

**APPENDIX A**  
**SURVEY DESIGN**



## APPENDIX A

### SURVEY DESIGN

#### A.1 Sample Design and Implementation

Zambia is divided administratively into 9 provinces and 57 districts. In preparation for the 1990 Census of Population, Housing and Agriculture, the entire country was demarcated into Census Supervisory Areas (CSAs). Each CSA was in turn divided into Standard Enumeration Areas (SEAs) of roughly equal size. The measure of size used for selecting the ZDHS sample was the number of households obtained during a quick count operation carried out in 1987. The frame of 4240 CSAs was stratified into urban and rural areas within each province, with the districts ordered geographically within provinces, thus providing further implicit stratification.

The ZDHS sample was selected from this frame in three stages. First, 262 CSAs (149 in urban areas and 113 in rural areas) were selected from this frame with probability proportional to size (the number of households from the quick count). One SEA was then selected from within each sampled CSA, again with probability proportion to size. The Central Statistical Office (CSO) then organised a household listing operation, in which all structures in the selected SEAs were numbered (on doors), the names of the heads of households were listed and the households were marked by number on sketch maps of the SEAs. These household lists were used to select a systematic sample of households for the third and final stage of sampling.

Initially, the objective of the ZDHS sample design was to be able to produce estimates at the national level, for urban and rural areas separately, and for the larger provinces. Since Zambia's population is almost equally divided by urban and rural residence, a self-weighting sample was originally designed. Later, it was decided that it would be desirable to be able to produce separate estimates for all

**Table A.1 Sample design parameters**

Distribution of 1990 census population and number of CSAs allocated and number of households selected in the ZDHS sample

Stratum	Population (1990)	Percent	Number of CSAs allocated	Number of households selected
<b>Urban</b>				
Central	216023	6.6	10	203
Copperbelt	1428697	43.5	64	1036
Eastern	85714	2.6	4	61
Luapula	83036	2.5	4	79
Lusaka	1041473	31.7	47	831
Northern	123457	3.8	6	82
North-Western	45599	1.4	2	44
Southern	190384	5.8	9	234
Western	71383	2.2	3	37
<b>Total</b>	<b>3285766</b>	<b>100.0</b>	<b>149</b>	<b>2607</b>
<b>Rural</b>				
Central	509588	11.2	10	394
Copperbelt	150845	3.3	3	131
Eastern	888104	19.6	17	604
Luapula	443669	9.8	16	577
Lusaka	166507	3.7	3	113
Northern	744338	16.4	14	527
North-Western	337547	7.5	18	624
Southern	755969	16.7	15	508
Western	536114	11.8	17	624
<b>Total</b>	<b>4532681</b>	<b>100.0</b>	<b>113</b>	<b>4102</b>
<b>Total</b>				
Central	725611	9.3	20	597
Copperbelt	1579542	20.2	67	1167
Eastern	973818	12.5	21	665
Luapula	526705	6.7	20	656
Lusaka	1207980	15.5	50	944
Northern	867795	11.1	20	609
North-Western	383146	4.9	20	668
Southern	946353	12.1	24	742
Western	607497	7.8	20	661
<b>Total</b>	<b>7818447</b>	<b>100.0</b>	<b>262</b>	<b>6709</b>

nine provinces. To achieve this objective, additional rural CSAs (and SEAs) were selected in Luapula, North-Western and Western Provinces and the sample *take* (number of households) in each rural SEA in these provinces was reduced from 42 to 35 in order to minimise the total sample size increase (the sample take was 20 households in urban areas). As a result of this oversampling in Luapula, North-Western and Western Provinces, the ZDHS sample is not self-weighting at the national level. Table A.1 presents data on the distribution of the population and various sample parameters by province.

Results of the sample implementation by province and urban-rural residence are presented in Table A.2. The results indicate that of the 6709 households selected, ZDHS interviewers successfully interviewed 93 percent. Three percent of the households selected were found to be either vacant or not a valid household, while another 3 percent were absent (*not at home*). The response rate at the household level was 96 percent. In the interviewed households, 7247 eligible women were found, of whom 97 percent were interviewed.

## A.2 Fieldwork

The ZDHS household and individual questionnaires were pretested September-October 1991. Sixteen staff from the Ministry of Health (mostly nurses and clinical officers) who spoke the languages into which the questionnaires had been translated were trained for two weeks at the Mwachisompola Health Demonstration Clinic, about one hour's drive from Lusaka. In the following 10 days, these interviewers completed 109 interviews mostly in Lusaka and Central Province.

Training of field staff for the main survey was conducted at the University of Zambia. After one-week training sessions—first for the trainers and then for the supervisors and field editors in early December—interviewers were trained from 16 December 1991 to 5 January 1992. Staff from the University, the CSO, the Ministry of Health, Planned Parenthood Association of Zambia, and Macro International conducted the four-week training course. A total of 72 candidates were trained, including most of those who had participated in the pretest. With the exception of two supervisors from the CSO, all candidates for fieldstaff positions were recruited from the Ministry of Health and consisted of nurses, nurse/midwives and clinical officers.

The training course consisted of instruction in general interviewing techniques, field procedures, a detailed review of items on the questionnaires, instruction and practice in weighing and measuring children, mock interviews between participants in the classroom, and practice interviews in the field. Trainees who performed satisfactorily in the training programme were selected as interviewers, while those whose performance was rated as superior were selected as field editors. Those whose performance was satisfactory, but who either could not travel in the field or who did not speak one of the major languages in Zambia, were selected as data processing staff.

The fieldwork for the ZDHS was carried out by 10 teams. Each consisted of one supervisor, one field editor, four interviewers and one driver; however, due to heavier workloads in their provinces, one team had five interviewers and another had six. In total, there were 10 supervisors, 10 field editors, 43 interviewers, and 10 drivers. Of the interviewers, 34 were women and 9 were men. In addition, each team was assigned a fieldwork coordinator, generally one of the trainers, who spent approximately half of the fieldwork time in the field with his/her team. Each team was assigned a vehicle either by the CSO or another government agency and team members moved together through the areas assigned to them. Fieldwork commenced on 18th January and was completed on 15th May 1992.

**Table A.2 Sample implementation**

Percent distribution of households and eligible women by result of the interview and household response rates, eligible woman response rates, and overall response rates, according to sample domain and urban-rural residence, Zambia 1992

Result	Province									Residence		Total
	Central	Copper-belt	East-ern	Lua-pula	Lusaka	North-ern	North West-ern	South-ern	West-ern	Urban	Rural	
	<b>Selected households</b>											
Completed (C)	92.1	97.0	94.1	90.4	95.3	94.6	75.6	97.8	92.0	96.2	90.2	92.5
Household present but no competent respondent at home (P)	0.3	0.4	0.0	0.3	0.3	0.2	0.0	0.4	0.3	0.3	0.2	0.3
Refused (R)	0.2	0.1	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1
Dwelling not found (DNF)	0.2	0.0	0.6	0.3	0.0	0.2	0.6	0.0	0.2	0.1	0.2	0.2
Household absent (HA)	3.2	0.5	1.4	1.4	1.1	2.6	12.8	0.6	2.1	1.1	3.6	2.6
Dwelling vacant/address not a dwelling (DV)	3.2	1.9	2.4	6.6	3.2	2.1	6.7	1.0	4.5	2.1	4.2	3.4
Dwelling destroyed (DD)	0.8	0.0	1.2	0.8	0.1	0.3	0.0	0.1	0.3	0.1	0.5	0.4
Other (O)	0.0	0.1	0.3	0.0	0.0	0.0	4.3	0.0	0.6	0.0	0.9	0.6
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	597	1167	665	656	944	609	698	712	661	2577	4132	6709
<b>Household response rate (HRR)<sup>1</sup></b>												
	96.0	98.9	97.7	97.5	98.6	97.0	81.1	98.9	96.7	98.3	94.7	96.1
<b>Eligible women</b>												
Completed (EWC)	97.6	96.6	97.3	98.5	97.8	97.8	94.6	98.3	97.8	97.4	97.4	97.4
Not at home (EWNH)	1.4	2.6	1.5	0.5	1.7	1.5	4.6	1.5	1.2	2.0	1.7	1.8
Postponed (EWP)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Refused (EWR)	0.3	0.4	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.3	0.2	0.2
Partly completed (EWPC)	0.0	0.1	0.1	0.3	0.1	0.3	0.2	0.0	0.2	0.1	0.2	0.1
Other (EWO)	0.7	0.2	0.7	0.3	0.2	0.2	0.2	0.2	0.8	0.2	0.5	0.4
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	579	1662	676	598	1163	603	409	963	594	3446	3801	7247
<b>Eligible woman response rate (EWRR)<sup>2</sup></b>												
	97.6	96.6	97.3	98.5	97.8	97.8	94.6	98.3	97.8	97.4	97.4	97.4
<b>Overall response rate (ORR)<sup>3</sup></b>												
	93.7	95.5	95.1	96.1	96.4	94.9	76.7	97.2	94.5	95.8	92.3	93.7

Note: The household response rate is calculated for completed households as a proportion of completed, no competent respondent, postponed, refused, dwelling not found and household absent. The eligible woman response rate is calculated for completed interviews as a proportion of completed, not at home, postponed, refused, partially completed and "other." The overall response rate is the product of the household and woman response rates.

<sup>1</sup>Using the number of households falling into specific response categories, the household response rate (HRR) is calculated as:

$$\frac{C}{C + HP + P + R + DNF + HA}$$

<sup>2</sup>Using the number of eligible women falling into specific response categories, the eligible woman response rate (EWRR) is calculated as:

$$\frac{EWC}{EWC + EWNH + EWP + EWR + EWPC + EWO}$$

<sup>3</sup>The overall response rate (ORR) is calculated as:

$$ORR = HRR * EWRR$$

### **A.3 Data Processing**

All questionnaires for the ZDHS were returned to the University of Zambia for data processing. The processing operation consisted of office editing, coding of open-ended questions, data entry, and editing errors found by the computer programs. Two programmers (one from the CSO and one from the University), one questionnaire administrator, two office editors, and three data entry operators were responsible for the data processing operation. The data were processed on four microcomputers owned by the Department of Social Development Studies at the University of Zambia. The ZDHS data entry and editing programs were written in ISSA (Integrated System for Survey Analysis) and followed the standard DHS consistency checks and editing procedures. Simple range and skip errors were corrected at the data entry stage. Secondary machine editing of the data was initiated as soon as a sufficient number of questionnaires had been entered. *The purpose of the secondary editing was to detect and correct, if possible, inconsistencies in the data.* No major problems were encountered during data editing. Data processing commenced on 22nd January and was completed on 20th June 1992.