CHAPTER III
FERTILITY LEVELS, PATTERNS AND TRENDS

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1. Introduction

Fertility as one of the major components of population change in almost all countries, has greater significance than mortality. It is because that to-day mortality is comparatively low and stable in majority of the countries, whereas fertility varies greatly among different countries (US. Bureau of the Census 1969). Between these two components of population change, the study of fertility is more complicated than mortality (Barclay, 1963). This could be due to various factors including the fact that birth, to a woman, is a recurrent event unlike death. In order to deal with the complexities involved in the measurement and analysis of fertility, various measures have been developed to get the robust estimate of fertility by controlling the extraneous factors which confound its interpretation (Shryock and Siegel, 1976). These methods have been developed for explaining the different quantitative aspects of human reproduction (Campbell, 1960).

In the absence of a reliable vital registration system in Nepal, fertility measures and estimates at the national level are derived from censuses and surveys through different techniques. This has created different estimates for the level of fertility in the past. Taking all these factors into account, it is attempted here to focus on the existing trends and differentials in fertility in Nepal from the past up to the present. As the data on fertility are lacking on its historical trend, an attempt has been made here to analyze the existing fertility trends and differentials from 1952/54 to 1991, wherever applicable.

2. Data Availability and Analytical Techniques

As the vital registration system in Nepal is at its infancy, birth and death data for fertility and mortality analysis should essentially come from the decennial population censuses and the inter-censal demographic sample surveys and other fertility surveys. Since data on vital events available from censuses and surveys are deficient due to under-reporting, it is difficult to estimate their levels and patterns by employing direct techniques. So estimates of fertility in this analysis have been derived through indirect techniques. No internationally comparable data on population and its characteristics existed for Nepal prior to the 1952/54 census. Also, no demographic surveys existed, to provide data on vital events before the nineteen sixties. A health survey that was conducted in

1966 (Gubhaju, et al., 1978) provided estimates of fertility but there were inherent weaknesses in the sample design and methodology. More reliable estimates of fertility were available from the multi-round demographic sample surveys conducted by the Central Bureau of Statistics in 1974-75, 1976 and l977-78; and the Nepal Fertility Survey of 1976 conducted by WFS (UN, 1980).

Even though the population counts in Nepal started as early as in 1911 and thereafter approximately at intervals of 10 years, the first four counts up to 1941 were only absolute counts of the population, and no other information were collected. Internationally comparable census started from 1952/54, and information on female fertility started to be collected from 1961 census onwards (CBS, 1987).

Regarding the quality of birth and death statistics, the under-reporting particularly of children born alive but dead soon after and the omissions in the recording of births as well as deaths at very early ages, are characteristic of the population censuses and demographic sample surveys conducted in Nepal (Chhetry, 1992). Not only the censuses but also sample surveys such as the Nepal Fertility Survey of 1976, Contraceptive Prevalence Survey of 1981 and many other similar surveys, suffer from different types of response biases, necessitating the use of indirect methods for obtaining accurate demographic estimates (Goldman, et al., 1979). Regarding fertility data in censuses, the data on children ever born as well as the data on births of the past 12 months do seem to be underreported (CBS, 1987). Since reporting of births and deaths is likely to be more complete and accurate in surveys than in censuses, the former have played an important role in the establishment of fertility and mortality rates in Nepal. Establishment of trends had, however, been problematic on account of differential completeness and quality levels in the data coming from censuses and surveys.

Questions on fertility were asked of all ever married women 15 to 49 years of age in the 1991 census. Gender-wise data were collected on children ever born, living with mothers, living elsewhere and dead. Further, this distribution was reconfirmed by separately asking the total ever-born children by sex. To ascertain the level of current fertility, all ever married women were asked whether there was any live birth during the past 12 months. If the answer was yes, the sex of the new born baby was recorded. Similar procedure was adopted also in the 1971 and 1981 population censuses in an attempt to obtain information oil cumulative and current fertility.

Indirect demographic techniques and tools including the software packages developed for demographic estimations are employed in this analysis. The techniques for indirect estimations used in this analysis are the P/F Ratio method using Brass and Trussel variants. The fertility packages developed by the East-West Population Institute and the Population Analysis Spreadsheet (PAS) developed by the Center for International Research of the US. Bureau of the Census are also used in the present analysis.

3. Child Woman Ratio: A Measure of Fertility

One of the commonly and widely used and easily understood measures of fertility is the child woman ratio. This ratio is usually computed by dividing the total number of children below 5 years of age by the number of women 15 to 49 years of age (PRB,1978). Also known as fertility ratio, the child woman ratio is a proxy to measure fertility in countries where the vital registration system is either lacking or is very inadequate (Shryock, 1976). Since the numerator of the ratio is based on the survivors of the births, instead of the births, during the five years preceding the census, this ratio is affected by infant and childhood mortality (Barclay, 1963). Even though this ratio provides only a rough approximation of the fertility measure on account of possible under enumeration of children under age 5, it is a useful indicator and is often used in fertility analysis.

Table l: Child Woman Ratio by Development Regions, Ecological Zones and Rural Urban Residence for Nepal, 1981 and 1991

Area	**Child Woman Ratio per Woman**	
	1981	**1991**
Nepal	0.656	0.615
Development Regions		
EDR	0.621	0.585
CDR	0.635	0.590
WDR	0.661	0.615
MWDR	0.720	0.687
FWDR	0.725	0.682
Ecological Zones		
Mountain	0.617	0.632
Hill	0.643	0.610
Terai	0.680	0.617
Rural/Urban Residence		
Rural	0.660	0.630
Urban	0.606	0.478

Source: CBS, 1984, Vol. I, Part 1, Table 5
CBS, 1993, Vol. 1, Part. l, Table 5.

The child woman ratio at the national, regional and ecological zone level is presented above (see Table 1). This table also shows the rural/urban differential during the period 1981-1991.

There has been a declining trend in the child woman ratio during 1981-1991. This could be the result of a decline in fertility during that period. Another cause for this result could, wholly or partly, be the differential completeness in the enumeration of children below 5 years of age in the two censuses. Theoretically, an increase in the infant and childhood mortality could also cause this decline. This possibility may be ruled out in the present case since there is no evidence to support the assumption of increase in infant and childhood mortality in Nepal.

The decline in child woman ratio (CWR) is apparent in most of the sub-areas of the country. Except in the Mountain zone, this ratio has declined in all other ecological zones and development regions. The effect of high fertility as well as the female migration could possibly explain the increase in the ratio in the mountain belts. Of all the regions and zones, 'Terai seems to have achieved the highest decline in the child woman ratio during 1981-1991.

In the decline of child woman ratio, the rural-urban differential is the most significant one - the child woman ratio has substantially reduced in the urban area. The gap between the rural/urban CWR has further widened -- from 0.660 to 0.606 in 1981 and from 0.630 to 0.478 in 1991. This could be due to the actual decline in fertility at a higher rate in urban areas than in rural areas. Another major reason for this decline could be migration of females, particularly of never-married and dissolved-marriage categories to the urban areas.

4. Estimation of Level and Age Pattern of Fertility

There are a number of indices used, to measure fertility. The most common of these is the Total Fertility Rate (TFR). This is a summary index whose age pattern is denoted by the Age Specific Fertility Rates (ASFR). Annual number of births and mid-year population of women, both by age, are the data needed for its computation. Since most Countries do not have reliable vital statistics, different techniques have been developed to estimate fertility measures indirectly using the information either from census or survey (Arriaga, et al., 1992). Presented in Table 2 are the estimates of TFR and ASFR obtained through the application of three methods of indirect estimation, using the 1991 Population Census data.

Table 2: Estimates of Age Specific Fertility Rates and Total Fertility Rate Based on Different Techniques for Nepal, 1991.

Age Group	PF Ratio Method	Arriaga Method	Trussell Method
15-19	0.0955	0.0888	0.099
20-24	0.2744	0.2684	0.274
25-29	0.2578	0.2546	0.258
30-34	0.2008	0.1985	0.201
35-39	0.1458	0.1428	0.146
40-44	0.0744	0.0739	0.074
45-49	0.0277	0.0258	0.027
TFR	5.4	5.3	5.4

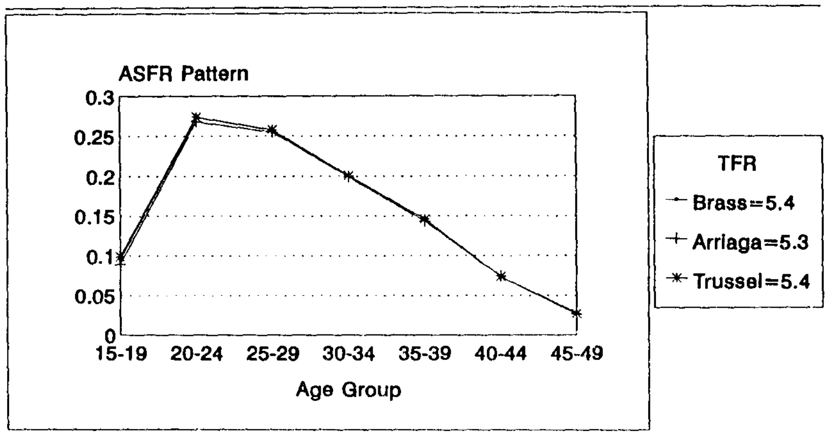
Source: CBS, 1993, Vol. 1, Part XII, Table 40 and 43
UN, 1983, Chapter II B.

The P/F ratio method of Brass and a refinement of the same by Trussel (United Nations, 1983) yield more or less identical estimates of the level of fertility as well as the age pattern. These methods assume constancy of fertility during the years prior to the 1991 census. The Arriaga method (United Nations, 1993) on the other hand takes into account past changes, if any, in fertility. The level of fertility estimated by this method is only slightly lower, represented by a TFR value of 5.3, compared to 5.4 estimated by the other two methods. There is also a remarkable closeness in the age pattern of fertility as shown in Table 2 and Fig.1.

In view of the fact that there is remarkable consistency among the estimates provided by these different techniques, and that the Arriaga method has the additional advantage of recognizing past fertility changes, the results of this method should be acceptable. The reservation, if any, in accepting these results should be on account of other considerations, such as the quality of data used in the estimation.

TFR was estimated to be 6.3 in 1981. The estimate of 5.3 for TFR in 1991 would imply a drop of about 16 per cent in a decade. The contraceptive prevalence (modern methods) increased from 8 per cent in 1981 to 24 per cent in 1991 (FP/MCH, 1993). Contraceptive prevalence being the main determinant of fertility trend, an increase of sixteen percentage points in contraceptive prevalence is not consistent with a sixteen per cent drop in fertility. CPR of 24 per cent seems to imply a TFR value of nearly 5.8[1]. From this point of view, the value of 5.3 for TFR in 1991 appears to be an under-estimate.

Fig 1: Estimates of ASFR and TFR from Different Techniques
Brass, Arriaga and Trussel Methods
Population Census 1991



Source: Same as in Table 2

The reason for under-estimation could possibly lie in the quality of data used. It may be noted that in all the three techniques used for estimation, the data on children ever born are treated as complete and in comparison with this, the under-reported birth data are adjusted. If in fact the CEB data are less than complete, the estimated TFR would be lower than the true value. Usually the CEB data are more complete in a survey than in a census. Hence, in order to determine the true level of fertility, use of survey data should be explored for estimation. The. Nepal Fertility, Family Planning and Health Survey was conducted at about the same time as the 1991 census. Arriaga technique applied to this survey data yielded a TFR of 5.6 in 1991 (Table 3). TFR of 5.6 in 1991 would imply 11-12 per cent drop from the 1981 level of 6.3. This appears to be more consistent with an increase of 16 per cent in the contraceptive prevalence. Thus the level of 5.6 for TFR appears to be closer to the truth and accordingly accepted. The estimates of TFR and ASFR, thus arrived at are shown in Table 3.

[1] IRDI, 1991

Based on the data from Demographic and Health Surveys (DHS), the regression relationship between TFR and CPR is given by (IRDI, 1991):

$$TFR = -.06895\ (CPR) + 7.43671$$

Table 3: Estimates of Age Specific Fertility Rates (ASFR) and Total Fertility Rate (TFR), based on the Population Census, 1991 and Nepal Fertility, Family Planning and Health Survey, 1991.

Age Group	ASFR
15-19	0.095
20-24	0.286
25-29	0.272
30-34	0.212
35-39	0.151
40-44	0.077
45-49	0.028
TFR	5.6

Source: CBS, 1993, Vol. 1, Part XII, Table 40 and 43
FP/MCH, 1993, Table 6.1 and Appendix-F
Arriaga, et-al., 1992, ARFE-2, pp. 73-81.

5. Trends in Fertility:

5.1 Trends in Age Specific Fertility Rates

Age specific fertility rates (ASFR) estimated from data from the three censuses of 1971. 1981 and 1991 along with those obtained from the five inter-censal surveys are shown in Table 4. These sets of ASFR are not only based on various sources of data but also are estimated using a variety of techniques. Recognizing this variety of sources and methodologies, it may be said that there seems to be an appreciable degree of consistency among the schedules of ASFR. The two schedules of 1976 coming from two different surveys, exhibit a remarkable degree of closeness in terms of their age pattern. The 1981 schedule of ASFR, however, needs to be singled out for its deviation in its age pattern from others. The 1981 schedule is characterized by the lowest ASFR in the first three age groups and the highest ASFR in the last three age groups, among all the schedules considered here. The reason for the 1981 age pattern of fertility to be distinctly different from others is not readily known. The distinctive pattern of 1981 along with the similarity of pattern of other years may be seen in Fig 2.

Table 4: Trends in Age Specific Fertility Rates and Total Fertility Rates for Nepal from 1971 to 1991

Age Group	1971[a]	1974/75[b]	1976[c]	1976[d]	1977/78[e]	1981[f]	1986[g]	1991[h]
15-19	0.074	0.116	0.141	0.145	0.130	0.066	0.094	0.095
20-24	0.267	0.270	0.305	0.290	0.294	0.230	0.326	0.286
25-29	0.310	0.297	0.284	0.295	0.294	0.266	0.289	0.272
30-34	0.261	0.260	0.252	0.269	0.252	0.245	0.215	0.212
35-39	0.196	0.169	0.170	0.169	0.180	0.206	0.174	0.151
40-44	0.109	0.089	0.095	0.075	0.072	0.142	0.087	0.077
45-49	0.043	0.050	0.034	0.023	0.024	0.099	0.021	0.028
TFR	6.3	6.3	6.4	6.3	6.2	6.3	6.0	5.6

Source: CBS, 1987, pp. 283-284

a. The Analysis of Population Statistics of Nepal, 1977

b. Demographic Sample Survey, 1974/75

c. Demographic Sample Survey, 1976

d. Nepal Fertility Survey, 1976

e. Demographic Sample Survey, 1977/78

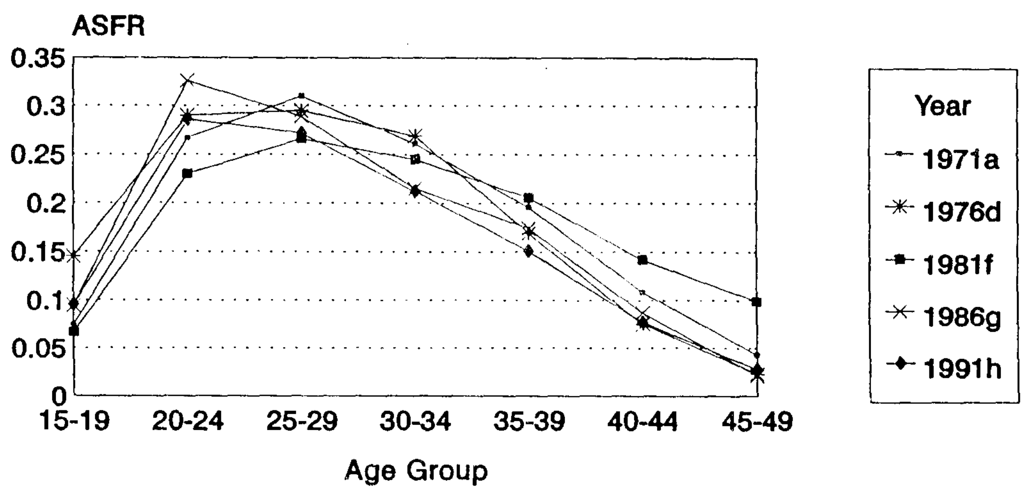
f. Calculated using Arriaga Technique on 1981 population Census data.

g. Nepal Fertility. Family Planning and Health Survey, 1986.

h. Table 3.

Fig 2 - Trends in Age Specific Fertility Rate (ASFR)

1971-1991



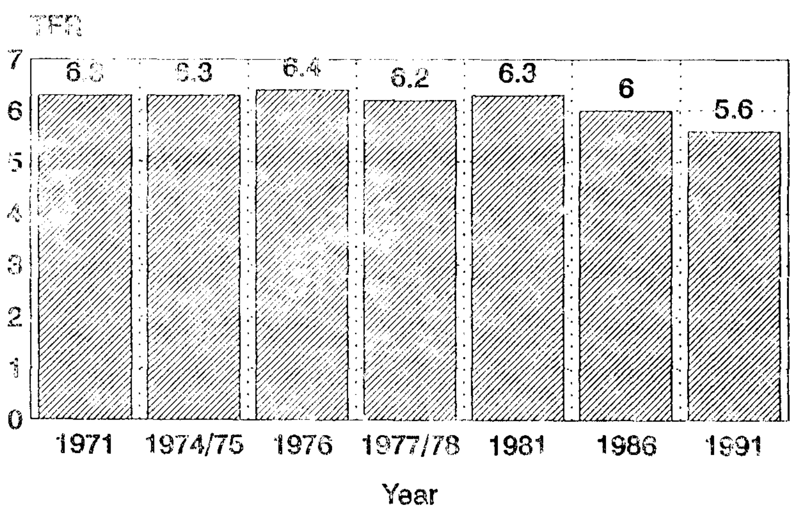
Source:
same as in Table 4.

5.2 Trends in Total Fertility Rate

The Total Fertility Rates (TFR) corresponding to the schedules of ASFR from 1971 to 1991 are also given in Table 4. The TFR is the average number of children that would be born to women during their child-bearing years conforming to the age specific fertility rates of a given year (PRB, 1978). As shown in Table 4, a TFR value ranging from 6.2 to 6.4 in the nineteen seventies as decreased to around 5.6 in the nineteen nineties.

Figure 3 clearly indicates that the TFR had remained almost constant during the period 1971-1981. This phenomenon could be associated with the high level of infant and child mortality during this period. Declines in TFR are evident in 1986 and 1991. These declines have been supported by increments in contraceptive prevalence between 1981 and 1991 as discussed earlier. These findings are significant in the sense that they subscribe to the fact that fertility decline has already started in Nepal.

Fig 3: Trends in Total Fertility Rates (TFR)
1971-1991



Source:
same as in Table 4.

5.3 Trends in Crude Birth Rate

In a country where the reporting of births is fairly good, a direct measure on the level of fertility could be obtained from Crude Birth Rate (CBR). The Crude Birth Rate is the number of live births per 1000 mid-year population in a given year (Shryock, 1976). This measure is simple to calculate and easy to understand; the only problem is the under-reporting of live births in censuses. The problem may be due to the recall lapse on the part of the respondent, proxy interview and failure to report infant deaths, also as live births. Taking all these into account, the CBR does not reflect the true level of birth rate when calculated directly. This necessitates CBR to be estimated applying indirect techniques.

Various estimates exist for CBR during the past forty years, for Nepal. These differ in source of data as well as method of estimation. It may be seen from Table 5, the estimated CBR ranged from as high a value as 47-49 per 1000 population, to as low a value as 41. The CBR estimates consistently show a level of around 45 for the mid-1970s and a level of about 41 towards the end of 1980s. In spite of the fluctuations which are bound to be there when varied sources of data and methods of estimation are involved, the overall trend in CBR is a declining one. This finding is encouraging in the sense that it provides a reconfirmation of the trend exhibited by TFR.

Table 5: Estimates of Crude Birth Rate (CBR) for Nepal, 1952/54 - 1991

Year	Source	CBR
1952/54	United Nations [a]	45.0
1954	Vaidiyanathan and Gaige [a]	48.7
1961	Krotki and Thakur [a]	47.0
1971	United States Bureau of the Census [a]	43.4
	Gubhaju [a]	42.4
	Central Bureau of Statistics (adjusted) [a]	42.0
1974-75	Demographic Sample Survey (adjusted) [a]	44.7
1976	Demographic Sample Survey (adjusted) [a]	45.5
	Nepal Fertility Survey (adjusted) [a]	45.5
1977-78	Demographic Sample Survey (adjusted) [a]	42.6
1981	Central Bureau of Statistics [b]	44.0
	Karki [b]	44.9
	(FP/MCH[b]	42.9
1986	Demographic Sample Survey [c]	40.7
1991	Central Bureau of Statistics [d]	41.6

Source: a. UN, 1980, p.61
b. CBS, 1988, p.43, Table 1.
c. CBS, 1988, p.43.
d. Calculated using the ASF'R pattern generated by Arriaga Technique in Table 3.

6. Regional Variations and Trends in Fertility

6.1 Fertility Variations Among Development Regions

The Regional variations in the total fertility rate for the census years of 1981 and 1991 are presented in Table 6.

Table 6 :Regional Variations in TFR, their Rank and Per cent Change during 1981-1991.

Region	TFR		Rank		% Change in TFR 1981-1991
	1981	1991	1981	1991	
Eastern Dev. Reg. (EDR)	6.6	5.2	1	3	-21.2
Central Dev. Reg. (CDR)	5.7	5.1	4	4	-10.5
Western Dev. Reg. (WDR)	5.9	5.6	3	2	-5.1
Mid-Wrn Dev. Reg. (MWDR)	6.5	6.9	2	1	6.2
Far-Wrn Dev. Reg. (FWDR)	5.7	6.9	4	1	21.1

Source: CBS, 1987, Chapter XI, Table II. 12, p. 271
CBS, 1993, Vol, I Part XII, Table 40 and 43.

Among the different development regions of Nepal, the Eastern Development and the Mid-Western Development Region showed a very high TFR of 6.6 and 6.5 in 1981. The other three regions differed only slightly in their TFR in 1981. In 1991 the highest TFR of 6.9 was attained in the Mid-Western and Far-Western Development Regions followed by Western Development Region with a TFR of 5.6. The lowest TFR values were obtained for the Central Development Region (5.1) followed closely by the Eastern Development Region (5.2).

Table 7: Estimates of Age Specific Fertility Rates and Total Fertility Rates for Nepal by Development Regions, 1981[a] and 1991[b]

Age Group	EDR		CDR		WDR		MWDR		FWDR	
	1981	1991	1981	1991	1981	1991	1981	1991	1981	1991
15-19	0.0834	0.0768	0.0911	0.1018	0.0793	0.0831	0.0880	0.1116	0.0847	0.1202
20-24	0.2496	0.2690	0.2188	0.2713	0.2121	0.2797	0.2262	0.3247	0.1991	0.3443
25-29	0.2939	0.2616	0.2397	0.2437	0.2505	0.2705	0.2587	0.3238	0.2304	0.3265
30-34	0.2575	0.1951	0.2138	0.1823	0.2299	0.2128	0.2482	0.2709	0.2211	0.2763
35-39	0.2098	0.1385	0.1760	0.1248	0.1909	0.1555	0.2160	0.2041	0.1860	0.1893
40-44	0.1389	0.0712	0.1239	0.0658	0.1281	0.0811	0.1566	0.1034	0.1350	0.0971
45-49	0.0824	0.0219	0.0826	0.0239	0.0851	0.0300	0.1030	0.0373	0.0903	0.0354
TFR	6.6	5.2	5.7	5.1	5.9	5.6	6.5	6.9	5.7	6.9

Source: CBS, 1987, Chapter XI, Table 11.12, p.271
CBS, 1993, Vol.1, Part XII, Table, 40 and 43.

a. Estimates for 1981 are obtained from the Population Monograph of Nepal-1987.
b. Estimates for 1991 are obtained using the Arriaga Technique

Between 1981 and 1991 three regions exhibited a drop in TFR whereas in two regions the TFR recorded an increase. As may be seen from Table 6, the greatest drop was in EDR (21.2%) followed by CDR (10.5%) and WDR (5.1%). The increment in TFR was the greatest in FWDR (21.1%) followed by MWDR (6.2%). In the regions exhibiting increase in TFR, it could probably be the improvement in health conditions that have caused an increase in fertility; whereas the decline in TFR could probably be attributed to increase in family planning. At least a part of the trend may be attributed to differential completeness of fertility data in the two censuses. The age specific fertility rates corresponding to these TFR values are shown in Table 7.

6.2 Fertility Variations Among Ecological Zones

The TFR and ASFR estimates for the three Ecological Zones of Nepal are shown in Table 8 for 1981 and 1991. In 1981 the highest (6.2) and the lowest (5.9) TFR values were obtained for the Hill and Terai respectively. In these zones the TFR declined by 1991 to levels of 5.8 and 5.5 respectively. In the case of Mountain the TFR exhibited an increase from 5.9 in 1981 to 6.6 in 1991. Once again, if this was not totally due to an improvement in the reporting of births from 1981 to 1991, it could be on account of improvement in health conditions probably not accompanied by any kind of contraception in this region.

Table 8: Estimates of Age Specific Fertility Rates and Total Fertility Rates by Ecological Zones, 1981 [a] and 1991 [b]

Age Group	MOUNTAIN		HILL		TERAI	
	1981	**1991**	**1981**	**1991**	**1981**	**1991**
15-19	0.0553	0.0763	0.0703	0.0833	0.1108	0.1176
20-24	0.1931	0.2914	0.2193	0.2875	0.2348	0.2987
25-29	0.2468	0.3166	0.2585	0.2825	0.2476	0.2659
30-34	0.2395	0.2803	0.2452	0.2293	0.2141	0.1925
35-39	0.2037	0.2120	0.2057	0.1704	0.1725	0.1291
40-44	0.1462	0.1116	0.1410	0.0865	0.1181	0.0670
45-49	0.0921	0.0382	0.0901	0.0286	0.0780	0.0253
TFR	5.9	6.6	6.2	5.8	5.9	5.5

Source CBS, 1987, Chapter XI, Table 11. 1 I, p.270
CBS, 1993, Vol. 1, Part X11, Table 40 and 43
CBS, 1995, Vol. IV, Table 18 and 20.

a. Estimates For 1981 are obtained from the Population Monograph of Nepal 1987.
b. Estimates for 1991 are obtained using the Arriaga Technique.

6.3 Rural/Urban Differentials in Fertility

The reduction in TFR in the urban area from 5.8 in 1981 to 3.5 in 1991 is more glaring than that observed for the rural area. However, a TFR of 6.4 in 1981, reaching 5.8 in 1991 for the rural areas reflects the prevailing trend at the national level. Even though, both the rural and urban areas have shown declining trend, the per cent reduction is more in the urban areas than in the rural areas. This contributed to an ever-widening gap between rural and urban fertility in Nepal.

Table 9: Estimates of Age Specific Fertility Rates and Total Fertility Rates by Rural/Urban Residence, 1981 [a] and 1991 [b]

Age Group	RURAL		URBAN	
	1981	**1991**	**1981**	**1991**
15-19	0.0794	0.0964	0.0912	0.0822
20-24	0.2466	0.2928	0.2548	0.2247
25-29	0.274	0.2792	0.2549	0.1875
30-34	0.2494	0.2205	0.2083	0.1110
35-39	0.2103	0.1600	0.1567	0.0622
40-44	0.1312	0.0829	0.0936	0.0269
45-49	0.0973	0.0291	0.0965	0.0125
TFR	6.4	5.8	5.8	3.5

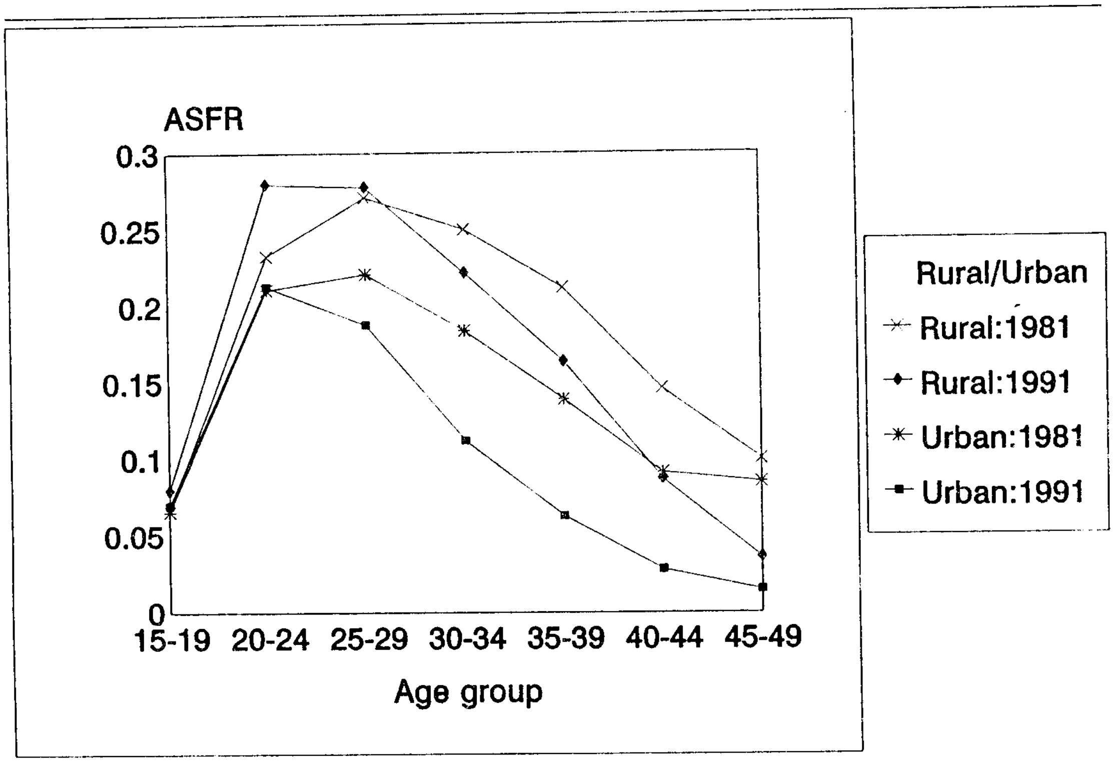
Source: CBS, 1987, Chapter XII, Table 12.6, p.289
CBS, 1993, Vol.1, Part XII, Table 40 and 43
CBS, 1994, Vol. II, Table 10 and 12

a. Estimates of TFR for 1981 are obtained from the Population Monograph of Nepal-1987.
b. Estimates for 1991 are obtained using the Arriaga Technique.

The lower fertility among urban women compared to the rural women is also verified by the NFHS data of 1991. According to this survey the Total Marital Fertility Rate (TMFR) among urban women is 5.3 and that among the rural women is 6.2 revealing a rural-urban difference of nearly I child (FP/MCH, 1993, p.58).

Fig 4: Rural/Urban Differentials in Age Specific Fertility Rates (ASFR)

1981 - 1991



Source: Same as in Table 9.

The changes in ASFR patterns from 1981 to 1991 in rural and urban areas are shown in Fig' 4. In urban areas, the decline in fertility from 1981 to 1991 seems to have essentially come from later age groups while there was very little change in fertility in the age groups of 15-19 and 20-24. In the rural areas, on the other hand, the women who exhibited a decline in fertility are older than those in urban areas and further the younger age groups namely 15-19, 20-24, 25-29 seem to have increased their fertility. This increase, in the absence of contraception, could be to in health conditions. Migration of unmarried young girls from rural to urban areas, if any, could also partly account for this phenomenon.

7. Determinants of Fertility

There are several determinants of fertility. Among them cultural, social and economic factors seem to exert their influence in regulating fertility. Unavailability of data being a constraint, only a few of these factors are considered here. The female age at marriage, literacy, educational attainment, occupation and industry are some of the determinants of fertility obtained from the census data and are examined here. Wherever possible these determinants have been looked into from the point of view of differentials and trends.

7.1 Age at Marriage of Men and Women

Marriage usually takes place at very early ages in Nepal. As the literacy rate in Nepal is low, age at marriage makes a real difference in governing fertility. Some studies have demonstrated that an increase in female age at marriage contributes to a reduction in fertility. This is also true in the case of Nepal, where an inverse relationship between age at marriage and fertility has been observed (Chhetry, 1993). Since data on age at marriage had not been collected in the census, use has been made of an indirect estimate known as Singulate Mean Age at Marriage (SMAM). Following the method proposed by Hajnal (Hajnal, 1953), SMAM has been computed for men and women for 1971, 1981 and 1991 (Table 10).

Table 10: Proportions Single by Age and Singulate Mean Age at Marriage for Nepal from 1971 to 1991

Age Group	1971		1981		1991	
	Females	**Males**	**Females**	**Males**	**Females**	**Males**
10-14	0.866	0.937	0.857	0.851	0.924	0.958
15-19	0.393	0.730	0.492	0.741	0.527	0.794
20-24	0.079	0.331	0.131	0.409	0.128	0.381
25-29	0.026	0.123	0.054	0.195	0.037	0.127
30-34	0.014	0.057	0.031	0.124	0.019	0.052
35-39	0.011	0.033	0.026	0.089	0.013	0.028
40-44	0.009	0.023	0.025	0.080	0.011	0.021
45-49	0.008	0.016	0.029	0.074	0.009	0.016
50-54	0.007	0.014	0.036	0.069	0.009	0.016
Singulate Mean Age at Marriage	16.8	20.8	17.2	20.7	18.1	21.4

Source:- CBS, 1975, Vol. II, Part II, Table 15
CBS, 1984, Vol. II, Table 15.
CBS, 1993, Vol.1, Part XI, Table 34.

As expected, the age at marriage has been increasing over the years. Table 10 depicts a shift in age at marriage between 1971 and 1991- for women from 16.8 years to 18.1 years and for men from 20.8 years to 21.4 years, despite the fact that female marriage still takes place relatively at early ages. The table also indicates that most women (99%) eventually marry. Marriage in Nepal is thus relatively early and universal, a fact which ultimately gives rise to a high level of fertility in a non-contracepting society like Nepal; the current-use rate of modern family planning methods is only 21.8 per cent in 1991 (NPHS, 1993, p.108). In this context an increase in age at marriage should be regarded as significant.

7.2 Educational Differentials in Fertility

The level of fertility declines with increase in educational level of females. The same applies for literacy status. Higher the level of female literacy in a community, the lower will be the fertility. This also implies that the level of fertility should be lower for the literate females compared to the illiterate females.

Table 11: Average Number of Children Ever Born (CEB) per ever Married Women 15-49 Years by Literacy Status and Educational Attainment, 1981 and 1991.

Literacy Status & Educational Attainment	Average no of CEB/ever-married women		Ever Married Women	
	1981	1991	1981	1991
All Total	2.5	2.7	3,935,163[1/]	3,727,732 [2/]
Illiterate	2.5	2.8	3,634,285	3,150,289
Literate	2.1	1.9	300,878	550,393
No Schooling	2.2	2.2	100,759	181,455
Primary 1-5	2.2	1.9	128, 932	125,664
Secondary 6-10	1.9	1.7	49,681	141,024
SLC & Equiv.	1.7	1.6	10,550	43,546
Intermediate & Equiv.	1.6	1.4	5,919	17,617
Graduate & Equiv.	1.4	1.5	3,890	10,343
Post Graduate & Above	1.5	1.5	1,147	2,571
Others	-	1.6		20

Source:- CBS, 1984, Vol. II, Table 17
CBS, 1993, Vol. 1, Part X1, Table 45.

1/ Includes Ever Married Women aged 10-14
2/ Includes literacy not-stated and education level not-stated categories.

Table 11 presents available evidence on average number of children ever-born per ever-married women aged 15-49 in Nepal by literacy and educational attainment derived from 1981 and 1991 censuses. The average number of CEB is lower for literate than for illiterate women, both according to 1981 and 1991 data. The literate - illiterate differential, however, seems to be greater in 1991 than in 1981. An overall increase in the contraceptive prevalence is likely to influence the literate fertility to a greater extent than the illiterate fertility. The increasing level of education does seem to be related to decreasing level of fertility. There is good deal of consistency in this relationship both in 1981 and 1991.

The negative relationship between women's education and fertility have also been established from the NFHS 1991 survey. Confirming the relationship, the Total Marital Fertility Rate (TMFR) among women with secondary level of education is lower (4.0) than among women with no education (6.2). A difference of 2 children indicates that there exists a significant differential in fertility of women with some education and no education (NFHS, 1991, p.58).

It may be noted that the relationship of fertility with education in this section and with Occupation and Industry in Sections. 7.3 and 7.4 are only bivariate relations. No adjustments were made for differences in the distributions by age, duration of marriage etc.

7.3 Occupational Differentials in Fertility

An interesting phenomenon is revealed when we look into the differential by type of occupation pursued. Females in different occupations are found to have different fertility levels as shown in Table 12. This could be due to the social status given to the occupation itself and the time available to working women for raising children.

When differentials by occupations are considered the mean number of CEB per ever-married woman is highest for the Farm and Sales workers. Similarly the lowest fertility is observed among the professional, administrative and clerical workers. This means that the fertility level of white collar female workers is lower than that of other groups. It may be emphasized that the difference in fertility between the white collar and blue collar occupation groups of women is quite substantial, the corresponding levels being 1.6 and 2.7.

Table 12: Average Number of Children Ever Born (CEB) per Ever Married Women 15-49 Years by Major Occupation Group, 1991.

Major Occupation Group	Average no of CEB/ever-married women 1991	Ever Married Women 1991
All Occupations	2.7	1,989,608[1/]
Professional & Tech. Workers	1.6	14,402
Administrative Workers	1.6	1,509
Clerical Workers	1.6	5,943
Sales Workers	2.7	38,197
Service Workers	2.4	76,321
Farm & Fish Workers	2.7	1,796,439
Production & Labor Workers	2.3	35,835
Other Occupation	2.1	16,713

Source: CBS, 1993, Vol. 1, Part Xll, Table 46.

1/ Includes Occupation not-stated group.

7.4 Fertility Differentials by Industry

Average number of CEB per ever-married women by major industry division is presented in Table 13. The higher average CEB of 2.7 is exhibited by women engaged in agriculture, forestry and fishing as well as commerce (presumably petty trade). The lowest average CEB of 1.5 is obtained for women working in electricity, gas, water and transport & communication. The two categories of industries associated with the lowest and the highest fertility are probably reflecting the white and blue collar jobs respectively.

Table 13: Average Number of Children Ever Born (CEB) per Ever Married Women 15-49 Years by Major Industry Division, 1991

Major Industry Division	Average no of CEB/ever-married women 1991	Ever Married Women 1991
All Industries	2.7	1,989,608[1/]
Agriculture, Forestry & Fishing	2.7	1,797,616
Mining & Quarrying	2.4	349
Manufacturing	2.1	19,195
Electricity, Gas & Water	1.5	573
Construction	2.2	2,678
Commerce	2.7	46,717
Transport & Communication	1.5	1,433
Finance & Business Service	1.8	2,334
Personal & Community Service	2.3	107,200
Others	1.4	1,352

Source: CBS, 1993, Vol. 1, Part XII, Table 47.

1/ Includes Industry not-stated group.

8. Social and Demographic Factors in Regional Fertility Variations

It has been observed in the above analysis that regional differentials in fertility exist in Nepal. These differentials must be a result of an interplay of a number of socio-economic and demographic variables operating in these regions. In Table 14, three variables have been presented along with a few socio-demographic variables for each of the development regions, ecological zones and rural/Urban areas.

Table 14: Measures of Fertility, Nuptiality and Literacy by Development Regions, Ecological Zones and Rural-Urban Residence, 1991

Area	Fertility Measures			Nuptiality Indicators for females		Literacy		Sex Ratios
	CWR	CBR	TFR	Mean Age at Marriage	Proportion Currently Married	Both Sexes	Females	
Nepal	.615	39.5	5.6	18.1	.814	39.3	24.7	99.5
Development Region								
EDR	.585	36.8	5.1	19.2	.771	44.0	29.1	100.5
CDR	.590	36.4	5.0	17.7	.832	43.7	30.6	103.7
WDR	.615	38.8	5.5	18.0	.812	43.7	30.6	93.4
MWDR	.687	46.9	6.8	17.6	.826	31.7	16.1	99.2
FWDR	.682	49.1	6.9	16.9	.855	31.9	13.1	96.0
Ecological Zone								
Mountain	.632	44.7	6.6	18.6	.789	32.9	16.3	98.4
Hill	.610	40.8	5.8	18.9	.775	43.6	28.3	95.3
Terai	.617	39.1	5.4	17.0	.858	36.3	22.6	103.9
Rural/Urban								
Rural	.630	40.4	5.8	17.9	.848	36.5	21.8	98.6
Urban	.478	29.2	3.5	19.6	.681	66.4	54.3	108.4

Source: CBS, 1993, Vol.1, Part 1, Table 5; Part X, Table 30; Part XI, Table 34; Part XII, Table 40 and 43.

As shown in Table 14, the variables, namely, CWR, CBR and TFR are the fertility indicators; where as female mean age at marriage, proportion currently married among females aged 15-49 and sex ratio are taken as the demographic variables; and the literacy rate represents the social status. From the levels of the three fertility indicators, it is obvious that the Mid-Western and Far-Western regions enjoy the highest fertility among all the regions. In these two regions, the mean age at marriage is lower, proportion currently married higher, overall literacy and female literacy lower and sex ratio lower than in the other regions. Similarly the two regions namely EDR and CDR which possess lowest fertility among all the regions are characterized as having higher mean age at marriage, lower proportion married, higher literacy and higher male to female ratio than other regions.

Among the three ecological zones, the highest fertility seems to be in Mountain zone which is characterized by the lowest level of literacy and low male - female ratio. The level of fertility in Terai is the lowest, but this is not fully explained by the nuptiality and literacy variables; since in this zone, the age at marriage is the lowest and proportion married the highest among the three zones. Even the literacy level is not the highest; only the sex ratio is the highest.

The lower fertility in urban areas than in rural areas is explained by a higher age at marriage, lower proportion married, higher literacy and higher sex ratio in urban than in rural areas.

The consistency of relationship between the level of fertility and the levels of socio-demographic variables is remarkably high in the case of the development regions and rural/urban areas. There is less consistency in the case of geographic regions. This may be on account of the limited number of explanatory variables considered here. There are probably other variables, not considered here which would explain the fertility differentials in the ecological zones.

9. Conclusion

The history of censuses and surveys in Nepal is not very old. This has created difficulty in studying the level, trend and differentials of fertility on a long time basis. However. the available data front censuses and other demographic surveys gives a reasonably consistent set of estimates on the level of fertility, its trend and differentials.

The analysis shows that a decline in fertility has started in Nepal and that it is supported by a concomitant increase in the contraceptive prevalence rate.

Socio-economic differentials in fertility do seem to exist and these are mostly in the expected direction. Fertility seems to vary inversely with literacy and the level of education. White collar and blue collar occupations of women are characterized by lower and higher fertility respectively.

Rural-urban and Regional variations in fertility also exist in Nepal. Variables such as age at marriage, proportion of women currently married, overall and female literacy levels, and sex ratio of the population do seem capable of explaining regional variations in fertility to a very great extent.

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