CHAPTER I
AGE SEX DISTRIBUTION OF POPULATION

- *Bishnu Dass Singh Dangol*

1. Introduction

The Population Census of 1991 was the ninth in succession after the "1911 Population Census", which according to the official records was the first population census in Nepal. Censuses were conducted in 1920, 1930 and 1941 at intervals of about 10 years. The information collected in these earlier censuses were very limited and included only head-counts. Modern methods of census-taking were adopted in the latter censuses. The 1952/54 census had collected not only demographic data, but also social and economic statistics. The main draw-back in the 1952/54 census was that, it was not conducted at one point in time. The eastern part of the country was covered in 1952 and the western part in 1954. These two sets of data were combined to provide the total data for the whole country. In view of the problem of time-reference with the 1952/54 census, it would be appropriate to treat the 1961 census as the first scientific census conducted in accordance with the international definition of `Census'. The subsequent censuses were all conducted ten years apart, namely, in 1971, 1981 and 1991; a feature which greatly helps in the analysis of age and age-related data in the censuses.

2. Population Size and Growth Rate

Size of population at various censuses since 1911 and the corresponding inter-censal population growth rates are presented in Table 1.

The data in Table 1 show that there was a decline in the absolute size of population from 5.6 million in 1911 to 5.5 million in 1930, with a relatively small decline between 1920 and 1930. The real reasons for this population decline during the period 1911 to 1930 are not known. However several writers (Bal Kumar et.al.,) had claimed that the decline in the absolute size of population is attributable to: (a) world wide influenza epidemic in 1918 and (b) the heavy casualties suffered by the Nepalese army in the first world war. Besides these reasons, there may also have been problems of under-counting in these censuses. Censuses prior to 1952/54 used to be conducted by landlord's agents. The task of enumeration was not their main work. Further, they were neither trained nor supervised in data collection. Thus the population growth rates during 1911-1920, 1920-1930, 1930-1941 and 1941-1952/54 should not be taken seriously as they had been suspected for the degree of completeness of their counts.

Table 1 : Population size and Growth Rates, Nepal, 1911-1991.

Year	Population	Intercensal change in population	Average Annual Growth rate (%)*	Doubling time (years)
1911	5,638,749	-	-	-
1920	5,573,788	- 64,961	-0.13	-
1930	5,532,574	- 41,214	-0.07	-
1941	6,283,649	+ 751,075	+1.16	60
1952/54	8,256,625	+1,972,976	+2.30	31
1961	9,412,996	+1,156,371	+1.65	42
1971	11,555,983	+2,142,987	+2.07	34
1981	15,022,839	+3,466,856	+2.66	26
1991	18,491,097	+3,468,259	+2.10	33

• Geometric Growth Rate

Source: CBS, 1958, Table 2
CBS, 1968, Vol. III, Part 2, Table 2
CBS, 1975, Vol. I, Table 5
CBS, 1984, Vol. II, Table 4
CBS, 1993, Vol. I, Table 5

Analysis of the census results from 1952/54 to 1991 shows that the population growth rates do not follow unidirectional trend but remain around 2 per cent per annum. The population growth rate of 2.66 per cent per annum observed during 1971-1981 is exceptionally high. Such high growth rate could be attributed to significant decline in mortality with persisting high level of fertility in Nepal during the decade 1971-1981. In addition, the return of the Nepalese persons staying abroad could be another factor in the swelling of population in 1981. It should be pointed out that there is no hard evidence to pinpoint the exact-cause. In comparison to the growth rate found in 1971-1981, the growth rate of 2.10 per cent per annum observed during 1981-1991 seems to be unrealistically low. This suggests a possible decline in fertility and a considerable volume of out-migration of people from the country during 1981-1991.

Further Investigation shows that there has been an increasing number of out migrations to countries other than the traditional out migration to India. For example it was reported that about 300,000 ordinary (Green) passports were issued by the Ministry of External Affairs during 1983-1991. It may be argued that, one can not treat all such green passport holders to be out migrants, since only a few may be intending to out migrate. Most of these, if not all, may have out migrated by the time of 1991

census. Further evidence comes from the fact that 658,290 persons were found absent from their households in the 1991 census as against 402,977 in 1981. The exclusion of army barracks and police quarters from enumeration in 1991 could be another cause. At the same time, since these people were supposed to be enumerated from their barracks, they were probably excluded from their households as per the instruction given to enumerators. Due to all such factors, the growth rate seems to have declined drastically during the 1981-1991 decade.

The Post Enumeration Survey (PES), designed to evaluate the 1991 census data-quality in terms of completeness of coverage, estimated an under-count of about 11 per cent in 1991 (Natarajan, 1993). Adjustment for 11 per cent under-count would make the adjusted 1991 population equal to 20.78 million, resulting in 1981-1991 average annual growth rate of well over 3 per cent. Such a high growth rate can hardly be explained by the inter-censal Birth and Death rates and international migration. The results of the Post Enumeration Survey were not accepted for a number of reasons including the timing of the conduct of PES and the tremendous problems encountered in the matching of the census and the PES records[1].

Doubling times calculated on the basis of inter-censal growth rates of population since 1952/54 are also shown in the Table 1. The fluctuations in growth rates are again reflected in the doubling times. If the 1981-1991 growth rate is any indication of the future growth of population, it appears that the country's population would double in a little over thirty years.

3. Sex Composition of Population

To study the sex composition of the population, two basic measures are taken into consideration. These are (1) Sex ratio and (2) Masculinity proportion

[1] The census date was 22 June 1991. The PES was planned to be completed by August 1991, but the revisiting in the field to reconcile the differences was actually completed by April 1992. The results of the matching show that, there were more households, missed by the PES than the census - 1,409 against 1,070 in rural and 887 against 597 in urban areas. Similar was the case with individuals in the enumerated households - in rural, PES missed 880 cases whereas census missed 418; and in urban, PES missed 453 while census missed 136.

Table 2 : Sex Ratio of Total Population in Censuses, 1952/54-1991, Nepal.

Year	Sex Ratio (M/F)x100*	Masculinity proportion (M/T)x100*
1952/54	96.80	49.19
1961	97.28	49.25
1971	101.37	50.34
1981	105.02	51.22
1991	99.47	49.87

* Where M,F and T are respectively the Male, Female and Total Population.

Source: CBS, 1958, Table 2, p.60
CBS, 1968, Vol. II, Part III, Table 2
CBS, 1975, Vol. I, Table 6
CBS, 1984, Vol. I, Table 4
CBS, 1991, Vol. I, Table 5

Table 2 indicates that most of the time females in Nepal slightly outnumbered males mainly because, adult males used to go abroad, mostly to India in search of livelihood. The sex-ratio, defined as males per 100 females was 96.80, 97.28 and 99.47 respectively in the censuses of 1952/54, 1961 and 1991. Accepting the general finding of more male births than female births, and a long existing higher risk of death to females than males in the country, such low sex ratio is hardly possible unless there has been a large volume of male emigration. However, in the 1971 census, for the first time, more males than females were counted. A similar but more pronounced situation prevailed in 1981 census with larger number of males than females (CBS, 1987, p. 43). One of the reasons for increased sex ratio in 1971 and 1981 could be the return of the Nepalese males from abroad during the decade 1971-81, owing to decline in the job opportunities abroad. However a sudden increase of more than 4 points in the sex-ratio in 1971 (from 97.05 to 101.32) and a further increase of about 4 points, a decade later in 1981 (from 101.32 to 105.02) is largely left unexplained since no authentic evidence/statistics, except some speculation, are available which could explain such drastic changes. The fall in sex ratio in 1991, as stated earlier, could be due to exodus of male population for work outside the country.

Table 3 shows that at all ages beyond 10, the sex ratios in 1971 and 1981 were higher than the corresponding values of 1952/54 and 1961. This seems to support the earlier contention regarding the return of the Nepalese males from abroad during this period. It may further be observed from the table that at the retirement ages, the sex ratios of 1981 are even higher than those of 1971 pointing to the greater return-migration of the retired males. The lower sex ratios particularly at working ages in 1991 compared to the earlier censuses is again in support of the belief that there probably was a male exodus from the country during the 1980s. Thus it appears, there was

significant volume of males who migrated out for work during 1952/54 to 1961 and the stream reduced during the period 1961-1971 and 1971-1981, but again became much more pronounced during 1981-1991. The higher sex ratios at old ages compared to earlier ages are reflective of the phenomenon, namely, male migrants generally return home to join their families during their retired life.

Table 3 : Sex Ratio by Five Year Age Groups, Nepal, 1952/54-1991.

	Year				
Age groups	**1952/54**	**1961**	**1971**	**1981**	**1991**
00-04	98	98	94	106	103
05-09	103	103	103	104	104
10-14	114	114	118	117	108
15-19	102	102	110	110	96
20-24	88	86	93	91	85
25-29	89	90	96	96	89
30-34	89	91	91	92	92
35-39	100	104	108	107	101
40-44	89	89	98	100	95
45-49	102	101	114	114	104
50-54	92	92	104	115	106
55-59	102	100	107	119	116
60+	89	83	92	111	103

Source: CBS, 1958, Table 2,
CBS, 1968, Vol. III, Part II, Table 2
CBS, 1975, Vol. I, Table 6
CBS, 1984, Vol. I, Table 4
CBS, 1991, Vol. I, Table 5

4. Age Data and its Accuracy

Age structure of the population is vital to planning of economic and social development. The importance of census data on age is even greater when vital statistics data from registration system are not available and population growth components have to be estimated indirectly from the age distributions.

The single year age distribution from 1991 census, is shown in Fig. 1 for males and in Fig. 2 for females and a comparison of the male-female age distribution in Fig. 3. The saw-toothed appearance in the case of both male and female age distribution clearly suggests heaping of population at ages ending in certain digits. The digits 0 and 5 seem to be the most preferred ones. A certain degree of preference also seems to exist for the digits 2 and 8. Although digit 5 in general is a preferred digit, age 15 as may be seen from Table 4 appears to be free from the digit preference effect. Per cent

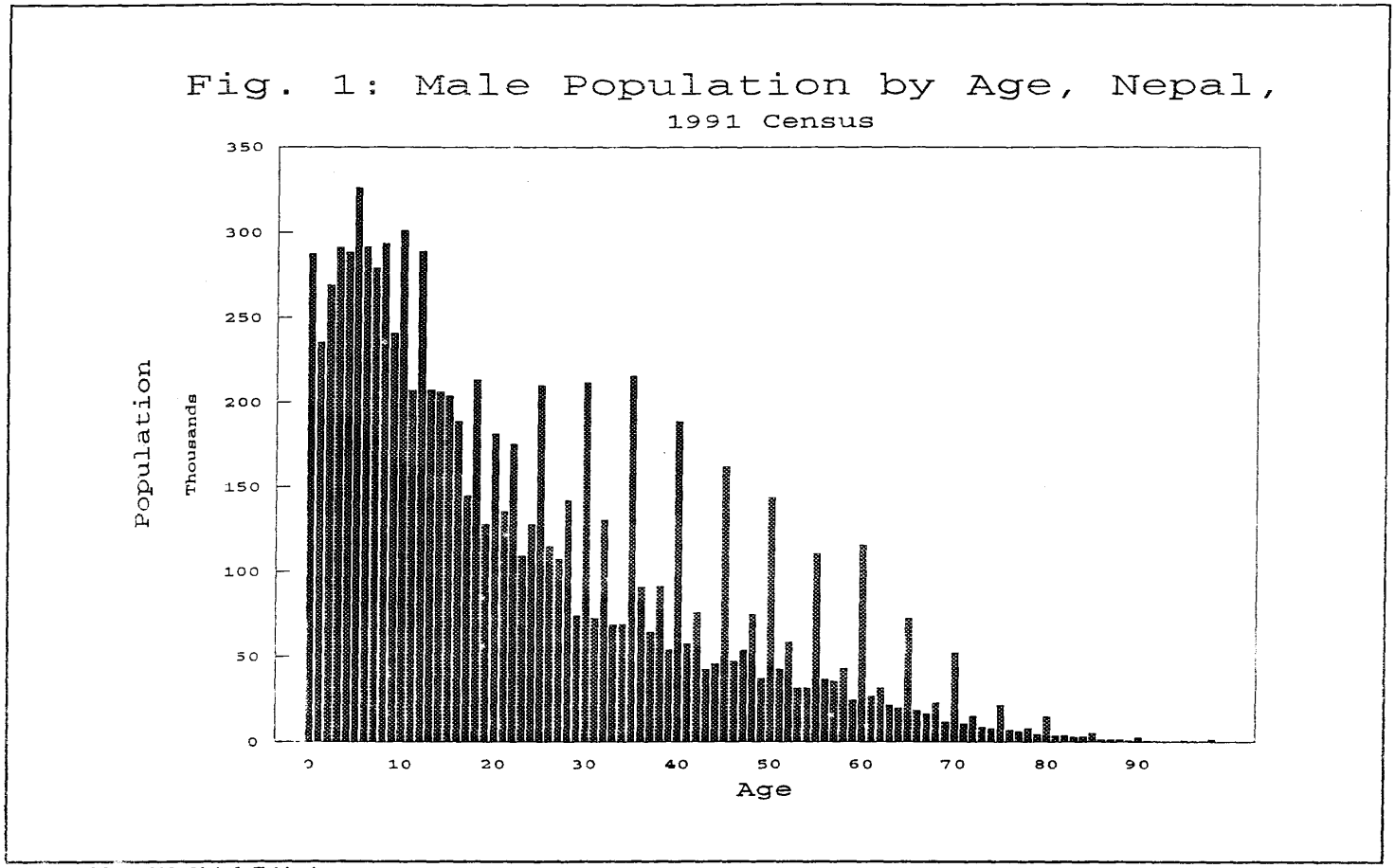
population at ages 14, 15 and 16 suggests that age reporting around 15 is relatively more accurate than at other ages. Passage from childhood, educational mile-stone of matriculation etc. occur around age 15 and people may be more aware of their exact age when they reach this age range.

Table 4 : Per cent Total Population by Single Years up to Age 20, by Sex, Nepal 1971-1991.

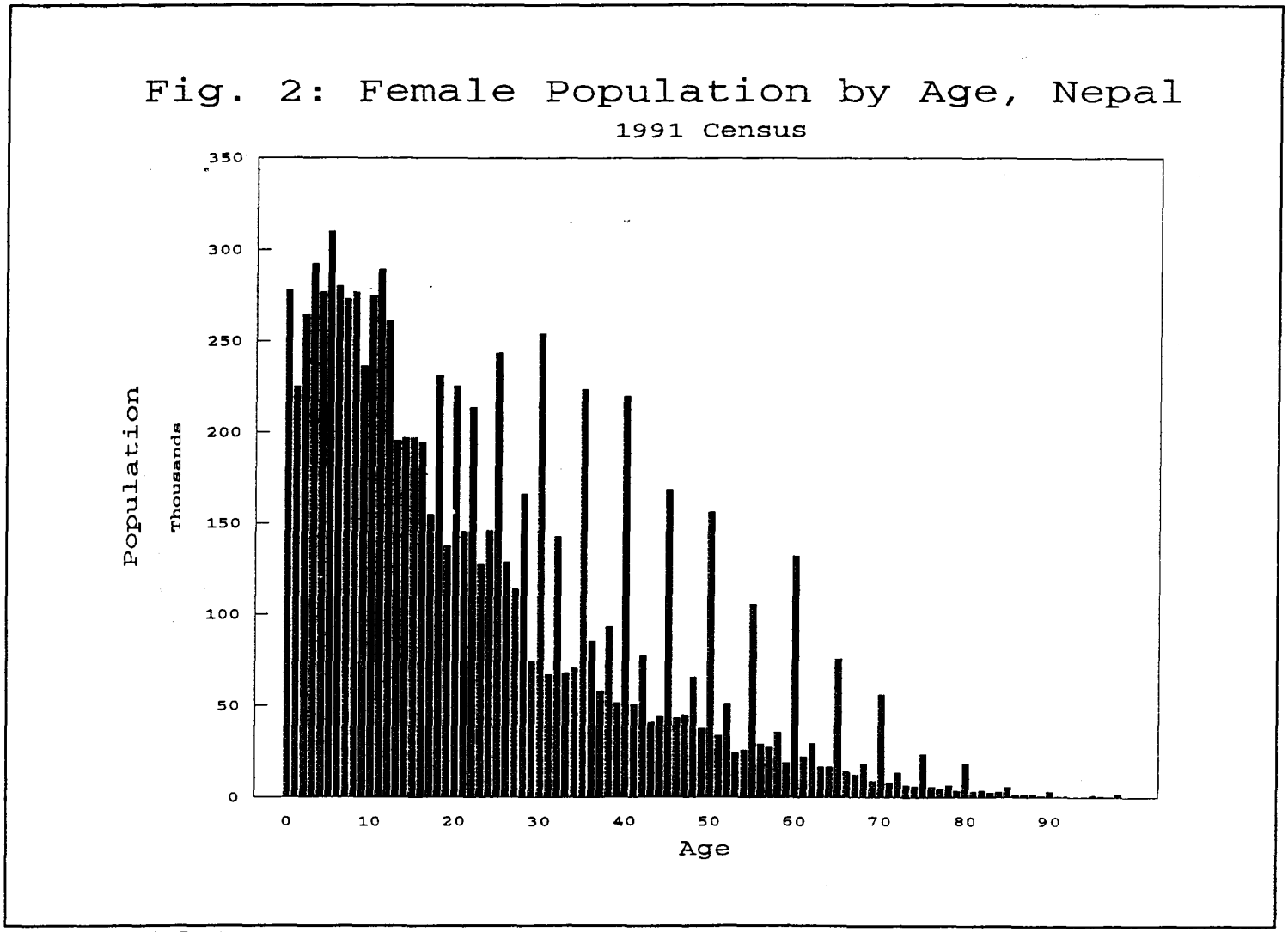
Age	1991		1981		1971	
	Male	Female	Male	Female	Male	Female
0	3.12	3.00	2.30	2.67	2.48	2.55
1	2.55	2.43	3.42	3.06	2.26	2.39
2	2.92	2.85	3.21	3.30	2.87	3.17
3	3.16	3.15	3.06	3.24	3.12	3.56
4	3.13	2.98	3.08	3.07	2.86	3.03
5	3.54	3.34	3.53	3.51	4.04	4.06
6	3.16	3.02	2.93	3.04	2.73	2.74
7	3.02	2.95	2.72	2.87	2.76	2.88
8	3.18	2.98	3.01	2.89	3.03	2.73
9	2.61	2.55	2.32	2.35	2.66	2.54
10	3.27	2.97	3.20	2.85	3.26	2.69
11	2.24	2.04	1.83	1.69	1.87	1.70
12	3.12	2.02	3.00	2.61	3.12	2.48
13	2.24	2.11	1.84	1.70	1.82	1.63
14	2.23	2.12	2.09	1.91	2.02	1.85
15	2.21	2.12	2.03	1.84	2.42	2.06
16	2.04	2.06	2.12	1.95	2.06	1.86
17	1.57	1.67	1.36	1.34	1.32	1.32
18	2.31	2.49	2.29	2.26	2.44	2.33
19	1.39	1.48	1.25	1.24	1.18	1.14
20	1.97	2.43	2.13	2.69	1.97	2.32

Source: CBS, 1975, Vol. I, Table 6
CBS, 1984, Vol. I, Table 4
CBS, 1993, Vol. I, Table 4

It is also noticed from Table 4 that population under one is less than the population one year of age in 1981. Such a short fall in the number of infants in 1981 is not supported by the constant fertility level and declining trend of infant mortality over the years. So the infant population must have been either under reported or reported wrongly as more than one year of age in 1981 census. It does not mean that infants have been reported completely in the censuses other than the 1981 census. It should be borne in mind that although infants are apparently relatively better-reported in 1991 than in the earlier censuses, the infants however, have always been traditionally under reported. The degree of under-reporting of this group of people in 1991 may not be of the same magnitude as that in the earlier censuses. This type of improvement in the completeness of reporting of infants in the1991 census may be attributed to improvement in the enumerator-quality i.e.employment of school teachers for enumeration.

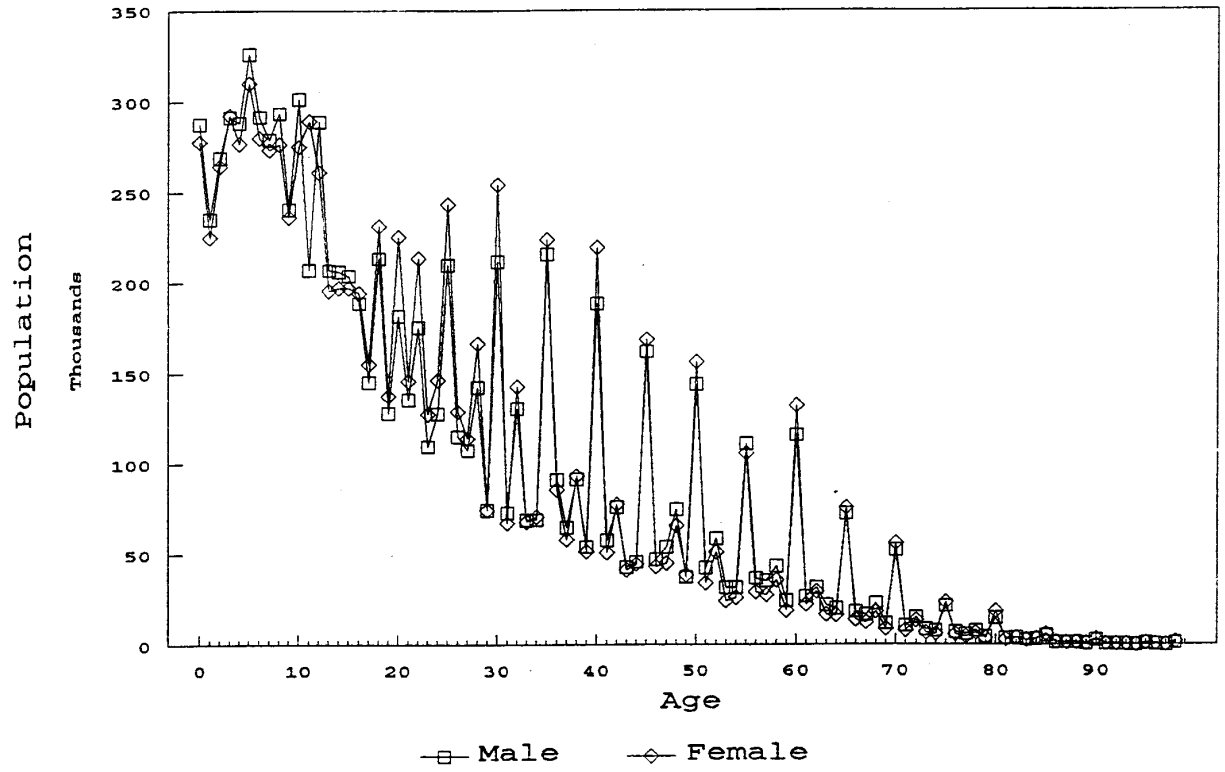


Source: CBS, 1993, Vol. I, Table 4.



Source: Same as for Fig. 1.

Fig. 3: Age Distributions of Population by Sex, Nepal, 1991 Census



Source: Same as for Fig. 1.

Table 5 : Myer's Index of Digit Preference by sex for Census Years 1971-1991, Nepal.

Digits	Male			Female		
	1971	1981	1991	1971	1981	1991
0	10.7	12.7	7.5	13.8	14.8	9.6
1	-3.7	-4.0	-2.7	-4.0	-4.3	-3.4
2	1.2	0.7	0.8	0.7	0.6	1.0
3	-4.8	-4.5	-3.1	-5.0	-4.6	-3.5
4	-3.8	-3.8	-2.4	-3.7	-3.8	-2.6
5	10.2	9.9	7.2	9.6	9.6	7.3
6	-1.9	-2.1	-1.6	-2.7	-2.8	-2.0
7	-4.2	-4.2	-2.5	-4.6	-4.7	-3.1
8	1.3	0.5	0.7	1.2	0.7	0.7
9	-5.1	-5.1	-3.8	-5.3	-5.4	-4.0

Source: Same as for Table 4.

Myer's Index is positive for preference and negative for dislike.

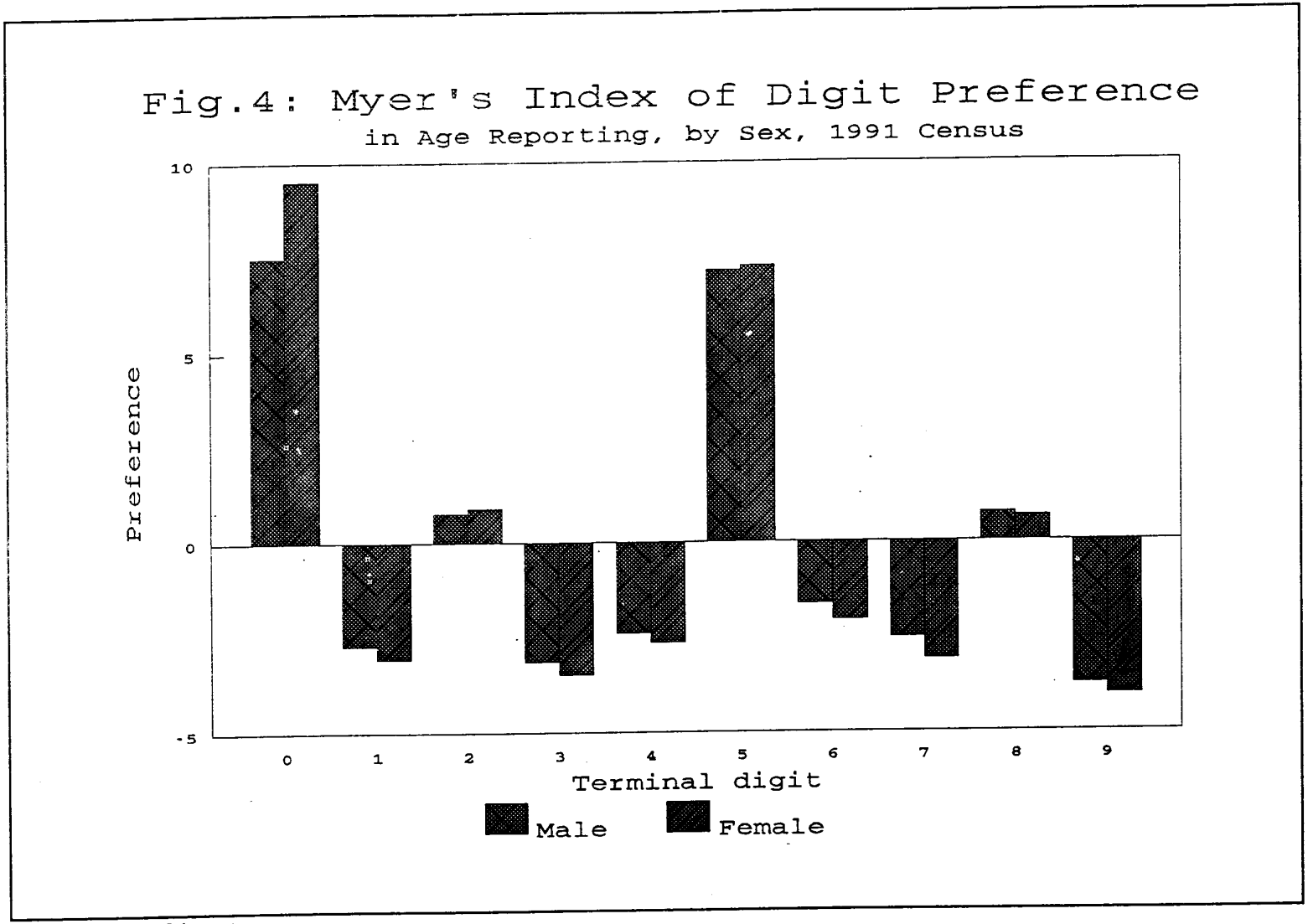
Table 5 presents the degree of digit preference among males and females in reporting their ages. The table indicates that there is a tendency among males and females to state their ages as ending in digits 0 and 5. Similarly, there is also a tendency for people not to state their ages ending in digits 3, 7 and 9 (also see Fig. 4). Though not to the same extent, digit 1 also falls in this category. This pattern is true in all the three censuses 1971-1991. It is also to be noted that the tendency of the people to prefer certain digits or dislike certain digits has decreased considerably in 1991. The overall digit-preference is summarized in the Myer's Blended Index shown in Table 6 for males and females for the three census years. There is essentially no change in the Myer's Blended Index during the period 1971 to 1981, whereas the index has declined significantly from about 24.3 in 1971 and 1981 to about 17.4 in 1991. This shows that there has been considerable improvement in 1991 in the tendency of people to report their ages correctly without being biased by digit preference. The digit preference had always been less among males than females.

Table 6 : Myer's Blended Index for Males and Females, 1971 to 1991, Nepal.

Year	Male	Female	Both Sexes
1971	23.3	25.3	24.3
1981	23.8	25.6	24.7
1991	16.2	18.6	17.4

Source: Same as for Table 4.

The theoretical range of Myer's Blended Index is "0" to "90" and Index value of 0 indicates no age heaping and 90 indicates extreme age heaping.



Source: Table 5 of the text.

The Whipple's Index (Table 7) calculated for the various years shows that there has been considerable improvement in the quality of age reporting in 1991 compared to that in 1971 and 1981. The indices were around 250 in 1971 and 1981, whereas it was around 200 in 1991 for males as well as females. The reduction of about 50 points during the decade 1981 to 1991 is a significant improvement in the quality of age data. However, the age data of 1991 seems to be still `very rough' according to the data quality classification. It is also clear from Table 7, that age reporting has all along been slightly better among males than females.

Table 7 : Whipple's Index for Census Years 1971-1991.

	Years		
Sex	**1971**	**1981**	**1991**
Male	240	248	196
Female	253	255	209
Both	247	251	202

Source: Same as for Table 4.

Rating:

Data quality	Whipple's Index
1. Highly accurate	< 105.0
2. Fairly accurate	105 - 109.9
3. Approximate	110- 124.9
4. Rough	125 - 174.9
5. Very rough	175 & above

5. Distribution of Population by Five Year Age Groups

When single year age data are grouped into five-year groups, some of the peaks and troughs exhibited by the single year data get ironed out. Grouping of ages does not totally remove the effects of age-heaping. The customary quinquennial age-grouping places the two most preferred digits 0 and 5 in the adjacent age groups. Though to a lesser extent, mis-statement of ages still contributes to mis-placement of population in age groups. Distribution of population in five-year age groups is shown for males and females in the three censuses in Table 8. The 1991 age distribution is also shown in Fig. 5. The table shows that in most cases, proportion of population of the age group (0-4) is relatively less than that of the subsequent age group. It may be due to the misplacement of persons into the next age group in addition to under-reporting of children particularly the new-born. For other age groups, the age specific proportion decreases with age, following more or less the expected pattern. This is not to say there are no age-shifts at ages beyond 10. There are obviously instances of misplacement of population in adjacent age groups in all the

censuses, an example being the age group 15-19 which seems to have lost to other age groups, particularly among women.

Table 8 : Per cent Distribution of Population by Five Year Age Groups, Nepal, 1971-1991.

Age	1971		1981		1991	
Group	Male	Female	Male	Female	Male	Female
00-04	13.6	14.7	15.5	15.3	14.9	14.4
05-09	15.2	14.9	14.5	14.6	15.5	14.8
10-14	12.1	10.4	11.9	10.8	13.1	12.1
15-19	9.4	8.7	9.0	8.6	9.5	9.9
20-24	8.0	8.8	8.3	9.5	7.9	9.3
25-29	7.8	8.3	7.4	8.1	7.0	7.8
30-34	6.6	7.4	6.1	6.9	6.0	6.5
35-39	6.6	6.2	6.0	5.9	5.6	5.5
40-44	5.2	5.4	4.9	5.1	4.5	4.7
45-49	4.2	3.8	4.3	3.9	4.1	3.9
50-54	3.5	3.4	3.8	3.4	3.3	3.1
55-59	2.3	2.2	2.4	2.2	2.7	2.3
60-64	2.4	2.7	2.5	2.4	2.3	2.3
65+	3.0	3.2	3.4	3.1	3.6	3.4
All Ages	100.0	100.0	100.0	100.0	100.0	100.0
No	5,817,203	5,738,780	7,695,336	7,327,503	9,220,974	9,270,123

Source: Same as for Table 4

The accuracy of the age-sex distribution in five-year age groups is assessed with the help of United Nations Age-Sex Accuracy Index. The index for the census years 1971, 1981 and 1991 is presented in Table 9. According to the index, the age sex distributions of population in 1971 and 1981 are rated as highly inaccurate with index values significantly greater than 40. The age-sex distribution in 1991 census is of better quality than in the earlier two censuses although it has a long way to go before it can be rated as accurate.

Table 9 : United Nations Age-Sex Accuracy Index 1/, Nepal 1971-1991

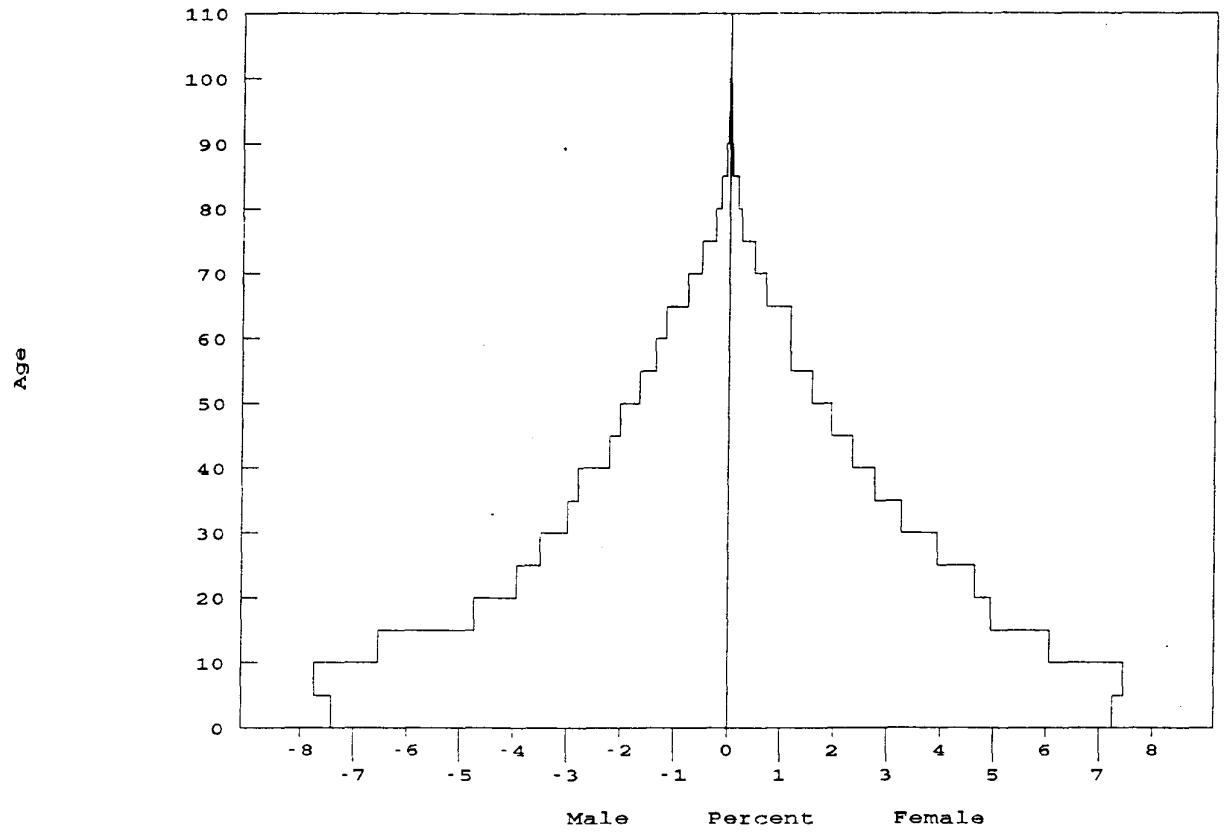
Census Year	Index
1971	51.9
1981	43.5
1991	41.9

1/ United Nations, 1952.

Rating:

Data Quality	Age-Sex Accuracy Index
Accurate	< 20
Inaccurate	20 - 40
Highly inaccurate	> 40

Fig. 5: Population Pyramid, 1991



Source: CBS, 1993, Vol. I, Table 5.

6. Index of Ageing and Median Age of Population:

When mortality declines, the extent of decline would usually be different at different ages. In high mortality countries such as Nepal, the gains in mortality would be greater at infant and childhood ages than at old ages. This phenomenon, until and unless accompanied by fertility decline, produces a young population. In order to measure the combined effect of changes in mortality and fertility on the age structure of males and females over the past two decades, two indexes namely, the Median Age and the Index of Ageing, have been computed and presented in Table 10. The index of ageing exhibits only a tendency for decline during 1971-81 whereas it became marked by 1991. There is a suggestion that female population has been more aged than male population. The 1981 data does not subscribe to this suggestion. It should be recognized that this index depends only on the young and the old age population and hence sensitive to errors in age reporting at these ages.

Table 10 further shows that the median age of population has gone down by about 1 year during the period of 1981 to 1991. This decline started even before 1981. This index, also shows that female population has all along been older than male population. The declining median age is most probably due to declining infant and child mortality during these decades given that fertility has been almost static or declining very slightly. The consistent pattern of greater female than male median age can not readily be explained except by the fact that out migration from the country has always been predominately of adult males.

Table 10 : Index of Ageing and Median Age of Males and Females, Nepal 1971-1991.

Census Year	Index of ageing			Median age		
	Male	Female	Total	Male	Female	Total
1971	13.20	14.75	13.86	19.80	20.70	20.30
1981	14.08	13.51	13.81	19.50	20.30	19.90
1991	13.56	13.80	13.58	18.41	19.40	18.92

$$\text{Index of aging} = \frac{\text{Population age 60+}}{\text{Population age 0-14}} * 100$$

7. Age-sex Distribution of Population by Rural/Urban Residence

The age distributions of males and females in rural and urban areas are shown in Table 11 and Fig. 6. The table shows, for males as well as females, in the early age groups, a higher

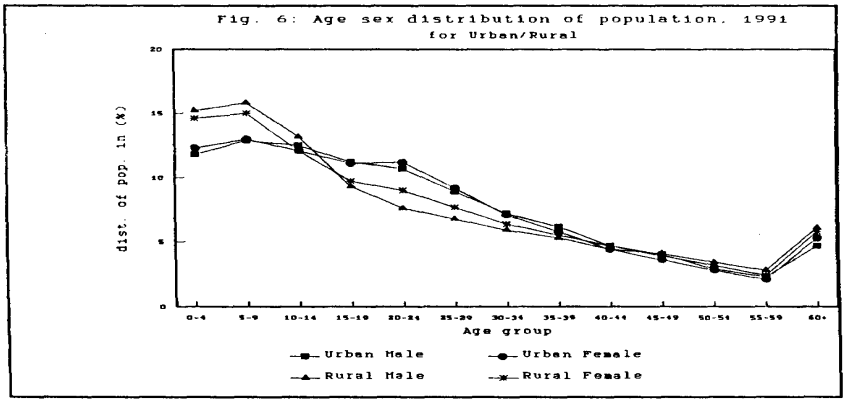
proportion of population in the rural areas than in the urban areas. Similarly, significant differences in proportion of population in the working age group can also be noted, with higher proportion in the urban areas than in the rural areas, both for males and females. The higher proportion of population in the early age groups and lower proportion in the working age groups in the rural areas, can not however be explained by a. single variable. It is due to the combined effect of differences in fertility and infant/child mortality levels between the two areas in addition to the effect of migration of working age population from rural to urban areas.

Table 11 : Age Distribution of Population by Sex and Five Years Age Groups for Rural and Urban Nepal, 1991 Census.

Age- group	Urban		Rural	
	Male	Female	Male	Female
00-04	11.8	12.3	15.2	14.6
05-09	12.9	13.0	15.8	15.0
10-14	12.5	12.1	13.2	12.1
15-19	11.2	11.1	9.3	9.7
20-24	10.7	11.2	7.6	9.0
25-29	8.9	9.2	6.8	7.7
30-34	7.2	7.1	5.9	6.4
35-39	6.2	5.8	5.3	5.5
40-44	4.7	4.4	4.4	4.7
45-49	4.0	3.6	4.1	3.9
50-54	2.9	2.8	3.4	3.2
55-59	2.3	2.1	2.8	2.4
60+	4.7	5.3	6.1	5.8
Total	100.0 (882,001)	100.0 (813,718)	100.0 (8,338,973)	100.0 (8,456,405)

Source: CBS, 1994 Vol. II.

Source: CBS, 1994, Vol. II.



Source: Table 11.

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Rural-urban differences in age-specific sex ratios are shown in Table 12.

Table 12 : Sex Ratio by Age, Rural and Urban Nepal, 1991 Census.

Age	Rural	Urban
00-04	102	104
05-09	103	107
10-14	108	112
15-19	98	109
20-24	83	103
25-29	87	104
30-34	84	111
35-39	99	116
40-44	92	115
45-49	102	120
50-54	104	114
55-59	116	115
60+	103	96
All ages	99	108

Source: Same as for Table 11.

The overall picture is that the age-specific sex ratios are greater than one hundred in urban areas and are greater than those in rural areas. The urban sex ratios are particularly higher in working age groups. At these ages, the rural ratios are not only lower than the urban sex ratios but lower than one hundred as well. This is suggestive of the male selective out-migration from rural areas. These male out-migrants can not be treated as in-migrants to the urban area only. Among those at ages (15-29) years, most of them might have gone outside the country for work or study and that is probably why the sex ratio among the rural people falls without any sizable rise in the ratio in the urban areas.

8. Age-sex Distribution of Population For Development Regions.

Per cent distribution, by age, of males and females is shown for the five development regions in Table 13. The distributions across the development regions do not follow the same pattern. In MWDR and FWDR, the highest proportion of population has been found in the age group (0-4) years followed by a systematic decline in the subsequent age groups, which is close to the expected pattern. But in the case of EDR, CDR and WDR the per cent population in age group 5-9 was higher than that in age group 0-4; thereafter the systematic decline in per cent population with increasing age has been maintained in all the three regions for both the sexes. Under-reporting of children is a common reason for lower proportion in 0-4 than in 5-9 age group. In addition, the

onset of fertility decline may have started in EDR, CDR and WDR and/or an increase in fertility may have taken place in MWDR and FWDR owing probably to improved health conditions of mothers. Both these possibilities are supported by the trends in fertility in the five development regions discussed elsewhere (Chapter III, in this Volume).

Table 14 provides age-specific sex ratios by five year age groups for the five development regions. Total sex ratio for EDR and CDR are higher than the national average, which is 0.99, whereas WDR and FWDR exhibit sex ratios below the national average. Age-specific sex ratios do not seem to present any visible regional patterns. The sex ratios are greater than one hundred at age groups under 15, lower than one hundred at ages 20-35 and again greater than one hundred at older ages; and this pattern is true of all the regions. The fact that the sex ratios at the prime working ages of 20-35 are less than one hundred in all the regions clearly points to emigration and its male bias.

Table 13 : Age Distribution of Population by Sex for Development Regions, 1991 Census, Nepal.

Age	EDR		CDR		WDR		MWDR		FWDR	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
00-04	14.2	13.8	14.0	14.0	15.5	14.1	16.3	16.1	16.6	15.8
05-09	15.4	15.0	15.2	14.8	16.0	14.4	15.5	15.2	16.1	15.2
10-14	13.1	12.3	12.5	11.4	13.9	12.4	13.2	12.6	13.6	12.0
15-19	10.0	10.2	9.5	9.5	9.3	9.8	9.4	10.4	9.1	9.8
20-24	8.1	9.4	8.5	9.6	6.7	8.8	8.0	9.1	7.5	9.0
25-29	7.3	8.0	7.6	8.1	5.9	7.5	7.0	7.6	6.7	7.4
30-34	6.2	6.6	6.4	6.8	5.3	6.3	5.9	6.1	5.5	6.1
35-39	5.8	5.5	5.9	5.6	5.1	5.5	5.5	5.4	5.3	5.5
40-44	4.5	4.6	4.6	4.7	4.3	4.7	4.5	4.6	4.3	4.8
45-49	4.0	3.7	4.1	4.0	4.1	4.0	4.1	3.8	4.0	3.9
50-54	3.1	2.9	3.3	3.1	3.7	3.4	3.3	3.1	3.4	3.3
55-59	2.7	2.4	2.6	2.4	3.0	2.5	2.5	2.0	2.6	2.2
60+	5.6	5.6	5.8	6.0	7.2	6.6	4.8	4.0	5.3	5.0
All Ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No	2,228,589	2,218,160	3,147,894	3,036,061	1,821,499	1,949,179	1,200,292	1,210,122	822,700	856,601

Source: CBS, 1993, Vol. I, Part I, pp. 172-212

Note: EDR = Eastern Development Region
CDR= Central Development Region
WDR = Western Development Region
MWDR= Mid Western Development Region
FWDR= Far Western Development Region

Table 14 : Sex Ratio of Population by Five Year Age Groups for Development Regions, Nepal, 1991 Census.

Age	EDR	CDR	WDR	MWDR	FWDR
00-04	103	104	103	100	101
05-09	103	106	104	101	102
10-14	107	114	105	104	109
15-19	98	104	89	90	89
20-24	87	92	71	87	80
25-29	92	97	74	91	87
30-34	94	98	79	96	87
35-39	106	109	87	101	93
40-44	98	101	85	97	86
45-49	109	106	96	107	99
50-54	107	110	102	106	99
55-59	113	112	112	124	114
60+	100	100	102	119	102
All Ages	100	104	93	99	96

Source: CBS, 1993, Vol. I, Part I, pp. 172-212

9. Age-sex Distribution of Population For Ecological Zones.

Table 15 presents percentage distribution of male and female population by five year age groups for ecological zones. The distributions show that the percentage decreases more or less with increasing age in the Mountain and the Hill zones conforming to the expected pattern. In Terai, the expected pattern holds true except that the proportion of population in 0-4 is lower than that in the 5-9 age group. This indicates that either the on-set of fertility decline has been greater or the under-reporting of infants greater, in the Terai zone. Yet another, and more plausible reason could be the age mis-reporting resulting in miss-placement of population from 0-4 to 5-9 age group, occurring to a greater degree in Terai compared to the other two zones. This may be due to differences in socio-cultural beliefs and practices of the ethnic groups residing in the three zones in addition to their fertility and mortality differentials.

Table 15 : Age Distribution of Population by Sex for Ecological Zones, Nepal, 1991 Census.

Age	Mountain		Hill		Terai	
	Male	Female	Male	Female	Male	Female
00-04	15.2	14.8	15.3	14.2	14.4	14.5
05-09	14.6	14.1	15.1	14.1	16.1	15.8
10-14	12.6	11.6	13.7	2.6	12.7	11.6
15-19	9.2	9.6	9.8	10.3	9.3	9.4
20-24	8.1	9.1	7.9	9.3	7.9	9.2
25-29	7.0	4.7	6.6	7.6	7.4	8.1
30-34	6.2	6.4	5.6	6.1	6.3	6.9
35-39	5.6	5.5	5.0	5.3	6.1	5.7
40-44	4.5	5.9	4.3	4.6	4.6	4.7
45-49	4.0	4.0	3.9	3.9	4.2	3.8
50-54	3.8	3.7	3.5	3.4	3.1	2.8
55-59	2.6	2.6	2.9	2.5	2.5	2.1
60+	6.6	6.0	6.4	6.1	5.4	5.4
All Ages	100.0	100.0	100.0	100.0	100.0	100.0
No	715,847	727,283	4,109,537	4,310,352	4,395,590	4,232,488

Source: CBS, 1995, Vol. IV.

Table 16 shows sex ratios by five year age groups for the three ecological zones in 1991. The sex ratios in the Mountain and Hill zones are less than the national average of 99 whereas it is greater in the Terai zone. Once again in the prime working age groups 15-34, the sex ratio is less than one hundred in all the zones indicating emigration in addition to inter-regional migration. The picture namely, the sex ratio in the Terai is the greatest of the three zones at all adult ages is suggestive of the receiving nature of the Terai and the sending nature of the other two zones as far as the inter-regional migration is concerned.

Table 16 : Sex Ratios by Five Years Age Groups for Ecological Zones, Nepal, 1991

Age	Mountain	Hill	Terai
00-04	101	103	103
05-09	102	102	106
10-14	107	104	114
15-19	94	91	103
20-24	88	81	89
25-29	89	83	95
30-34	95	88	95
35-39	100	90	111
40-44	90	89	98
45-49	98	95	115
50-54	101	98	115
55-59	98	111	124
60+	108	100	104
All Ages	98	95	104

Source: CBS, 1995, Vol. IV.

10. Utilization of Age-Sex Distribution of Population

Changes in the age distribution of a national population reflect the past trends in fertility and mortality. They also reflect the effects of migration where international migration is significant. The differences between male and female age distributions are indicative of the sex differentials in the three components of population growth.

Age-sex distribution of population has numerous uses in demographic analyses and has implications for development planning. Ageing of population, dependency, health service requirements for women, children and the elderly, male and female labour force supply, schooling and related infrastructural requirements etc.. can all be derived from the age-sex distribution of population. As such, the age-sex distribution becomes the basic requirement for making population projections. Needless to state, quality is the crucial factor in the utilization of age-sex data in analytical and planning exercises. The single-year age data in Nepal censuses are still riddled with problems of omission, age-heaping and other types of age mis-statement, although the quality of age reporting has been improving over the decades. Age data in five-year age groups is certainly to be preferred over the single-year age data though it still requires some adjustments. While smoothing of age data can be performed at adult ages, adjustments may be needed at childhood ages. In making population projections by age and sex, adjusted age distributions of males and females at the base-year would be required.

Using the estimated fertility and mortality, adjustment of population below age 10 was made, whereas age-smoothing was performed beyond age 10, on the reported male and female age distributions of 1991 census of Nepal. Adjustment of population at childhood ages, namely, 0-4 and 5-9, involved estimating male and female births during the ten years preceding the census date and surviving them to the census date. During the period of ten years preceding the 1991 census, both fertility and mortality declined. Accordingly, due consideration had to be given to the declining fertility in the estimation of births, and to declining mortality in surviving these births to the 1991 census. For this, the fertility and mortality for 1981 estimated elsewhere (CBS, 1987) and the fertility and mortality for 1991 estimated in Chapters III and IV in this volume, were utilized. The adjustment of population at ages below 10 and smoothing of the age distribution for ages 10+ was accomplished by the software developed by the US. Bureau of Census (Arriaga, 1993). These adjusted male and female age distributions formed the basis for population projection by age and sex for Nepal, 1991-2011 (CBS, 1994 a.).

Refinements of age distributions are not easy when it comes to sub-national populations, on account, mainly, of migration. In the process of making sub-national population projections for Nepal, an approximate procedure had to be adopted. Using the adjusted age distribution for the nation, refinements were effected for the sub-national age distributions by a two-way raking procedure (CBS, 1994 b.).

The potentialities of age-sex distributions and their planning implications were illustrated in the National Projections (CBS, 1994 a.) and the Sub-national Projection of Population for Nepal 1991-2011 (CBS, 1994 b.).

11. Conclusion

It may be said that, quality of age data obtained in the censuses of Nepal is still far from satisfactory. This is true, mainly, of the single-year age data. Five-year age grouping remedies some of the problems associated with single-year age data, certain adjustments would still be needed to render the age data usable. Here again, adult age-groups are far less affected than childhood ages, by age reporting errors.

In view of its crucial role in much of the demographic analysis and in planning exercises, the quality of age-sex distribution of population needs to be improved. Only when it is reliable, would one be able to regard the changes observed in the age-sex distribution as true reflections of changes in the population growth components. It should be emphasized that, although techniques of adjustment do some times exist, these are no substitutes for good quality data.

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