Afrobarometer Weights Protocol

In Rounds 1 through 3, the Afrobarometer did only minimal weighting of data to correct for over- or under-samples of certain populations, usually based on region or urban-rural location. Starting in Round 4, however, we began collecting additional data (population of each EA selected and the total population of each stratum) in order to improve our calculations of weighting factors based on individual selection probabilities, which are now included for all countries. This allows us to compute much more comprehensive and accurate within-country weights, which can be identified by the variable "WITHINWT".

The variable COMBINWT adjusts WITHINWT as if every country sample size were the same, and should be turned on when reporting multi-country results.

In order to calculate the within-country weights, five kinds of population data are used:

1. **The current population of the survey year in a country**
   The sample universe for Afrobarometer surveys includes all citizens of voting age (usually 18 years and older) within the country.

2. **The population of each Stratum**
   To increase the precision of our estimate, we stratify our sample of either 1200 or 2400 interviews by the key social characteristics in the population, usually sub-national area (usually the first-order administrative division within the country, e.g., region or province) and residential locality (urban or rural).

3. **The population of each EA**
   The Census Enumeration Areas (EA) is the primary sampling unit (PSU), which is the smallest, well-defined geographic unit for which reliable population data are available.[1] Most national census data and maps are broken down to the EA level. Given the Afrobarometer standard clustering of 8 interviews per EA, a sample size of 1200 must therefore contain 150 EAs (1200 ÷ 8). Samples of 2400 will have 300 EAs (2400 ÷ 8). To complete the process of sample design, we allocate the 150 EA's (or 300 with a sample size of 2400) across the strata based on the proportion of the sample allocated to each.

4. **The sum of selected EA population in one stratum**

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[1] From this point, we will use the two terms (PSU and EA) interchangeably.

In order to select the actual EAs in which we will conduct our urban interviews, the NI or
sampling specialist will compile a sampling frame of all EAs in each urban stratum. We then consult the sample design to determine the total number of urban PSUs to select from each stratum. To obtain #4, we add up the EA population in one stratum.

5. **The sum of selected EA population in one secondary sampling unit (SSU)**
The Afrobarometer sampling process has additional stage in rural areas. In rural areas we first select SSUs in order to reduce the traveling distance between EA's. Then 2 EAs will be randomly selected from each SSU. Thus, to obtain #5 we sum up the population in 2 EAs within a given SSU. Note that in case of urban sample, this value is the same as #4 (i.e. the sum of selected EA population in one stratum).

Calculation of Weights

Notation
P_t: the total sampling probability
$P_{(EA)}$: the EA sampling probability
$P_{(STA)}$: the strata sampling probability
N: the sample size
$Population$: the current population of a country in the survey year
$Population_{(STA)}$: the population of each stratum
$Population_{(EA)}$: the population of each EA
$Population_{(SSU)}$: the population of each SSU
$Population_{(STA\_EA)}$: the sum of selected EA population in one stratum
$Population_{(SSU\_EA)}$: the sum of selected EA population in one SSU

The Afrobarometer data Round5 is weighted to the EA level so the stratification and the sampling frame matter. The stratification is usually provinces divided into urban and rural areas. The sampling frame is based on the most recent population projections developed based on the Census data available.[2]

To start with, we need to calculate the *Total Sampling Probability* denoted as P_t.

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[2] Please refer to the Sampling Report for the information on population in each country. AB survey requires that "regardless of whether or not a previous survey has been done in a country, an updated sample frame must be obtained and a new sample must be drawn for each round of the Afrobarometer (p.25)."

$$P_t = \frac{N}{Population}$$

Note that the standard sample size for Round 5 surveys will be 1200 cases. A larger sample size of 2400 is preferred in societies that are extremely heterogeneous (such as South Africa and Nigeria), or where there is interest in doing extensive sub-national analysis.

In addition to the Total Sampling Probability, two pieces of information are needed for weight calculation: EA and Strata sampling probability. Based on the population estimates of strata and EAs, we can obtain them.

The EA sampling probability is:

$$P_{(EA)} = \frac{8}{Population_{(EA)}}$$

Note that there are 8 cases in one EA.[3] The standard Afrobarometer practice is to cluster eight (8) interviews in a single primary sampling unit (PSU). This drastically reduces the costs we would incur compared to traveling to eight different PSUs to collect one interview in each. Therefore, $P_{(EA)}$ does not vary within a given EA.

The strata sampling probability is:

$$P_{(STA)} = \frac{Population_{(STA\_EA)}}{Population_{(STA)}}$$

Note that $P_{(STA)}$ is the same for respondents from the same stratification.

Taken together, the weights for the urban area are calculated as:

$$withinwt = P_t * \left\{ \frac{1}{\left(P_{(EA)} * P_{(STA)} \right)} \right\}$$

For some countries, additional stratification is used because of the great dispersion of the rural residents. In general, the secondary sampling units (SSUs) are districts or wards in a country. Now we need the population estimate at

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[3] If the sampling size of EAs are not constant, additional variable needs to be created for $P_{(EA)}$ calculations.

this level for weights. $P_{(EA)}$ remains the same. The sampling probability is:

$$P_{(SSU)} = \frac{\text{Population}_{(SSU\_EA)}}{\text{Population}_{(SSU)}}$$

These are for those rural samples and it is 1 for urban samples. Following the same standard, the strata sampling probability is:

$$P_{(STA)} = \frac{\text{Population}_{(STA\_SSU)}}{\text{Population}_{(STA)}}$$

Note that for urban strata without SSU stratification, $Population_{(STA\_SSU)}$ is just the sum of selected $Population_{(EA)}$ in one urban stratum.

Taken together, the weights for the rural area are calculated as:

$$withinwt = P_t * \left\{ \frac{1}{\left(P_{(EA)} * P_{(SSU)} * P_{(STA)} \right)} \right\}$$

A. Example[4]

RESPNO	REGION	URBRUR	EANUMB_AB	Population					Sampling Probability			withinwt
				EA	SSU	STRATA	SSU in a Strata	EA in a SSU	EA	STATA	SSU	
752	783	1	244	3219	1	202803	19533	1	0.002485	0.096315	1	0.778414
1801	780	2	1	1106	4419	2104070	385576	2664	0.007233	0.183252	0.602851	0.233173

The Afrobarometer R4.5.5 (also named R4.5(2)) survey sample in Uganda is based on the 2002 National Housing and Population census frame and the 2010 single year population projections. The projected 2010 single year district population is aggregated to regional population totals and used to stratify the sample at that level. The 2002 single year population figures are then used to estimate the adult population (18 years + older) at regional level and urban/rural stratum.[5]

- Population of a country in the survey year = **10733862**[6]

Selection of SSUs (at Sub County Level) and PSUs (Parish level) are based on the 2002 Adult Population. A total of 250 PSUs (n=2000) was stratified across all regions of the country.

- Sample size N = **2000**

Taken together, the weights of each case are calculated as follows:

a. Weights for the case RESPNO752 (Urban)

$$withinwt = \left(\frac{2000}{10733862}\right) * \left\{\frac{1}{(0.002485 * 1 * 0.096315)}\right\} = 0.778414$$

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[4] Source: uga R4.5.5 weights 03feb11.rvsd.xls
[5] Source: Afrobarometer R4.5(2) Uganda Sample Report.doc
[6] 2002 census Population (Urban + Rural)

b. Weights for the case RESPNO1801 (Rural)

$$withinwt = \left(\frac{2000}{10733862}\right) * \left\{\frac{1}{(0.007233 * 0.602851 * 0.183252)}\right\} = 0.233173$$