CHAPTER 16

THE QUALITY OF CENSUS DATA 2001: AN EVALUATION

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16.1 Introduction

Nepal has had a long history of Census undertaking since 1911. The present 2001 Census is the 10th Census. However, the census with international comparability was undertaken since 1952/54. As this was also undertaken in two phases, the census of 1961 only can be regarded as the first census which was undertaken in the modern sense. Since then, censuses have been undertaken in Nepal at an exact interval of 10 years. As such, cohort analysis can be carried out and results can be interpreted in more convenient terms. This 2001 census is the first census where some of the information were collected on a sample basis. In fact, 12 questions on household and nine questions on individual basis were asked in all households and seven questions on household and 20 questions on individual basis were asked on sample basis with one in eight housing units in each enumeration area.

Though the 2001 census was successfully completed, enumeration could not be completed in all areas. Enumeration was disturbed in 955 rural and 2 urban wards. It is to be recalled that there are 3914 village development committees (VDC) and 58 municipalities and a VDC consists of nine wards. As such it can be seen that the completion of enumeration of enumeration areas is almost 100 percent.

16.2 Steps Taken in Improving Quality of Data

Followings are various steps taken to improve the quality of 2001 census data.

16.2.1 Formation of Committees

Several Committees were formed to provide guidelines in performing various activities of census operation. They were as follows.

1. Population Census Technical Committee
2. Questionnaires and Manual Preparation Committee

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3. Media Core Group

4. Project Management Committee

5. Occupations and Industry Classification Committee

The Director General of the Central Bureau of Statistics was the chief coordinator and the chief of the population section worked as member secretary.

16.2.2 Census Publicity

Census publicity was made through mass media, work shops and seminars from the very beginning of planning and preparatory work of 2001 Census. These activities helped to improve the coverage of the Census.

16.2.3 Cartography

The Survey Department of His Majesty's Government of Nepal provided clearly delineated maps of VDC's and municipalities for 2001 census along with delineated maps of wards of 58 municipalities. These maps helped to achieve the goal of the census to have a complete and unduplicated count of population as well as to assign the enumeration areas to enumerators.

16.2.4 Questionnaire Designing and Pre-Testing

Two types of questionnaire were designed one at the household level and another at the individual level. Questionnaire contents and the pre-testing of census enumeration procedure were conducted in four districts, Bajura from mountain, Mahottari from terai and Dhankuta as well as Kathmandu from the hilly region.

16.2.5 Personnel and Training

Enumerators were assigned based on enumerating 200,160 and 130 households per enumerator in Terai, Hill and Mountain regions respectively. Altogether 20,000 enumerators and 500 supervisors were employed.

Table 16.1 : Population, supervisors, enumerators by census years 1952/54-2001

Census Year	Population	Supervisors	Enumerators[1]	Population per Enumerator Ratio	Enumerator per Supervisor Ratio
1952/54	8,256,625	200	17,000	486	85
1961	9,412,996	300	15,933	591	53
1971	11,555,983	500	12,000	963	24
1981	15,022,839	1500	15,000	1001	10
1991	18,491,097	4000	20,000	925	5
2001	23,151,423	5000	20,000	1137	4

Source : [1] Karki, 2002, p7

The training was conducted at three levels. At the central level, the training was given to district census officers who in turn, gave training to area supervisors and supervisors at the district level. Area supervisors and supervisors gave training to enumerators at sub district level.

16.2.6 Field Work and Data Processing

The field work of census 2001 was undertaken during the period June 10-26, 2001. The tragic incident in the Royal Palace delayed the actual field plan and enumeration for a week. The field operation went on smoothly except in 955 out of 35226 rural wards and 2 urban wards of 58 municipalities.

The completed questionnaires were returned to the Central Office where data processing was done taking utmost care at every step. Data coding, editing and entry work were contracted out to the private party. Nearly 400 Micro computers (Pentium III) were used for the data entry work. The data entry work was completed within a 5 months period. The use of computer in data processing made possible to apply various checks to improve data quality.

16.3 Completeness of Reporting

The completeness of reporting of the final result of the population size and not reported cases in the published tables of the population census 2001, national report are examined.

16.3.1 Population Size

The reported and the final result of the population size according to 2001 census are as follows.

Table 16.2 : Reported and the final result of the population of 2001 census

Description	Reported	Final Result of 2001 Census
Population (Total)	22,736,934	23,151,423
Male	11,359,378	11,563,921
Female	11,377,556	11,587,502

Source : CBS,2002, p1 and 21

The final results of the population of 2001 census are obtained from the reported population and by estimating the population of disturbed areas in the census from the household listing or the observed growth of population between 1991 and 2001. The affected districts are Jhapa, Siraha, Sindhuli, Dolakha, Sindhupalchok, Salyan, Surkhet, Dolpa, Jumla, Kalikot, Mugu, Bajura and the affected municipality is Damak. The percentage of under enumeration in the final result of 2001 census is discussed in the section 16.9

16.3.2. Not Reported Cases

The following table shows percentage of not reported cases for selected variables.

Table 16.3 : Percentage of not report cases and total cases for selected variables.

S.No	Variables	Percentage of Not Reported Cases	Total Cases
1.	Single year age distribution	About .01	22,736,934
2.	Population absent from household and destination abroad by country	<.50	762,181
3.	Population absent from household and reasons for absentee.	<4.41	762,181
4.	Population by Caste ethnic group	1.02	22,736,934
5.	Population by religion	<.35	22,736,934
6.	Population by mother tongue	<.74	22,736,934
7.	Population by Citizenship	<.02	22,736,934
8.	Deaths during last 12 months by age group	About 4.62	106,789

S.No	Variables	Percentage of Not Reported Cases	Total Cases
9.	Population by place of birth	0	22,736,934
10.	Population 5 years and above by place of stay before 5 years ago by age group.	About 2.18	19,981,721
11.	Population 6 years of age and over by literacy status.	0.62	192,55,805
12.	Literate population 6 years of age and over by educational attachment.	About 0.50	10,348,428
13.	Ever married population aged 10 years and above by age at first marriage and by 5 year age group.	About 3.92	10,948,387
14.	Population 10 years of age and over by marital status.	0.50	16,770,279
15.	Ever married female population 15 to 49 years of age by reported number of children ever born.	0.30	44,867,739
16.	Ever married female population 15 to 49 years of age by reported number of children born in the past 12 months	0.30	4,486,738
17.	Population 10 years of age and over by economic activity.	0	16,770,279
18.	Usually economically active population 10 years of age and over by major occupation.	0.08	9,900,196
19.	Usually economically active population 10 years of age and over by major industry division.	0.23	9,900,196
20.	Usually economically not active population 10 years of age and over by reasons for not being usually active.	1.80	8,034,164

Source: CBS, 2002, p21-252

The above table shows that out of 20 variables, the percentage of not reported cases are <1 for 14 variables. The highest percentages are about 4 for 3 variables. The low percentage of not reported cases for majority of variables indicate that, the level of reporting and data processing are good.

16.4 Accuracy of Reported Ages

The accuracy of reported ages are examined by whipple's, index, Myer's blended index and getting correct age distribution by smoothing.

16.4.1 Whipple's Index

The tendency of respondents or enumerators to report particular ages are known as age heapings. Age heapings are usually found at ages ending in 0 and 5. The whipple's index has been

developed to determine the amount of age heapings. If there are no age heapings at ages ending in 0 and 5, the whipple's index is 100. If only digits 0 and 5 are reported, then index is 500. The whipple's index for the total population of Nepal is 206.1 indicating that the population tabulated at these ages is more by 106 percent than the corresponding unbiased population. In fact, the quality of data is very rough. According to UN scale, the quality of data is very rough if the value is 175 or more.

The values of whipple's index for males and females are 205.7 and 206.6 respectively indicating that quality of data are very rough for both sexes though it is a little bit better for males than for females.

16.4.2 Myer's Blended Method

As there are more age heapings at ages ending in 0 than ending in other digits, Myer's blended method has been developed to determine the amount of heapings.

Values range from 0 to 90. If there are no age heapings, the value is zero. If there are maximum heapings, theoretically reporting all ages at a single digit only, the value is 90. In case of 2001 census, the value is 18.7 for total population in contrast to 17.4 in 1991 census.

The percentage of population of 2001 census with ages ending in each digit 0 to 9 are shown below.

Table 16.4 : Percentage distribution of 2001 population for terminal digits by Myer's blended method for total, male and female population

Digit of Age	Total	Male	Female
All Digits	100.0	100.0	100.0
0	19.2	18.7	19.6
1	6.3	6.5	6.1
2	10.9	10.9	10.8
3	6.8	6.8	6.7
4	7.3	7.2	7.3
5	17.4	17.5	17.2
6	8.3	8.3	8.2
7	6.9	7.0	6.9
8	11.3	11.2	11.5
9	5.8	5.9	5.7
Myer's Index	18.7	18.3	19.1

The above table shows that the percentage of population are more than 10 percent in ages ending at 0,2,5 and 8 with the highest in 0 followed by 5,8 and 2 indicating that the maximum preference for reporting age is digit 0 followed by digits 5,8 and 2 for total, male and female population. The heapings are more for females at digits ending at 0 and 8 than for males. There are more under reporting in ages ending at digits 9,1 and 3 for total, male and female population as the percentages are lowest in these categories.

16.4.3 A Comparison between Reported and Smoothed Data

It has already been seen that age distributions of 2001 census are distorted by age mis reporting. The correct age distribution with reduction in age heapings and as close to correct as possible are obtained by the method mentioned in UN manual X, 1983, p241. The percentages of reported and corrected age distributions by sex are shown in the following table.

Table 16.5 : Percentage of reported and corrected age distributions of 2001 census and percentage change with respect to correct age distribution for total, male and female

Age Group (i)	Reported [1]			Corrected			Percentage Change		
	Total (ii)	Male (iii)	Female (iv)	Total (v)	Male (vi)	Female (vii)	Total[2] (viii)	Male (ix)	Female (x)
0 – 4	12.1	12.3	11.9	13.7	14.1	13.3	11.5	12.8	10.1
5 – 9	14.1	14.4	13.9	13.1	13.4	12.9	-7.6	-7.6	-7.7
10-14	13.1	13.5	12.7	12.5	12.7	12.3	-5.0	-6.7	-3.3
15-19	10.5	10.4	10.6	10.7	10.5	10.9	2.1	1.0	3.1
20-24	8.9	8.3	9.4	9.2	8.8	9.5	3.1	5.0	1.4
25-29	7.6	7.2	7.9	7.8	7.4	8.2	2.7	2.9	2.6
30-34	6.6	6.4	6.7	6.7	6.5	6.9	1.8	1.6	2.1
35-39	5.8	5.7	5.8	5.7	5.6	5.7	-1.9	-2.2	-1.6
40-44	4.8	4.8	4.8	4.7	4.8	4.7	-0.9	.0	-1.8
45-49	4.1	4.1	4.0	3.9	4.0	3.9	-2.9	-3.3	-2.5
50-54	3.4	3.5	3.3	3.3	3.4	3.2	-3.3	-3.0	-3.6
55-59	2.6	2.8	2.5	2.7	2.8	2.6	1.1	-1.5	3.8
60-64	2.3	2.3	2.3	2.1	2.2	2.1	-6.8	-5.2	-8.5
65-69	1.7	1.7	1.7	1.6	1.6	1.6	-5.3	-5.0	-5.6
70-74	1.2	1.2	1.2	1.1	1.1	1.1	-11.2	-12.8	-9.5
75+	1.3	1.3	1.3	1.2	1.2	1.2	-7.2	-5.3	-9.1
Total	100	100	100	100	100	100	-	-	-

Source: [1] CBS,2002, p24

[2] $\frac{(v)-(ii)}{(v)} x100$

By comparing reported percentage with corrected percentage, it can be seen that there are 12 percent under reporting in 0-4 age group with 13 percent for males and 10 percent for females. There are about 2 percent under reporting for the age group 15-34 years. For age groups from 35 years onwards, there are about 2 percent over reporting.

16.5 Sex Ratio

Quality of data can be examined by looking at

i) Sex ratio at birth

ii) Sex ratios by broad age groups

iii) A comparison between sex ratios of 1991 and 2001 Censuses

16.5.1 Sex Ratio at Birth

Sex ratio at birth is measured by male birth per female birth. It usually lies between 1.02 to1.07 (UN 1983, p272). If reported sex ratios at birth fall outside this range, it could indicate the sex selective omission of births. For 2001 census, the sex ratio at birth is estimated to be 1.05. This is well within the range indicating that the combined effect of reporting population and distribution of deaths under one year don't have sex selective bias.

16.5.2 Sex Ratios by Various Age Groups

The sex ratios as measured by males per female for broad age groups in 1991 and 2001 censuses are shown in Table 16.6

The sex ratios for broad age groups appear reasonable except for some groups. The sex ratios for 10-14 and 70-74 age groups are 1.06 and 1.07 respectively which are a little bit on high side. It is possible that girls in the age group 10-14 might report themselves as 14+ and /or they may be excluded from enumeration because of various reasons. The high value in the age group 70-74 years might be due to net effects of mortality differential by sex, return of male migrants and reporting problems.

Sex ratios for the age groups 15-44 years are less than one indicating that there are out migration of males in this age group. The sex ratios for the age groups 20-29 are around 0.9 showing that there are heavy male migrants in this group. These facts are quite consistent with Nepal's tradition.

16.5.3 A Comparison between Sex Ratios of 1991 and 2001 Censuses

Table 16.6 shows sex ratios of 1991 and 2001 censuses by broad age groups.

Table 16.6 : Sex ratios of 1991 and 2001 censuses by broad age groups

Age Group	Sex Ratios	
	1991[1]	2001[2]
0-4	1.03	1.03
5-9	1.04	1.03
10-14	1.08	1.06
15-19	0.96	0.99
20-24	0.85	0.88
25-29	0.89	0.91
30-34	0.92	0.95
35-39	1.01	0.99
40-44	0.95	0.99
45-49	1.04	1.04
50-54	1.06	1.05
55-59	1.16	1.12
60-64	1.00	1.01
65-59	1.10	1.03
70-74	1.05	1.07
75+	0.97	0.96
Total	0.99	1.00

Source : [1]CBS, 1193,p172

[2]CBS,2002,p24

The trends of sex ratios in 1991 and 2001 are similar with high values in age groups 10-14 and 70-74 years, lower than one in the age groups 15-44 except for the age group 35-39 years with 1.01 in 1991 and lowest values in age groups 20-29.

16.6 Fertility Data

Fertility data are collected in census 2001 based on individual information on sample basis about marital status, age at first marriage, children ever born by living together, living separately as well as dead and births during the last 12 months by sex, year and month. The quality of fertility data are examined by analyzing coverage of live births and estimating current fertility.

16.6.1 Coverage of Live Births

The omission of live births is difficult to detect from data themselves. However, a large scale omission of births can be detected from average number of children ever born by age groups of women (Fred,1990, p100)

Table 16.7 : Average number of children ever born in census 2001 and Demographic Health Survey (DHS) 2001

Age Group	Average Number of Children Ever Born (CEB)	
	Census 2001[1]	DHS 2001[2]
15-19	0.16	0.18
20-24	0.97	1.32
25-29	2.06	2.71
30-34	2.87	3.71
35-39	3.45	4.48
40-44	3.83	5.16
45-49	4.04	5.71

Source : [1]Karki, 2002, p16

[2]MOH et al, 2002, p61

The average number of CEB obtained from census 2001 and DHS 2001 for each five year age group increase with ages indicating that there are no gross under reporting of births. However, the average parity difference in the two oldest age groups 40-44 and 45-49 is 0.22 in the census compared to 0.55 in the survey, an increment of 150 percent. This can be taken as an indication that there are heavy under reporting of CEB among older women compared to younger women in the census 2001. In fact, the average CEB for younger women (20-29) years given by the census is lower by 25 percent than the corresponding figure of survey data indicating that there are significant under reporting of CEB for younger women also in the census.

16.6.2 Measures of Current Fertility

The frequently used measures in estimating current fertility are crude birth rate (CBR), general fertility rate (GFR), age specific fertility rate (ASFR) and total fertility rate (TFR). CBR is the total number of births per 1000 population in a year and GFR is the total number of births per 1000 women aged 15-44 years in a year ASFRs are the total number of births per 1000 women of

the particular age group in a year. TFR is the total number of births a woman would have during her reproductive period under the prevailing ASFRs.

Estimates of CBR and GFR are made based on Table 16.8 along with estimates of ASFRs and TRF. The estimation of CBR and GFR are 14.2 and 61.9 respectively from the census 2001 as compared to 33.5 per 1000 live births and 148 per 1000 women aged 15-44 years from DHS 2001. Hence, it can be seen that CBR and GFR based on census 2001 are far lower than the corresponding figures in DHS 2001.

Table 16.8 : Estimate of TFR based on census 2001

Age Group (i)	Number of Women [1] (ii)	Births in The Past Year[2] (iii)	ASFR (iv)
15-19	1203176	37051	0.0308
20-24	1070026	116933	0.1093
25-29	904464	83120	0.0919
30-34	763463	45888	0.0601
35-39	659302	25070	0.0380
40-44	548051	10833	0.0198
45-49	453678	3421	0.0075

TFR 1.8

Source : [1]CBS, 2002 p24

[2]CBS, 2002 p175

The estimate of TFR from the Census 2001 is 1.8 births per woman. This value is not strictly comparable to TFR from DHS 2001 because the TFR from DHS survey is based on past 3 years preceding the survey and the survey gives the interval estimation only with the estimate of true TFR lying between 3.9 to 4.3 with 95 percent confidence (MOH, 2002, p225). As the census was for the date June 22, 2001 and the mid value of the field work for DHS was mid April 2001, the comparable value would be to estimate TFR based on past year from the survey and adjust for under reporting of births and declining fertility (UN,1988,p73). The estimated value of TFR is 4.6 which is shown in Table 16.9. The constant factor for 20-25 years is taken for adjustment because the adjustment factors are in increasing trend. Hence, it can be seen that the estimate of TFR obtained from the Census is far lower than the expected true value.

Table 16.9 : Application of Arriaga's approaches for estimation of age specific fertility rates for study of DHS, 2001.

Based on children ever born for one point(s) in time and the age pattern(s) of fertility (brass)

Age Groups	Children Ever Born (C.E.B.)	Fertility Consistent With C.E.B. (A.S.F.R.)	Fertility Pattern By Age At Survey Date	Fertility Pattern By Age at Birth of Child	Cumulation of		Adjustment Factors	Age Specific Fertility Rates Based on Adjustment Factor for the Age Group		
					A.S.F.R.	Fertility Pattern by Age at Birth		20 - 25	25 - 30	20 - 30
APR 2001										
			Recorded	Calculated						
15 - 20	0.180	0.1200	0.0747	0.0948	0.1200	0.0948	1.2656	0.1158	0.1175	0.1167
20 - 25	1.320	0.2923	0.2392	0.2425	0.4122	0.3373	1.2222	0.2964	0.3007	0.2986
25 - 30	2.710	0.2380	0.1954	0.1870	0.6502	0.5243	1.2401	0.2286	0.2320	0.2303
30 - 35	3.710	0.1725	0.1187	0.1137	0.8227	0.6380	1.2896	0.1389	0.1410	0.1399
35 - 40	4.480	0.1421	0.0814	0.0772	0.9649	0.7152	1.3492	0.0943	0.0957	0.0950
40 - 45	5.160	0.0972	0.0346	0.0301	1.0621	0.7453	1.4251	0.0368	0.0374	0.0371
45 - 50	5.710	0.0353	0.0047	0.0034	1.0974	0.7487	1.4658	0.0042	0.0042	0.0042
Mean age of Childbearing :		27.08		25.68						
Total Fertility Rate:		5.49		3.74				4.58	4.64	4.61

Source: 1.MOH, 2002, p61 for CEB

2. Personal Communication with New Era for fertility pattern by age at survey date.

16.7 Mortality Data

Mortality data are collected in the Census 2001 from household information on sample basis about number of deaths occurred in the household during last 12 months. Based on this information, four measures of mortality namely crude death rate (CDR), infant mortality rate (IMR), under 5 mortality rate (U5MR) and child mortality rate (CMR) are calculated. CDR is the number of deaths per 1000 population in a year. IMR is the number of deaths under one year per 1000 live births in a year U5MR is the number of deaths under five year per 1000 live births in a year. CMR is the number of deaths between one and under five year per1000 children surviving one year in a year. The estimate of CDR based on 2001 Census is 4.7 deaths per 1000 population showing a gross under enumeration of deaths in the past year. The estimates of IMR, CMR and U5MR are 40.5, 31.7, and 70.9 as compared to 64.4 infant deaths per 1000 live births, 28.6 deaths during 1-5 year per 1000 children surviving one year and 91.2 deaths under five year per 1000 live births respectively from DHS 2001. By comparing these figures, it can be interpreted that deaths under one year and five years are under enumerated in the Census 2001.From the fertility analysis, it has been seen that total number of live births are highly under reported. As this is the denominator estimating IMR and U5MR, it can be interpreted that deaths under one year and five years are highly under enumerated.

However, it should be noted that the estimate of child mortality based on Census 2001 is higher than the corresponding estimate from DHS 2001. This indicates that there are heapings in the Census 2001 for infant deaths at age 12 months because of rounding up the age at death of late infant deaths. This will cause IMR to be under estimated and CMR to be over estimated.

Since, child hood mortality are highly under reported and adult mortality to different extents along with mis reporting of age at death, the construction of adequate life tables with the correction for under enumeration of deaths are highly questionable. Hence, model life tables with expected age pattern of mortality can be used to determine the effects of mortality.

16.8 Migration Data

Migration characteristics in 2001 Census are obtained by citizenship as well as persons absent and living in other countries based on full enumeration and place of birth, duration of stay in the current place and place of residence 5 years before based on sample enumeration.

16.8.1 Place of Birth and Population Living in Other Countries

Information about foreign born from the place of birth in 1991 and 2001Censuses can be used to estimate volume of immigration during the period 1991-2001. Similarly, information about emigrants can be obtained from population living abroad.

Table 16.10 shows intercensal increase of foreign born population living in Nepal and population living abroad by sex.

Table 16.10 : Intercensal increase of foreign born population living in Nepal and population living abroad by sex during 1991 and 2001

Population	Foreign Born Population Living in Nepal[1]		Intercensal Increase	Population Living Abroad[2]		Intercensal Increase
	1991	2001		1991	2001	
Male	123660	183038	59378	548024	679469	131445
Female	315828	425055	109227	110313	82712	-27601
Total	439488	608093	168605	658337	762181	103844

Source : [1]CBS 2002, p120

[2]Personal Communication with CBS

Foreign born population living in Nepal increased during the intercensal period for both males and females. The analysis by age group show that 65 percent of the foreign born population are in the age group 15-44 years. However, population from Nepal living abroad, though increased for males decreased for females during the intercensal period 1991-2001. This decrease for female population might be due to reporting problems rather than the genuine case. The analysis by age group show that 77 percent of total absent population departed in the age group 15-34 years. The intercensal increase for both foreign born and absent population are minimum values as survival factors for 1991 population have not been used. The intercensal increase of foreign born population during the period 1991-2001 obtained from this table is consistent with the figure of 260875 obtained from the Table 16.12. However, the intercensal increase of absent population during the period 1991-2001 from this table is not consistent with figures of about 636000 obtained from Table 16.13.

16.8.2 Citizenship

The following table shows population with citizenship in 1991 and 2001

Table 16.11 : Citizenship by sex in 1991 and 2001

Population	Population with Citizenship		Percent	
	1991	2001	1991	2001
Male	9174769	11292559	49.6	49.7
Female	9225901	11327804	49.9	49.8
Total	18400670	22620363	99.5	99.5
Total Population	**18491097**	**22736934**	**100.0**	**100.0**

Source : CBS,2002,p85

Personal Communication with CBS

99.5 percent of the total population in 2001 are Nepalese citizens with 49.7 percent male and 49.8 percent female. These figures are almost identical to corresponding figures in 1991. Hence, it can be seen that data in this regard in 2001 are consistent with data in 1991.

16.8.3 Internal and External in Migrants

The following table shows internal and external in migrants as measured by place of birth

Table 16.12: Place of birth by duration of residence at the place of enumeration

Place of Birth	Duration of Residence at the Place of Enumeration					Total
	0 Year	1-4 Years	5-9 Years	10-14 Years	15+ Years	
Other District	142547	673149	651430	430890	1031047	2929063
Other Countries	17539	114575	128761	91116	256101	608092
Total	160086	787724	780191	522005	1287149	3537155

Source: Personal Communication with CBS

45 percent of internal inmigrants lived at the place of residence for 1-9 years followed by 35 percent living for 15 or more years. In case of external inmigrants, the highest majority 42 percent lived for 15 or more years at the place of residence followed by 40 percent living for 1-9 years. The fact that 40 percent of the population whose place of birth are in other countries lived at the

place of residence for more than 15 or more years is quite significant specially when the corresponding figure is 35 percent for internal migrants.

The above table shows that total foreign born population who resided at the place of enumeration during the period 1991-2001 is 260875.

The following table shows total absent population from household by duration of absence.

Table 16.13: Absent population from household by duration of absence

Duration of Absence (Year)	Total Absent Population from Household
0	146095
1-2	250202
3-5	155324
6-10	105637
11-15	36862
16-20	32406
20 and Above	35655
Total	**762181**

Source: Personal Communication with CBS

Based on this table, the estimation of absent population who left the place of enumeration during the period 1991-2001 is about 636000. As this figure is not consistent with the figure obtained from Table 16.10, it seems that there are problems in the estimation of emigrants as measured by absent population who left during the period 1991-2001.

The following table shows percentage of interval and external inmigrants by duration of residence at the place of enumeration.

Table 16.14: Percentage of interval and external inmigrants by duration of residence

Place of Birth	Duration of Residence and External In-Migrants by Duration of Residence					Total
	<1	1-4	5-9	10-14	15+	
Other District	89.0	85.5	83.5	82.5	80.1	82.8
Other Countries	11.0	14.5	16.5	17.5	19.9	17.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 16.12

The percentage of internal migrants are far greater than external migrants for each group of duration of residence at the place of enumeration. This is in accordance with the general expectation that there would be more migrants from short distances.

16.9 Completeness of Coverage in 2001 Census Enumeration

The post enumeration survey (PES) has been conducted since 1981 to check the accuracy of the enumerated population of Censuses. The quality of PES data of 1981 was highly suspect and as such, it was not used to evaluate the total enumeration in 1981 (CBS, 1987, p332)

In 1991, the PES survey was undertaken but it showed the under enumeration of 1991 population as 11 percent. Out of 11 percent, 6 percent was due to the missing of households and another 5 percent was due to the missing of individuals in the matched households.

After doing a detailed analysis of PES data, the committee then formed by the National Planning Commission (NPC) to evaluate the completeness of coverage of 1991 Census came to a consensus that the under enumeration of 1991 Census is about 5 percent (Unpublished NPC report of the PES Committee, 1993). However, this under enumeration figure was not used to adjust 1991 census because the census figures after all, are obtained by a vast amount of field works.

The PES of 2001 was conducted after four months the census was completed. The field works lasted for one month and was completed by third week of November. 2001. In fact, the PES should have been undertaken immediately after the census. The shorter the period between the completion of the census and PES, the more reliable the estimated figure will be. However, the PES report mentions that the net omission rate in the population Census of 2001 is 5.3 percent with a standard error of .56 percent (Dangol, p. 19).

It seems that the under enumeration is estimated based on individuals in the matched households only. The estimates of under enumeration based on missed individuals both by the census and the survey are not obtained. Moreover, the estimates of under enumeration based on unmatched households in Census and PES are not obtained. The sampling design has not been discussed and the design effect has not been obtained. If the sample is representative of the population and the design effect is not more than three, then it seems that the under enumeration of 5.3 percent in 2001 census can be regarded as the minimum estimate.

16.10 Conclusion

1. Then enumeration of enumeration areas in 2001 Census is almost 100 percent complete.

2. Various Committees have been formed to improve the quality of Census data of 2001.

3. Enumerator per supervisor ratio has been increased and the training has been given at various levels which are the necessary requirements to get reliable Census data.

4. The use of computer in data processing made possible to apply various checks to improve data quality.

5. The low percent of not reported cases for majority of variables indicate that the level of reporting and data processing are good.

6. The application of various techniques indicate that there are problems in the accuracy of reported age.

7. The quality of data as measured by sex ratios in 2001 are similar to corresponding values in 1991 census.

8. Various fertility measures based on 2001 Census data give lower values than corresponding expected true values.

9. Data needed for estimating various mortality measures are highly under reported.

10. There are significant heapings in 2001 Census data for infant deaths at age 12 months.

11. The estimates of immigrants during 1991-2001 based on the foreign born population seem reliable, however, there are problems in the estimates of emigrants during the same period as measured by absent populations.

12. Citizenship data based on 2001Census seem to be reliable.

13. Data on internal migrants as measured by place of birth seem to be reliable as they show, according to the general expectation, that there are more migrants from short distances.

14. If the sample is representative of the population and the design effect is not more than three, the under enumeration of the Census 2001 by 5.3 percent as shown by PES 2001 can be regarded as the minimum estimate.

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