CHAPTER3. METHOD OF THE SAMPLE TABULATION AND RELIABILITY OF ESTIMATES

1. Sampling Method

(a) Private households and institutional households with less than 30 persons were sampled.

(b) Institutional households with 30 persons or more, residents in camps of Self- Defence Forces, inmates of reformatory institutions, etc. were complete count.

The sampling ratios used for (a) were determined as shown in the following table taking into consideration of the accuracy required for respective *shi*, *ku*, *machi*, or *mura*.

Table. Sampling Ratio for (a)

Population Size	Sampling Ratio
(1) *Shi* or *Ku* of 500,000 inhabitants or more	1/20
(2) *Shi* or *Ku* of 300,000 to 499,999 inhabitants	1/18
(3) *Shi* or *Ku* of 200,000 to 299,999 inhabitants	1/13
(4) *Shi* or *Ku* of 100,000 to 199,999 inhabitants	1/10
(5) *Shi*, *Machi*, or *Mura* of 50,000 to 99,999 inhabitants	1/9
(6) *Ku* of 50,000 to 99,999 inhabitants	1/8
(7) *Shi*, *Machi*, or *Mura* of 30,000 to 49,999 inhabitants	1/7
(8) *Ku* of 30,000 to 49,999 inhabitants	1/6
(9) *Shi*, *Machi*, or *Mura* of 20,000 to 29,999 inhabitants	1/5
(10) *Shi*, *Machi*, or *Mura* of 10,000 to 19,999 inhabitants	1/4
(11) *Shi*, *Machi*, or *Mura* of 5,000 to 9,999 inhabitants	1/3
(12) *Machi* or *Mura* of 2,000 to 4,999 inhabitants	1/2
(13) *Machi* or *Mura* of under 2,000 inhabitants	1/1

2. Method of Estimation

The results of the households (a) were estimated as the product of the sample count by the reciprocal of the sampling ratio of each *shi*, *ku*, *machi*, and *mura*.

However, the result of (b) was obtained by complete count.

An estimate $\hat{X}$, that is, the number of persons or households for private households only having the characteristics concerned in an area is obtained as follows.

$$\hat{X} = \sum_{i=1}^{M} (f_i \times x_{1i} + x_{2i})$$

Where

i : i-th *shi*, *ku*, *machi*, or *mura* in the area concerned

M : Number of *shi*, *ku*, *machi*, and *mura* in the area concerned

f_i : Reciprocal of the sampling ratio of households (a) in the i-th *shi*, *ku*, *machi*, or *mura*

x_{1i} : Number of households (a) having the characteristics concerned counted for the i-th *shi*, *ku*, *machi*, or *mura*

x_{2i} : Number of persons having the characteristics concerned living in institutional households with 30 persons or more, etc. in the i-th *shi*, *ku*, *machi*, or *mura*.

3. Sampling Error of Estimates

The figures obtained from the sample tabulation mentioned above are not necessarily equal to the true values that would be obtained from the complete count due to sampling errors.

Sampling errors depend on the size of estimates and the characteristic of items. The ratios of standard error are shown in table .

This ratio of standard error shown in the following table has been computed on the assumption that the sample design was a simple random sampling .

The ratios of standard error have been calculated by the following formula.

Ratio of standard error

$$\hat{C}(\hat{X}) = \sqrt{\frac{N-n}{N} \times \frac{1-\hat{p}}{n\hat{p}}}$$

Where

N: Total population in the concerned area

n: Number of sample household members in the concerned area

p: Ratio of estimate to the total population in the concerned area

The ratio of standard error means the range in which the true value would be found. Probability that the difference between an estimate and the true value is less than the product of the estimate multiplied by its ratio of standard error is about 68% and probability that the same difference would be less than the product of the estimate multiplied by twice the ratio is about 95%.

These tables can be applies to numbers concerning to persons or households by characteristics but not to averages and rates such as persons per household.

Table. Ratio of Standard Error by Size of Estimates (Japan)

Size of estimates	Ratio of Standard Error (Population)	Ratio of Standard Error (Household number)
10, 000, 000	0. 00081	0. 00082
8, 000, 000	0. 00091	0. 00094
6, 000, 000	0. 00106	0. 00111
5, 000, 000	0. 00116	0. 00123
4, 000, 000	0. 00131	0. 00139
3, 000, 000	0. 00151	0. 00162
2, 000, 000	0. 00186	0. 00200
1, 000, 000	0. 00264	0. 00286
800, 000	0. 00296	0. 00321
600, 000	0. 00342	0. 00371
400, 000	0. 00419	0. 00455
300, 000	0. 00484	0. 00526
200, 000	0. 00593	0. 00645
150, 000	0. 00684	0. 00745
100, 000	0. 00838	0. 00913
80, 000	0. 00937	0. 01021
60, 000	0. 01082	0. 01180
40, 000	0. 01326	0. 01445
30, 000	0. 01531	0. 01669
20, 000	0. 01875	0. 02044
15, 000	0. 02165	0. 02360
10, 000	0. 02652	0. 02891
8, 000	0. 02965	0. 03232
6, 000	0. 03424	0. 03732
4, 000	0. 04193	0. 04571
3, 000	0. 04842	0. 05278
2, 000	0. 05930	0. 06464
1, 500	0. 06848	0. 07464
1, 000	0. 08387	0. 09142
800	0. 09377	0. 10221
600	0. 10827	0. 11802
400	0. 13260	0. 14455
300	0. 15312	0. 16691
200	0. 18753	0. 20442
150	0. 21654	0. 23605
100	0. 26521	0. 28910