CHAPTER 12

FERTILITY LEVELS, PATTERNS AND TRENDS IN NEPAL

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12.1   Background

Population counting has a relatively long history in Nepal - the first count was taken in 1911 and thereafter it was conducted roughly every ten years. However, the first four periodic censuses (1911, 1920, 1930, and 1941) did not meet the requirements of a scientific census. The 1952/54 census was the first scientific count in the modern sense of the term. Because of political instability the whole country could not be enumerated in one year in 1952 and therefore the remaining parts were enumerated in 1954. The subsequent censuses of 1961, 1971, 1981, 1991 and 2001 were, however, conducted timely and 22nd June was maintained as the census day throughout. Apparently census operation has successively improved over the years (Karki, 1992 and Karki 2002).

In 2001, despite the CBS was fully prepared to conduct the 2001 census enumeration, two major events beyond the control of CBS affected census undertaking. Firstly, the tragic Royal Palace incident of 1st June 2001 delayed the recruitment of field staffs and their training for a week and secondly, the Maoists insurgency hampered complete enumeration in 12 districts (CBS and UNFPA/Nepal, June 2002). In Kalikot only about 11% population could be enumerated while in Salyan the corresponding figure was about 28%. In other 10 districts enumeration was affected in varying degrees (Table 12.1). The four Mid-Western high mountain districts of Kalikot, Mugu, Dolpa and Jumla were badly affected by the Maoists insurgency.

In general when a developing nation is not subject to war, famines, mass movement of people across the political boundaries, natural calamities, etc., the population size can be expected to grow steadily. The introduction of modern medicines and the onset of modernisation and socio-economic development, be it at a slow pace, can contribute to mortality decline and sometimes even to fertility increase in the absence or near absence of birth control practices. Such a demographic process can only contribute to fast population growth. Nepalese society is neither totally traditional nor completely modern it is in transitional period.

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Table 12.1 : Status of enumeration of 12 districts, 2001 census.

Ecological Region	Development Region		Per cent enumerated		
			Females	Male	Total
Mountain	Central Development Region	Dolakha	86.1	86.1	86.1
		Sindhupalchok	95.8	96.3	96.0
	Mid Western Development Region	Dolpa	73.6	75.3	74.4
		Jumla	76.9	77.9	77.4
		Kalikot	9.9	11.8	10.9
		Mugu	70.4	72.2	71.3
	Far-Western Development Region	Bajura	92.5	92.5	92.5
Hill	Central Development Region	Sindhuli	99.1	99.1	99.1
	Mid-Western Development Region	Salyan	27.8	29.0	28.4
		Surkhet	93.3	93.8	93.5
Tarai	Eastern Development Region	Jhapa	91.9	92.1	92.0
		Siraha	99.5	99.6	99.6

Source: CBS and UNFPA/Nepal, June 2002

Fertility rates like Total Fertility Rate (TFR) and Crude Birth Rate (CBR) are available at national (Bourini, 1977; MOH, 1977 and CBS, 1978), at development region and administrative zone levels (Karki, 1984) for different years but not for 2001. Data referring to previous periods are useful to look at the levels and trends over time. This exercise was carried out with a view to fill this gap.

Attempting to influence human fertility behaviour is perhaps one of the most difficult tasks. In the words of Eberstadt (1983) "formulating effective policy to influence human behaviour is difficult in many spheres, but probably nowhere do policy-makers and planners encounter so many problems as when attempting to alter human fertility". Population planning with the objective of reducing fertility level therefore becomes most intractable of planning areas. In order to influence the most sensitive area of human fertility behaviour calls for the clear understanding of various ramifications of social, cultural, economic, psychological, biological and political aspects of human life. It is no wonder that many nations fail to achieve fertility targets.

12.2   Methodology

Because of the paucity of reliable data fertility rates or for that matter any other demographic rates in the context of Nepal, have to be estimated using indirect methods of estimation. Only the 1976 Nepal Fertility Survey data (Goldman et al, 1980), Family Health Survey 1996 (MOH, New Era and Macro International, 1997) and Nepal Demographic and Health Survey 2001 (MOH, New Era and ORC Macro, 2002) were good enough to estimate fertility directly. For this reason, recourse has been taken to indirect methods of fertility estimation techniques to estimate regional level fertility rates in the present work.

A number of indirect methods are currently available for preparing fertility estimates. The methods most often used are the Brass method (Brass and Coale, 1968), Palmore's regression method (Palmore, 1978), Gunasekaran and Palmore method (Gunasekaran and Palmore, May 1984) and own-children method (Cho, et al, 1986). Other methods include "reverse survival" techniques and methods based on stable and quasistable population theory (UN, 1967). Recently many more methods are available among which some that can be cited here are those of Coale, Hill and Trussel (1975), Feeny (1977) and Arriaga (1983).

Brass's method known as the P/F ratio method is widely used in estimating fertility when available data are limited and defective. Underlying the method is the empirical observation that respondents when asked about their fertility are likely to provide reports which contain at least two types of errors: (a) in responding to the question on children ever born, older women commonly omit some births, possibly a high proportion of the dead rather than the living children. Therefore, the average parities of women 45-49 cannot be used to measure the life time fertility (the total fertility rate) without some allowance for this omission; and b) although the information on births in the 12 months preceding the census or survey (referred to as the reference period) gives generally a fair idea of the age pattern of fertility, the level of fertility indicated by the data can be over or underrepresented. This is because the respondents often misunderstand the reference period.

Brass's solution to this problem is to compare the two sets of reports, children ever born and births in the last year by age of mother and to use one set of results to correct the other. This procedure compares lifetime fertility (P- the average parities by age) with current fertility (F) and hence the correction is known as the P/F ratio method. There is, however, one basic assumption of this method, i.e., the fertility level has not changed in the recent past. As regards Nepal's 1971 and 1981 data this assumption still holds true because until mid 1981 Nepalese women's fertility

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behaviour was more or less natural because until then contraceptive prevalence rate was only about 9 per cent (MOH, 1983). That the application of P/F ratio method was still valid is supported by the 1976 fertility survey data, which showed the same TFR as the direct method (Goldman et al, 1980).

For 1991 and 2001 regional level fertility estimates, as there was some evidence of fertility decline in Nepal, the P/F ratio method as described in Manual X (UN, 1983) and further modified by Arriaga (1983) which takes into account declining fertility, was used. Other indirect techniques were not tried for regional analysis as the required types of information for those techniques are not available at regional levels. From the analysis presented in Section 4 here it is also clear that the fertility level arrived at by applying the P/F ratio method is very reasonable.

12.3   Data

The basic data for the present estimates come from Population Censuses of Nepal 1991 (CBS, 1993, Vol. I, Parts III and XII) and 2001. Both censuses contain information on children ever born and births in the last year by age of mothers. These two types of fertility information are suitable to apply the P/F ratio method to estimate fertility.

The problems associated with these fertility data are worth mentioning here. To begin with, age reporting by women is bad. Age exaggeration by older women is common in Nepal which affects fertility level. The second problem is the omission of children ever born. Since contraceptive prevalence was low during the 1980s and the 1990s one would expect much larger number of children ever born than what has been reported in the censuses. Because Nepalese women do not generally recall dead infants or children the omitted infants and children are most likely to be the dead ones. This phenomenon affects both children ever born and births last year data and because of high infant mortality birth data are more extensively affected.

Despite these problems and limitations the present work is an attempt to estimate levels and trends of national and regional fertility in Nepal. The last four censuses (1971, 1981, 1991 and 2001) have made enormous investments in collecting the types of information suitable for the application of indirect methods of fertility estimation. The present work is an effort to add some meaning to the huge undertaking of HMG in collecting data. One wonders about the usefulness of such a massive undertaking if they are not analysed at all.

12.4   Fertility Levels and Trends: National Level

To determine the level of fertility at the national level various methods were applied to the
available data. This was possible because various parameters required to use different methods are
available at the national level. For mid 2001 the Total Fertility Rate arrived at by applying
different methods to the census data are given in Table 12.2. For mid 2001 various methods of
estimation point at TFR slightly less than 4.00 per woman in Nepal. The lowest level is given by
the Rele's method (TFR=3.66) and the highest is given by Gunsekaran and Palmore's regression
method (TFR=3.87). The mean TFR value turns out to be 3.8 for 2001 and this very much squares
with the estimate arrived at by the P/F ratio method.

Table 12.2 :   Fertility level in 2001, Nepal.

Total Fertility Rate (TFR)	Method
3.77	Trussell's method
3.87	Gunasekaran and Palmore method
3.70	Palmore's method
3.66	Rele's method
3.79	Arriaga modified P/F ratio method

The Nepal Demographic and Health Surveys are carried out in Nepal every five years and among
other variables they also collect fertility related information. The researchers involved in
implementing and analysing data from the surveys claim that the data are good enough to estimate
fertility level directly from the responses given by the respondents. Having been convinced of the
reliability of the responses they have estimated TFR for the periods 1993-95 and 1998-2000
directly from the births in the recent past. The direct estimates and their reference periods are
given in Table 12.3. On the assumption that they are right the author has extrapolated the TFR
trend for mid 2001 which comes to 3.88.

Table 12.3 :   Fertility trends based on direct estimates, 1993-2001

Period	Based on DHS Direct Estimates	
	TFR	Mid Point
1993-95	4.64	1994
1998-00	4.10	1999
2001	3.88	2001, Based on linear extrapolation [a]

[a] [4.10-[{(4.64-4.10)/5}*2]] Linear trend

Source :   MOH, New Era and Macro International, 1997 and MOH, New Era and ORC Macro, 2002

However as several studies show once the decline of fertility level is initiated the speed is fast at an early stage and later on it slows down. From mid 1994 to mid 1999 the average annual linear decline was about 0.11. If this is assumed then by mid 2001 the TFR would be 3.8. As stated above, it can be reasonably assumed that it is slightly faster than the trend observed in the recent past. Therefore for mid 2001 the level of TFR was about 3.8 as indicated by the 2001 census data (Table 12.2).

Nepal began setting fertility reduction targets as early as 1965 but they were never met. During the Third Plan (1965-70) period, the target was to reduce the estimated CBR of 39.1 in 1967 to 38.1 in 1971. No such target was fixed for the Fourth Plan (1970-75) period though about 132,000 married couples were to be supplied with family planning services. During the Fifth Plan (1975-80) period, the newly estimated CBR of 40 was to be reduced to 38 by 1980 (Joshi and David, 1983). For 1980, the official estimate of CBR was 42, and the Planning Commission set the target of reducing the official figure to 40 by the end of the Sixth Plan (1980-85) period (NPC, 1981). But the Fertility and Family Planning Survey of 1986 showed CBR of about 39 for 1986 which is a year later than the target year (MOH, 1987). The Seventh Plan (1985-90), as usual, planned to achieve TFR of about 4 per woman by the end of the plan period (NPC, 1986/1987). But the demographic information shows that Nepal's TFR was above 5, although not as high as 6.0, until early1990s (MOH, 1993).

The Eighth Plan (1991/92-1996/97) set the target of reducing TFR from an estimated 5.8 per woman to 4.5 by 1996/97 (NPC, July 1992). The Family Health Survey 1996 showed TFR of 4.64 per woman. The Ninth Plan (1996/97-2001/02) aimed to reduce the fertility level to 4.2 by the end of the plan period. Despite tumultuous political times during the Ninth Plan period and its consequences on the health service delivery the level of fertility was more than achieved as the last Nepal Demographic and Health Survey 2001 showed TFR of 4.1 for the three year-period 1998-2000 (Table 12.3). In addition the fertility level has apparently continued declining and by mid 2001 it is estimated to have declined to 3.8 per woman (Table 12.2).

In this work three types of fertility measures - Age-Specific Fertility Rate (ASFR), Total Fertility Rate (TFR) and Crude Birth Rate (CBR) have been estimated at national and regional levels for both 1991 and 2001 census years.

The fertility levels tempt one to conclude that the birth control programmes did not have much effect on population growth rate until the early 1980s. These programmes were at best successful in checking TFR from rising to a very high level of about, say, 7 or more per woman because estimates of TFRs show consistent rise from about 5.7 in 1961 to well above 6 until early 1980s (Table 12.4). This trend is perhaps due to improvements in general health standards (Langford, 1981). The other possible factor could be increasing co-operation from the people reporting their vital events in the recent past. Further data collection method itself might have improved recently. However, it is quite clear from Table 12.4 that the onset of fertility decline has begun in Nepal, perhaps some where in the early 1980s.

Table 12.4 : Estimates of crude birth rate (CBR) and total fertility rate (TFR), Nepal: 1952/54-2001

Reference Year/Period	CBR	TFR	Method	Source
1952/54	45-50	n. a.	Stable population analysis	Vaidyanathan and Gaige (1973)
1961	47	5.74*	Stable population analysis	Krotki and Thakur (1971)
1971	43	5.83	Brass's P/F Ratio method	Karki (1984)
1976	46.8	6.33	Direct estimate	Goldman, et al (1980)
1981	45	6.39	Brass's P/F Ratio method	Karki (1984)
1986	39	5.75+	Brass's P/F Ratio method	MOH (1987)
1991	39	5.16[@]	Arriaga modified P/F Ratio method	Karki (the present study)
1991	n. a.	5.12**	Arriaga modified P/F Ratio method	MOH (1993)
1993-95	37	4.64[++]	Direct estimate	MOH, New Era and Macro International (1997)
1998-00	33.5	4.1	Direct estimate	MOH, New Era and ORC Macro (2002)
2001	30.5	3.8	Arriaga modified P/F Ratio method	Karki (the present study)

n. a.   Not Available

*   GRR converted to TFR using sex ratio.

+   MOH 1986 survey data corrected for under-reporting.

@   1991 Census data corrected for under-reporting. This estimate is quite robust in that the estimated TFR matches well with Retherford and Thapa (August 1999) estimate of 5.16 for 1990/91.

++   Based on direct estimate.

**   1991 Survey data corrected for under-reporting

12.5   Fertility Pattern

The rate of childbearing starts from zero at about age 15, it rises to a peak in the late 20's, and then tapers off to zero again at about age 49. The age pattern of fertility varies from population to population and in any one population varies from time to time depending on marriage habits, incidence of sterility, the practice of family planning and other factors. However, most of the variation in fertility takes place in the level of this curve rather than in its general shape which remains fairly constant from population to population and from time to time. For instance, as Figure 1 shows the shape of fertility curve is about the same for a high fertility country such as Nepal and that of the low fertility country such as Chile but the difference is noticed in terms of fertility level.

Figure 1: Age-Specific Fertiltiy Rates for Chile and Nepal
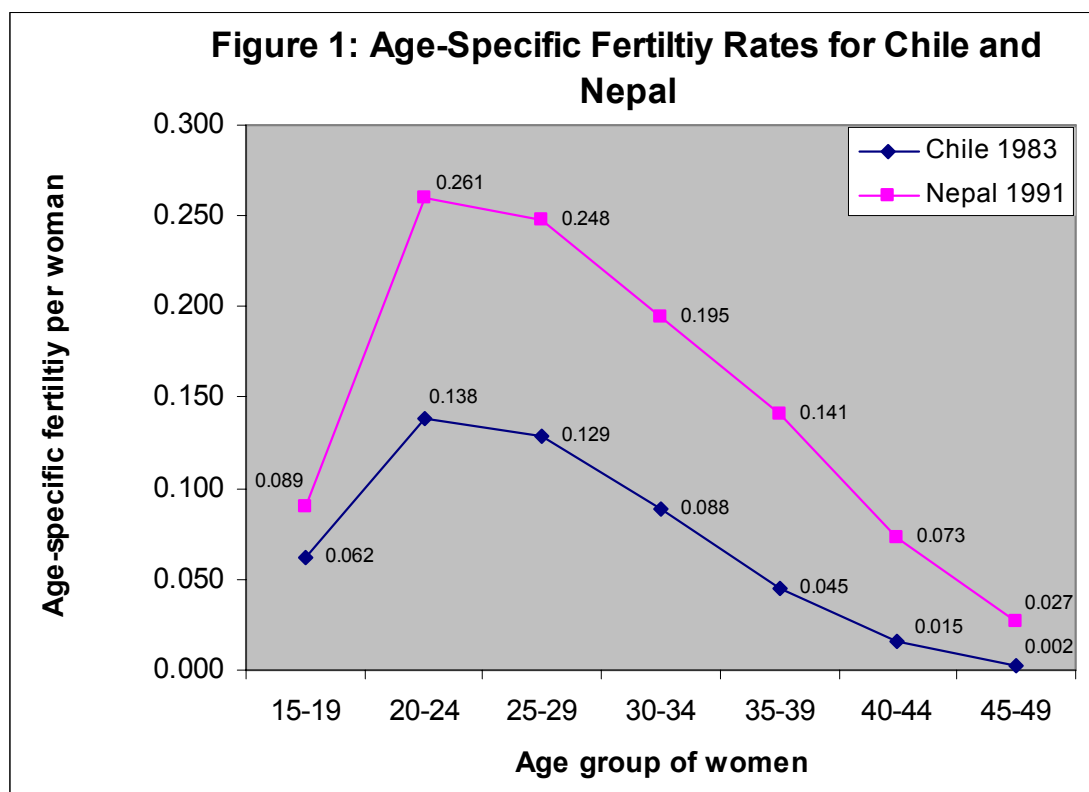
Source :   Arriaga, E. E. Population Analysis with Microcomputers, Vol. I. Bureau of the Census, USAID and UNFPA, November 1994 and the present study.

Within Nepal it is seen that as fertility declines the age pattern of fertility does not change but the level changes. Figure 12.2 shows for all seven age groups the level of fertility has gone down while the age pattern of fertility has remained about the same.

Figure 2: Age pattern of fertiltiy, 1991 and 2001, Nepal
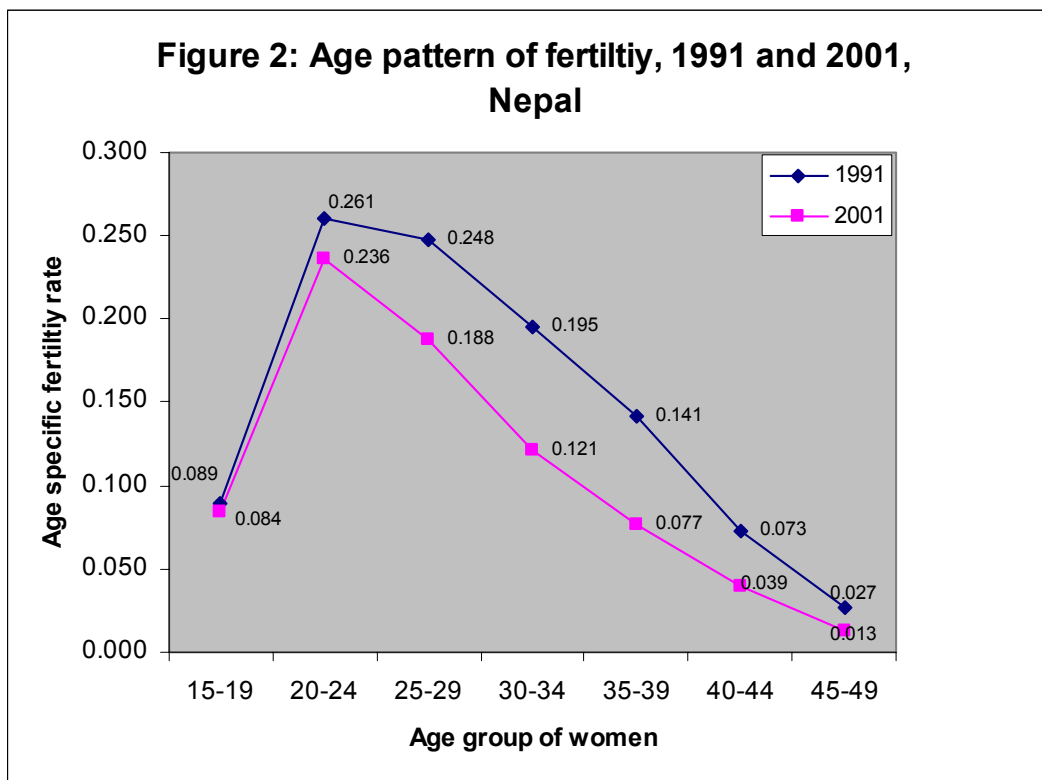
12.6   Fertility Differentials

Differential fertility is the study of fertility differences between specific population groups. Common analyses are by socio-economic group, by religion, by education level, by race, by occupation, by urban/rural region, by wife's work experience and by husband's income. Such analyses are carried out in order to throw light on the causes of reproductive behaviour, to interpret the changes which have taken place in the birth rate and as a guide to changes likely to take place in the future. If, for instance educated persons experience lower fertility, and if the proportions of the population in these classes are increasing, then this could be a factor causing the overall birth rate to fall.

Differences in the fertility of specific population groups arise mainly from three sources, namely, differences in the number of children which couples in the various population groups want, difference in their knowledge, attitude and practice of fertility control which enable them to obtain these desires, and difference due to the demographic characteristics of each population group. The cultural differences in fertility is concerned with the examination of the factors, the 'intermediate variables' of Davies and Blake (1955), through which cultural conditions can affect fertility. These include age at entry into sexual unions, proportion of women never entering sexual unions,

periods of abstinence (voluntary or involuntary), fecundity or infecundity, use of contraception and foetal mortality, etc.

For the present purposes differential fertility is examined with respect to residence ecological belts and development regions as the census data are available for analysing fertility differentials only for these categories.

12.6.1   Fertility by Residence

According to the population census of 2001 about 85.8% of the total population of Nepal resides in rural areas (CBS and UNFPA/Nepal, 2002). In 1971 more than half of the total urban population lived in the three cities of the Kathmandu valley, but by 2001 this proportion had declined to about 30.9%. Now 45.5% of the total urban population lives in the Tarai areas. Although according to the 1991 census of Nepal the proportion of urban population was 9.2% by the end of 1997 this proportion had changed to 12.7% because of the reclassification of some rural areas as urban centres[1] (Bastola, July 2000). Although about 14.2% of the total population is classified as urban residents more than 50% of them do not exhibit urban characteristics.

Urban total fertility rate in Nepal in 2001 based on the census data was estimated at 2.82 per woman (Table 12.5) which is about three quarters of the national TFR of 3.8. In 1991 the urban TFR was 3.4 while the national TFR was 5.2.

Table 12.5 :   Estimates of the age-specific fertility rate (ASFR) and total fertility rate (TFR) by residence, Nepal, 1991 and 2001.

Age Group	Urban		Rural	
	1991	**2001**	**1991**	**2001**
15-19	0.085	0.075	0.089	0.079
20-24	0.212	0.201	0.267	0.243
25-29	0.181	0.146	0.257	0.212
30-34	0.106	0.079	0.204	0.148
35-39	0.058	0.037	0.149	0.126
40-44	0.026	0.018	0.076	0.050
45-49	0.011	0.007	0.028	0.015
TFR	**3.40**	**2.82**	**5.35**	**4.37**

The rural TFR of 4.37 in 2001 (Table 12.5) is about one and a half times the urban TFR. Ten years ago the rural woman on average gave birth to about 5.35 children. It is clearly seen that both in the rural as well as the urban areas the fertility level has gone down in the last ten years. Fewer

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[1]   In 1991 there were 33 municipalities but at the beginning of 1992 an additional 3 areas were designated as urban areas. Further, at the beginning of 1997, 15 more areas were designated as urban and at the end of 1997 still another 7 more areas were designated as urban areas.

younger women under 20 years of age bear children now compared to some 10 years ago. However the peak age of fertility has remained the same. Women belonging to the age group 20-24 are most active in reproduction. The second most reproductively active age group is 25-29 in both rural and urban areas (Table 12.5). It is also seen that compared to the urban women the rural women keep on producing children late in their 40's up to about they are 50 years old.

12.6.2   Fertility by Ecological Belts

Nepal is characterized by three distinct geographic areas running east to west, referred to as the Mountains, the Hills and the Tarai. The Mountain areas range in altitude from 16,000 feet (4880 metres) to 29,028 feet (8848 metres) above sea level and include such mountains as Everest, Kanchanjunga, Makalu, Dhaulagiri and Annapurna. The area accounts for almost 35% of the total land area of the country and according to the 2001 census about 7.3% of the country's 23.2 million population live in this area.

The Hill areas range in altitude from above 1,000 feet (305 metres) to 16,000 feet (4880 metres). The Hills account for 44% of the total land of the country and about 44.3% of the total population. The Tarai areas range from about 200 feet (60 metres) to 1000 feet (305 metres) above sea level and include some of the most fertile land in the country. Slightly over one-fifth of the total land area and about 48.4% of the total population are located in the Tarai.

The high mountain area is sparsely populated and also less developed overall than the other ecological regions. This region is remote and inaccessible. The fertility level in the mountain region has remained high. In 1991 the TFR was estimated at 5.93 (Table 12.6), almost 15% higher than the national rate of 5.16 (Table 12.4) and in 2001 the corresponding figures were 4.57 and 3.79. The mid hill region has the second highest fertility level. The TFR was 5.33 in 1991 and it declined to 3.77 in 2001. The Tarai exhibits the lowest fertility level. The TFR was estimated at 4.72 in 1991 and this level further declined to 3.64 by 2001 (Table 12.6). Most Tarai settlements are accessible by road and every year increasing number of migrants settle there. Socio-economically too the Tarai region is better-off. More than half of urban populations are in the Tarai.

The fertility peaked for the age group 25-29 in the mountain region in 1991 when the level of fertility was nearly 6 per woman but when the level declined by 2001 the peak shifted to younger age group, i.e., 20-24 (Table 12.6). In other regions the peak age of fertility is 20-24. In all ecological belts more than 50% of all births take place in the age groups 20-24 and 25-29. It is

also seen that as the level of fertility declines fertility increasingly concentrates in the age group 20-24.

Table 12.6 : Estimates of the age-specific fertility rate (ASFR) and total fertility rate (TFR) by ecological regions, Nepal, 1991 and 2001.

Age Group	Mountain Region		Hill Region		Tarai	
	1991	2001	1991	2001	1991	2001
15-19	0.068	0.074	0.076	0.054	0.103	0.099
20-24	0.258	0.243	0.260	0.219	0.254	0.235
25-29	0.283	0.223	0.258	0.196	0.228	0.182
30-34	0.250	0.173	0.210	0.137	0.165	0.107
35-39	0.190	0.126	0.158	0.091	0.111	0.061
40-44	0.100	0.055	0.078	0.045	0.058	0.031
45-49	0.036	0.020	0.027	0.012	0.024	0.013
TFR	**5.93**	**4.57**	**5.33**	**3.77**	**4.72**	**3.64**

12.6.3   Fertility Differentials by Development Regions

Nepal is divided into five development regions, which are further subdivided into 14 zones and 75 districts. Each development region spreads from North to South engulfing districts belonging to all three ecological belts. Ecologically each development region is a mini Nepal. In general, the level of social and economic development is the highest in the eastern region, followed by the central region, the western region, mid-western region and the far-western region. However, three big cities of Kathmandu valley belong to the Central Development Region. One would therefore expect lowest fertility in the east and highest in the mid-west and far-west.

In 1991 as shown by Table 12.7 the fertility level in the Eastern Development Region was second lowest (5.00) while for the Central Development Region it was estimated to be the lowest (4.37). Although the highest fertility (6.00) was found in Far-Western Development Region the fertility level in the Mid-Western Development Region (5.96) was nearly as high as that of the Far-Western Development Region. In the Western Development Region the TFR was 5.13 in 1991.

In 2001 fertility levels have come down in all development regions compared to 1991. As in 1991 the lowest fertility was observed in the Central Development Region (3.56) and the highest in the Far-Western Development Region (4.53). The second highest fertility level (4.31) was found in the Mid- Western Development Region and the second lowest (3.60) in the Western Development Region (Table 12.7). In the Eastern Development Region the total fertility rate was 3.68.

Table 12.7 :   Estimates of the age-specific fertility rate (ASFR) and total fertility rate (TFR) by development regions, Nepal, 1991 and 2001.

Age Group	Eastern Development Region		Central Development Region		Western Development Region		Mid-Western Development Region		Far-Western Development Region	
	1991	2001	1991	2001	1991	2001	1991	2001	1991	2001
15-19	0.074	0.071	0.091	0.081	0.078	0.078	0.097	0.103	0.105	0.094
20-24	0.259	0.222	0.231	0.227	0.257	0.241	0.279	0.251	0.295	0.271
25-29	0.251	0.190	0.209	0.177	0.248	0.179	0.279	0.202	0.282	0.220
30-34	0.186	0.122	0.158	0.114	0.194	0.111	0.235	0.144	0.240	0.148
35-39	0.136	0.080	0.109	0.067	0.144	0.065	0.179	0.096	0.164	0.108
40-44	0.069	0.039	0.055	0.034	0.074	0.035	0.089	0.052	0.083	0.049
45-49	0.023	0.011	0.021	0.012	0.029	0.011	0.034	0.015	0.031	0.016
TFR	5.00	3.68	4.37	3.56	5.13	3.60	5.96	4.31	6.00	4.53

The age pattern of fertility is similar in all regions both in 1991 and 2001 in that it peaked in the age group 20-24 except in the Mid-Western Development Region where in 1991 fertility level peaked in both 20-24 and 25-29 age groups (Table 12.7).

12.7   Crude Birth Rates

Crude Birth Rates (CBRs) have also been calculated for 1991 and 2001 census years. These rates are given in Table 12.8. Like TFRs, CBRs are also found decreasing after 1991. In general, high TFR is accompanied by high CBR and low TFR by low CBR but this cannot be true for all areas.

CBR, as the phrase indicates, is only a "crude" measure. It is also affected by the composition of the population as regards age, sex and other characteristics. Thus it can sometimes mislead if used for comparing different populations or the same population at widely different times, because they may vary greatly in their composition. Nevertheless it is a useful measure because a) it is very easy to understand and b) it requires few data and it is easy to calculate. All that is required are the total number of births and the total population.

Table 12.8 : Percentage change of crude birth rates between 1991 and 2001, Nepal and its different regions.

Area	1991	2001	Percent Change 1991-2001
Nepal	38.7	30.5	-21.1
Mountain Region	42.5	33.5	-21.3
Hill Region	39.7	34.3	-13.6
Tarai Region	35.8	29.4	-17.9
Urban	29.9	23.6	-21.4
Rural	39.5	34.2	-13.5
Eastern Development Region	37.8	29.7	-21.5
Central Development Region	33.5	28.8	-13.9
Western Development Region	38.0	29.4	-22.8
Mid-Western Development Region	43.2	42.3	-2.0
Far-Western Development Region	44.2	35.1	-20.5

In 1991 the CBR for the country was estimated at 38.7 which declined to 30.5 by 2001 (Table 12.8). The CBR decline in 2001 compared to 1991 was about 21%. Among the three ecological regions the CBR was the highest (42.5) in the Mountain region in 1991 but by 2001 the Hill region was found having the highest CBR (34.3) although the level of fertility was lower in the hills. By residence, the decline of CBR was higher in the urban areas (21.4%) than in the rural areas (13.5%). Among the five development regions, highest CBR (44.2) was observed in the Far-Western region in 1991 but by 2001 the highest CBR was found in the Mid-Western region (42.3). During the last decade the decline of CBR was very minimal in the Mid-Western region (2% - Table 12.8) although TFR declined by almost 28% (Table 12.7). This indicates that there was heavy out-migration of population from this region to elsewhere. This is the breeding ground of Maoist insurgency and it has been reported that this region was hit hardest by the political insurgency (Karki, 2003).

12.8   Conclusion

It is clear from the above analysis that fertility level in Nepal has declined in the last decade, i.e., from 1991 to 2001. Individual regional level fertility estimates, however, indicate that the pattern of fertility change was not uniform throughout the country. Many factors are responsible for this uneven pattern of fertility change in the last decade.

Traditionally Nepalese society favours high fertility. Children are a symbol of well being both socially and economically. This is evident from the popular saying which goes "may your progeny fill the hills and mountains". Marriage is early and universal. It is a disgrace for a couple, particularly the wife not to have children. High fertility is desired because by producing children, preferably sons, a woman raises her status in the family. She avoids the chance of having a co-wife, makes herself socially eligible to inherit some property from the family, and above all, wins the support and affection from her husband and the other members of the family, particularly the ever-dominating mother-in-law.

Although the fertility level has begun declining, the last census data show Nepal's TFR of 3.8 (Table 12.4), which is by the world standards still high. The high fertility level in Nepal can be attributed to a number of contributing factors that continue to favour high fertility. They include early and universal marriage, desire for sons for both religious (to perform religious rituals) and economic reasons -- immediate economic gains and old age security (Karki, 1982). Besides, various religions while do not prohibit the use of contraception may give a disposition to high fertility. Many also hold the belief that in situations where life offers little but hardship to the majority, sexual pleasure and the joy the children can bring, are one of the few sources of satisfaction.

Age at marriage is one of the major factors influencing fertility change. Among the ever-married women the median age at first marriage has remained at 16 (16.4 in 1991 and 1996 – MOH, 1993 and 1997 and 16.6 in 2001- MOH, 2002). As age at first marriage data at the national level for males and females are not available the alternative to this is to estimate singulate mean age at marriage (SMAM) using never married population by age and sex. The SMAM for males has steadily increased from 19.5 years in 1961 to 22.9 in 2001 and the corresponding figures for females were 15.4 and 19.5. The male female gap in SMAM was 4.1 years in 1961, which has declined to 3.4 by 2001 (Bhattarai, D. P. and Gharty Chhetry, R. K. in CBS, 1995 and Gharty Chhetry, R. K. and Niraula, B. P. - 2002). A study claims that women marrying between 20 and 24 have similar fertility to that of those marrying before age 20; only if the marriage age reached

25 or over would there be a significant reduction of fertility (Das, 1969). Perhaps this is one of the reasons for persistent high fertility in Nepal.

The fertility transition is usually accompanied by some form of 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. Some argue that income to the deprived would initially raise fertility, as they would use the extra income to have more children to gain status in the society. Changing aspirations and opportunities for women who are ultimately enabled to make fertility decisions on their own can perhaps check this.

Using various census and survey data the present study has established a certain fertility trend for Nepal since the 1990s to 2001. Also for the first time, the author has made a sincere attempt to arrive at different measures of fertility for different regions of Nepal using the census data of 1991 and 2001. For the local political leaders also it is very important to be aware of the volume and magnitude of population problem especially that of reproduction and fertility as this is one of the major components of population change.

In this work, the author has attempted to estimate fertility change in Nepal. Applying latest indirect techniques of fertility estimation at the national level, fertility estimates were presented for 1991 and 2001. Fertility levels and trends were also estimated for urban and rural areas, for three ecological belts, and for five development regions. The fertility estimates, which are based on children ever born, births last year and reported age-sex distributions of females from 1991 and 2001 censuses of Nepal, show that fertility in Nepal is declining in the recent past.

The people of Nepal are caught up in economic hardships due to the depletion of natural resource base. This was realised in the early 1970s (Blaikie, et al, 1980) and in 1979 when this author was conducting field work in Nepal. Then the author observed the respondents singling out the deteriorating hill environment and the economic cost of raising children responsible for their hardships; they spoke in support of a shift towards smaller family size if they could. Those families who had good land are now only moderately well off. Inheritance customs continually divide large estates between several sons; thus more sons mean less land for each. Many villagers, therefore, linked the poverty of the people to large family size (Karki, 1982). Apparently the poverty level has not changed since then rather it appears that it has even become worse as the proportion of people living under the poverty line has risen from 37% in 1984/85 to 42% in 1996 (Karki, 2000). However, HMG of Nepal has set the target of reducing the proportion of

population under the poverty line to 30% by the end of the 10th Plan, i.e., by mid 2007 (NPC, March 2003).

In order to reduce poverty in Nepal it is highly important to effectively implement fertility reduction programmes. Studies show that since 1970, developing countries with lower fertility and slower population growth have seen higher productivity, more savings and more productive investment. They have registered faster economic growth. Investments in health and education, and gender equality are vital to this effect. Family planning programmes and population assistance were responsible for almost one third of the global decline in fertility from 1972 to 1994. These social investments attack poverty directly and empower individuals, especially women. They enable choice (UNFPA, 2002).

In Nepal the birth rate can possibly be reduced by carefully designed population policies and programmes that are correctly implemented. These should take into account the experience of other countries with similar problems. What is now needed is the integrated, multidimensional approach, which emphasises literacy, education (particularly for women), lowering infant mortality and providing contraceptives along with follow-ups. Information, education and communication programmes must be reinforced by health or community workers at the village level who can teach the villagers - the involvement of women must be encouraged here. Perhaps at this stage local NGOs can be effective as they can mobilise the community better locally. Even appropriate government policies fail, however, because of administrative inefficiency.

References

Arriaga, E. E. (1994). *Population Analysis with Microcomputers*. Vol. I. Bureau of the Census, USAID and UNFPA.

Arriaga, E. E. (1983). *Estimating Fertility from Data on Children Ever Born by Age of Mothers*. International Research Document, no 11. Washington D. C., United States Bureau of the Census.

Bastola, T. (2000). Urban Population of Nepal. *In Nepal Population and Development Journal*. Ministry of Population and Environment, Kathmandu, Nepal.

Bhattarai, D.R. and G. C., R. K. (1995). Nuptiality Trends, Differentials and Patterns. *Population Monograph of Nepal*. Central Bureau of Statistics, National Planning Commission Secretariat, Kathmandu, Nepal.

Blaikie, P., Cameron J. and Seddon, D. (1980). *Nepal in Crisis, Growth and Stagnation at the Periphery*. Clarendon Press, Oxford.

Bourini, A.K. (1977). *The Demographic Sample Survey of Nepal* 1976. Central Bureau of Statistics, National Planning Commission Secretariat, Kathmandu, Nepal.

Brass, W. and Coale, A.J. (1968). *Methods of Analysis and Estimation*. In William Brass et al, eds. The Demography of Tropical Africa. Princeton University Press. Princeton.

Central Bureau of Statistics (2002). *Population Census 2001: National Report*. National Planning Commission Secretariat, Kathmandu, Nepal.

Central Bureau of Statistics (1997). *The Demographic Sample Survey of Nepal, Third Year Survey 1977-78*. National Planning Commission, Secretariat, Kathmandu, Nepal.

Central Bureau of Statistics (1993). Population Census - 1991. Vol. I, Parts III and XII. National Planning Commission Secretariat, Kathmandu , Nepal.

Central Bureau of Statistics (1993). *Population Census 1991*. Vol. I and Parts I, III, IV and V, National Planning Commission Secretariat, Kathmandu, Nepal.

Central Bureau of Statistics (1984). *Population Census 1981*. Vol. I and Parts I, III and IV, National Planning Commission Secretariat, Kathmandu, Nepal.

Central Bureau of Statistics (1987). *Population Monograph of Nepal*. National Planning Commission Secretariat, Kathmandu, Nepal.

Central Bureau of Statistics (1975). *Population Census 1971*. Vols. I and IV, National Planning Commission Secretariat, Kathmandu, Nepal.

Cho, L.J.; Retherford, R. D. and Choe, M.K. (1986). The Own-Children Method of Fertility Estimation. An East-West Centre Book.

Coale, A. J., Hill, A. G., and Trussell, T. J. (1975). A New Method of Estimating Fertility Measures from Incomplete Data. *Population Index* 41(2).

Das, N. C. (1969). A Note on the Effect of Postponement of Marriage on Total Fertility and Female Birth Rate. IUSSP, International Population Conference, London.

Davis, K. and Blake, J. (1955). Social Structure and Fertility: an Analytic Framework. *Economic Development and Cultural Change*, Vol. 4.

Eberstadt, N. (1983). Recent Declines in Fertility in Less Developed Countries, and What Population Planners may Learn from them. World Development. 8(1), Pergamon Press Ltd.

Feeny, G. (1977). Estimates of Demographic Parameters from Census and Vital Registration Data. Proceedings of the 1977 Mexico International Population Conference, pp. 349-70. Liege: IUSSP.

G. C., R. K. and Niraula, B. (2002). *Major Findings of Population Census 2001*. Kathmandu, Nepal.

Goldman, N., Coale, A.J. and Weinstwein, M. (1981). An Analysis of the National Fertility Survey Maternity Histories. IUSSP, Liege, Belgium. Center, Honolulu, Hawaii.

Gunasekaran and Palmore, J.A. (1984). Regression Estimates of the Gross Reproduction Rate using Moments of the Female Age Distribution. *In Asia and the Pacific Census Forum*. Vol. 11, No. 1. East-West Population Institute, East-West Center, Honolulu, Hawaii.

Joshi, P.L. and David, A.S. (1983). *Demographic Targets and their Attainments the Case of Nepal. National Commission on Population*, Singha Durbar, Kathmandu, Nepal.

Karki, Y. B. (2002). *Assessment of the 2001 Population Census of Nepal and Establishment of Demographic Bases for New Population Projections*. United Nations Population Fund (UNFPA), Country Office, Nepal.

Karki, Y. B. (2000). Population Growth, Poverty and ICPD POA in Nepal. *Population and Development Journal*. Ministry of Population and Environment, Kathmandu, Nepal.

Karki, Y. B. (1992). *Estimates and Projections of Population*, *Nepal: 1981-2031*. Central Department of Population Studies, Tribhuvan University, Kathmandu, Nepal.

Karki, Y. B. (1984). Estimates of Total Fertility Rates for Nepal and its Geographical Sub-Divisions and Administrative Zones 1971 and 1981. National Commission on Population, Kathmandu, Nepal.

Karki, Y. B. (1982). Fertility and the Value of Children: A Study of Rural and Urban Populations in Nepal. Ph.D. Thesis, London School of Economics, London.

Krotki, K. J. and Thakur, H.N. (1971). Estimates of Population Size and Growth from the 1952/54 and 1961 censuses of the Kingdom of Nepal. *Population Studies* 25(1).

Ministry of Health (MOH) (2002). Nepal Demographic and Health Survey 2001.Kathmandu, Nepal and Calverton, New ERA and ORC Macro, DHS+, Maryland, USA.

Ministry of Health (MOH) (1997). Nepal Family Health Survey 1996. Kathmandu Nepal and Calverton, Maryland.

Ministry of Health (MOH) (1993). Nepal Fertility, Family Planning and Health Status Survey, 1991. Kathmandu, Nepal.

Ministry of Health (MOH) (1987). Nepal Fertility and Family Planning Survey Report 1986, First Report. Family Planning and Maternal Child Health Division, Planning Research and Evaluation Section, Kathmandu, Nepal.

Ministry of Health (MOH) (1983). Nepal Contraceptive Prevalence Survey Report, 1981. Nepal FP/MCH Project, HMG and Westinghouse Health Systems.

Ministry of Health (MOH) (1977). Nepal Fertility Survey 1976, First Report. World Fertility Survey. Nepal, FP/MCH Project, Kathmandu, Nepal.

National Planning Commission (2003). *Tenth Plan 2002-2007*. Kathmandu, Nepal.

National Planning Commission (1997). *Ninth Plan 1997-2002*. Kathmandu, Nepal.

National Planning Commission (1992). *Eighth Plan (1992-1997)*. Kathmandu, Nepal.

National Planning Commission (1986/87). *Seventh Plan (1985-90)*, Part I (in Nepali), Kathmandu, Nepal.

National Planning Commission (1981). *Vikas: A Journal of Development*. Kathmandu, Nepal.

Palmore, J. A. (1978). Regression Estimates of Changes in Fertility, 1995-60 to 1965-75, for Most Major Nations and Territories. Paper of the East-West Population Institute, no. 58, East-West Center, Honolulu, Hawaii.

Robert D., Retherford and Thapa S. (1999). *The Trend of Fertility in Nepal, 1961-1995*. Family Health International. Population & Reproductive Health, Research & Technical Services Office, Kathmandu, Nepal.

Rele, J. R. (1987). *Fertility Levels and Trends in India, 1951-81*. Reprints of the East-West Population Institute, Number 217. East-West Center, Honolulu, Hawaii.

United Nations (UN) (1983). *Manual X: Indirect Techniques for Demographic Estimation*. Population Studies, No. 81. New York.

United Nations (UN) (1967). Department of Economics and Social Affairs. *Manual IV. Methods of Estimating Basic Demographic Measures from Incomplete Data*. Population Studies, No. 42. New York.

UNFPA (2002). *The State of World Population 2002*. 220 East 42nd Street, 23rd floor, New York, NY 10017 U.S.A.

Vaidayanathan, K. E. and Gaige F.H. (1973). *Estimates of Abridged Life Tables*, Corrected Age-Sex Distribution and Birth and Death Rates for Nepal. Demography India, 2(2).