detail of the methodology). To reduce the complexities in analysis and interpretation, currently married women who are married only once from both surveys are considered so that they are in regular exposure, without break, to childbearing since their entry into union.

Summary of the regression results are presented in Table-3.10 (Detailed results are given in Appendix Table-4). Regression based decomposition analysis of current marital fertility change during 2001-2011 shows that in the study period, there is decline of 0.27 in the mean number of children in the last five years preceding the survey born to those currently married women who are married only once. Out of this total inter-survey decline, only one third could be explained by a set of selected socioeconomic and

demographic factors. Among selected study variables, changes in the composition of sample distribution for urban-rural residence, exposure to media, time elapsed since first cohabitation and status of whether sterilized at the start of five years period before survey produced significant negative effect of varying extent. Also, change in educational distribution and distribution by household wealth index are found to have significant but a nominal positive impact on fertility.

Table-3.11: Results of regression-based decomposition of the change in marital fertility between 2001 and 2011

Component due to change between two surveys in composition by	Size of component	
	Gross change	**Net change**
Place of Residence	-0.031	-0.031***
Ecological Region	0.005	0.005***
Development Region	0.004	0.003***
Education	-0.011	0.005***
Media Exposure	-0.037	-0.011***
Household Wealth Index	0.001	0.022***
Age at First Cohabitation	-0.002	0.002***
Time Elapsed Since First Cohabitation	0.000	-0.083***
Number of Living children at Start of 5-Year Period	0.020	0.008***
Whether Sterilized at Start of Five Year Period	-0.019	-0.007***
Whether Any Pregnancy terminated During Last Five Years	0.005	0.000***
Unexplained component		**-0.182**
Total Change in Fertility Between Two Surveys		**-0.269*** **

*** indicates that regression coefficients are significant at 0.1% level of significance

Source: Calculated by the researcher from NDHS data 2001and 2011

The remaining two thirds of the decline in current marital fertility could not be explained by the regression based decomposition model. This indicates a general type of decline in fertility over time, which could not be directly captured by these measurable factors. In a similar study done by Retherford and Thapa (2004) based on data of NFHS-1996 and NDHS-2001, it was found that almost half of the decline in marital fertility stemmed from changes in population composition by ecological region, development region, urban-rural residence, education, age at first cohabitation with husband, time elapsed since the first cohabitation, number of living children at the start of the five year period and media exposure. Remaining portion of decline remained unexplained. When results of these two studies are compared, it appears that the explanatory power of similar set of socioeconomic and demographic variables has declined over time to explain the changes

in current marital fertility between two surveys. This may be an indication of the fact that the role of socioeconomic and demographic factors to explain fertility change has declined over time. Role of diffusion in fertility change might have increased and hence the explanatory power of other socioeconomic factors has declined to explain the fertility decline.

3.5 Summary

Fertility transition took off in Nepal in the early 1980s with a slow pace which speeded a bit in the 1990s and further accelerated in the period 1998-2000 to 2003-2005. The pace of decline has been receding thereafter and at present, fertility level has reached around two and half children per woman in her life time. Fertility declined in all sections of population to varying extents and the differentials still exist for different socioeconomic and spatial characteristics. Differentials by place of residence, economic condition of household and women's education are remarkably observed. However, place of residence and regional factors like ecological and development region are no more significant to explain variation in fertility after controlling for other factors. Women's exposure to media, their education, experience of child loss and household wealth status significantly explain the variation in child birth at individual level. Some changes in age pattern of fertility in various subpopulations have been observed. Differentials also exist in fertility pattern by socioeconomic and other background characteristics. However, in general, age pattern of fertility in Nepal is characterized by an early start with relatively higher level, early peak (in age 20-24), slower decline after peak and continuation to late ages.

Change in the age pattern of marriage has substantial role in fertility decline and contributes almost one fifth of the total decline in current fertility. Four fifths of the decline in current fertility is due to marital fertility decline; undergone though collective influences of a complex set of factors including diffusion. Regression based decomposition of change in current marital fertility, though not promising, could explain one third of total decline in current marital fertility. Inability to adequately explain fertility decline using socioeconomic framework is itself an indication of role of diffusion on fertility change. Perceived costs and benefits of children and aspirations for children might have changed lowering the demand for children due to quantity-quality trade-off. But a promising point is that substantial fertility decline became possible in Nepal in spite of its low income setting.

Chapter-IV

Dynamics of Family Building Process in Nepal

The previous chapter described fertility decline in terms of current and cumulative fertility and also discussed changes in the age pattern of fertility schedule. However, more in-depth analysis of the process of fertility transition is desirable in terms of changes that have occurred in timing of start of childbearing and its pace during reproductive life course of women. The family building process includes a series of steps starting from union formation, to the first birth and then to successive higher order births until childbearing stops. It also includes deliberate intermediate actions used for fertility control. Analysis of the family building process gives clear picture of fertility transition at micro level. In the Nepalese society, fertility generally occurs only within marriage. Therefore, age at which a woman gets married has much influence in fertility. The changes occurring in age at marriage have a bearing on fertility transition as it is one of the principal proximate determinants of fertility (Bongaarts 1978). Older the age at marriage and longer the interval between entry into marriage and parenthood, the smaller the number of children would be (Marini 1981). Similarly women's progression to first and successive higher order births gives a good idea about family building process describing how far women progress to higher order births. The timing of birth and the spacing between successive births is another important aspect to understand the tempo of fertility. In this background, this chapter focuses on analysis of changes that occurred in age at marriage including determinants and risk factors of it; transition that occurred in age at first birth and progression to higher order births and also the dynamics of change in birth intervals including the determinants of risks of birth. The next component of family building that is dynamics of deliberate birth control within marriage will be discussed in the next chapter. The analysis is mainly based on data of NDHS 2001, 2006 and 2011.

4.1 Trends and Determinants of Age at Marriage

This section describes trends in age at marriage measured in terms of Singulate Mean Age at Marriage (SMAM) and proportion of ever married women. Since the analysis is associated with fertility, focus has been given in female age at marriage. Next, some socioeconomic determinants of female age at marriage and the risk factors of marriage have been discussed.

Singulate Mean Age at Marriage (SMAM) is a measure which indicates how many years a person remains single on average and is a powerful indicator of nuptiality dynamics. Table-4.1 presents the SMAM trends in Nepal. The figures show increase in SMAM both for males and females. A steady increase in SMAM in the past five decades has been observed. Male SMAM is historically greater than that of females but the age difference has slightly declined over time. At present, SMAM for females is around 20 years and that of males is more than 23 years.

Table-4.1: Trends in Singulate Mean Age at Marriage (SMAM) in Nepal

Year	Male (Years)	Female (Years)	Source
1961	19.5	15.4	CBS (2003)
1971	20.8	16.8	CBS (2003)
1981	20.7	17.2	CBS (2003)
1991	21.4	18.1	CBS (2003)
2001	22.9	19.5	CBS (2003)
2001	22.1	18.5	@
2006	22.4	19.2	@
2011	23.2	20.1	@
2011	23.8	20.6	CBS (2014a)

@ Calculated by the researcher from NDHS data 2001, 2006 and 2011

Proportion of ever-married women in reproductive age groups and cumulative proportions of ever married women by certain age are two other indicators useful to analyse dynamics of changes in age at marriage. Table-4.2 shows the proportion of ever married women for reproductive age groups for the three surveys NDHS 2001, 2006 and 2011.

Table-4.2: Proportion of ever married women, NDHS-2001, 2006 and 2011

	2001		2006		2011	
Age	Number of all women	Proportion of Ever Married Women	Number of all women	Proportion of Ever Married Women	Number of all women	Proportion of Ever Married Women
15-19	2099	0.436	2229	0.353	2708	0.294
20-24	1935	0.853	1970	0.831	2289	0.777
25-29	1714	0.961	1784	0.951	2085	0.937
30-34	1490	0.978	1345	0.977	1746	0.973
35-39	1206	0.982	1220	0.985	1560	0.984
40-44	1029	0.993	1122	0.987	1289	0.985
45-49	861	0.988	912	0.987	942	0.991
Total	**10497**	**0.831**	**10745**	**0.804**	**12688**	**0.785**

Source: Calculated by the researcher from NDHS data 2001, 2006 and 2011

In 1976, 63 percent women in age 15-19, 94 percent in age 20-24 and more than 98 percent in next higher reproductive age groups were ever married (HMG 1977). The inference is that female marriage was early and universal in Nepal in the past. The situation has gradually changed. The proportion of ever married women in age 15-19 declined to 44 percent in 2001 and further to 29 percent in 2011. This is clear indication of increasing female age at marriage over time. However, the proportion steadily rises to around 80 percent in age 20-24 in 2011, indicating that most women do get married before reaching the age of 25 years now. Near universality of marriage is supported by the fact that more than 95 percent women are ever married in all reproductive ages beyond 25 years. Permanent celibacy measured in terms of population who remained single in age 45-49 is almost nonexistent in Nepal (CBS 2003).

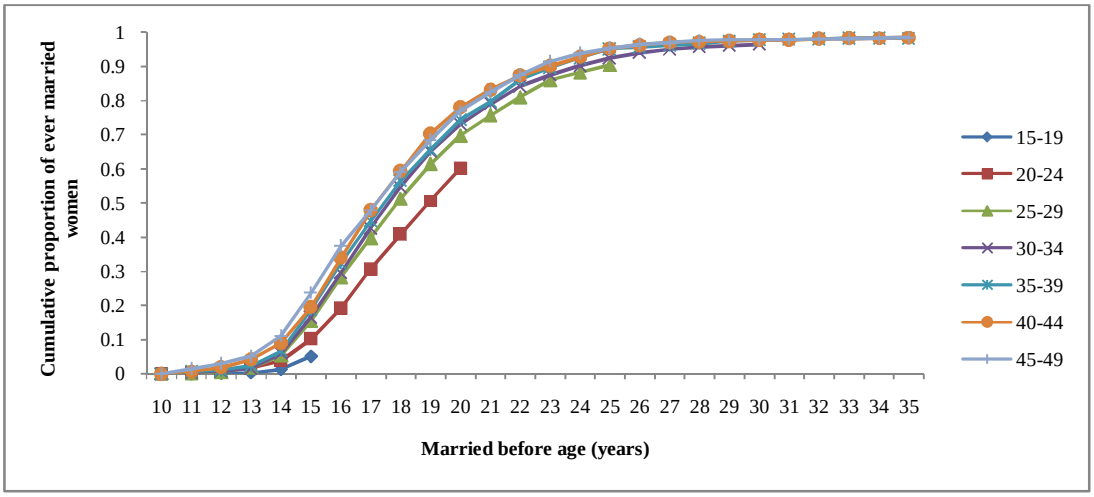
Figure-4.1a, Figure-4.1b and Figure-4.1c show the trends in cumulative proportions of ever married women by exact age according to age at survey in the three successive demographic and health surveys of 2001, 2006 and 2011. The respective figures are shown in Appendix Tables-5a, 5b and 5c. Note that the proportions are based on the data for all women, including not married at the time of survey. Women from these three surveys represent a cohort difference of five years; and women of different reproductive ages from each survey also have age difference of five years. The cohort of age 45-49 in 2011 is equivalent to the cohort aged 40-44 in 2006 and 35-39 in 2001. The respective proportions by any exact age for them are comparable. Similarly, trend in proportions of ever married women can be studied from each figure, reading the cumulative proportions for certain exact age attained in curves of different cohort. Trends computed from all the three survey data show a fair decline in cumulative proportions of ever married women over time.

Figure-4.1a shows that about 60 percent women who were in the age group 45-49 in 2011 had got married before reaching 18 years of age but only about 40 percent of the women aged 20-24 years had got married by the same age. This implies that in the cohort difference of 25 years, there is decline of about 20 percentage points in the proportions marrying before reaching age 18 years. On the other hand, for the cohort aged 45-49 years in surveys of 2011, 2006 and 2001, there were some 60 percent, 70 percent and 70 percent women respectively who had got married by age 18 years (Figure-4.1a, Figure-4.1b and Figure-4.1c). In the cohort difference of 10 years, there is decline in proportion married women by age 18 years from nearly 70 percent to 60 percent. A similar decline is

seen in proportion married by age 20 years. For all cohorts of all the three surveys, more than 90 percent women got married before reaching age 25. Decline in the extent of child marriage is also noticeable. The oldest cohort of the study period is women aged 45-49 in survey 2001 and the youngest one is women aged 15-19 in survey 2011. Between these two cohorts, 28 percent of the oldest cohort were married before reaching 15 years of age whereas, only some five percent of the youngest cohort were married by the same age. The results show a gradually declining trend of proportions ever married by certain exact age over time. Putting it in other way, younger cohorts are getting married later than the older cohorts. In spite of increase in age at marriage and decline in proportions ever married by age, young age pattern of marriage and its universality for women has been retained.

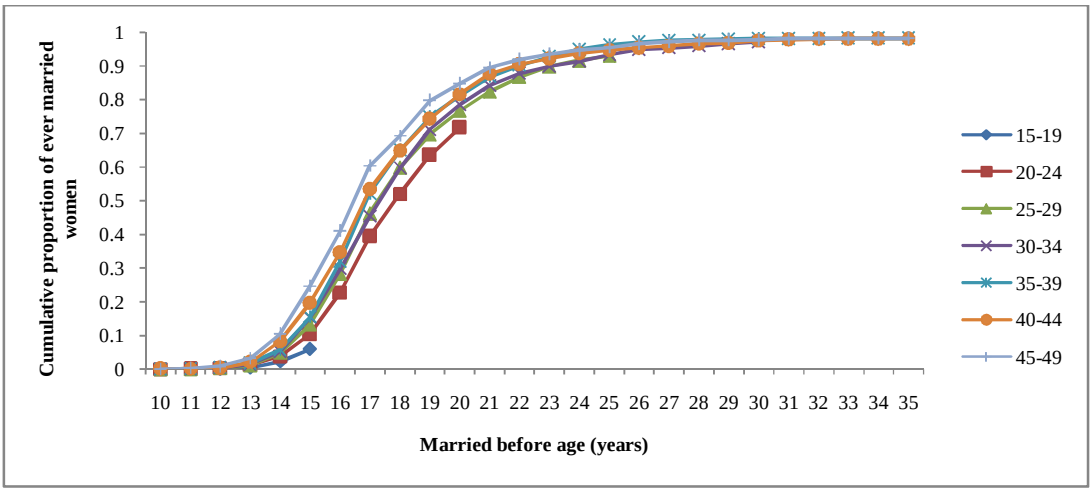
The median age at marriage here refers to group median that is the age by which half of the women of that age group get married. It is not computed for women of aged 15-19 because less than 50 percent women were ever married in this age group. An increase in median age at marriage has been observed in the three survey periods form 16.2 years in 2001 to 17.47 years in 2011 (See Appendix Tables 5a, 5b and 5c). The median age at marriage of the oldest cohort in 2011 (aged 45-49 years) was 16.2 years but the same for the cohort aged 20-24 years was 18.9 years. Those women who were in age 20-24 in survey 2001 had median age at marriage of 17.4 years, whereas the women of same age in 2006 and 2011 had median age of marriage of 17.8 years and 18.9 years. These evidences confirm a gradual increase in age at marriage of women in Nepal.

Figure-4.1a: Cumulative proportion of ever married women before exact age according to age at survey, NDHS-2011



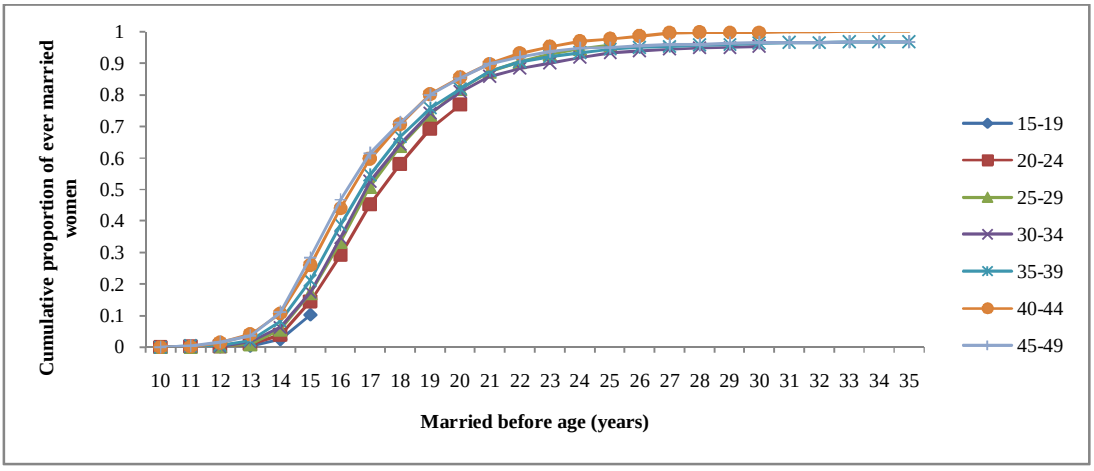
Source: Calculated by the researcher from NDHS data 2011

Figure-4.1b: Cumulative proportion of ever married women before exact age according to age at survey, NDHS-2006



Source: Calculated by the researcher from NDHS data 2006

Figure-4.1c: Cumulative proportion of ever married women before exact age according to age at survey, NDHS-2001



Source: Calculated by the researcher from NDHS data 2001

After having the idea that there is a gradual increase in age at marriage of women in the recent past, it is desirable to analyse the influence of various socioeconomic and spatial factors on age at marriage. This has been performed using multivariate analysis. Multiple linear regression on age at marriage of ever married women aged 25-49 and Cox regression (Proportional hazard models) on risk of marriage of all exposed women have been carried out. Such models on retrospective data are used elsewhere in analyzing marriage timing (e.g. Anderson et al. 1987; the method of Cox regression has been described in Chapter-II, section 2.3.7). In the multiple regression analysis, age at marriage is the dependent variable. As many women in the younger age groups were not married by the date of the survey (and whose age at marriage was obviously not known at the

time) and analysis based on only the married women would have introduced a heavy selection bias, the regression uses observations only on women in the age range 25-49 because, most (at least 90 percent) of the women are married by the age of 25 years and hence the selection bias would be minimal. The Cox regression analysis is based on all women since here the risk of marriage is being studied. Analysis is performed for the most recent survey NDHS-2011. Results are shown in Table-4.3.

Table-4.3: Results of multiple regression analysis on determinants of age at marriage and Cox regression on risk of marriage, NDHS-2011

Background Characteristics		β from Multiple Linear Regression	Exp(β) from Cox Regression
Residence	Urban (Ref.)	--	-
	Rural	0.06	1.07**
Ecological region	Mountain (Ref.)	--	-
	Hill	0.10	0.96
	Tarai	-0.46***	1.10**
Development region	Eastern (Ref.)	--	-
	Central	-1.03***	1.20***
	Western	-1.23***	1.28***
	Mid-Western	-1.20***	1.35***
	Far-Western	-1.62***	1.42***
Education	None (Ref.)	-	-
	Primary	0.38**	0.93**
	>Primary	2.49***	0.45***
Household wealth quintile	Poorest (Ref.)	-	-
	Poorer	-0.08	1.01
	Middle	-0.16	1.04
	Richer	-0.22	1.05
	Richest	-0.37*	0.91*
Year of birth		-0.01**	0.98***
Constant		18.02***	
R-Square		0.15	
-2LL			169852
Number of cases		7603#	12674@

Total number of ever married women aged 25-49 years, @Total number of women, both ever married and never married

Source: Calculated by the researcher from NDHS data 2011

After controlling for other factors, age at marriage of ever married women does not vary significantly by place of residence. With reference to Mountain region, age at marriage in Hills is not significantly different but that in *Tarai* region is significantly lower by 0.46 years. A slightly lower age at marriage in *Tarai* region has a long history. In 1976, among

women of age 30-34, mean age at marriage in Mountain, Hill and *Tarai* were 16, 15 and 14.6 years respectively (HMG 1977). This lower age at marriage in *Tarai* region is mainly due to differences in cultural practices. With reference to women of Eastern region, those of Central region have almost the same age at marriage but as we move towards west, age at marriage shows a significant decline. For example, women of Western and Mid-Western regions marry 1.2 years earlier and those of Far-Western region marry 1.6 years earlier on average with reference to women of Eastern region.

Rise in women's education is significantly associated with increase in age at marriage. But a minimum of primary education seems to have a significant net effect. As compared to uneducated women, age at marriage rises by 2.5 years on average for women with at least primary education. Such educational difference in marriage age was evidenced since distant past. Among women aged 25-29 in 1976, those with no education had mean age at marriage of 15 years and those with some education had it 15.6 years (HMG 1977). In a similar study, Caltabiano and Castiglioni (2008) conclude that diffusion of education is the most important mechanism for increasing age at marriage for both men and women in Nepal. Household economic condition has little to do with women's age at marriage. With reference to women from the poorest household wealth quintile, those from the richest wealth quintile have lower age at marriage by 0.37 years and the difference is significant. Coefficients for other categories of wealth quintile are insignificant. The temporal effect in age at marriage, although significant, is quite small after controlling for other factors.

The last column of Table-4.3 (Hazard ratios based on Cox regression) gives the relative risk of marriage for different categories of background variables. A significant relative risk of greater than unity indicates more relative risk of marriage as compared to reference category which means earlier marriage. Results are similar to that of linear regression on age at marriage. Risk of marriage is significantly higher in rural area than in urban area but the magnitude is very small (relative risk 1.07). This indicates only a nominal difference in risk of marriage between urban and rural areas. Similarly, risk of marriage is significantly higher in the *Tarai* region as compared to the Mountain region. As compared to the Eastern development region, risk of marriage increases significantly for all other development regions, with the highest risk seen in the Far-Western region (relative risk 1.42). The hazard of marriage declines with increase in women's education. As compared to uneducated women, the risk of marriage significantly declines to 0.45

times for women who have more than primary education. Women with primary education have only marginally reduced risk of marriage (relative risk 0.93) with reference to uneducated women. As compared to women from the poorest wealth quintile, risk of marriage significantly declines only for women from the richest wealth quintile (relative risk 0.91). A feeble temporal effect on risk of marriage is observed after controlling for other factors. Women born in the recent years have lower risk of marriage as compared to those born earlier (relative risk 0.98).

4.2 Transitions in Progression to the First and Higher Order Births

This section gives a brief account of transition in age at first birth and then describes the changes over time in progression to the first and higher order births. The transition in age at first birth has been analysed by comparing cumulative percentage distribution curves of women age 35 years and above who had their first birth by certain age over time. Cohort comparisons are also made for cumulative percentage of women who had their first birth by certain age. The Period Parity Progression Ratio (PPPR) has been used to examine transition to higher order births. PPPRs are synthetic period measures that are calculated from cross sectional survey data on birth history of women. These measures are useful to describe recent changes in childbearing pattern and also analyse trends in family building process (See Chapter-II, section 2.3.6 for detail of PPPR).

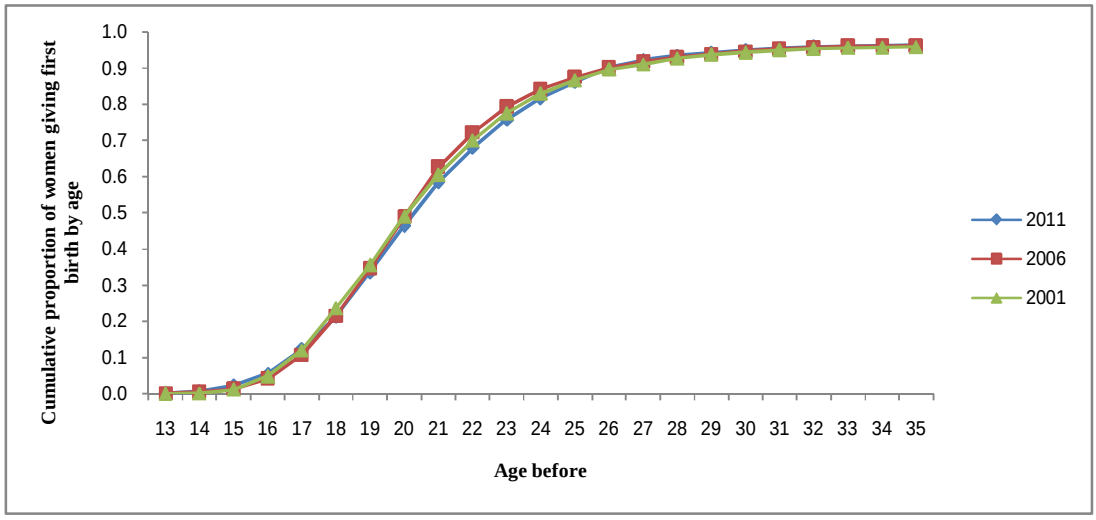
4.2.1 Age at the first birth

Age at the first birth marks the initiation of childbearing and it is also associated with maternal and child health outcomes. As discussed earlier, though fertility has declined by a considerable amount in Nepal, it is still characterized by early start and early peak; and there is not much decline in age at marriage. In this context, a corresponding smaller decline in age at first birth is expected. The median age at first birth and cumulative percentage of women who gave first birth before a certain age, are used to examine transitions in age at first birth.

The median age at first birth is almost constant over the period 1996-2011; more than 85 percent of women of different age cohorts had first birth by age 25 years; and the median age at first birth for cohort 25-49 years is around 20 years (Pradhan et al. 1997; MOH et al. 2002; MOHP et al. 2007; MOHP et al. 2012). Figure-4.2 depicts the cumulative percentage of women aged 35 years and above who had their first birth before a certain age for the three surveys NDHS-2001, 2006 and 2011. Only women above the age of 35

years have been considered here because almost all women who had a birth had it before 35 years there were only a negligible number of first births beyond this age.

Figure-4.2: Cumulative percentage of women age 35 years and above who had their first birth by certain age, NDHS-2001, 2006 and 2011

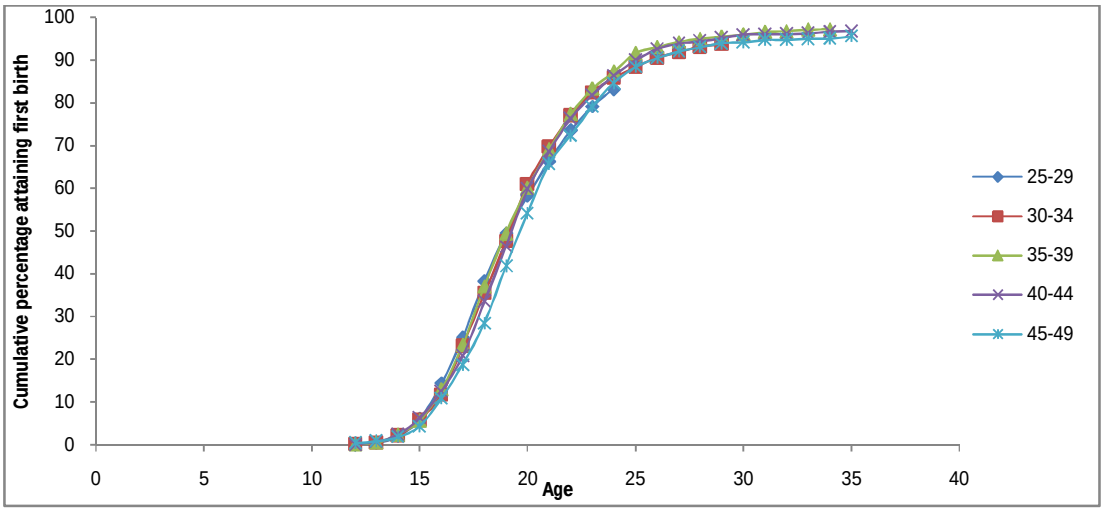


Source: Calculated by the researcher from NDHS data 2001, 2006 and 2011

There is only a little difference in the three cumulative distribution curves (Figure-4.2). A marginal reduction in the occurrence of the first birth in adolescence has been noticed from 2001 to 2011; the cumulative proportion giving the first birth before 20 years declined from 0.5 in 2001 to 0.44 in 2011. By the age of 30 years, almost 97 percent women had given first birth in all the three surveys. Some differences in cumulative proportions of having first birth in the age 20-25 are noticed. As compared to the 2001 survey, a very small extent of *acceleration* (early rise) in proportions of women having the first birth in 2006 and a very small extent of *postponement* (late rise and reach at same level) in 2011 have been observed; but beyond that age, the three curves almost coincide with each other. Almost all women have first birth by age 35.

Cumulative percentage of women of different age cohorts who had their first birth before a certain exact age for NDHS-2011 is presented in Figure-4.3. This also shows very little change in age at first birth across various cohorts. Slightly lower proportions of women of younger cohort (age 25-29) have experienced first birth before age 25 years than other older cohorts; however the figures are already more than 80 percent. The median age at first birth is around 20 years for all these cohorts.

Figure-4.3: Cumulative percentage of women of different age cohort who had their first birth by certain age, NDHS-2011



Source: Calculated by the researcher from NDHS data 2011

4.2.2 Period Parity Progression Ratios (PPPRs)

PPPRs for each year are computed for period 1989/90 to 2008/09 from NDHS-2011 data on birth history of women and annual series has been obtained (the method has been described in Chapter-II, section 2.3.6). Progressions are computed for women's birth to her first child birth, 1st birth to 2nd birth, 2nd birth to 3rd birth, 3rd birth to 4th birth, 4th to 5th birth and 5th to 6th birth. Progression ratios for other higher order births are not obtained because a very small number of women were exposed to and progressed to the next higher order birth leaving the denominator too small to have a meaningful ratio.

Annual series of PPPRs from 1989/90 to 2008/09 are presented in Table-4.4. In case of progression from the woman's birth to the first child birth (P_0), the values are almost constant and more than 0.96, with some fluctuations. This indicates women's nearly universal progression to the first parity, only a very small proportion of women remain childless. Once they have the first child, almost all progress to the second child (majority of P_1 values are more than 0.95) and there is almost constancy in series of progressions to the second parity. There is a clearly visible decline over time in the proportions of women who move from the second to the third parity. With exceptions of some fluctuations, PPPRs for third to fourth parity, fourth to fifth parity and fifth to sixth parity are clearly declining over time. For example, PPPR from fourth to fifth parity declines from 0.71 in 1989/90 to 0.54 in 2008/09. The fluctuations observed in the PPPRs might be due to smaller number of women at specific duration in the calendar year. Moreover, reporting

errors due to digit preference might have led to misdating of child birth causing fluctuations in PPPRs (Sahoo 2010).

Table-4.4: Annual series of Period Parity Progression Ratios (PPPRs) Nepal, 1989/90-2008/09

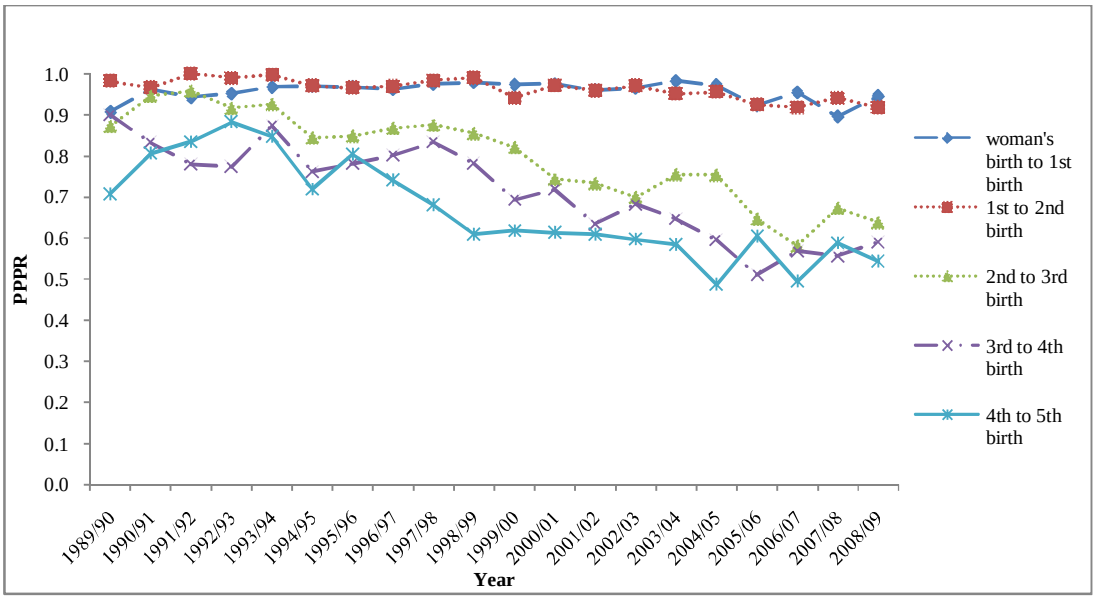
Year	Women's birth to 1st birth (P_0)	1st to 2nd birth (P_1)	2nd to 3rd birth (P_2)	3rd to 4th birth (P_3)	4th to 5th birth (P_4)	5th to 6th birth (P_5)
1989/90	0.908	0.982	0.872	0.900	0.7075	0.322
1990/91	0.963	0.966	0.946	0.833	0.8065	0.543
1991/92	0.943	1.000	0.959	0.780	0.8353	0.753
1992/93	0.952	0.990	0.917	0.774	0.8824	0.804
1993/94	0.968	0.997	0.927	0.874	0.8471	0.913
1994/95	0.970	0.971	0.844	0.762	0.7194	0.701
1995/96	0.968	0.966	0.849	0.782	0.8039	0.736
1996/97	0.963	0.970	0.868	0.802	0.7405	0.798
1997/98	0.976	0.984	0.876	0.834	0.6803	0.850
1998/99	0.979	0.990	0.855	0.781	0.6093	0.704
1999/00	0.974	0.942	0.821	0.694	0.6186	0.619
2000/01	0.976	0.972	0.744	0.718	0.6132	0.610
2001/02	0.960	0.959	0.734	0.634	0.6092	0.682
2002/03	0.966	0.970	0.699	0.683	0.5970	0.640
2003/04	0.983	0.951	0.755	0.647	0.5847	0.602
2004/05	0.972	0.955	0.754	0.595	0.4869	0.626
2005/06	0.924	0.925	0.647	0.511	0.6051	0.576
2006/07	0.955	0.919	0.581	0.568	0.4948	0.533
2007/08	0.895	0.942	0.673	0.557	0.5892	0.581
2008/09	0.946	0.917	0.639	0.590	0.5433	0.574

Source: Calculated by the researcher from NDHS data 2011

The observed PPPRs are also presented in figures for easy understanding of the dynamics of the change. Figure-4.4a clearly shows almost a constant series with very high (nearly unity) values for progressions to the first and the second births. Similarly, a decline in the ratios over time with some fluctuations is clear for the next higher parities. Further, to remove these fluctuations, a set of new series with three yearly moving averages of PPPRs is constructed and depicted in Figure-4.4b. The smoothed series indicates some decline even in PPPRs for the first and the second parities in the recent past, which were otherwise almost constant and very close to unity. Progression to the third parity appears to decline from around 0.9 in 1989/90 to 0.6 in 2008/09. Similar declines are noticed in other higher parities. The declines in PPPRs for third, fourth and fifth births are steeper after 1997/98. Similar findings were obtained from a previous study on PPPRs in Nepal. Retherford and Thapa (1998) also studied PPPRs for 1982 to 1986 and showed that the

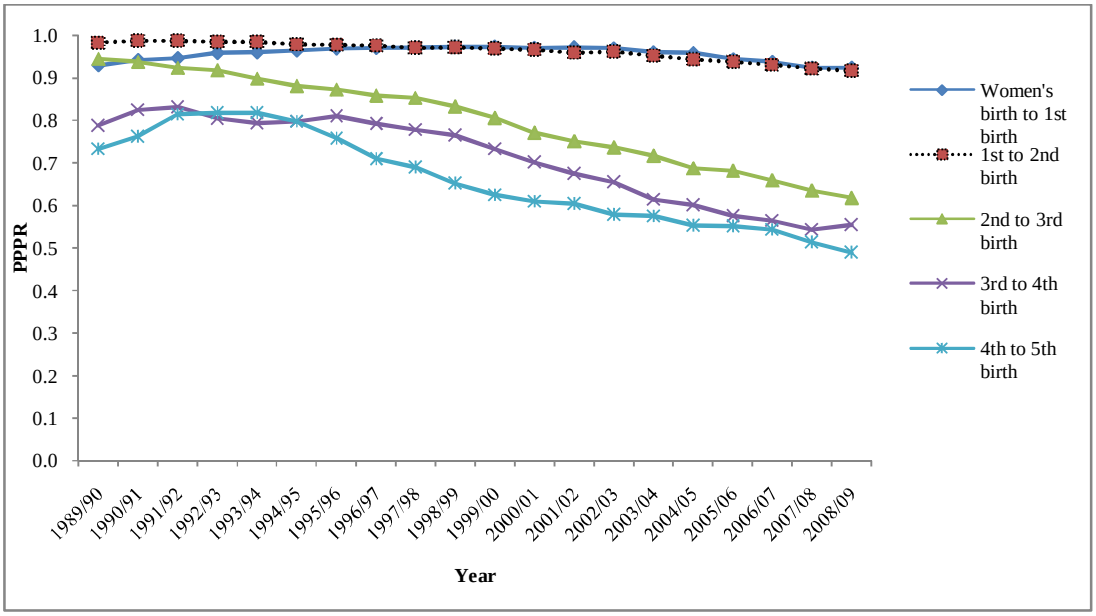
progression ratios for up to second birth did not change, and, to other higher order births, they declined with a varying extent.

Figure-4.4a: Graph of PPPRs series for progression to different birth orders, NDHS-2011



Source: Calculated by the researcher from NDHS data 2011

Figure-4.4b: Graph of smoothed (taking three yearly moving average) PPPRs for different birth orders, NDHS-2011



Source: Calculated by the researcher from NDHS data 2011

4.3 Analysis of Birth Intervals

Biologically, reproductive life span of a woman ranges from start of ovulation to menopause. In the Nepalese context, fertility is limited within marital life. Therefore, effective reproductive life of woman starts after one of the two events: onset of ovulation and union formation, whichever occurs later and ends after one of the two events: menopause and permanent exit from marital union due to different reasons, whichever occurs earlier. Also, within this effective reproductive life, there might be deliberate efforts either to recede pace or to limit number of children. The total number of children a woman would have in her effective reproductive life depends on the time of start of childbearing, the pace for succeeding births and subsequently the frequency of childbearing. Slower the pace less will be the frequency and vice-versa. The time interval between successive births not only measures the pace of childbearing but also influences total number of births. Therefore, analysis of inter-live birth interval including open birth interval is important to study the dynamics of both the 'magnitude' and the 'pace' of fertility decline.

This section is focused on analysis of birth intervals in terms of the median birth interval (the interval in months by which 50 percent women attain the next higher order birth) and the proportions of women attaining the next birth by certain time period (24 months, 60 months and 120 months) based on life table approach. The first indicator describes the pace (tempo aspect) of child bearing whereas the second describes the magnitude (quantum aspect) of fertility. Life table approach is used because it captures information from both open and closed birth intervals (see Chapter-II, section 2.3.7 for details of the procedure). Monthly life tables are constructed for the period of 120 months, beyond which the chance of occurrence of birth of the next higher order becomes negligible. The determinants of occurrence of birth have been studied by using Cox Proportional Hazard model which describes the net relative effect of specific variable on risk of subsequent birth. Currently married women who are married only once from NDHS-2011 are taken for studying differentials of birth interval and determinants of higher order birth. Transitions over time in attaining higher order births within certain months have been studied by analyzing NDHS-2001, 2006 and 2011 data. The analysis incorporates currently married women of age 15-49 who are married only once. It is to be noted that the first birth interval has not been analysed here. The analysis of the first birth interval requires good data on dates of marriage and first birth. While the latter is captured fairly

accurately in fertility histories, there is vagueness about the data of marriage. The exact date may not be known, often only the age at marriage is mentioned. Besides, consummation may not take place immediately after marriage and for the first birth interval, date of consummation is meaningful. Therefore, the first birth interval has not been analysed here. An analysis of the age at first birth has been presented earlier, in section 4.2.1.

4.3.1 Trends and differentials in birth intervals

Table-4.5a, Table4.5b, Table-4.5c and Table-4.5d depict the results of life table analysis of the second, third, fourth and fifth birth intervals in terms of median birth interval (in months) and the proportion of women attaining next higher order birth by certain time period (24, 60 and 120 months). Multiple births are considered single in analysis. The time difference between first and second birth is the closed second birth interval, and if no second birth has occurred, the duration from first birth to the date of survey is the open second birth interval. Similarly other birth intervals are defined.

The median lengths of the second, third, fourth and fifth birth intervals are 33.3, 40.4, 44.7 and 49.6 months respectively (Tables 4.5a, 4.5b, 4.5c, 4.5d). Higher the birth order, longer is the median birth interval. Majority of the couples had the second birth within three years from the first birth, but if they go for next higher order births, they wait for longer time. One fourth of the couples go for the second birth within two years of the first birth and some 83 percent do it within five years. The second birth is almost universal, because, 95 percent couples have their second birth within 10 years of the first birth. About 18 percent women had their third birth within two years, about two thirds had it in five years and around three fourths women had it within 10 years. The pace of attaining fourth birth is slower than that of other lower order births. Around three in each five women attained fourth birth within 60 months of third birth and two thirds women attained it within 120 months. The proportions of women going for fifth birth are still lower. Some 54 percent women had their fifth birth within 60 months and 61 percent had it within 120 months.

Table-4.5a: Life Table analysis of second birth interval of currently married women who are married only once by selected background characteristics, NDHS-2011

Background characteristics	Number of cases	Median birth interval (months)	Proportion attaining second birth within months of first birth		
			24	60	120
Period of first birth					
2003-2011	2701	40.2	0.193	0.712	-
1993-2003	3077	32.9	0.256	0.839	0.949
Before 1993	2178	29.9	0.300	0.903	0.982
Residence					
Urban	2197	35.6	0.225	0.774	0.921
Rural	5759	32.4	0.261	0.853	0.961
Women's education					
No education	3899	30.6	0.294	0.893	0.976
Primary	1502	33.1	0.229	0.827	0.949
>Primary	2555	40.3	0.190	0.712	0.895
Work status of women					
Not working	1677	34.3	0.248	0.793	0.924
Agriculture	4758	31.8	0.261	0.872	0.970
Non-agriculture	1521	37.1	0.221	0.740	0.911
Household wealth quintile					
Poorest	1560	30.7	0.279	0.913	0.979
Poorer	1466	32.1	0.269	0.863	0.975
Middle	1512	31.8	0.269	0.861	0.968
Richer	1566	33.9	0.233	0.813	0.951
Richest	1852	38.2	0.213	0.727	0.890
Exposure to media					
Low	2715	31.4	0.278	0.873	0.974
High	5241	34.4	0.236	0.809	0.936
Age of mother at first birth					
Less than 20	4338	32.3	0.260	0.867	0.967
20-24	3051	33.8	0.245	0.818	0.941
25 and more	567	40.5	0.208	0.686	0.843
Sex of first child					
Male	4105	34.6	0.238	0.806	0.939
Female	3851	31.8	0.264	0.858	0.962
Survival status of first child					
Survived >1 year	7328	34.4	0.224	0.822	0.946
Died in infancy	628	22.8	0.555	0.937	0.993
All	**7956**	**33.3**	**0.251**	**0.831**	**0.950**

Source: Calculated by the researcher from NDHS data 2011

Table-4.5b: Life Table analysis of third birth interval of currently married women who are married only once by selected background characteristics, NDHS-2011

Background characteristics	Number of cases	Median birth interval (months)	Proportion attaining third birth within months of second birth		
			24	60	120
Period of second birth					
2003-2011	2261	64.2	0.118	0.481	-
1993-2003	2600	40.6	0.190	0.641	0.732
Before 1993	1536	32.6	0.241	0.833	0.912
Residence					
Urban	1716	51.9	0.152	0.537	0.636
Rural	4681	38.1	0.193	0.699	0.802
Women's education					
No education	3594	34.8	0.221	0.778	0.872
Primary	1195	45.5	0.177	0.587	0.698
>Primary	1608	NA	0.089	0.380	0.482
Work status of women					
Not working	1219	46.8	0.175	0.592	0.696
Agriculture	4009	37.0	0.196	0.722	0.830
Non-agriculture	1169	65.5	0.137	0.485	0.563
Household wealth quintile					
Poorest	1338	32.9	0.259	0.822	0.929
Poorer	1223	36.9	0.194	0.744	0.859
Middle	1227	40.4	0.169	0.668	0.788
Richer	1227	44.6	0.174	0.610	0.716
Richest	1382	76.7	0.113	0.450	0.528
Exposure to media					
Low	2318	35.2	0.215	0.765	0.874
High	4079	46.0	0.162	0.591	0.688
Age of mother at second birth					
Less than 20	1346	34.6	0.232	0.756	0.850
20-24	3677	39.5	0.186	0.668	0.769
25 and more	1374	58.9	0.116	0.503	0.609
Sex of second child					
Male	3386	45.9	0.153	0.582	0.674
Female	3011	36.5	0.214	0.735	0.848
Survival status of second child					
Survived >1 year	6035	42.0	0.162	0.636	0.742
Died in infancy	372	24.4	0.481	0.931	0.968
All	**6397**	**40.4**	**0.181**	**0.654**	**0.756**

Note: 'NA' means the median is not applicable for that category because less than 50 percent women attained next birth within 120 months from the previous birth

Source: Calculated by the researcher from NDHS data 2011

4.3.1.1 Trends in birth intervals

According to the period of occurrence, births of all orders are categorized into three groups, those occurring in 2003-2011, 1993-2003 and before 1993. This enables one to compare the birth intervals for births those occurring in recent past to those occurred in distant past. The second birth interval varies considerably by period of the first birth. Later is the period of first birth, the longer is the median second birth interval. For women who had given first birth before 1993 the median length of second birth interval was 30 months whereas, if the first birth had occurred in the period 2003-2011, the second birth interval had median length of 40 months. This indicates lengthening second birth intervals over time and hence a decrease in the pace of childbearing. This is further justified by the fact that within 60 months from the first birth, 70 percent women had second birth if their first birth was in the period 2003-2011 but 90 percent women had second birth if their first birth was before 1993. Most of the women (more than 95 percent) went for second birth irrespective of the period in which their first birth had taken place, indicating almost universality of the second birth. Therefore, the prevalence of second birth has not declined over time. The median length of the third, fourth and fifth birth interval has increased over time, indicating declining pace to transition to higher order births over time. Similarly, the proportions attaining higher order births within 10 years from the previous birth is declining over time for the third, fourth and fifth order births. Therefore, analysis of birth intervals also shows a decline in number of births as well as declining speed of childbearing over time.

4.3.1.2 Differentials in birth intervals

This section deals with the differences in the lengths of birth intervals across various subgroups of women according to selected socioeconomic and demographic characteristics. Behavioural dissimilarities of women of different socioeconomic groups may cause variations in birth interval. The analysis is intended to throw light on the dynamics of transition to higher order births by women of various socioeconomic groups.

Differential in birth interval exists by urban-rural place of residence (Tables 4.5.a-4.5.d). A longer median birth interval of urban women as compared to rural women is seen for second and higher order births; with the difference widening for higher order births. For example, median length of second birth interval for urban women (35.6 months) is four months longer than rural counterparts whereas, for fourth birth interval, it is 20 months longer (Urban: 62.5 months). Difference in pace of child bearing in rural area than urban

area is quite small for second birth but it widens for next higher order births. Ultimately, all women go for second birth irrespective of their place of residence but a vast differential exists in the proportions of women ultimately attaining higher order births. For example, 96 percent rural women and 92 percent urban women had their second birth within 120 months of the first birth, but, 70 percent rural women and only 55 percent urban women had their fourth birth within 120 months of the third birth.

A positive association between length of birth interval and women's educational attainment has been found for all higher order births (Tables 4.5.a-4.5.d). The median length of second birth interval for women with at least primary education (40.3 months) is 10 months longer than that of uneducated women. The educational differential in length of median birth interval widens for next higher order births. No more difference is found in proportions of women attaining the second birth within 120 months of the first birth according to women's educational status. But, a sharp decline in the proportion attaining the third, fourth and fifth birth within 60 and 120 months of the previous birth is noticed with increase in women's education. For example, women's transition probability to the third birth within 120 months from second birth is 0.87 if they are uneducated whereas the same is only 0.48 if they have at least primary education.

Higher exposure to mass media is found to be associated with increased length of birth interval for all orders and a lower proportion of women attaining next higher order birth by 24, 60 and 120 months; with the gap widening for higher order birth intervals (Tables 4.5.a-4.5.d). For example, in case of third birth interval, women highly exposed to mass media had median birth interval of 46 months but for women with low exposure to media, it was only 35 months. Similarly, three in every four women who were less exposed to mass media transited to the third birth within 60 months of the second birth but only three in every five women who had higher exposure to media did so in the same period.

Differential in median length of birth interval exists by working status of women. The shortest birth intervals have been found among women working in agriculture sector and the longest one among women in non-agriculture sector (Tables 4.5.a-4.5.d). The differentials are wider for higher order birth intervals. Similarly, except for transition to second birth, the transition probabilities to next higher order birth is the highest among women working in agriculture sector and the lowest among women from non-agriculture sector. 'Not working' women showed intermediate characteristics between other two groups of women.

Table-4.5c: Life Table analysis of fourth birth interval of currently married women who are married only once by selected background characteristics, NDHS-2011

Background characteristics	Number of cases	Median birth interval (months)	Proportion attaining fourth birth within months of third birth		
			24	60	120
Period of third birth					
2003-2011	1388	85.3	0.112	0.432	-
1993-2003	1823	43.1	0.173	0.599	0.662
Before 1993	896	35.6	0.201	0.728	0.801
Residence					
Urban	944	62.5	0.113	0.496	0.550
Rural	3163	41.9	0.176	0.618	0.701
Women's education					
No education	2852	38.7	0.178	0.662	0.739
Primary	681	62.3	0.156	0.484	0.559
>Primary	574	NA	0.082	0.321	0.381
Work status of women					
Not working	664	50.4	0.163	0.540	0.586
Agriculture	2862	41.5	0.169	0.627	0.710
Non-agriculture	581	86.0	0.125	0.454	0.523
Household wealth quintile					
Poorest	1064	35.8	0.197	0.762	0.868
Poorer	866	40.1	0.181	0.639	0.722
Middle	798	53.9	0.137	0.532	0.624
Richer	737	53.6	0.149	0.515	0.570
Richest	642	NA	0.124	0.421	0.467
Exposure to media					
Low	1736	38.1	0.184	0.682	0.772
High	2371	54.0	0.145	0.522	0.588
Age of mother at third birth					
Less than 25	2240	39.6	0.180	0.645	0.720
25 and more	186	54.4	0.139	0.518	0.593
Sex of third child					
Male	2169	52.5	0.144	0.528	0.590
Female	1938	38.7	0.182	0.656	0.746
Survival of third child					
Survived >1 year	3843	46.6	0.142	0.572	0.648
Died in infancy	264	25.1	0.441	0.815	0.887
All	**4107**	**44.7**	**0.162**	**0.589**	**0.664**

Note: 'NA' means the median is not applicable for that category because less than 50 percent women attained next birth within 120 months from the previous birth

Source: Calculated by the researcher from NDHS data 2011

Table-4.5d: Life Table analysis of fifth birth interval of currently married women who are married only once by selected background characteristics, NDHS-2011

Background characteristics	Number of cases	Median birth interval (months)	Proportion attaining fifth birth within months of fourth birth		
			24	60	120
Period of fourth birth					
2003-2011	774	97.0	0.095	0.413	-
1993-2003	1200	49.5	0.161	0.532	0.959
Before 1993	415	32.6	0.280	0.745	0.802
Residence					
Urban	476	NA	0.132	0.420	0.476
Rural	1923	45.4	0.172	0.574	0.642
Women's education					
No education	1878	44.8	0.117	0.585	0654
Primary	325	120.0	0.128	0.432	0.500
>Primary	186	NA	0.039	0.264	0.282
Work status of women					
Not working	327	57.7	0.155	0.503	0.561
Agriculture	1787	46.0	0.173	0.564	0.630
Non-agriculture	275	81.3	0.117	0.450	0.522
Household wealth quintile					
Poorest	750	38.6	0.191	0.691	0.775
Poorer	538	48.4	0.175	0.544	0.640
Middle	433	64.9	0.153	0.483	0.550
Richer	385	100.8	0.128	0.465	0.501
Richest	283	NA	0.142	0.371	0.415
Exposure to media					
Low	1147	40.9	0.170	0.626	0701
High	1242	79.4	0.159	0.468	0.527
Age of mother at fourth birth					
Less than 25	640	38.8	0.201	0.635	0.713
25 and more	1749	58.0	0.150	0.508	0.567
Sex of fourth child					
Male	1201	73.6	0.147	0.470	0.536
Female	1188	40.9	0.181	0.618	0.683
Survival of fourth child					
Survived >1 year	2247	52.4	0.144	0.530	0.596
Died in infancy	142	25.4	0.477	0.740	0.797
All	**2389**	**49.6**	**0.164**	**0.543**	**0.608**

Note: 'NA' means the median is not applicable for that category because less than 50 percent women attained next birth within 120 months from the previous birth

Source: Calculated by the researcher from NDHS data 2011

For second, third, fourth and fifth births, a woman's belonging to household from better wealth quintile means she has longer median birth interval and a smaller transition probability to higher order birth (Tables 4.5.a-4.5.d). Even in case of second birth, median length of birth interval is 31 months for women from the poorest wealth quintile and it is 38 months for women from richest wealth quintile. Moreover, proportion attaining second birth within 120 months from first birth is quite lower for women from the richest wealth quintile (0.89) as compared to those from the poorest wealth quintile (0.98). Women from the poorest wealth quintile show a higher speed of childbearing as well as higher level of fertility. For this group of women, even for fifth birth interval, the median length is 39 months and 78 percent women transit to fifth birth within 120 months from fourth birth. But less than 50 percent women from the richest wealth quintile transited to fourth and fifth birth within 120 months from previous birth.

The length of birth interval and the proportion attaining next higher order births are influenced by age of women at previous birth. Lower age at previous birth is associated with shorter median birth interval and higher proportions attaining next birth within certain period. For example, if mother's age at second birth is less than 20 years, median length of third birth interval is 35 months whereas, if mother's age at second birth is at least 25 years, median length of third birth interval is 59 months (Tables 4.5.a-4.5.d). Similarly, the transition probability to third birth within 60 and 120 months from second birth is quite higher (0.76 and 0.85 respectively) for women who gave second birth before reaching age 20 years as compared to women who gave second birth after age 25 years (0.50 and 0.61 respectively).

If the last child survived beyond infancy, the corresponding birth interval would be longer. If the first child died in infancy, it would be replaced by next within a median interval of 23 months, but survival of first child at least beyond infancy means the second child would be born after 34 months on average (Tables 4.5.a-4.5.d). More than half of women go for second child within 24 months if first child dies in infancy but two in every ten do so, if the first child survives up to one year. A substantially higher proportion of women progressed to next higher order birth if they experienced infant death as compared to those who did not experience it. Therefore, survival status of previous child has a substantial role to determine pattern of subsequent births. This clearly shows couple's tendency to replace deceased child as soon as possible.

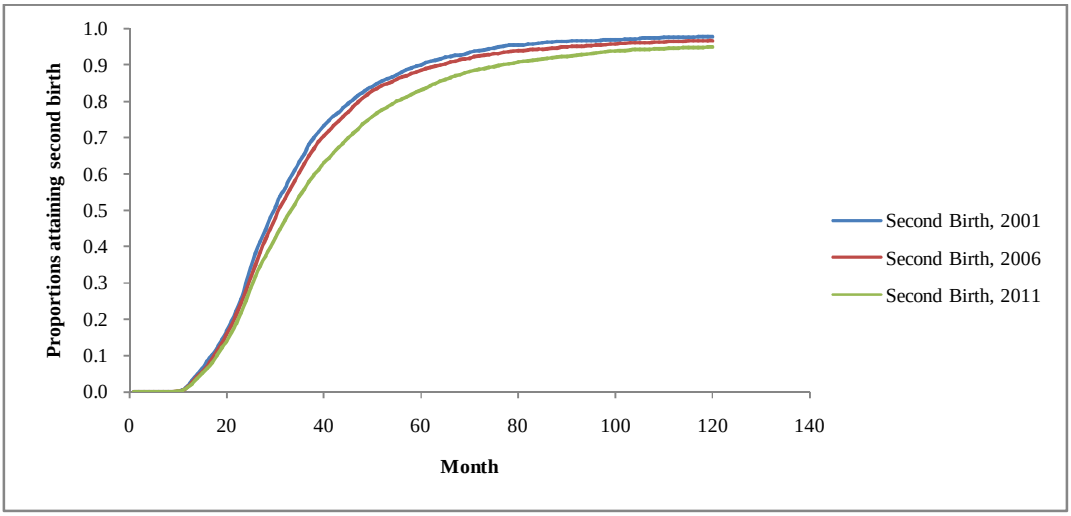
Although median second birth interval is a bit longer among women whose first child was a son (35 months) as compared to those who had first daughter (32 months), there is almost no difference in the proportion attaining second birth within 60 and 120 months from the first birth by sex of first child. However, for third, fourth and fifth births, the differentials in median birth interval as well as proportion attaining next higher order birth according to the sex of previous child are noticeable (Tables 4.5.a-4.5.d). Median fourth birth interval was 39 months if the third child was female but it was 53 months if the third child was a male. Similarly, after having a third child female, two thirds and three fourths women transit to fourth birth within 60 and 120 months respectively whereas, only half and three fifth of women do so in respective periods if the third child were a son. It seems that couples want to have a son as earlier as possible, an indication of higher preference for son than daughter in Nepalese society.

Based on the above analysis, it can be inferred that fertility is declining due to decline in both the pace of childbearing and the total number of children. The increasing median length of higher order birth intervals indicates declining pace of childbearing and the declining ultimate proportions attaining third, fourth and fifth order births (all higher order births) indicate decreased extent of higher order births and hence a decline in fertility.

The nature of change in the life table proportions of attaining second, third and fourth births over time has been presented in Figure-4.5a, Figure-4.5b and Figure-4.5c. Based on the life table analysis of second birth interval from data of all the three surveys for currently married women who had given the first birth, it is clear that the ultimate proportions attaining the second birth within 10 years from the first birth has remained almost constant (around 0.95) (Figure-4.5a). Thus, the second birth is almost universal. However, there is some difference in nature of these curves; mainly the curve for the most recent period is visibly different. The proportions attaining second birth within 60 months of first birth declined from 90 percent in 2001 to 83 percent in 2011, indicating a declined pace of attaining the second birth over time (Figure-4.5a). According to Figure-4.5b, some 83 percent women attained third birth within five years from second birth in 2001 but the proportion declined to 65 percent in the same duration in 2011; and that the curve of 2001 asymptotes to around 0.9 but that for 2011 tapers around 0.75. The curves of recent past fall below that of distant past. A declining prevalence as well as pace of attaining the third birth over time is therefore evident. Analysis for transitions to the

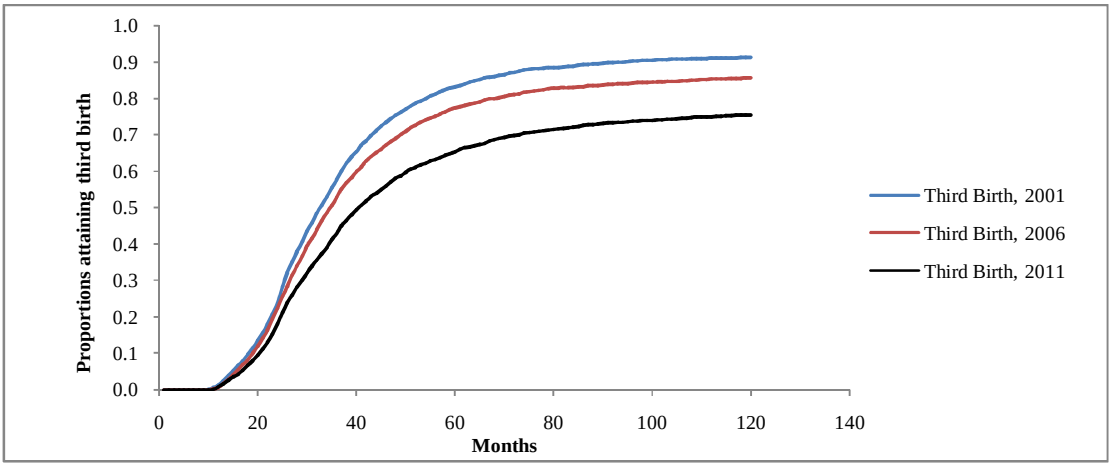
fourth birth over time reveals a similar pattern as observed for the third birth (Figure-4.5c). When observed across each survey, both the prevalence and its pace are found to be quite smaller for third and fourth order births as compared to second birth. This phenomenon for 2011 survey has been presented in Figure-4.6. The results indicate increasing proportions of couples having only two children.

Figure-4.5a: Life Table proportions attaining second birth within certain months from first birth for currently married women who are married only once, NDHS-2001, 2006 ad 2011



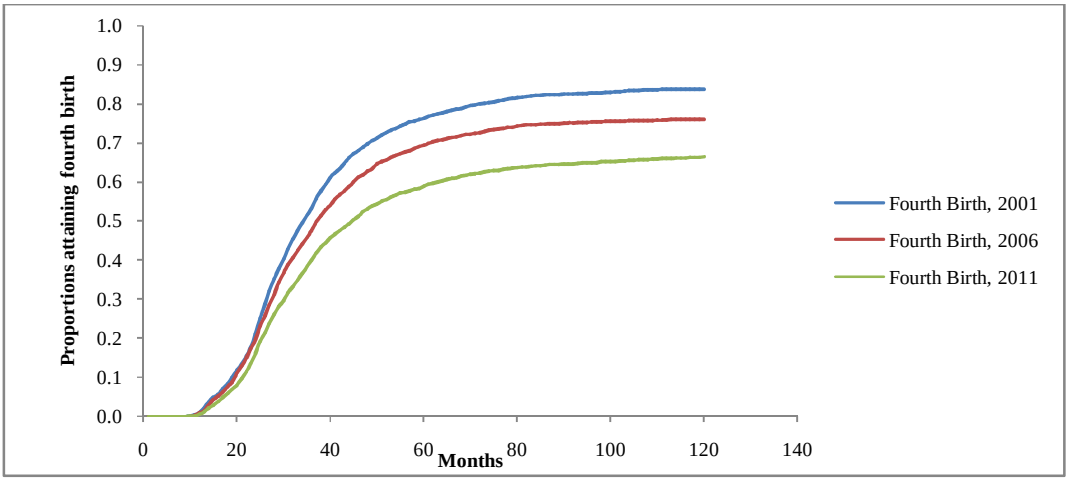
Source: Calculated by the researcher from NDHS data 2001, 2006 and 2011

Figure-4.5b: Life Table proportions attaining third birth within certain months from second birth for currently married women who are married only once NDHS-2001, 2006 ad 2011



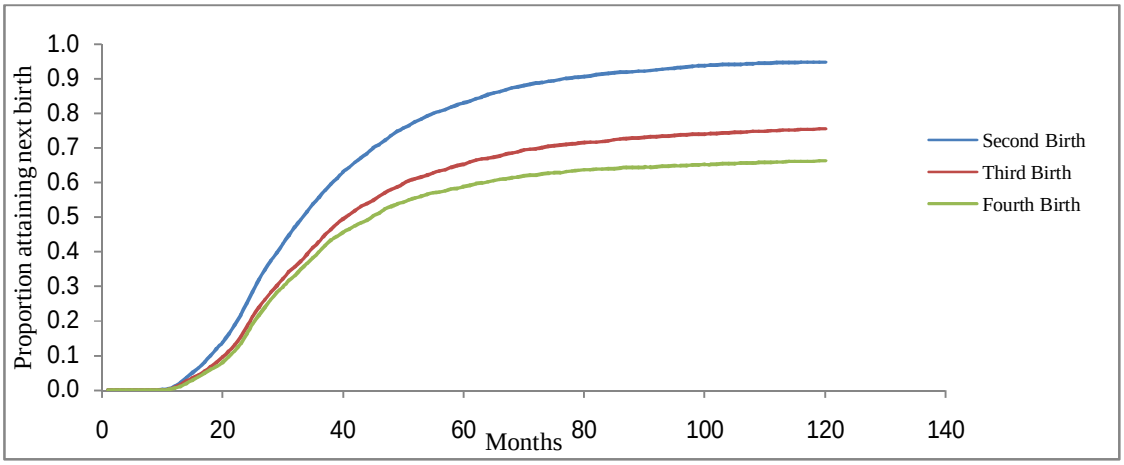
Source: Calculated by the researcher from NDHS data 2001, 2006 and 2011

Figure-4.5c: Life Table proportions attaining fourth birth within certain months from third birth for currently married women who are married only once, NDHS-2001, 2006 ad 2011



Source: Calculated by the researcher from NDHS data 2001, 2006 and 2011

Figure-4.6: Life Table proportions attaining subsequent births within certain months from previous birth for second, third and fourth births, for currently married women who are married only once, NDHS-2011



Source: Calculated by the researcher from NDHS data 2011

4.3.2 Determinants of risks of higher order birth

The previous section described the differentials in birth intervals by selected socioeconomic and demographic factors. Such differentials only show gross effects of these factors on the birth interval. In order to estimate the net effect of these factors in determining occurrences of birth, the method of Cox regression (also called Cox Proportional Hazard Model) has been followed (See Chapter-II, Section 2.3.7 for detail of the methodology). Cox regression is used to analyse determinants of the risk of the second, third, fourth and fifth births and this enables to compare the risk of having

subsequent births of women of a particular group with that of a reference group, after controlling for the effect of other factors. The analysis is performed for NDHS-2011 data and the results are expressed in terms of relative risk ratios. If the relative risk ratio for a particular group is significantly greater than unity, the risk of having subsequent birth is higher for these women as compared to the reference category which also means a shorter birth interval. The results are shown in Table-4.6.

The second birth

Results show that age of mother at first birth, sex of the first child, survival status of the first child beyond infancy and the year of birth are most significant factors to determine the occurrence of the second birth. Similarly, women's education, work status and household wealth also have some net significant effect in occurrence of the second birth. Place of residence and exposure to mass media do not have net significant impact on it. As compared to the first births occurred in the period 2003-2011 (in the recent past), the relative risk of the second birth was significantly higher (risk ratio 1.57) if the first birth had occurred before 1993. Similarly, risk of the second birth declined significantly (risk ratio 0.69) for women who had the first birth after 25 years of age as compared to those who had the first birth before reaching 20. Having the first child daughter is associated with increased risk of the second birth (risk ratio 1.19) as compared to having a son. Women whose first child survived during infancy had significantly reduced risk of having the second child (risk ratio 0.52) with reference to those whose first child died in infancy.

There is only a small difference in the risk of attaining second birth between uneducated women and women with some primary education. But risk of the second birth reduces by 20 percent (risk ratio 0.8) for women with at least primary education as compared to uneducated women. Some reduced risk of the second birth is noticed for women working in non-agriculture sector (risk ratio 0.87) as compared to not working women. A significantly lower risk of the second birth is also observed for women from richer and the richest wealth quintile (risk ratio 0.85 and 0.75 respectively) as compared to those from the poorest wealth quintile.

Table-4.6: Relative Risk Ratios from Cox Regression of second, third, fourth and fifth births for currently married women who are married only once, NDHS-2011

Background Characteristics	Relative Risk Ratios for			
	2nd Birth	3rd Birth	4th Birth	5th Birth
Year of previous birth				
2003-2011 (Ref.)	-	-	-	-
1993-2003	1.39***	1.45***	1.56***	1.69***
Before 1993	1.57***	2.13***	2.15***	2.95***
Residence				
Urban	0.96	0.94	0.93	0.82*
Rural (Ref.)	-	-	-	-
Women's education				
No education (Ref.)	-	-	-	-
Primary	0.93*	0.79***	0.84**	0.81*
> Primary	0.80***	0.56***	0.60***	0.54***
Work status of women				
Not working (Ref.)	-	-	-	-
Agriculture	0.96	0.86***	0.82**	0.82*
Non-agriculture	0.87**	0.73***	0.78***	0.96
Household wealth quintile				
Poorest (Ref.)	-	-	-	-
Poorer	0.91*	0.82***	0.79***	0.68***
Middle	0.93	0.70***	0.59***	0.59***
Richer	0.85***	0.64***	0.56***	0.50***
Richest	0.75***	0.50***	0.47***	0.44***
Exposure to media				
Low (Ref.)	-	-	-	-
High	1.03	0.95	0.88**	0.84**
Age of mother at previous birth				
Less than 20 (Ref.)	-	-	-	-
20-24	0.95*	0.88**	#	#
25 and more	0.69***	0.62***	0.76***	0.74***
Sex of previous child				
Male (Ref.)	-	-	-	-
Female	1.19***	1.48***	1.42***	1.47***
Survival status of previous child				
Died in infancy (Ref.)	-	-	-	-
Survived >1 year	0.52***	0.48***	0.48***	0.50***
Model χ^2	927***	1726.9***	794.5***	448.2***
(d.f.)	(16)	(16)	(15)	(15)
-2Log Likelihood	102289.7	64577.8	36233.9	18151.3
Total number of cases	7677	6173	4002	2312

Note: All multiple births are considered as single; *, ** and *** indicate that the corresponding relative risk ratios are significant at 5%, 1% and 0.1% level of significance respectively

Source: Calculated by the researcher from NDHS data 2011

The third birth

The factors influencing transition from the second birth to the third birth are similar to those from the first to the second birth. Place of residence and women's exposure to media have no net effect on risk of attaining the third birth. The risk of third birth was significantly higher for women whose second child was female (risk ratio 1.48) with reference to those whose second child was male; and earlier was the timing of the second birth, the higher was the risk of the third birth. Similarly, higher is the age at the second birth; lower is the risk of transiting to the third birth. Risk of the third birth is quite lower for those women whose second child survived the first year of life (risk ratio 0.48). As compared to the second birth, the influence of women's education, work status and household wealth quintile have become more prominent for the third birth. As compared to the risk of the third birth among uneducated women, the risk among women with at least primary education is almost half (risk ratio 0.56); with comparison to not working women, risk of the third birth reduces to three fourth for women working in non-agriculture sector. With reference to women from the poorest wealth quintile, as one moves to upper quintiles, the risk of attaining the third birth significantly and substantially declines and falls to 0.5 for women of the richest wealth quintile.

The fourth and the fifth births

The transition probabilities to the fourth birth showed almost similar result as it was for the third birth. The only difference is that there is some significant net effect of media exposure on transition to the fourth birth. The more the women are exposed to mass media, the lower is their transition probability to the fourth birth (risk ratio for better exposed women is 0.88). Women who are better educated, working in non-agriculture sector, belong to upper household wealth quintiles, and have given the third birth more recently and at older age have reduced risk of the fourth birth.

Risk ratios of the fifth birth for different categories of socioeconomic and demographic variables are similar to those obtained for risk of the fourth birth except for the fact that, urban rural difference is also significant for the fifth birth. Transition probabilities to the fifth birth in urban area are significantly lower than in rural area (risk ratio 0.82).

4.4 Summary

The objective of this chapter was to throw more light on fertility transition in Nepal by analyzing dynamics of the family building process at micro level. Changes in age at

marriage, age at first birth, parity progression ratios, birth intervals and risks to higher order births have been analysed based on NDHS-2001, 2006 and 2011 data. Moreover, the determinants of age at marriage and higher order births are also studied. Only a small increment in age at marriage as well as in age at first birth has been observed. It has been discussed in the previous chapter (Chapter-III) that nuptiality component has quite a small share in contributing to fertility decline as compared to that of marital fertility decline and the young age pattern of fertility persists in Nepal. The findings of this chapter confirm the same. Apart from some regional variations, women's education is found to be a prominent predictor of both age at marriage and risk of marriage; a higher education associated with decrease in risk of marriage and increase in age at marriage. Not much change over time has observed in age at first birth, which is universal and achieved latest by 30 years. Analysis of PPPRs shows that the first two births are almost universal and there is almost no decline in PPPRs for the first and the second order births over time. But, a substantial decline over time has been observed in women's progressions to the third and higher order births.

Analysis of birth intervals reveal that there is no change in ultimate proportions attaining the second birth but there is some reduction in the pace of transition to the second birth over time. Inference is that, the extent of the second birth is has not declined though there is some decline in its pace. However, for all other higher order births, a clear decline in both the pace and the prevalence of attaining the birth over time are observed. Not only this temporal effect, a decline in speed and progressions to next higher order births is observed for higher order births for each survey period, which is quite obvious due to fertility differentials among women of different characteristics. An increase in birth interval with increased birth order is noticed. Trends in birth interval show an increasing tendency of median lengths of birth intervals of different order over time. Differentials are observed in birth intervals, which are attributable to various socioeconomic and demographic factors.

Cox Regression has been used to analyse the risks of having successive higher order births for a particular group of women as compared to some reference category. The relative risk of the second birth is significantly higher for women who had given the first birth in earlier times and whose first child is female. Similarly, significantly lower risk of the second birth has been observed among more educated women in comparison to uneducated women; women working in non-agriculture in comparison to those who are

not working; among women from richer or the richest household wealth quintile as compared to those from the poorest quintile; among women with higher age at the first birth and whose first child survived during infancy. Place of residence and media exposure are no more significant determinants of timing of the second and the third births after controlling for other factors. Similar scenario has been observed for the third, the fourth and the fifth birth intervals.

From the analysis, it can be concluded that only a little transition has occurred in age at marriage and almost no transition in age at first birth in Nepal. This shows that some delay in age at entry into sexual union has not affected the age at initiation of childbearing in aggregate level. Women marrying at relatively older age have a tendency to start childbearing earlier most probably to make up for the lost time. Similar results were obtained in earlier studies on Goa and Orissa, India **(**Rajaram et al. 1994; Sahoo 2013a**)**. Early age at marriage and early and universal first birth followed by universal second birth is still prevalent in Nepal. A nominal decline in the pace of attaining the second birth in the recent past is noticed. A substantial decline in fertility is largely contributed by decline in both the pace and the prevalence of the third and higher order births. Rapid decline in fertility in the recent past is attributed to steep decline in progression ratios of the third and higher order births. In the days to come, it is likely that majority of the couples will have two children and avoid higher order births. These results are in same line with those found in Orissa's fertility decline (Sahoo 2013a). Results in Nepal also resemble with those from Cambodia. As observed in Nepal, in Cambodia too, median age at first birth has remained almost constant but changes are occurred in age-specific fertility rates, with prolonged birth intervals and concentration of fertility in the 20s (Hukin 2014). In Cambodia, people desire children, son or daughter for continuation of lineage (ibid.); whereas in Nepal, it is thought that a lineage is continued only through a son.

Controlled for other factors, some temporal effects on occurrence of higher order birth have been observed which also played a role in fertility decline by reducing the risks of higher order births at more recent times. Socioeconomic factors like women's education, work status, household wealth quintile, age at previous birth and sex and survival status of previous child are significant determinants of higher order births. Further scope of fertility decline is seen among uneducated women, those from the poorest household

wealth quintiles and those working in agriculture sector. Similarly, further improvement in child survival and elimination of son preference would also help fertility decline.

Chapter-V

Dynamics of Fertility Preference and Contraceptive Use

The previous chapters highlighted the mechanism of fertility decline in Nepal by analyzing trends and differentials in fertility. Moreover, the two steps of family building: union formation and progression to births have been analysed. This chapter deals with two more aspects associated with fertility decline. The first is about changing preferences of having children during fertility transition and the second one is the dynamics of contraceptive use. Both of these two are parts of the family building process. Coale (1973) has stated that sustained marital fertility decline takes place when couples accept childbearing as a calculated choice, perceive fewer children advantageous and have mastery of effective techniques of birth control. Analyzing fertility preferences is expected to throw light on declining demand for children and studying dynamics of contraceptive use examines how these demands are fulfilled within marital union. Therefore, a study of the dynamics of fertility preferences and contraceptive use enables to judge to what extent these three preconditions stated by Coale are met.

Decrease in demand for children is manifested in decreased ideal family size and increased proportions wanting no more children. On the other hand, decline in demand for children leads to increase in demand for means of fertility regulation. Contraceptive use will then increase to materialize the decreased demand for children provided that there is motivation to use and supply is available at affordable cost. Not only the changing fertility preferences, but also the improved implementation of established preferences equally contributes to rise in contraceptive use (Feyisetan and Casterline 2000). In general, there will be decline in ideal family size of couples and rise in use of contraceptives during fertility transition. Couples materialize their desired family size only when they have adequate knowledge of contraceptive means, have access to it and consciously use it to avoid unwanted births. In the first stage of emergence of contraceptive use, the users would be characterized by higher cumulative fertility because they regulate fertility only in the late stage of family building after having achieved or even exceeded the number of children they desired **(**Knodel and Prachuabmoh 1974). But, change in the dynamics of contraceptive use occurs during declining fertility preferences and couples start regulating fertility from early phase of family building. So, it becomes

important to analyse how the changes are occurring in family size preferences and how couples are shaping their contraceptive behavior to materialize these preferences.

5.1 Changes in Fertility Preference

Fertility preference is generally studied with the help of two indicators: ideal number of children and desire for another child. Ideal family size has influence on fertility level. A high ideal family size in Africa is noted as an obstacle to rapid fertility decline in that region (Bongaarts and Casterline 2012). The ideal number of children of couples is shaped by a large set of socioeconomic and demographic factors, societal norms and cultural factors. In survey, question is asked to women or men as *'If you could go back to the time you did not have any children and could choose exactly the number of children to have in your life, how many would that be?'* for women and men having children and *'If you could choose exactly the number of children to have in your whole life, how many would that be?'* for women and men with no living children. This question expects a numeric response from respondents and is often criticized on the ground that not all respondents clearly understand what exactly 'ideal' means for them and can give a precise numeric response. Moreover, those already having some children would have tendency to rationalize their children they already have and may adjust their ideal family size upwards or even downwards. Yet, this question is a key to understand fertility preference and widely used in surveys. Together with this, another very much clear question is used to assess fertility preference based on the fertility achievements till the survey date. Answer to the question on desire for an additional child (Yes/No) is easier to get from respondents and gives further information on fertility preference. The desire for the next child depends on the number of children a couple already has, their sex composition (if there is higher preference for a child of particular sex) and many other socioeconomic and demographic factors. Based on both of these two questions available in the DHS, an analysis of fertility preference has been made. Changes occurred in fertility preference are analysed from NDHS 2001, 2006 and 2011 data. Focus of this section is to analyze ideal family size and desire for an additional child and to describe how different socioeconomic and demographic characteristics affect these in Nepal.

5.1.1 Trends and differentials in ideal number of children

Table-5.1 shows the distribution of never married and ever married women by their stated ideal number of children and the mean ideal number of children. The survey of 2001 had information only from ever married women but in 2006 and 2011 surveys, it was taken

from all women. Therefore, for making comparative analysis, the distribution has been given separately for ever married and never married women. The women who had given non-numeric response to the question of ideal number of children are excluded in the calculation of mean ideal number of children.

Table-5.1: Percent distribution of never married and ever married women age 15-49 by stated ideal number of children and mean number of children, NDHS-2001, NDHS-2006 and NDHS-2011

Ideal number of children	Percent distribution of						
	Ever married women			Never married women		All women	
	2001	2006	2011	2006	2011	2006	2011
0	0.0	0.3	0.4	0.9	3.1	0.4	1.0
1	3.9	6.6	10.6	12.4	22.5	7.7	13.1
2	45.8	55.4	61.8	76.3	67.4	59.6	63.0
3	33.7	28.0	21.0	8.0	5.9	24.0	17.8
4	12.7	8.0	5.0	1.7	0.6	6.8	4.1
5	1.5	0.9	0.5	0.2	0.1	0.8	0.4
6+	0.6	0.6	0.3	0.1	0.0	0.5	0.3
Non-numeric response	1.8	0.2	0.3	0.4	0.5	0.2	0.3
2 or less	49.7	62.3	72.8	89.6	93.0	67.7	77.1
Mean	2.63	2.42	2.23	1.98	1.78	2.33	2.13
Number of women	8726	8645	9965	2149	2709	10793	12674

Source: Computed by the researcher from NDHS data 2001, 2006 and 2011

Among ever married women, a maximum proportion stated two children to be ideal in all the three surveys, with a substantial increase in this proportion over time; from 46 percent in 2001 to 62 percent in 2011. The proportion of ever married women stating more than two children to be ideal has substantially declined over time. For example, in 2001, 34 percent ever married women considered three children to be ideal but in 2011, only 21 percent women stated so. The mean ideal number of children declined from 2.63 to 2.23 during 2001-2011. Never married women tend to state even smaller ideal family size. In 2011, two in every three never married women stated two children to be ideal; 93 percent stated two or less children to be ideal and the mean ideal number of children was 1.78. A substantially higher proportion of never married women stated only one child to be ideal (22.5 percent) as compared to ever married counterparts (10.6 percent) in 2011. Never married women are on average younger than ever married women and this result indicates that the younger generation mostly desires two or less children. If they will be able to fully materialize their fertility preferences, this will eventually lead to further decline in

fertility. Among never married women, proportion stating three of more children to be ideal is quite low and declining over time. The proportions giving non-numeric response are quite small and decreasing over time.

The results indicate an emerging 'two-child' norm in Nepal. This phenomenon is further substantiated by analyzing how the proportions stating up to two children to be ideal is changing over time for various background characteristics. Also, the change in mean ideal family size has been examined for the three surveys. Table-5.2 gives the distribution of ever married women by percentage stating two or less children to be ideal and the mean ideal number of children for selected background characteristics.

Decline in mean ideal number of children and increase in proportion stating two or less children to be ideal over time has been observed for ever married women of each and every category of background characteristics. However, differential in both of these two indicators among various subgroups of each background characteristics continue to exist over time. In 2011, a substantial proportion of women who have at most one living child, who are from urban area, who have above primary education, who work in non-agriculture sector and who belong to the highest household wealth quintile stated mean ideal number of children less than two and consequently, more than 85 percent of such women stated at most two children to be ideal. The highest value of mean ideal family size (2.8) has been stated by women having at least four living children, followed by older women (mean 2.5 for women aged 35-49) and women from lowest household wealth quintile (2.5).

Increase in age and number of living children are associated with increase in mean ideal family size and decline in proportion stating at most two children to be ideal. Women having more living children are generally of higher age and they have experienced relatively higher fertility regime in their earlier days of reproductive period. So, their preference for larger ideal number of children may be partly due to their life time fertility experience and partly due to justification of the number of children they already have. However, the mean ideal number stated by women with four or more living children is 2.8 in 2011, which is quite lower than the number of living children they already have.

Table-5.2: Distribution of ever married women by mean ideal number of children and percentage stating two or less children to be ideal by selected background characteristics, NDHS-2001, NDHS-2006 and NDHS-2011

Characteristics		Mean ideal number of children[#]			Percentage stating two or less children to be ideal		
		2001	2006	2011	2001	2006	2011
Residence	Urban	2.3	2.1	2.0	70.0	75.6	85.3
	Rural	2.7	2.5	2.3	47.6	59.3	75.2
Ecological region	Mountain	2.7	2.6	2.3	53.6	57.1	70.6
	Hill	2.5	2.2	2.1	58.9	73.2	78.7
	Tarai	2.7	2.6	2.3	41.9	54.3	68.8
Development region	Eastern	2.6	2.5	2.2	50.0	62.7	75.8
	Central	2.7	2.5	2.3	45.5	58.8	67.1
	Western	2.4	2.3	2.1	63.5	70.2	81.0
	Mid-Western	2.8	2.5	2.3	47.1	61.9	69.7
	Far-Western	2.8	2.4	2.3	38.6	59.9	71.3
Women's education	None	2.8	2.6	2.5	39.1	49.0	55.8
	Primary	2.3	2.2	2.1	66.9	77.3	80.5
	> Primary	2.0	1.9	1.9	88.6	90.3	93.4
Work status of women	Not working	2.6	2.3	2.2	52.0	66.2	73.4
	Agriculture	2.7	2.5	2.3	47.0	58.3	68.3
	Non-Agriculture	2.4	2.1	2.0	72.7	81.3	86.3
Household wealth quintile	Poorest	2.8	2.6	2.5	39.5	51.3	57.6
	Poorer	2.7	2.6	2.3	43.4	52.9	67.0
	Middle	2.7	2.5	2.3	43.9	56.5	78.2
	Richer	2.6	2.4	2.1	51.8	67.7	79.3
	Richest	2.3	2.1	1.9	71.4	82.4	88.8
Exposure to media	Low	2.8	2.1	2.5	39.0	45.8	57.3
	High	2.4	2.7	2.1	61.0	70.7	81.9
Religion	Hindu	2.6	2.4	2.2	50.7	63.2	73.4
	Non-Hindu	2.8	2.6	2.3	44.1	57.1	69.5
Age of woman	15-24	2.4	2.2	2.0	65.1	78.8	83.7
	25-34	2.6	2.3	2.2	52.2	67.2	77.7
	35-49	2.9	2.7	2.5	34.4	45.2	60.5
Number of living children	0	2.4	2.2	1.9	65.0	77.7	86.2
	1	2.3	2.0	1.9	68.3	84.5	90.6
	2	2.3	2.2	2.0	68.5	77.9	87.1
	3	2.7	2.5	2.4	40.2	54.3	61.1
	4+	3.1	2.9	2.8	29.7	36.1	44.3
All ever married women		**2.6**	**2.3**	**2.2**	**49.8**	**62.3**	**72.8**
Number of women (N)		**8569**	**8628**	**9935**	**8569**	**8628**	**9935**

Women with non-numeric response are excluded in calculation of mean ideal number of children

Source: Computed by the researcher from NDHS data 2001, 2006 and 2011

Urban rural differential in ideal family size is quite noticeable, with substantially higher mean ideal family size among rural women (2.3) than urban (2.0) counterparts. Only a

little variation in ideal family size is observed by ecological region and development region. Relatively lower mean ideal family size is found in Hills than in *Tarai* and Mountain. Similarly, the lowest value is found in Western development region whereas the highest one in Mid-Western region. Educational differences are quite high; mean ideal family size for uneducated women is 2.5 but the same for women with more than primary education is as low as 1.9. Similarly, gap in mean ideal family size between women from the poorest and the richest wealth quintile is very high; that for former is 2.5 and for the latter, it is 1.9. Non-Hindu women have relatively higher mean ideal family size than Hindus. Women working in non-agriculture sector stated lower ideal family size on average than women who are working in agriculture or are not working. Women who have higher exposure to mass media stated smaller ideal family size (mean 2.1) as compared to those who are less exposed (mean 2.5).

The differential noticed in stating ideal number of children between ever married and never married women has been analysed for different background characteristics from NDHS-2011 data. The results are presented in Table-5.3a and Table-5.3b. In all subgroups of the study variables, proportion stating two children as their ideal is the highest. Among never married women, 51 percent uneducated and 73 percent from the poorest household wealth quintile favoured for two children. In all age groups, proportion of women stating two children to be ideal is the largest irrespective of marital status of women. Proportion of women stating one or two ideal children declines with age for ever married women; but proportion stating three or more children to be ideal increases with age. Similar association has been observed with number of living children. For never married women, proportion stating two children to be ideal declines with age. This also suggests declining fertility preferences with age and number of children women already have.

Preference for only one child among never married women has emerged more in urban area (33 percent), in Central development region (26 percent), among women from the richest wealth quintile (34 percent), among women with more than primary education (26 percent) and among women working in the non-agricultural sector (30 percent). Preference for at least three children among never married women is the highest among uneducated women (32 percent) and relatively higher for women less exposed to mass media (16 percent) and women from the poorest household wealth quintile (11 percent).

Table-5.3a: Percent distribution of never married women age 15-49 by ideal number of children for selected background characteristics, NDHS-2011

Characteristics		Percent stating ideal number of children					Number of women
		0	1	2	3+	Non-numeric response	
Residence	Urban	3.6	33.4	60.8	1.4	0.8	503
	Rural	3.0	20.0	68.9	7.6	0.4	2204
Ecological region	Mountain	3.3	16.6	74.2	6.0	0.0	151
	Hill	3.8	24.5	67.5	3.7	0.4	1147
	Tarai	2.6	21.5	66.6	8.8	0.6	1410
Development region	Eastern	3.3	18.9	70.3	7.4	0.1	693
	Central	3.5	25.9	60.6	9.0	1.1	923
	Western	2.9	23.0	69.9	4.0	0.2	544
	Mid-Western	3.9	17.4	74.8	3.5	0.4	282
	Far-Western	0.7	24.3	71.2	3.7	0.0	267
Women's education	None	9.4	6.8	51.1	31.5	1.3	235
	Primary	4.5	11.8	70.9	12.8	0.0	313
	>Primary	2.2	25.7	68.7	2.9	0.5	2160
Work status of women	Not working	3.0	25.1	65.9	5.2	0.8	862
	Agriculture	2.7	18.0	70.7	8.5	0.0	1323
	Non-Agriculture	4.4	29.6	61.6	3.3	1.1	523
Household wealth quintile	Poorest	2.9	13.0	72.9	11.2	0.0	384
	Poorer	4.0	17.0	67.9	10.5	0.6	477
	Middle	3.5	18.5	68.1	9.3	0.6	508
	Richer	1.8	21.8	70.9	4.9	0.5	595
	Richest	3.4	34.1	60.9	0.9	0.7	745
Exposure to media	Low	3.3	14.6	65.6	15.9	0.6	508
	High	3.1	24.3	67.8	4.3	0.5	2202
Religion	Hindu	3.0	22.8	68.0	6.0	0.3	2228
	Non-Hindu	3.8	21.5	64.6	8.8	1.5	480
Age of woman	15-24	1.7	22.5	68.6	6.9	0.3	2476
	25-34	10.5	24.3	60.8	1.7	2.8	181
	35-49	45.1	17.6	33.3	3.9	0.0	51
All women		**3.1**	**22.5**	**67.3**	**6.5**	**0.5**	**2709**

Source: computed by the researcher from NDHS data 2001, 2006 and 2011

Table-5.3b: Percent distribution of ever married women age 15-49 by ideal number of children for selected background characteristics, NDHS-2011

Characteristics		Percent stating ideal number of children					Number of women
		0	1	2	3+	Non-numeric response	
Residence	Urban	0.5	16.5	68.4	14.3	0.3	1315
	Rural	0.4	9.7	60.8	28.8	0.3	8651
Ecological region	Mountain	0.3	8.1	62.2	29.4	0.0	653
	Hill	0.5	11.6	66.5	20.8	0.5	3943
	Tarai	0.4	10.1	58.3	31.0	0.2	5369
Development region	Eastern	0.3	11.4	64.1	24.1	0.1	2365
	Central	0.7	10.8	55.5	32.4	0.5	3313
	Western	0.4	10.9	69.7	18.8	0.2	2116
	Mid-Western	0.3	8.8	60.7	29.9	0.4	1197
	Far-Western	0.2	9.2	61.9	28.5	0.2	976
Women's education	None	0.5	4.7	50.6	43.8	0.4	4812
	Primary	0.4	10.0	70.2	19.2	0.3	1897
	>Primary	0.3	19.6	73.4	6.4	0.2	3258
Work status of women	Not working	0.4	13.3	59.7	26.1	0.5	2264
	Agriculture	0.3	7.4	60.5	31.4	0.3	5849
	Non-Agriculture	0.7	17.1	68.5	13.6	0.2	1852
Household wealth quintile	Poorest	0.2	5.2	52.1	41.9	0.5	1734
	Poorer	0.5	7.7	58.8	32.9	0.1	1917
	Middle	0.3	6.9	61.0	31.5	0.3	2093
	Richer	0.5	14.4	64.4	20.3	0.4	2129
	Richest	0.6	17.5	70.7	10.9	0.2	2094
Exposure to media	Low	0.5	5.4	51.4	42.3	0.3	3760
	High	0.4	13.6	67.9	17.8	0.3	6295
Religion	Hindu	0.4	10.6	62.4	26.3	0.3	8443
	Non-Hindu	0.4	10.5	58.6	29.9	0.6	1521
Age of woman	15-24	0.5	17.1	66.1	16.2	0.1	2575
	25-34	0.4	11.7	65.5	22.0	0.3	3653
	35-49	0.5	5.0	55.1	39.0	0.5	3737
Number of living children	0	1.7	21.6	62.9	13.6	0.2	1116
	1	0.4	23.7	66.5	9.1	0.3	1839
	2	0.4	10.0	76.7	12.6	0.2	2751
	3	0.3	3.7	57.0	38.6	0.3	2041
	4+	0.1	1.1	43.2	55.1	0.5	2220
All women		**0.4**	**10.6**	**61.8**	**26.9**	**0.3**	**9965**

Source: computed by the researcher from NDHS data 2001, 2006 and 2011

Among ever married women, preference of one child is the highest among women who have one living child (24 percent) followed by women with more than primary education (20 percent), women from the richest wealth quintile (18 percent), and urban women (17 percent). Similarly, preference of at least three children among ever married women is the highest among women with four or more living children (55 percent), followed by uneducated women (44 percent), women less exposed to mass media (42 percent), and women from the poorest household wealth quintile (42 percent). A maximum of women (77 percent) with two children stated their desired family size to be two. Similarly, more than 70 percent women with some education and those from the richest household wealth quintile prefer to have only two children. Proportion of ever married women who stated three or more children to be ideal declined from 42 percent for women from the poorest household wealth quintile to 11 percent for women from the richest household wealth quintile.

5.1.2 Determinants of ideal number of children

The pervious section described trends and differentials in ideal family size. Differentials are found for never married and ever married women by some socioeconomic and demographic factors. This section uses multivariate analysis to examine significant predictors of variation in ideal family size. Since the dependent variable is a count variable, Poisson regression model has been used to assess the effect. Regressions are separately performed for never married, ever married and all women for survey data of 2011. Results are presented in Table-5.4.

It is interesting to note that, among never married women, after controlling for other factors, women's education alone stands to have negative impact on ideal family size. Only women with more than primary education have significantly lower Poisson ratio (0.88) with reference to uneducated women. However, among ever married women, women's education, her household wealth quintile, working status, exposure to mass media, and number of living children are significant predictors of variation in ideal family size. Results for all women (both ever married and never married) are similar as those for ever married women (shown in the last column of Table 5.4). After controlling for other factors, the ratio of mean ideal family size declines to 0.93 and 0.90 times respectively for women who have primary education and more than primary education, as compared to those having no education.

Table-5.4: Results of Poisson Regression on ideal number of children of never married, ever married and all women age 15-49, NDHS-2011

Characteristics		Poisson Ratio (Exp(β)) for		
		Never married women	Ever married women	All women
Residence	Urban (Ref.)	-	-	-
	Rural	1.03	1.02	1.02
Ecological region	Mountain (Ref.)	-	-	-
	Hill	0.99	1.01	1.01
	Tarai	1.02	1.06	1.06**
Development region	Eastern (Ref.)	-	-	-
	Central	0.94	0.99	0.98
	Western	0.95	0.97	0.97
	Mid-Western	0.94	1.01	0.99
	Far-Western	0.95	0.99	0.98
Women's education	None (Ref.)	-	-	-
	Primary	0.91	0.94**	0.93***
	More than primary	0.88*	0.90***	0.90***
Work status of women	Not working (Ref.)	-	-	-
	Agriculture	1.01	0.98	0.99
	Non-Agriculture	1.02	0.95*	0.96*
Household wealth quintile	Poorest (Ref.)	-	-	-
	Poorer	0.97	0.95*	0.96*
	Middle	0.97	0.95*	0.95*
	Richer	0.97	0.91**	0.92**
	Richest	0.94	0.90**	0.91**
Exposure to media	Low (Ref.)	-	-	-
	High	0.96	0.96*	0.96**
Religion	Hindu (Ref.)	-	-	-
	Non-Hindu	1.00	1.02	1.01
Age		0.97	1.0	0.99
Number of living children		--	1.07***	1.07***
Intercept		3.08***	1.99***	2.1***
Log Likelihood Chi Square		58.93***	620.87***	846.17***
Number of cases (unweighted)		2826	9810	12636

Note: Women with nun-numeric response are excluded from analysis; *, ** and *** indicate that the values are significant at 5%, 1% and 0.1% level of significance respectively

Source: Computed by the researcher from NDHS data 2011

Similarly, the mean ideal family size decreases to some extent for women from the second to the fifth wealth quintile as compared to women from the first wealth quintile (Poisson ratios range from 0.90 to 0.95 and are significant). Variation in fertility preference by household economic condition suggests that the economic differentials in

fertility would remain even when fertility preferences are met. These results are similar to those for Indian states as observed by Roy et al. (1999). Ideal family size is significantly negatively affected by women's involvement in the non-agricultural sector as compared to not working women and higher exposure to mass media as compared to lower exposure. Larger number of living children has a nominal but significant positive impact on ideal number of children. Place of residence, religion, ecological region and development region are not significant factors to explain variation in ideal family size in Nepal after controlling for other factors.

5.1.3 Changes in desire for additional children

Information on desire for the next child tells future fertility intention of couples. Since births are confined almost within marital union in Nepal, currently married women were asked in DHS whether they desired an additional child in future. Some indications of fertility preference can be obtained by analyzing socioeconomic and demographic characteristics of couples who desire an additional child and who do not desire further. Since desire for an additional child is largely determined by the number of living children a couple already have, analysis of desire for an additional child is to be made by number of living children. Table-5.5 depicts the status of future intention to have additional child of currently married women based on NDHS-2001, 2006 and 2011 survey.

Couples with husband or wife sterilized are deemed not to desire an additional child. The share of sterilized couples was 21 percent in 2001, 24 percent in 2006 and 23 percent in 2011. Around one fourth already had enough children and got sterilized. In all the three surveys, proportion sterilized increased with the number of living children and a maximum proportion of couples are found to be sterilized after having three children. Proportion of women who want no more children has increased over time. Some 44 percent women did not want an additional child in 2001, but 50 percent women stated so in 2011. A maximum proportion of couples desire to stop childbearing after having two children, and this proportion is also increasing over time, indicating emergence of the two-child norm. Among women with two living children, about two thirds want to stop childbearing in 2011. But in 1976, merely 23 percent currently married fecund women had intention to stop childbearing after having two children (HMG 1977). At the same time, the proportion stating no desire for further child after having a single child is also increasing; it was 23 percent in 2001 and increased to 37 percent in 2011.

Table-5.5: Percent distribution of currently married women stating their desire for an additional child by number of living children, NDHS-2001, NDHS-2006, NDHS-2011

Desire for an additional child	Percent of women stating the desire with number of living children[#]					
	0	**1**	**2**	**3**	**4+**	**All women**
			2011			
Wants within 2 years	36.7	15.2	3.3	2.2	0.6	8.4
Wants after 2+ years	44.2	38.8	4.7	2.0	0.5	14.0
Wants, unsure timing	1.4	2.5	0.8	0.4	0.2	1.0
Undecided	5.7	3.9	1.7	0.4	0.3	2.0
Wants no more	8.5	37.0	65.2	50.6	61.0	49.7
Sterilized*	1.3	1.5	23.1	42.3	34.0	23.0
Declared infecund	2.2	1.1	1.1	2.0	3.3	1.9
Number of women	**1074**	**1782**	**2661**	**1969**	**2121**	**9607**
			2006			
Wants within 2 years	44.2	16.8	5.0	2.4	1.0	9.4
Wants after 2+ years	42.0	44.1	8.6	3.3	1.0	14.8
Wants, unsure timing	1.7	1.0	0.2	0.2	0.0	0.4
Undecided	2.4	2.9	1.0	0.6	0.6	1.3
Wants no more	5.4	31.4	59.1	49.2	58.4	46.6
Sterilized*	0.7	1.7	25.0	41.9	33.3	24.4
Declared infecund	3.5	1.9	1.2	2.3	5.8	3.1
Number of women	**859**	**1390**	**1972**	**1704**	**2329**	**8254**
			2001			
Wants within 2 years	50.5	20.0	6.3	3.4	1.1	11.5
Wants after 2+ years	37.1	48.0	15.3	5.7	1.6	16.6
Wants, unsure timing	2.8	2.9	1.1	0.6	0.6	1.3
Undecided	2.1	1.8	2.0	1.0	0.8	1.4
Wants no more	4.2	22.7	54.0	49.4	60.2	44.3
Sterilized*	0.6	1.8	19.3	37.3	29.9	21.3
Declared infecund	2.7	2.8	1.9	2.6	5.9	3.6
Number of women	**1005**	**1289**	**1671**	**1628**	**2745**	**8338**

includes current pregnancy, * wife or husband sterilized

Source: MOH et al. 2002; MOHP et al. 2007; MOHP et al. 2012

It is rather surprising that the proportion of currently married women with no living children who do not desire any more children in future, though small, is increasing over time (from four percent in 2001 to nine percent in 2011). This indicates the emergence of

childlessness, voluntarily or for some other physiological reasons. Overall, there is some decline in the proportion of currently married women desiring the next child in near future. In 2001, 12 percent women wanted to have the next child within two years whereas, in 2011, only eight percent had such a desire. The proportion stating their desire for next child after two years is almost the same (14 percent) over time. A small proportion of women are either undecided about their future intention of fertility or undecided about the timing though they stated a desire to have next child.

Table-5.6 shows differentials in percentage of currently married women stating no desire for an additional child by the number of living children they already have for selected background characteristics for 2011. Treating a woman who is sterilized (or whose husband is sterilized) as having no desire for an additional child, the numerator of this percentage includes women who stated that they had no desire for next child and sterilized women. Those women who declared infecund are excluded from analysis because, whether they desired an additional child is actually unknown. Some 74 percent women wanted no more children; the proportion increases with increased number of living children. A non-negligible proportion (one in every 10) of women with no children did not want any more children; this increased to 39 percent for women with one child, 89 percent for those with two children, 95 percent for those with three children and 98 percent for those with at least four children. The reason for the small yet non-negligible proportion of women with no children not wanting to have one is largely unknown. Some of them might have voluntarily decided not to have children and some others might change their current preference and have children later.

In terms of place of residence, ecological region and development region, there is very little difference in the proportions who did not want an additional child for women with one, two and three living children. At least 29, 87 and 93 percent women respectively with one, two and three living children did not want to have an additional child. Some educational differences have been observed in proportions who do not want another child. For women with one, two, and three children, the desire to stop childbearing increases steadily with increase in women's education. Similarly, for women with two children, desire to stop childbearing increases from 86 percent for women in the poorest quintile to 99 percent for women in the richest quintile. A similar increment is observed for women with one living child.

Table-5.6: Percentage of currently married women age 15-49 who do not desire an additional child by number of living children for selected background characteristics, NDHS-2011

Background Characteristics		Percentage of women with living children					
		0	1	2	3	4+	All women
Residence	Urban	13.4	43.7	93.1	97.7	98.7	74.8
	Rural	9.6	38.1	88.5	94.4	98.3	74.0
	Mountain	11.9	35.7	88.7	96.1	97.8	76.2
Ecological region	Hill	11.7	42.2	93.0	97.6	99.1	76.9
	Tarai	8.6	37.1	86.7	92.9	97.6	71.9
Development region	Eastern	13.3	34.4	88.3	94.8	99.1	71.9
	Central	9.0	42.9	87.3	93.5	97.6	74.5
	Western	10.47	44.8	94.3	98.0	98.7	77.3
	Mid-	7.0	36.0	89.7	93.7	97.5	73.6
	Far-Western	4.9	29.1	87.1	93.5	98.8	75.2
Women's education	None	8.5	36.6	84.6	93.8	98.3	83.9
	Primary	7.0	38.2	90.9	93.8	98.6	73.4
	>Primary	11.6	40.3	92.9	99.4	97.0	60.9
Work status of women	Not working	6.5	40.1	85.0	92.4	97.9	64.3
	Agriculture	8.3	36.2	89.2	94.9	98.3	77.8
	Non-	19.3	43.6	93.7	97.5	98.6	74.9
Household wealth quintile	Poorest	5.0	29.8	86.1	92.1	97.7	77.1
	Poorer	7.3	36.1	84.9	94.1	98.8	74.0
	Middle	8.9	31.0	83.5	93.4	97.7	70.4
	Richer	12.2	43.3	92.3	96.5	98.3	74.2
	Richest	14.5	47.4	94.9	98.8	99.5	75.5
Exposure to media	Low	6.6	33.7	83.0	91.1	97.3	76.2
	High	11.3	41.1	91.9	97.5	99.5	73.0
Religion	Hindu	10.4	37.3	89.6	94.8	98.1	74.0
	Non-Hindu	8.2	47.6	87.7	94.6	98.9	74.8
Age of woman	15-24	7.4	32.3	78.0	82.9[@]	-	35.8
	25-34	14.7	43.4	89.7	92.9	96.1	80.5
	35-49	52.9[#]	73.4	96.4	98.5	99.1	96.9
Number of living sons	0	10.1	29.9	59.9	70.8	79.2	30.1
	1	-	46.7	93.6	93.2	98.2	81.5
	2	-	-	94.6	99.3	99.7	97.7
	3+	-	-	-	98.3	99.6	99.3
Experienced any child loss	No	10.2	37.8	90.3	95.4	98.3	71.4
	Yes	8.2	50.3	83.5	92.8	98.1	86.4
Husband's residential status	At home	11.2	39.5	90.2	95.2	98.3	76.8
	Elsewhere	8.1	38.2	87.5	93.9	98.1	68.5
All women		**10.1**	**39.0**	**89.3**	**94.8**	**98.2**	**74.1**
Number of women		**1051**	**1763**	**2630**	**1929**	**2053**	**9426**

Note: Living children includes current pregnancy; @ Merged as three or more children due to small frequency in four or more children category

Source: Computed by the researcher from NDHS data 2011

Differential by religion is quite small, noticeable only for women with one child, where, more proportions of non-Hindu women have desire to stop childbearing. Similarly, of women with two children 85 percent of those not working do not want an additional child in contrast to 94 percent of those working in the non-agriculture sector. Experience of child loss has some influence on future intention to have next child. For women with two children, 90 percent women who had never experienced child loss stated no desire for another child but, 84 percent women who had experience of child loss stated the same. Future intention to have an additional child shows very little variation by husband's residential status. Almost equal proportions of women with one, two and three children stated their desire to stop childbearing, irrespective of whether husband is residing at home with wife or living elsewhere. Current age is also a factor in bringing variation in desire for next child; for women with one or two children, increase in age means increase in the proportion having no desire for an additional child. Sex composition of living children heavily influences the future preference for a child. Among women with two children, if both are daughters, 60 percent do not desire further, but, if at least one of them is son, 95 percent do not desire to have an additional child. This indicates a stronger preference for sons as compared to daughters in Nepal.

5.1.4 Determinants of 'no desire for an additional child'

This section describes results obtained from Logistic Regression analysis of 'no desire for an additional child' on selected socioeconomic and demographic factors (the explanation of the method has been provided in Chapter-II, section 2.3.8). The analysis has been carried out for currently married women surveyed in NDHS-2011. For the reason mentioned earlier, separate regressions are performed for women with one, two and three living children, and those women who declared infecund are not considered for the analysis. Results are shown in Table-5.7. Controlling for other factors, rural-urban residence and ecological region are no more significant factors to predict 'no desire for an additional child'. However, the development region has some influence; odds of 'no desire for an additional child' are significantly greater for women with one and three children from Western development region as compared to those from Eastern development region.

Table-5.7: Results of Logistic Regression analysis showing the effect of selected background characteristics on 'no desire for an additional child', NDHS-2011
(For currently married women with one, two and three living children)

Background Characteristics		Odds ratios for women with		
		one living child	two living children	three living children
Residence	Urban (Ref.)	-	-	-
	Rural	1.16	0.85	0.71
Ecological region	Mountain (Ref.)	-	-	-
	Hill	0.94	0.99	1.54
	Tarai	0.78	0.62*	0.37
	Eastern (Ref.)	-	-	-
Development region	Central	1.56*	1.14	0.98
	Western	1.93***	1.57	2.15
	Mid-Western	1.37	1.40	0.73
	Far-Western	1.12	1.33	0.71
	None (Ref.)	-	-	-
Women's education	Primary	0.98	1.66*	1.23
	>Primary	0.88	1.41	3.08*
	Not working (Ref.)	-	-	-
Work status of women	Agriculture	0.90	1.56*	1.45
	Non-Agriculture	0.88	1.58	3.21*
Household wealth	Poorest (Ref.)	-	-	-
quintile	Poorer	1.25	1.34	2.31*
	Middle	1.20	1.31	1.59
	Richer	1.58*	2.39**	2.25
	Richest	1.87*	3.13**	4.20*
Religion	Hindu (Ref.)	-	-	-
	Non-Hindu	1.33*	0.99	1.53
Exposure to media	Low (Ref.)	-	-	-
	High	1.02	1.24	1.73*
Age	15-24 (Ref.)	-	-	-
	25-34#	1.93***	1.50*	3.03**
	35-49		4.95***	13.14***
	0 (Ref.)	-	-	-
Number of living son	1	1.99***	10.92***	6.93***
	2		16.49***	74.82***
	3+			39.60***
Experience of child	No (Ref.)	-	-	-
loss	Yes	1.59*	0.69**	0.81
Husband's residential	At home (Ref.)	-	-	-
status	Elsewhere	1.09	1.03	1.13
Constant		0.17***	0.33*	0.30
-2LL		2140	1233.57	434.13
Cox and Snell R square		0.08	0.15	0.12
Negelkerke R square		0.11	0.31	0.40
Number of cases (unweighted)		1708	2619	1894

Note: *, ** and *** indicate that the values are significant at 5%, 1% and 0.1% level of significance respectively;
for one living child, age groups 25-34 and 35-49 are merged to 25-49
Source: computed by the researcher from NDHS data 2011

For women with two and three children, women's education has net positive effect on 'no desire for an additional child'. As compared to uneducated women, those with some primary education have 1.6 times higher odds of 'no desire for an additional child' if they had two children, and for women with more than primary education, the odds for the same are three times higher if they had three children. Similarly, among women with one or two children, as compared to those from the poorest wealth quintile, odds of no desire for an additional child are significantly higher for women from richer and the richest wealth quintile. Non-Hindu women with one child have higher odds of desire to stop childbearing as compared to the reference category of Hindu women, but the effect is insignificant for women with two and three children. For women with three children, women's work status has a significant effect; with three times higher odds of desire to stop childbearing for women working in the non-agriculture sector with reference to not working women.

Higher odds of no desire for next child among women with three children have been observed for those who are better exposed to mass media as compared to those who are less exposed. Husband living with wife or living elsewhere makes no difference in intention to stop childbearing. Obviously, increase in age is associated with increase in odds of intention to stop childbearing after controlling for other factors. Odds of no desire for additional child increase steeply as the number of son increases. If couples have one son out of one, two, or three children, the odds of no desire for next child multiply two, eleven and seven times respectively. It appears that, two children with a son is the most preferred sex composition for Nepali couples and they intend to stop childbearing after that.

5.2 Dynamics of Contraceptive Use

The previous chapters discussed the evidence of fertility decline with continuing differentials and the analysis in the previous section of this chapter revealed declining fertility preferences with differentials existing across various subgroups of population. Since contraceptive use is one of the most essential tools for fertility decline, it is desirable to analyse the dynamics of contraceptive use during fertility decline to see how these differentials in fertility are reflected in contraceptive use. In this context, the present section deals with level and trends of contraceptive use, analyses the differentials and examines the determinants of it. The analysis is primarily based on survey data of NDHS-2001, 2006 and 2011.

5.2.1 Level and trends in contraceptive use

Table-5.8 shows the level and trend of modern contraceptive use of currently married non-pregnant women in Nepal based on figures from various sources. There were only three percent currently married non-pregnant women using some kind of modern contraceptives in 1976. This very low level of use was associated with a lower level of knowledge of couples about modern means of contraception, poor condition of availability (supply), cost factor including direct and psychological costs and cultural factors. Moreover, this was the period just after formal implementation of the family planning programme in Nepal. The level of knowledge on family planning methods at that time was poor, 77 percent ever married women had heard of no methods of family planning; male sterilization was the most known (16 percent knew about it) and most used method at that time (HMG 1977). Likewise, 96 percent ever married women had never used contraception at that time (ibid.). But the situation has become quite different now; knowledge of some means of contraception has become universal (MOHP et al. 2012; MOHP et al. 2007). The proportions of currently married non-pregnant women of reproductive age currently using a modern contraceptive is gradually increasing; which reached 39 percent in 2001, 48 percent in 2006 and showed a marginal decline to 46 percent in 2011. A gradual increase and tapering in the level of use of modern methods has been observed, which is further clarified by Figure-5.1.

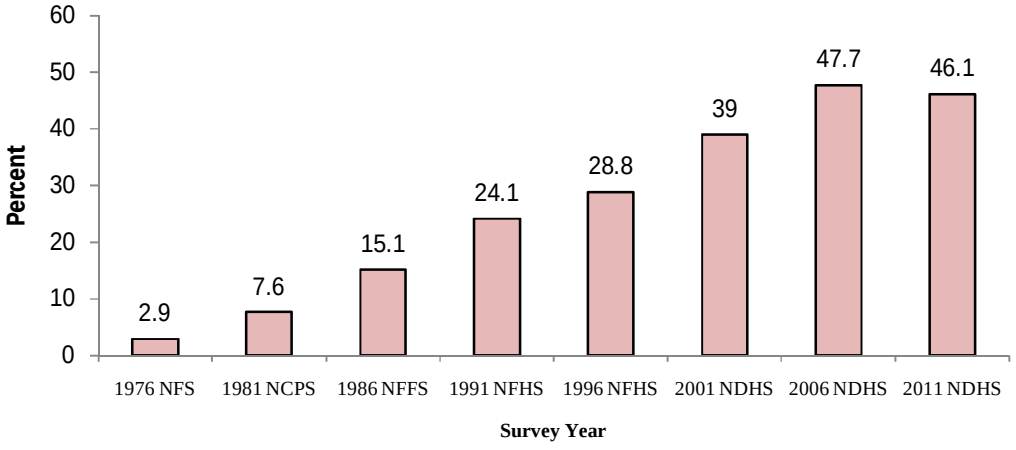
During this increment in the proportion of users, female sterilization users increased from a nominal 0.1 percent in 1976 to 19.5 percent in 2006 and then declined to 16.2 percent in 2011. Similarly, male sterilization showed an increase till 1991 reaching a maximum of 7.5 percent from two percent in 1976, and has stabilized around that level. Use of Pills and Condoms has shown a slow increase and now less than five percent are using these methods. Injectable contraceptive is the second popular method now, used by about 10 percent couples. Long acting temporary methods like IUD and Implants are used by only a very small proportion of couples (around one and half percent each). But, use of these methods has shown some increment in the period 2006-2011.

Table-5.8: Percentage of currently married non-pregnant women age 15-49 who are currently using modern contraceptive methods by type of methods, Nepal

Method	1976 NFS[a]	1981 NCPS[b]	1986 NFFS[b]	1991 NFHS[b]	1996 NFHS[b]	2001 NDHS[c]	2006 NDHS[c]	2011 NDHS[c]
Female Sterilization	0.1	2.6	6.8	12.1	13.3	16.5	19.5	16.2
Male Sterilization	1.9	3.2	6.2	7.5	6.0	7.0	6.8	8.4
Condom	0.3	0.4	0.6	0.6	2.1	3.2	5.2	4.6
Pill	0.5	1.2	0.9	1.1	1.5	1.8	3.8	4.4
Injectables	0.0	0.1	0.5	2.3	5.0	9.3	10.9	9.8
Implants	NA	NA	NA	0.3	0.5	0.7	0.8	1.3
IUD	0.1	0.1	0.1	0.2	0.3	0.4	0.7	1.4
Others	NA	NA	NA	NA	0.1	0.1	0.0	0.0
Any modern method	2.9	7.6	15.1	24.1	28.8	39.0	47.7	46.1
Total Number	4325	5277	3654	22096	7190	7591	7645	8987

Note: The proportions for 1976, 1981, 1986, 1991 and 1996 mentioned in this table were for currently married non-pregnant women age 15-49 and the same denominator has been used to calculate the proportions from survey data of 2001, 2006 and 2011 to facilitate comparison, NA: Not Applicable
Source: [a]HMG 1977; [b]Pradhan et al. 1997; [c]Calculated by the researcher from NDHS 2001, 2006 and 2011 data files

Figure-5.1: Percentage of currently married non-pregnant women age 15-49 who are using modern contraceptive methods, Nepal, 1976-2011

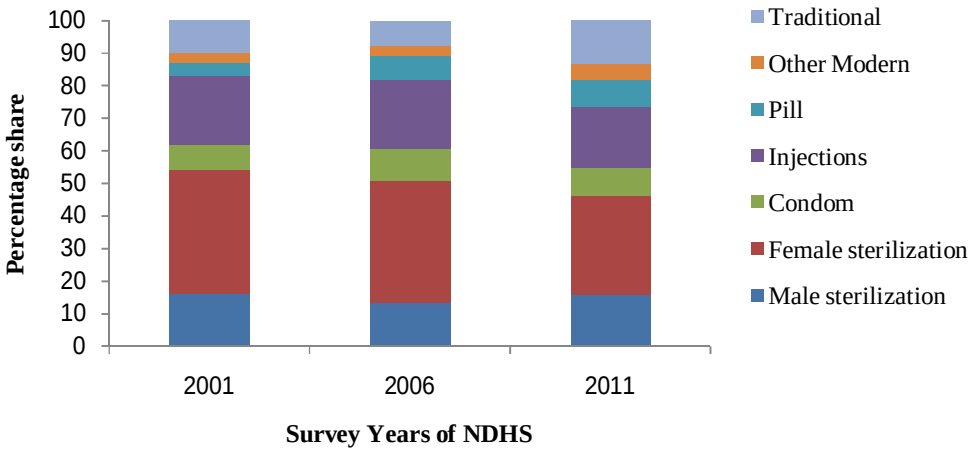


Source: Table 5.8

In the context of changing proportions of users of different methods and the changes occurred in proportion of users of any methods, dynamics of use of different methods can be better explained by proportionate share of each methods; which has been obtained for the most recent three surveys in Nepal and presented in Figure-5.2. This figure shows that

female sterilization remained the most popular method in the study period but some decline in its proportionate share of use has been observed in the most recent survey of 2011. Similarly, injection has the second highest share among different methods, with a slightly decline in its share in the last survey followed by male sterilization, with a nominal increase in its share observed in the recent past. Share of Condom and Pills are not so large and are almost equal; with a nominal increase over time in the share of Pills. Other modern methods, which include long term temporary methods IUD and Implants together have still lower share in total use, and showing a very nominal increase in it over time.

Figure-5.2: Percentage share of different contraceptive methods among currently married women using contraception, 2001-2011



Note: Other modern methods include IUD, Implants and Foam or Jelly
Source: Calculated by the researcher from NDHS 2001, 2006 and 2011 data files

Traditional methods also contribute a substantial share in total contraceptive use and its share is increasing over time. Some changes in the method mix have been observed in the period 2001-2011 in contraceptive use. A gradual shift from permanent to temporary methods, increase in share of traditional method as well as long term temporary methods is evident. Different factors might have played a role to bring this gradual shift. Increased awareness level of people might have favoured more consistent use of traditional methods like withdrawal and calendar method and the programme's focus on temporary methods as compared to sterilization at present might have played role. Increased access to services through the programme and increase in number of methods offered might also have made the difference. Similarly, experience of some side effects of a method makes users to switch over to another method and may bring some changes in share of different

methods. But, in spite of the programme's emphasis to promote long acting temporary methods, the share of such methods among all methods has not successfully increased.

5.2.2 Differentials in contraceptive use

The increase in level of contraceptive use over time is a result of a complex process and to some extent, associated with changes that have occurred in socioeconomic and demographic conditions of population both in individual and in community level. Based on the data from NDHS-2001, 2006 and 2011, this section explains differentials in contraceptive use for various categories of selected background characteristics. The analysis is based on information obtained from women who were currently married and in reproductive age at the time of survey. Contraceptive use at the time of survey refers to the situation where either of the husband or wife is using contraception and the information has been given by the wife. Most of the times, explanations are given in terms of 'woman' just for simplicity, but it actually refers to 'couple' and should be understood accordingly. Since the use of contraceptives obviously depends on the number of children a couple currently has, the analysis of contraceptive use has been made separately for couples with different number of living children. Differentials of contraceptive use for women with no living child have not been studied because fertility regulation before the first birth is very low in developing countries undergoing fertility transition. Due to much smaller size of women with five or more children, a broader category of four or more children has been used for the purpose of analysis of contraceptive use.

Tables-5.9a and 5.9b give percentage of currently married women age 15-49 using any method of contraception for one, two, three, and four or more living children for selected background characteristics. In all the three surveys, proportion using contraception increased with increase in the number of living children up to three children and declined slightly for women with four or more children. Moreover, increment in users has been observed over time for one, two, three, and four or more living children. The increment in the proportions of women with one child using contraceptives is substantial from 2001 to 2011; there were 20 percent women with one child using contraception in 2001, which reached 32 percent in 2011, an increment of 12 percentage points. Similarly, among women with two and three children, the proportions increased by 14 and 12 percentage points respectively in the same period. A bit higher increment in contraceptive use for women with two children indicates couples' increasing practice to use contraceptives at

two children. However, maximum proportions of users are found among women with three living children in all the three surveys.

Urban rural differential in start of contraceptive use as well as the level of use is evident in all three surveys. Though the level of use is rising in both the areas of residence, it is higher in urban area than in rural area for all parity women. Urban women start using contraception at lower parity as compared to rural women. For example, in 2011, 49 percent urban women with one child were contraceptive users but only 29 percent rural women with one child were doing so. Some regional differences in contraceptive use have been noticed in the study period. The proportions of contraceptive users among women with one child are found to be the highest in the Hill region (36 percent), followed by the *Tarai* (31 percent) and the least in the Mountain (19 percent) in 2011. These differentials are almost non-existent for women with two children in 2011; and for women having three children, the highest proportions of users are in the *Tarai* region (70 percent), followed by the Mountain (66 percent) and the Hill (61 percent) regions respectively. For women with four or more children, the highest proportion of contraceptive users is again found in the *Tarai* (64 percent). In terms of development regions, a huge differential in users among women with one child in the past has been narrowed down now. In 2001, only 11 percent women with one child from the Mid-Western region and 27 percent from the Eastern region were using contraception, but, in 2011, the respective figures for the Mid-Western and the Eastern region reached 33 percent and 31 percent respectively. Some differential still exists in contraceptive use of women with two children; the highest proportion of users is in the Central region (62 percent) and the lowest proportion is in the Mid-Western region (52 percent). The Central region consistently shows the highest proportion of users of contraception for all parity women. It may be due to the presence of the capital city and other larger urban centres in the region, with a good access to methods.

Educational differentials in contraceptive use are evident; a positive association of women's education with proportion using contraception has been observed for women having one, two, and three living children throughout the study period. For women with four or more children, a curvilinear relationship of women's education has been found with proportion of contraceptive users. For example, in 2011, 66 percent uneducated women with three children are using contraception whereas, 75 percent women with more than primary education are doing so. More educated women have tendency to start using

contraception at early parity as compared to less educated counterparts. Among women having one child, 20 percent uneducated women are using contraception whereas, 38 percent women with more than primary education are using contraception in 2011. Irrespective of the number of living children women have, a positive association of household wealth quintile with contraceptive use has been found throughout the study period. For example, in 2011, among women with two living children, 47 percent women from the poorest wealth quintile are using contraception and this proportion increases to 69 for women from the richest wealth quintile. Moreover, higher proportion of women from better household wealth quintile uses contraceptives at lower parity (for women with one child, proportions of women using contraceptives are 18 and 45 percent respectively for women from the poorest and the richest household wealth quintile). Economically well off women start contraception at lower parities than economically worse women.

Women with high exposure to mass media have higher contraceptive use than those with low exposure at all parities. For women with two children, there are 48 percent with low exposure to mass media and using contraceptives but it is 60 percent for those with high exposure to mass media. Some religious differentials in contraceptive use are evident; with more proportion of Hindu women using contraception as compared to Non-Hindu counterparts at all levels of number of living children throughout the study period. Women engaged in non-agricultural activities are more likely to use contraception and also start using it at lower parity. For example, among women having three living children, 65 percent are using contraceptives if they are engaged in agriculture and 75 percent are using it if they are engaged in non-agricultural works. Also, among women having one child, some 27 percent women who are either not working or working in the agriculture sector are using contraception and 50 percent women working in the non-agricultural sector are doing so.

Current use of contraception is heavily influenced by sex composition of living children. Differences of large magnitude among women with two children and with three children are observed in current use of contraceptives by number of sons they already have, but, such differences are smaller among women having one child. In 2001, 16 percent women having only a daughter were using contraceptives but 23 percent used it if the child was son. But in 2011, this difference narrowed down, where, 30 percent women having only a daughter were using contraceptives and 34 percent women having only one son were using contraceptives. This suggests an increasing tendency of couples to adopt

contraceptives after one child irrespective of the sex of the first child. However, the gap in contraceptive use by the number of sons has remained consistently large over the study period for women with two and three children. For example, among women having two children, 21 percent with both daughters and 58 percent with both sons were using contraception in 2001 and those respective percentages reached to 39 percent and 66 percent in 2011. Similarly, among women having three children, 20 percent with all three daughters and 66 percent with all three sons were using contraception in 2001 and those respective percentages reached to 36 percent and 73 percent in 2011.

For women with two or more children, contraceptive use rate rises with increase in current age throughout the study period but, a curvilinear relationship of current age with contraceptive use is found for women having one child. For example, in 2011, among one child women, there are 30 percent users of contraception aged 15-24, 35 percent users aged 25-34 and 34 percent users aged 35-49. Slightly reduced use among women aged 35-49 with one child may be due to their intention to have additional child. Higher age at marriage means higher rate of contraceptive use, but it is true for women with one and two children only. For women having more than two children, differential by age at marriage is quite negligible. Some lower proportion of women used contraception if they had experienced loss of child as compared to those who had never had such experience. Other most important factor to bring variation in contraceptive use is husband's absence from home. A consistently low level of contraceptive prevalence has been found for those women whose husband is living elsewhere as compared to those whose husband is staying with wife and this wide gap persists throughout the study period. For example, in 2011, among women having two children, 73 percent women whose husband currently lives with wife use contraception but, only 27 percent women whose husband is staying elsewhere are using contraception. The reason may be a perceived low risk of pregnancy or even contraception deemed not necessary due to infrequent or no sex during husband's absence. Using contraception in the absence of husband is also criticized in society on moral grounds.

Table-5.9a: Percentage of currently married women age 15-49 currently using any contraception by number of living children for selected background characteristics, NDHS-2001, 2006 and 2011

Background Characteristics		Percentage of users with 1 Living Child			Percentage of users with 2 Living Children		
		2001	2006	2011	2001	2006	2011
Residence	Urban	43.7	50.6	48.9	74.2	68.2	68.4
	Rural	16.6	24.0	29.2	37.9	52.1	54.2
Ecological region	Mountain	16.1	19.4	24.5	37.8	39.8	55.6
	Hill	21.4	35.5	35.6	41.8	56.7	57.2
	Tarai	18.5	24.1	30.5	43.9	55.5	56.2
Development region	Eastern	26.6	24.1	31.2	46.6	54	52.7
	Central	21.7	35.4	34.3	44.7	59	62.1
	Western	15.5	22.1	28.9	41.8	48.6	54.5
	Mid-Western	11.0	30.1	33.3	43.7	46.8	52.4
	Far-Western	14.3	30.7	33.8	24.1	61.1	57.4
Women's education	None	11.4	20.0	20.3	33.1	53.6	52.7
	Primary	24.4	27.8	28.2	46.4	53.0	53.4
	More than primary	36.4	38.2	38.6	68.0	59.3	62.2
Work status of women	Not working	20.7	28.4	26.8	47.9	51.8	48.8
	Agriculture	15.9	22.8	27.9	34.7	52.7	53.9
	Non-Agriculture	47.6	58.0	50.0	69.0	68.4	70.3
Household wealth quintile	Poorest	10.9	10.9	18.1	23.9	39.4	46.5
	Poorer	11.4	18.3	27.3	28.4	42.9	46.5
	Middle	13.1	21.7	25.4	36.6	54.1	49.0
	Richer	18.8	33.4	34.3	45.5	57.2	59.7
	Richest	40.7	47.3	45.1	70.0	69.3	69.4
Exposure to	Low	10.4	15.6	22.5	26.5	41.0	48.0
	High	27.3	33.8	36.0	55.9	59.9	60.0
Religion	Hindu	19.9	29.7	33.0	43.7	56.5	58.1
	Non-Hindu	16.3	25.6	27.9	34.7	45.8	47.7
Age of woman	15-24	19.7	28.4	30.3	30.2	39.4	36.1
	25-34	21.9	32.2	35.0	48.0	60.3	57.9
	35-49	12.3	23.1	34.2	55.7	65.9	68.0
Age at marriage	Less than 16	11.8	24.6	26.1	37.9	51.5	53.4
	16 and above	23.1	30.4	33.8	45.2	56.5	57.7
Number of living sons	0	16.1	27.1	30.2	20.9	35.9	38.8
	1	22.9	30.9	33.8	40.9	51.2	54.9
	2	-	-	-	57.7	67.7	66.2
Experienced any child loss	No	20.7	30.6	32.2	44.5	55.4	57.7
	Yes	13.6	16.9	31.4	36.4	53.8	50.1
Husband's residential status	At home	24.8	42.1	49.5	50.2	67.5	72.6
	Elsewhere	6.5	8.1	6.8	20.5	28.0	26.7
All women		**19.5**	**29.1**	**32.2**	**42.6**	**55.1**	**56.6**
Number of women		**1289**	**1391**	**1782**	**1673**	**1973**	**2660**

Source: Computed by the researcher from NDHS data 2001, 2006 and 2011

Table-5.9b: Percentage of currently married women age 15-49 currently using any contraception by number of living children for selected background characteristics, NDHS: 2001, 2006 and 2011

		Percentage of users with					
		3 Living Children			4+ Living Children		
Background Characteristics		**2001**	**2006**	**2011**	**2001**	**2006**	**2011**
Residence	Urban	77.2	74.5	76.4	66.5	65.2	64.8
	Rural	52.7	63.7	65.5	47.8	53.8	58.4
Ecological region	Mountain	38.5	57.3	65.9	41.3	45.3	54.6
	Hill	48.3	58.3	60.8	44.6	46.4	53.4
	Tarai	61.2	71.3	70.7	54.0	62.3	64.2
Development region	Eastern	63.0	72.6	66.8	55.3	61.3	57.7
	Central	55.5	64.6	71.4	49.7	52.8	65.5
	Western	52.1	55.1	63.1	46.7	49.8	50.0
	Mid-Western	50.0	59.9	63.8	46.3	54.2	53.1
	Far-Western	44.2	69.6	62.8	42.8	57.4	59.9
Women's education	None	50.2	64.0	66.1	47.1	53.5	58
	Primary	63.2	68.2	61.4	61.9	66.7	64.2
	More than primary	77.6	68.2	74.9	73.0	58.7	59.9
Work status of women	Not working	55.5	66.4	67.1	50.6	52.4	52.9
	Agriculture	52.3	63.1	64.8	47.9	54.1	58.3
	Non-Agriculture	81.4	78.3	74.7	66.0	69.5	72.0
Household wealth quintile	Poorest	32.6	44.4	50.7	39.9	40.1	47.5
	Poorer	46.5	65.4	65.1	46.1	50.5	58.0
	Middle	53.5	63.9	67.9	45.8	64.7	68.1
	Richer	61.4	69.9	72.9	52.9	64.1	60.8
	Richest	76.2	78.3	75.9	70.3	65.2	75.0
Exposure to media	Low	41.8	57.9	60.5	42.5	48.9	53.5
	High	67.5	79.0	71.0	58.7	60.4	65.2
Religion	Hindu	56.7	67.3	68.0	51.9	57.9	60.7
	Non-Hindu	43.2	50.2	58.3	36.8	38.5	50.4
Age of woman	15-24	35.7	36.8	43.9	33.3	47.1	34.8
	25-34	54.4	64.6	60.7	48.1	52.1	55.3
	35-49	62.1	71.3	74.9	50.0	56.0	60.5
Age at marriage	Less than 16	56.5	67.3	66.5	49.7	54.4	60.0
	16 and above	54.1	64.0	66.8	48.8	55.4	58.0
Number of living sons	0	20.1	34.5	36.0	24.5	30.3	42.6
	1	45.0	59.1	59.0	48.2	53.1	55.8
	2	66.6	73.8	76.9	56.5	61.9	61.2
	3+	66.2	74.8	73.0	46.2	52.4	61.0
Experienced any child loss	No	58.0	67.2	68.0	54.8	59.0	61.2
	Yes	49.4	60.1	62.1	42.6	50.0	54.6
Husband's residential status	At home	59.3	73.4	76.9	51.5	59.4	65.1
	Elsewhere	38.3	36.8	43.4	34.6	32.3	35.4
All women		**55.1**	**65.2**	**66.7**	**49.2**	**54.9**	**58.9**
Number of women		**1627**	**1704**	**1669**	**2746**	**2330**	**2121**

Source: Computed by the researcher from NDHS data 2001, 2006 and 2011

5.2.3 Determinants of contraceptive use

Since contraceptive use is influenced by many socioeconomic and demographic factors, the extent to which they affect contraceptive use may have remained persistent or changed over time. To examine whether the role of different factors in explaining variations in contraceptive use has changed, multivariate technique has been used. The study variable has been measured as 'currently using any contraception' (coded '1') and 'currently not using contraception' (coded '0') for all currently married women. Due to the dichotomous nature of the dependent variable, Logistic Regression model has been used. As in the case of study of differentials, the determinants of contraceptive use have been analysed separately for one, two, three, and four or more living children for survey data of NDHS-2001, 2006 and 2011. Instead of presenting the results in terms of regression coefficients, predicted probability (expressed in percentage) of contraceptive use for each category of the independent variable have been presented (the explanation of the method has been provided in Chapter-II, section 2.3.8). On calculating predicted percentages of contraceptive use for each category, all other variables have been held constant at their respective means (based on the weighted distribution of respondents) instead of fixing them at reference category. The results are expressed in Table-5.10a, Table-5.10b, Table-5.10c and Table-5.10d.

After controlling for other factors, there is no significant effect of place of residence on contraceptive use of women. Similarly, variation in contraceptive use in three different ecological regions is insignificant for women with up to three children. But, for women with four or more children, women from the *Tarai* region have significantly higher contraceptive use as compared to those from the Mountain. The influence of regional factor (five development regions) on contraceptive use is very weak; that is, the predicted proportion of contraceptive users in the Central region is significantly higher (for women with two or more children), it is lower in the Western region (for women with three or more children), the Mid-Western region (for women with one child) and the Far-Western region (for two and four or more children). Clearly, the region effect varies by the number of living children and shows no pattern.

A significantly higher proportion of more educated women are predicted to use contraception after having one child as compared to uneducated counterparts. This relationship has persisted over time. For example, in 2011, 22 percent uneducated women having one child are predicted to use contraceptives whereas, 40 percent women with

more than primary education and having one child are predicted users of contraception. For women with two children, though there is significant positive effect of women's education on use of contraception, the effect has weakened over time. This implies that, educational differences in contraceptive use after two children are narrowing over time. For women having three or more children, the relationship of education and contraceptive use is not conclusive. In 2011, as compared to uneducated women, those with more than primary education have significantly higher predicted probability of contraceptive use for women having three children, but it is significantly lower for women with four or more children. There would be very few women with more than primary education having four or more children; but, smaller predicted probability of their contraceptive use as compared to that of uneducated women is a bit unexpected. Net effect of women's exposure to mass media on contraceptive use is found for uses at higher parity. The predicted proportion of contraceptive use for women having at least three children throughout the study period is greater among women who are highly exposed to mass media as compared to those who are less exposed. For women with two children, there was some net positive effect in the past (2001 and 2006 surveys) but it has eliminated now (2011 survey). Difference in contraceptive use between less exposed and more exposed women is insignificant for women with one child.

Economic status of household has net positive effect on contraceptive use of currently married women. As compared to women from the poorest household wealth quintile, the predicted probability of contraceptive use after having one child was significantly higher only for women from the highest wealth quintile in 2001; but in 2011, the probability of use is significantly higher for women from all four higher household wealth quintiles. This means, the variation in the likelihood of using contraception by economic status after having one child is becoming wider over time (Table-5.10a). As compared to women from the poorest household wealth quintile, higher predicted probability of contraceptive use for women from middle and higher wealth quintile category has been observed for women with two living children throughout the study period (Table-5.10a). Religious affiliation of women has some influence in contraceptive use for women with two or more children; a lower predicted probability of use has been found for non-Hindu women as compared to Hindu counterparts. Women engaged in non-agricultural sector have higher chances of using contraceptives at lower parity (after one or two children) with reference to not working women. But, at higher parity (four or more children), women

working both in agricultural and non-agricultural sector have significantly greater probability of contraceptive use with reference to not working women.

Older women (25 years and more) with two or three children have significantly higher predicted probability of contraceptive use with reference to younger women (age 15-24); but no significant age differential exists for women with one child or four or more children. Age at marriage (whether below 16 years or above it) has no influence on contraceptive use prediction. A higher preference for sons as compared to daughters is reflected in contraceptive use too. Couples feel it safe to use contraception after having at least one son. After controlling for other factors, the predicted probability of using contraception is significantly higher for women having at least one son as compared to those having no son. Women's ever experience of child loss has net negative impact on contraceptive use among women with two or more children. For example, predicted probability of women with three children using contraceptives in 2011 is 69 percent if they had never experienced child loss but the same for women who had ever experienced child loss is 60 percent. Husband's absence from home (not living at home with wife, living elsewhere) is a powerful predictor of low propensity to use contraception in Nepal. For example, in 2011, 74 percent women with two children are predicted to use contraception if their husband is living with them at home but, only 25 percent women with two children are predicted to use contraception if their husband lives elsewhere.

Table-5.10a: Predicted probability of contraceptive use by currently married women having one living child, NDHS: 2001, 2006 and 2011

(Probability expressed as percentage)

Background Characteristics		Adjusted percentage of contraceptive		
		2001	**2006**	**2011**
Residence	Urban (Ref.)	23.8	28.5	34.3
	Rural	20.3	26.0	33.3
Ecological region	Mountain (Ref.)	18.6	31.9	27.2
	Hill	20.8	30.1	35.1
	Tarai	21.5	22.5	34.9
Development region	Eastern (Ref.)	25.3	27.8	31.1
	Central	23.5	23.1	35.3
	Western	17.0*	21.7	30.4
	Mid-Western	14.1*	34.6	36.8
	Far-Western	20.3	30.6	38.1
Women's education	None (Ref.)	16.6	22.9	21.8
	Primary	26.3**	25.4	33.2**
	> Primary	29.6**	31.5*	39.7***
Work status of women	Not working	17.6	21.4	28.3
	Agriculture	20.7	26.7	33.1
	Non-Agriculture	31.2**	38.6***	43.0***
Household wealth quintile	Poorest (Ref.)	16.7	12.6	21.6
	Poorer	17.0	16.9	35.6**
	Middle	19.6	24.3**	35.1**
	Richer	21.1	35.8***	34.6*
	Richest	29.7*	44.5***	39.1**
Exposure to media	Low (Ref.)	18.1	19.6	33.9
	High	23.3	29.8**	33.8
Religion	Hindu (Ref.)	20.9	26.9	34.0
	Non-Hindu	20.3	25.6	33.0
Age of woman	15-24 (Ref.)	21.9	29.6	34.3
	25-34	19.2	21.8*	34.5
	35-49	16.5	19.9	28.3
Age at marriage	Less than 16	16.2	24.6	34.5
	16 and above	22.7	27.4	33.6
Number of living sons	0 (Ref.)	16.6	23.4	29.4
	1	25.4**	29.9*	37.5**
Experienced any child	No (Ref.)	21.0	29.0	33.4
	Yes	19.9	13.6***	38.4
Husband's residential status	At home (Ref.)	28.5	49.3	58.0
	Elsewhere	7.7***	7.4***	9.2***
-2 Log Likelihood		**1090.0**	**1235.7**	**1708.5**
Negelkerke R square		**0.25**	**0.39**	**0.35**
Number of women (unweighted)		**1283**	**1390**	**1730**

Note: *, ** and *** indicate that the corresponding logistic regression coefficients are significant at 5%, 1% and 0.1% level of significance respectively

Source: Computed by the researcher from NDHS data 2001, 2006 and 2011

Table-5.10b: Predicted probability of contraceptive use by currently married women having two living children, NDHS: 2001, 2006 and 2011

(Probability expressed as percentage)

Background Characteristics		Adjusted percentage of contraceptive		
		2001	2006	2011
Residence	Urban (Ref.)	54.2	55.7	59.7
	Rural	42.1*	52.4	57.4
Ecological region	Mountain (Ref.)	42.2	50.2	62.4
	Hill	40.8	54.5	56.2
	Tarai	47.5	53.3	58.5
Development region	Eastern (Ref.)	46.4	54.0	52.8
	Central	47.6	54.6	64.3**
	Western	42.1	49.6	56.4
	Mid-Western	54.1	52.7	57.6
	Far-Western	30.0**	56.7	59.2
Women's education	None (Ref.)	37.9	52.0	54.1
	Primary	48.4*	52.6	57.7
	> Primary	58.9***	56.4	62.0*
Work status of women	Not working	35.0	45.8	48.1
	Agriculture	46.4*	54.6*	59.7**
	Non-Agriculture	43.9	58.4**	64.1***
Household wealth quintile	Poorest (Ref.)	32.3	36.3	47.3
	Poorer	33.3	48.3*	52.1
	Middle	42.3*	56.9***	59.4**
	Richer	50.5***	53.3**	60.9**
	Richest	57.3***	64.1***	63.3**
Exposure to media	Low (Ref.)	35.5	43.9	56.6
	High	51.2***	56.7***	58.8
Religion	Hindu (Ref.)	45.6	54.8	59.4
	Non-Hindu	34.5*	42.5**	50.1**
Age of woman	15-24 (Ref.)	32.9	41.2	40.6
	25-34	50.0***	58.5***	60.7***
	35-49	54.2***	60.2***	64.4***
Age at marriage	Less than 16	46.6	55.2	61.1
	16 and above	42.8	52.7	57.2
Number of living Sons	0 (Ref.)	14.1	26.4	40.1
	1	35.8***	45.7***	55.6***
	2	54.9***	60.1***	68.8***
Experienced any child loss	No (Ref.)	45.9	54.8	59.9
	Yes	38.5*	46.5*	48.4**
Husband's residential status	At home (Ref.)	53.3	66.5	74.3
	Elsewhere	19.5***	24.9***	24.7***
-2 Log Likelihood		**1734.2**	**2110.1**	**2790.9**
Negelkerke R square		**0.39**	**0.33**	**0.36**
Number of women (unweighted)		**1694**	**1915**	**2650**

Note: *, ** and *** indicate that the corresponding logistic regression coefficients are significant at 5%, 1% and 0.1% level of significance respectively

Source: Computed by the researcher from NDHS data 2001, 2006 and 2011

Table-5.10c: Predicted probability of contraceptive use by currently married women having three living children, NDHS: 2001, 2006 and 2011

(Probability expressed as percentage)

Background Characteristics		Adjusted percentage of contraceptive users		
		2001	**2006**	**2011**
Residence	Urban (Ref.)	62.7	61.3	71.2
	Rural	54.6	63.9	64.9
Ecological region	Mountain (Ref.)	45.8	64.3	66.8
	Hill	49.1	57.9	60.4
	Tarai	61.9**	66.4	71.1
Development region	Eastern (Ref.)	57.8	69.1	61.4
	Central	60.5	64.9	74.9***
	Western	50.6	55.7**	65.0
	Mid-Western	58.0	61.3	65.3
	Far-Western	49.12	62.4	63.8
Women's education	None (Ref.)	51.3	61.8	64.1
	Primary	59.8	70.4*	65.8
	More than primary	74.2	61.2	74.4**
Work status of women	Not working (Ref.)	36.8	61.2	63.5
	Agriculture	57.4***	62.5	66.2
	Non-Agriculture	71.3***	71.1	71.4
Household wealth quintile	Poorest (Ref.)	38.3	42.8	57.8
	Poorer	47.1	65.8***	69.1**
	Middle	57.0***	61.4***	71.9**
	Richer	63.3***	65.7***	67.0
	Richest	67.4***	75.4***	66.9
Exposure to media	Low (Ref.)	48.7	57.2	61.6
	High	62.1***	66.1**	69.4**
Religion	Hindu (Ref.)	56.9	64.3	68.0
	Non-Hindu	47.3*	54.3*	55.8**
Age of woman	15-24 (Ref.)	38.0	36.3	38.2
	25-34	56.3***	63.4***	63.1***
	35-49	60.1***	68.1***	72.4***
Age at marriage	Less than 16 (Ref.)	60.2	68.3	68.9
	16 and above	52.8*	60.1**	65.2
Number of living sons	0 (Ref.)	18.1	31.4	31.4
	1	43.7***	54.0***	59.4***
	2	68.7***	71.8***	75.4***
	3	69.1***	76.4***	73.6***
Experienced any child Loss	No (Ref.)	69.1	66.3	68.5
	Yes	58.4*	55.0***	60.0**
Husband's residential status	At home (Ref.)	59.7	71.2	76.9
	Elsewhere	39.2***	34.3***	34.0***
-2 Log Likelihood		**1718.2**	**1791.2**	**1941.6**
Negelkerke R square		**0.35**	**0.31**	**0.33**
Number of women (unweighted)		**1607**	**1698**	**1931**

Note: *, ** and *** indicate that the corresponding logistic regression coefficients are significant at 5%, 1% and 0.1% level of significance respectively

Source: Computed by the researcher from NDHS data 2001, 2006 and 2011

Table-5.10d: Predicted probability of contraceptive use by currently married women having four or more living children, NDHS: 2001, 2006 and 2011

(Probability expressed as percentage)

Background Characteristics		Adjusted percentage of contraceptive users		
		2001	**2006**	**2011**
Residence	Urban (Ref.)	51.5	60.9	54.8
	Rural	49.3	52.1**	59.0
Ecological region	Mountain (Ref.)	44.3	51.1	54.0
	Hill	45.6	48.8	57.1
	Tarai	54.0**	58.7*	61.6*
Development region	Eastern (Ref.)	53.6	58.2	56.4
	Central	53.6	55.0	65.3*
	Western	43.8**	47.3**	49.7
	Mid-Western	48.4	54.1	54.9
	Far-Western	44.6**	53.3	60.8
Women's education	None (Ref.)	48.1	52.9	58.5
	Primary	58.6**	60.2	62.8
	More than primary	61.3*	59.0	45.6*
Work status of women	Not working (Ref.)	36.3	37.6	46.9
	Agriculture	50.9***	55.6***	59.0**
	Non-Agriculture	51.1**	55.4**	65.7***
Household wealth quintile	Poorest (Ref.)	42.9	40.1	48.3
	Poorer	47.1	51.9***	56.3*
	Middle	46.2	63.7***	67.5***
	Richer	51.2	63.3***	60.0**
	Richest	64.7	61.2***	73.6***
Exposure to media	Low (Ref.)	45.9	50.0	55.4
	High	54.6***	58.2***	60.9*
Religion	Hindu (Ref.)	52.1	56.0	59.6
	Non-Hindu	37.8***	41.0***	50.7**
Age of woman	15-24 (Ref.)	31.4	50.8	33.5
	25-34	49.5	54.6	56.5
	35-49	49.8	53.7	59.2*
Age at marriage	Less than 16 (Ref.)	50.0	52.4	58.2
	16 and above	49.1	54.9	58.2
Number of living sons	0 (Ref.)	21.2	25.2	43.0
	1	44.4***	48.2***	53.6
	2	57.3***	60.4***	61.1**
	3+	48.6***	54.7***	60.3**
Experienced any child loss	No (Ref.)	54.6	58.5	61.0
	Yes	43.8***	48.1***	52.9**
Husband's residential status	At home (Ref.)	51.4	58.9	64.01
	Elsewhere	36.5***	32.2***	34.5***
-2 Log Likelihood		**3492.0**	**2867.4**	**2583.1**
Negelkerke R square		**0.15**	**0.20**	**0.16**
Number of women (unweighted)		**2753**	**2356**	**2101**

Note: *, ** and *** indicate that the corresponding logistic regression coefficients are significant at 5%, 1% and 0.1% level of significance respectively

Source: Computed by the researcher from NDHS data 2001, 2006 and 2011

5.3 Summary

This chapter illustrated the changes occurred in fertility preference and contraceptive use in Nepal based on survey data of NDHS-2001, 2006 and 2011. A decline in ideal family size has been observed in all subgroups of different socioeconomic, demographic, and regional characteristics. Irrespective of the marital status (ever married or never married), a vast majority (around two thirds) stated two children to be ideal for them. Never married women stated smaller ideal family size (1.78) than ever married women (2.13). The two child norm is emerging in Nepal, but a substantial increase in couples desiring only one child has also occurred. Women's education is the single factor which explains significantly the decline in ideal family size among never married women. For ever married women, increase in women's education, betterment in household economic condition, working in non-agricultural sector, better exposure to media explain a smaller ideal family size; and having more living children explains larger ideal family size. Similarly, increase in women's education, betterment in household economic condition, working in non-agriculture sector, higher exposure to mass media, older age and more number of sons are associated with decreased desire for an additional child.

An increasing trend coupled with little change in method mix in contraceptive use has been observed in Nepal. Maximum of couples using contraception already have three children and this phenomenon has remained unaltered since 2001. However, an increasing proportion of users after having one child are emerging over time, indicating couple's tendency to plan their births from early parity. Substantial differential in contraceptive use exists by number of living children and other socioeconomic factors. Women from urban residence, better educated, working in non-agricultural sector, from better household economic condition and having at least one son start fertility regulation at relatively lower parity and are more likely to use contraception. Urban-rural and regional differences (by ecological region and by development region) in contraceptive use are insignificant after controlling for other factors. Women's education and household economic condition are significant predictors of contraceptive use. Higher preference for sons is another factor explaining contraceptive use, by which, couples start fertility regulation more intensively only after having a son. Husband's absence from home is almost a sufficient condition for non-use of contraception and hence one of the important factors to explain contraceptive use throughout the study period. There is not much change in the determinants of contraceptive use over time.

Chapter-VI

Causes of Fertility Decline: Findings from Field

The previous chapters dealt with the dynamics of fertility transition in Nepal based on the results obtained from analysis of national level survey data, mainly NDHS 2001, 2006 and 2011. The findings showed that there has been substantial fertility decline in Nepal in the recent years; there has been a shift towards higher age at marriage, for desire for a small family, and rise in the adoption of contraception. In order to have a better understanding of why these changes occurred, the researcher carried out a field study in some villages of Nepal, had discussions with men and women of different ages and sought their perceptions on the reasons for the change. Two villages, from Bastipur VDC of Siraha district and Barbote VDC of Ilam district were selected for this purpose. As discussed earlier in methodology (Chapter-II, Section-2.2.2.1), these villages are in some ways typical of the respective districts; and Ilam is a leading district and Siraha is a lagging district in terms of fertility decline. Qualitative method of data collection was followed in the field. A total of eight FGDs were conducted, four each in the two villages such that there were four each for males and females, four each for older and younger generations. The following sections present the profile of study villages as well as that of FGD participants, perceived socioeconomic changes, perceived changes occurred in desired family size, aspirations for children and the values of children. Based on the findings of FGDs, an attempt has been made to explain the causes of fertility decline in these rural settings.

6.1 Profile of Study Area

The field study was done in two villages; one in Mid-Hills and one in Plains (*Tarai*). Barbote VDC of Ilam district and Bastipur VDC of Siraha districts were selected for field study. There are some similarities as well as differences in these two villages in terms of various characteristics which are shown in Table-6.1. Barbote village lies in the slope of Hills, facing towards east, and Bastipur village is in Plains. Both the villages have mixed settlements in terms of people's caste/ethnicity. Bastipur is resided by majority of *Madhesi* people, mainly *Koiri, Yadav, Halwai* and *Dalits* (*Musahar* and *Chamar*). Some *Brahmin* and *Kshetri* of Hill origin are also there. In Barbote, there are more *Brahmin* and *Kshetri* of Hill origin followed by *Janajaati* (mainly *Limbu, Gurung* and *Rai*) and some

Dalits (*Kami, Damai* and *Sarki*). Both the villages are good examples of mixed ethnicity. All the communities in Bastipur belong to the Hindu religion, but in Barbote, though Hindus are in a majority, there are some Buddhists, *Kirats* and Christians as well.

Agriculture is the main occupation in both the villages. There are more landless people in Bastipur, who are mainly agricultural labourers. Maize followed by rice is the main cereal crop grown in Barbote while rice and wheat are main cereals grown in Bastipur. Sugarcane and vegetables are major cash crops of Bastipur; Broom Grass *(Amliso)*, ginger, potato, tea and green vegetables are main cash crops of Barbote, which is also famous for milk production.

Facilities like electricity, mobile network, schools (both public and private), health post, family planning service, ECD and immunization centres, market place, rice and flour mill, and post office are available in both the villages. Moreover, there are some cooperative groups like milk production cooperative, tea production cooperative and saving and credit cooperatives in Barbote and small farmer's group and saving and credit cooperatives in Bastipur village. Bastipur village has most of the road graveled and relatively better road facility as compared to muddy (graveled in some places only) seasonal road of Barbote. Both the VDCs are connected to national highways, but there is no bus service to the particular villages.

Table-6.1: Some key characteristics of the study villages

District	**Ilam**	**Siraha**
Village Development Committee (VDC)	Barbote	Bastipur
Name of the village	Barbote	Bastipur
Wards included in FGD	Ward number 6 and 7	Ward number 3 and 6
Geography	Located in the slope of Hill	Located in the Plain
Caste/Ethnic composition of population (in order)	1. *Brahman* and *Kshetri 2. Limbu 3. Gurung 4. Dalits (Kami, Damai, Sarki) 5. Rai*	1. *Koiri 2. Yadav 3. Halwai, 4. Dalits (Chamar, Musahar) 5. Hill Brahmin* and *Kshetri*
Religious composition	1. Hindu 2. *Kirat* 3. Buddhist 4. Christian	Hindu
Occupation (in order)	1. Cultivator 2. Foreign employment 3. Service 4. Small business 5. Agricultural Labour	1. Agricultural Labour, 2. Cultivator 3. Foreign employment 4. Small business 5. Service
Agro Products (in order)	1. Maize 2. Rice 3. Ginger 4. Broom Grass 5. Potato 6. Green vegetables 7. Tea	1. Rice 2. Wheat 3. Vegetables 4. Sugarcane 5. Pulses 6. Mango
Veterinary Products	Milk, Meat	Meat
Basic Amenities within study wards	Electricity, Mobile network, Radio, Local FM, TV (with Disc antenna), Tea shops, small retail shops, Rice and Flour Mill	Electricity, Mobile network, Radio, Local FM, TV (with Disc antenna), Post office, Tea shops, small retail shops, Rice and Flour Mill
Basic Amenities within study VDC	Post office, Market (a hub of transaction of agro products), Agro-Vet service centre	Small market, Weekly *Haat/Bazar* (Market for exchange of household products and finished products)
Schools within study wards	Primary (Government), Secondary (Private), ECD centre	Primary, Higher Secondary (Government), ECD centre
Schools within study VDC	Higher Secondary (Government), Secondary (Private)	Higher Secondary (Government), Primary (Private)
Health Service	Health Post in ward no. 5, village clinic (monthly), immunization centre	Health Post in ward no. 6, immunization centre
FP service (Government)	Condom, Pills and Injectables	Condom, Pills and Injectables
FP service from NGO	IUCD	IUCD
Transport facility	Some graveled and some muddy road, VDC connected to Mechi Highway (North-South), no bus service to village	Some graveled and some muddy road, VDC connected to East-West Highway, no bus service to village
Nearest town	Ilam (District Headquarter), 8-12 Km.	Lahan (a town in north eastern region of the district), 7-10 Km.
Cooperative Organizations	Milk production, Tea production, Saving and credit	Small Farmers, Saving and credit
Banking facility	Only in Ilam (nearby town)	Only in Lahan (nearby town)

Source: Field study, 2014

6.2 Background Characteristics of FGD Participants

In each of the villages, Barbote of Ilam and Bastipur of Siraha, four FGDs were conducted. Table-6.2 shows the number of participants of different sex and age group. Only age and sex were considered for identifying participants for focus group discussion. Number of participants was six to nine, with an average of 6.9 participants per focus group.

Table-6.2: Number of focus groups and number of participants by age and sex

Village/District	Number of FGDs				
	Male		Female		Total
	<50 years	>50 years	<40 years	>40 years	
Barbote/Ilam	1 (6)	1 (6)	1 (6)	1 (8)	4 (26)
Bastipur/Siraha	1 (7)	1 (9)	1 (6)	1 (7)	4 (29)
Total	2 (13)	2 (15)	2 (12)	2 (15)	8 (55)
Average number of male participants per focus group					7
Average number of female participants per focus group					6.8
Average number of participants per focus group					6.9
Minimum number of participants in a focus group					6
Maximum number of participants in a focus group					9

Note: Figures in parentheses represent the number of participants
Source: Field study, 2014

The groups of males of age under 50 years and females of age under 40 years are called 'younger groups' and those of males of age above 50 years and female of age above 40 years are called 'older groups'. The same terminologies are frequently used in explaining the findings. By age, the result shows that male's had higher mean age, higher mean age at marriage, more CEB and larger family size than females, when compared within both younger and older groups (Table-6.3).

Table-6.3: Demographic characteristics of FGD participants

Characteristics	Male		Female	
	<50 years	>50 years	<40 years	>40 years
Mean age (years)	37.2 (24, 48)	63.2 (51, 74)	30.3 (20, 39)	47.3 (41, 63)
Mean age at marriage	23.2 (15, 32)	21.4 (15, 28)	18.2 (13, 29)	15.8 (9, 24)
Mean Children Ever Born	2.2 (0, 5)	4.6 (1, 9)	1.8 (1, 3)	2.9 (1, 6)
Mean Children Surviving	2.2 (0, 5)	4.4 (1, 9)	1.8 (1, 3)	2.7 (1, 6)
Mean Family size	5 (3, 7)	4.3 (2, 8)	3.8 (2, 7)	4.3 (2, 7)
Number of participants	13	15	12	15

Note: Figures in parentheses show minimum and maximum values respectively.
Source: Field study, 2014

Table-6.4 depicts number of participants by various socioeconomic characteristics. Irrespective of the age group and sex, majority were literate, working in agriculture, had agricultural land with their family, belonged to *Brahmin/Kshetri* caste group and followers of Hindu religion. More participants of younger age were living in nuclear family whereas; more participants of older age were living in joint families, both for males and females.

Table-6.4: Number of FGD Participants by Socioeconomic Characteristics

Characteristics	Number of participants				
	Male		Female		Total
	<50 years	>50 years	<40 years	>40 years	
Literacy					
Illiterate	1	3	2	6	12
Literate[#]	12	12	10	9	43
Occupation					
Agriculture (own)	7	12	5	13	37
Agricultural labour	1	3	2	2	8
Service	3	0	1	0	4
Business	0	0	4	0	4
Self employed	2	0	0	0	2
Ownership of agricultural land by household					
No	0	2	3	2	7
Yes[@]	13	13	9	13	48
Type of family					
Nuclear	7	7	8	5	27
Joint	6	8	4	10	28
Caste/Ethnicity					
Dalit	4	1	2	2	9
Janajaati	3	4	4	3	14
Brahmin/Kshetri	6	10	6	10	32
Religion					
Hindu	11	14	12	15	52
Non-Hindu[$]	2	1	0	0	3

[#] the highest level of education for male was bachelor's degree and that for female was higher secondary; [@]the maximum agricultural land owned by a family in Hills was 22 Ropani (Approximately 1.11 Hectare or1.63 Bigha) and in Tarai, it was 2 Bigha (Approximately 1.36 Hectare); [$]of these three participants, one of each was Buddhist, Christian and Kirat (Satya Hang)

Source: Field study, 2014

6.3 Findings from FGD

To have a better understanding on how fertility declined, apart from various socioeconomic aspects, several issues that are likely to be associated with family size

desires were brought into discussions in focus groups. Discussions were made about the changes occurring over time on different socioeconomic factors and their impact on people's life and consequently on fertility preferences and fertility. The findings discussed here are based on the recordings of FGDs and field notes. Recordings were transcribed, translated, and general view of the participants was drawn. A consensus was found among FGD participants in majority of the issues; but not all participants had unanimous view on some issues and inferences have been carefully drawn. Apart from the general perceived views of participants, some excerpts are also reproduced here.

6.3.1 Socioeconomic changes

6.3.1.1 Educational status

Provision of mass education in developing countries gives impetus to the process of economic and emotional nucleation of family, which favours fertility decline by establishing net wealth flow from parents to children (Caldwell 1973). When mass education intervenes in a society with traditional family morality, those persons who get first educated start to have greater access to power and wealth than those left uneducated and uneducated parents become immensely tempted to educate their children so as to enhance their access to wealth of the economy's modern sector (Caldwell 1980). Women's education empowers them through their involvement in family decision-making including matters of contraceptive use and fertility, control over household resources, enhanced knowledge and awareness of the modern world and creates more favourable fertility attitudes and norms thus indirectly creating negative influence on fertility (Jejeebhoy 1994; Khuda and Hossain 1996). Increased women's education also instills a sense of prestige to them leading to their better status in the family and in the society (Parasuraman et al. 1999). As a result, more educated women will be more aware about fertility control in terms of knowledge, acceptance, access, and use of means of regulation. They are more capable to make rational choice for the number of children they would have and more likely to behave accordingly. Ultimately, as more people, including women become educated, easier the fertility decline becomes. Empirical evidences in China also showed a negative association of family size with children's education outcome (Li et al. 2008). Similarly, schooling of children and monetization led to inspire for smaller family size in south Indian Western Ghats (Caldwell and Caldwell 2006). In this context, an attempt was made in the field study to examine the educational changes perceived by people.

In the study villages, educational level of people has increased in the recent past. There was discrimination against girls in attaining education in the past but that has become almost nonexistent now. Only a few girls enjoyed the opportunity of school education in the past. The saying that 'females will become witch and they would elope when they read' and restrictions on girls to come out of home made it impossible for availing education. Moreover, in many communities, daughters were simply not sent to school thinking that education was not deemed necessary for a girl as she would go to other's home after marriage and involve in household works only. However, in some families, especially *Brahmins*, females were also made literate by educating them in the household in the past. Regarding the question for the reasons of not going to the school among girls, participants replied:

> *"In the past, some people used to send their sons to school for some education, but daughters had to engage in cutting grass and collecting firewood, only that much; educating girl was rare; we did not read, I was sent to other's house by marrying at nine years; I don't know even a single letter (Ka akshar)" (female, 55 years, illiterate)*
>
> *"Why not to tell you, at that time people used to say that females would be witch if they read" (male, 70 years, illiterate)*
>
> *"I was not sent to school; when I clandestinely went school one day, I was locked up in goat's cage; but my brother who was only one year younger than me was sent to school" (female, 44 years, literate)*
>
> *"There was much discrimination in educating girls; in my time, school was very far, my five brothers stayed at hostel and got education but I could not; they did not care for a daughter's education" (female, 41 years, illiterate).*

Education of children is now at top priority for most of the people. Opportunities of education are expanded now; there are government schools and also some private schools in the locality now. There is almost no differential treatment between boys and girls in terms of sending school. However, among *Madhesi Dalits*, who are generally very poor, there are some discriminatory practices found even now; daughters are deprived of getting education for the sake of accomplishing household works.

Although there is no difference in choice of school for son and daughter in Hills, among *Madhesi* community in *Tarai*, some practices of gender discrimination prevail. They preferably send their sons to private schools but their daughters to government schools which they consider to be of substandard quality and are much cheaper. Dowry is another

important factor impeding girl's higher education in *Madhesi* community. If a daughter becomes highly educated, her parents have to search a highly educated mate for her, preferably a Doctor or an Engineer whom they have to pay a huge amount in dowry. Thus many parents prefer to educate their daughter to some moderate level only and want to give her away in marriage paying a relatively lower amount in dowry. Therefore, girls are still discriminated in terms of enjoying full opportunity of education in this community.

Another fact is that daughters are more helpful to their mothers than sons. In agrarian setting, daughters help mothers in cooking and cleaning and also in rice plantation, cattle rearing, collecting animal fodders and collecting firewood. So, girls have to attend school after accomplishing household works rather than homework given at school. This has made girls weak in their scholastic performance and they become less competitive. Regarding this issue, some participants recited:

> *"Even now in some places, they say that if sons get educated, they will do a job, earn money, they will remain in home; but why to educate girls; anyway they have to do kitchen job; so they are ordered to clean kitchen utensils and sent to graze goat" (female, 30 years, illiterate)*

> *"In agriculture, a daughter's help to her mother is far more important than a son's help to his father; daughters help in cooking, cleaning and boys do not, therefore girls are weaker than boys in their study" (male, 68 years, 12 years of education)*

> *"In our Madhesi community, if daughters become highly educated, we have to search for a Doctor or an Engineer for their marriage and more dowry is to be paid; a doctor should be given 40-50 lacks (4-5 million Rupees) dowry and one needs to have that amount as bank balance; this reason has caused a limitation in girl's higher education" (male, 58 years, 8 years of education).*

Now, people have perceived education as a means to acquire prosperous life. They are concerned about quality of education and perceive private schools to be better than government schools in terms of quality, which is due to teaching in the English medium. Therefore, they preferably send their children to more expensive private schools than cheaper government schools.

The participants unanimously agreed on the positive impacts of change in educational level of people, especially that of women on human life. They agreed that increased educational level made women empowered, they became more vocal, and they could

comfortably express their matters. They became more aware of their rights. Following are some statements made by participants regarding impact of education in life:

> *"Now, they (children) became educated, they can express their views openly with parents and in other places too; they can say where they want to study, whom they want to marry; they are aware of their rights; it is very good" (female, 46 years, 8 years of education)*

> *"Education makes children aware of their child rights, women's rights and it is good to be educated" (female, 45years, literate).*

Discussions on education revealed that the educational status of both males and females has increased over time; with males more advantaged to be educated. Girls now are generally not facing discrimination in sending to school but, some differential behaviour still exists in the *Madhesi* community in *Tarai* region in terms of educating girls. Culturally rooted dowry system is also an impediment to higher education of girls in *Tarai* which is not there in the Hills. People now give very high priority to education of their children. Women became more empowered than before due to education and became more capable of expressing and implementing their desire for children (which is now for a small family).

6.3.1.2 Occupation and scope of employment

People in village are mostly engaged in agriculture related works as in the past and there is no substantial change in the avenues of employment. However, there has been marginal expansion in avenues of work. In Ilam, cropping pattern gradually shifted from cereals like maize, millet and rice to cash crops like tea, Broom Grass *(Amliso)*, ginger, vegetables and fruits; and people now use hybrid crops and chemical fertilizers. Professional cow farming of modern species for milk production and goat farming for meat are growing in the village. This has also made some changes in people's living standard by enhancing their household incomes. Transportation facility has made their market access easier. In Siraha too, the cropping pattern went through some changes; vegetable farming has boomed now as compared to that in the past; some modern techniques of agriculture are introduced in terms of planting new and hybrid species of crops and using chemical fertilizers, which caused marginal increase in productivity. Labour cost has increased by a massive amount but the market price of farmer's produce has not increased accordingly. By selling agro-product, they cannot make a major household purchase or spend on some special event like marriage. Therefore, on average,

living standard of farmers has not satisfactorily improved. Regarding our discussion on occupation, some participants mentioned:

> *"People mainly do agricultural works, some educated persons get salaried jobs, but some educated unemployed are also there" (female, 26 years, 9 years of education)*
>
> *"There are some different jobs for those who can read and write, but for others, it is the same (agricultural work)" (female, 39 years, literate)*
>
> *"For rural youth, opportunities have increased; they go to foreign countries for work" (female, 44 years, 9 years of education)*
>
> *"If I have five Bigha (around 3.4 Hectare) land, and I want to organize my son's or daughter's marriage by selling the produce from this land, it will be quite impossible; I can do it (organize marriage) only by selling some five Kattha (around 0.42 Acre) land" (male, 51 years, 10 years of education)*
>
> *"There is change in agriculture; modern fertilizers came; hybrid seeds came and production increased" (male, 47 years, literate).*

There is some change in the occupational pattern; engagement of educated people in the service sector, going abroad as labour migrants and engaging in small business and small industries in the locality are growing now. Wage of workers in agriculture or the other sector has substantially increased. Though the agriculture sector has gone to diversification of crops with some changes in cropping pattern and is being modernized and commercialized, it still remains mostly subsistence. Investments in agriculture have increased quite a lot but productivity has increased only marginally. Though income from agriculture seems to increase, due to drastic increase in costs of living it does not appear to have increased in real terms so as to substantially improve the standard of living of farmers. The household economic status of some people has improved due to remittances. But people still feel it difficult to maintain their living standard due to increased costs of everything. Adopting small family might be a viable option for people to maintain their standard of living in the context of increased cost of living. On the other hand, when males go abroad after marriage, childbearing of such couples is postponed at least for the time being. Moreover, due to exposure to wider world, migrants may change their idea about fertility. They will be influenced more by diffusion of world view on fertility. Therefore their fertility is likely to fall.

6.3.1.3 Communication and media exposure

Mass communication is also a channel which promotes family nucleation and finally supports fertility decline (Caldwell 1973). Increased access to media causes ideational changes even among poor to have modern outlooks and attitudes and adopt lower fertility norms (Khuda and Hossain 1996). Therefore, in our FGDs, discussion was initiated on people's perception regarding changes in communication and media. The discussions revealed that there is sea change in means of communication in villages. Communication facility is regarded as one of the major agents of social change and mobile phone is the most important means for it. People consider mobile phone as 'good' for making communication among people quite easy. However, some negative impacts including increased household expenses due to handsome money required for buying a mobile for each person in family and the costs incurred in availing the service are also mentioned by participants. On asking about the advantage and disadvantage of use of mobile phones, the respondents mentioned:

> *"From one side, mobile is very good because it gives correct information on time; but on the other hand, there are some defects of it; a girl of one place can contact to a boy of any other place and elope; the girls' matter comes at first; therefore it has worked both the ways, because of its misuse" (male, 70 years, 3 years of education)*

> *"Mobile is both good and bad; it is good for easy communication; but, it is also misused by school students, facebook has spoilt many school boys and girls; even in office, sirs (administrative staffs) are found using facebook and they do not give service in time" (female, 30 years, 10 years of education)*

> *"All kinds of violence are increased now due to misuse of mobile phone" (male, 40 years, 12 years of education).*

Access to media like radio, TV and internet has also increased in the society. More specifically, FM radio has played a role to bring the changes in life of uneducated people too making them more aware and knowledgeable regarding different aspects of life. These means of information and communication are considered indivisible components of social change. But apart from the positive impact made by these media on people's life, participants noted some negative consequences such as exposure to fashion and showy things which are not always good and true. Media are perceived to have made mixed impact on people's life. Regarding the impacts of these media, participants put the following views:

"We could see the world; for example, not only us but also our children can easily identify an animal, its living environment and feeding habit through TV programme; we became more knowledgeable" (male, 60 years, 5 years of education)

"It has made good impacts; I see great role of FM radio and newspapers in bringing changes in society" (male, 32 years, 10 years of education)

"Good people learned good things and bad people learned bad things from TV. A film has many good messages to follow but a good person can perceive it and bad persons learn only bad things from it" (male, 38 years, 10 years of education)

"Good or bad, every type of idea is shown there in TV and people learn from it" (male, 24 years, 12 years of education).

A massive change occurred in means of communication due to mobile phone and exposure to mass media immensely increased due to exposure to TV channels and FM stations. Easy access to mobile phones not only made communication quite easier, but also alleged to have spurred some socially unacceptable things like crime, forgery, elopement, consumerism, and even family disruption due to its misuse. People's general knowledge has increased due to exposure to electronic media; they are now exposed to enormous information and could make a world view of their own. Easy access to electronic media also increased people's exposure to messages on benefits of smaller family, use of various methods of contraception and also presumably developed more rational perception regarding difficulties of having large family. Such media effect could be applicable even for uneducated people. Therefore, increased access to various means of communication and exposure to mass media also help in fertility decline.

6.3.1.4 Health status

Betterment in health status of people means improved child survival. People who changed their behaviour related to personal hygiene and sanitation are more likely to adopt the same in case of family planning use. Further, these people will be more easily influenced by behaviour change programmes and are more susceptible to have declined fertility through adoption of contraceptive behaviour. Similarly, access to better drinking water facility and sanitary practices ensure better health for people thereby contributing positively in reduction of infant and child mortality and hence desired family size. Provision of better sanitation like sealed toilet facility reflects rising living standards and aspirations, and thereby raises the relative cost of bringing up children and reduces their

economic utility (Khuda and Hossain 1996). Therefore, in our FGDs, participants were invited to discuss changes occurred in health status of people, their health seeking behavior, sanitary practices and personal hygiene.

The discussions revealed that there is an increase in awareness about health as well as the facility of modern medical treatments in the villages. Transition has occurred on healing/treatment practices from traditional (*Dhami/Jhankri* and herbal medicines) to modern medicines. There is a government health post in the village which provides treatments of elementary level free of cost. Provision of health facility in the village has not only increased awareness about health but also changed their health seeking behavior. Private medical service centres are also available in nearby towns. People are concerned about cost of care and consider it as a burden but compulsion. Therefore, access to health service has increased and simultaneously, the cost of health care has also risen.

Women nowadays can express their health problems more easily than before and this has enabled them to avail of health services. They consider time and cost factors associated with getting health service to be important. Some of the statements given by respondents regarding the issue of health care are:

> *"Women are more aware now, in the past many women had problem of uterus prolapse, but now, they know when not to carry heavy loads and the situation of this problem is not like that in past" (female, 36 years, 8 years of education)*

> *"Health service has increased from then to now, people's mentality has also changed; in the past people used to go to traditional healers (Dhami, Jhankri) but now even in case of small ailments, we run towards that place (health facility)" (male, 60 years, 5 years of education)*

> *"People became more aware now, in the past they used to wait for normal delivery of women for many days, but now, due to awareness, they go to hospital if a problem is perceived" (female, 28 years, 12 years of education).*

The changes that occurred in health facilities have brought positive impacts on people's lives. A participant in Ilam stated that the most significant achievement to this end is cessation of cases of maternal deaths now in the village. Some participants of the discussion mentioned:

"It (health facility) makes positive impact; mainly in delivery cases and in child treatment it has become better" (male, 30 years, 12 years of education)

"It has made our life easier because, we can easily reach there, take service, return home and do our work; we can get treatment without hampering our normal work here at home" (male, 70 years, 3 years of education).

In Ilam, there has been behavior change regarding personal hygiene and sanitation. Nowadays people are conscious about health; they drink boiled water, defecate only in toilet and also follow sanitary procedures after defecation. They considered it as a social development caused by increased awareness. Use of soap has also been considered as development, which was not there in the past. The researcher observed that the toilets were properly used and cleaned and there was no human excreta seen in open space in the village. A substantial behavioural change among people regarding sanitation was found in Ilam.

In Siraha too, there has been some behavioural changes regarding personal hygiene and sanitation. More people now started using toilet for defecation. However, not all households have toilet in the village till now. Improper use or non use of toilet in *Tarai* is mostly found and it was due to three reasons. One is cultural matter related to shyness in *Madhesi* community that a respected elderly male does not go to the same toilet where female members of the family go. The other is that, in agrarian setting, the male member has to go to watch his field after waking up in the morning and it is easier for him to defecate there in the field rather than to return home for it. The third reason is associated with lack of piped water inside toilet in villages to maintain the sanitation of the toilet. However, the process of making the village free from open defecation is going on and people are in support of it. On asking the behavioural changes associated with sanitation and personal hygiene a few respondents stated:

"In the past, we used to boil clothes in ash water to clean; but now, soap and detergent is used to wash clothes" (female, 56 years, literate)

"Nowadays, in case of emergency, we look for someone's toilet for defecation; we cannot do it outside; this is one thing; the second thing is that, in the past, it was not always a practice to use water for washing after defecation, but now, water is compulsory after defecation. This change I have felt" (male 70 years, 3 years of education)

"Toilet is constructed, but not used. The reason is that, there is only one toilet, in our Madhesh, males do not go to the same toilet where females go; it is due to shyness" (male, 58 years, 8 years of education).

The field study revealed that awareness of health as well as service availability has increased. Although the basic health service is provided free of cost by government, due to people's tendency of availing specialized and higher quality service, total expenditure on health has also increased. There is substantial change in people's behavior regarding personal hygiene and sanitation. This change has made people's life better than before. However, some clusters of *Tarai* region are lagging behind, mainly because of lack of awareness. Some cultural practices appear as constraints in such behavior change.

6.3.1.5 Infrastructure: road and electricity

Development in basic facilities like food, clean water and roads helps to reduce child mortality and plays an important role for wellbeing and in bringing fertility down, though the direct effect in fertility levels cannot be proven (Sääväla 2010). In Brazil, electrification has an even clearer role in the spread of the mass media and acted as a source of new ideas and values among people (Potter et al. 2002). Provision of electricity helps in promoting exposure to mass media and better road network enhances access to health services, which have distant influence on fertility. Therefore, facility of electricity and road connectivity was also discussed in the study villages.

In Barbote, there was no road connectivity to the village in the past but now they have access to black topped highway at a maximum of one hour walking distance (two to five Km from study village) which crosses from the same VDC, as well as rural road network though it is seasonal muddy road with only some portion graveled. People feel that it is a great achievement to have a road in the village. Similarly, electrification in village took place some 15 years ago. In Bastipur too, change has occurred in transportation facility. The condition of roads in the village was miserable in the past; it would be almost impossible to travel in the monsoon season. Now, the East-West national highway crosses Bastipur VDC from its corner and villagers have easy access to it. Rural roads are mostly graveled and some are seasonal muddy road. Similarly, villagers are using electricity for 20 years by now.

People consider facility of road and electricity as major components to bring a change in their living standard. In Hills, roads mainly helped people to transport heavy loads for long distances and made their life comfortable. In both the villages, people now can

manage vehicle near their homes in case of emergency like illness, accidental injuries and delivery cases; transport their agro and forest products to the nearest market place and sell them easily, and conveniently travel to other places. Road connectivity also increased their access to health and other services. Electricity replaced kerosene lamps and emancipated people from exposure to smoke; made their children's reading easier and also opened avenues through increased access to electrical and electronic gadgets like TV, Rice Cooker, and Electric Iron. In Siraha, electricity also helped in water lifting, which is used for irrigation, so it is associated with increased productivity of crops and hence with food security. It further eased women's life, because they started using motors to lift water from underground, which otherwise should be lifted manually by using hand pumps. Following are some of the statements mentioned during discussions:

> *"Development due to road and electricity is higher than 'sky' for us" (male, 60 years, 5 years of education)*
>
> *"There are so many benefits of road and electricity in agriculture" (male, 58 years, 8 years of education)*
>
> *"If electricity was not there, we would die of hunger" (female, 46 years, 8 years of education)*
>
> *"An ill person would be carried in Doko (Bamboo Basket) in the past but now we do not even need stretcher; vehicles can be managed nearby" (male, 32 years, 10 years of education).*

It can be concluded that there has been a substantial improvement in road network in the study villages with facility of electricity, which has made people's life far better than before. These developments enhanced the mobility of rural people and their interaction with urban people, both helping in diffusion of life style and behavior of urban people to rural areas. Urban to rural diffusion of idea of small family and its benefits and use of contraception to achieve it might be facilitated through increased connectivity. This also promotes fertility decline in rural settings.

6.3.2 Demographic changes

6.3.2.1 Age at marriage

Age at marriage is one of the principal proximate determinants of fertility and increment in age at marriage is one of the key factors for determining family size (Bongaarts 1978). Apart from this direct effect, the opportunities of acquiring education and skills before marriage enhance more rational thinking regarding fertility. Couples married after

reaching a mature age would be more able to perceive the benefits of family planning, consider that fertility can be controlled, and apply more effective means of fertility regulation. Therefore, increasing age at marriage, which is one of the major aspects of social change can promote fertility decline in rural settings.

During our discussions, participants of all the focus groups unanimously agreed that there is an increase in age at marriage of both females and males. In the past, marriage, especially of women, would be arranged by parents or family and happen at a tender age. Now, marriage has become more voluntary; candidates have more say about their marriage decision; spousal age gap has reduced and consensus between prospective mates has become very important. Gaining skill and independence through education is the first priority than marriage. Increased level of awareness among people made them consider marriage as a matter of bearing a huge responsibility and they want to be mature enough and get ready to take this responsibility. Though most of the marriages are arranged marriages, some cases of elopement and court marriages also occur. In the *Tarai* region, among some communities like *Dom*, child marriage still prevails as a cultural practice. Dowry system is also practiced in the *Madhesi* community in *Tarai*, which has also permeated to *Dalits* now; but there is no such monetary dowry practice in the Hills.

Previously, caste endogamy was strictly adhered to, but now it has loosened to some extent and inter-caste marriages are also accepted in the community. But, in the *Tarai* village, relatively more strict conditions still prevail as compared to the Hill village. The following excerpts from our focus group discussions support changes that have taken place in age at marriage and the marriage system:

> *"I was nine years old in marriage; my husband was of 17-18" (female, 55 years, illiterate)*
>
> *"In our time, it was 16-18 for males and 12-13 for females; let me not say of the time before that; but now, it is 25-30 for males and at least 19-20 for females" (male, 70 years, illiterate)*
>
> *"Nowadays, prospective boy has to talk with prospective girl about her interest and also about their future way of life; first they should agree upon it; the boy should say that he is agreeable to marry her, and then await the girl's response and only after her agreement, the matter is informed to the parents for further process of marriage; then only a marriage process proceeds further" (male, 70 years, 3 years of education).*

"Child marriage is still there among Dom" (male, 64 years, 7 years of education)

"Now, girls should at least have appeared SLC (high school completion examination), for boys, it is better to be highly educated and then only get married" (male, 68 years, 12 years of education)

"In the past, a girl had to go where their parents decided to marry, but now, girl's consent is also taken in marriage" (female, 32 years, literate).

Increase in age at marriage has made positive impact on human life. Increased age at marriage has given the opportunity to become financially independent before marriage which enables the couple to live a better marital life in future. Getting married after completion of physical development is good for reproduction, which promotes mother's and child's health and helps in reducing the maternal and child deaths and also causes the number of births to decline. Increased age at marriage has made more equitable power relations between mother-in-law and daughter-in-law in the family. The positive impact of declining age gap along with increasing age at marriage is that spouses live together more happily and gradually women started enjoying more rights now. Some of the following excerpts from our FGD provide further insights in the issue:

"In the past, females would get married at tender age, and gave birth at young age, but increased age at marriage means child birth only after reaching age (being mature) and hence leads to better health" (female, 35 years, literate)

"A good thing is that, there used to be a strict control of mother-in-law in the past, but now, it has been much relaxed due to increase in age at marriage" (female, 45 years, literate)

"It (higher age at marriage) is good; first, the number of births declines, after that it makes good for (promotes) maternal and child health" (male, 24 years, 12 years of education).

In summary, age at marriage has increased, people perceived it as a major social change with positive impact on their life and they are aware of fertility declining effect of increasing age at marriage.

6.3.2.2 Child survival

Cleland (1998) has proposed three mechanisms by which improvement in child survival affects family size. One is through the insurance effect, by which, couples adjust to lower family size after realization that fewer births are sufficient to achieve specified desired family size due to improved child survival. The second is the replacement effect in which,

couples have tendency to react to child death by bearing an additional child to replace the dead one, which becomes less frequent when child survival improves. Finally, there will be pure physiological effect where, an early child death interrupts breastfeeding, allows return of ovulation earlier and causes next birth to happen earlier, given that all other conditions held constant. Such incidences will be less frequent due to improved child survival. Perception of child survival probability is therefore considered one of the proximate factors to determine fertility (Mason 1997). Dyson (2010) also mentioned the improvement in child survival status as a prime factor of fertility decline. A direct association between infant mortality and fertility has been found in Thailand (Knodel and Prachuabmoh 1974).

In our discussion, participants of all focus groups unanimously expressed the awareness of increased child survival in their locality. They argued that increased care right from the pregnancy stage to delivery and during childhood due to improved access to health services and increased awareness of people to avail such services made it possible. They considered education as a key factor to bring this change. Some of the statements made by participants regarding improved child survival are:

> *"In the past, there was no system of taking a sick child to hospital, we used to wait at home for recovery, but now, they are taken to hospital whenever they fall sick" (female, 63 years, illiterate)*

> *"There is so much improvement; there are no cases nowadays where an infant of 28-30 days dies" (female, 36 years, 8 years of education)*

> *"There are negligible cases of child death now; these have declined. That is due to increased health service; and the other thing is, as compared to today's situation, marriage used to take place at an early age and births also used to take place at an early age in the past" (male, 74 years, literate).*

On the contrary, there are some clusters of poor and marginalized people; especially *Dalits* of *Tarai* region where higher incidences of child death cases occur and the situation has not changed much as in other community. A *Dalit* participant stated:

> *"In mixed communities, people have understood, but in some isolated Dalit community like Musahar, they do not understand and the situation is still like that (as in the old days)" (female, 30 years, illiterate).*

Interestingly, participants noted interrelationship between increased age at marriage of women, increased child survival, decline in births and use of family planning with population increase. Some of the related excerpts from our discussion are:

> *"Death rate decreased and population increased" (male, 51 years, 10 years of education)*
>
> *"In spite of family planning, population is increasing, the reason is that those who born survive" (male, 68 years, 12 years of education)*
>
> *"Due to mother's education, her age at marriage is higher; she knows from health education what to do and what not to do; and this causes such incidents to decline" (male, 30 years, 15 years of education).*

It can be concluded that child survival level has risen up in the present years. Increased mother's education, increased access to health service, practice of contraception to lengthen birth interval, and increased care of children are the reasons of this change. Couples now worry less about survival of their young children and hence prefer to have fewer children which they want see to grow up.

6.3.3 Changes in family size and fertility preference

After having an idea of socioeconomic and demographic changes that have occurred in the villages, this section discusses the changes that are occurred in total family size and fertility preference over time. A combination of high aspirations for children and the cost of living are important factors motivating couples to prefer small family size (Vaithilingam and Murugesan 1999). An appreciation of the value of smaller families may occur once couples perceive that educated children have new economic and social opportunities (Freedman 1987). Therefore, discussions around questions like 'Why large family size was rational in past', 'Why smaller family is rational now', 'Is there any change in son preference' and 'Whether decline in family size is an economic matter' was made in the villages.

The field study revealed that, there was system of living in joint families for a long time and a couple would have more children and actual family size used to be quite large in the past. But, there has been substantial decline in family size now. The two routes for decline in actual size of a family are decline in the number of children that couples have and increased prevalence of nuclear families. Nowadays, a son separates quite earlier after marriage and lives in own nuclear family. Family nucleation is associated with economic status of the family. A son wants to live separately from his parents after

marriage seeking better economic progress in his nuclear family. Many families disintegrate due to good economic condition and many others do so due to extremely poor condition too. If sons are educated and get a good job outside the village, it is their compulsion to go out of home and live in a nuclear family. A sense of economic independence has also promoted early nucleation of family. Another recent phenomenon is that when a male goes to foreign country and starts sending remittance, his wife wants to live separately from his parents, most preferably in nearby town to take care of and provide education to their children. All these things are playing role to promote family nucleation, leading to decline in actual family size. It is obvious that once couples have fewer children, the total family size declines. Moreover, this decline in number of children of couples is due to their declined demand for children. Highlighting a drastic decline in family size, a participant stated:

> *"When I count in my family, I have three children, my next younger brother has five children, next younger brother has two and the youngest one has two children; altogether 12 children but I am one among the 15 children; we were that much of our parents but now we four have only 12" (male, 60 years, 5 years of education).*

There has been decline in the desired number of children of couples now. Participants of older generation tried to justify that high fertility was rational in the past. In agrarian setting, it would be a matter of pride and a source of power to have more children for the prosperity of the family of landowners and high fertility was rational for them. There was belief that prosperity and status would be gained by holding more land and more sons were needed to earn and maintain it. Also, for those who did not own land, they would get more land for farming from landowners in the past due to abundance of it and more children means more hands for them to work as tenant farmer and more conducive to get additional land from landowners and high fertility was rational for them too. But, since land is a limited resource and its fragmentation proceeds geometrically from generation to generation, it created an environment against high fertility. Younger males argued that high fertility was rational in the past due to low survival of children to adulthood. It was necessary to continue childbearing till some of them reached adulthood so that couples would be sure for the continuation of next generation. Rationalizing the choice for family size, some of the participants in the discussions mentioned:

> *"There was no awareness among people in the past; it was their determination (Rahar) to have 2-3 wives and more children; let many*

children be born and occupy large area; it is not by obligation" (male, 64 years, 7 years of education)

"In the past, landlords had more land; we could get more land for agriculture from them and could raise 4-5 children but now, there is no more land then how to raise a large family?" (male, 55 years, illiterate, Dalit)

"Yes, it is the same thing; my father had 15 Bigha (about 10 Hectare) land and five sons, then I got three Bigha (about two Hectare), I have four sons, then how much each of my sons gets? It is now in Kattha (one Kattha is equivalent to 0.08 Acre)" (male, 51 years, 10 years of education)

"In the past, a man used to have many wives and produce many children from them because there was scarcity of human resource in agriculture and generally he would have huge amount of land" (male, 74 years, 5 years of education).

However, some males of older generation argued that some people in the past too wanted to limit their family size. They stated that people always want to live more happily and accordingly they want to adjust their number of children too. There was some feeling that having many children will be troublesome. But there was no idea as well as means for regulating fertility. Some members in our discussion mentioned:

"In the past, the main difficulty was that there was no family planning" (male, 70 years, literate)

"There was no way, it (contraception) would not happen by eating 'orange'; family planning should be done but it (the means) was not there" (male, 68 years, 12 years of education).

So, higher fertility was justifiable in the past either as a choice or simply either due to lack of knowledge or means of regulation or both.

According to participants of older generation, couples might prefer less number of children now because of increased cost of rearing children on one hand and due to limited land resource which is to be divided among sons in each generation on the other. They argued that, nowadays there is scarcity of land as family resource, which is not enough to divide among many sons, and other avenues of livelihood are not certain; one has to spend much on education to explore other avenues and hence less number of children is more favourable from every point of view as an adjustment for this situation. In current time, a realization among people developed in favour of less number of children which has made new generation adjust to the same. They considered economic reasons to be

mainly responsible for preferring less number of children. Further, some participants stated that level of awareness on benefits of small family and means of birth control are more important. Another factor associated with decline in desired number of children is the health of mother. Due to increased awareness about women's health, people now know health hazards of having many children and want to have fewer children to maintain their good health. Expectation of more happiness and prosperity in life is also a reason for reduced demand for children. As reason for the lower demand for children, participants had the idea:

> *"This (desire for a small family) may be in search of happiness in life; if the number is more, then there will be more suffering and small number is more happier; this may be the reason" (male, 70 years, illiterate)*

> *"Yes, economic condition does matter; but, more than that, awareness is important; even poor, if aware do not go for more children" (male, 54 years, 10 years of education).*

Participants of younger generation stated that imparting quality education to children is the main driving force to desire less number of children. On the other hand, children of these days have high demands, everything is quite expensive and satisfying desires of many children is quite impossible for couples now, and, only a few children can be reared more comfortably. Next, couples now want to provide a good care for their children in terms of feeding, clothing and providing education. That is associated with economic status of family and couples desire less children for their better rearing and education. But *Dalits* in *Tarai*, who are generally marginalized, are having more children. They have some knowledge of fertility control and some motivation too, but are not effectively doing so. This may also be due to their less perceived importance of educating children.

Female participants of younger generation perceived that desire for fewer children is an economic matter and couples now could materialize it mainly due to availability of different means of fertility regulation. They argued that improved women's status is associated with declining demand for children. Opportunity cost of having additional children is also perceived by young women as one of the reasons for declined desired family size. Having fewer children means they need to spend less time of their productive life in reproduction and they can get more time for some productive works. Now, the discrimination between sons and daughters has also declined and the cost of educating

children has increased, which also favours the demand for fewer children. Further clarifying the subject matter, participants stated:

> *"If one child is to be born, mother is totally locked up for at least three years; we can do nothing, neither at home nor for society, if next child is born, six years, if next, then nine years, then the whole life is gone; that's why only a few children are preferred" (female, 36 years, 8 years of education)*
>
> *"Yes, increased cost of upbringing and educating children and more concern about their quality education makes couples desire fewer children" (male, 29 years, 12 years of education)*
>
> *"It is due to economic condition and also due to changed 'intention' of people for not having large family" (male, 68 years, 12 years of education)*
>
> *"This matter is mainly related to economic condition; the main thing is that, now, people, even if less educated, are exposed to outside world, learn and understand many things and can think whether their economic conditions can sustain the family or not and decide to have only a few children; the next thing is that there is equal treatment for sons and daughters now; this has caused decline in population (growth)" (male, 30 years, 12 years of education)*
>
> *"Among Dalits, there is no food to eat but there are many children; we continue giving birth, someone tells to do operation, but we think whether that operation suits or not, wife might even die of it, we are afraid of it and more children will be added" (male, 47 years, illiterate, Dalit)*
>
> *"In the past, there would be no medicines and tablets, a woman had to continue giving births; a woman would have 12, 16 births; many women would die of giving birth; but now, the situation has been like that, if many children are born, what to feed them, how to give them education; therefore, after having 2-3 children, people undergo an operation or get injection or take tablets; having 2 or 3 children is better" (female, 30 years, illiterate)*
>
> *"Now, women themselves want less number of children, they came out, understood, wanted to control births and used family planning methods" (female, 27 years, 7 years of education).*

There is higher preference for sons than daughters for continuation of lineage, for performing certain rituals and also for old age support. But the extent of son preference as such has declined to some extent over time. The idea of compulsorily having a son has

faded out now and many couples are contented in having only daughter. However, there are a few couples who highly prefer to have sons and continue childbearing if only daughters are born and end up with a large family. When discussed on 'who would prefer to have many children even now', all participants stated that almost none prefer to have more children now, but, due to *'compulsion'* some couples go for many. Having girls only in successive births is still regarded as a sufficient reason cited for continuation of childbearing, expecting a son. Participants consider lack of education and awareness as reasons for such son preference. Couples feel safe to have a son; if they get son as the first child, they may stop childbearing and most of them prefer to have a son and a daughter as an ideal sex composition of children. Moreover, in *Tarai* region, sons and daughters are differently valued also due to prevailing dowry system. Couples may have more desire for a son than a daughter thinking that they would get a handsome amount in dowry and gain higher social and economic status once they have an educated son. It may also happen that those couples who have only daughters are more likely to continue childbearing expecting a son because having a son compensates to some extent in their dowry transaction. Some of the ideas expressed in the discussions are:

> *"In the past, a son was considered essential, they (couples) would continue (to have children) even after having five daughters, but now, couples are satisfied even with two daughters" (female, 41 years, 9 years of education)*

> *"I don't agree that there is no discrimination; it is there; for example, I have two daughters and a son, how much do I get in marriage of a son; but I need 40-50 Lacks (4 -5 million Rupees) for my daughter's marriage; from where do I manage? My brother has a daughter passed B. A. and they ask 20 Lacks (2 million Rupees) cash in dowry; so, dowry system is the main reason for discrimination now" (male, 38 years, 10 years of education)*

> *"There may be a few couples, those due to lack of awareness and one or two are there who wait for son even after having 2-4 daughters" (male,54 years, 10 years of education)*

> *"Except for the case when there are only daughters, there would be no one who wants many children in these days; they want short cut now (indication: Sterilization)" (male, 74 years, 5 years of education).*

A mixed type of response was obtained from the FGDs on the issue whether there would be any discussions among family members and relatives regarding the number of sons,

daughters and total children a couple should have. Participants of older generation stated that such discussions among family relatives generally do not occur but those of younger generation replied that such matter comes in an informal way. Sometimes, some comments are made by relatives. There are some concerns of relatives; if a couple is having more children then it is questioned. Some extent of son preference is also reflected in such concerns.

Similarly, response from participants was sought on whether there would be such discussions among peers or any other social groups. Participants of older generation expect that there would be discussions among peers in younger generations regarding this matter. Participants of younger generation stated that there happens to be general talk among peers in gatherings on the matters of children. Generally, examples of small and happy families become the matter of discussion and are regarded as an ideal. Sometimes, some negative remarks are made for those having more children. Others are concerned if a couple has many children and sometimes such a couple is embarrassingly teased and becomes a matter of joke too. People informally warn on not having many children. The following some excerpts from our discussion:

> *"Those having more children are now looked at differently by the society and teased" (male, 40 years, 12 years of education)*
>
> *"General discussions in this matter also take place among friends; examples of someone with two children is appreciated as having good future; everything is sufficiently managed like economic affairs and education"(male, 30 years, 12 years of education)*
>
> *"Sometimes elderly relatives say, 'Do not have many children like us, there is no more land to settle'; they say like this; it is even told to me" (male, 32 years, 10 years of education, no children)*
>
> *"They say 'Mind your throat before swallowing a bone (Ghaanti heri haad nilnu)'" (implying that one should have only as many children as one can afford to have) (male, 43 years, literate).*

Participants had a mixed view regarding the influence of fertility behavior of others on a couple. Most of the participants of older generation thought that there would be no such influence. But, participants of younger generation stated that there would be some influence of such events to other couples in the community. They argued that learning from other's situation also occurs; and there would be adoption of other's behavior. They opined that they all learnt to have less number of children by imitation from others. If

some couple is enjoying a happy family with two children, others appreciate it and aspire for the same for them too. They also stated that, in some situations, someone makes a decision as per social pressure too. One of the young male participants (with a son and a daughter) indicated that the other participant (recently married, no children) is inspired by him and wants to follow him. One young female participant gave example of *Dalits* learning from other high caste people about educating their children and adopting family planning to limit the fertility. Generally, a new social behavior shown by some elite person of a society is copied by some others as an ideal and gradually becomes a norm. The following statements by participants are reproduced in support of the above explanation:

> *"There is some imitation too, if a couple has only two children and enjoying a happy life, others too, get influenced by this" (female, 46 years, 8 years of education)*
>
> *"It happens; people think that if it is good for others why not for me; and imitate other's behavior" (male, 68 years, 12 years of education)*
>
> *"People say; 'if that so wealthy person got sterilized after having two daughters only, then why do I need more?'; learning happens like this" (male, 40 years, 12 years of education).*

In can be concluded that increased cost of rearing and educating children, increased aspirations of parents about their children, increased awareness on benefits of small family, more concern about quality of children, increased child survival, health concerns of mother and children and perceived opportunity costs of additional child by women are reasons behind preferring a small family (a small number of children). Availability of family planning means helped materialize this desire to a large extent. Messages in favour of a small number of children are indirectly disseminated among peer groups and this has some influence on couple's desired number of children. Diffusion of the idea of small family is therefore taking place through these channels of social interaction.

6.3.4 Changes in aspirations for children

As per the perceptions of the older generation, there is difference between older generations and younger generations in terms of aspirations about their children. In the past, parents aspired for their children to be strong, hold more land and become prosperous when grown up. Making them highly educated was not the main priority in the past; but now, parents want their children to be more educated and skillful so that they

can live their life better than their own. The main focus of parents now is that their children would remain happy and prosperous when grown up and acquiring education and skill is the most necessary requirement for this. Parents invest more on education of children now to make them more competitive in job market. They have perceived that education enhances knowledge, then it creates wisdom, and this can be utilized to live a better quality life. Moreover, parents in the past were less knowledgeable and lacked specific idea to make their children's life better than their own. But now, guardians have become more knowledgeable, focused, and they have some specific idea about it such as making their children doctor, engineer, officer, minister and much more. During our discussion regarding changing aspirations, some of the participants mentioned:

> *"When I was in class 3-4, my father, who was chronically ill, told me, 'I am in this condition, looking after buffalo and you will become a 'master' (an educated and knowledgeable person)!'. Like this my father forcefully expelled me from school and I had to stop going school. But, I have always inspired my children for education; I always encouraged them for continuation in case of their failure too; like this there is change" (male, 60 years, 5 years of education)*

> *"In the past, people wanted that their children would acquire more land, farm on it, tame more animals and become prosperous; and it was not that necessary to be educated; but now, they aspire that their children would read, write, become smart and knowledgeable, go to better places, contact with higher personalities; and work in the country and go abroad. Having fewer children will make it easier to achieve this" (male, 70 years, illiterate).*

Of the four FGDs of younger generation, three unanimously agreed that there are differences in the aspirations for children between the older generation and the younger generation. As opined by participants of the older generation, the main difference from then and now is in aspiration of higher education for children and giving children's education the highest priority. However, some young male participants argued that there is not much difference between older generations and younger generations in terms of aspirations about their children; their parents also aspired for them of being highly educated and they also aspire for the same for their children. But, the participants agreed on the fact that there is more emphasis on children's education now as compared to that in the previous generation. The following are some of the ideas to mention:

> *"Aspirations are always there; parents want their children to be prosperous; now, if we can educate our children, they can happily look*

after us; if they become educated, they do not have to depend on ploughing and digging (Halo Kodalo garera khaane)" (female, 26 years, 9 years of education)

"It is different; our parents had aspired that we would become healthy and strong so that we could plough field efficiently and do farming and hence could look after them in future; this was the belief; but now, we do not have this; if we can educate them well, it would be better than the land; it would make their future better; this attitude is there" (male, 30 years, 12 years of education)

"In the past, children were compared by the amount of grass they have cut and brought home, but now, they are compared in terms of marks they secured in their exams" (female, 39 years, literate).

There is clearly a shift in the priority of couples, with a high aspiration for education of their children now than in the past. Participants of all FGDs unanimously agreed that once the couples have fewer children, it becomes easier for them to invest on their education and fulfill their high aspirations about their children.

6.3.5 Change in perceived values of children

Change in the value of children occurs during the course of fertility transition (Bulatao 1981). A change in the value of children over a period of time has been observed in Tamil Nadu where the parents in the past perceived more economic benefit from children working in the early age which has declined for present day's parents (Vaithilingam and Murugesan 1999). Perception of costs and benefits of children is also a proximate determinant of fertility (Mason 1997). The increasing financial costs of rearing children and increasing returns to educating them directs parents to a smaller number of children so that they can channel their limited resources towards children's education (Cai 2010). In rural contexts, where infrastructure and financial market are poorly developed, children are important security assets for parents for an indefinite time in their old age (Cain 1983). In such settings, children fulfill the need for a kind of annuity for parents and hence they invest on children in spite of a high cost incurred and the associated risk of return (ibid.). As a society shifts from traditional to modern, the importance of the 'value' component of children that they have the ability to provide wealth and insurance to ageing parents declines causing a shift in the value of children so that the number of children demanded diminishes (Friedman et al. 1994). Moreover, a conscious emphasis on enhancing the quality of children in terms of health, education and job emerges during fertility transition (Vaithilingam and Murugesan 1999). The quality-quantity trade-off is

another aspect that has a close relation to child cost in health and education with fertility change (Ogawa et al. 2009). Therefore, the present study has made an attempt to assess changes in perceived values of children in rural settings, emphasizing on the costs of rearing children, economic value of children, old age support and the emphasis on quality versus quantity of children.

6.3.5.1 Cost of rearing and providing education

Participants of all the FGDs unanimously agreed that there is substantial increase in the cost of rearing and educating children; both in terms of direct and indirect costs. Direct cost of rearing and caring children during childhood including their medical care and the cost of providing them education have increased. In the past, small children were not given intensive care as provided these days; but now, more time and human resources are needed for rearing a small child, which accounts for increased indirect cost. There is a feeling of rise in indirect cost of rearing children in terms of time spent and opportunity forgone as well. People are now concerned more about doing some economic activities and earn something for betterment of their present living and also for some saving for future. After a probe, young women agreed that they have a feeling that they could spend the time to be given in child rearing in additional economic activities. Therefore, the opportunity cost of having children as perceived by women is another indirect cost, which they stated has increased.

Direct cost is incurred for child's education, health and allied expenses. In the past, there was no facility of health care and treatment was done at home with traditional medicines but now due to increased awareness about child health and easier access to modern health care, cost of rearing children has increased due to increased health expenditure on them. Moreover, expenses on their clothing and other allied things have also increased. The most important one is the cost of providing education to children. In spite of the fact that there was provision of tuition fee payment in schools in the past and it is now free and only stationery and other costs are incurred in government schools, the cost of educating children has increased now. Even in government schools, one has to spend on uniform, stationery and other incidental charges. If children are sent to government school, they are given extra tuition to ensure better quality education and additional costs are incurred for it. Many parents now send their children to expensive private schools in the hope of getting better quality education for their children. It is the economic status of family to make a choice in type of school. Such choice prevails in both the study villages because

there are both government and private schools in the locality. According to the participants, only those who cannot afford private schools send their children in government schools. Their intention is to buy quality education by paying more money. This perception of 'quality education' has increased the cost of providing education to children.

Sending children to private schools is also a status symbol and some couples do so as imitation of neighbours or others even if it means bearing great economic hardship. The tendency of imitating other's social behaviour is therefore also associated with increased cost of raising children in some cases. Relatively poor families have tendency to follow the behaviour of relatively better off families in terms of raising children including educating them thus carrying more economic burden. Regarding the increment in direct and indirect costs of bringing up of children, participants made the following arguments:

> *"The cost of rearing children has increased; in our time, a small child was fed, left alone in the Kokro (a swing, made up of bamboo basket and ropes, used for baby to sleep and swing) for almost whole day and only taken care at the end of day but now, a member of family is totally engaged in carrying small child in lap and caring every moment; and that is also not sufficient; therefore now it (the cost of child rearing) has increased. The change has occurred in education also; now there are no children who do not go to school" (male, 70 years, 3 years of education)*
>
> *"Raising children is more expensive now; if economic status of neighbor is better and that of this family is worse, in this condition also, children are to be made (reared) like that of the neighbour, they should be made to follow the same line even by taking extra economic burden" (male, 74 years, literate)*
>
> *"Now, government schools take no tuition fee but there is no quality, so people are paying more in private" (male, 30 years, 15 years of education)*
>
> *"Yes, the cost has increased, there were no boarding schools earlier, now they are there, parents want their children to be boarders and the cost goes up" (female, 41 years, 9 years of education)*
>
> *"Yes, by having only a few children, she (a woman) can exit from childbearing matters soon and can utilize more time in other economic activities; but if more children are born, one should always engage in rearing them and would not come out from it" (female, 44 years, 9 years of education).*

Another aspect of providing education to children was related to differential treatments in son and daughter and changes occurred in it over time. All participants unanimously agreed that there was differential treatment for girls in schooling in the past; they were generally not sent to school. But, gradual change occurred and sending children including girl child to school has become a social norm. In Barbote, Ilam, participants stated that there is no discriminatory behaviour for girls in terms of educating them. Some participants in Hill opined for more priority for educating their daughters than sons because daughters have to go other's home (after marriage) and couples wish their daughters to have a good position in their new home. They consider good education to be a means to acquire better job and better position in her marital life. During discussion, participants mentioned:

> *"Daughter has to go to others' home, if she is educated; she can stand on her own and will live a happy life" (female, 36 years, 8 years of education)*

> *"My idea is different; I say that daughter is to be given more priority because son will get parental property in future, so we have to invest more on daughter" (male, 32 years, 10 years of education).*

But, in Bastipur, Siraha, though girls are also sent to school, some kind of discrimination still exists among *Madhesi* community. They have a tendency to allocate more resources to educate their sons as compared to daughters. Difference occurs in choosing school; sons are sent to private schools whereas daughters are sent to government schools. Therefore educating a son is more expensive than educating a daughter. Moreover, daughter's higher education is also impeded by the dowry system (for details, see section 6.3.1.3 Educational status).

In summary, both the direct and indirect costs of raising children have increased a lot. In the context of escalating costs of living and a high priority for quality education due to high aspirations for children's education, the increased cost of having children made couples limit the number (quantity) to achieve high quality. This prepared the base for quality-quantity trade-off to come in effect.

6.3.5.2 Economic value of children

On the discussion regarding expectations of economic returns from children when they become grown up, participants put diverse views. Some of the participants of older generation stated that the economic expectations from children are always there but the expected way on how they make the economic returns are different. In the past, people

used to think that their children would make economic returns by holding a larger area of land and farming on it, but now the expectations are that children would earn in some relatively easier way, most preferably doing some white collar job and make economic returns. Their indication was that, now parents educate their children, they would do some salaried job instead of troublesome agrarian job, earn some handsome amount and bring prosperity to the family. They argued that the older generation had more economic expectations from their children but the younger generations have fewer expectations. Relating to the questions of economic value of the children, few participants replied:

> *"In the past, children were expected to earn from farming and livestock when grown up, but now, it is expected that they would do some light (not a heavy physical) job somewhere or do some salaried job and earn for family"(male, 60 years, 5 years of education)*
>
> *"Parents have hope, and they educate children but after getting a son married, what happens, it is not sure" (male, 64 years, 7 years of education)*
>
> *"They will make the return if we invest now; it is a future expectation" (female, 45 years, literate).*

Couples of the younger generation are less hopeful and less sure than those of the previous generation that they will get economic returns from their children. Couples now only aspire for better future for their children rather than economic returns to be paid for them. They stated that grown up children of the next generation will be less under the control of parents and economic expectation from them in such situations is sceptical. They are investing on their children without expecting much return from them. Some of the ideas shared by participants in our discussions are:

> *"That (expectation from children) has declined now; because, the only aspiration now is that, let their future be secured" (male, 30 years, 12 years of education)*
>
> *"There is slight change; thinking of parents now is that it is their responsibility to educate their children whether they (children) would support (parents) in future or not; but there is hope; everybody does have it" (male, 30 years, 15 years of education)*
>
> *"It (expectation from children) has a bit decreased; because, grown up children are not under the full control of parents now, as was the case in the past" (male, 74 years, literate).*

Participants of all FGDs unequivocally stated that economic value of children as child labour has drastically declined and parents' consciousness about children's education is one of the important reasons for this decline. In the past, children had to help parents in collecting animal fodder and doing household works and also work in agriculture. Children nowadays do not help in agriculture like those in the past. It is due to two reasons. *One* is that now there is less amount of land for agriculture in family as compared to that in the previous generation and children's help is deemed less necessary there. The *other* reason is related to parents' increased priority to children's quality education in which they should engage more in educational activities and improve their education rather than helping in household and agricultural works. Parents take extra burden on themselves but let their children free for their educational attainment. However, a few parents use their children as well in some household and agricultural works without hampering their study. The following are some of the statements given by participants:

> *"Children of these days do not do know how to cut grass; we do not let them do these jobs; we emphasize them to study" (female, 44 years, literate)*
>
> *"Nowadays, their time is spent in study; they do not have time to help us" (female, 56 years, literate)*
>
> *"Parents now are serious about the investment in children's education; they do not want their investment to go futile and do not let their children help in agricultural works, instead they do more work themselves"(male, 58 years, 8 years of education)*
>
> *"It is how the children are groomed; I also tell them to help in household and agricultural works, but without disturbing their study" (female, 39 years, literate)*
>
> *"Parents do not let their children work, but it is only for sons; a daughter must help her mother; daughters are at home, sons can go anywhere any time" (male, 68 years, 12 years of education).*

It can be concluded from discussions that the expectations of economic returns from children have declined and net flow of wealth has started to be directed towards children now. The way, in which parents invest on children, it is less believed now that they would get similar economic returns from them. This is the situation of the net wealth flow from parents to children which, according to Caldwell (1973), also suffices for fertility to

decline. Parents place the highest priority on children's education and they are of less economic value as child labour now.

6.3.5.3 Old age support

A majority of the participants of older generation argued that there is some change in the view that children look after their parents in their old age. Previously, it would be a matter of responsibility of a son to look after his parents in their old age. It was a strong societal norm and there would be social pressure in case of deviance from it. But now, children are being less responsible in this matter. They are more concerned with their own children rather than their parents and even live separately leaving their parents alone in old age. Moreover, due to structural change in the society, now, a son may go far away from his parents to manage his living and it is not practical for him to live with parents. This is a kind of compulsion where parents live alone and son can't take care of his parents in their old age. But, incidences of children not living with their parents in their old age are increasing in the society.

Participants of older generation are worried about their old age when all their strength exhausts; they are not sure whether their children will take care of them at that time. They reiterated that it is the son's responsibility to take care of his parents in the old age. Some of them are hopeful that their children would take care of them when they become dependent and some others are also developing their confidence that if their children do not look after them in old ages, they will live by using their own savings. The researcher found an old age home being constructed in Barbote, Ilam, which clearly indicates the change taking place in the villages in this matter. The following are excerpts supporting the above explanation:

> *"We have taken care of our children and brought them up thinking that they will look after us; and we are much hopeful that they will do so" (male, 70 years, 3 years of education)*
>
> *"In the past, there was a feeling that 'it is my responsibility to look after my parents' but now, love and affection from them (children) has declined; after having own wife and children, they leave 70-80 year old father and mother and live separately" (male, 60 years, 5 years of education)*
>
> *"It has changed; for me, it (expectation of support from children) has decreased now, they look after parents only due to compulsion, they do not look after them by their own will as before" (female, 46 years, 8 years of education).*

But, another opinion is that there were some cases in the past as well as at present where children do not look after their parents in their old age and there is no substantial change in this matter. Some participants argued:

> *"They should take care; but some do so and some others do not do it; parents have brought them up with great difficulties, educated them and they should understand it after their marriage" (male, 54 years, 10 years of education)*

> *"In the past too, those who did not take care, did not do it; those who did it, did so; and now also those who do not take care, do not do so; and those who do it, do so" (male, 70 years, illiterate).*

Participants of younger generation had different views regarding this matter. A majority of participants stated that there is decline in the expectations that children would look after parents in old age; but some others stated that it has not changed. Previously, there was the practice of living in joint family and there would be a kind of respect, discipline and order in family and it would be a matter of responsibility of one of the sons to look after his parents in their old age. But now, all are going for *'small family, happy family'* and the idea that children look after their parents in old age has weakened to some extent. Their ideas are reflected in the following statements:

> *"In the past, there used to be joint families, there was respect and discipline; but now people go for 'small family, ground for prosperity'; and this idea (children take care of parents in old age) has narrowed down" (male, 30 years, 15 years of education)*

> *"Son and daughter-in-law nowadays want to get away from parents and think that 'I am doing job and busy here; it would be better if my parents stay in old-age homes'" (male, 32 years, 10 years of education)*

> *"It is only our investment; there is little hope of support at old age" (male, 32 years, 10 years of education).*

In patriarchal agrarian settings, it is basically a son's responsibility to look after his parents in old age. But, due to *structural changes* in the society, the situation is different now and incidences of parents living alone in old age are increasing. The strong belief that sons will look after parents at old ages is weakening over time.

6.3.5.4 Quantity-quality trade-off of children

Participants of younger generation are much concerned about the quality of their children when they grow up; they expect that their children would live a happy and prosperous

life. For this aspiration, parents are more concerned about educating their children. Due to increased cost of living, cost of educating children has also increased. Perceived better quality education in private schools also caused increase in cost of education. To better utilize family resources, couples now want to have fewer children so that they can be given better education by investing more per child. Once the couple has a small number of children, it becomes easier to educate them and fulfill higher aspirations about them. Therefore, there is a quantity-quality trade-off, where, couples nowadays are concerned more on 'quality' of grown up children by compromising on the 'quantity'. Higher aspirations for children's education are indirectly linked to decline in the demand for children through quantity-quality trade-off. This trade-off has also favoured the fertility decline. In support of the quantity-quality trade-off, some participants mentioned:

> *"Now, people may give birth to one child but invest three times more" (male, 32 years, 10 years of education)*

> *"Expectation of high quality children is the main reason of having fewer children" (female, 39 years, literate).*

Changes occurred in values of children in the following way: net wealth started to flow from parents to children, perception of sons as source of old age support has weakened, economic value of children has declined and cost of upbringing children has gone up. Interplay of 'quantity' versus 'quality' gradually came into effect. These all conditions support fertility to decline. Caldwell (1973) stated that the reversal of net wealth flow from 'children to parents' to 'parents to children' is sufficient for fertility to decline. This situation has largely reached in the rural setting.

6.3.6 Family planning service

People now are more aware about family planning than before. It was a gradual change that more people accepted the idea of family planning and started adopting it. Women of younger generation have understood the meaning of family planning as a plan by which one uses some contraceptives to space as well as to limit child birth. However, some confusion is still left in using 'family planning' synonymous to 'sterilization'. All participants agreed that 'family planning' incorporates both the temporary and permanent methods, and it is a means that help couples give birth to children as per their desire. In our discussion on understanding of family planning, some participants mentioned:

> *"Family planning may stand for doing permanent sterilization after having desired number of children; that is good, but now in village, very*

few people do that 'family planning'; because it has effects like weakness, inability in doing work, being thin and other things; other different medicines contraceptives) are there now; many use these things; it is temporary family planning, isn't it?" (male, 30 years, 12 years of education)

"FP refers to making family small and giving births with spacing" (female, 32 years, literate).

There are more users of family planning now as compared to the past. Using family planning in order to have a small family has become a social norm. Now, people watch couples with many children and raise questions on it. This makes a kind of social pressure in using family planning. However, shyness in asking for contraception still prevails among *Dalit* women of *Madhesi* community. There are no beliefs and cultural/religious practices against use of the family planning methods in the village. When family planning service came for the first time, there was provision of male sterilization camps and family planning was almost synonymous with sterilization. Gradually, temporary methods were also included in the service and people also started adopting these reversible methods. In *Tarai*, female sterilization became the most popular method. Some awareness about adverse effects of hormonal contraceptive methods prevails among women and they also have a fear of such side effects. Women have perception that a particular method will either suit or will not suit her. In spite of some side effects women have felt, they have perceived more benefits of using family planning. They weighed more the health benefits (for their own health and also their children's health) and the economic benefits (by having less number of children) of using family planning than adverse side effects. Discussing on this issue some participants recited:

"In our parents' times, it (family planning) would not be there, therefore we 12-13 children were there for them; still we 13 are there, I am the fourth among daughters" (female, 45 years, literate)

"Now, in village, if 4-5 children are born to someone, then people started asking, 'Hey, what happened to you?'" (male, 74 years, literate).

There is increase in the availability of family planning services. Now, Condoms and Pills are resupplied on the doorsteps through FCHVs and in addition to these, local health service centre gives the Depo Injection. In the times of older generation, there would also be situations, where people had knowledge of family planning and readiness to use, but the means were not available. But now the situation has changed and couples can get one or the other means of family planning in their village.

The sources of knowledge regarding family planning are also widened now. Previously, some family planning workers used to counsel people to use family planning; then information started to disseminate through Radio. Now, not only Radio, local FM, TV channels and hoarding boards are used to disseminate information. Moreover, FCHVs play an appreciable role to counsel women and help in their decision making regarding the use of family planning. People have perceived that there is good environment in villages for using family planning and the service is also 'good'.

Increment also occurred in the awareness as well as availability and in use of family planning. Use of family planning has become a socially accepted matter now. Use of family planning has direct influence on fertility as it is one of the principal proximate determinants of fertility (Bongaarts 1978). Increased use of contraception in the villages also supports for fertility decline.

6.4 Summary: Causes of Fertility Decline

People's perception on different aspects of socioeconomic changes and their influence in fertility (both preference and performance) can be stated in the following way. There is increase in age at marriage, educational level of people (including women), exposure to means of communication and mass media, awareness and access to health and family planning service and survival status of children. Similarly, behavioral changes like adopting family planning and good sanitary habits also occurred to a large extent. Connection of village to urban centres through extended road network, provision of electricity and provision of communication technology has also made people's life easier and opened access to wider world, from where they could make their own ideas about how to live a more comfortable life. Some transitions occurred in occupational structure of people and some new jobs are created outside of the agriculture sector. Labour wage has increased; agricultural productivity has also increased but, due to escalating costs of living, there is not much change in the overall economic status of people. Therefore, a picture of substantial social change coupled with a slow economic progress has been observed in the study villages.

It is quite well known that all the social changes stated above have negative influence on fertility. Factors like increase in age at marriage and contraceptive use have proximate negative effect on fertility whereas the other factors have distant effect. In FGDs, only a few participants stated increased child survival, increase in age at marriage, increased awareness of women's health, and increased pressure on fixed land resources as reasons

for fertility decline. Relatively more cited reasons were increased women's status due to education, decreased discrimination between son and daughter and use of family planning. The most cited reasons for fertility decline from all the FGDs are economic condition, increasing costs of educating children and higher aspirations for children. Lack of awareness, education and higher preference for son are the reasons stated for relatively higher fertility even at present.

The relationship between economic status of family and the number of children appears to be quite complex. Participants too put conflicting views regarding this matter. One most prominent view, as already mentioned, was that couples desire fewer children because of awareness of increased expenses in rearing and educating them. This means that the poor would have less children due to their economic hardship, indicating for a 'positive income effect' in which there exists a positive association between economic status and number of children. But in reality, those couples in the poorest economic strata are having more children and a clear negative association has been observed. In this research too, fertility differentials by economic status of family have shown a similar result (See Chapter-III). At least, the 'poverty induced fertility decline' hypothesis cannot be accepted in this context.

Then, the question arises: why relatively higher fertility is there among the poorest and why relatively better off families prefers to have fewer children? The explanation given by participants in this issue is the following: The poorest people in rural setting are engaged in agriculture, most probably as agricultural labourer rather than having their own land for agriculture, therefore they consider more children as more hands for work and then more earning for subsistence by selling labour from childhood; and they require one more child to look after other smaller children in the family. They may consider that current economic (labour) value of children is higher than the expected returns by making current investment in educating children. They might be aware of the value of education but they have not perceived its importance to be very high. This situation makes their demand for more children rational. Although such couples have some knowledge of controlling fertility and some inspiration to do so, they can't properly utilize it because of either fear of side effects of means of family planning, or difficulty in access or due to some other factors. Therefore, they end up with relatively larger family. In terms of Coale's (1973) three preconditions for marital fertility decline, it can be said that they are largely not meeting the three pre-conditions and lagging behind. But, during the course of

social transformation, a stage comes when mass education becomes a common phenomenon; all people including the poor perceive education as the most important aspect in their life and couple's awareness to control fertility increases, then all start controlling fertility in a more effective way. After that, couples of the lowest economic strata also desire less number of children and can effectively materialize it given the easy access to means of fertility regulation.

Declined demand for children is mainly due to increased awareness of educating children. The provision of mass education is found to play a role in it. Mass education is believed to favour smaller families because it increases the costs of children and the value of investing in higher quality children, while decreasing the value of larger numbers of them (Freedman 1987). People perceived the importance of education to be the highest in human life. An educated person can live a better life at any cost than an uneducated one. Couples now want to make their children as highly educated as they can. They apply all their efforts in this endeavour. But, educating children is generally a costly affair. Not only the direct cost is associated with children's education, but also they become less useful as economic hands when they are engaged in their study. Moreover, availability of private schools in villages, people's perception of high quality education in such English medium schools, and high aspiration of quality education for their children have played an important role for exponential increase in expenditure of educating children. This has led to decrease in the demand for children through the quality-quantity trade-off route and hence fertility declined. These findings are similar with those in Cambodia, where, people saw educational route to social mobility as something that was affordable only when a family had fewer children (Hukin 2014).

Diffusion of the idea about small family and the means of fertility control have also played a role. Despite slow social development, fertility decline in the state of Andhra Pradesh in India has been partly attributed to geographical and social diffusion (Sääväla 2010). In the present research too, discussion in the field revealed interactions among peers and relatives regarding different matters related to fertility. To some extent, diffusion of the idea of small family has taken place. Due to increased access to communication and transportation, interaction of rural people to those from urban area and elites has increased. Adoption of the behaviour of others, especially that of elites, became easier which also contributed to fertility decline to some extent. Though there is debate on what actually diffuses during the process of diffusion, the idea that 'education

is the most important factor of human life' appears to have diffused prominently. This is diffusion of aspirations rather than that of small family norm *per se* (Kulkarni 2011). Once people perceive that education for their children is the most important thing, they aspire for higher education of their children and invest more on it given their economic condition. Human capital component of children is a very important consideration in parents' perception in highly success-oriented societies of East Asia (Ogawa et al. 2009). But, this appears true even in case of Nepal, where, 'success' is mainly dreamt for their children, if not for parents themselves. In India, education has indirect effect on fertility decline through diffusion mechanism whereby a large chunk of uneducated women are inspired by fertility behaviour of the smaller chunk of educated community and received knowledge and preferences from them (Arokiasamy et al. 2004). A similar mechanism of diffusion in Nepal could not be ruled out.

Couples also become convinced that high costs are incurred to meet high aspirations for their children's education. But still, they become ready to invest more per child on education by limiting the number of children they desire, expecting a high quality grown up child. In a rural area of a developing country, where there is poor public education system and no generous support for child care, the cost of child quality is mostly borne by parents and the quantity-quality trade-off is more likely (Li et al. 2008). At the same time, increase in costs of living also causes increase in cost of rearing children leading to relatively less benefits of having more children as compared to the costs incurred. This creates an environment where classical quantity-quality trade-off applies, where, increase in quantity becomes more expensive if higher quality children are required, because higher quality children cost more (Becker and Lewis 1974). Finally, fertility declines due to demand for less number of high-quality grown up children. Quantity-quality trade-off largely applied in case of rural settings of Nepal and supported fertility decline. In a similar low development setting of Orissa, India, high aspirations for children's education caused rise in the cost of raising children, parents felt it an economic burden, quantity-quality trade-off operated, and fertility declined (Sahoo 2013b).

Provision of family planning service is also a contributing factor to materialize declined demand for children. In the study villages, a good environment to use family planning methods is prevailing; couples are getting some choice of methods too and they are gradually shifting towards the use of reversible methods. People perceive family planning service as one of contributory factors to help materialize their fertility desire. The family

planning programme propagated the slogan 'Small Family Happy Family' *(Saano Pariwar, Sukhi Pariwar)*, adoption of which is considered as another reason of fertility decline.

In conclusion, it is found that fertility decline has occurred among all economic groups, including the poor. But, the poor are having relatively more children. It is not only because they are poor, but they also have less awareness about importance of education, less aspiration for their children, lower level of awareness of means of contraception and hence less capacity to control fertility. Relatively richer people have fewer children because of effective interplay of quantity-quality trade-off. Therefore, increased awareness to education is the triggering force and economic constraints and provision of family planning service are supporting environment for remarkable fertility decline in rural setting in Nepal.

Chapter-VII
People's Perception of Role of Family Planning Programme: Results from Field Study

In the previous chapters, explanations have been provided for dynamics of fertility decline, changes in fertility preferences and its determinants, the dynamics of contraceptive use and possible causes of fertility decline in Nepal. The government of Nepal has been implementing the family planning programme as a conscious neo-Malthusian policy initiative. Though family planning programmes are not the only policy measures for fertility decline, they are effective in reducing fertility (Gupta et al. 2011). Empirical evidences show that national family planning programmes played a significant role in fertility decline in developing countries in two ways: providing contraceptives at free or subsidized costs and popularizing small family norm and legitimizing contraceptive use (Caldwell et al. 2002). Information, Education and Communication (IEC) activities of the family planning programme not only explain the advantages of small families, but also increase the social acceptability of birth control and counter negative perceptions and groundless rumors of methods (Bongaarts 2011; Bongaarts and Casterline 2012). Family planning supply (programme) factors are also important in reducing psychic and resource costs of fertility regulation and in activating latent demand for contraception (DeGraff 1991). In this context, an attempt has been made to examine people's perceptions of how the programme is playing a role in facilitating fertility transition in Nepal.

The situation of family planning has been examined based on information obtained from two villages through individual interviews of women, FGDs of men and women of different ages, interviews with health personnel of local health facility and FCHVs and also from personal observation during the field study. Individual women's interview was carried out in the same villages where the FGDs were conducted. Although those matters related to family planning use which could be shared in groups were included in the group discussions, individual interviews were also deemed necessary to capture individual woman's contraceptive behavior and experiences for better understanding of the situation. People's perceptions about family planning programme, their knowledge and use of different methods, service availability and accessibility, costs, method choice, service quality, and side effects have been discussed. Also covered are some of the

reasons of non-use and discontinuation of use of family planning. Apart from information obtained from the field study, some secondary data including the surveys and other relevant sources are also used.

7.1 Background Characteristics of Respondents

The research setting and background characteristics of FGD participants has been presented in Chapter-VI. This section presents some key characteristics of those women who were interviewed during the field investigation. A total of 63 currently married women of age 16-39 were interviewed by using a semi-structured questionnaire. They were 31 women from Barbote, Ilam and 32 women from Bastipur, Siraha. Details of sample selection have been described in Chapter-II, Section-2.2.2.1. Individual interviews were conducted in parts of ward number six and seven of Barbote VDC and three, six and eight of Bastipur VDC. The interviews were focused on various issues related to family planning.

Majority of participants from Bastipur are residing in joint families and equal proportions of women are living in nuclear and joint family in Barbote. Both villages are mixed in terms of caste/ethnic composition and the respondents comprise *Brahmin/Kshetri*, *Janajaati* and *Dalits* in both the villages. There were more *Dalits* in Bastipur, which is reflected among interviewees too. Almost all respondents of Bastipur were Hindu, but a substantial number of them were followers of *Kirat*, Buddhism and Christianity in Barbote.

Educational status of participants is quite different in the two villages; there were no illiterate respondents in Barbote, but almost two fifths were illiterate in Bastipur. Both villages are similar in terms of whether their husband is living at home or living elsewhere. Husbands of about one third women in both the villages are out of home and living mostly in foreign countries for earning. Those males who were out of country were mainly in Malaysia, Qatar, and Saudi Arabia. Husbands of women from Barbote, Ilam were mainly in Malaysia, but those of Bastipur, Siraha were in Saudi Arabia and Qatar.

As compared to respondents of Barbote, those of Bastipur are relatively younger (mean age 30 years in Barbote versus 26 years in Bastipur), married at relatively lower age (mean age at marriage 20 years in Barbote versus 17 years in Bastipur), gave birth to first child at lower age (mean age at first child birth 21.5 years in Barbote versus 18.5 years in Bastipur) and have higher fertility (mean CEB 1.9 in Barbote versus 2.4 in Bastipur).

Table-7.1: Background characteristics of respondents, Barbote, Ilam and Bastipur, Siraha

Characteristics	Barbote, Ilam		Bastipur, Siraha		All	
	Number	Percent	Number	Percent	Number	Percent
Family type						
Nuclear	15	48.4	8	25.0	23	36.5
Joint	16	51.6	24	75.0	40	63.5
Caste/Ethnicity						
Dalit	2	6.5	9	28.0	11	17.5
Janajati	13	42.0	19	59.5	32	50.8
Brahmin/Kshetri	16	51.5	4	12.5	20	31.7
Religion						
Hindu	19	61.3	31	96.8	50	79.3
Non-Hindu	12	38.7	1	3.2	13	20.7
Education						
Illiterate	0	0.0	13	40.6	13	20.6
1-9	14	45.2	9	28.2	24	38.1
10+	17	54.8	10	31.2	26	41.3
Husband's residential status						
At home	21	67.7	21	65.6	42	66.7
Elsewhere	10	32.3	11	34.4	21	33.7
Age						
16-24	7	22.6	13	40.6	20	31.8
25-34	14	45.2	16	50.0	30	47.6
35-39	10	32.2	3	9.4	13	20.6
Mean age (SD)	**29.9 (6.1)**		**26.1 (5.2)**		**27.9 (5.9)**	
Age at marriage:						
Below 16	3	9.7	7	31.8	10	15.9
16-17	7	22.6	13	40.6	20	31.8
18-19	6	19.4	10	31.3	16	25.4
20+	15	48.3	2	6.3	17	26.9
Mean age at marriage (SD)	**19.9 (3.9)**		**16.8 (1.7)**		**18.3 (3.3)**	
Age at first child birth[#]						
Below 20	7	24.1	21	67.7	28	46.7
20+	22	75.9	10	32.3	32	53.3
Mean age at first birth (SD)	**21.5 (3.1)**		**18.5 (2.0)**		**20.0 (3.0)**	
Number of children ever born						
0	2	6.5	1	3.1	3	4.8
1-2	22	71.0	18	56.3	40	63.5
3+	7	22.5	13	40.6	20	31.7
Mean children ever born (SD)	**1.9 (1.0)**		**2.4 (1.2)**		**2.2 (1.1)**	
Number of living children						
0	2	6.5	1	3.1	3	4.8
1-2	23	74.2	19	59.4	42	66.7
3+	6	19.3	12	37.5	18	28.5
Mean number of living chidren (SD)	**1.8 (1.0)**		**2.2 (1.1)**		**2.0 (1.0)**	
Total	**31**	**100.0**	**32**	**100.0**	**63**	**100.0**

Mean age at first child birth is calculated by excluding three women who had no child born

Source: Field study, 2014

Interviewee women broadly reflect the difference in education and age at marriage that is prevailing in Ilam and Siraha districts. In terms of fertility transition, Barbote village of Ilam can be considered as a village which has moved ahead as compared to Bastipur village of Siraha district.

7.2 General Perception on Family Planning

People have good awareness about family planning. However, when discussed on what family planning precisely means, FGD participants expressed mixed views. Some participants could not precisely state what exactly the term family planning means, some others referred it to stopping child bearing, and many participants precisely stated it to be a way of having a suitable plan of giving child birth which consists of using both reversible and permanent methods of birth control. The first impression of the term 'family planning' among people is largely 'limiting childbearing by sterilization'. Nepali terminology for 'family planning' has been chosen as *'Pariwar Niyojan'*, where, *'Niyojan'* in Nepali is synonymous to 'control' and it literally means obstacle against conception. So the term *'Pariwar Niyojan'* is superficially understood by common people as the way 'to control' or 'to limit' birth. Therefore, some people still perceive the restricted meaning of family planning as a way of limiting births and do not see scope of incorporating birth spacing within it. Moreover, in the early days of the family planning programme, male sterilization was in high priority and control of excess births was the main thrust. Therefore, from the beginning of the programme, perception has been developed among people that family planning is synonymous to stopping child bearing by doing sterilization *('operation'* in common people's term). During the course of time, different methods are included in the programme and also the objectives and priorities are changed. But many people still have the same first impression of family planning. Regarding the perception about family planning, women are found to express more precise meaning of the term as compared to men. Many young women and some young men could precisely state the meaning of family planning. They stated that family planning means a way of planning on how to build a good and well managed family and it refers to a planning done by couples to have a certain number of children with desired birth spacing by using means of contraception. In conclusion, family planning as perceived by people is something that leads them to achieve a small family size. The following FGD excerpts from our discussion confirm the explanation:

"We are taught that family planning means a planning for a well managed family" (female, 36 years, 8 years of education)

"Family planning means limiting births" (female, 41 years, illiterate)

"It is a planning of couple to have this many children in this much intervals, and using the means to achieve it; it is permanent and temporary also" (male, 30 years, 15 years of education)

"Family planning means having fewer children, it is both permanent and temporary" (male, 24 years, 12 years of education)

"Family planning may stand for doing permanent sterilization after having desired number of children; that is good, but now in village, very few people do that 'family planning'; because it has effects like weakness, inability in doing work, being thin and other things; other different medicines are there now; many use these things; it is temporary family planning, isn't it?" (male, 30 years, 12 years of education).

The government of Nepal has also perceived that the term 'family planning' bears negative connotations when translated into Nepali meaning and is working out to emphasize a more positive term which means a well planned family *(Byawasthit pariwar)* (Tamang et al. 2012).

7.3 Knowledge of and Attitude towards Family Planning

According to Nepal DHS, knowledge of at least one method of family planning has become almost universal now (MOHP et al. 2012). In the field study, participants of FGD unanimously mentioned that there is increase in awareness among people about family planning than before. Women in individual interviews in the field were asked about different methods of family planning they have heard about. Answers were expected for seven methods: male and female sterilization, Pills, Injection, IUD, Implants, and condom. Of the 63 women interviewed, only 26 (41 percent) could state all these seven methods of family planning, even after probing. Most of them know about Pills, Injection, and Condom, which are available in the local health facility. Three women could state only female sterilization as the method they know and were users of the same method. It appears that once women intend to use some method and acquire knowledge about the method from some sources, they use it and do not care for other alternative methods. Interestingly, one woman from Barbote, Ilam could state periodic abstinence and withdrawal as methods of family planning apart from all other methods and she was also found to be using the same. One woman stated that she does not know any methods of

family planning. She was an illiterate woman from Bastipur, Siraha, aged 27 years who started giving birth by age 17 years and has given births to six children five of whom were living. Although Nepal DHS 2011 states a universal knowledge of at least one method of family planning among currently married women (MOHP et al. 2012), it can be indicated that there are still some marginalized women who are quite unaware of the means of contraception. This indicates that general knowledge of women about various means of family planning varies from woman to woman but most of them know about those methods which are available in their locality or used by others in the village. All the women who are currently using a method could correctly state the duration for which the method they are using works.

Multiple sources of knowledge of family planning methods are mentioned by village women. Health personnel of the local health post are the major source of knowledge of family planning among women, cited by 28 (44 percent) respondents. Similarly, FCHV are the second most important source of knowledge of family planning, followed by friends and relatives as the third. Other sources of information mentioned are texts books, relatives, meetings of women's groups, and the media like Radio and TV. It is to be noted that, with increasing level of education, texts of educational curricula could have been the most important source of knowledge, which has not happened. Similarly, women's groups are also important to disseminate knowledge and can be used as agents for change.

People have perceived a change in the sources of knowledge of family planning in village. The channels of disseminating information regarding family planning have increased. In the past, there was only a limited coverage of Radio and family planning workers would be the major source of knowledge. But now, apart from health personnel, FCHVs are important channels of information dissemination and media like FM Radio and TV are abundantly used in it due to their increased coverage. Text books of high school and college curricula also provide information on family planning matters. Moreover, hoarding boards in towns also provide information on it.

People's attitude towards family planning has also changed to a great extent. In the past, it would be a matter of shyness to talk about family planning and if someone gets sterilization done or uses other family planning methods, people looked at them differently. Many people in the past had negative thinking about family planning. In the early days of the programme, people were afraid of male sterilization and thought that one can't work in agriculture after getting it done. But now, the situation has become

quite different where people can demand a contraceptive they need. The society has accepted use of family planning methods; it is more comfortable for any couple to use a method than before. Now, community also watches those couple having many children and not using family planning and sometimes raises questions on it. This indicates that lower fertility has now become a norm and use of family planning is a socially acceptable way to achieve it. Some of the arguments put by participants indicating changes in attitude towards family planning are:

> *"Yes, there is change in people's attitude on family planning; it is more easily acceptable now" (male, 30 years, 12 years of education)*
>
> *"In the past, people felt shamed; for example, if one had to take condom, women could not go there and ask for it, but now, it has been kept there, she can get it herself or even ask for it" (female, 28 years, 12 years of education)*
>
> *"In the beginning, people used to say that we should not have to do operation (sterilization)" (male, 74 years, 5 years of education)*
>
> *"In the beginning, people said that operation makes males weak; they got afraid; then instead opted for women to undergo operation; the same thing was said for women; but gradually it (family planning) went on developing; government also emphasized on it and now people use it as per their desire" (male, 51 years, 10 years of education)*
>
> *"If a woman has two children now, other women tell her to undergo operation" (male, 68 years, 12 years of education).*

Similarly, a FGD participant who had worked in the programme earlier shared her past experience of family planning counseling as:

> *"In the past, people had no knowledge about family planning, when we went in village to provide knowledge, they did not try to understand it, they felt shy; some 20 years back, when I worked for family planning, they used to hide inside house, when we entered and counseled, they told that they would be scolded by family for using it, they had the perception that such things make them ill; when tablets were given after counseling, they used to waste these after eating one-two. But now, the situation has changed, they themselves ask for it (contraception)" (female, 46 years, 8 years of education).*

Health persons from the local health post also stated that people's perception regarding family planning has changed over time; there is positive attitude of people regarding family planning; awareness has increased but full awareness to all is yet to reach and people still copy from other's behavior (relatives and neighbours) to use contraceptives,

rather than developing own understanding of it. Most of the FCHVs agreed on the above statement. However, an FCHV stated that some people from marginalized community have some negative attitude regarding use of family planning.

7.4 Current Use of Family Planning Methods

Ever use and current use of family planning methods by currently married women based on field study is presented in Table-7.2. The two study villages are quite different in terms of use of family planning. Of the total respondents, 39 (62 percent) are ever users and 26 (41 percent) are current users of family planning. But, in Barbote, Ilam, there are 25 (80 percent) ever users and 16 (52 percent) current user women, whereas in Bastipur, Siraha, only 14 (44 percent) women are ever users and 10 (32 percent) women are current users.

Table-7.2: Currently married women aged 16-39 years who have ever used and currently using a family planning method

Use status	Barbote, Ilam		Bastipur, Siraha		All	
	Number	Percent	Number	Percent	Number	Percent
Ever used any method	25	80.6	14	43.8	39	61.9
Currently using a method	16	51.5	10	31.5	26	41.3
Total	31	100.0	32	100.0	63	100.0

Source: Field study, 2014

Of these 26 current users, six women are sterilized, five each are using Pills and Depo (injection), three each are using IUD, Implant, and Condom and one is using withdrawal method. The pattern of use of family planning is found to be similar with that obtained from the national level Demographic and Health Survey (DHS) except for male sterilization. Similar to that seen in DHS-2011, a maximum among the interviewed women are using female sterilization, followed by injection and Pills. No respondent stated using male sterilization in both the villages. Female sterilization is more popular in the *Tarai*; more varieties of methods are used in the Hills and long acting reversible methods are gaining popularity in the Hills. The only user of withdrawal method among the interviewed women is an educated woman with a daughter, quite knowledgeable of all other methods, choosing this method as per consensus with her husband, and the motive for using the method is to remain free from any health hazards of hormonal methods. More diversity in currently used methods of family planning is found in the Hill village as compared to the *Tarai* village.

From programme perspectives, these two villages are similar, but a substantial difference in the pattern of family planning use has been observed. Such difference could not only be due to sampling error associated with a small and non-probability sample under study but might be due to many other reasons like preference to sterilization, not using family planning for birth spacing and directly using it for limiting births only or lower level of knowledge of variety of different methods in the *Tarai*.

A majority of ever users are found to be using more than a method in their life time. There were four women who have ever used three different methods and currently using temporary methods; five women used both Pills and injection, nine women used injection and any other method and six women used Pills and any other method in their life time. It may be due to availability of Pills and injection in the local health posts that a maximum number of women have ever used any one or both of these two methods. A tendency of switching over from one temporary method to another has been observed in the study villages. According to Gubhaju (2009b), switching between family planning methods in Nepalese women may be indicative of high motivation for fertility regulation but a considerable dissatisfaction with methods.

Sterilized women from the *Tarai* village had not used any other method before sterilization, but those from the Hill village had used other methods earlier. The indication is that in the *Tarai*, there is tendency of adopting sterilization after having the desired numbers of children without using any other methods specially meant for birth spacing. But in the Hill village, people are shifting towards reversible methods, giving less preference to sterilization. Moreover, more non-users and maximum users of female sterilization in the *Tarai* village indicate that the perception that 'family planning is synonymous with sterilization' is more prominent in *Tarai*. Also observed is the fact that more uneducated women are sterilized there.

7.5 Service Delivery Mechanism

This section describes availability of different methods, service delivery system, method choice, method changes and contact with family planning workers in the study villages based on information obtained from FCHV, health person, FGD participants, and individual interview of women.

7.5.1 Family planning service

Family planning service in Nepal is delivered through government channels and also complemented by various NGOs, social marketing, and the private sector. The government channel takes the largest share in total family planning materials distributed in the country. However, the share of government sector is declining to some extent. The scenario during 2001-2011 is depicted in Table-7.3, which is based on NDHS. In 2001, nearly 80 percent of total contraceptives were distributed through government channels but it declined to 69 percent in 2011; only the share of Implants has increased over time.

Table-7.3: Percentage share of government channels in distribution of specific contraceptives, Nepal, 2001-2011

Contraceptive Type	Percentage share in		
	2001	2006	2011
Female Sterilization	85.8	90.5	77.8
Male Sterilization	81.0	83.6	83.6
Pills	55.3	49.6	50.9
IUD	64.3	71.4	57.9
Injectables	86.0	81.4	69.0
Implants	51.5	60.0	66.6
Condom	46.0	30.4	32.3
All modern methods	79.4	77.1	69.0

Source: MOH et al. 2002; MOHP et al. 2007; MOHP et al. 2012.

In both the study villages, service of three contraceptives: Pills, Depo (injection) and condom is provided free of cost through government programme. In general, the three methods are always available in the health post; supply of contraceptives is made from the District Health Office (DHO) as per estimated demand and there is mechanism of resupply to meet additional demand. Family planning service is delivered in villages through three channels: direct distribution of all three methods from the Health Post; distribution of all three methods from monthly Out Reach Clinics (ORC) (also called *Gaaun Ghar Clinic*), and resupply of Pills and Condoms through FCHVs. Those who need contraceptives should go to the Health Post either directly or through the FCHV; after assessing their general health condition and other requirements, certain method is suggested to them. There are other complementing partners in supplying family planning service in the village. FPAN has a weekly clinic to distribute contraceptives and MSI

(Marie Stopes International) also collects clients and gives service of long acting temporary methods: IUD and Implants in Barbote, Ilam and Population Service International (PSI) has motivators as well as service providers deployed in Bastipur, Siraha, who counsel and give service of IUD in the village. Non-governmental organizations charge some nominal cost for family planning service.

Regarding the source of methods of current users of family planning in the study villages, women stated that, Pills are obtained from the FCHV, injection is taken from the health post, condom is bought from medical shops by husband, IUD and Implants are provided through non-governmental sectors and sterilization service is provided at camps generally organised by the government programme.

As stated by the health person of the local health post, almost all types of clients come to avail of family planning service in the health post. However, *Dalits* are less likely to come as compared to non-*Dalits*. In the *Tarai*, *Dalits* mostly go for sterilization. Similarly, relatively richer people come less frequently to government posts for contraceptive services; they may go to private shops. There may be some women who lack family support and do not come for family planning service. In Bastipur, Siraha, people choose sterilization than other temporary methods and go for it once they have sufficient number of children.

Service providers stated that counseling is given to the prospective clients regarding various options of family planning means, their possible side effects, and also about remedial measures in case of such side effects. Such counseling is also given during immunization of children. But, no specific training for counseling regarding family planning is given to the service providers. Among users, a maximum number reported that they got counseling on family planning from the health persons of health posts or FCHV. Friends, relatives and neighbours are also important agents for counseling.

Though there are no difficult situations as such in providing family planning methods, service providers feel it difficult to convince some of the clients as they are not fully aware about all aspects of a method. Common people hear something good or bad about some method from their friends and relatives, make up a mind for a particular method and come to health post for service. But in screening in the health post, the method of their choice may not suit them and in that situation service providers counsel them for using other method. Sometimes, it becomes difficult to convince them in such situation.

Regarding this issue, the researcher was witness to the following incident in a health post during the field study:

> *A client came and requested for resupply of Pills. She was not resident of that village; she had come to her natal home in the village. The service provider asked her to produce any card/document to check her previous use status. But, she had no such document and she started arguing on why she was not being given Pills. The service provider was trying to confirm whether she was a regular user of Pills till the date. Finally, the provider took her BP measurement and told her that her BP was high and she would not be advised to use Pills. In the end, the service provider denied her Pills and the client went out without having Pills or anything else.*

This case is an example of practical difficulty in service delivery. Many questions arise by observing this case. It is quite genuine for a service provider to find out the status of a prospective user. Here, the woman was asking for resupply but the service provider did not give her resupply, instead wanted to confirm whether she was really using Pills regularly, because she was from another village and the provider had no prior information about the client. This is also justifiable. As the client was choosing Pills, the provider did screening for it, found her BP to be high and decided not to give Pills; this looks quite a correct procedure. It was a bit difficult situation for the provider to convince the client that pills were not advisable for her. But, the outcome was that a woman returned from the health post without having contraceptive she demanded. Most probably, it would be a genuine case that she had been to natal home for a few days carrying her Pills as it should be consumed daily; thought that she would easily get it resupplied there too when exhausted and had gone to the health post asking for it. If this was the case, she is really deprived of regular use of Pills from the same day, which could have many implications. She may discontinue it at all and fall on risk of unwanted pregnancy. It could be argued that she could not ensure provider that she were a regular user of Pills to the date and deprived of the service. But she was not satisfied that is this reason a sufficient condition for denial of family planning service. Another thing is that, she had high BP and Pills did not suit her. But could she not be counseled further and given alternative, at least condom for the time being? This case indicates some lack in service itself; most probably its quality component.

FCHVs are important stakeholders of family planning service in villages. They are given responsibility of resupply of Pills and condom. They also assess demand of contraceptives, counsel prospective clients for suitable methods and send or even

accompany them to health post for further screening and adoption if appropriate. Most of the Pill users are found to get resupply from FCHV. Most of the FCHVs keep condom also, but they have more regular clients of Pills than condom. Only a few women take condom from an FCHV. In general, condom users manage it from private medical shops and managing it is mainly men's responsibility. Moreover, men generally do not ask FCHV for condom probably finding it embarrassing to ask a woman for it. Therefore, an FCHV stated that she does not keep condoms, and asks to go to health post if someone needs it. Most of the FCHVs stated that they do not have to go door to door now for assessing demand; women themselves come to ask for family planning. However, an FCHV told that she mentions about family planning service when she visits door to door to inform about immunization of children. Apart from knowledge on different methods of family planning, FCHVs are given some short orientation regarding counseling women for family planning use and they apply it in their village. No specific trainings are given to them for counseling and other things. They take the unsatisfied women to health post for further counseling. Sometimes, an FCHV also does a favour for women reaching to sterilization camp, going for insertion of IUD or Implant, or even for abortion.

FCHVs have also faced some difficulties. If women experience some side effects, they complain to the FCHV. Due to use of Pills or also due to injection, women complain of excessive bleeding as the major side effect. At that time, they suggest women to go to health post for remedy. Apart from that, one FCHV stated that there is sometimes complaint about the method itself. She had complaints that the Pills were not in good condition, had got damaged (became amorphous). At that time she advised client not to use that set and instead gave condom for current use.

7.5.2 Choice of methods

From our field study, all women currently using family planning stated that the method they were using was according to their choice. But, it does not mean that the method was her absolute choice and she has no regret of using it. There are regrets associated with side effects. Some sterilized women also stated that sterilization made them weak and they became unable of doing heavy work.

At some point of time, women choose one method based on the information they have at that time. If she feels side effects from that method, then she wants to switch over to some other method and sometimes, this process goes for many methods. Generally their first

choice goes for one of the easily available methods of the locality. Later on, they may seek other methods too. A story of a woman is worth mentioning here.

> *"At first, I used Pills for family planning; but I felt dizziness and it became quite difficult for me. Then I went to the health post and complained about it. They told me to stop it and advised Depo (injection). Then I started using Depo. But, it caused me continuous bleeding, which did not stop for three months. Then I stopped using it. Then I did not use anything. But I got pregnant, which was ended in induced abortion. I went for one more abortion thereafter. At the time of second abortion, sister (nurse) there counseled me for using IUD. They told me about adverse health consequences of repeated abortion. Then I agreed for it and now I am using IUD as per their suggestion. There is no major problem but I feel vaginal itching now, which was never there before. I think it is due to IUD. I have used this method because it is good to use something than doing repeated abortion. I have heard that Norplant (Implant) is better and do not have other side effects. I would prefer to use Norplant now" (37 years, 3 children, 12 years of education)*

From this story, many inferences can be drawn. This woman first chose a method which was available in the locality, then switched over to another which was also available in the village and discontinued using family planning once both the methods did not suit her. There appears to be either lack of communication between spouses or husband's indifference in wife's choice of family planning methods because, no condom was considered for use in between. She bore the burden of unintended pregnancy as well as had abortion repeatedly and finally started using a relatively better method for her. But she is still not fully satisfied with the method she is using. During this course of events, she never preferred to have sterilization.

7.5.3 Contact with family planning workers

A low level of exposure of nonusers to family planning information and numerous missed opportunities is evidenced in Nepal DHS. Eighty eight percent of those women who are not using a family planning method did not discuss on any family planning matters either with family planning workers or at health facility during 12 months preceding the survey (MOHP et al. 2012). This indicates a poor contact of women with family planning service providers. In the field, questions were asked to all interviewed women about their visits to health posts for family planning matters and also whether any person related to family planning service met them. Out of 63 respondents, only two thirds have ever met with some family planning workers and only one third women ever visited health posts for

family planning matters. Women's meeting with family planning workers is less frequent and mostly not regular. They meet family planning workers either to discuss on starting of a method or if any problem occurs while using a method; and not as a regular follow up. Sometimes, FCHV and MCH also make home visits and ask about requirement of family planning methods. Interviewee women stated that when they went to the health post for complaining of side effects, mostly they get suggestion for changing the method. However, a woman was told that the method she was using was suiting her in spite of her complaint of no menstruation and massive weight loss due to injection.

Of those 63 women interviewed, 50 stated that they do not feel any opposition in using family planning from home. Some women in *Tarai* feel that there is opposition in using family planning from husband or in-laws and consider this matter to be decided by their husband or in-laws. A few of them have little say on whether and when to use contraceptives. One woman with no children thinks that her family does not allow her to use family planning then because first she should have children. She might have intention to postpone the first birth but is incapable of doing so. One woman from Bastipur, Siraha who had never used family planning stated that she does not know anything about the matter of using family planning as she does not go out of home and her mother-in-law may know about it as she takes part in every event like meetings that take place in the village. This indicates women's subordinate position associated with non use of family planning. A very low level of awareness regarding the issue of family planning is found among uneducated women in the *Tarai.* Story of a woman is presented below as an illustration:

> *Chandani (name changed) is an illiterate woman aged 25 years. She got married at the age of 15 years and is now a mother of four children. She has heard of different methods of family planning but could not say from where she got this knowledge. She had never used a family planning method but she could not state any reason for non use. She could not say whether family planning was needed for her or not. But, she wants to have sterilization in future. She stated the Rs.100 given after sterilization as benefit of using family planning; and could not estimate any other benefits of family planning. She had not heard any side effects of using family planning, never met family planning workers and never been to health post for family planning matters. Though she thinks that there are some obstacles in family planning use, she could not state any (may be reluctant to state).*

This story clearly indicates that only hearing about family planning methods does not ensure their demand for family planning. Uneducated women from marginalized sections are still unaware that it is their right to be well informed about family planning. They are covert and shy. So it is less expected that they can themselves take decision for their benefit.

7.6 Perceptions and Experiences of Side Effects

People have a general notion that each method of family planning has some side effects. Many FGD participants of older generation could not specifically mention method specific side effects, but they also had view that there are negative health effects of family planning methods like bleeding, weakness and obesity. Many FGD participants of younger generation, especially females, stated some method specific side effects. Most cited side effects were: weakness for sterilization, dizziness and weakness for Pills, irregular bleeding for injection and irregular and heavy bleeding for IUD. They opined that not all women face the same side effect of a method; different persons are differently affected by various methods of family planning. So they have perception that a single method does not suit all and not all methods suit for a woman. In our discussions regarding side effects, participants mentioned:

> *"Family planning methods are made to suit our body, but it definitely has some side effects too; I think each method has some side effect on health" (female, 32 years, 9 years of education)*
>
> *"Yes, there are some side effects of temporary methods like irregular menses, obesity, weakness, blotches (Chaya Poto) in face, headache, dizziness (Chakkar); but these are normal, not so serious" (female, 36 years, 8 years of education)*
>
> *"All temporary methods have side effects; three months injection causes some women to be too lean and thin and some others to be obese' (male, 38 years, 10 years of education).*

In individual interviews, women shared many side effects they perceived to be associated with different methods of family planning. According to their perception, injection affects uterus, causes bleeding, headache, back pain, irregular or no menstruation, weakness, obesity or slimness, lethargy, dizziness and even fluctuates blood pressure; Pills affect uterus, cause indigestion, no or excess menstrual bleeding, weakness, face swelling, eye problem, allergy and appetite loss; IUD causes irregular menses, back pain, bleeding,

burning sensation in stomach, itching and sensation of foreign object in uterus; and Implants cause excessive bleeding, back pain, lower abdominal pain, frequent menses, difficulty in carrying heavy loads by hand and pain during work.

There are some misconceptions developed among women regarding side effects, some of which are difficult to believe. Statements like 'Pills become garland in the stomach' and 'Pills get deposited in the uterus' were heard from some people in the village. Another misconception the researcher found was the saying among common women that Pills would be collected in uterus and later on make adverse effect on this organ. One of the FGD participants stated:

> *"Pills cause dizziness, Goti (the tablet) collects in uterus and later on it affects" (female, 27 years, 7 years of schooling).*

Some misconceptions like Pills cause abdominal stones and tablets become garland are heard from some interviewee women too. Other studies also found that misinformation about methods and services exist in Nepal; like fears that some methods may cause severe health problems, such as cancer (Engender Health 2003).

Friends and relatives are found to be the most important channel to disseminate information about side effects of family planning. However, health personnel and FCHV have also told them about possible side effects. Many women stated about side effects based on their own experience and as heard from others who had experienced. The idea of side effects, much of which is real experience and some of which is exaggeration is deeply rooted among women in the village. Perception of side effects is reflected as a combination of reality and some myth.

Actual side effects the users have experienced include: excessive bleeding, no or infrequent menses and heavy bleeding for injection; dizziness, weakness, vomiting and irregular bleeding for Pills and irregular bleeding for IUD. Not all women who ever experienced side effects of using family planning methods knew in advance that the side effect they experienced might occur. All the users should at least be made aware about possible side effects of using the method and it is the service provider's job. Based on Nepal DHS, the proportions of currently married women among current users of a family planning method who were briefed about possible side effects of the method in advance and initial source of methods over the period 2001-2011 has been presented in Table-7.4.

Table-7.4: Percentage of currently married women using contraception who were told about possible side effects of the method used by method and its initial source, NDHS-2001, 2006 and 2011

Method/Source	Percentage of women in		
	2001	2006	2011
Method			
Female Sterilization	19.1	39.7	42.8
Pill	50.8	37.0	57.8
IUD	67.7	79.5	89.6
Injection	62.6	71.6	72.7
Implants	85.0	82.8	82.2
Initial source of method			
Public Sector	37.7	55.3	64.3
NGO Sector	44.8	65.6	64.2
Private Sector	65.8	50.8	60.3
All	37.5	55.5	63.3

Source: MOH et al. 2002; MOHP et al. 2007; MOHP et al. 2012.

The proportion of women who were told in advance about possible side effects, though increasing over time, has reached only 63 percent as seen in the Nepal DHS 2011. Either the service provider did not state about the possible side effects, or it was not fully stated and woman experienced side effect something not told to her or she did not care much about it at the time she were told. However, the public sector has made considerable improvement over time in this endeavour. Besides, those who were informed in advance stated health persons as main source of knowledge about such side effects. Our field study revealed that majority of women who felt side effects stopped using the method but some women still continued after consultation in the health post. In some cases, the woman was complaining about side effects but she was told that it was not like that and the method was suiting her instead of changing the method or applying remedial measures of the side effects.

7.7 Costs of Family Planning Use

People in study villages are quite aware that family planning methods are available free of cost in local health centres and at affordable cost in the market. They do not consider using family planning methods to be a costly affair. They agreed that availing contraceptive does not take much time since it is available in village or even at doorsteps. Following are some of the excerpts from our FGDs supporting no or a very low direct cost of using family planning:

"For those who need, it (contraception) is available free of cost in Village Clinic; it is not costly" (female, 41 years, 9 years of education)

"It is not so expensive, even if it is taken from private shop, one Snagini Injection costs Rs.40-45, which is not so expensive" (female, 46 years, 8 years of education)

"It is not expensive; in government hospitals it is available free of cost and it is not costly in private shops too" (male, 24 years, 12 years of education).

All family planning users in the villages stated either the method was free of cost or they paid only a nominal charge for it. Therefore, direct cost of family planning can be said to be negligible. They have not faced any problem in obtaining the methods they are using. They did not consider time spent to get the method to be so important to consider it as a part of cost.

According to FGD participants, in general, there are no such things like shyness or stigma to use family planning methods in the village these days; rather suggestions are given to use family planning for those who seek it. In Barbote, Ilam, if someone is busy, others could be requested to bring for them resupply of Pills. A personal observation by the researcher in Barbote village is noteworthy. This is described below:

A boy of around 10-11 years came to FCHV's home, asked FCHV to give his mother's medicine and she gave him something wrapping in a paper. The researcher guessed that it must be Pills and asked later what the medicine was. It was really a file of Pills.

However, a male participant in Bastipur, Siraha stated that there is superstition among some people that one should not get own body and nerves cut and hence they do not go for sterilization. Regarding the issue of superstition and stigma of using family planning, participants mentioned:

"No, there are nothing like shyness and stigma in using family planning in this village" (female, 41 years, 9 years of education)

"It is due to superstition, religious superstition that one should not cut body, nerves should not be cut; due to this some people do not go for operation" (male, 24 years, 12 years of education).

Psychological costs in using family planning, though largely non-existent, are still found to exist to some extent. Local health worker in Bastipur, Siraha mentioned that shyness among women sometimes becomes a barrier to avail family planning method. In *Tarai*, women feel it difficult to talk with males and it is due to shyness, so, regarding the matter

of family planning, women cannot openly express their demand with male health worker and sometimes even return without telling anything from the health post if only male service providers are there. Some FGD participants also supported this view. They stated that women from *Dalit* community hesitate to speak and face difficulty to avail contraceptives from male service provider. So, the gender of service provider makes a difference. But, women of Barbote, Ilam had mixed views regarding this matter. Some women stated that there would be no difference whether service provider is a male or a female and women can easily get service from a male provider too. But males stated that it would be more beneficial if service provider and client would be of the same sex. During discussions on gender of family planning service provider, participants put following views:

> *"They (women) feel shy more with males; they cannot speak; even they cannot say Namaskar to sir (the male provider); they do not talk to sir" (female, 30 years, illiterate)*
>
> *"If females are there in health post that is okay but if there are males, then it becomes a situation of shyness for females" (male, 24 years, 12 years of education)*
>
> *"It does not make difference; a male health worker had inserted and taken out IUD for me" (female, 35 years, literate)*
>
> *"For females, it would be better to be female there; because clients can state their matter without hesitation; for males, males would be better" (male, 30 years, 12 years of education).*

Shyness in getting family planning method appears in some way or the other as a feeble psychic cost associated with family planning use and 10 interviewee women out of 63 mentioned some kind of it. For example, a Pills user, though she stated that she can ask for her resupply with FCHV in the presence of other male members asking to get 'her medicine' in FCHV's home, she would be given it by wrapping in paper so that others may not notice what medicine did she take. So, carrying means of family planning openly is still not in practice in village. Similarly, shyness would be mainly due to a situation where there is no female health worker for female client; also it is more for the first time users and for women from marginalized section of the society.

Though there are no such beliefs and cultural or religious practices in general against use of family planning methods in the village now, there are some husbands who have denied

their wife to adopt sterilization. This thing happens in *Dalit* community of *Tarai* who are marginalized. Husband's such control over his wife is associated with much inferior status of women in the family and community and unequal power relation between husband and wife by which a husband always considers his wife a property for consumption and expects that his wife be ready whenever he demands sex. But, when a woman undergoes sterilization operation, he would be deprived of sex until her complete recovery and instead, he has to take care of his wife till then. Therefore, the husband does not want his wife go for sterilization.

In most of the FGDs, participants argued that there would be no psychological displeasure associated with the use of family planning. However, some participants mentioned some kind of such displeasure. For females, it was associated with difficulty to begin using family planning. At the individual level, some women feel shy and do not openly ask for family planning method, which makes it difficult to start a method for the first time. Some participants in our FGD stated:

> *"Yes, some shyness is there among women but they go to ask other women who have understood better or using a method" (female, 46 years, 8 years of education)*
>
> *"Yes, hesitation would be there in starting, they fear like what would happen; but when they get support from others, they develop confidence" (female, 41 years, illiterate).*

On the other hand, some young males stated some psychological displeasure of carrying condom. They stated that other persons may think that the condom is carried for sex in extra-marital affairs. Concerned with this matter, a young male participant from our FGD stated:

> *"In case of condom, when it is carried, it can be thought by others that it is for using outside rather than for home; this causes some displeasure in carrying it in the pocket" (male, 30 years, 10 years of education)*

None of the FGD participants stated that there is any disapproval in use of family planning in the study villages.

7.8 Reasons for Discontinuation and Non Use

According to Nepal DHS 2011, among those women who discontinued using family planning in the past five years from the survey date, 40 percent did so due to husband's absence from home, 24 percent due to health concerns related to side effects of the method used and seven percent due to failure of the method used (MOHP et al. 2012). In

the study villages, women who discontinued using a method mentioned different reasons for discontinuation of family planning use. It is mainly due to side effects of the method used. Rarely, shortage of method being used in the village when resupply is needed is also a reason for discontinuation. Health personnel also reinforced that side effect may be a reason of discontinuation. The argument was that when users feel some kind of side effects, all of them do not come to health post and someone simply stops using it (there is no need to contact a health worker to stop use in case of Pills and injection, which are mostly used in village).

Majority of users in the study villages discontinued the method due to side effect of some kind or the other and changed the method. Changing methods due to side effects sometimes ends in non-use too. A woman reported that she first used injection but suffered from problem of no menses and dizziness; then switched over to Pills. But, hearing side effects of Pills from others, she feared of it and decided to change the method. Then she had Implants but then suffered from bleeding. Finally she discontinued using this and now she intends to use condom. But the question here is whether her husband is supportive enough to use condom. The sequence of use, side effect, change of method, again side effect and non-use leads women to the obvious risk of unintended pregnancy. Most of the injection and Pills users stated side effects from method as the reason of discontinuation. However, in Nepal DHS 2011, 59 percent women who were using IUD discontinued it due to its side effects and this method stands the first in the list of discontinuation due to appearance of side effects; and, injection (46 percent), implant (40 percent) and Pills (24 percent) are the followers of it (MOHP et al. 2012). Absence of husband from home is another obvious reason cited for discontinuation of a method. A woman in the field mentioned that she took out IUD when her husband went out of country for earning. Using contraception in husband's absence in society is judged through sanctity perspective and not considered proper. In a national level survey, some seven percent users of family planning were reported to discontinue due to getting pregnant during use in Nepal (MOHP et al. 2012). In the field, one woman was found who was using injection but got pregnant during its use. Then she continued that pregnancy and gave birth to her second child; and then got sterilized during caesarean section of the baby. Most of these women who discontinued using family planning expressed their desire to use again in future; for which, some are determined about the method to be used, some are in dilemma and some others had to discuss with husband in

this matter. Increasingly higher proportion of non-users stating their intention to use in future is evidenced from Nepal DSH, which is shown in Table-7.5. The share of non-user women who have no intention to use in future has declined from 24 percent to 17 percent.

Table-7.5: Percent distribution of currently married women who are not using family planning by their intention to use in future, NDHS-2001, 2006 and 2011

Intention	2001	2006	2011
Intends to use	73.2	74.1	80.6
Unsure	2.7	3.8	2.6
Does not intend to use	24.1	22.1	16.8

Source: MOH et al. 2002; MOHP et al. 2007; MOHP et al. 2012.

Women interviewed in the researcher's field study stated different reasons for non use of family planning. Out of 25 never users, the most commonly cited reasons of non use were want child (six women), husband went to a foreign country (five women) and feared of all the methods (three women). No son till the date and no knowledge of any method were cited by one woman each as reason of non-use and other women could not state specific reasons for non-use. However, regarding future plan of using it, 16 have intention to use in future, seven have no intention and two are unsure about it. Those who intend to use in future mostly want to go for sterilization (seven women), some want to use injection (three women), Implant (one woman) and others are not decided about the method and stated that the decision would be taken by consulting with husband. Those whose husband is not at home intend to use family planning after their husband's return back.

7.9 Preference for Family Planning Methods

7.9.1 Preferred methods of family planning

Health personnel informed that sterilization in *Tarai* and injection and Pills in Hill are more popular. Respondents use temporary methods more than permanent methods in Barbote village. FGD participants were sceptical about the side effects of all the available methods; and could not specifically state the best method. Regarding preferred method, a woman in FGD argued:

> *"None of the methods had good credit; some method affects someone, another method affects somebody else; there is no such single best method to choose" (female, 45 years, literate).*

Our discussion with young generation revealed that there is a shift over time from permanent methods towards temporary methods in the villages. Users of temporary methods are growing now. A majority of women favoured temporary methods. However,

stronger voice in favour of permanent method came from Bastipur, a village from *Tarai*. There is a kind of 'norm' in family planning use in Madhesi community to use sterilization rather than using temporary methods. Choice for permanent method was linked with possible side effects of temporary methods. Those women favouring permanent method argued that it would be hassle free since it acts life-long once adopted and has almost no side effects. So it would be better to go for sterilization after having enough number of children. The choice for temporary methods over permanent one was linked with intensive fertility preference coupled with declined demand for children. Many couples have strategy to be on the safe side so that they can reproduce again in case of emergency conditions which may arise due to accidental deaths of their children or some other reasons. They judge temporary methods easier to adopt because these can be used when needed and discontinued to resume fertility. They consider side effects of reversible methods to be minor and opine that there might be side effects in case of sterilization too, which, if occurs, would be life-long. They also argued that one can get rid of the side effects of temporary methods simply by stopping use of the method. Therefore, they prefer reversible methods of family planning. Following are some of the arguments put by participants during our FGD:

> *"Nobody knows the future, if anything happens, one can again have children if temporary methods are used" (female, 45 years, literate)*
>
> *"People now might have mentality, 'if we accept a permanent method, there may be situation of child loss due to accidents, but if we adopt a temporary method, then we can again have another one when needed', and so they prefer temporary methods now"(male,60 years, 5 years of education)*
>
> *"Temporary methods can be used and stopped as per need, this is better" (male, 30 years, 12 years of education)*
>
> *"After having enough children, permanent method is better, if more children are needed, temporary method is better" (female, 41 years, illiterate)*
>
> *"For me, temporary methods are better; it can be stopped when next child is needed or it causes health problems, but if permanent (sterilization) is done and there occurs something, one cannot stop using it; side effects of temporary methods are minor and eliminated slowly; but if permanent method causes some side effects, one should suffer life-long from this; one can stop using temporary methods in case side effect occurs and even use calendar method; then why to make that wound and suffer; one has to take rest for three months after operation, there would be no other members in family to*

work in replacement; this would not be the case while temporary method is used; therefore I prefer to use temporary method" (female, 46 years, 8 years of education).

Most of the women interviewed stated child spacing and liming to be reasons of using family planning by which they can manage easy rearing and educating children in these days of increased costs living. They considered family planning use as today's demand. Some of them recited the slogan *'Saano pariwar sukhi pariwar'* (meaning: small family, happy family) propagated by the family planning programme. Some women also stated health benefits of both woman and children as reason for use of family planning. A maximum number of women preferred to use sterilization (10 out of 32), followed by injection (eight out of 32) and long acting temporary methods Implant and IUD (six out of 32). Those who preferred to use spacing methods argued that it would be better to start using family planning after marriage or after first birth. Supporters of limiting methods stated that family planning should be used only after having sufficient number of children. Their perception is that using temporary methods in between may cause problem in conception and may hamper to meet their fertility goal. One woman using Implant who had not experienced any side effect of it expressed this idea. Similarly, one injection user woman was worried whether she could become pregnant after stopping its use.

7.9.2 Ideal method

FGD participants could not choose a particular method available to them to be an ideal one, mainly because of side effects associated with the methods. However, they stated permanent method (sterilization) to be better on this ground. Some participants could not precisely suggest how an ideal method would be. But, majority of them agreed that if there would be such a method, which suits everyone and does not have side effects, it would be the best. An ideal method would work for 2-3 years after one use, would suit even for women of high or low blood pressures and also suitable in case of all illness conditions. Participants, agreeing on the fact that not a single method suits all, opined that it would be better to have a single method which is free from any adverse health effects suiting all persons. Some ideas expressed by participants on the issue of ideal method are:

"It is our positive demand to have such a method which suits all people and is free from side effects" (male, 30 years, 12 years of education)

"There is method to use daily, to use in three months each, method for longer times like five years or even more, many types of methods are in market, but still it would be better if it would be free from side effects" (female, 36 years, 8 years of education).

7.10 Responsibility and Decision Making

Most of the FGD participants stated that using family planning is mainly a joint responsibility of spouses, but it has more to do with women. It is mainly due to the fact that more methods for females are available than for males. Some others stated that it is mainly female's responsibility to use family planning methods. Women's opinion was that they are in lower position than men, and a responsible use of family planning methods makes their position better. Especially in case of sterilization, some participants told that they would not want their husband to get sterilized; mainly because the husband might become weak due to it and cannot carry heavy loads and do hard work. Some of the statements from FGD related with responsibility of using family planning are:

"Women are in a 'corner' (lower position), and it is mainly their responsibility to use family planning for their betterment" (female, 29 years, 12 years of education)

"It(the responsibility) is equal for both because a woman has come to spend whole life with the husband, therefore, it should be the best to use by consensus; it is the same, whether used by anyone of the couples" (male, 30 years, 12 years of education)

"It is more of female's responsibility; for males, it is said that they cannot work hard, cannot plough field (after sterilization)" (female, 26 years, 9 years of education)

"It is women's responsibility more because if male has one method, females have many" (males, 30 years, 10 years of education).

All women currently using family planning stated that there was consensus with husband in the matter of using the current method and the final decision to use family planning was made by both husband and wife in majority of the situations (14 out of 26). Some women took final decision themselves (nine out of 26) and a few of them followed the final decision of husband (two out of 26).

Majority of the FGD participants preferred joint decision regarding use of family planning. Some of them had the idea that joint decision would be the best in case of sterilization and any one of the couples could decide on using temporary method. Some

women preferred that the final decision be taken by the woman. However, they were in favour of discussion with husband before taking decision on which method to use. In our discussion related to decision making in family planning use, participants argued:

> *"Joint decision is better; if any problem comes due to it one needs a way out from it" (female, 41 years, 9 years of education)*
>
> *"It is better to have self decision of females, but there must be discussion with husband" (female, 36 years, 8 years of education)*
>
> *"It depends on own desire, in case of temporary method, to have single decision also does not matter" (males, 40 years, 12 years of education)*
>
> *"It is for permanent and temporary; in case of permanent, consensus between husband and wife is better" (males, 30 years, 10 years of education).*

7.11 Perceived Quality of Family Planning Service

Service providers in health posts perceive family planning service to be good in general given the constraints; but need of training to service providers about counseling and other methods (IUD and Implants) are mentioned for betterment of quality and extension of service. They also advised that mothers' groups are to be made more active to propagate family planning service. There are no trained service providers for family planning in the village Health Post.

All women using family planning methods were found to be satisfied with the service they got and stated it to be 'good'. FGD participants perceived that there is favourable environment in village for using family planning methods and the service is good in general. Mainly, availability of service on the doorsteps was considered as the most important factor. They stated that service providers suggest a suitable method for a prospective client and entertain them with a good behaviour. Some statements regarding the matter of service quality are mentioned below:

> *"It (the service) is good; clients get suggestions about methods; behavior (of providers) is also good" (male, 30 years, 12 years of education)*
>
> *"It is good, there are no complaints about service" (female, 45 years, literate)*
>
> *"It is very good, the service is available at our doorsteps" (female, 32 years, literate).*

7.12 Perception on Abortion

People have mixed views towards abortion. The general view of FGD participants of older generation was against abortion. They said that abortion is risky for a woman's life and it would be better to avoid getting pregnant by using available family planning methods than doing abortion. Also, their pro-life view was noticed; as they said that it is not good to eliminate a life which has started in mother's body. However, some of them have support for abortion under certain conditions within such denial. Those participants approved it especially on the ground of threats to women's health. It could be done to maintain dignity and status of women. Some of the ideas expressed by participants regarding abortion are:

> *"It (induced abortion) is not good; those who do not want (a child) should prevent from getting pregnant; it affects mother's body, a life has come to mother's body which dies" (female, 41 years, illiterate)*
>
> *"Sometimes, it should be done due to some compulsion" (female, 46 years, 8 years of education)*
>
> *"This is not good; at first, contraceptives are there, permanent or temporary, using them and avoiding from pregnancy is good; after being pregnant there comes a 'life' and abortion is its assassination; which is not good; that I feel" (male, 74 years, literate)*
>
> *"Due to fear of more children if it is unwanted, then it could be aborted; but……, as far as possible, it is not good to do so. This is misused; some unmarried also use it" (male, 54 years, 10 years of education)*
>
> *"It (an induced abortion) should be given with some criteria, and should not be totally banned" (male, 68 years, 12 years of education)*
>
> *"If there were no legal provisions, many women would commit suicide; if a woman got pregnant due to bad relationship (extra marital) or boy left after making pregnant, she would be rejected in home and society and option was to commit suicide; now, due to legal abortion, women can get rid of such a situation" (female, 48 years, 9 years of education).*

Women participants of younger generation are not totally against abortion; in general they do not consider it to be good but they approve it under certain conditions. They are more inclined towards pro-choice view than pro-life. Young women justified abortion in case of unwanted pregnancy due to contraceptive failure or any other reason. They stated that preventing unwanted pregnancy by using family planning methods sounds better than abortion from women's health perspective. They argued that it should be left to the

particular person to decide whether to have abortion, no forceful situation should be there. Young males had similar opinion as that of young women. But, they were against the provision of abortion without specific reasons. According to them, abortion for all reasons help make people more promiscuous and brings social problems on one hand and worsens women's health on the other due to repeated use of it. All participants were strictly against sex selective abortion. Some of the statements made by participants on conditions for approving abortion are:

> *"If there happens to be an unintended pregnancy, and it is known quite early so that it could be aborted safely without hampering mother's health, it could be done; but if abortion hampers her health, it should not be done" (female, 36 years, 8 years of education)*
>
> *"From one point of view it is bad and from another point of view, it is good also; because, it causes population to be controlled; some may have unwanted pregnancy and it is good to abort it; but if there is gender discrimination, for example to abort female fetus in the name of need of a son, it is not good" (male, 30 years, 15 years of education)*
>
> *"We do not have to think everything negatively; 'safe abortion' may be required in some situations among married couples" (male, 30 years, 12 years of education).*

Some of the FGD participants were totally against abortion and stated that no one should be allowed to have an abortion. But finally, a majority of FGD participants agreed that women with unintended pregnancy could be allowed to do abortion safely within early weeks of pregnancy so that women's health is not affected adversely by the procedure. Other grounds for allowing abortion are cases of rape, contraceptive failure, threat to mother's health due to continuation of pregnancy and pregnancy due to extra-marital and pre-marital affairs. They advocated for rights based (pro-choice) safe abortion service under certain conditions.

Participants were aware that there is an abortion law in Nepal. Many of them could precisely recite some of the legal provisions to avail abortion service. They also know the place where abortion service is available. Participants knew that someone in the village has used this service. But, people use this service clandestinely and let many people not know about it. This means that abortion is being practiced in the villages but considered as a kind of taboo.

7.13 Diffusion of Idea of Family Planning

It is observed from the FGDs that young women discuss family planning matters in social gatherings, some meetings, and also among peers. Discussions happen about which method is better and on side effects of the methods. According to male participants, it is not discussed in social gatherings, talked between husband and wife only; but it is sometimes discussed among peers too.

People are exposed to family planning messages. Such messages inform people about the benefits of small family and availability of different methods of family planning. According to Nepal DHS 2011, 74 percent women are exposed to family planning messages through either of radio, TV, newspaper/magazine, poster/pamphlets or street drama (MOHP et al., 2012). In the study villages, people are aware about such information disseminated especially through local FM radio which many people listen to with interest and some people hear it even without interest. Such information disseminated through various media has helped increasing awareness level of people. They got idea about the difficulties of having many children and also the ways of controlling the number of children. Participants agreed that this information influences a large share of population to change their behavior. Listening something many times definitely helps making mind and it would have some influences on the desired family size too. Regarding the effect of information disseminated, our participants of discussion mentioned:

> *"It is given in between news, intentionally or unintentionally people listen to it; after listening for one day, two days or three days, it definitely makes some sense and influences them" (male, 32 years, 10 years of education)*
>
> *"Such information makes even illiterate people knowledgeable about family planning methods" (female, 45 years, literate)*
>
> *"Such information has had an influence; even women who are not much educated know about better health of mother and child as a result of family planning use" (female, 56 years, literate)*
>
> *"Yes, some influence will be there; Radio/TV are giving information and people are doing accordingly in spite of some exceptions" (male, 54 years, 10 years of education).*

They opined that the effect of such information through media would be greater than that of formal education in influencing people's thinking. But there are still some people in

society, who are not influenced by such information and they always stand against the content of such messages. Justifying this fact, a female participant stated:

> *"Such information has made impact on a large number of people, but there are still some people, who are not influenced by any kind of such information" (female, 36 years, 8 years of education).*

The idea of family planning has diffused through community interactions and also through proper channels used for disseminating information.

7.14 Agreement on Role of Family Planning Programme

It was discussed in FGDs whether there is favourable environment now for couples to have as many children as they desire and whether family planning helped in this matter. All the participants viewed that the environment is favourable due to availability of different means of family planning; but to have exactly the same number of children according to them is not assured. They indicated the cases of contraceptive failure on one hand and cases of infertility on the other, where exact intended fertility is not possible to attain. There was a common consensus among FGD participants that family planning methods help couples to maintain spacing and to limit their number of children. The following ideas shared by participants further clarify the issue:

> *"Now, a woman can have as many children as she wants to have; no more children (if she does not want more)" (female, 30 years, illiterate)*

> *"Yes, there is conducive environment to control births, but in some cases, couples want to have a child but cannot have it in spite of desire" (male, 30 years, 12 years of education)*

> *"It is possible, a couple can have certain number of children they want; but 80 percent sure, because, sometimes the method may also fail" (female, 36 years, 8 years of education)*

> *"It is 60 percent God's gift; if God does not give, man only can do nothing; but couples can control the number if they want to do so" (male, 32 years, 10 years of education).*

People's agreement on the statement 'family planning programme has helped couples to materialize their fertility goal' was widely expressed in FGDs. The response from all the FGDs was positive, but to a varying extent. FGD participants of the older generation stated that the statement is true 'to some extent'; and, those of the younger generation stated that it is true 'to a large extent'. This shows an increasing and important perceived

role of family planning programme to materialize fertility desire of couples. Some statements expressed in the discussion of role of family planning programme are:

> *"It is correct; 15 out of 16 times (sorha aanaamaa pandhra chahi hola)" (female, 32 years, 9 years of education)*
>
> *"It is right; not wrong, neither totally correct" (female, 46 years, 8 years of education).*

7.15 Political Commitment for Family Planning Programme

The approval of political leaders and their willingness to use their prestige and power in support of the family planning programme may have direct influence on the programme (Freedman 1987). The Government of Nepal has given family planning programme a topmost priority at the national level. However, the Family Planning Day was celebrated in Nepal for the first time in 18th September, 2014 only after more than 40 years of the programme. Commitments towards family planning programme are rarely heard in public speeches by political leaders in the country. So, participants were asked whether they have heard of any commitments or mention from local and national level political leaders about family planning programme. A question was also asked whether there is any local level effort for strengthening family planning programme. Apart from some collective counseling for women by FPAN in Barbote village, there are no other collective efforts found at the local level to promote family planning in the study villages. Similarly, none of the FGD participants, health personnel and FCHVs has ever heard any commitments or mention regarding family planning programme by political leaders in public meetings or mass meetings. Some of the arguments made by participants on the matter of political commitments are:

> *"I have never heard from political leaders about this matter till now; they simply talk about developing the country" (female, 41 years, 9 years of education)*
>
> *"I have not heard so; what they talk about family planning" (female, 46 years, 8 years of education)*
>
> *"I have not heard so; they talk about women's rights but not about family planning" (female, 30 years, 10 years of education).*

Further, a participant ironically stated:

> *"For leaders, it would be better to have more people to get more votes" (male, 47 years, illiterate).*

There is lack of expression of commitments from political leaders to the common people regarding the family planning programme.

7.16 Summary

On the basis of above explanations, the following paragraphs summarize people's perception on family planning programme in Nepal. Though the level of awareness about family planning has phenomenally increased over time, not all people have perceived it as a way of adopting contraceptive behavior by which they can maintain birth spacing and limit the number of children as per their desire. Attitude of people towards family planning has changed over time and now there is no disapproval in using family planning in general. Knowledge of at least one method of family planning seems to be almost universal but this is only superficial, not to the extent by which all people can compare different methods in terms of their merits and demerits and choose a method that appears to be the most feasible for them. However, it is good that all the users of family planning at least know the duration for which the method they are using works for.

Information about family planning is disseminated through various channels and people have good exposure to such information. But in many cases, their level of knowledge is limited only to name particular methods and not beyond that. Although there are provisions for possible contact of prospective users of family planning with family planning workers of different kind, there are many missed opportunities either due to no contact or infrequent contact of people with them. On the other hand, the general level of awareness of illiterate poor people regarding family planning matters is still in a miserable condition and they are incapable of gauging the benefits of using family planning, and this is a major challenge to be addressed by the programme.

The monetary cost of using contraception is almost negligible in villages. This is because, the government family planning programme distributes contraceptives free of cost in the villages and most of the users there are taking services from government channels. Those users who took service from other channels also pay only a nominal amount as service charge in availing family planning service. The service is available at doorsteps and people do not consider time factor in availing the service as a significant cost to be incurred. However, some psychological costs of using family planning still exist in villages. It is found relatively more in the *Tarai* village as compared to the Hill village. Psychic costs are mainly related to hesitation in asking for a method with service provider

and carrying a contraceptive openly. Such cost has negatively influenced use of family planning by illiterate poor women.

People have the opinion that an ideal method of family planning should be one, which would work for 2-3 years after an episode of use, may be of any type but should suit to all irrespective of some illness conditions. There is increasing preference for reversible methods over permanent methods over time. In the context of desire for fewer children, this shifting of choice in favour of reversible methods is due to the fact that the use of such methods can be stopped at any point of time and a couple can again have an additional child if they decide to have it in future due to some reasons or the other.

The transition occurring in the choice of family planning methods from permanent to reversible in villages is not occurring everywhere in the same way and there is lead-lag situation between the villages. More transition has occurred in Barbote, Ilam, which is also a village from a district that has moved relatively forward in fertility transition as compared to Bastipur village of Siraha, which is a district, relatively lagging in fertility transition. In spite of a similar situation of service delivery mechanism, a kind of rural-rural differentials in level and pattern of use of family planning is indicated. Such differentials could be associated with differences in general level of awareness of family planning among people by which they can assess various methods available to them, their preferences to specific methods and some cultural factors that influence preferences.

Female sterilization, Pills and injection are the most popular methods in villages. Couples in *Tarai* have a tendency to adopt sterilization after having desired number of children rather than doing something for birth spacing; but, those in Hills start using family planning earlier and also have a tendency to continue reversible methods even after having desired number of children. Family planning use is perceived mainly as a matter of couple's behavior and emphasis is given to joint decision of spouses in using it. But a vast majority of couples are using female related methods and male's direct participation in this regard is quite low. People now consider abortion under certain conditions to be more rational than it was thought in the past and abortion is practiced in rural settings too. Transition in ideas from pro-life to pro-choice is gradually taking place in villages. Legal provision for abortion under certain conditions is more likely to influence the use of different methods of family planning in future.

Health personnel of local health post and FCHVs are the main pillars of service delivery of family planning in villages. They are also the main source of information on family planning means for common people and have the responsibility of counseling, informing about possible side effects, and applying remedial measures for side effects of the clients.

Not all methods are available up to the grassroots level and one must agree that the fullest choice could not be enjoyed by prospective users in villages. From quality perspective, this situation definitely indicates a less than perfect situation. However, there is a good choice of methods up to the lowest level of service delivery. Given the method choice and other constraints, people perceive family planning service as 'Good' in general; and there are no major dissatisfactions about the service. Though the programme has a strategy to promote reversible methods, especially long acting methods over permanent methods, still the maximum proportions of users are of female sterilization and the share of long acting methods is quite low (See Chapter-V for detail). Good counseling with complete information on the advantages and disadvantages of long acting methods (Tamang et al. 2012) and their availability to the lowest level of health facility are major barriers for this. Specific trainings for counseling the clients and for developing skills to give service of long acting reversible methods like IUD and Implants are desirable for health personnel of village level health facility to improve quality of service as well as to enhance the choice of methods. Expansion of more effective service is also desirable for avoiding more unwanted pregnancies and meeting the high demand of family planning (Tuladhar 2007).

Side effects of using a method have multifaceted effects on family planning use. A deep perception exists among people that there are harmful health impacts of all different family planning methods. Such understanding is based on a combination largely of realities and also some myths of side effects. However, it should be emphasized that users of different reversible methods have complaints of side effect of one kind or the other. Therefore, it is more of realities. Propagation of experience of side effects among women sometimes might lead to construct some myths too. Some women are not using any family planning methods simply due to fear of side effects. Experience of side effects is also associated with discontinuation of family planning use. Side effects and health concerns appear to be the second largest reason for discontinuation of family planning method in national level as seen from national surveys (MOHP et al. 2012). The most important reasons for discontinuation of Pills, IUD, Implant and injection are found to be

side effects (Engender Health 2003). This should be a matter of deep concern for the family planning programme which needs to develop a mechanism to tackle the real cases of side effects as soon as these appear and also to disseminate information to clarify the misconceptions about side effects so as to build a more trustful environment for other prospective users.

Non-use and discontinuation of family planning use are also due to husband's absence from home. In the past decade, there is an increasing tendency of outmigration of male youths to foreign countries for earning, leaving their wife back at home. This phenomenon has also influenced use of family planning. Husband's absence at home is almost a sufficient reason for non use of family planning. Current users discontinue using contraception once their husbands go out of country. The national level survey Nepal DHS shows that the largest proportion of couples who discontinued family planning method in the last five years is due to husband going away (MOHP et al. 2012). Non-use of family planning methods in the husband's absence may be due to perceived safety from unwanted pregnancy due to no or infrequent sex. But the risk of unwanted pregnancy always exists upon their husband's arrival either for a short period or permanently. Moreover, occasional involvement in sexual activities even in husband's absence cannot be ruled out. In this respect, the programme must consider women whose husbands are away as a special category having special need of family planning.

Apart from side effects and husband's absence from home, other reasons for non-use of family planning are cultural value of conceiving soon after marriage, lack of adequate counseling on benefits of family planning and on the advantages and disadvantages of each method, shortage of human resources, shortage of certain methods in certain areas, and lack of integration of family planning into every aspect of health (Tamang et al. 2012). Moreover, lack of adequate awareness of methods and their availability, inability to assess importance of family planning use and lower position of women among marginalized communities are other reasons of non use of family planning.

Social networks like friendship, family relations and memberships of some groups are acting as channels for diffusion of idea about family planning use and its pros and cons. People have perceived that there is positive influence of IEC activities of the family planning programme on general populace in deciding the number of children they desire and the way of materializing this reduced desired family size through behavior change (adopting contraceptives). However, it is true that not all couples are equally influenced

in this regard and those from marginalized community are yet to be addressed properly. There is a broad consensus on the statement that the family planning programme has helped couples to materialize their reduced fertility goals.

Although the family planning programme in Nepal has top government priority and there is political commitment to family planning, the main difficulty is in translating policy into programme and then to practice at grassroots level (Tamang et al. 2012). Besides, the political leadership has failed to prominently express their emphasis on family planning in public forums, both at the local and national level. Expression of strong commitment of political leaders towards the programme at local and national level, and in international forums is desirable to boost up support of common people to the programme.

In conclusion, the national family planning programme in Nepal in its history of more than four decades has made substantial achievements to facilitate fertility transition. The programme has played a role in changing people's attitude and behaviour towards family planning and also helped people to make up some idea about their fertility aspirations and to materialize them. Overall, the service is of good quality as per people's perception. However, people of marginalized section like illiterate, poor and *Dalits* are underserved by the programme. In spite of the family planning programme having had high priority at the national level, lack of funds and inadequate attention to it and fear that the other reproductive health programmes would be prioritized at the cost of family planning programme are major concerns (MOHP et al. 2012; Tamang et al. 2012). Ensuring better quality service as per people's demand to meet the unmet need of family planning service is still challenge of the programme.

Chapter-VIII

Synthesis and Conclusions

8.1 The Research Issue

Fertility transition has become a well researched area of social science. A number of social scientists have given explanations of fertility transition from different perspectives. Differences are evidenced not only in the level of socioeconomic development of population at which the fertility transition occurred but also in the time of onset of transition, its pace and the duration for its completion. Moreover, fertility transition is a complex process associated with pace of socioeconomic development, diffusion of new ideas regarding family size, birth control measures and aspirations for children, and also influenced by family planning programmes. No single factor explains fertility transition in any population. Neither is there a certain set of conditions necessary for fertility to decline; the threshold hypothesis has not received much empirical support in the recent years. In spite of many explanations provided by different scholars, there is not a generalized theory to explain fertility transition (Hirschman 2001). This is the reason why fertility transition still remains an area of interest to researchers. Motivation for this research developed against this background.

Nepal is undergoing a fertility transition as are many other developing countries. The country witnessed evidence of fertility decline beginning the early 1980s when it was one of the poorest countries to have this experience (Caldwell 1998). In the context of evidences that fertility transition starts at relatively lower level of socioeconomic development as time proceeds (Bongaarts and Watkins 1996), Nepal has become one more example to support this finding. Fertility in Nepal has declined now by a substantial amount in spite of more informal agrarian based economy characterized by lack of prosperity, low level of income and lack of rapid industrialization and urbanization, conditions generally thought to be not conducive for sustained fertility decline. But there have occurred significant social changes like provision of mass education and exposure to media and communication in Nepal that brought transformations in people's perceptions on existing value system regarding life and enabled them to have more rational point of view. People's mobility also increased causing more chances of exchange, as well as diffusion of ideas. Moreover, Nepal has been implementing a family planning programme

for more than four decades as a conscious neo-Malthusian initiative. Therefore, a study of fertility transition in Nepal was thought desirable to better understand fertility transition in the context of changing socioeconomic conditions and presence of family planning programme in a low income setting. Fertility transition in Nepal might be a unique case within South Asia.

After reviewing previous works in fertility transition in Nepal, the present study planned to extensively examine fertility transition for the period 2001 to 2011. Specific objectives have been set for the study. The first objective was to examine the trends, differentials and the components of change in fertility, focusing on selected socioeconomic and regional factors. The next objective was to understand the changes occurring in different aspects of family building: age at marriage, age at first birth, progressions to higher order births, risk of higher order births and lengths of birth intervals. Moreover, changes in fertility preferences in the context of changing values of and aspirations for children, desire for fertility regulation, and use of contraceptives were proposed to be studied for a clearer understanding of the process of fertility transition. Finally, examining people's perception of role of family planning programme in shaping fertility behavior was also proposed.

The research has been guided by a conceptual framework, which has been developed on the essence of the well-known Bongaarts's Proximate Determinants Framework. In the framework, selected socioeconomic factors, perceived values of children and family planning programme are supposed to influence fertility through changes in family size desires and use of contraception to materialize these desires. Also, change in marriage pattern is supposed to be influenced by socioeconomic factors and this acts as a proximate factor to affect fertility. The present study has explained fertility transition based on an analysis of available secondary data sources supplemented by a field investigation in selected villages of two districts Ilam and Siraha. This study has followed a mixed method, in which, most of the quantitative analysis is based on secondary data and complemented by qualitative methods based on a field study. The three rounds of Nepal DHS, 2001, 2006 and 2011 comprised the major sources of secondary data; however, census return data were also used as per need of study objectives. Both bivariate and multivariate statistical methods and demographic techniques (Linear Regression, Logistic Regression, Poisson Regression and Life Table) have been used for data analysis. The

field study was conducted in two rural settings, one in the Hills and the other in the *Tarai* region. FGDs and interview techniques were adopted in the field.

8.2 Summary of Findings

The results are presented in different chapters according to the order of objectives set for the study. The following paragraphs depict major findings pertaining to different chapters.

The analysis of fertility trends, differentials and determinants in Chapter-II revealed that fertility transition began in Nepal in the early 1980s with a slow pace which gained some speed in the 1990s and further accelerated in the period 1998-2000 to 2003-2005 and decelerated thereafter. Analysis of birth history data showed that fertility level reached around two and half children per woman in 2008-2010. Although pre-transition fertility level in Nepal was not so high (it was close to 6), it took more than three decades to reach the present level and the transition is yet to complete. In general, the transition is not very fast. All sections of population witnessed fertility decline but remarkable fertility differentials still exist by place of residence, economic condition of household, and women's education. Although place of residence and regional factors like ecological and development region are insignificant to explain variation in life time fertility after controlling for other factors, women's exposure to media, their education, experience of child loss and household wealth status significantly explain the variations at the individual level. In spite of some changes in age pattern of fertility in various subpopulations, differential exists by socioeconomic characteristics. The age pattern of fertility in Nepal is still characterized by an early start, an early peak, and a slower decline after peak. Changes that occurred in age pattern of marriage contribute almost one fifth of the total decline in current fertility during 2001-2011. Four fifths of the decline is due to marital fertility decline; undergone through action of a complex set of factors including diffusion. Of the marital fertility decline in the period 2001-2011, one third is contributed by changes in population distribution of various socioeconomic and spatial characteristics and the remaining changes left unexplained. The latter may, in part, be attributable to the role of diffusion in fertility change, which could not be directly captured by using some measurable factor in survey data.

The investigation into the dynamics of the family building process in Chapter-IV incorporated analyses of changes in age at first marriage, age at first birth, transitions to higher order births and birth intervals. Going through the dynamics of family building, it

is revealed that the age at marriage has increased to a small extent. A decline in cumulative proportions of women ever married by certain age has been observed for younger cohorts. Women's education is the major predictor of both age at marriage and risk of marriage at a given age; higher education associated with decrease in the risk of marriage and increase in the age at marriage. Some regional variations in age at marriage are also observed, which could be attributable to cultural differences. Analysis of birth history data from Nepal DHS revealed that the first birth is universal and achieved the latest by 30 years. Not much change in the age at first birth is found. Women marrying at relatively older age have a tendency to start childbearing earlier after marriage and thus initiation of childbearing at the aggregate level has remained almost stagnant in spite of some rise in age at marriage. Analysis of PPPRs shows that the first two births are almost universal till the date and a substantial decline over time has observed in women's progressions to third and higher order births. Life Table analysis of birth intervals revealed no decline in ultimate proportions attaining the second birth but indicated some reduced tempo of transition to the second birth over time. A clear decline in both extent and speed of all other higher order births has been observed over time, showing clear temporal effect in family building. An increase in birth interval with increased birth order is noticed. Cox Regression on risks of having successive higher order births shows that the relative risk of second birth is significantly lower among women who are more educated, working outside agriculture, belong to richer or the richest household wealth quintile, have higher age at first birth, and whose first child survived during infancy. A similar scenario has been observed for the third, fourth and fifth birth intervals. A decline in both speed and prevalence of the third and higher order births largely contributed to fertility transition in Nepal. It seems quite likely that majority of the couples will have two children and avoid higher order births in the days to come. Some net temporal effects on the risks of higher order births are observed in which, a reduced risk of higher order births at more recent times also contributed to fertility decline. Among the explanatory variables considered in the study, significantly reduced risk of higher order births is associated with socioeconomic factors like increased women's education, non-agricultural occupation of women, better household economic status, a higher age at previous child birth, previous child being male, and previous child survived during infancy.

The dynamics of fertility preference and contraceptive use in the period 2001-2011 have been analysed in Chapter-V based on Nepal DHS data. The analysis of fertility preference in Nepal reveals a decline in ideal family size observed in all subgroups of different socioeconomic, demographic, and regional characteristics. Never married women prefer even smaller family size to be ideal than ever married women do. Not only the preference for two children is emerging as a norm in Nepal, but also a substantial increase in couples desiring only one child is observed. After controlling for other factors including age, women's education is the single factor that explains the variation in ideal family size among never married women. For ever married women, higher women's education, better household economic condition, better exposure to media, and non-agricultural occupation for women are significantly associated with relatively smaller ideal family size. Similarly, decreased desire for an additional child is associated with increase in women's education, betterment in household economic condition, working in non-agriculture sector, and higher exposure to mass media. Those with no living sons have greater desire for an additional child compared to those with one or more living sons, other factors held constant; this clearly shows the strong influence of son preference.

Analysis of dynamics of contraceptives use shows that Nepal has gone through a vast increase in proportions of couples using contraception during the course of fertility decline. Only a little change in method mix in contraceptive use has been observed. Higher prevalence of limiting methods, especially female sterilization, is persistent over time, and contraceptives are used mostly after three children, that is, for limiting. However, couple's tendency to plan their births at earlier parity seems to be emerging, thus increasing the share of reversible methods of contraception among all users. The number of living children and other socioeconomic factors create substantial differential in contraceptive use in Nepal. Women from urban residence, better educated, working in non-agricultural sector, from better household economic condition, and those having at least one son are more likely to use contraception and more likely to start using it at a relatively lower parity. Women's education and household economic condition are significant predictors of contraceptive use. Higher preference for son is reflected in contraceptive use; couples start fertility regulation more intensively only after having a son. Husband's absence from home leads to avoidance of use of contraception and hence is one of the important factors to explain contraceptive use throughout the study period. This phenomenon partly explains the stagnancy in contraceptive prevalence rate in the

context of increasing proportions of married women having their husband out of home at the time of survey.

An exploration into causes of fertility decline based on information from field study conducted in two villages helped deepen the understanding of the process of the transition; the findings have been discussed in Chapter-VI. Investigation from field revealed that people have perceived an increase in age at marriage, educational level of people including that of women, exposure to means of communication and mass media, awareness and access to health and family planning service and improvement in survival of children, which are in same line with the findings from analysis of survey and other macro level data. Connection of village to urban centres through extended road network, provision of electricity and provision of communication technology in villages has also made people's life easier and opened access to wider world. Some transitions occurred in occupational structure of rural people and some new jobs are created outside of the agriculture sector. Labour migration to foreign countries has become a common phenomenon in the villages. Labour wage has increased in the villages; agricultural productivity has also increased to some extent but, due to escalating costs of living, there is not much perceived change in the overall economic status of people. Therefore, a picture of substantial social change coupled with a slow economic progress has been observed in the study villages. Factors like increase in age at marriage and contraceptive use have proximate negative effect on fertility, whereas, the other factors associated with social changes have some distant effect. In FGDs, increased child survival, increase in age at marriage, increased awareness of women's health and increased pressure on fixed land resources are less cited as reasons for fertility decline. On the other hand, increased women's status due to education, decreased discrimination between son and daughter and use of family planning are mentioned more often. But the most frequently cited reasons for fertility decline from all the FGDs are economic, increasing costs of educating children and higher aspirations for children.

Increased awareness of educating children caused a decline in demand for children. When people perceived the importance of education to be the highest in human life, they started aspiring higher education for their children and began to apply all their efforts in this endeavour. But, given their economic constraints, educating children is generally a costly affair which not only incorporates the direct cost in children's education, but also makes children less useful as economic hands. These led to decreased demand for children

through quantity-quality trade-off route. Interaction of rural people to those from urban area and the elite has increased due to improved access to communication and transportation, which made adoption of elite's behaviour easier. The idea that 'education is the most important factor of human life' appears to be more efficiently diffused, which made effective intervention of quantity-quality trade-off even among many rural uneducated people. Moreover, diffusion of idea about small family and the means of fertility control have also played a role.

People's perception of the role of the government family planning programme as assessed from the field study is discussed in Chapter-VII. Provision of family planning service largely contributed to materialize declined demand for children in Nepal. In its history of more than four decades, the family planning programme in Nepal has made substantial achievements to facilitate fertility transition. The field investigation showed that there is a good environment to use family planning methods in villages where, couples are getting a modest quality of family planning service. There is a good choice of methods (Pills, condom and injection) provided up to the grassroots level free of costs.

The programme has played an important role in changing people's attitude and behavior towards family planning. Contraceptive use has phenomenally increased. The programme has also helped people to make up some idea about their fertility desires and find a way out to materialize them. The family planning programme in Nepal is still one of the top priority government programmes. It is functioning through the channel of health service and reaches the lowest level of health service centres. Local health workers and the FCHVs play a central role in service delivery. However, there are some issues like less contact of couples with family planning workers, health concerns and fear of side effects, and some psychological costs in using contraceptives. Moreover, there is scope of increasing the choice as well as improving the quality of service of the programme. Similarly, political commitments towards the programme have not been explicitly expressed to common people. Overall, people perceive an appreciable role of family planning programme in materializing their fertility desires and hence facilitating fertility transition in Nepal.

8.3 Synthesis of Results

Nepal is moving from a moderately high fertility regime to a moderately low fertility regime, nearing to replacement level. Fertility decline witnessed a phase of slow decline

in the 1980s and the early 1990s, attained relatively higher pace in the late 1990s that continued up to 2005 and a bit retarded pace thereafter. Based on the experience of developing countries, Bongaarts (2013) argues that higher the level of development at the time of onset, the faster would the pace of fertility decline be and the process would be more rapid in the first decade of the transition than in later years. But in Nepal, fertility decline was relatively slow in the first decade of transition, and gradually gained speed later. It might be due to the fact that the transition started in Nepal at a relatively low level of development.

Although some change in the age pattern of fertility is observed for all socioeconomic subgroups, it can still be characterized by an early age at start, an early peak and gradual decline after attaining peak. Further, although fertility decline is largely contributed by neo-Malthusian forces with a clear decline in the desired family size, the contribution of increasing age at marriage should not be ignored. In fact, one fifth of decline in TFR is attributable to changes in age pattern of marriage and the remaining is attributable to marital fertility decline in the period 2001-2011.

Marriage and childbearing is universal in Nepal; most of the females marry by the age of 25 years and give the first birth latest by the early thirties. Almost all married women progress to the second birth but, next higher order births are now heavily curtailed. Birth spacing has prolonged over time. Fertility transition is therefore largely contributed by curtailment of higher order births than by increased age at marriage or increased age at first birth. Changes in socioeconomic conditions partly explain marital fertility decline, and factors like diffusion of the idea of fertility regulation, changes in perceived values of children played a great role in it.

Fertility decline occurred among all socioeconomic groups of population in Nepal. Fertility among urban, educated, and wealthy people is now fairly below replacement level and couples from these backgrounds have quite low chance of transiting to higher order births beyond two. These couples are more likely to use contraception and hence are more effectively controlling fertility. The scope of further decline in fertility among these subpopulations appears to be quite nominal. However, uneducated couples and those from the poorest household wealth category still have relatively higher fertility and have higher chances of transiting to beyond second birth though fertility in these sections has also declined substantially. Couples from poorer economic backgrounds are less likely to use contraceptives and are less capable of controlling fertility. This indicates

further scope of fertility decline among uneducated and poor. Therefore, although fertility differentials exist for different educational groups, economic categories, place of residence, and spatial factors, there appears fair chance of convergence in fertility among various socioeconomic strata in future.

The field investigation suggests that demand for children has substantially declined among rural people. Due to structural changes that are gradually occurring in rural setting, people now consider children to be more liability than asset. Expansion of health and education made improvements in child survival, which is perceived by general people too and their concern of insurance against child loss has became redundant. Similarly, expansion of mass media and transportation has made social interaction easier and helped more speedy diffusion. Rural people's exposure to the outer world has phenomenally increased due to expansion of communication, increased exposure to mass media and betterment in transportation facility. Even poor and uneducated people learnt from urban elites and other educated people about the new ideals of having fewer children and motivated to follow the same. Most of the rural couples now consider children's education to be the most important and they also think it to be their responsibility to impart a high quality education to their children. They hope for overcoming the economic constraints once they rear educated offspring. Therefore, the costs of rearing children have phenomenally increased. Their emphasis on highly educated quality children made them compromise in quantity in the context of their limited economic resources and increasing costs of living. This led to the classical quality-quantity trade-off to operate effectively even in a low income rural setting where most of the people now desire fewer children than ever before.

In similar low development settings of sub-Saharan Africa, the cost of raising children still remained low compared to other developing regions, the benefits of having offspring remained substantial in the subsistence economies and the drivers of diffusion processes were not as influential (Bongaarts 2013). But the situation in Nepal is a bit different. Though the level of economic development is relatively low in Nepal, a substantial increase in the cost of raising, phenomenal decline in desired family size and a strong diffusion of new fertility ideals, means of birth control measures as well as educational aspirations of children has taken place, which made such massive fertility transition possible. Easterlin (1976) argues that if resources are in abundance relative to aspirations, couples prefer to have many children, but if resources are scarce relative to aspirations,

they will be hesitant about having many children. Therefore, in Nepal, the second condition largely holds causing couples to prefer fewer children.

At the same time, the Government of Nepal is implementing the family planning programme for a long time as a conscious neo-Malthusian intervention. Although political commitment towards the programme has not been strong or explicitly expressed, the programme is still at a top priority of the government. The programme is functioning well in the existing administrative set up, in giving information as well as service and playing a valuable role in creating demand as well as in providing supply of contraceptives. A good choice of methods (Pills, condom and injection) has reached the grassroots level through the channel of health services. As in most of the Asian countries, where family planning programme's success is supported by changes in the demand for children caused by social development, particularly the spread of basic education (Jones 2002), Nepal cannot be exception to this fact. There is already a very high demand for contraceptives in Nepal mainly because of the fact that couples are aware of and motivated enough for using them. Except for some people from marginalized sections who are ultra poor and uneducated, a high level of motivation for using family planning methods exists in the general populace. It can therefore be said at this juncture that not much further effort is needed for the programme to create a demand for contraception. Socioeconomic changes in many dimensions, especially in women's education and in survival status of children promoted creation of more demand for contraceptives, the family planning programme itself also played a role to promote demand and once again, the family planning service provided through the programme addressed the supply side. Therefore, the presence of the family planning programme created a very supportive environment for fertility decline.

Achievements in fertility transition in Nepal can be compared to some Indian states in terms of most plausible causes and contexts. It is to be noted that fertility transition in Kerala is one of the most accelerated transition, occurred in a low economic setting. Kerala is an example of fertility decline due to a right order of effective policy intervention in the sequence: policy to reduce infant and child mortality, then to increase female education, then to redistribution of resources, and finally the family planning programme (Zachariah et al. 1994). Kerala showed an evidence of rapid fertility decline due to effective implementation of the family planning programme and considered education and better health as prerequisites for it. In Tamil Nadu also, fertility decline

occurred at a relatively lower level of economic development and moderate level of social development, and was explained by cultural and historical factors including the role of family planning programme (Rajna et al. 2005). Increased awareness due to social movements and more efficient diffusion associated with social changes made a rapid fertility transition possible in Tamil Nadu (Krishnamoorthi et al. 2005). Similarly, in Andhra Pradesh, couples' desire to invest in improving the quality of life of their children, especially education and health, is most important to make fertility transition possible (Ramachandran and Ramesh 2005). Karnataka witnessed a relatively slower pace of fertility decline as compared to Kerala, Tamil Nadu, and Andhra Pradesh mainly due to within state disparity in socioeconomic development (Sekhar et al. 2005). On the other hand, Odisha is another state to witness relatively slower pace of fertility decline but a decline in relatively more adverse socioeconomic conditions in comparison to the southern states of India, where diffusion of high aspirations for children's education and economic hardship led to declined desire for children through quality-quantity trade-off and provision of family planning service through programme supported a substantial fertility decline (Sahoo 2010). Comparing these evidences with the case of Nepal, the contexts for fertility decline are not exactly similar. The pace of decline also differs. Another difference is that in all these Indian states except Odisha, fertility fell near or below replacement level now, but not in Nepal. Transition in Nepal appears to be relatively slower as compared to that in these states. But, a common ground is that, fertility transition occurred in settings of relatively poor economic conditions in all these cases. Differences are there in terms of level of social development as well as the changes occurring in it. Another common ground is the existence of family planning programmes. One major difference in the programme component is that there are more reversible methods (injection and implants) offered in Nepal, which are not there in the Indian programme. In Nepal, injection serves up to the lowest level of health delivery system that is sub-health post and this is one of the mostly used methods. For sure, the ways of implementation of family planning programme differ in these examples. However, the role of family planning programme in fertility transition has been acknowledged in all these states and Nepal would be one more example in the list. The role of diffusion is another commonality in these cases. Both the diffusion of means of fertility control and that of aspirations for children's better quality, especially in terms of education, are common phenomena. Discussing the success stories of fertility transition in the three Indian states Goa, Kerala and Tamil Nadu, Srinivasan (1995) argues for a combined role

of ‘top-down’ and ‘bottom-up’ forces with their differential contributions in the process. He stated that the ‘top-down’ forces dominated in Tamil Nadu, the ‘bottom-up’ forces in Goa and both of them operated in a balance in Kerala. It can be inferred that a kind of balance of both of these two types of forces acted in the process of fertility transition in Nepal. Largely, within the differences in the time of onset and pace, there could be some commonalities in the processes of fertility transition in seemingly less favourable conditions in terms of socioeconomic development.

Fertility transition in Nepal can be explained on the basis of Coale’s three well-known preconditions (Coale 1973) required for sustained marital fertility decline. This is possible because, the changes occurring in the age pattern of marriage have made a relatively smaller contribution to fertility decline as compared to that of marital fertility decline. As has been cited earlier, the three preconditions represent a situation where fertility is considered by couples as a rational form of behavior which is under their control, declined family size is more beneficial to them and there are effective means of birth control measures available. If all these conditions are simultaneously met, a sustained fertility decline occurs. It would be better to perceive each of these three conditions as a ‘continuum’ in which the lowest extreme represents total absence of the condition and the uppermost extreme represents a situation where the condition is fully met. At any point of time, a population under consideration can be thought to be at some point in the continuum of each of the three preconditions that collectively reflects the extent to which the situation is favourable for fertility decline.

In the case of Nepal, all the three preconditions are largely met and sustained fertility decline became possible. As Caldwell (1998) has mentioned, mass education might have played a major role in initiation of fertility transition in Nepal in spite of a low level of income. It can be argued that the provision of mass education opened a new avenue in human life. Increasing educational level of people made them more aware, knowledgeable, and rational and they started viewing fertility as a more rational form of behaviour. Most of the women now can give a numeric response to the question on their preferred ideal family size instead of stating responses like ‘up to God’ or other non-numeric responses. This also confirms that couples largely consider fertility as a rational form of behavior. Almost universal knowledge of at least one kind of family planning methods also indicates that all are aware that fertility can be controlled through some means. Discussing family planning matters among friends is no more a taboo now. People

are frequently exposed to information disseminated through programme that fertility can be controlled and so and so are the means for it. Therefore, Coale's first condition of fertility being within the calculus of conscious choice is largely met in case of Nepal.

Secondly, it is the same element 'education' whose perceived importance increased as people started considering it as one of the major aspects of human being, by achieving which, one can live a more respectful and prosperous life. Even in rural settings and also among the poor, a higher aspiration for education, at least for their children started to emerge. But, it is not necessarily true that all poor people from rural setting equally emphasized on education and aspired for higher education for their children. Some poor and uneducated couples might have considered current economic value of children to be more than the expected future returns by investing in their education. Given their economic constraints and tastes for children, differentials remained on values of children in terms of their perceived costs and utilities. Those couples who put more priority to children's education wanted high quality grown up children. They aspired to a prosperous life for their children and thought it could be achieved once they can nurture an offspring to be educated. But, given their economic constraints, they have to compromise in the number mainly because of increased cost of living in general and high cost of educating children in particular. Consequently, Coale's second condition of low fertility being beneficial also prevailed. This became possible due to an effective functioning of classical quantity-quality trade-off.

The provision of government family planning service facilitated to meet Coale's third condition of efficient means of fertility regulation being available. People perceive family planning service to be of modest quality, providing service free of cost and there is largely a conducive environment to use available means of fertility control. Increasingly more proportions of couples are now using birth control measures, largely through the programme. Therefore, the third precondition has largely been met. Collectively, a more conducive environment has created for sustained fertility decline in spite of a low income setting. Fertility differentials are evident especially for different educational and economic category. These differentials could be interpreted in the light of differences in the extent to which these three preconditions are met in respective subpopulations. After reaching the situation where all these three preconditions are fully met, it is likely that fertility will decline to some minimum level and all the differentials would be sufficiently

narrowed down. There are chances of convergence of fertility at some low level thus maintaining a kind of low stabilization in future.

8.4 Limitations of the Study

Most of the quantitative analyses in this research are based on analysis of birth history data from the Nepal DHS. It has been taken for granted that quality of these data is reasonably good for statistical analysis. The results obtained from data analysis are subject to influence of any error present in the data. In the analysis of the family building process, a detailed analysis of quantum and tempo aspects of fertility change has not been made. Similarly, of the four principal proximate determinants of fertility, only age at marriage and contraception are considered for detailed analysis; an analysis of abortion has not been possible due to lack of reliable data on induced abortions and only a little change has been seen in post partum infecundability. While constructing focus groups in the field, only sex and age have been considered as stratification variables and other characteristics like education, economic status have not been considered. Moreover, the field work was done only in two villages, which certainly does not represent the whole country but was meant to give a glimpse of attitudes and perceptions of couples.

8.5 Conclusions

A sustained fertility decline has occurred among all socioeconomic groups, including poor and uneducated in Nepal. Apart from increases in age at marriage and child survival, changes in socioeconomic conditions have influenced fertility. Once couples become aware enough to value children's education as a top priority, opting for fewer children becomes their most viable strategy in the context of increasing cost of rearing children given the economic constraints. The role of the family planning programme then comes in whereby couples get family planning services and materialize their fertility desire.

Fertility transition in Nepal is thus a combined result of socioeconomic changes, diffusion, and the government family planning programme. As proximate factors, changes age at marriage and use of contraception are the sole role players in fertility transition. Among the socioeconomic factors, improvements in educational status, child survival and exposure to mass media and communication are the most important to be mentioned. Two types of diffusion can be noted down. Apart from the diffusion of new ideas regarding desire for smaller family and means of fertility control as conventional 'diffusionists' indicated, also diffused are the educational aspirations for children. The third component is the role of the family planning programme which promoted demand

as well as provided family planning service and fueled fertility transition. Based on evidences from India and Bangladesh, Caldwell (2001, 99) writes, “economic and social changes were the underlying forces in fertility decline, with the education of children being an important element, but that family planning programme almost certainly hastened the process”. A similar argument holds for Nepal too. Therefore, increased awareness to education is the triggering force and economic constraints and provision of family planning services provide a supporting environment for remarkable fertility decline in predominately rural and low income setting of Nepal.

In the light of the findings of this study and of previous studies on the fertility transition in Nepal, some avenues of future research have emerged. Fertility convergence among various subpopulations is likely, further analysis is needed to see how soon this will occur. Similarly, a detailed analysis of quantum and tempo aspects of fertility decline is desirable in order to understand changes over short periods of time. The detailed field investigation covered only two villages in two regions. Given the diversity in Nepal, field studies in other ecological settings would be helpful to have a comprehensive understanding of the transition. Further research on use of abortion is desirable to know its role in affecting contraceptive use.

Sustained fertility decline in Nepal to a fairly low level indicates that it would continue further and reach around or even below replacement level. As a policy initiative, Nepal should now consider consequences of low fertility, undoubtedly the ageing, and orient population programmes accordingly. The family planning programme requires continuation, but its profound neo-Malthusian thrust could be wisely loosened and the programme could focus on meeting couples’ family planning needs through a quality service with enhanced choice. Policies towards poverty reduction and improving women’s education in remote rural area are desirable to have a more harmonious social set up, where fertility of each couple could be a wise decision, safeguarded by their right to choose.

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Appendices

Appendix Table-1: Percent distribution (weighted) of women age 15-49 by selected background characteristics, NDHS-2001, 2006 and 2011

Background Characteristics	2001[#]		2006[$]		2011[$]	
	Number	Percent	Number	Percent	Number	Percent
Age						
15-19	941	10.8	2437	22.6	2753	21.7
20-24	1658	19.0	1995	18.5	2297	18.1
25-29	1666	19.1	1773	16.4	2101	16.6
30-34	1427	16.4	1336	12.4	1734	13.7
35-39	1168	13.4	1220	11.3	1557	12.3
40-44	1030	11.8	1121	10.4	1285	10.1
45-49	837	9.6	912	8.4	947	7.5
Place of Residence						
Urban	841	9.6	1687	15.6	1819	14.4
Rural	7885	90.4	9106	84.4	10855	85.6
Ecological Region						
Mountain	602	6.9	753	7.0	805	6.4
Hill	3615	41.4	4598	42.6	5090	40.2
Tarai	4509	51.7	5443	50.4	6779	53.5
Development Region						
Eastern	2098	24.0	2392	22.2	3057	24.1
Central	2804	32.1	3553	32.9	4236	33.4
Western	1771	20.3	2070	19.2	2660	21.0
Mid-western	1197	13.7	1250	11.6	1478	11.7
Far-western	855	9.8	1528	14.2	1242	9.8
Education						
None	6279	72.0	5728	53.1	5046	39.8
Primary	1294	14.8	1901	17.6	2209	17.4
More than primary	1153	13.2	3163	29.3	5419	42.8
Household Wealth Index						
Poorest	1945	22.3	1961	18.2	2120	16.7
Poorer	1699	19.5	2079	19.3	2393	18.9
Middle	1654	19.0	2214	20.5	2600	20.5
Richer	1725	19.8	2226	20.6	2722	21.5
Richest	1703	19.5	2313	21.4	2839	22.4
Total	**8726**	**100.0**	**10793**	**100.0**	**12674**	**100.0**

Note: [#]Ever married women sample, [$]All women sample

Source: Computed by the researcher from NDHS data 200, 2006 and 2011

Appendix Table-2: Values of selected district level indicators that are used in district level regression analysis of fertility

District code	District	CBR	FLR	FLFPR	PCI	IMR
1	Taplejung	20.78	64.1	64.92	1313	34.53
2	Panchthar	18.39	65.8	58.68	1082	32.13
3	Ilam	14.73	72.0	63.26	1260	32.32
4	Jhapa	18.25	68.6	44.87	1226	31.79
5	Morang	18.74	63.1	42.70	1251	25.05
6	Sunsari	19.19	60.5	37.50	1104	22.82
7	Dhankuta	18.29	67.4	70.17	1257	30.41
8	Teharthum	17.99	67.0	70.75	1419	25.41
9	Sankhuwasabha	20.03	62.2	74.34	1193	37.09
10	Bhojpur	19.69	61.4	67.79	999	31.45
11	Solukhumbu	19.78	55.7	74.44	1841	41.44
12	Okhaldhunga	19.32	56.0	61.11	957	32.04
13	Khotang	20.18	61.1	61.22	1132	34.84
14	Udaypur	21.03	61.5	53.83	920	26.37
15	Saptari	20.79	42.6	45.15	801	19.30
16	Siraha	22.85	39.2	35.78	689	22.69
17	Dhanusha	21.13	40.2	25.30	938	22.59
18	Mahottari	24.29	36.6	26.21	681	31.77
19	Sarlahi	24.55	36.6	21.96	809	32.92
20	Sindhuli	22.04	52.1	57.83	822	35.90
21	Ramechhap	16.13	53.5	60.88	951	33.83
22	Dolakha	17.08	53.7	65.20	922	30.57
23	Sindhupalchok	16.79	51.9	65.31	1110	37.71
24	Kavrepalanchok	15.11	60.9	55.61	1399	31.26
25	Lalitpur	13.90	74.7	39.66	1894	18.72
26	Bhaktapur	14.22	72.7	44.44	1379	16.75
27	Kathmandu	14.61	79.8	31.07	2764	16.67
28	Nuwakot	16.08	52.4	57.11	1086	31.04
29	Rasuwa	18.00	46.5	61.38	1520	40.18
30	Dhadimg	18.64	55.7	61.55	982	37.76
31	Makawanpur	19.28	60.6	56.38	1410	37.43
32	Rautahat	26.12	32.0	22.15	757	34.90
33	Bara	24.82	40.7	26.36	1480	30.22
34	Parsa	24.31	43.9	21.62	1223	23.80
35	Chitwan	16.07	70.7	47.74	1537	30.31
36	Gorkha	17.47	59.4	61.80	1039	32.28
37	Lamjung	17.14	63.3	59.60	1186	29.24

Continued…

38	Tanahu	17.76	67.9	51.34	1072	27.53
39	Syanjha	16.77	69.6	58.40	1215	25.80
40	Kaski	16.52	75.4	37.89	1561	20.35
41	Manang	10.75	64.2	69.39	3166	20.00
42	Mustang	12.97	55.8	76.09	1922	33.39
43	Myagdi	21.69	64.5	63.85	1028	34.23
44	Parbat	18.75	66.4	64.04	1013	32.51
45	Baglung	21.06	65.3	55.37	868	23.91
46	Gulmi	20.50	65.9	63.29	752	32.27
47	Palpa	19.03	69.5	60.89	985	34.21
48	Nawalparasi	18.71	62.8	59.14	1157	40.65
49	Rupendehi	20.06	60.8	36.94	1123	41.42
50	Kapilwastu	24.58	45.0	37.40	990	51.73
51	Arghakhanchi	21.54	65.8	69.65	909	33.77
52	Pyuthan	27.95	58.6	69.84	681	48.08
53	Rolpa	27.85	50.5	62.10	643	62.64
54	Rukum	25.35	53.9	48.03	782	50.29
55	Salyan	24.74	55.2	55.60	786	44.16
56	Dang	21.18	62.8	49.84	1127	40.27
57	Banke	22.13	54.9	33.90	1133	41.60
58	Bardiya	19.85	57.9	50.73	1086	48.69
59	Surkhet	24.80	64.9	54.24	911	46.13
60	Dailekh	29.80	52.9	59.98	684	53.22
61	Jajarkot	33.86	48.7	50.21	611	65.77
62	Dopla	31.62	40.6	70.91	1040	93.77
63	Jumla	31.76	40.8	66.92	1007	79.02
64	Kalikot	36.64	45.7	61.64	578	69.34
65	Mugu	36.67	36.9	70.84	866	85.86
66	Humla	34.45	33.0	71.38	794	91.86
67	Bajura	32.96	43.3	64.42	523	87.15
68	Bajhang	31.68	40.1	68.38	487	74.95
69	Achham	30.78	42.9	66.53	536	50.68
70	Doti	31.17	42.3	65.68	774	59.43
71	Kailali	21.36	57.1	45.55	942	45.59
72	Kanchanpur	21.38	61.0	46.66	938	38.93
73	Dadeldhura	26.22	52.9	67.21	764	45.53
74	Baitadi	27.51	49.2	61.08	573	50.93
75	Darchula	26.39	52.9	62.67	627	48.62

Note: CBR=Crude Birth Rate, FLR=Female Literacy Rate, FLFPR=Female Labour Force Participation Rate, PCI=Per Capita Income ($ PPP), IMR=Infant Mortality Rate

Source: Computed from census 2011 and Nepal Human Development Report 2013

Appendix Table-3: Percent distribution of study sample for variables used in regression based decomposition (Currently married women, who are married only once)

Variables		2001		2011	
		Number	**Percent**	**Number**	**Percent**
Residence	Rural	1088	13.1	2583	27.3
	Urban	7236	86.9	6876	72.7
Ecological region	Mountain	1129	13.6	1158	16.5
	Hill	3083	37.0	3675	38.9
	Tarai	4112	49.4	4226	44.7
Development region	Eastern	1968	23.6	2212	23.4
	Central	2284	27.4	2232	23.6
	Western	1489	17.9	1721	18.2
	Mid-Western	1092	13.1	1755	18.6
	Far-Western	1491	17.9	1539	16.3
Education	None	5946	71.4	4446	47.0
	Primary	1227	14.7	1791	18.9
	>Primary	1151	13.8	3222	34.1
Media exposure	Low	4173	50.1	3196	33.8
	High	4151	49.9	6263	66.2
Household wealth quintile	Poorest	1847	22.2	1922	20.3
	Poorer	1536	18.5	1755	18.6
	Middle	1509	18.1	1767	18.7
	Richer	1662	20.0	1862	19.7
	Richest	1770	21.3	2152	22.8
Age at first cohabitation	<15	1682	20.2	1532	16.2
	15-16	3051	36.7	2648	28.0
	17-18	1928	23.2	2345	24.8
	19-20	977	11.7	1464	15.5
	21+	686	8.2	1470	15.5
Time elapsed since first cohabitation	0-4	1672	20.1	1902	20.1
	5-9	1654	19.9	1761	18.1
	10-14	1454	17.5	1687	17.8
	15+	3544	42.6	4109	43.3
Whether sterilized at the start of five year period	No	7216	86.7	7962	84.2
	Yes	1108	13.3	1497	15.8
Whether any pregnancy terminated during last five years	No	7820	93.9	8517	90.0
	Yes	504	6.1	942	10.0
Mean number of living children at the start of five years			2.07		1.92
Mean number of births during last five years			0.82		0.56
Total number of women		8324	100.0	9459	100.0

Source: Computed by the researcher from NDHS data 2001 and 2011

Appendix Table-4: Results of decomposition regression on current fertility

Variables in order as they are introduced in regression	Coefficients from Regression Equation												Net change in size of component
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Constant	.825	.854	.914	.879	.873	.971	.909	.839	1.845	1.812	1.707	1.708	
Coefficient of Z (Survey year)	-.269	-.238	-.243	-.246	-.251	-.240	-.262	-.264	-.181	-.189	-.182	-.182	
Place of Residence		-.219	-.205	-.207	-.213	-.172	-.106	-.106	-.061	-.061	-.057	-.057	**-0.031**
Ecological Region													**0.005**
ecoreg1			-.053	-.032	-.033	-.029	-.016	-.016	-.028	-.024	-.019	-.019	
ecoreg2			-.086	-.068	-.069	-.071	-.029	-.026	-.067	-.064	-.030	-.030	
Development Region													**0.003**
devreg1				.002	.005	-.013	.008	.012	-.034	-.036	-.003	-.003	
devreg2				-.073	-.073	-.084	-.060	-.057	-.066	-.068	-.042	-.042	
devreg3				.093	.097	.074	.064	.068	-.002	.000	.018	.018	
devreg4				.101	.105	.079	.071	.076	.008	.008	.024	.024	
Education													**0.005**
edu1					.015	.061	.066	.066	-.141	-.143	-.126	-.126	
edu2					.026	.107	.165	.159	-.169	-.171	-.168	-.168	
Exposure to Radio, TV or Newspaper						-.215	-.190	-.191	-.163	-.165	-.132	-.132	**-0.011**
Wealth Index from factor scores							-1.272E-06	-1.290E-06	-5.904E-07	-6.859E-07	-6.543E-07	-6.541E-07	**0.022**
Age at first marriage								.004	-.021	-.020	-.020	-.020	**0.002**
Years since first marriage									-.034	-.026	-.017	-.017	**-0.083**
Number of living children at the start of five year period										-.050	-.053	-.053	**0.008**
Whether sterilized at the start of five year period											-.536	-.536	**-0.007**
Whether any pregnancy terminated in last five years												-.001	**0.000**
R^2 (unadjusted)	.028	.040	.041	.047	.047	.061	.069	.070	.187	.193	.238	.238	

Source: Computed from NDHS data 2001 and 2011

Appendix Table-5a: Cumulative proportion of ever married women before exact age according to age at survey, NDHS-2011

Married before age	Proportion of women for age						
	15-19	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**
10	0	0	0.0005	0	0	0	0
11	0	0.0013	0.0014	0.0034	0.0058	0.007	0.0149
12	0.0011	0.0066	0.0048	0.0069	0.0103	0.0178	0.0297
13	0.0026	0.017	0.0182	0.016	0.0237	0.0411	0.0509
14	0.0129	0.038	0.0537	0.059	0.0654	0.0892	0.1104
15	0.0506	0.1013	0.1544	0.165	0.1871	0.1947	0.2367
16		0.1918	0.2834	0.2962	0.3243	0.3391	0.3746
17		0.3066	0.398	0.4262	0.4467	0.4787	0.4786
18		0.408	0.5131	0.5482	0.5646	0.5928	0.5901
19		0.5076	0.6138	0.6513	0.6569	0.703	0.6856
20		0.6006	0.6977	0.7304	0.7434	0.7798	0.7705
21			0.7572	0.7905	0.7966	0.8318	0.8246
22			0.8104	0.8421	0.8626	0.8729	0.8755
23			0.8603	0.8753	0.8959	0.9016	0.9159
24			0.8833	0.9022	0.9254	0.928	0.9381
25			0.9044	0.9251	0.9517	0.9536	0.9541
26				0.9406	0.9568	0.9621	0.9647
27				0.9509	0.9626	0.9714	0.9689
28				0.9578	0.9664	0.973	0.9763
29				0.9612	0.9748	0.9745	0.9785
30				0.9646	0.9773	0.9768	0.9785
31					0.9793	0.9776	0.9785
32					0.9805	0.9807	0.9806
33					0.9831	0.9823	0.9817
34					0.9831	0.9838	0.9838
35					0.9837	0.9854	0.9848
Median age at marriage	**NA**	**18.92**	**17.89**	**17.61**	**16.45**	**16.19**	**16.19**
Adjusted number of all women	**2708**	**2289**	**2085**	**1746**	**1560**	**1289**	**942**

NA=Not Applicable

Source: Computed by the researcher from NDHS data 2001 and 2011

Appendix Table-5b: Cumulative proportion of ever married women before exact age according to age at survey, NDHS-2006

Married before age	Proportion of women for age						
	15-19	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**
10	0	0	0	0	0	0.0009	0
11	0.0004	0.0015	0	0	0.0016	0.0018	0.0022
12	0.0009	0.0036	0.0028	0.0022	0.0049	0.0027	0.0088
13	0.0045	0.0117	0.0112	0.0141	0.0172	0.0205	0.0318
14	0.0224	0.0376	0.0488	0.0513	0.0566	0.082	0.1041
15	0.0597	0.1031	0.1323	0.1524	0.1541	0.1961	0.2466
16		0.2269	0.2831	0.2975	0.3197	0.3467	0.4099
17		0.3939	0.4625	0.4529	0.5222	0.5338	0.6039
18		0.5203	0.5977	0.5956	0.6493	0.6488	0.6938
19		0.6356	0.6969	0.7117	0.7501	0.7423	0.7979
20		0.7178	0.7681	0.786	0.8124	0.8172	0.8484
21			0.8242	0.8418	0.8674	0.8769	0.8955
22			0.8679	0.879	0.9018	0.9054	0.9196
23			0.8987	0.899	0.9288	0.9223	0.936
24			0.9167	0.9147	0.9493	0.9384	0.947
25			0.9301	0.934	0.9633	0.9473	0.9558
26				0.9489	0.9715	0.9544	0.9667
27				0.9541	0.9756	0.9598	0.9722
28				0.9593	0.978	0.9669	0.9766
29				0.9667	0.9797	0.9687	0.9766
30				0.9727	0.9813	0.9758	0.9777
31					0.9813	0.9785	0.981
32					0.9813	0.9803	0.9821
33					0.9821	0.9812	0.9821
34					0.9821	0.9812	0.9821
35					0.9821	0.9812	0.9821
Median age at marriage	**NA**	**17.84**	**17.28**	**17.33**	**15.89**	**15.82**	**16.46**
Adjusted number of all women	**2229**	**1970**	**1784**	**1345**	**1220**	**1122**	**912**

NA=Not Applicable

Source: Computed by the researcher from NDHS data 2001 and 2011

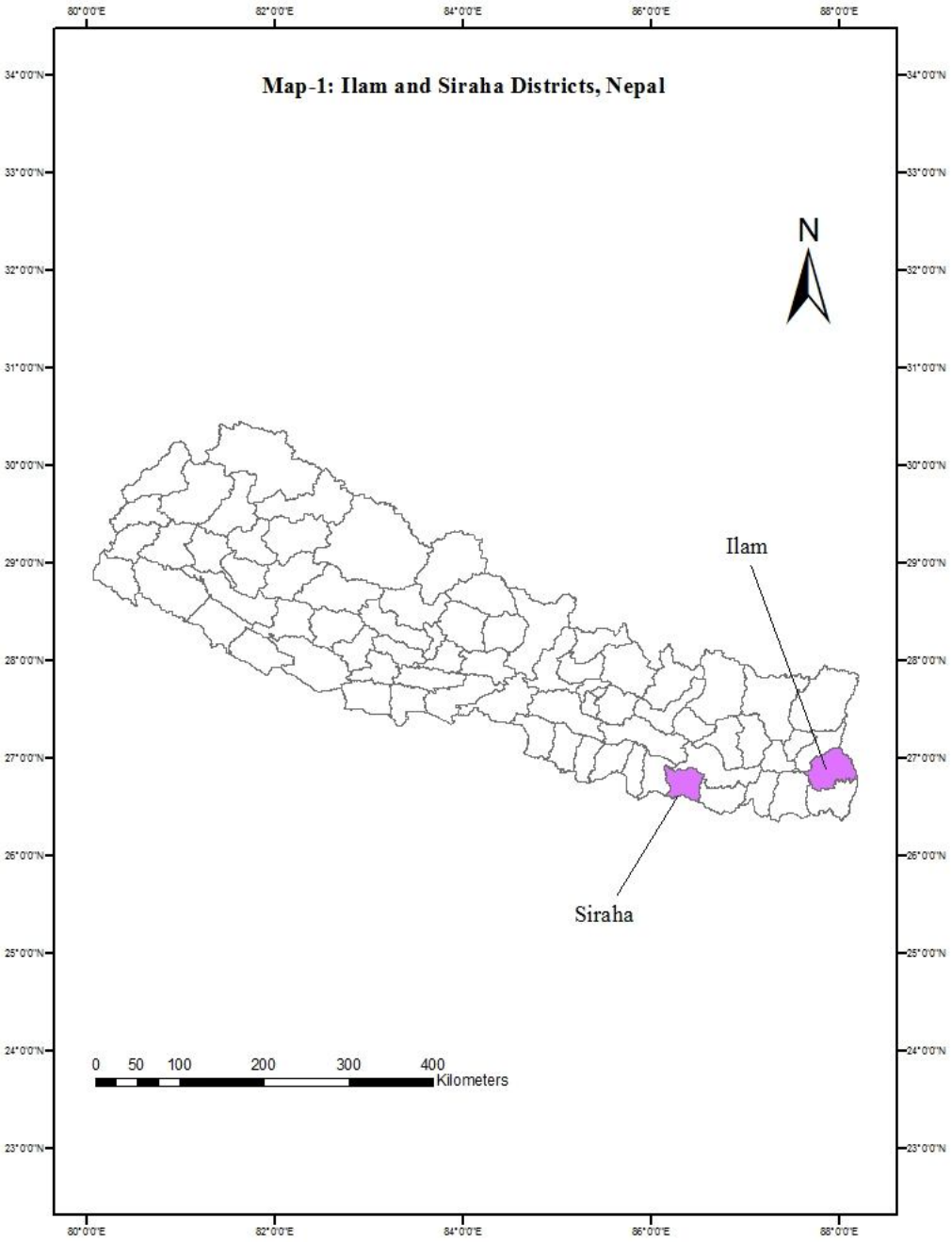
Appendix Table-5c: Cumulative proportion of ever married women before exact age according to age at survey, NDHS-2001

Married before age	Proportion of women for age						
	15-19	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**
10	0	0	0	0	0	0	0
11	0	0.0005	0.0012	0.0013	0.0025	0.0019	0.0035
12	0.0005	0.001	0.0023	0.002	0.0058	0.0117	0.0151
13	0.0033	0.0093	0.0082	0.0168	0.0199	0.0389	0.036
14	0.0238	0.0372	0.0554	0.0631	0.0821	0.1069	0.1092
15	0.1015	0.1452	0.1716	0.1725	0.2123	0.2596	0.2847
16		0.2909	0.3344	0.3463	0.3873	0.4414	0.4671
17		0.4522	0.51	0.5254	0.5449	0.5979	0.6146
18		0.5798	0.6384	0.6442	0.6677	0.7068	0.7122
19		0.6925	0.7382	0.7435	0.7581	0.8021	0.7994
20		0.7695	0.8187	0.8093	0.8186	0.8546	0.8528
21			0.8748	0.8596	0.8767	0.9003	0.8993
22			0.9051	0.8845	0.9057	0.9314	0.9202
23			0.9296	0.9006	0.9223	0.9528	0.9377
24			0.9465	0.918	0.9339	0.9693	0.9481
25			0.9594	0.9328	0.9455	0.9771	0.9516
26				0.9395	0.9513	0.9868	0.9562
27				0.9455	0.9555	0.9966	0.9597
28				0.9489	0.958	0.9985	0.9609
29				0.9516	0.9613	0.9995	0.9644
30				0.9549	0.9638	0.9995	0.9655
31					0.9663	1.0014	0.9667
32					0.9671	1.0014	0.9667
33					0.9679	1.0024	0.9679
34					0.9679	1.0024	0.9679
35					0.9679	1.0024	0.9679
Median age at marriage	**NA**	**17.37**	**16.94**	**16.86**	**15.71**	**15.37**	**16.22**
Adjusted number of all women	**2099**	**1935**	**1714**	**1490**	**1206**	**1029**	**861**

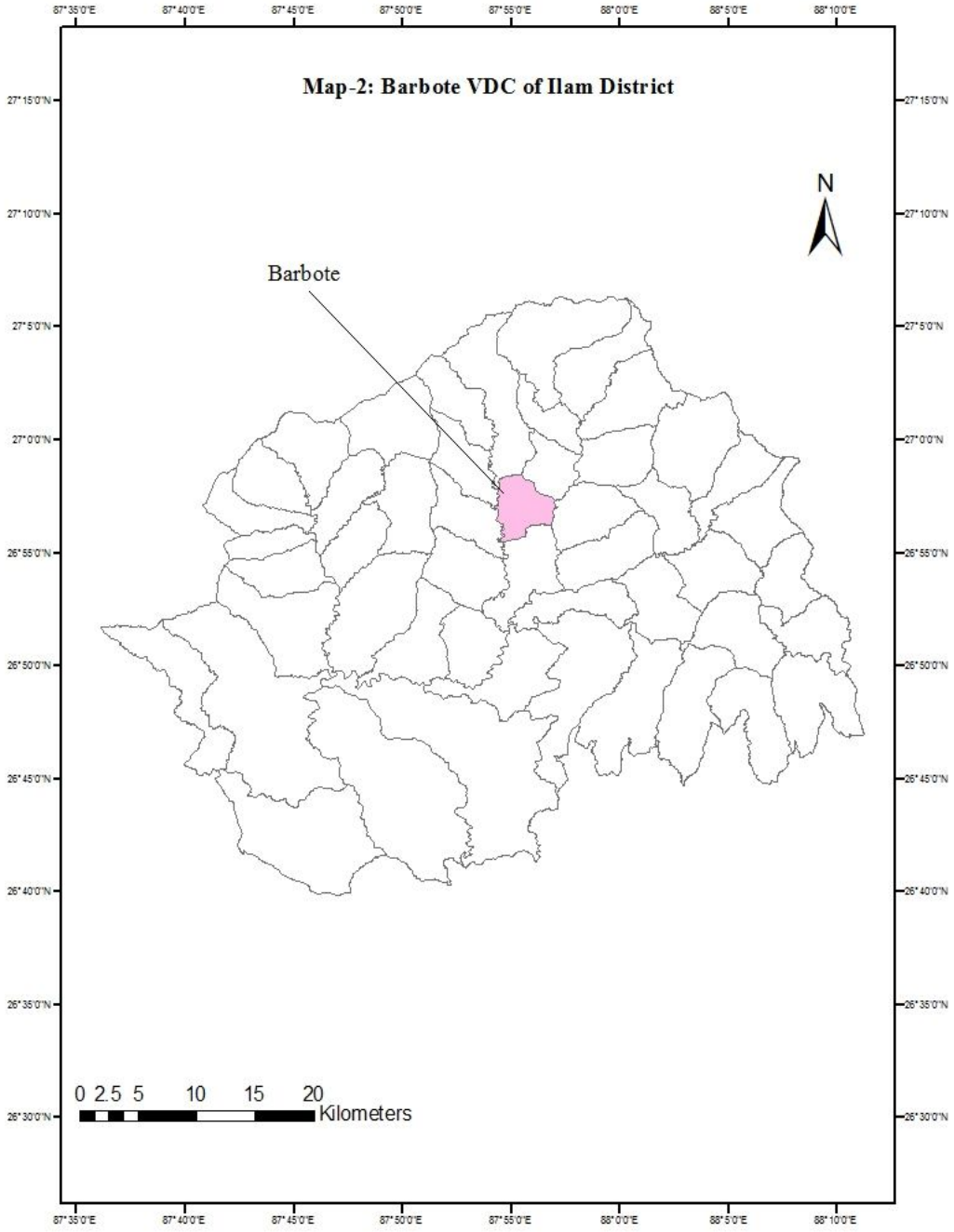
NA=Not Applicable

Source: Computed from NDHS data 2001 and 2011

Appendix Map-1: Map showing districts selected for field work



Appendix Map-2: Map showing VDC selected for field work, Ilam district



Appendix Map-3: Map showing VDC selected for field work, Siraha district