

**STEP Survey Weighting Procedures Summary
(Based on The World Bank Weight Requirement)**

Lao PDR

October 11, 2013

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1 Survey Design Overview

The Laos survey firm implemented a partial literacy assessment design. The partial assessment required each selected person to attempt to complete a General Booklet comprising Reading Components and a set of Core Literacy Items. The partial assessment sampling objective was to have a minimum of about 2000 selected persons attempt the General Booklet.

The target population for the Laos STEP survey comprised all non-institutionalized persons 15 to 64 years of age (inclusive) living in private dwellings in urban and rural areas of Laos at the time of data collection.

Exclusions

Remote villages (i.e., Village Type 3 in the sample frame) without road access were excluded from the target population due to the operational difficulty and the cost to reach these communities.

The sample frame for the selection of first stage sample units was the Excel file '[Data - Poppulation census 2009](#)' that was provided by the Laos survey firm. The frame is a list of first stage sampling units in the urban and rural areas of Laos. The source of this sample frame is the '2009 List of Villages' from the Laos Bureau of Statistics.

Table 1 provides the sample frame counts excluding the Remote villages.

Table 1: Laos Sample Frame Count - Number of Villages & Number of Households by Province (Excludes Village Type = 'Remote')							
Province		Number of Villages			Number of Households		
		Village Type			Village Type		
Code	Name	Urban	Rural	Total	Urban	Rural	Total
01	Vientiane Capital	264	224	488	90,909	39,405	130,314
02	Phongsaly	52	347	399	5,294	18,282	23,576
03	Luangnamtha	37	271	308	6,294	20,201	26,495
04	Oudomxay	49	303	352	9,381	29,195	38,576
05	Bokeo	42	212	254	5,625	20,163	25,788
06	Luangprabang	160	413	573	25,063	33,018	58,081
07	Huaphanh	28	646	674	6,141	37,067	43,208
08	Xayabury	97	316	413	20,772	43,702	64,474
09	Xiengkhuang	69	394	463	11,455	27,231	38,686
10	Vientiane Province	87	409	496	22,277	60,198	82,475
11	Borikhamxay	56	251	307	13,086	28,836	41,922
12	Khammuane	114	368	482	18,207	41,017	59,224
13	Savannakhet	145	733	878	35,184	98,628	133,812
14	Saravane	32	551	583	4,871	53,412	58,283
15	Sekong	20	138	158	3,853	9,254	13,107
16	Champasack	101	387	488	31,569	58,376	89,945
17	Attapeu	25	106	131	6,009	14,290	20,299
Total		1,378	6,069	7,447	315,990	632,275	948,265

The Laos sample design is a 3 stage stratified sample design. The stratification variable is urban-rural indicator.

First Stage Sample

The primary sample unit (PSU) is a village. The sampling objective was to conduct interviews in 134 urban villages and 54 rural villages.

The villages were selected with probability proportional to size (PPS), where the measure of size was the number of households in a village.

Second Stage Sample

The second stage sample unit (SSU) is a household. In the second stage, the number of households selected in each selected PSU was proportional to the size of the selected PSUs. The households were selected from a list of households in each selected PSU by systematic equal probability sampling. At the same time, a reserve sample of the same number of households as the target sample in each PSU was selected for use when needed to ensure that the target sample size is achieved.

Third Stage Sample

The third stage sample unit was an individual aged 15-64 (inclusive). The sampling objective was to select one individual with equal probability from each selected household.

2 Data Collection Outcomes

The final survey weights depend on the outcome from the attempt to obtain an interview at each selected household. The treatment of each sampled case in the weighting process depends on the result code assigned to the sampled household and the result code assigned to the selected person. The result codes used in the Laos STEP are listed in Table 2. A variable called '**FinResultCode**' with these code values was created during the weighting process and a '**FinResultCode**' was assigned to each sampled case.

Note: The final result code '10-Household moved away' was added to the list of final result codes for the Laos data collection.

Table 2: Result Codes for Sampled Households and Selected Persons	
I. Household-level Codes	
Code	Code Description
01	Household Refusal
02	Household unusual circumstance (e.g., death in family, illness, fire in dwelling, etc.)
03	No knowledgeable household member found after 3 visits (only a child, non-competent adult, etc.)
04	Temporarily absent/unavailable for field period (information from other persons)
05	No competent household member to interview (because of severe illness, mental disability, etc.)
06	Language problem – no household member spoke a language understandable by survey team, no translator available
07	Dwelling could not be found / selected address has no household
08	Vacant dwelling
09	Dwelling not habitable/dwelling destroyed/dwelling converted to commercial use
10	Household moved away
21	Household Refusal to continue Household Module (i.e., begun but not complete)
22	Household unusual circumstance (e.g., death in family, illness, fire in dwelling, etc.) prevented continuance
31	No household member in the eligible range of 15-64
95	Sample case not activated
96	General non-response; Reason unspecified by survey firm
97	Sample selection error – a wrong household was selected in the field
II. Person-level Codes	
Code	Code Description
	Individual modules 2-7 not begun
32	Refusal by Selected Person to begin modules 2-7
33	Unusual circumstance - Selected Person (e.g., death in family, illness, fire in dwelling, etc.)
34	Refusal - Another household member refused to let selected individual do individual modules
35	Unable to contact Selected Person after three visits during field period
36	Temporarily absence/unavailability of Selected Person for field period (info from household member)
37	Hearing Problem - Selected Person is deaf or so hard-of-hearing, no translator available
38	Learning or mental disability (includes emotional conditions like severe depression) of Selected Person
39	Speech impairment of Selected Person prevented participation, no translator available
40	Language problem – Selected Person's language not understood by survey team, no translator available
	Individual modules 2-7 begun but not completed
51	Refusal by Selected Person to continue modules 2-7
52	Unusual circumstance - Selected Person
	General Booklet (module 9) not begun
61	Unable to read or write in language of General Booklet – Selected Person refused to begin
62	Refusal by Selected Person to begin General Booklet
63	Unusual circumstance - Selected Person
64	Blindness or visual impairment of Selected Person prevented completion of General Booklet
65	Physical disability of Selected Person prevented completion of General Booklet
	General booklet (module 9) looked through or attempted but not completed
71	Selected Person looked at Booklet but unable to read & write the language of Booklet - did not begin
72	Refusal by Selected Person to continue the General Booklet
73	Interruption – unacceptably long
74	Unusual circumstance - Selected Person
75	Attempted General Booklet but no answers marked
76	Marked some items but did not attempt all items in General Booklet
77	Marked some items & attempted all items in General Booklet
78	Marked all items in General Booklet
98	Sample selection error – an incorrect eligible person was selected by the interviewer
99	Sample selection error – an ineligible person was selected by the interviewer

3 Weighting Overview

The Laos three-stage stratified cluster design resulted in differential probabilities of selection for the selected persons. Consequently, each selected person in the survey does not necessarily represent the same number of persons in the target population. To account for differential probabilities of selection due to the nature of the design and to ensure accurate survey estimates, the Laos STEP requires a sampling weight for each person that participated in the survey.

In general, the objectives of the Laos STEP weighting are to construct a set of survey weights to,

- 1) compensate for unequal probabilities of selection;
- 2) compensate for household-level non-response and person-level non-response;
- 3) adjust the weighted sample distribution for key variables of interest (for example, age, gender, education) so that it conforms to a known population distribution for these variables.

The general weighting procedure for the Laos STEP survey required the following tasks.

- 1) Creation of a data file to input into the weighting process;

2) **World Bank (WB) Weight Requirement:**

Create survey weights for sampled cases of households and persons that provided sufficient data to be considered a participant in the survey. This requirement does not necessarily include the completion of an assessment General Booklet, nor does it necessarily include the completion of all household and individual questionnaire modules.

- a) Calculation of a PSU weight for 188 sampled PSUs (i.e., 154 urban PSUs, 34 rural PSUs);
 - b) Calculation of a household weight for each sampled household;
 - i) Calculation of a household-level non-response adjustment independently for each PSU.
 - c) Calculation of a person weight for each selected person (SP);
 - i) Calculation of a non-response adjustment independently for each sampled person.
- 3) The required output from the weighting process is a final Laos data file with the survey design weights (i.e., for each sampled PSU, household, person) appended to each data record.

4 Weighting Process Files

The key file for the weighting process is the STATA file '[STEP - Laos - Data for Weights](#)' provided by the WB core team. An SPSS version of this file was created for the weighting process.

Table 3 provides the frequency counts by 'Result Code of Interview', i.e., variable '*m11_q07*', for the Laos data file '[STEP - Laos - Data for Weights](#)'.

Table 3: Result Code of Interview by Urban-Rural Indicator - 'STEP - Laos - Data for Weights'			
Result Code of Interview	Urban	Rural	Total
32-Refusal-Refusal by SP to begin modules 2-7		1	1
51-Refusal by SP to continue modules 2-7	1		1
61-SP unable to read language of GB	124	129	253
62-SP refusal to begin GB	31	3	34
63-SP unable to do GB due to unusual circumstance	4	1	5
64-SP blindness or visual impairment-unable to do GB	30	3	33
65-SP physical disability	4		4
71-SP looked through GB-unable to read & write language of GB	56	63	119
72-SP refused to continue GB after starting	176	91	267
73-GB interruption	38	10	48
74-GB terminated due to unusual circumstance	81	43	124
75-SP attempted GB-did not mark any answers	2	3	5
76-SP marked some GB items-did not attempt all items	187	105	292
77-SP marked some GB items & attempted all GB items	443	180	623
78-SP marked all GB items	857	183	1040
Total	2034	815	2849

4.1 Revisions to Input Data File

The following revisions were made to the Laos data file:

- 1) Revised the value labels for the variable '*m11_q07*', the Result of Interview Code, to correspond to the Codes and code descriptions in Table 2 of this document.
- 2) Renamed the variable '*final_status*' to '*FinResultCode*', Final Result Code, and revised its value labels to correspond to the Codes and code descriptions in Table 2 of this document. This was done to be consistent with the variable name in the weighted files for other countries.
- 3) Revised Final Result Code, i.e., variable '*FinResultCode*', for incorrectly selected persons as follows:
 - ♦ IF (*hh_listing* = 228190) *FinResultCode*=98.
 - ♦ IF (*hh_listing* = 282253) *FinResultCode*=98.
 - ♦ IF (*hh_listing* = 111072) *FinResultCode*=98.
- 4) **SPSS Output File: '[W01-LAO Final Sampled Cases\(03-Dec-2012\)](#)'**
 - a) This file includes all 5600 sampled cases; each case includes a final result code. Table 4 provides the breakdown of the 5600 cases by Final Result Code.
 - i) This file is the primary file for the process of creating the survey weights.

- ♦ Table 5 provides the list of key variables for weighting that are included in ‘[W01-LAO Final Sampled Cases\(03-Dec-2012\)](#)’
- b) Table 6 provides the breakdown of the 5600 cases by Final Result Code and by Household Sample Type.
- c) For weighting purposes, a finalized case is a sample household for which a final result code has been assigned. Ideally, there should be a final result code for each of the 5600 sampled households on the original sample file. During the file preparations for weighting, a final result code was assigned to the 5600 sampled cases.

Table 4: Laos Step Data - Number of Cases by Final Result Code			
Final Result Code	Urban	Rural	Total
01-Refusal-Household	69	5	74
02-Unusual circumstance-Household	7		7
03-No knowledgeable household member found after 3 visits	2	1	3
04-Temporarily absent/unavailable for field period	42	22	64
05-No competent household member to interview	1		1
06-Language problem	1		1
07-Dwelling could not be found / selected address has no household	3		3
10-household moved away	75	6	81
31-No eligible household member aged 15-64	20	8	28
32-Refusal-Refusal by SP to begin modules 2-7		1	1
51-Refusal by SP to continue modules 2-7	1		1
61-SP unable to read language of GB	124	129	253
62-SP refusal to begin GB	31	2	33
63-SP unable to do GB due to unusual circumstance	4	1	5
64-SP blindness or visual impairment-unable to do GB	30	3	33
65-SP physical disability	4		4
71-SP looked through GB-unable to read & write language of GB	55	63	118
72-SP refused to continue GB after starting	176	91	267
73-GB interruption	38	10	48
74-GB terminated due to unusual circumstance	81	43	124
75-SP attempted GB-did not mark any answers	2	3	5
76-SP marked some GB items-did not attempt all items	187	105	292
77-SP marked some GB items & attempted all GB items	442	180	622
78-SP marked all GB items	857	183	1040
95-Sample case not activated	1746	743	2489
98-Sample selection error – incorrect eligible person selected	2	1	3
Total	4000	1600	5600

Table 5: Key Variables in Primary Input File for Weighting Process		
Variable Name	Source	Description
country	Sample File	Country abbreviation code
smplid	Sample File	Sampled case ID#
psusmpid	Sample File	PSU ID – sampled PSUs
villaget	Laos Data File	village type - indicator of urban-rural
hhldcnt	Sample File (from Sample Frame)	Sample Frame # of households in PSU
HHsmpSeq	Sample File	Household Sample Sequence #s 01 to 30
HHsmpType	Sample File	HH Sample Indicator
HHsmpOrder	Sample File	Sample activation order
id_ques	Laos Data File	Questionnaire Identifier
cluster	Laos Data File	Household Id
hhn	Laos Data File	Household Number
check_digit	Laos Data File	check digit
m1c_a	Laos Data File	NUMBER A-# of eligible persons
m1c_b	Laos Data File	NUMBER B- listing # of selected person
m11_q07	Laos Data File	Result code of interview
FinResultCode	Created during file preparations	Final Result Code
hhcntlst	Laos Data File	total # of listed households in PSU

Table 6: Laos Step Data - Number of Finalized Cases by Final response Code, HH Sample Type, & Urban-Rural Indicator									
Final Result Code	Urban			Rural			Total		
	Initial sample	Reserve sample	Total	Initial sample	Reserve sample	Total	Initial sample	Reserve sample	Total
01-Refusal-Household	58	11	69	5		5	63	11	74
02-Unusual circumstance-Household	5	2	7				5	2	7
03-No knowledgeable household member found after 3 visits	2		2	1		1	3		3
04-Temporarily absent/unavailable for field period	38	4	42	20	2	22	58	6	64
05-No competent household member to interview	1		1				1		1
06-Language problem	1		1				1		1
07-Dwelling could not be found/selected address has no hhold	3		3				3		3
10-household moved away	69	6	75	6		6	75	6	81
31-No eligible household member aged 15-64	16	4	20	7	1	8	23	5	28
32-Refusal-Refusal by SP to begin modules 2-7				1		1	1		1
51-Refusal by SP to continue modules 2-7	1		1				1		1
61-SP unable to read language of GB	116	8	124	121	8	129	237	16	253
62-SP refusal to begin GB	27	4	31	2		2	29	4	33
63-SP unable to do GB due to unusual circumstance	3	1	4	1		1	4	1	5
64-SP blindness or visual impairment-unable to do GB	27	3	30	2	1	3	29	4	33
65-SP physical disability	4		4				4		4
71-SP looked through GB-unable to read & write language of GB	51	4	55	62	1	63	113	5	118
72-SP refused to continue GB after starting	157	19	176	86	5	91	243	24	267
73-GB interruption	33	5	38	10		10	43	5	48
74-GB terminated due to unusual circumstance	72	9	81	43		43	115	9	124
75-SP attempted GB-did not mark any answers	2		2	3		3	5		5
76-SP marked some GB items-did not attempt all items	170	17	187	100	5	105	270	22	292
77-SP marked some GB items & attempted all GB items	406	36	442	171	9	180	577	45	622
78-SP marked all GB items	771	86	857	173	10	183	944	96	1040
95-Sample case not activated		1746	1746		743	743		2489	2489
98-Sample selection error – incorrect eligible person selected	1	1	2	1		1	2	1	3
Total	2034	1966	4000	815	785	1600	2849	2751	5600

4.2 Final Output File from Weighting Process

The output file from the weighting process is,

1) LAO-W01-STEP(HH) Weighted Data-Basic Weights (04-Dec-2012)

- a) This file contains the original data variables from the Laos data file '[STEP - Laos - Data for Weights](#)' and the applicable PSU weights, household weights, person weights, and other variables that were created during the weighting process.
- b) The file contains 2849 participating households, each with a final household weight. The breakdown of the count of participating households by urban-rural indicator is shown below in Table 7.

Table 7: Laos Count of Participating Households by Urban-Rural Indicator			
	Urban	Rural	Total
Number of Participating Households	2034	815	2849
Sum of Household Weights	305,183	628,795	933,978

- c) In addition to the Laos data file variables, the weighted data file includes additional variables that were created during the weighting process. The essential variables that are needed for estimation of survey results are included in the final weighted data file.
 - i) Table 8 provides the list of variables, created or revised during the weighting process, which are included in the final weighted data file.
 - ii) Table 9 provides the list of other available variables from the weighting process that are not included in the final weighted data file.
 - iii) Table 10 provides the frequency count of result codes for participating households in the final weighted data file '[LAO-W01-STEP\(HH\) Weighted Data-Basic Weights \(04-Dec-2012\)](#)'.

Table 8: Variables Created or Revised During Weighting Process - Added to Laos Data File		
Variable Name	Description	Values
hhldcnt	Sample Frame # of households in PSU (renamed from 'hhldcoun')	n/a
hhcntlst	total # of listed households in PSU (renamed from 'HH_Count_Listing')	n/a
FinResultCode	Final Result Code (renamed from 'final_status')	Refer to Table 2 for code descriptions
FinRespCat_HH	Final Response Category-Households	1-Participant HH 2-Ineligible HH 3-Non-participant Eligible HH 4-Non-participant Unknown Eligibility HH
FinRespCat_SP	Final Response Category-Selected Person	1-Participant SP 2-Non-participant, Eligible 3-Non-participant, Ineligible 9-Not applicable - non-participating HH
W1_PSUwt	Basic PSU Weight	n/a
W_FinHHwt	Final Household Weight Use for estimation of Household characteristics	n/a
W_FinSPwt	Final Person Weight Use for estimation of Person characteristics	n/a

Table 9: Variables Created During Weighting Process – Not Added to Laos Data File		
Variable Name	Description	Values
PSU_FIN#	Count of 'FinRespCat_HH' in PSU	n/a
HH_k	# of participant HHs in PSU	n/a
HH_x	# of Ineligible HHs in PSU	n/a
HH_z	# of Non-participant Eligible HHs in PSU	n/a
HH_u	# of Non-participant Unknown Eligible HHs in PSU	n/a
W2_HH	Household Weight within PSU	n/a
W2_HHwt_basic	Basic Household Weight	n/a
Elig_Prop	Proportion of Eligible HHs - known eligibility	n/a
R_adj_HH	Response adjustment ratio for HHs	n/a
EligPersCnt	Eligible Person Count in Sampled HH	n/a
W3_SP	Selected Person n weight within household	n/a
R_adj_SP	Response adjustment for selected person	n/a
PSU_EPsum	Total Eligible Persons-PSU Participant Households	n/a
PSU_PPcumul	Total Eligible Persons-PSU Participant SP Households	n/a

Table 10: Laos Final Weighted Data File – Frequency of Final Result Codes For participating households (i.e., FINRESPCAT_HH=1)

Final Result Code	Urban		Rural		Total	
	n	% of Total n	n	% of Total n	n	% of Total n
32-Refusal-Refusal by SP to begin modules 2-7			1	0.0%	1	0.0%
51-Refusal by SP to continue modules 2-7	1	0.0%			1	0.0%
61-SP unable to read language of GB	124	4.4%	129	4.5%	253	8.9%
62-SP refusal to begin GB	31	1.1%	2	0.1%	33	1.2%
63-SP unable to do GB due to unusual circumstance	4	0.1%	1	0.0%	5	0.2%
64-SP blindness or visual impairment-unable to do GB	30	1.1%	3	0.1%	33	1.2%
65-SP physical disability	4	0.1%			4	0.1%
71-SP looked through GB-unable to read & write language of GB	55	1.9%	63	2.2%	118	4.1%
72-SP refused to continue GB after starting	176	6.2%	91	3.2%	267	9.4%
73-GB interruption	38	1.3%	10	0.4%	48	1.7%
74-GB terminated due to unusual circumstance	81	2.8%	43	1.5%	124	4.4%
75-SP attempted GB-did not mark any answers	2	0.1%	3	0.1%	5	0.2%
76-SP marked some GB items-did not attempt all items	187	6.6%	105	3.7%	292	10.2%
77-SP marked some GB items & attempted all GB items	442	15.5%	180	6.3%	622	21.8%
78-SP marked all GB items	857	30.1%	183	6.4%	1040	36.5%
98-Sample selection error – incorrect eligible person selected	2	0.1%	1	0.0%	3	0.1%
Total	2034	71.4%	815	28.6%	2849	100.0%

5 Weight Calculations based on World Bank (WB) Weight Requirement

The input file for the process of calculating the weights based on the World Bank (WB) weight requirement is 'W01-LAO Final Sampled Cases(03-Dec-2012)', which was created from the provided file 'STEP - Laos - Data for Weights'.

5.1 First-stage Weight (PSU Weight)

The basic first stage weight, i.e., the PSU weight, is calculated separately for the selected urban PSUs and the selected rural PSUs. The urban PSU weight is based on a sample size of 134 urban PSUs, while the rural PSU weight is based on 54 rural PSUs. Although 224 PSUs were initially selected, only the 188 'initial' PSU sample was actually activated during data collection; none of the 36 'reserve' PSUs was used for the Laos STEP data collection. Therefore, the Laos STEP survey weight is based on the probability of selection for each of the 188 'initial' PSU sample.

For the Laos PPS sample, the probability of selection of the j^{th} PSU in geographic area 'g', say p_{gj} , may be represented as,

$$1) \quad p_{gj} = \frac{y_g * m_{gj}}{M_g}$$

where,

$$g = \begin{cases} 1, \text{Urban PSU} \\ 2, \text{Rural PSU} \end{cases}$$

y_g - the number of sampled PSUs in geographic area g (i.e., $y_1=154$ urban PSUs, $y_2=34$ rural PSUs in the case of the Laos STEP Survey),

m_{gj} - the measure of size for the j^{th} PSU in geographic area 'g', in the case of the Laos STEP Survey the measure of size for the first stage selection of PSUs was the sample frame number of households in each PSU in the target population,

M_g - the total number of households, based on the sample frame information, in the target population in geographic area 'g', is represented by

$$2) \quad M_g = \sum_{j=1}^{Y_g} m_{gj}$$

where,

Y_g - the total number of PSUs in the target population.

$M_1 = 315,990$ is the sample frame count of *urban* households for the Laos STEP survey,

$M_2 = 632,275$ is the sample frame count of *rural* households for the Laos STEP survey.

The basic first stage weight, W_{1gj} , for the j^{th} PSU in geographic area 'g' is calculated as the inverse of its probability of selection:

$$3) \quad W_{1gj} = \frac{1}{p_{gj}} = \frac{M_g}{y_g * m_{gj}}$$

➤ The basic first stage PSU weight is appended to the STEP data file.

Example 1: First Stage Weight

The basic first stage weight for the *urban* (i.e., $g=1$) Laos PSU # 101 which contains 305 sample frame households is calculated as follows:

$$W_{1j1} = \frac{1}{p_{j1}} = \frac{M_g}{y_1 * m_{j1}} = \frac{315,990}{134 * 305} \approx 7.73$$

The basic first stage weight is similarly calculated for each of the 188 PSUs.

5.2 Second-stage Weight (Household Weight)

The basic second stage weight for the k^{th} household in PSU ' j ', W_{2jk} , is calculated as follows:

$$4) \quad W_{2jk} = \frac{m'_j}{n_j}$$

where,

m'_j - the number of ***listed*** households in the j^{th} PSU,

n_j - the number of households sampled in the j^{th} PSU.

Example 2: Second Stage Basic Weight

The basic second stage weight for each of the 26 sampled households in the Laos PSU # 101, which contains 325 ***listed*** households, is calculated as follows:

$$W_{2jk} = \frac{m'_j}{n_j} = \frac{325}{26} \approx 12.5$$

The basic second stage weight is similarly calculated for each of the 188 PSUs.

5.2.1 Second-stage Response Adjustment

For treatment in the weighting process the data collection outcomes for the sampled households may be summarized in four possible categories: participant, ineligible, non-participant with known eligibility, non-participant with unknown eligibility.

Participant - A participating household 'k' is an eligible sampled household that provides sufficient data to be considered a participant in the survey. The sampled households 'k' with person-level result codes 32-40, 51-78 and 98-99 satisfy the requirement for classification of the household as a survey participant. The result codes and corresponding code descriptions for participating households 'k' are as follows:

I. Household-level Codes – Participant, Eligible Household	
Code	Code Description
Individual modules 2-7 not begun	
32	Refusal by Selected Person to begin modules 2-7
33	Unusual circumstance - Selected Person (e.g., death in family, illness, fire in dwelling, etc.)
34	Refusal - Another household member refused to let selected individual do individual modules
35	Unable to contact Selected Person after three visits during field period
36	Temporarily absence/unavailability of Selected Person for field period (info from household member)
37	Hearing Problem - Selected Person is deaf or so hard-of-hearing, no translator available
38	Learning or mental disability (includes emotional conditions like severe depression) of Selected Person
39	Speech impairment of Selected Person prevented participation, no translator available
40	Language problem – Selected Person's language not understood by survey team, no translator available
Individual modules 2-7 begun but not completed	
51	Refusal by Selected Person to continue modules 2-7
52	Unusual circumstance - Selected Person
General Booklet (module 9) not begun	
61	Unable to read or write in language of General Booklet – Selected Person refused to begin
62	Refusal by Selected Person to begin General Booklet
63	Unusual circumstance - Selected Person
64	Blindness or visual impairment of Selected Person prevented completion of General Booklet
65	Physical disability of Selected Person prevented completion of General Booklet
General booklet (module 9) looked through or attempted but not completed	
71	Selected Person looked at Booklet but unable to read & write the language of Booklet - did not begin
72	Refusal by Selected Person to continue the General Booklet
73	Interruption – unacceptably long
74	Unusual circumstance - Selected Person
75	Attempted General Booklet but no answers marked
76	Marked some items but did not attempt all items in General Booklet
77	Marked some items & attempted all items in General Booklet
78	Marked all items in General Booklet
98	Sample selection error – an incorrect eligible person was selected by the interviewer
99	Sample selection error – an ineligible person was selected by the interviewer

Ineligible – A sampled household ‘x’ is categorized as ineligible if there is no household member in the eligible 15-64 age range. The result codes for ineligible sampled households ‘x’ are as follows:

II. Household-level Codes – Ineligible Household	
Code	Code Description
07	Dwelling could not be found / selected address has no household
08	Vacant dwelling
09	Dwelling not habitable/dwelling destroyed/dwelling converted to commercial use
10	Household moved away
31	No household member in the eligible range of 15-64

Non-participant - Eligibility Known: A non-participating household ‘z’ results when an eligible household does not participate due to refusal, unusual circumstance, or the household was selected in error. The result codes for sampled households ‘z’ with known eligibility are as follows:

III. Household-level Codes – Non-participants, Eligible Household	
Code	Code Description
21	Household Refusal to continue Household Module (i.e., begun but not complete)
22	Household unusual circumstance (e.g., death in family, illness, fire in dwelling, etc.) prevented continuance
97	Sample selection error – a wrong household was selected in the field

Non-participant - Eligibility Unknown: A non-participating household ‘u’ results when a household does not participate due to non-contact with a responsible household member, inconclusive information about the eligibility status of the sampled household, or sample case was not activated (this usually pertains to the reserve sample cases). The result codes for non-participating households ‘u’ with unknown eligibility are as follows:

IV. Household-level Codes – Non-participants, Unknown Eligibility Household	
Code	Code Description
01	Household Refusal
02	Household unusual circumstance (e.g., death in family, illness, fire in dwelling, etc.)
03	No knowledgeable household member found after 3 visits (only a child, non-competent adult, etc.)
04	Temporarily absent/unavailable for field period (information from other persons)
05	No competent household member to interview (because of severe illness, mental disability, etc.)
06	Language problem – no household member spoke a language understandable by survey team, no translator available
95	Sample case not activated
96	General non-response; Reason unspecified by survey firm

The total number of sampled households in each PSU may be represented by the following equation.

$$5) \quad n_j = n_{jk} + n_{jx} + n_{jz} + n_{ju}$$

where,

- n_j - the number of households sampled in the j^{th} PSU,
- n_{jk} - the number of households ‘k’ that participate in the j^{th} PSU,
- n_{jx} - the number of ineligible households ‘x’ in the j^{th} PSU,
- n_{jz} - the number of non-participating households ‘z’ with known eligibility in the j^{th} PSU,
- n_{ju} - the number of non-participating households ‘u’ with unknown eligibility in the j^{th} PSU.

Table 11 provides the STEP counts from the Laos data file for the outcome categories described above.

Table 11: Sample Count of Households by Final Response Category						
Final Response Category-Households	Urban		Rural		Total	
		% of		% of		% of
	n	Total n	n	Total n	n	Total n
1-Participant HH (n_{jk})	2034	36.3%	815	14.6%	2849	50.9%
2-Ineligible HH (n_{jx})	98	1.8%	14	0.2%	112	2.0%
3-Non-participant, Eligible HH (n_{jz})	0	0.0%	0	0.0%	0	0.0%
4-Non-participant, Unknown Eligibility HH (n_{ju})	1868	33.4%	771	13.8%	2639	47.1%
Total (n_j)	4000	71.4%	1600	28.6%	5600	100.0%

5.2.2 Adjustment of Household Weights for Unknown Eligibility

The STEP assumes that the households 'u' with unknown eligibility in the j^{th} PSU are comprised of some proportion, say ε_g , that are eligible households and the complementary proportion, $1 - \varepsilon_g$, that are ineligible households. Note that the calculation of ε_g is carried out independently for the urban and rural PSUs.

Amongst the n_{ju} non-participating households 'u' with unknown eligibility the proportion of households with known eligibility is estimated to be

$$6) \quad \varepsilon_g = \frac{\text{Total \# of known eligible cases}}{\text{Total \# of known eligible \& known ineligible cases}} = \frac{n_{gjk} + n_{gjz}}{n_{gjk} + n_{gjx} + n_{gjz}}$$

➤ Note that the eligible proportion is the same for all eligible participating households.

Example 3: Eligible Proportion

The counts in Table 11 provide input for calculation of the proportion of households with known eligibility.

For the *urban* PSUs, the calculation of the eligibility proportion is as follows,

$$\begin{aligned} \varepsilon_1 &= \frac{\text{Total \# of known eligible cases}}{\text{Total \# of known eligible \& known ineligible cases}} \\ &= \frac{n_{jk} + n_{jz}}{n_{jk} + n_{jx} + n_{jz}} \\ &= \frac{2034 + 0}{2034 + 98 + 0} = \frac{2034}{2132} \approx 0.954034 \end{aligned}$$

For the *rural* PSUs,

$$\varepsilon_2 = \frac{815 + 0}{815 + 14 + 0} = \frac{815}{829} \approx 0.983112$$

5.2.3 Adjustment of Household Weights for Non-participation

A household-level response adjustment is necessary to compensate for households that did not participate in the survey. The household-level response adjustment for the j^{th} PSU in geographic area 'g', R_{gj} , is calculated as follows:

$$7) \quad R_{gj} = \frac{\text{Total eligible households in PSU 'j'}}{\text{Total participating households in PSU 'j'}} = \frac{n_{jk} + n_{jz} + (\epsilon * n_{ju})}{n_{jk}}$$

- The response adjustment ratio, R_{gj} , incorporates the adjustment for unknown eligibility, ϵ_g .
- The households that are categorized as ineligible, n_{jx} , are excluded from the calculation of the household-level response adjustment.

Example 4: Second Stage Response Adjustment for sampled Households

For example, the following results were obtained for PSU #101

n_j	n_{jk}	n_{jx}	n_{jz}	n_{ju}
26	13	1	0	12

Therefore,

$$\begin{aligned} R_{1,101} &= \frac{\text{Total eligible households in PSU } j}{\text{Total participating households in PSU } j} = \frac{n_{jk} + n_{jz} + (\epsilon_1 * n_{ju})}{n_{jk}} \\ &= \frac{13 + 0 + (0.954034 * 12)}{13} \\ &\approx 1.880647 \end{aligned}$$

The response adjustment ratio, R_{gj} , is similarly calculated for all sampled PSUs.

5.2.4 Final Second-stage Household Weight

The final household weight is the weight used for producing household-level estimates, such as the proportion of households with a specific attribute. This weight is appended to the STEP data file.

The final household weight is calculated as the product of the PSU weight, the basic household weight, and the response adjustment for the basic household weight. Therefore, for household 'k' in PSU 'j', the final household weight, W_H , is calculated as follows:

$$8) \quad W_H = W_{1j} * W_{2jk} * R_j$$

- The final second stage household weight is appended to the STEP data file.

Example 5: Second Stage – Final Household Weight

For PSU #101,

$$\begin{aligned} W_H &= W_{1j} * W_{2jk} * R_j \\ &= 7.73 \times 12.5 \times 1.880647 \\ &\approx 96.6648 \end{aligned}$$

The final household weight is similarly calculated for all sampled households.

5.2.5 Weighted Household Counts

The original sample frame ‘[Data - Poppulation census 2009](#)’ showed that there is a total of 948,265 households in the target population, comprised of 315,990 urban households and 632,275 rural households. The numbers of households on the sample frame includes households that no longer existed at the time of the STEP survey, e.g. vacant dwellings, demolished dwellings, no eligible person for STEP in household, etc..

The total unweighted number of households in the sampld PSUs is provided in Table 12. The counts in Table 12 are unweighted counts that have not been adjusted for ineligible households found in the STEP sample.

Table 12: Number of Households in Sampled PSUs by Source of Count by Urban-Rural Indicator			
Source of Count	Urban	Rural	Total
Sample Frame Count	46,677	10,815	57,492
Listing Operation	47,231	10,784	58,015

Table 13 provides,

- the total number of households based on the sample frame count of households;
- the weighted count of households based on the listed households from the Laos listing operation.

Table 13: Laos – Weighted Number of Households – Sample Frame vs. STEP Data File						
Source of PSU Household Count	Urban		Rural		Total	
	# of Sampled PSUs	Weighted Sum of Households	# of Sampled PSUs	Weighted Sum of Households	# of Sampled PSUs	Weighted Sum of Households
1) Based on # of Hhlds in Sample Frame ‘ Data - Poppulation census 2009 ’	134	315,990*	54	632,275*	188	948,265*
2) Based on # of Listed Hhlds in STEP Data File ‘ STEP - Laos - Data for Weights ’ [all participants, i.e., participants, non-participants, ineligible]	134	318,649	54	637,905	188	956,554
3) Based on # of Listed Hhlds in STEP Data File ‘ STEP - Laos - Data for Weights ’ [eligible households only]	134	305,183	54	628,795	188	933,979

* Unweighted sum of PSU households

Notes for Table 13

- For source 1, the ‘sum of households’ is an unweighted total - it is the actual total number of households for all PSUs in the sample frame.
- For source 2, the increase in the weighted number of households based on the listed household counts can be attributed to the increased count of households from the listing operation for the sampled PSUs. These weighted estimates of the number of households are not adjusted for sampled ineligible households.
- For source 3, the decrease in the weighted number of households is attributable to the adjustment of the household weights for ineligible households found in the STEP sample.
 - The ‘Weighted Sum of Households’ is the estimate of the number of households in the STEP target population.***

5.3 Third-stage Weight (Person Weight)

The basic third stage weight for the i^{th} person, W_{3jki} , is calculated as follows:

$$9) \quad W_{3jki} = \frac{a_{jk}}{b_{jk}} = \frac{a_{jk}}{1} = a_{jk}$$

where,

a_{jk} - the number of eligible persons in the k^{th} household in the j^{th} PSU,

b_{jk} - the number of persons sampled in the k^{th} household in the j^{th} PSU, (i.e., $n_{jk} = 1$ person in each Laos sampled household).

N.B. $A_{jk} = \sum_{k=1}^{n_{jk}} a_{jk} = \text{total \# of selected persons in the } j^{\text{th}} \text{ PSU}$
where,

n_{jk} - the number of households 'k' that participate in the j^{th} PSU

Example 6: Third Stage – Basic Person Weight within sampled Household

For PSU #101, selected household # 10 has 3 eligible persons. Therefore,

$$W_{3jki} = \frac{a_{jk}}{b_{jk}} = \frac{3}{1} = 3$$

5.3.1 Third-stage Person-level Response Adjustment

For eligible participating households, there are three possible person-level outcomes, a selected eligible person participates in the survey, a selected eligible person does not participate, a selected person is ineligible.

Participant SP - A participating selected person 'i' is an eligible sampled person that provides sufficient data to be considered a participant in the survey. The sampled persons 'i' with result codes 51-78 satisfy the requirement for classification of the person as a survey participant. The result codes for participating persons 'i' are as follows:

I. Person-level Codes – Participant in Eligible Selected Household	
Code	Code Description
Individual modules 2-7 begun but not completed	
51	Refusal by Selected Person to continue modules 2-7
52	Unusual circumstance - Selected Person
General Booklet (module 9) not begun	
61	Unable to read or write in language of General Booklet – Selected Person refused to begin
62	Refusal by Selected Person to begin General Booklet
63	Unusual circumstance - Selected Person
64	Blindness or visual impairment of Selected Person prevented completion of General Booklet
65	Physical disability of Selected Person prevented completion of General Booklet
General booklet (module 9) looked through or attempted but not completed	
71	Selected Person looked at Booklet but unable to read & write the language of Booklet - did not begin
72	Refusal by Selected Person to continue the General Booklet
73	Interruption – unacceptably long
74	Unusual circumstance - Selected Person
75	Attempted General Booklet but no answers marked
76	Marked some items but did not attempt all items in General Booklet
77	Marked some items & attempted all items in General Booklet
78	Marked all items in General Booklet

Non-participant SP - A non-participating person 'q' results when an eligible person does not participate due to refusal, unusual circumstance, non-contact, language problem, physical disability (hearing, vision, other) or the person was selected in error. The result codes for non-participating persons 'q' are as follows:

II. Person-level Codes – Non-participant in Eligible Selected Household	
Code	Code Description
Individual modules 2-7 <u>not</u> begun	
32	Refusal by Selected Person to begin modules 2-7
33	Unusual circumstance - Selected Person (e.g., death in family, illness, fire in dwelling, etc.)
34	Refusal - Another household member refused to let selected individual do individual modules
35	Unable to contact Selected Person after three visits during field period
36	Temporarily absence/unavailability of Selected Person for field period (info from household member)
37	Hearing Problem - Selected Person is deaf or so hard-of-hearing, no translator available
38	Learning or mental disability (includes emotional conditions like severe depression) of Selected Person
39	Speech impairment of Selected Person prevented participation, no translator available
40	Language problem – Selected Person's language not understood by survey team, no translator available
98	Sample selection error – an incorrect eligible person was selected by the interviewer

Ineligible SP - A sampled person ‘f’ is categorized as ineligible if the person is not a member of the target population, for example, the person’s age is outside the eligible 15-64 age range. Ineligible sampled persons ‘f’ are as assigned the result code 99.

III. Person-level Codes – Non-participant in Eligible Selected Household

Code	Code Description
99	Sample selection error – an ineligible person was selected by the interviewer

The third stage person weight is only relevant for sampled households in the final response category FinRespCat=1, i.e., participating households. Table 14 provides the pertinent frequency counts of the Final Result Codes.

Table 14: Final Result Code for Participating Households (i.e., Households with FinRespCat_HH=1)

Final Result Code & Description	Frequency	Percent
32-Refusal by Selected Person to begin modules 2-7	1	.0
51- Refusal by Selected Person to continue modules 2-7	1	.0
61- Unable to read or write in language of General Booklet – SP refused to begin	253	8.9
62-SP refusal to begin GB	33	1.2
63- Unusual circumstance - Selected Person	5	.2
64-SP blindness or visual impairment-unable to do GB	33	1.2
65- Physical disability of Selected Person prevented completion of General Booklet	4	.1
71- Selected Person looked at Booklet, unable to read & write the language of Booklet	118	4.1
72-SP refused to continue GB after starting	267	9.4
73-GB interruption	48	1.7
74-GB terminated due to unusual circumstance	124	4.4
75- Attempted General Booklet but no answers marked	5	.2
76-SP marked some GB items-did not attempt all items	292	10.2
77-SP marked some GB items & attempted all GB items	622	21.8
78-SP marked all GB items	1040	36.5
98-Sample selection error – incorrect eligible person selected by the interviewer	3	.1
Total	2849	100.0

In each participating household in the STEP Survey, one eligible person was selected to be interviewed. Therefore, for each participating household the basic person weight, W_{3jki} , would also be the final person weight within a sampled PSU if all persons in the PSU participated. However, when there is one or more non-participating selected persons within a sampled PSU, the basic person-weights for the PSU require a response adjustment so that the final person weight for each participating person in the PSU is also representative of the non-participating person(s) in the sampled households in the PSU. In other words, the total number of participating persons in a sampled PSU must represent the total number of eligible persons in the sampled households in the PSU.

Therefore, within each sampled PSU, a person-level response adjustment to the basic person weight is necessary to compensate for persons that did not participate in the survey.

The total number of eligible persons in each PSU may be represented by the following equation:

$$10) A_{jk} = A_{jki} + A_{jkq}$$

where,

$$\begin{aligned} A_{jk} &= \sum_{k=1}^{n_{jk}} a_{jk} && \text{- the total number of eligible persons for all } n_{jk} \text{ participating households} \\ &&& \text{in the } j^{\text{th}} \text{ PSU,} \\ A_{jki} &= \sum_{k=1}^{n_{jk}} a_{jki} && \text{- the total number of eligible persons 'i' that participate for all } n_{jk} \\ &&& \text{participating households in the } j^{\text{th}} \text{ PSU,} \\ A_{jkq} &= \sum_{k=1}^{n_{jk}} a_{jkq} && \text{- the total number of non-participating eligible persons 'q' for all } n_{jk} \\ &&& \text{participating households in the } j^{\text{th}} \text{ PSU,} \end{aligned}$$

Therefore, the person-level response adjustment for the j^{th} PSU, R_{jk} , is calculated as follows:

$$11) R_{jk} = \frac{\text{Total eligible persons in all participating sampled households in PSU 'j'}}{\text{Total participating persons in all participating sampled households in PSU 'j'}} = \frac{A_{jk}}{A_{jki}}$$

Note that ineligible persons are excluded from the above ratio adjustment for person-level non-response.

Example 7: Third Stage – Basic Person Weight Response Adjustment

- i) For PSU #101, there are 39 eligible persons across all participating households. Also, all selected persons participated in the survey and thus the selected persons represent the 39 eligible persons in the participating households. Therefore,

$$A_{jk} = \sum_{k=1}^{n_{jk}} a_{jk} = 39 ; \quad A_{jki} = \sum_{k=1}^{n_{jk}} a_{jki} = 39$$

$$R_{jk} = \frac{A_{jk}}{A_{jki}} = \frac{39}{39} = 1.00$$

- ii) For PSU # 111, the total number of eligible persons across all participating households is 91. For PSU # 111, there is one non-participating selected person from sampled household #07 with 6 eligible persons. Hence, the total number of eligible persons across the participating households where a selected person participates is 85 (i.e., 91 minus 6). Therefore,

$$A_{jk} = \sum_{k=1}^{n_{jk}} a_{jk} = 91 ; \quad A_{jki} = \sum_{k=1}^{n_{jk}} a_{jki} = 85$$

$$R_{jk} = \frac{A_{jk}}{A_{jki}} = \frac{91}{85} \approx 1.07$$

Table 15 provides the sample counts of the Final Response Category for selected persons.

Table 15: Sample Counts (n) by Selected Person (SP) Final Response Category for Participating Households						
Final Response Category-SP (For Participating Households)	Urban		Rural		Total	
	n	% of Total n	n	% of Total n	n	% of Total n
1-Participant SP	2032	36.3%	813	14.5%	2845	50.8%
2-Non-participant SP, Eligible	2	0.0%	2	0.0%	4	0.1%
3-Non-participant SP, Ineligible	0	0.0%	0	0.0%	0	0.0%
9-Not applicable - non-participating HH	1966	35.1%	785	14.0%	2751	49.1%
Total	4000	71.4%	1600	28.6%	5600	100.0%

Based on the above table, there are 2845 participating selected persons (i.e., 2032 urban participants and 813 rural participants) for which a final non-zero person weight was calculated. The sampled persons in categories 2, 3, and 9 will have a zero value final person weight.

5.3.2 Final Third-stage Person Weight

The final person weight is the weight used for producing person-level estimates, such as the proportion of persons with a specific attribute. This weight is appended to the STEP data file.

The final person weight is calculated as the product of the final household weight (which incorporates the PSU weight and the response adjustment for the basic household weight), the basic third stage person weight, and the response adjustment for the basic person weight. Therefore, for the selected person 'i' in household 'k' in PSU 'j', the final person weight, W_{SP} is calculated as follows:

$$12) W_{SP} = W_H * W_{3jki} * R_{jk}$$

➤ **The final third stage person weight is appended to the STEP data file.**

Example 8: Third Stage – Final Person Weight

- i) For PSU #101, selected household # 10 with 3 eligible persons, the selected person was a participant. All selected persons participated in PSU #101, therefore, $R_{jk} = 1$

$$W_{SP} = 181.7548 * 3 * 1 \approx 545.26$$

- ii) For PSU #111, in participant household # 08 with 5 eligible persons, the selected person was a participant. For this household,

$$W_H \approx 114.3262; \quad W_{3jki} = 5; \quad R_{jk} \approx 1.07$$

$$W_{SP} = 114.3262 * 5 * 1.07 \approx 611.98$$

The final person weight is similarly calculated for all sampled persons. Note that the final person weight will be zero for all non-participating selected persons.

5.3.3 Weighted Person Counts

The weighted count of the non-institutionalized persons 15 to 64 years of age (inclusive) living in private dwellings in urban and rural areas of **Laos** at the time of data collection is provided in Table 16. The ‘Weighted # of Eligible Persons’ in this table is the estimated number of persons aged 15 to 64 in the Laos target population based on the STEP sample.

Table 16: Sample Frequency & Weighted Persons Totals by Final Selected Person Response Category						
Final Response Category-SP (For Participating Households only)	Urban		Rural		Total	
	n	Weighted # of Eligible Persons	n	Weighted # of Eligible Persons	n	Weighted # of Eligible Persons
1-Participant SP	2032	994,764	813	1,961,358	2845	2,956,121
2-Non-participant SP, Eligible	2	1,894	2	4002	4	5896
3-Non-participant SP, Ineligible	0	0	0	0	0	0
9-Not applicable - non-participating HH	98	0	14	0	112	0
Total	2132	996,658	829	1,965,359	5600	2,962,017

For participating selected persons, Table 17 provides a summary of the central tendency of the number of eligible persons in the participating households. Based on the average of 2.45 eligible persons per participating household and an estimated 1,063,933 households, there are approximately 2,600,000 persons aged 15 to 64 in the target population.

Table 17: Summary of Average # of Eligible Persons, Average Person Weights & Average Household Weights			
Statistic	NUMBER A- # of eligible persons	Final Person Weight	Final Household Weight
	2849	2849	2849
Mean	3.26	1039.66907951992150	327.82684331856880
Std. Error of Mean	.029	28.867506731572448	7.683439179994492
Median	3.00	494.91981228939730	160.20429587221770
Mode	2	263.76118115385740	131.88059057692870
Minimum	1	0E-16	50.367954959034880
Maximum	12	27,108.087289755790	3,012.0096988617543
Sum	9297	2,962,017.20755225650	933,978.67661460260