Appendix A – Sample Design

Sample Size and Sample Allocation

During the implementation of the survey, two major constraints were encountered: a low birth rate in BiH and a limited budget for the survey.

The target BiH MICS sample size of 6,000 households was calculated to fit within the available budget. The standard sample design which is conducted in most MICS countries proved to be inappropriate for BiH due to the country's low birth rate. This meant that it was necessary to purposely look for households with children under five.

The sample was therefore stratified into two types: type 1 consists of households with children under five and type 2 consists of all other households. In addition, the size ratio of the two strata could not threaten the estimation of indicators for other target populations such as indicators for women of reproductive age.

As the total sample size was fixed at 6,000 households, what remained to be done was to estimate the size of the type 1 stratum. The size of type 2 was computed as the difference of the total sample size and type 1 stratum size.

For the calculation of the size of type 1, the key indicator used was the stunting prevalence among children aged 0-4 years. The following formula was used to estimate the required sample size for these indicators:

$$n = \frac{[\ 4\ (r)\ (1\text{-}r)\ (f)\ (1.1)\ ]}{[\ (0.12r)^2\ (p)\ (n_h)\ ]}$$

where:

- n is the required sample size, expressed as the number of households
- 4 is a factor to achieve the 95 percent level of confidence
- r is the predicted or anticipated indicator value
- 1.1 is the factor necessary to raise the sample size by 10 percent for non-response
- f is the shortened symbol for deff (design effect)
- $0.12r$ is the margin of error to be tolerated at the 95 percent level of confidence, defined as 12 percent of r (relative sampling error of r)
- p is the proportion of the total population upon which the indicator r is based
- n_h is the average household size.

For calculation, r (stunting) was predicted at 13 percent. The value of *deff* (design effect) was taken as 1.5 based on estimates from previous surveys, p (percentage of children aged 0–4 years in the total population of households with children under five) was taken as 23.2 percent, and n_h (average size of household with children under five) was taken as five.

The resulting number of households from this exercise was 2,644. This number was rounded up to 3,000 since this did not threaten estimations of other indicators. Based on this, the size of type 2 was determined at 3,000 households – accordingly, the total sum of 6,000 households remained constant.

The sample for BiH MICS was selected at the national level and the main geographical domains (entities) were unevenly represented in the sample.

The Master Sample was used for the selection of the sample due to the fact that no population census has been conducted in BiH since 1991. The Master Sample was updated in 2006 and consists of 1,500 census enumeration areas that were systematically selected with probability proportional to size from approximately 20,000 census enumeration areas covering the whole national territory. A total of 455 census enumeration areas were systematically selected from the Master Sample with probability proportional to size.

All households from 455 census enumeration areas were allocated to two household lists. The first list (type 1) consisted of all households with children under five, and the second list consisted of all other households.

3,000 households having equal selection probability were selected from each list. This meant that each household from the list had the same selection probability. As the lists were different, the households with different sizes from different lists had different selection probability.

Thus, a sample was obtained, which was self-weighted at the level of each list but is not self-weighted at the national level.

The number of households within each cluster is unequal and proportional to the cluster size.

The households in each list were implicitly stratified, i.e. sorted by entity/district, by urban/rural classification, by order of census enumeration area within the municipality, and by ordinal number within the cluster.

The following table shows cluster allocation by sampling domains.

Table SD.1: Allocation of Sample Clusters (Primary Sampling Units) which were included in the sample by sampling domains and sub-domains

Region	Number of clusters		
	Urban	Other	Total
Una-Sana Canton	8	20	28
Posavina Canton	1	4	5
Tuzla Canton	13	30	43
Zenica-Doboj Canton	18	31	49
Bosnia-Podrinje Canton	1	3	4
Central Bosnia Canton	6	21	27
Herzegovina-Neretva Canton	7	19	26
West Herzegovina Canton	1	9	10
Sarajevo Canton	47	4	51
Herceg-Bosnia Canton	2	10	12
Total FBiH	104	151	255
Krajina	24	60	84
Posavina	3	16	19
Podrinje and SRR	13	39	52
Herzegovina	2	11	13
Total Republika Srpska	42	126	168
Brčko District	9	11	20
TOTAL BIH	155	288	443*

* 12 census enumeration areas were not included in the sample

Sampling Frame and Selection of Clusters

The last population census in BiH was conducted in 1991, whereupon war broke out in BiH, lasting from 1992 to 1995. On top of the massive destruction, the war brought about profound demographic changes and movement of populations. Due to the fact that the political situation in BiH was not favourable for the conduct of a population census, no census was taken in 2001.

Due to these unfavourable circumstances in BiH, work was undertaken on the preparation of Master Sample, which would serve as a basis for selection of the sample for social surveys. The Master Sample consists of 1,500 enumeration areas systematically selected from the list of approximately 20,000 census enumeration areas from the 1991 Population Census, which cover geographically the entire territory of BiH. The rationale for systematic rather than PPS selection of enumeration areas was that the size of the enumeration area has become obsolete since 1991.

Census enumeration areas represent clusters in BiH MICS.

Upon selection of the sample of 1,500 census enumeration areas, the Statistical System of BiH which consists of the Agency for Statistics of BiH, Federal Office of Statistics, and the Republic Institute of Statistics of RS, conducted a census of households within these census enumeration areas.

Thus, a list was obtained of 79,629 dwellings, of which a full survey was conducted in 67,699 households. The questionnaire used for updating the Master Sample contained a question on the age of all household members, which made it possible to determine the households with children under five.