Simple Poverty Scorecard® Tool Cambodia

Mark Schreiner

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ឯកសារនេះ និង[ឧបករណ៍ប្រមូលទិន្នន័យ](#) ជាភាសាខ្មែរមាននៅគេហទំព័រ scorocs.com
This document and a data-collection tool are in English at scorocs.com

The Scorocs Simple Poverty Scorecard-brand poverty-assessment tool is a low-cost, transparent way for pro-poor programs in Cambodia to get to know their participants better so as to prove and improve their social performance. Responses to the scorecard's 10 questions can be used to:

- Check poverty rates and numbers of poor people among in-coming participants
- Track changes in poverty among on-going participants
- Segment participants for differentiated treatment based on poverty

Version note

This new scorecard for Cambodia is based on data from 2017. It replaces the old scorecards in Schreiner (2009 and 2015a) based on data from 2004 and 2011.

Acknowledgements

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Scorocs® Simple Poverty Scorecard® Tool

			Name	Identifier
Interview ID:				
Interview date:		Direct participant:		
Country:	KHM	Field agent:		
Scorecard:	003	Service point:		
Sampling weight:		Number of household members:		

Question	Response	Points
1. In which province does the household live?	A. Phnom Penh, or Koh Kong	0
	B. Battambang, Takéo, Siem Reap, Banteay Meanchey, Kampong Thom, Oddar Meanchey, Ratanak Kiri, or Stung Treng	16
	C. Kampong Cham, Tboung Khmum, Kandal, Svay Rieng, Kampot, Kampong, Chhnang, Preah Sihanouk, Preah Vihear, or Kratié, or Mondulkiri	18
	D. Prey Veng, Kampong Speu, Pursat, Kep, or Pailin	20
2. How many members does the household have?	A. Eight or more	0
	B. Seven	3
	C. Six	5
	D. Five	9
	E. Four	16
	F. Three	22
	G. One, or two	30
3. How many rooms in the dwelling unit are used by the household (other than kitchen, toilets, and bathrooms)?	A. One	0
	B. Two	2
	C. Three or more	6
4. What is the primary construction material of the floor of the dwelling unit occupied by the household? (*Observe and record*)	A. Earth, clay, or other	0
	B. Bamboo strips, parquet/polished wood, wooden planks, or cement/brick/stone	2
	C. Ceramic tiles, polished stone/marble, or vinyl	7
5. Does the household own any dining sets (dining table and chairs)?	A. No	0
	B. Yes	2
6. How many electric burners or gas stoves does the household own?	A. None	0
	B. One	3
	C. Two or more	7
7. How many motorcycles (including electric motorcycles), cars, or jeeps/vans does the household own?	A. None	0
	B. One	6
	C. Two or more	9
8. How many cell phones does the household own?	A. None	0
	B. One	2
	C. Two or more	7
9. In how many days in the past 7 days (that is, since last [CURRENT DAY OF THE WEEK] until yesterday) did the household eat bananas, apples, lemons, or tangerines?	A. None	0
	B. One	6
	C. Two or more	9
10. In the past 7 days (that is, since last [CURRENT DAY OF THE WEEK] until yesterday), did the household consume any dairy products (fresh milk, condensed or powdered milk, ice cream, cheese, or other dairy products)?	A. No	0
	B. Yes	3

Score:

Back-page Worksheet: Household Members

Fill out the scorecard header first. Include the interview's unique identifier (if known), the interview date, and the sampling weight of the participating household (if known). Then record the full name and the unique identification number of the direct participant (who may differ from the respondent), of the direct participant's field agent (who may differ from you the enumerator), and of the service point that the direct participant uses (if any and if known). Circle the response to the first scorecard question based on the province where the participating household lives.

Then read to the respondent: *Please tell me the first name or nickname of each household member. A* household *is one or more people—regardless of kinship ties—who usually live together and who share an arrangement for food, such as using a common kitchen or sharing a food budget. The members do not have another permanent residence, and their actual or planned stay with the household is at least 12 months. Migrant or commuting workers (such as garment workers) count if they visit the household at least once a month.*

Write down the first name or nickname of each member, beginning with the head and the (eldest) spouse of the head (if there is one). Mark the head and his/her spouse (if there is one). Record the number of household members in the scorecard header next to "Number of household members:". Then circle the response to the second scorecard question about the number of household members.

Read the remaining questions aloud (except for the fourth question about the main material of the floor). For this one question, you the enumerator should try to observe and record the main material of the floor without asking the question directly of the respondent. If you are not completely certain of the appropriate response, then ask the question of the respondent, marking his/her answer.

Always keep in mind and apply the detailed instructions in the "Interview Guide".

First name or nickname?	Head or spouse of head?
1.	Head (male) Head (female)
2.	Eldest wife of male head Husband of female head Other
3.	Other
4.	Other
5.	Other
6.	Other
7.	Other
8.	Other
9.	Other
10.	Other
11.	Other
12.	Other
13.	Other
Number of members:	—

Figure 1: Conversion of scores to poverty likelihoods (all poverty lines)

	Poverty likelihood (%)																	
	National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
Score	100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th	80th
0–35	57.7	91.0	100.0	13.1	62.4	83.0	100.0	100.0	9.3	63.5	99.3	100.0	59.3	75.1	92.4	96.2	100.0	100.0
36–39	27.0	77.6	96.3	2.0	30.9	62.8	100.0	100.0	2.0	33.8	94.3	100.0	29.4	49.6	78.6	86.9	94.8	99.6
40–42	17.2	68.8	93.5	1.1	23.0	55.2	98.6	99.3	0.9	24.0	90.3	100.0	18.5	41.5	72.1	81.5	91.6	98.0
43–44	14.1	68.2	92.3	0.8	20.9	52.9	96.5	98.3	0.1	21.1	88.8	100.0	14.7	37.6	72.1	79.8	90.6	96.0
45–46	9.0	62.6	84.0	0.5	14.4	42.6	95.6	98.3	0.1	14.4	80.9	100.0	9.0	31.6	63.6	77.4	81.4	92.9
47–48	4.3	45.4	79.0	0.3	8.5	29.7	95.2	98.3	0.1	10.1	72.6	99.8	5.0	15.3	53.8	63.3	73.9	92.9
49–50	4.3	45.4	79.0	0.0	8.2	29.4	94.9	98.3	0.0	8.8	72.6	99.6	5.0	15.3	52.4	63.3	73.9	92.9
51–52	4.3	33.6	73.0	0.0	8.0	22.0	92.4	97.4	0.0	8.3	66.3	99.6	5.0	13.6	37.3	52.0	68.6	90.6
53–54	3.3	28.7	63.9	0.0	5.5	20.6	89.1	95.6	0.0	5.8	57.4	99.6	3.6	11.4	31.9	43.6	60.3	86.7
55–56	1.3	24.3	61.0	0.0	2.0	15.2	88.3	93.8	0.0	2.3	53.9	99.6	1.3	7.3	26.8	40.1	57.3	84.0
57–58	0.0	16.5	48.5	0.0	0.7	10.0	88.3	93.8	0.0	0.7	41.1	99.6	0.0	4.4	19.0	30.2	42.2	82.9
59–60	0.0	10.9	45.1	0.0	0.1	4.5	71.7	89.8	0.0	0.2	41.1	99.6	0.0	2.9	13.0	28.2	42.2	65.4
61–62	0.0	7.0	39.0	0.0	0.1	2.3	68.5	82.5	0.0	0.2	29.9	99.6	0.0	1.9	10.1	19.6	30.3	64.0
63–64	0.0	3.5	33.8	0.0	0.1	1.6	67.7	82.5	0.0	0.2	20.7	99.6	0.0	0.5	5.7	12.9	24.3	61.0
65–66	0.0	2.5	22.4	0.0	0.1	1.6	57.4	76.6	0.0	0.1	16.9	97.7	0.0	0.3	4.0	9.2	18.1	52.3
67–69	0.0	1.1	17.3	0.0	0.1	0.5	49.4	71.5	0.0	0.1	13.7	97.7	0.0	0.1	2.1	5.0	14.4	40.9
70–73	0.0	0.6	10.1	0.0	0.1	0.2	43.8	64.8	0.0	0.1	7.9	97.3	0.0	0.1	1.2	3.0	8.8	31.2
74–100	0.0	0.0	2.2	0.0	0.0	0.0	14.8	37.6	0.0	0.0	0.7	90.6	0.0	0.0	0.0	0.0	2.0	14.5

Figure 2: Errors in estimated snapshot head-count poverty rates in a single time period, along with margins of error and α for finding margins of error and sample sizes

	Poverty lines																	
	National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
	100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th	80th
Estimation error	−1.5	−2.5	−1.2	+0.5	−2.9	−1.7	+0.4	−0.2	+0.1	−3.9	−0.8	0.0	−1.8	−3.5	−2.1	−3.7	−1.2	−0.1
Margin of error	0.6	0.6	0.5	0.1	0.6	0.6	0.4	0.3	0.1	0.6	0.6	0.1	0.6	0.7	0.6	0.6	0.5	0.4
α for margins of error and sample sizes	1.80	0.99	0.84	1.21	1.69	1.21	0.72	0.66	1.24	1.61	0.90	0.65	1.75	1.35	0.95	0.93	0.88	0.73

Results are deriving by applying the scorecard to 1,000 bootstrap samples of n = 16,384 households from the validation sample.
Estimation errors (average differences between estimates and observed values) are in units of percentage points.
Margins of error are in units of ± percentage points with 90-percent confidence.

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Scorocs® Simple Poverty Scorecard® Tool Cambodia

1. Introduction

The Scorocs Simple Poverty Scorecard-brand poverty-assessment tool for Cambodia is a low-cost, transparent way for pro-poor programs to get know their participants better so as to prove and improve their social performance.

1.1 Questions addressed by the scorecard

To address the question of "How many poor people does our program attract?", the scorecard can take a snapshot in a single time period with a sample of in-coming households to estimate both head-count poverty rates and the number of poor people.

To address the question of "How has poverty changed for on-going participants?", the scorecard can be applied across two time periods with samples from a given population of on-going participants to estimate both net changes in head-count poverty rates and net changes in the number of poor people.

The scorecard can also be used for targeting, that is, to segment participating households for differentiated treatment based on poverty.

It is difficult and costly for pro-poor programs to address these questions with the traditional direct approach to poverty assessment via consumption surveys. A case in point is the 2017 Cambodia Socio-Economic Survey (CSES) by Cambodia's National Institute of Statistics (NIS). The 2017 CSES asked about 500 top-level questions, many of which had several follow-up questions or were repeated (for example, for each household member, expenditure item, parcel of land, or crop).

1.2 How the scorecard works

The scorecard has 10 factual questions that are drawn from the exhaustive 2017 CSES survey. Examples include: "What is the primary construction material of the floor of the dwelling unit occupied by the household?" and "How many electric burners or gas stoves does the household own?".

The 10 questions are selected to be:

- Inexpensive to collect, easy to answer quickly, and straightforward to verify
- Strongly and intuitively linked with poverty
- Liable to change over time as poverty changes
- Applicable in all regions of Cambodia

Each question has multiple-choice response options, and points are assigned to each possible response. The points are zeroes or positive whole numbers. The points are derived from the statistical links between responses and consumption-based poverty in the 2017 CSES.

Adding up the points for a given household's responses gives a *score* that ranges from 0 to 100. The lower the score, the poorer the household.

Given 10 factual questions and easy-to-add-up points, an enumerator can interview a household, record its responses on paper or on a hand-held device, and tally the household's score (if needed for on-the-spot segmentation) in about ten minutes.[1]

Back at the office or in the cloud, a household's score is converted into an estimated probability (the *poverty likelihood*) that the household is poor for a given poverty line, again based on CSES data.

The average of poverty likelihoods across the members of sampled households is an estimate of the head-count poverty rate among people in the sampled population.

This estimated poverty rate may then be used to estimate:

- The number of poor people in in-coming households in a single time period, or
- The net number of poor people in households of on-going participants who rise above a poverty line across two time periods

[1] Responses on paper are entered in a spreadsheet or database later at an office.

1.3 Targeting

The scorecard can also be used to segment participating households for differentiated services. Unlike some other targeting tools—such as the World Bank's "proxy-means tests"[2]—the scorecard is transparent, freely available,[3] and tailored to the capabilities and purposes not of national governments but rather of local pro-poor programs. The feasible poverty-assessment tools for such programs are typically blunt (such as rules based on land ownership or housing quality) or subjective and relative (such as community-based, participatory wealth ranking facilitated by skilled field workers). Poverty assessments based on these approaches may be costly, their accuracy is unknown, and they are not comparable across places, programs, nor time.

1.4 Consumption-based poverty

Cambodia's scorecard is a quantitative way to assess whether a program's participants have consumption below any of 18 poverty lines, for example:

- Cambodia's national line of KHR5,301 per person per day, giving a head-count poverty rate of 9.4 percent for Cambodia as a whole in 2017
- The World Bank's "international lower-middle-income poverty line" of $3.20 per person per day 2011 PPP (KHR5,773), giving a poverty rate of 13.0 percent

A program uses only the poverty line(s) that fit its context and mission. For example, a program may report poverty estimates to funders based on a World-Bank international line while internally using a national line or percentile-based line.

1.5 Transparency

The scorecard's design aims to make its workings clear to non-statisticians. Its adoption in Cambodia and around the world stems from the low cost of its short interviews and from the fact that program managers can see for themselves how the scorecard works and that its approach makes sense. Similar tools have been around for decades, but pro-poor programs have rarely used them. This is not because these tools are inaccurate, but because *how* they work is hidden or unclear.

When scorecard projects fail, the cause is not usually statistical inaccuracy but rather a program's failure to commit to the work-a-day project management

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[2] Coady, Grosh, and Hoddinott, 2004.

[3] Cambodia's scorecard is not in the public domain; it is copyright © 2020 Scorocs.

needed to integrate the scorecard in the program's processes and to train and convince employees to use the tool properly.[4] For tools that predict social outcomes such as poverty, statisticians have long known that there is almost no trade-off in terms of accuracy between the straightforward and transparent versus the complex and opaque.[5] Project risk is less technical and more human, not statistics but organizational-change management.

1.6 Assumptions and estimation errors

Like all predictive tools, the scorecard makes two fundamental assumptions:

- The scored sample is representative of the same population as that whose data was used to construct the scorecard
- The links between responses and poverty are the same in the scored sample as in the population whose data was used to construct the scorecard

Of course, the assumptions do not hold to some unknown degree.[6] In particular:

- A given program's participants will not be representative of Cambodia
- Over time, the links between responses and poverty drift or shift

Scorecard estimates have errors because the scorecard incorrectly acts as if the links between responses and poverty in all scored samples and in all time periods are the same as in the construction data. Reality diverges further from assumptions as:

- More time has passed since the collection of construction data
- A program's participants differ from the country's population as a whole
- Attrition has changed the composition of a cohort of on-going participants
- Change has been rapid (say, due to war, plague, or changes in the program itself)[7]

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[4] Schreiner, 2002.

[5] Dupriez, 2018; Caire and Schreiner, 2012; Schreiner, 2012; Hand, 2006; Lovie and Lovie, 1986; Kolesar and Showers, 1985; Stillwell, Barron, and Edwards, 1983; Dawes, 1979; Wainer, 1976; Myers and Forgy, 1963.

[6] Diamond *et al.*, 2016; Tarozzi and Deaton, 2009.

[7] For example, the 2020 economic downturn due to COVID–19 changed the links between poverty and questions, but the Cambodia scorecard still uses the 2017 links.

For any particular scorecard and scored sample, the estimation error due to migration away from the assumptions is unknown. It is known, however, that the scorecard's targeting is robust. That is, the extent to which assumptions diverge from reality is not strongly linked with the extent to which the scorecard gives lower scores to more-poor households and higher scores to less-poor households. It is also known that the scorecard's estimation errors are larger when estimating changes in poverty across two periods (or with two scorecards) than when estimating poverty in one period.

There are no rules nor formulas that automatically signal when estimation error is too large for estimates to be useful. Program managers must make their own judgments based on common sense and on what they know about their context and their participants from non-scorecard sources.

In practice, scorecard estimates often serve to check whether a pro-poor program is indeed *pro-poor*. They address existential questions such as:

- "How many in-coming participants are below the national poverty line?"
- "Are in-coming participants poorer than the average person in our region?"
- "Are our poor participants more likely to rise above a poverty line than the average poor person in our region?"

For such existential checks on whether a program lives out its purported social mission, estimation errors will often be small enough to be immaterial.

1.7 Estimation errors when assumptions hold

If the scorecard's assumptions do hold, then all the scorecard estimators are statistically *unbiased*. That is, the true value in the population matches the average of estimates in repeated samples.

The assumptions do hold when the scorecard is tested against households in the validation sample from the 2017 CSES that is not used to construct the scorecard. Smaller errors in this ideal case imply smaller-than-otherwise errors in real-world use.

Even so, there are estimation errors on average in the validation sample because there is only one scorecard, and it is derived from one construction sample and applied to a single validation sample. Annex 5 documents the error for snapshot estimates of poverty rates in one time period, allowing scorecard users to adjust for the error and to consider the margins of error.

1.8 What is next?

Section 2: How to convert responses into poverty likelihoods

Section 3: How to calculate scorecard estimates:

- Snapshot estimates of:
  - Head-count poverty rates in a single time period
  - Number of poor people in a single time period
- Estimates of net changes across two time periods in:
  - Net change in poverty rates with one sample scored twice
  - Annual net change in the number of poor people with one sample scored twice
  - Net change in poverty rates with two independent samples
  - Annual net change in the number of poor people with two independent samples

Section 4: How to design scorecard surveys and samples

Section 5: How to use scores for targetingHow to use scores for targeting

After Section 5, the "Interview Guide" tells how to ask questions—and how to interpret responses—so as to mimic practice in Cambodia's 2017 CSES as closely as possible. The "Interview Guide" (and the "Back-page Worksheet") are integral parts of the scorecard. Do not ignore them.

The annexes, figures, and references provide details for advanced users:

Annex 1: Data used for construction and validation

Annex 2: Definitions of poverty and of poverty lines

Annex 3: Scorecard construction

Annex 4: Estimates of poverty likelihoods

Annex 5: Error and margins of error

Annex 6: Formulas for sample size

Figure 14 reports head-count poverty rates for Cambodia as a whole and for each province for each of 18 poverty lines.

Figure 15 and Figure 16 report targeting accuracy for each poverty line

References cited appear at the end.

2. How to convert responses to poverty likelihoods

This section tells how to:

- Collect a household's responses to scorecard questions
- Convert responses to points
- Add up points to get scores
- Convert scores to poverty likelihoods

The next section tells how to combine poverty likelihoods from a sample of households to estimate poverty.

2.1 Instructions for enumerators

An *enumerator* asks a scorecard's questions to a respondent and then records the responses. An enumerator may or may not be same as the program's field agent (if any) associated with a participating household.

Enumerators should interview a sampled household at the household's residence using an app on a hand-held device or a paper scorecard (questionnaire and "Back-page Worksheet"). Following the "Interview Guide", enumerators should:

- Record administrative information in the scorecard header:
  - Interview identifier (if known)
  - Interview date (required)
  - Country code ("KHM")
  - Scorecard code ("003")
  - Sampling weight assigned to the household by the survey design (if known)
- Record names and identifiers (if known) in the scorecard header:
  - Direct participant. The *direct participant* is the household member who directly interacts with the pro-poor program. He/she may or may not be the same as the respondent who answers the scorecard questions. For example, a direct participant with a microfinance program is a borrower or a saver, and a direct participant with a child-health program is a child's parent or guardian
  - Field agent (if there is one). The *field agent* is the direct participant's main, repeated point of contact with the program. The field agent may or may not be the same as the enumerator. For example, the field agent in a microfinance program is a loan officer or savings collector, and the field agent in a child-health program is a village health-care worker

  - Service point (if there is one). The *service point* is the program office that is relevant to the direct participant. The service point is usually the base of operations of the direct participant's field agent (if there is one) or where the direct participant usually goes to do program business. For example, the service point for a microfinance program is a branch, and the service point for a child-health program is a health post
- Mark the response to the first scorecard question ("In what province does the household live?"). If the enumerator already knows the province, then the question does not need to asked directly of the respondent
- Complete the "Back-page Worksheet" with each household member's first name or nickname, marking the head and his/her sex, and also marking the (eldest) spouse of the head and his/her sex (if the head has a spouse)
- If using a paper scorecard, then use the "Back-page Worksheet" to record:
  - The number of household members in the header next to "Number of household members:"
  - The response to the second scorecard question ("How many members does the household have?")
- Read the third question aloud, marking the respondent's answer
- Do not read aloud the fourth question ("What is the primary construction material of the floor of the dwelling unit occupied by the household?"). Instead, observe the floor without asking the question directly of the respondent. If you the enumerator are certain of the appropriate response, then mark it. Otherwise, ask the question of the respondent
- Read the remaining six questions aloud one-by-one and in order, marking the responses
- When marking a response on paper, write each point value in the far right-hand column. Then make single circle around the pre-printed response, the pre-printed points, and the hand-written points. This helps to reduce mistakes in data entry
- Add up the points to get a total score (if needed on-the-spot and if using a paper scorecard)
- Implement targeting policy (if any) based on the score
- Upload the data with a mobile data-collection tool, or deliver the filled-out paper scorecard to a central office for data entry, reporting, and analysis

2.2 Header, 'Back-page Worksheet', 'Interview Guide', and audits

Fill out the scorecard header as best you can; do not skip it. Scorecard estimates are more useful if they can be linked—via names or identifiers—to a program's existing data on direct participants, field agents, or service points. Record the types

of identifiers that are used in the program's databases, be they program-specific or government-issued. Be sure to record the number of household members not only indirectly via the scorecard's second question but also directly in the header.

Likewise, do not skip the "Back-page Worksheet". Take the time to read the definition of *household* to the respondent and to fill out the roster member-by-member. If you cut corners by only asking, "How many members does the household have?", many respondents will miscount or apply the wrong definition of *household*. Completing the "Back-page Worksheet" improves data quality because it mimics the practice of Cambodia's NIS in the 2017 CSES. The accuracy of the scorecard's estimates depends on the quality of recorded responses, and especially strongly on the count of household members. Working through the "Back-page Worksheet" gives the best count.

Throughout the interview, apply the instructions in the "Interview Guide". Enumerators must be thoroughly trained on the "Interview Guide" before they do any interviews, and they should carry a copy to each interview.[8] Even though the scorecard is less difficult than other poverty-assessment tools, training and explicit definitions of the scorecard's terms and concepts are still essential.[9] Enumerators must scrupulously study and follow the "Interview Guide".

Finally, on-going quality-control audits are wise if a program or its field agents gather their own data and if they believe that they have an incentive to exaggerate participants' poverty (for example, if they are rewarded for higher poverty rates).[10]

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[8] The "Interview Guide" is the only guidance that programs should give to enumerators. All other issues of interpretation should be left to the judgment of enumerators and respondents, as this seems to be what Cambodia's NIS did in the 2017 CSES.

[9] Merely reading through the scorecard with enumerators is not adequate training.

[10] Matul and Kline, 2003. If a program does not want enumerators or respondents to know the points associated with responses, then it can use a mobile data-collection tool or provide a paper version of the scorecard that omits the points, with scores computed later at an office. Even if points are hidden, however, enumerators and respondents can use common sense to guess how responses are linked with poverty.

Figure 3: First example household, filled-in scorecard

			Name	Identifier
Interview ID:	A123			
Interview date:	13 JUNE 2020	Direct participant:	ANNA JACKSON	1V0276FZ7
Country:	KHM	Field agent:	UNKNOWN	UNKNOWN
Scorecard:	003	Service point:	NORTHWEST CLINIC	NWC
Sampling weight:	UNKNOWN		Number of household members:	NINE

Question	Response	Points	
1. In which province does the household live?	A. Phnom Penh, or Koh Kong	0	
	B. Battambang, Takéo, Siem Reap, Banteay Meanchey, Kampong Thom, Oddar Meanchey, Ratanak Kiri, or Stung Treng	16	**16**
	C. Kampong Cham, Tboung Khmum, Kandal, Svay Rieng, Kampot, Kampong, Chhnang, Preah Sihanouk, Preah Vihear, or Kratié, or Mondulkiri	18	
	D. Prey Veng, Kampong Speu, Pursat, Kep, or Pailin	20	
2. How many members does the household have?	**A. Eight or more**	0	**0**
	B. Seven	3	
	C. Six	5	
	D. Five	9	
	E. Four	16	
	F. Three	22	
	G. One, or two	30	
3. How many rooms in the dwelling unit are used by the household (other than kitchen, toilets, and bathrooms)?	A. One	0	
	B. Two	2	
	C. Three or more	6	**6**
4. What is the primary construction material of the floor of the dwelling unit occupied by the household? (*Observe and record*)	**A. Earth, clay, or other**	0	**0**
	B. Bamboo strips, parquet/polished wood, wooden planks, or cement/brick/stone	2	
	C. Ceramic tiles, polished stone/marble, or vinyl	7	
5. Does the household own any dining sets (dining table and chairs)?	**A. No**	0	**0**
	B. Yes	2	
6. How many electric burners or gas stoves does the household own?	**A. None**	0	**0**
	B. One	3	
	C. Two or more	7	
7. How many motorcycles (including electric motorcycles), cars, or jeeps/vans does the household own?	**A. None**	0	**0**
	B. One	6	
	C. Two or more	9	
8. How many cell phones does the household own?	A. None	0	
	B. One	2	**2**
	C. Two or more	7	
9. In how many days in the past 7 days (that is, since last [CURRENT DAY OF THE WEEK] until yesterday) did the household eat bananas, apples, lemons, or tangerines?	**A. None**	0	**0**
	B. One	6	
	C. Two or more	9	
10. In the past 7 days (that is, since last [CURRENT DAY OF THE WEEK] until yesterday), did the household consume any dairy products (fresh milk, condensed or powdered milk, ice cream, cheese, or other dairy products)?	**A. No**	0	**0**
	B. Yes	3	

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Score: 16 + 0 + 6 + 0 + 0 + 0 + 0 + 2 + 0 + 0 = 24

Figure 4: First example household, filled-in “Back-page Worksheet”

First name or nickname?	Head or spouse of head?
1. ANNA	Head (male) Head (female)
2. BILLY	Eldest wife of male head Husband of female head Other
3. CHARLES	Other
4. DARLA	Other
5. EUGENE	Other
6. FREDA	Other
7. GRETA	Other
8. HANK	Other
9. IRIS	Other
10.	Other
11.	Other
12.	Other
13.	Other
Number of members: NINE	—

2.3 First example household

The points for the first example household's responses add up to a score of 24 (Figure 3 and Figure 4).

For a given poverty line, Figure 1 lists poverty likelihoods by score range. A score of 24 falls in the first range of 0–35. For 150% of the national poverty line, the poverty likelihood for scores of 0–35 is 91.0 percent. That is, the scorecard estimates that 91.0 percent of households in Cambodia with a score of 0–35 have consumption below 150% of the national line.

Figure 5: The first example household's score of 24 implies a poverty likelihood of 91.0 percent for 150% of the national line (excerpted from Figure 1.)

	Poverty likelihood (%)		
		National	
Score	100%	150%	200%
0–35	57.7	91.0	100.0
36–39	27.0	77.6	96.3
40–42	17.2	68.8	93.5
43–44	14.1	68.2	92.3
45–46	9.0	62.6	84.0
47–48	4.3	45.4	79.0
49–50	4.3	45.4	79.0
51–52	4.3	33.6	73.0
53–54	3.3	28.7	63.9
. . .	. . .	. . .	. . .

Figure 6: Second example household, filled-in scorecard

			Name	Identifier
Interview ID:	B456			
Interview date:	13 JUNE 2020	Direct participant:	JOHN BROWN	2W3120ZG8
Country:	KHM	Field agent:	UNKNOWN	UNKNOWN
Scorecard:	003	Service point:	NORTHWEST CLINIC	NWC
Sampling weight:	UNKNOWN		Number of household members:	FIVE

Question	Response	Points	
1. In which province does the household live?	A. Phnom Penh, or Koh Kong	0	
	B. Battambang, Takéo, Siem Reap, Banteay Meanchey, Kampong Thom, Oddar Meanchey, Ratanak Kiri, or Stung Treng	16	16
	C. Kampong Cham, Tboung Khmum, Kandal, Svay Rieng, Kampot, Kampong, Chhnang, Preah Sihanouk, Preah Vihear, or Kratié, or Mondulkiri	18	
	D. Prey Veng, Kampong Speu, Pursat, Kep, or Pailin	20	
2. How many members does the household have?	A. Eight or more	0	
	B. Seven	3	
	C. Six	5	
	D. Five	9	9
	E. Four	16	
	F. Three	22	
	G. One, or two	30	
3. How many rooms in the dwelling unit are used by the household (other than kitchen, toilets, and bathrooms)?	A. One	0	
	B. Two	2	2
	C. Three or more	6	
4. What is the primary construction material of the floor of the dwelling unit occupied by the household? (*Observe and record*)	A. Earth, clay, or other	0	
	B. Bamboo strips, parquet/polished wood, wooden planks, or cement/brick/stone	2	2
	C. Ceramic tiles, polished stone/marble, or vinyl	7	
5. Does the household own any dining sets (dining table and chairs)?	A. No	0	0
	B. Yes	2	
6. How many electric burners or gas stoves does the household own?	A. None	0	
	B. One	3	3
	C. Two or more	7	
7. How many motorcycles (including electric motorcycles), cars, or jeeps/vans does the household own?	A. None	0	
	B. One	6	
	C. Two or more	9	9
8. How many cell phones does the household own?	A. None	0	
	B. One	2	
	C. Two or more	7	7
9. In how many days in the past 7 days (that is, since last [CURRENT DAY OF THE WEEK] until yesterday) did the household eat bananas, apples, lemons, or tangerines?	A. None	0	0
	B. One	6	
	C. Two or more	9	
10. In the past 7 days (that is, since last [CURRENT DAY OF THE WEEK] until yesterday), did the household consume any dairy products (fresh milk, condensed or powdered milk, ice cream, cheese, or other dairy products)?	A. No	0	
	B. Yes	3	3

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Score: 16 + 9 + 2 + 2 + 0 + 3 + 9 + 7 + 0 + 3 = 51

Figure 7: Second example household, filled-in "Back-page Worksheet"

First name or nickname?	Head or spouse of head?
1. JOHN	Head (male) Head (female)
2. MARY	Eldest wife of male head Husband of female head Other
3. SUE	Other
4. KIM	Other
5. MONICA	Other
6.	Other
7.	Other
8.	Other
9.	Other
10.	Other
11.	Other
12.	Other
13.	Other
Number of members: FIVE	—

2.4 Second example household

The points for the second example household's responses add up to a score of 51 (Figure 6 and Figure 7).

In Figure 1Figure 1: Conversion of scores to poverty likelihoods (all poverty lines), a score of 51 falls in the range of 51–52. For 150% of the national poverty line, the poverty likelihood for scores of 51–52 is 33.6 percent. The scorecard estimates that 33.6 percent of households in Cambodia with a score of 51–52 have consumption below 150% of the national line.

Figure 8: The second example household's score of 51 implies a poverty likelihood of 33.6 percent for 150% of the national line (excerpt from Figure 1)

	Poverty likelihood (%)		
		National	
Score	100%	150%	200%
0–35	57.7	91.0	100.0
36–39	27.0	77.6	96.3
40–42	17.2	68.8	93.5
43–44	14.1	68.2	92.3
45–46	9.0	62.6	84.0
47–48	4.3	45.4	79.0
49–50	4.3	45.4	79.0
51–52	4.3	33.6	73.0
53–54	3.3	28.7	63.9
. . .	. . .	. . .	. . .

3. How to calculate scorecard estimates

This section tells how to estimate:

- Head-count poverty rates for a single time period for in-coming participants
- Net changes in poverty rates across two time periods for on-going participants

It also tells how to use these estimated poverty rates to estimate the:

- Number of poor people in the households of in-coming participants
- Net number of poor people in the households of on-going participants who rose above a poverty line

3.1 Head-count poverty rates in a single time period

The *head-count poverty rate* is the share of people in participating households in which total household consumption (divided by the number of household members) is below a given poverty line.

For a given poverty line, the scorecard estimates head-count poverty rates as the household-size-weighted average of poverty likelihoods from a scored sample, adjusted for the scorecard's known estimation error.

To illustrate the calculation, suppose that a pro-poor program opens a new service point in rural of Battambang province in 2020. In that calendar year, it enrolls 1,000 in-coming households, from which it scores a simple random sample[11] of two households.[12]

The program judges that 150% of the national poverty line is the most-relevant line for its purposes. For that line and for snapshot estimates of poverty rates in one period, the scorecard's estimation error is –2.5 percentage points (Figure 2).

The first example household has nine members and is interviewed on June 13, 2020. With a score of 24, it has a poverty likelihood for 150% of the national line of 91.0 percent.

The second example household has five members and is also interviewed on June 13, 2020. Its score of 51 corresponds with a poverty likelihood of 33.6 percent.

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[11] In a *simple random sample*, all households in the population have the same selection probability. This paper does not discuss samples in which selection probabilities vary.

[12] Of course, estimates based on such an unrealistically small sample have wide margins of error, but a small sample facilitates the arithmetic in the examples.

The estimated head-count poverty rate for the population of in-coming households in the 2020 calendar-year cohort at the rural Battambang service point is the household-size-weighted average of the estimated poverty likelihoods of the sampled households, less the known estimation error. Expressing poverty likelihoods and the estimation error as proportions between 0 and 1 rather than percentages between 0 and 100, this is:

$$\frac{9 \cdot 0.910 + 5 \cdot 0.336}{9 + 5} - (-0.025) \approx \frac{9.87}{14} + 0.025 \approx 0.730 = 73.0 \text{ percent.}$$

In the nine in the "9 · 0.910" term in the numerator is the number of members (household size) in the first household, and 0.910 is the first household's estimated poverty likelihood.

In the same way, the five in the numerator's "5 · 0.336" is the number of members in the second household, and 0.336 is the second household's estimated poverty likelihood.

The "9 + 5" in the denominator is the sum of the weights—that is, the number of household members—for the two sampled households.

The "–0.025" is the scorecard's estimation error for this poverty line from Figure 1. Because unadjusted estimates tend to be too low by 2.5 percentage points, they are adjusted upwards by subtracting –2.5 (which is equivalent to adding 2.5). This is akin to how an archer whose arrows tend to miss a little to the left of the bulls-eye will adjust his/her aim to be a little to the right of the bulls-eye.

The estimated head-count poverty rate for the population is the household-size-weighted average of the two sampled households' poverty likelihoods, adjusted for the estimation error (73.0 percent).[13]

For real-world samples with hundreds or thousands of interviewed households, a spreadsheet or app would be used for the calculations (Figure 9).

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[13] Be careful; the estimated poverty rate is *not* the single poverty likelihood associated with the household-size-weighted average score, which here is (9·24 + 5·51) ÷ (9 + 5) ≈ 34. This average score of 34 corresponds to a poverty likelihood of 91.0 percent (Figure 1), giving an error-adjusted poverty rate of 91.0 – (–2.5) = 93.5 percent. This differs from the 73.0 percent found as the household-size-weighted average of the two individual likelihoods associated with each of the two scores. Unlike likelihoods, scores are ordinal symbols, like colors in the spectrum or syllables in a solfège scale. Because scores are ordinal, they cannot be added up or averaged. Only three operations are valid for scores: conversion to likelihoods, analysis of distributions, or comparison with a cut-off for segmentation (Schreiner, 2012). In general, analyze likelihoods, not scores.

Figure 9: Spreadsheet calculation of estimated head-count poverty rate and number of poor people in the population of in-coming participants in one time period

	A	B	C	D	E	F	G
1	Round	Interview date	Direct participant ID	Number of household members	Score	Poverty likelihood (%)	Estimated number of poor household members
2	Baseline	13-Jun-20	1V0276FZ7	9	24	91.0	8.19 = (D2*F2)/100
3	Baseline	13-Jun-20	2W3120ZG8	5	51	33.6	1.68 = (D3*F3)/100
4			Sum:	14 = SUM(D2:D3)			9.87 = SUM(G2:G3)
5			Average:	7.0 = AVERAGE(D2:D3)			
6							
7	Estimated error scorecard for this poverty line (percentage points):						-2.5
8							
9				Estimated head-count poverty rate (%):			73.0 = (G4/D4)*100-G7
10							
11				Households in population:			1,000
12							
13				People in households in population:			7,000 = G11*D5
14							
15				Number of poor people in population:			5,110 = (G9/100)*G13
16	Rows of data are sorted by Round, then by Interview date, then by Direct participant ID.						

This snapshot estimate tends to be more relevant for in-coming participants who joined in the current period than for on-going participants who joined in past periods. This is because fulfilling a pro-poor mission implies that some share of new participants be poor by some definition of *poverty*.[14] To be pro-poor, a bare-minimum standard is that the poverty rate of in-coming participants exceed that of the country as a whole or of the region where the program works.

To help with benchmarking poverty-rate estimates, Figure 14 reports head-count poverty rates from the 2017 CSES for all 18 poverty lines by urban/rural/all for Cambodia as a whole and for each province. In the example of rural Battambang, the head-count poverty rate for 150% of the national line is 42.1 percent. Thus, the example program is pro-poor in the sense that its in-coming participants have an above-average poverty rate (73.0 percent).

3.2 Number of poor people in a single time period

Fulfilling a pro-poor mission depends not only on the *poverty rate* of in-coming participants but also on the *number* of poor in-coming participants. After all, a smaller program whose few participants have a higher poverty rate may serve fewer poor people than a larger program whose many participants have a lower poverty rate.[15]

The first step in estimating the number of poor people in one period is to estimate the number of household members in the population of in-coming households. In our two-household example with simple random sampling, this is the equal-weighted average of the number of people in the sampled households:

$$\frac{9+5}{1+1} = \frac{14}{2} \approx 7.0 \text{ people.}$$

The second step is to estimate the total number of people in the population of in-coming households. The example program has 1,000 in-coming households in its first year, each with an estimated 7.0 members. The estimated number of in-coming participants is then 1,000 · 7.0 = 7,000 people.

The third and final step is to multiply the estimated poverty rate (here, 73.0 percent, or 0.730) by the estimated number of people in in-coming households (here, 7,000). This gives 7,000 · 0.730 = 5,110 people.

---

[14] The scorecard uses a consumption-based definition of *poverty*. Common non-consumption definitions include: being rural, agricultural, landless, or unemployed; living in a given region; having a head who is illiterate, female, or an ethnic minority; or having a member who is pregnant, handicapped, elderly, or very young.

[15] Navajas *et al*. (2000).

All else constant, the *number* of in-coming participants who are poor is more important than the *share* of in-coming participants who are poor. Both estimates are useful,[16] but increasing the share who are poor is only a means to the end of increasing the number who are poor. In turn, increasing the number of in-coming participants who are poor is only a means to the end of increasing the net number of on-going participants who rise above a poverty line.

3.3 Net changes in poverty rates across two time periods for on-going participants

The estimated net change in a population's poverty rate is the difference between estimated poverty rates at follow-up versus baseline.

After baseline, two sampling approaches are possible for the follow-up round:

- *One sample scored twice*: Score the same sample that was scored at baseline
- *Two independent samples*: Score a new sample from the same population as at baseline

Given the scorecard's assumptions, both approaches are unbiased, but scoring one sample twice has smaller margins of error.

3.3.1 Net change in poverty rates with one sample scored twice

When the follow-up sample is made up of the same households as the baseline sample,[17] then the estimated annual net change in the poverty rate of the population of on-going participants is the average-household-size-weighted average of the change in each scored household's poverty likelihood, divided by the household-size-weighted average of the years between each household's interviews.[18]

Continuing our example, suppose that the first household at follow-up has eight members (rather than nine as at baseline) and is scored a second time on August 13, 2023, which is 1,156 days (about 3.17 years) after its first interview on June 13, 2020. Its score is now 38 (rather than 24), so its poverty likelihood for 150% of the national line has decreased from 91.0 to 77.6 percent (Figure 1).

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[16] Schreiner (2014) tells how to report and analyze scorecard estimates.
[17] Or when the follow-up sample is a random sample of the baseline sample.
[18] Estimates of change do not directly adjust for the estimation error in snapshot estimates because—given the scorecard's assumptions—this error washes out when comparing follow-up with baseline. Error due to divergence from assumptions is unknown, and there is no direct way to adjust for it.

Suppose also that the second household now has six members (rather than five as at baseline) and is scored a second time on May 15, 2023, which is 1,066 days (about 2.92 years) after its first interview on June 13, 2020. Its score is now 54 (rather than 51), so its poverty likelihood has decreased from 33.6 to 28.7 percent.

With poverty likelihoods expressed as proportions between 0 and 1, the average-household-size-weighted average of the change in each scored household's poverty likelihood is:

$$\frac{\left(\frac{9+8}{2}\right)\cdot(0.776-0.910)+\left(\frac{5+6}{2}\right)\cdot(0.287-0.336)}{\left(\frac{9+8}{2}\right)+\left(\frac{5+6}{2}\right)} \approx \frac{-1.139-0.270}{14} \approx -0.101 = -10.1 \text{ percentage points.}$$

The head-count poverty rate decreased (improved) by 10.1 percentage points (not by 10.1 percent) between baseline and follow-up.

For clarity—and because the time between interviews varies across scored households—this estimate should be annualized by dividing by the average-household-size-weighted average of years between the two interviews:

$$\frac{\left(\frac{9+8}{2}\right)\cdot 3.17+\left(\frac{5+6}{2}\right)\cdot 2.92}{\left(\frac{9+8}{2}\right)+\left(\frac{5+6}{2}\right)} \approx \frac{26.95+16.06}{14} \approx 3.07 \text{ years.}$$

The annual, non-compounded rate of net change is then the percentage-point change in the poverty rate, divided by the average years between interviews: –10.1 ÷ 3.07 ≈ –3.3 percentage points per year.[19] The negative change means that poverty decreased.[20]

In practice, the calculations would be done with an app or spreadsheet (Figure 10).

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[19] *Percentage points* are distinct from *percentages* (or *percents*). On the one hand, if the baseline poverty rate is 50.0 percent, and if there is a *10.0-percent* annual reduction in the poverty rate, then the poverty rate after one year is 0.50·(1 – 0.10) = 0.450 = 45.0 percent, and the poverty rate after two years is 0.45·(1 – 0.10) = 0.405 = 40.5 percent. On the other hand, if there is a *10.0-percentage-point* annual reduction in poverty, then the poverty rate after one year is 0.50 – 0.10 = 0.40 = 40 percent, and the poverty rate after two years is 0.40 – 0.10 = 0.30 = 30 percent.

[20] Of course, such a large annual reduction in poverty, but this is just an example to show how the scorecard can be used to estimate change.

Figure 10: Spreadsheet calculation of estimated annual net change in a head-count poverty rate and in the annual net number of poor people who rose above a poverty line with one sample scored twice

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Direct participant ID	Interview date		Years between interviews	Number of household members			Member-years between interviews	Score		Poverty likelihood (%)		Estimated net change in number of poor household members
2		Baseline	Follow-up		Baseline	Follow-up	Average		Baseline	Follow-up	Baseline	Follow-up	
3	1V0276FZ7	13-Jun-2020	13-Aug-2023	3.17 = (C3-B3)/365	9	8	8.50 = (E3+F3)/2	26.92 = D3*G3	24	38	91.0	77.6	-1.139 = G3*(L3-K3)/100
4	2W3120ZG8	13-Jun-2020	15-May-2023	2.92 = (C4-B4)/365	5	6	5.50 = (E4+F4)/2	16.06 = D4*G4	51	54	33.6	28.7	-0.270 = G4*(L4-K4)/100
5				Average:	7.0 = AVERAGE(E3:E4)	7.0 = AVERAGE(F3:F4)	Sum:	42.98 = SUM(H3:H4)					-1.409 = SUM(M3:M4)
6													
7													Estimated net change in head-count poverty rate (percentage points), follow-up versus baseline: -10.1 = M5/(E5+F5)*100
8													
9													Household-size-weighted average years between interviews: 3.07 = H6/(E5+F5)
10													
11													Estimated annual net change in head-count poverty rate (percentage points): -3.3 = M7/M9*100
12													
13													Participating households at baseline: 1,000
14													Participating households at follow-up: 700
15													
16													Estimated average number of on-going participating people: 5,950 = (E5*M13+F5*M14)/2
17													
18													Estimated annual net change in the number of poor people: -195 = M16*M11/100
19	Rows of data are sorted by Direct participant ID.												

3.3.2 Annual net change in the number of poor people with one sample scored twice

For a pro-poor program, the one bottom line is not the net change in the poverty rate but rather the annual net change in the number of poor participants who rise above a poverty line.

To calculate this, the first step is to estimate the average number of household members in the population of on-going households from baseline to follow-up, accounting for drop-out. In our example, the population of the in-coming households in the 2020 cohort was 1,000. By the end of the follow-up period of calendar-year 2023, 300 had dropped out, leaving 700. If drop-out took place at a constant pace and was unrelated to changes in poverty,[21] then an estimate of the average number of on-going participating people is the equal-weighted average of the number of participating people among households interviewed at baseline and

[21] This assumption rarely holds. On the one hand, households that benefit most from the program—and thus those for whom participation is most likely to cause a faster-than-otherwise decrease in poverty—may also be the least-likely to drop out, leading to too-high estimates of the reduction in poverty due to participation. On the other hand, households whose poverty decreases may be more likely to drop out because the benefits of continued participation fall as poverty decreases, leading to too-low estimates of impact. Unfortunately, there is no general way to adjust scorecard estimates to account for drop out that is related to changes in poverty. As in all decision-making, managers must use their experience and judgment to detect deviations from assumptions and then to adjust for them as best they can. This is true even though scorecard estimates are based on data and math. "Hard numbers" may not represent reality as accurately as they seem to, and only a manager's knowledge of context can detect and adjust for this. Managers should discount unreliable estimates when they have reasoned, explicit arguments to do so (Schreiner, 2016). Of course, discretion also opens the door to abuse; faced with unexpectedly low estimates of poverty reduction, managers might quietly sweep them under the rug or attribute them to a slow economy (even though they would not attribute high estimates of poverty reduction to a roaring economy). Ironically and sadly, such attempts to make a program look good by hiding or excusing undesired results destroys the results' value as feedback, harming the program's ability to fulfill its mission. If a program's funders fail to act like owners, then its employees—not its participants—often become its *de facto* beneficiaries (Schreiner, 1997).

follow-up. In a given round, the number of participating people is the average household size for that round's interviewed households (in our example, 7.0 at both baseline and follow-up), multiplied by the number of participating households in the population in the given round (1,000 at baseline and 700 at follow-up), divided by two. This is $\frac{7.0 \cdot 1{,}000 + 7.0 \cdot 700}{1+1} = 5{,}950$ people.

The second and last step is to multiply the estimated annual change in the poverty rate (here, –3.3 percentage points, or –0.033) by the estimated average number of on-going participants (here, 5,950). This gives an annual net change in the number of poor people by 150% of the national line of $-0.033 \cdot 5{,}950 \approx -195$ people.[22] This negative change is a reduction (improvement) in poverty; there are 195 fewer poor people in participating households each year.

3.3.3 Estimating a program's impact

Estimating *change* is not the same as an estimating a program's *impact*. It stands to reason that program participation is a force that does cause some share of the reduction (or increase) in the poverty of its participants. At the same time, it is equally logical to expect that a large share of any change is caused by the multitude of non-program forces that affect participants' lives. On its own, the scorecard is like a bathroom scale; it can tell whether you lost weight in the past month, but not how much is due to diet and exercise versus taking off your coat and shoes.

This point is often forgotten, confused, or ignored, so it bears repeating: the scorecard estimates change, but it does not—on its own—identify the causes of change. In particular, estimating the impact of program participation requires knowledge or assumptions about what would have happened to participants if they had not been participants. This must come from beyond the scorecard.

What is a program to do? All decision-making hinges on forecasts of the expected impacts of alternative choices, so a program cannot pretend that merely estimating change is helpful with also imputing some impact. Yet there are diminishing returns to improving inferences of impact. At a minimum, a program should compare its estimated annual net change in the poverty rate of its on-going participants to third-party estimates for the country as a whole or for the region where it works. A program can also look for signs that participants value (or expect to value) its services. Is the number of in-coming participants growing? Is the drop-out rate low?

[22] This is a net figure; some people start above the line and end below it, and vice versa.

Are drop-outs due to dissatisfaction or graduation? Do participants participate in spite bearing significant costs in terms of their own time, cash, or effort? Is participation voluntary, without being a condition for some other linked benefit? Is the program the sole provider in its niche and region?

In short, decision-makers in pro-poor programs are called to do what good decision-makers always do: triangulate and weigh data and knowledge from a number of angles and sources—including scorecard estimates, but not *only* scorecard estimates—to inform reasoned guesses as to more or less what share of observed changes are due to program participation. Of course, the inevitable need for human wisdom/art may be disingenuously invoked as a cover for decision processes that do not take a program's pro-poor mission to heart. This is why the "scientific method"—that is, being transparent about inputs and reasoning so as to facilitate the productive review and debate of a course of action—makes sense even (or perhaps especially) for business questions.[23]

3.3.4 Net change in poverty rates with two independent samples

Instead of interviewing the same sample of households at both baseline and follow-up, a program could draw a second, independent sample of households from the same population as the baseline sample.[24] The head-count poverty rate for on-going participants in this new follow-up sample is estimated in the same way as for the baseline sample.

Continuing our example, suppose that a third and fourth households are sampled at follow-up. The third household is interviewed on March 3, 2023. It has five members, a score of 43, and a poverty likelihood by 150% of the national line of 68.2 percent (Figure 1).

The fourth household is interviewed on April 4, 2023. It has seven members, a score of 46, and a poverty likelihood of 62.6 percent.

As at baseline, the estimated head-count poverty rate at follow-up is the household-size-weighted average of the poverty likelihoods of the sampled households: $\frac{5 \cdot 0.682 + 7 \cdot 0.626}{5+7} \approx \frac{3.41+4.38}{12} \approx 0.649 = 64.9$ percent.

[23] Schreiner (2016) and Schreiner (2014).

[24] By chance, some households may end up in both samples.

The estimated annual net change in the head-count poverty rate of on-going participants is then the difference between the poverty-rate estimates at follow-up (64.9 percent) versus at baseline (70.5 percent[25]), divided by the difference (in years) between the household-size-weighted average of follow-up interview dates (March 19, 2023) versus the household-size-weighted average of baseline interview dates (June 13, 2020). These two average dates differ by 2.76 years.

The estimate annual net change in the head-count poverty rate is the difference between the two poverty-rate estimates at follow-up versus baseline, divided by the difference in the average years between interviews in the two rounds. For 150% percent of the national line, this is (64.9 – 70.5) ÷ 2.76 ≈ –2.0 percentage points.

In practice, an app or spreadsheet would be used for the calculations (Figure 11).

[25] With two independent samples, the estimation error in each of the two snapshot estimates washes out, so it is not explicitly included in the calculation.

Figure 11: Spreadsheet calculation of estimated annual net change in a head-count poverty rate and in the annual net number of poor people who rise above a poverty line with two independent samples

	A	B	C	D	E	F	G
1	Round	Direct participant ID	Interview date	Number of household members	Score	Poverty likelihood (%)	Estimated number of poor household members
2	Baseline	1V0276FZ7	13-Jun-2020	9	24	91.0	8.19 = D2*F2/100
3	Baseline	2W3120ZG8	13-Jun-2020	5	51	33.6	1.68 = D3*F3/100
4	Follow-up	3XA76T21L	3-Mar-2023	5	43	68.2	3.41 = D4*F4/100
5	Follow-up	4Y8Y3EQS9	4-Apr-2023	7	46	62.6	4.38 = D5*F5/100
6		Sum baseline:		14 = SUM(D2:D3)			9.87 = SUM(G3:G4)
7		Sum follow-up:		12 = SUM(D4:D5)			7.79 = SUM(G5:G6)
8		Average baseline:	13-Jun-2020 = AVERAGE(C2:C3)	7.0 = AVERAGE(D2:D3)			
9		Average follow-up:	19-Mar-2023 = AVERAGE(C4:C5)	6.0 = AVERAGE(D4:D5)			
10							
11				Estimated baseline poverty rate (%):			70.5 = G6/D6*100
12				Estimated follow-up poverty rate (%):			64.9 = G7/D7*100
13							
14			Average years between follow-up and baseline interviews:				2.76 = (C9-C8)/365
15							
16		Estimated annual net change in head-count poverty rate (percentage points):					-2.0 = (G12-G11)/G14
17							
18				Participating households at baseline:			1,000
19				Participating households at follow-up:			700
20							
21			Estimated average number of on-going participating people:				5,600 = (D8*G18+D9*G19)/2
22							
23			Estimated annual net change in the number of poor people:				-113 = G21*G16/100
24	Rows of data are sorted by Round, then by Interview date, then by Direct participant ID.						

3.3.5 Annual net change in the number of poor people with two independent samples

For a pro-poor program, the one bottom line is not the net change in the poverty rate but rather the annual net change in the number of poor participants who rise above a poverty line.

To calculate this, the first step is to estimate the average number of household members in the population of on-going households from baseline to follow-up, accounting for drop-out. In our example, the population of the baseline 2020 cohort was 1,000 in-coming households. By the end of the follow-up period 2023, 300 had dropped out, leaving 700. If drop-out took place at a constant pace and was unrelated to changes in poverty, then an estimate of the average number of on-going participating people is the equal-weighted average of the number of participating people among households interviewed at baseline and follow-up. In a given round, the number of participating people is the average household size for that round's interviewed households (in our example, 7.0 at baseline and 6.0 at follow-up), multiplied by the number of participating households in the population in the given round (1,000 at baseline and 700 at follow-up), and divided by two (the number of rounds). This is $\frac{7.0 \cdot 1{,}000 + 6.0 \cdot 700}{1+1} = 5{,}600$ people.

The second and last step is to multiply the estimated annual net change in the head-count poverty rate (here, –2.0 percentage points, or –0.020) by the estimated number of on-going participants (here, 5,600). For 150% of the national line, this gives an annual net change in the number of poor people of –0.020·5,600 ≈ –113 people. This negative change is a (non-compounded) reduction in poverty; the number of poor people in participating households decreases (improves) by 113 each year.

Given the scorecard's assumptions, both approaches to estimating change over time—one sample scored twice, and two independent samples—are unbiased. In general, the two approaches give different estimates (as in this example) because they interview different households at different times. All else constant, scoring one sample twice has smaller margins of error, but there may be context-specific reasons (related to costs or non-sampling errors) to score two independent samples.

4. How to design scorecard surveys and samples

To design a scorecard survey and its sample, a program must decide:[26]

- Who will do interviews
- Where and how to interview
- How to record responses and scores
- How to calculate estimates and report/analyze them
- Which participating households to interview
- How many participating households to interview
- How frequently to do surveys
- Whether to track a population across multiple time periods
- Whether to interview the same participants twice

Decisions should follow from the program's goals for the survey, the business questions to be answered, and the budget. The central goals of the design are to:

- Inform issues that matter to the program
- Make sure that the sample is representative of a well-defined population

4.1 Who will do interviews

The enumerators who interview participating households must be trained to follow the "Interview Guide". The enumerators may be:

- Program employees
- Contractors

4.2 Where and how to interview

Interviews should be:

- In-person, and
- At the sampled household's residence, and
- With an enumerator trained to follow the "Interview Guide"

This is the only recommended way. It follows Cambodia's NIS in the 2017 CSES, so it provides the most-accurate and most-consistent data (and thus the best estimates).

[26] IRIS Center (2007) and Toohig (2008) also discuss this topic, covering sampling, budgeting, training, logistics, interviewing, piloting, and recording data.

Of course, it is possible to do interviews in non-recommended ways such as:

- Without an enumerator (such as by asking respondents to fill out paper or web forms on their own or to answer questions sent via e-mail, texts, or robo-calls)
- Away from home (such as a program's service point or a local meeting place)
- Not in-person (such as with an enumerator by phone)

While non-recommended methods may reduce costs, they also affect responses[27] and thus reduce the accuracy of estimates. This is why interviewing by a trained enumerator at the residence is recommended.

In some contexts—such as when a program's field agents do not already visit participants at home anyway as part of their normal work—a program might be willing to trade accuracy for a lower-cost, non-recommended approach. The business wisdom of this depends on context-specific factors that each program must judge for itself. To judge carefully, a program that is considering a non-recommended method should do a small test to see how responses differ versus with a trained enumerator at the residence. Furthermore, all reporting should discuss the possible consequences of the non-recommended method.

4.3 How to record responses and scores

Responses and scores can be recorded by enumerators on:

- Paper in the field, and then keyed into a database or spreadsheet at an office
- Mobile devices in the field, and then uploaded to a database[28]

4.4 How to calculate estimates and report/analyze them

Analysts can calculate estimates by plugging data into spreadsheets (set up as in the examples here) or with the spreadsheet-based PovIt!™ reporting app. Schreiner (2014) describes how to report and analyze scorecard estimates.

[27] Schreiner, 2015b.

[28] Scorocs can help set up a system to collect data with mobile devices or to transfer data from paper forms into a database at the office. Support is also available for calculating estimates as well as for reporting and analysis.

4.5 Which participating households to interview

Given a population relevant for a particular business question, the participating households to be interviewed can be:

- All relevant participants (a census)
- A representative sample of relevant participants
- All relevant participants in a representative sample of relevant service points and/or in a representative sample of relevant field agents
- A representative sample of relevant participants in a representative sample of relevant service points and/or in a representative sample of relevant field agents

A census is rarely necessary, except for very small programs. Nevertheless, it may be easier to interview all in-coming households as a standard part of in-take rather than managing who gets scored and who does not.

4.6 How many participating households to interview

If not determined by other factors, the number of participating households to interview can be derived from sample-size formulas (Annex 6) to achieve a desired confidence level for a desired margin of error.

The focus of sample design, however, should be less on having enough interviews to achieve some arbitrary level of statistical significance and more on having a representative sample from a well-defined population that is relevant for informing business questions that matter to the program.

In practice, non-sampling errors in implementation and in the definition of the population often matter at least as much as errors due to smaller samples. Program managers sometimes get hung up on sample size, but there is no point in fixating on sample size unless just as much effort goes to mitigating other sources of error and then accounting for margins of error in the analysis stage. Of course, smaller samples produce less-reliable estimates. In practice, however, almost no one reports or considers margins of error (even though they should), and estimates derived from at least 1,000 interviews will rarely raise eyebrows (Annex 6).

4.7 How frequently to do surveys

The frequency of scorecard surveys can be:

- As a once-off project (precluding estimating change)
- Every three years (or at any other fixed or variable time interval, allowing estimating change)
- Each time a field agent visits a participant at home (allowing estimating change)

4.8 Whether to track a population across periods

The scorecard can estimate changes in poverty across periods, but not all programs want this. For many programs, it is enough to check poverty only for in-coming participants.

4.9 Whether to interview the same participants twice

If a scorecard is applied more than once in order to estimate changes in poverty, then it can be applied with:

- One sample of participants who are all scored at both baseline and follow-up
- Two samples of participants from the same population, with the first sample scored at baseline and the second sample scored at follow-up.

Scoring one sample twice gives estimates with smaller margins of error. It may also be less costly at follow-up, given that the households have already been tracked down at home at baseline. Furthermore, the follow-up round could be based on a random sample of the households interviewed at baseline.

4.10 Survey design and implementation in Bangladesh

An example set of choices is illustrated by the microfinance arms of BRAC and ASA, two pro-poor titans in Bangladesh who each have about 7 million participating households and who made plans to apply the scorecard for Bangladesh[29] with a sample of about 25,000 participants each.

Their design is that all loan officers in a random sample of branches score all participants each time the loan officers visit a homestead (about once a year) as part of their standard due diligence prior to loan disbursement. The loan officers record responses on paper in the field before sending the forms to a central office to be entered into a database and converted to poverty likelihoods for further analysis.

[29] Schreiner, 2013.

5. How to use scores for targeting

When a program uses the scorecard for segmenting (*targeting*) participants for differentiated treatment based on poverty, people in households with scores at or below a cut-off are labeled *targeted* and given one type of treatment. People in households with scores above a cut-off are labeled *non-targeted* and given another type of treatment.[30]

Households that score at or below a given cut-off should be labeled as *targeted*,[31] not as *poor*.[32]

Targeting is successful to the extent to which people truly below a poverty line are targeted (*inclusion*) or people truly above a poverty line are not targeted (*exclusion*). Of course, no poverty-assessment tool is perfect, and targeting is unsuccessful to the extent to which people truly below a poverty line are not targeted (*undercoverage*) or people truly above a poverty line are targeted (*leakage*).

Figure 12 below depicts these four possible targeting outcomes. Targeting accuracy varies by the cut-off score. A higher cut-off has better inclusion and better undercoverage (but worse exclusion and worse leakage). In contrast, a lower cut-off has worse inclusion and worse undercoverage (but better exclusion and better leakage).

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[30] *Targeting status* (having a score at or below a targeting cut-off) is not the same concept as *poverty status* (having consumption below a poverty line). Poverty status is a fact that is defined by whether consumption is below a poverty line as directly measured by a survey. In contrast, targeting status is a program's policy choice that depends on a cut-off and on an indirect estimate from a scorecard.

[31] Other labels can be meaningful as long as they describe the segment and do not confuse targeting status (having a score below a program-selected cut-off) with poverty status (having consumption below an externally-defined poverty line). Examples include: *Groups A, B, and C*; *People with scores of 29 or less, 30 to 69, or 70 or more*; and *People that qualify for reduced fees, or that do not qualify*.

[32] After all, unless all targeted households have poverty likelihoods of 100 percent, it is likely that some of them are non-poor (their consumption is above a given poverty line). In the context of the scorecard, the terms *poor* and *non-poor* have specific definitions. Using these same terms for targeting status is incorrect and misleading.

Figure 12: Possible targeting outcomes

Observed poverty status		Targeting segment: Targeted	Targeting segment: Non-targeted
Poor		**Inclusion** Poor correctly targeted	**Undercoverage** Poor mistakenly not targeted
Non-poor		**Leakage** Non-poor mistakenly targeted	**Exclusion** Non-poor correctly not targeted

Programs should weigh these trade-offs when setting a cut-off. A formal way to do this is to assign net benefits—based on a program's values and mission—to each of the four possible targeting outcomes and then to choose the cut-off that maximizes the sum of net benefits.[33]

Figure 15 shows targeting outcomes by cut-off for people in Cambodia. For an example cut-off of 46 or less, outcomes for 150% of the national line in the validation sample are:

- Inclusion: 23.5 percent are below the line and correctly targeted
- Undercoverage: 14.4 percent are below the line and mistakenly not targeted
- Leakage: 8.1 percent are above the line and mistakenly targeted
- Exclusion: 54.0 percent are above the line and correctly not targeted

Increasing the cut-off to 48 or less improves inclusion and undercoverage but worsens leakage and exclusion:

- Inclusion: 26.8 percent are below the line and correctly targeted
- Undercoverage: 11.0 percent are below the line and mistakenly not targeted
- Leakage: 11.9 percent are above the line and mistakenly targeted
- Exclusion: 50.3 percent are above the line and correctly not targeted

[33] Adams and Hand, 2000; Hoadley and Oliver, 1998.

Which cut-off is preferred depends on the sum of net benefits. If each targeting outcome has a per-person benefit or cost, then total net benefit for a given cut-off is:

Benefit per person correctly included	x	People correctly included	–
Cost per person mistakenly not covered	x	People mistakenly not covered	–
Cost per person mistakenly leaked	x	People mistakenly leaked	+
Benefit per person correctly excluded	x	People correctly excluded.	

To set an optimal cut-off, a program would:

- Assign benefits and costs to possible outcomes, based on its values and mission
- Tally total net benefits for each cut-off using Figure 15 for a chosen poverty line
- Select the cut-off with the highest total net benefit

The most difficult step is assigning benefits and costs to targeting outcomes. A pro-poor program that uses targeting—with or without the scorecard—should thoughtfully consider how it values successful inclusion and exclusion versus errors of undercoverage and leakage. It is healthy to go through a process of thinking explicitly and intentionally about how possible targeting outcomes are valued.

A common choice of benefits and costs is the *hit rate*, where total net benefit is the number of people correctly included or correctly excluded:

Hit rate =	1	x	People correctly included	–
	0	x	People mistakenly undercovered	–
	0	x	People mistakenly leaked	+
	1	x	People correctly excluded.	

Figure 15 shows the hit rate for all cut-offs for the scorecard. For the example of 150% of the national line in the validation sample, total net benefit under the hit rate for a cut-off of 46 or less is 77.5 percent, with about three in four people in Cambodia correctly classified.

The hit rate weighs successful inclusion of people below the poverty line the same as successful exclusion of people above the line. If a program values inclusion more (say, twice as much) than exclusion, then it can reflect this by setting the benefit for inclusion to 2 and the benefit for exclusion to 1. Then the chosen cut-off will maximize (2 x Households correctly included) + (1 x Households correctly excluded).

As an alternative to assigning benefits and costs to targeting outcomes and then choosing a cut-off to maximize total net benefits, a program could set a cut-off to achieve a desired poverty rate among targeted people. The third column of Figure 16 ("% targeted people who are poor") shows, for the scorecard applied to the validation sample, the estimated poverty rate among people in households who score at or below a given cut-off. For the example of 150% of the national line, targeting people who score 46 or less would target 31.6 percent of all people (second column) and would be associated with an estimated poverty rate among targeted people of 74.3 percent (third column).

Figure 16 also reports two other measures of targeting accuracy. The first is a version of coverage ("% poor people who are targeted"). For the example of 150% of the national line with the validation sample and a cut-off of 46 or less, 62.0 percent of all poor people are covered.

The final targeting measure in Figure 16 is the number of successfully targeted poor people for each non-poor person mistakenly targeted (right-most column). For 150% of the national line with the validation sample and a cut-off of 46 or less, covering about 2.9 poor people means leaking to 1 non-poor person.

Interview Guide

The excerpts quoted here are from:

National Institute of Statistics (2012) "Field-Operations Manual for Interviewers and Supervisors: Cambodia Socio-Economic Survey 2012" [the *Manual*], link.[34]

and

National Institute of Statistics (2017) "Household Questionnaire: Cambodia Socio-Economic Survey 2017", [the *Questionnaire*].

G1. Basic interview instructions

The scorecard can be filled out on paper in the field, with responses entered later in a spreadsheet or in your own database. Alternatively, Scorocs' cloud-based data-collection tool works in a web browser or as an app on Android phones, allowing data entry in the field or in the office. If there is no connection, then data is stored locally until there is a connection. Download the data-collection tool, or ask about a private account.

The scorecard should be administered by an enumerator trained to follow this "Interview Guide".

Fill out the scorecard header and the "Back-page Worksheet" first, following the directions on the "Back-page Worksheet".

In the scorecard header, fill in the number of household members based on the list that you the enumerator made as part of the "Back-page Worksheet".

Do not directly ask the first scorecard question ("In what province does the household live?"). Instead, fill in the answer based on your knowledge of the province where the household lives.

In the same way, do not directly ask the second scorecard question ("How many members does the household have?"). Instead, mark the answer based on the number of household members that you listed on the "Back-page Worksheet".

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[34] According to Lundy Saint (Director of the Department of Information, Communication, and Technology for the NIS), the 2017 CSES used the same *Manual* as the 2012 CSES.

Ask all of the remaining questions directly of the respondent, except for the fourth question ("What is the primary construction material of the floor of the dwelling unit occupied by the household?"). For this one question, you the enumerator should try to observe and record the main construction material of the floor without asking the question directly of the respondent. If you are not completely certain of the appropriate answer, then ask the question of the respondent.

G1.1 General interviewing guidance

Study this "Interview Guide" carefully, and carry it with you while you work. Follow the instructions in this "Interview Guide" (including this one).

Remember that the respondent for the interview need not be the household member who is the direct participant with your program.

Likewise, the field agent to be recorded in the scorecard header is not necessarily the same as you the enumerator who does the interview. Rather, the field agent is the employee of the pro-poor program with whom the direct participant has an on-going relationship. If there is no such field agent, then leave those spaces in the scorecard header blank.

Read each question aloud (except as indicated above) word-for-word, in the order presented in the scorecard.

When you mark a response to a scorecard question, write the point value in the "Score" column and then circle the spelled-out response option, the pre-printed point value, and the hand-written points, like this:

3. How many rooms in the dwelling unit are used by the household (other than kitchen, toilets, and bathrooms)?	A. One	0	
	B. Two	2	2
	C. Three	6	

When an issue comes up that is not addressed in this "Interview Guide", its resolution should be left to the unaided judgment of the enumerator and the respondent, as that apparently was the practice of Cambodia's NIS in the 2017 CSES. That is, a program should not promulgate any definitions or rules (other than those in this "Interview Guide") to be used by all its enumerators. Anything not explicitly addressed in this "Interview Guide" is to be left to the unaided judgment of each individual enumerator and the respondent.

Do not read the response options to the respondent. Instead, read the question, and then stop; wait for a response. If the respondent asks for clarification or otherwise hesitates or seems confused, then read the question again or provide additional assistance based on this "Interview Guide" or as you the enumerator deem appropriate.

In general, you should accept the responses given by the respondent. Nevertheless, if the respondent says something—or if you see or sense something—that suggests that the response may not be accurate, that the respondent is uncertain, or that the respondent desires assistance in figuring out how to respond, then you should read the question again and provide whatever help you deem appropriate based on this "Interview Guide".

While most responses to questions in the scorecard are verifiable, in most cases you do not need to verify responses. You should verify only if something suggests to you that a response may be inaccurate and thus that verification might improve data quality. For example, you might choose to verify if the respondent hesitates, seems nervous, or otherwise gives signals that he/she may be lying, confused, or uncertain. Likewise, verification is probably appropriate if a child in the interviewed household or if a neighbor says something that does not square with a respondent's response. Verification is also a good idea if you can see something yourself that suggests that a response may be inaccurate, such as a consumer durable that the respondent claims not to possess, or a child eating in the room who has not been counted as a member of the household.

In general, the application of the scorecard should mimic as closely as possible the application of the 2017 CSES by Cambodia's NIS. For example, interviews should done in-person by a trained enumerator at the participant's residence because that is what the NIS did in the 2017 CSES.

G1.2 Translation

As of this writing, the scorecard itself, the "Back-page Worksheet", and this "Interview Guide" are available only in English. There are not yet official, professional translations to Khmer nor other languages spoken in Cambodia. Users should check scorocs.com to see what translations have been done since this writing.

If there is not yet an official, professional translation to a desired language, then please contact Scorocs for help in creating such a translation.

G2. General interview guidance from the *Manual*

G2.1 Who should be the respondent?

Remember that the respondent does not need to be the household member who is the direct participant with your program (although the respondent may be the direct participant).

According to p. 1 of the *Questionnaire*, "The questions should be asked of the head of the household, the spouse of the head of the household, or—if both the head and the spouse of the head are absent—another adult member of the household."

According to p. 8 of the *Manual*, "[You] may interview any responsible member of the household who can provide accurate responses to the questions and who can give information for the household. The head of the household and/or the spouse would be the most qualified to respond."

According to p. 24 of the *Manual*, the questionnaire "should be administered to the head of the household or to the spouse of the head of the household. If it is impossible to administer the questionnaire to either of these persons (for example, because they are both absent), then the questionnaire may be administered to another adult member of the household who is sufficiently knowledgeable."

G2.2 Who is the head of the household?

Note that the head of the household may or may not be the household member who is the direct participant with your program (although the head may be the direct participant).

G2.3 How to conduct an interview:

According to pp. 8–9 of the *Manual*, "Getting accurate and complete information is the prime objective. . . . As an enumerator, you must be polite at all times. At the same time, be authoritative enough to win the respondent's trust and confidence.

"The success of the interview depends on your making a good impression. Follow these instructions:

"Be presentable. Make a good impression by dressing appropriately and neatly. Some people judge others by what they wear, and they may not open the door for someone who looks messy or untidy.

"*Introduce yourself and the survey*. While you cannot control how people will react to you, you yourself can always be cordial and polite. Always try to smile. Be ready for any kind of question, and give honest answers. Never argue or quarrel with the respondent. Keep your composure, even if the respondent seems irritated or indifferent.

"*Be polite*. Your introduction is important. To introduce yourself, say: 'Good morning/afternoon, I am [your name], an enumerator with [your program]. Here is my identification card. We are currently [gathering data from some of our participants' households to learn more about how they live]. We would very much appreciate your responding to our questions. Please be assured that all responses will be kept strictly confidential.'

"Explain the objectives of the survey. Do this if needed to obtain cooperation.

"Read and follow the instructions on the ["Back-page Worksheet"] carefully. Familiarize yourself with the [scorecard].

"*Ask all questions*. Never assume a response [unless this "Interview Guide" explicitly says otherwise]. Ask a question even if you think you already know the response; your assumption may be mistaken. [As an exception, do *not* ask the fourth question ("What is the primary construction material of the floor of the dwelling unit occupied by the household?"). Instead, you the enumerator should try to observe and record the main construction material of the floor without asking the question directly of the respondent. If you are not completely certain of the appropriate answer, then ask the question of the respondent.]

"*If you do not understand a question or a procedure, first consult [this "Interview Guide"]*. [If this "Interview Guide" does not resolve the issue, then use your best judgment.]

"*Probe if a response is not satisfactory*. Do not accept an unsatisfactory response; instead, probe for more information. You can also:

- Repeat the question. Asking again may help a respondent to recall
- Explain the concept. You may need to explain some technical or difficult words in simple terms

"Thank the respondent for his/her cooperation. Leave the respondent with a good feeling about the survey. Express your appreciation for his/her co-operation. For example, say, 'Thank you very much for your time in answering the questions.'

"After each interview, review [the scorecard] for possible omissions. If anything is missing, please make the corrections with the help of the respondent."

G2.4 How to ask questions:

According to pp. 9–10 of the *Manual*, "Follow these rules when asking questions:

"*Ask all questions exactly as they are worded in [the scorecard]*. [As an exception, do *not* read the first question to the respondent ("In which province does the household live?") Instead, fill in the answer based on your knowledge of the province where the household lives.] Changing the wording can change the meaning of the question and, consequently, change the response. The questions have been written carefully in order to [match how items were asked in the CSES]. . . . You should not paraphrase the question nor try to make it clearer or easier to respond. If the respondent asks for clarification, it is fine to provide additional information, but only that provided in [this "Interview Guide"]. If the respondent still cannot respond, [then use your best judgment to determine the best response option to be marked].

"Ask the questions in the order that they appear in [the scorecard]. Do not skip items. [As an exception, do *not* read the first question to the respondent ("In which province does the household live?") Instead, fill in the answer based on your knowledge of the province where the household lives. For the second question ("How many members does the household have?"), first complete the Back-page Worksheet, then circle the appropriate response options based on what is recorded on the Back-page Worksheet.]

"Do not read the response options to respondents. Try to find the response option which best fits the respondent's response. If no option fits, then mark the response option that includes 'other' [if such a response option exists]. The survey is designed to obtain information from the respondent, not to provide information to respondents. Listen skillfully to ensure that the survey gets correct information from respondents. In exceptional cases in which the respondent seems to be unable to grasp what kind of response is relevant, then you can mention a few of the response options to give him/her some idea. But this is an exception to the rule.

"Verify that all items have a response recorded.

"Never ask a leading question. A *leading question* is one that suggests the answer that you expect. By asking a leading question, you set up the respondent to believe that the response suggested by the question is the appropriate one. An example of a leading question is: 'Are you the head of this household?' The better way to ask is: 'Who is the head of this household?' Another example is: 'Did you consume 10 kilos of rice last week?', [in contrast to the neutral 'How much rice did you consume last week?']

"Be absolutely neutral. Most people are naturally polite, particularly with visitors, and they tend to try to please the visitor. Do not show any surprise, approval, nor disapproval about the respondent's responses. If the respondent asks for your opinion, do not tell her/him what you think about the subject yourself. Instead, explain that the survey seeks to find out what the respondent thinks. Do not discuss your own views with the respondent until after the interview is over. Remember that although you are in charge of the interview and that although you must be on top of the situation at all times, you are also there to listen to what the respondent has to say in response to the question posed. Always strive to be a skilled listener and to avoid trying to instruct or steer the respondent toward a particular response.

"Maintain the tempo of the interview. Avoid lengthy discussions of the questions. If you receive seemingly irrelevant or complicated answers, do not break in too suddenly; listen carefully to what the respondent says, and then lead him/her back to the original question.

"*Finish recording an answer before moving on to the next question*."

G2.5 What to do when a respondent has difficulty responding:

According to p. 13 of the *Manual*, "There will be some questions that some respondents will not be able to answer. This may be because they do not:

- Remember well
- Possess the information
- Understand the question

G3. Guidelines for each question in the scorecard

G3.1 In which province does the household live?

A. Phnom Penh, or Koh Kong
B. Battambang, Takéo, Siem Reap, Banteay Meanchey, Kampong Thom, Oddar Meanchey, Ratanak Kiri, or Stung Treng
C. Kampong Cham, Tboung Khmum, Kandal, Svay Rieng, Kampot, Kampong, Chhnang, Preah Sihanouk, Preah Vihear, Kratié, or Mondulkiri
D. Prey Veng, Kampong Speu, Pursat, Kep, or Pailin

Unless you have to, do not directly ask this question of the respondent. Instead, fill in the answer based on your knowledge of the province) where the household lives.

G3.2 How many members does the household have?

A. Eight or more
B. Seven
C. Six
D. Five
E. Four
F. Three
G. One, or two

Do not directly ask this question of the respondent. Instead, mark the response based on the number of household members that you listed on the "Back-page Worksheet".

According to p. 26 of the *Manual*, a *household* is "a group of persons (or a single person) who usually live together and who have a common arrangement for food, such as using a common kitchen or a common food budget. The persons may be related to each other or they may be non-relatives, including servants or other employees who stay with the employer.

"Students, boarders, and employees who reside in the household's residence and who have a common food arrangement with the household are considered to be *members of the household* if they have been in the household for more than a year or if they have no other place of residence.

"However, if there are five or more boarders/lodgers in a housing unit, then they should not be reported as *members of the household* from whom they buy room and board."

According to p. 27 of the *Manual*, "A *member of a household* is any person who has been normally living in the residence of the interviewed household and who has shared arrangements for food for at least one year, or one who has no other residence.

"Thus, most students going to school away-from-home are considered to be *members of their family's household*, rather than members of a household [close to] their school, unless they have stayed continuously with the household close to their school for more than a year.

“A person who has moved recently (that is, less than one year ago) is considered to be a *member of the household* at his/her destination if he/she does not plan to return to the previous household within one year. Similarly, a person who has moved out of a household recently with no intention to return is no longer considered to be a *member of that household*.

“A person is counted as a *household member* if he/she lives there or has been absent for less than 12 months.

“A person who has moved out of the interviewed household more than one year ago and who still visits the interviewed household only occasionally (such as only during major holidays a few times a year) is not considered to be a *member of the interviewed household*. However, a person who has had a separate residence for more than one year but who comes home regularly (on average, once a month or more frequently) is still considered to be a *member of the interviewed household* (for example, garment workers).

Newly-wed spouses (for example, a son-in-law or a daughter-in-law) who recently joined the interviewed household, newborn children, or a household member who commutes between the village and work or who comes home regularly from work (for the weekend, or sometimes at the end of the month, such as garment workers), are considered to be *members of the interviewed household*.

Newly-weds who have moved out of the interviewed household, people who have died, and so on are not counted as *usual members of the household*.”

G3.3 How many rooms in the dwelling unit are used by the household (other than kitchen, toilets, and bathrooms)?

A. One
B. Two
C. Three or more

According to p. 35 of the *Manual*, "Ask for the number of rooms in the dwelling unit that is used by the interviewed household. A *room* must have four walls with a roof and a doorway. It must be wide enough and long enough for a person to sleep in. When counting the number of rooms occupied by the interviewed household, you should exclude kitchens, storerooms, bathrooms, and toilets, as these are are not normally usable for living or sleeping. A room which is shared by more than one household is not to be counted as being occupied by any of the sharing households.

G3.4 What is the primary construction material of the floor of the dwelling unit occupied by the household? (*Observe and record*)

A. Earth, clay, or other
B. Bamboo strips, parquet/polished wood, wooden planks, or cement/brick/stone
C. Ceramic tiles, polished stone/marble, or vinyl

According to p. 35 of the *Manual*, "This question can be answered via observation. If in doubt, however, then ask the question of the respondent.

"If the floor of the interviewed household's residence is made of more than one type of material, then [record the type of material that accounts for the largest share of the floor area]."

G3.5 Does the household own any dining sets (dining table and chairs)?

A. No
B. Yes

According to the NIS, dining sets that are broken-but-repairable should be counted for the purposes of this question. Borrowed dining sets should not be counted.

The *Manual* provides no additional information for this question.

G3.6 How many electric burners or gas stoves does the household own?

A. None
B. One
C. Two or more

According to the NIS, electric burners and gas stoves that are broken-but-repairable should be counted for the purposes of this question. Borrowed electric burners and gas stoves should not be counted.

The *Manual* provides no additional information for this question.

G3.7 How many motorcycles (including electric motorcycles), cars, or jeeps/vans does the household own?

A. None
B. One
C. Two or more

According to the NIS, motorcycles (including electric motorcycles), cars, and jeeps/vans that are broken-but-repairable should be counted for the purposes of this question. Borrowed motorcycles (including electric motorcycles), cars, and jeeps/vans should not be counted.

The *Manual* provides no additional information for this question.

G3.8 How many cell phones does the household own?

A. None
B. One
C. Two or more

According to the NIS, cell phones that are broken-but-repairable should be counted for the purposes of this question. Borrowed cell phones should not be counted.

The *Manual* provides no additional information for this question.

G3.9 In how many days in the past 7 days (that is, since last [CURRENT DAY OF THE WEEK] until yesterday) did the household eat bananas, apples, lemons, or tangerines?

A. None
B. One
C. Two or more

According to p. 29 of the *Manual*, you the enumerator should replace "[CURRENT DAY OF THE WEEK]" with the name of the day of the week when the interview is taking place. For example, if the interview is taking place on a Tuesday, then read the question as: "In how many days in the past 7 days (that is, since last Tuesday until yesterday) did the household eat bananas, apples, lemons, or tangerines?"

The *Manual* provides no additional information for this question.

G3.10 In the past 7 days (that is, since last [CURRENT DAY OF THE WEEK] until yesterday), did the household consume any dairy products (fresh milk, condensed or powdered milk, ice cream, cheese, or other dairy products).

A. No
B. Yes

According to p. 29 of the *Manual*, you the enumerator should replace "[CURRENT DAY OF THE WEEK]" with the name of the day of the week when the interview is taking place. For example, if the interview is taking place on a Wednesday, then read the question as: "In the past 7 days (that is, since last Wednesday until yesterday), did the household consume any dairy products (fresh milk, condensed or powdered milk, ice cream, cheese, or other dairy products)?"

The *Manual* provides no additional information for this question.

Technical Annexes: Overview

The technical annexes cover aspects of the scorecard for advanced users or other specialists. While programs can skip the annexes and still benefit from the scorecard, understanding the details will increase the usefulness of scorecard estimates and improve implementation, interpretation, and analysis.

The annexes cover:

1. Data used for construction and validation
2. Definitions of poverty and of poverty lines
3. Scorecard construction
4. Estimates of poverty likelihoods
5. Error and margins of error
6. Formulas for sample size

Annex 1: Data used for construction and validation

The National Institute of Statistics (NIS) fielded the 2017 Cambodia Socio-Economic Survey (CSES) with 3,840 households from January 1 to December 31, 2017. The 2017 CSES is Cambodia's most-recent available national household consumption survey.

Questions and points for the scorecard are selected (*constructed*) based on data from a random three-fifths of the 3,840 households in the 2017 CSES. These same three-fifths of households are also used to associate (*calibrate*) scores with poverty likelihoods for all poverty lines.

Data from the other two-fifths of households from the 2017 CSES is used to test (*validate*) the scorecard's accuracy for one-period, snapshot estimates of poverty rates *out-of-sample*, that is, with data that is not used in construction nor calibration. Data from those same two-fifths of households are also used for out-of-sample tests of targeting accuracy.

Poverty estimates based on data from the 2017 CSES—and thus poverty estimates from the scorecard—are problematic because they use the Cambodia government's definitions of consumption and poverty lines.[35] In particular, 100% of the national poverty line by the government's definition in 2017 gives head-count poverty rates of 15.1 percent for Phnom Penh, 9.6 percent for "Other urban" areas, and 8.4 percent for rural areas. Among the almost-70 countries with scorecards, only in Cambodia does the urban poverty rate exceeds the rural rate. Something is wrong with Cambodia's data or with its definition of *poverty*.

These issues led PovcalNet at the World Bank (2017) to decline to estimate poverty by international PPP lines for Cambodia. It notes: "Close examination of the household survey and price data suggested problems with the household survey-based welfare [consumption] aggregate, producing implausibly low poverty rates. According to these estimates, Cambodia's poverty rate was much lower than what is expected from its GDP per capita. Furthermore, some non-income welfare indicators are much lower in Cambodia than in economies with comparable extreme-poverty rates."

[35] Section 2.3 of Schreiner (2015a)

Annex 2: Definitions of poverty and of poverty lines

A household's *poverty status* as poor or non-poor depends on whether its consumption (KHR per person per day) is below a given poverty line. Thus, a definition of *poverty* is a poverty line together with a measure of consumption.

Consumption is defined the same for the 2011 and 2017 CSES. This "government definition" is described in Schreiner (2015a). Consumption is in prices for Cambodia as a whole on average during the 2017 CSES fieldwork.

Because pro-poor programs in Cambodia may want to use different or various poverty lines, scores from the scorecard are calibrated to poverty likelihoods for 18 lines:

- 100% of the national line
- 150% of the national line
- 200% of the national line
- $1.25/day 2005 PPP
- $2.00/day 2005 PPP
- $2.50/day 2005 PPP
- $5.00/day 2005 PPP
- $8.44/day 2005 PPP
- $1.90/day 2011 PPP
- $3.20/day 2011 PPP
- $5.50/day 2011 PPP
- $21.70/day 2011 PPP
- First-decile (10^{th}-percentile) line
- First-quintile (20^{th}-percentile) line
- Second-quintile (40^{th}-percentile) line
- Median (50^{th}-percentile) line
- Third-quintile (60^{th}-percentile) line
- Fourth-quintile (80^{th}-percentile) line

A2.1 National poverty lines

Schreiner (2015a) documents Cambodia's government-definition poverty lines for the 2011 CSES. The lines for the 2017 CSES are the 2011 lines, adjusted for changes in prices in the areas of Phnom Penh, "Other urban", and rural.

In average prices for Cambodia as a whole during the 2017 CSES fieldwork, the national poverty line (usually called here "100% of the national line") is KHR 5,301 per person per day. The corresponding all-Cambodia head-count poverty rate is 9.4 percent (Figure 14).[36]

A2.2 International 2005 PPP poverty lines

International 2005 PPP lines are derived from:

- 2005 PPP exchange rate for Cambodia for "individual consumption expenditure by households":[37] KHR1,615.298 per $1.00
- Average all-Cambodia Consumer Price Index[38] (CPI) in calendar-year:
  - 2005: 115.195
  - 2010: 162.253
  - 2011: 171.157
  - 2017: 202.131
- Average all-Cambodia spatial price deflator in 2017: 1.0000
- Spatial price deflators for three poverty-line areas in 2017:
  - Phnom Penh: 1.6032
  - Other urban: 1.0994
  - Rural: 0.8849

Given this, the $1.25/day 2005 PPP line for a given poverty-line area is:

$$\$1.25 \cdot 2005\ \text{PPI}\ \text{factor} \cdot \frac{\text{Deflator}_{\text{Area}}}{\text{Ave. deflator}} \cdot \frac{\text{CPI}_{2017}}{\text{CPI}_{2005}}.$$

For the example of rural areas, the $1.25/day 2005 PPP line is:

$$\$1.25 \cdot 1{,}615.298 \cdot \frac{0.8849}{1.0000} \cdot \frac{202.131}{115.195} = \text{KHR}3{,}135.$$[39]

For Cambodia overall, the average $1.25/day 2005 PPP line is KHR3,543 per person per day, giving a head-count poverty rate of 1.2 percent (Figure 14).

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[36] Cambodia's NIS has not published a poverty rate for 100% of the national line using data from the 2017 CSES.

[37] World Bank, 2008.

[38] Base = 100 in October to December of 2006. The series is spliced from link, link, link, link, link of 28 April 2014; and link of 15 March 2019.

[39] This differs from KHR3,161 in Figure 14 because the NIS counts some households differently for its three poverty-line areas versus for its urban/rural classification.

The lines and rates for $1.25/day here cannot be compared with those of the World Bank because—as noted in Annex 1—PovcalNet does not report $1.25/day 2005 PPP figures for the 2017 CSES.

The 2005 PPP poverty lines for $2.00/day, $2.50/day, and $5.00/day are multiples of the $1.25/day line.

$8.44/day is the 75th percentile of worldwide per-capita income (not consumption).[40] The $8.44/day 2005 PPP line is used by the International Finance Corporation as a benchmark for the "bottom of the pyramid". While the "$1.25" aspect of the $1.25 2005 PPP standard is in prices in calendar-year 2005, the "$8.44" aspect of the $8.44 2005 PPP standard is in prices in calendar-year 2010.[41] Thus, the all-Cambodia $8.44/day 2005 PPP line is $\$8.44 \cdot 1{,}615.298 \cdot \left(\frac{202.131}{162.253}\right) =$ KHR16,984. This gives a head-count poverty rate of 90.8 percent.

A2.3 International 2011 PPP poverty lines

International 2011 PPP lines are derived from the parameters listed above, along with the 2011 PPP exchange rate for Cambodia for "individual consumption expenditure by households" of KHR1,527.558 per $1.00.[42]

Analogous to the $1.25/day 2005 PPP line, the $1.90/day 2011 PPP line for a given poverty-line area in the 2017 CSES is:

$$\$1.90 \cdot 2011 \text{ PPI factor} \cdot \frac{\text{Deflator}_{\text{Area}}}{\text{Ave. deflator}} \cdot \frac{\text{CPI}_{2017}}{\text{CPI}_{2011}}.$$

For the example of rural areas, the $1.90/day 2011 PPP line is:

$$\$1.90 \cdot 1{,}527.558 \cdot \frac{0.8849}{1.0000} \cdot \frac{202.131}{171.157} = \text{KHR3,033.}$$[43]

[40] Hammond *et al.* (2007).
[41] Link and link of 20 July 2020.
[42] World Bank, 2015, Table 2.4.
[43] This differs from KHR3,059 in Figure 14 because the NIS counts some households differently for its three poverty-line areas versus for its urban/rural classification.

For Cambodia overall, the average $1.90/day 2011 PPP line is KHR3,428 per person per day, giving a head-count poverty rate of 0.9 percent (Figure 14).[44]

The 2011 PPP poverty lines for $3.20/day, $5.50/day, and $21.70/day are multiples of the $1.90/day line.[45]

A2.4 Percentile-based poverty lines

The scorecard for Cambodia also supports percentile-based poverty lines.[46] This facilitates a number of types of analyses. For example, the second-quintile (40th-percentile) line might be used to help track Cambodia's progress toward the World Bank's (2013) goal of "shared prosperity/inclusive economic growth", defined as income growth among the bottom 40 percent of the world's people.

The four quintile lines, analyzed together, can also be used to look at the relationship of consumption with health outcomes (or anything else related with the distribution of consumption). The scorecard thus offers an alternative for health-equity analyses that typically have used an asset index such as that supplied with the data from the Demographic and Health Surveys to compare an estimate of socio-economic status with health outcomes.[47]

Of course, relative-wealth analyses were always possible (and still are possible) with scores from the scorecard. But support for relative consumption lines allows for a more straightforward use of a single tool to analyze any or all of:

- Relative wealth (via scores)
- Absolute consumption (via poverty likelihoods and absolute poverty lines)
- Relative consumption (via poverty likelihoods and percentile-based poverty lines)

[44] There are no comparable $1.90/day 2011 PPP poverty lines nor poverty rates for Cambodia available from the World Bank's PovcalNet.
[45] Jolliffe and Prydz (2016) discuss the World Bank's four 2011 PPP lines.
[46] Percentiles are defined in terms of people for Cambodia as a whole. For example, the all-Cambodia head-count poverty rate for the first-quintile (20th-percentile) poverty line is 20 percent (Figure 14).
[47] Rutstein and Johnson, 2004.

Unlike the scorecard, asset indexes serve only to analyze relative wealth. Furthermore, the scorecard—unlike asset indexes based on Principal Component Analysis or similar approaches—uses a straightforward, well-understood standard for socio-economic status whose definition is external to the tool itself (consumption relative to a poverty line defined in monetary units).

In contrast, an asset index defines *poverty* in terms of its own questions and points, without reference to an external standard. This means that two asset indexes with different questions or different points—even if derived from the same data for a given country—imply two distinct definitions of *poverty.* In the same set-up, two scorecards would provide comparable estimates under a single definition of *poverty*.

Annex 3: Scorecard construction

For Cambodia, about 80 candidate questions are prepared in these areas:

- Household composition (such as the number of household members)
- Education (such as the literacy of the female head (or eldest wife of the male head))
- Employment (such as the number of household members who work)
- Housing (such as the primary construction material of the floor)
- Ownership of consumer durables (such as dining sets or motorcycles)
- Location of residence (such as province)
- Agriculture (such as ownership of cattle, buffaloes, or horses)
- Food consumption in the past seven days (such as fruit or dairy products)

To facilitate the estimation of change over time, preference is given to questions that are more sensitive to changes in poverty. For example, the number of motorcycles owned is probably more responsive to changes in poverty than is the age of the male head (or the husband of the female head.

The scorecard itself is built using 150% of the national poverty line and Logit regression on the construction sub-sample. Questions are selected based on both judgment and statistics.

The first step is to use Logit to build one draft scorecard for each candidate question. The power of each one-question draft scorecard to rank households by poverty status is assessed via the concentration index.[48]

[48] Ravallion, 2009.

One of the one-question draft scorecards is then selected based on:[49]

- Improvement in accuracy
- Likelihood of acceptance by users according to:
  - Simplicity
  - Cost of collection
  - "Face validity" in terms of:
    - Experience
    - Theory
    - Common sense
- Sensitivity to changes in consumption
- Variety among types of questions
- Applicability across regions
- Tendency to have a slow-changing relationship with poverty
- Relevance for distinguishing among people at the poorer end of the distribution of consumption
- Verifiability

A series of two-question draft scorecards are then built, each adding a second question to the one-question scorecard selected from the first stage. The best two-question draft scorecard is then selected, again using judgment to balance statistical accuracy with non-statistical criteria. These steps are repeated until the scorecard has 10 questions that work well together.

The last step is to transform the Logit coefficients into non-negative integers such that scores range from 0 to 100, with lower scores corresponding with greater poverty.

This algorithm is similar to common R^2-based stepwise least-squares regression. It differs from naïve stepwise in that the selection of questions considers both statistical[50] and non-statistical criteria. The use of non-statistical criteria can improve robustness through time and across non-nationally representative groups. It also helps to ensure that questions are straightforward, common-sense, inexpensive-to-collect, and acceptable to users.

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[49] Schreiner *et al.*, 2014; Zeller, 2004.

[50] The statistical criterion is not the *p* values of a question's coefficients but rather the question's contribution to the ranking of households by poverty status in the context of a scorecard with nine other questions.

The single scorecard here applies to all of Cambodia. Customizing poverty-assessment tools by urban/rural does not improve targeting accuracy much.[51] Segment-specific tools may improve the accuracy of estimates of poverty rates,[52] but they are also at greater risk of overfitting.[53]

[51] Brown, Ravallion, and van de Walle, 2018; World Bank, 2012; Sharif, 2009; Schreiner, 2006; Schreiner, 2005a; Narayan and Yoshida, 2005; and Grosh and Baker, 1995.
[52] Diamond *et al.*, 2016; Tarozzi and Deaton, 2009.
[53] Haslett, 2012.

Annex 4: Estimates of poverty likelihoods

This annex tells how scores are converted into estimated poverty likelihoods.

Scores form an ordinal scale from 0 to 100. Higher scores signal less poverty, but not how much less. The ordered symbols used to represent scores are numbers, but those symbols are not the normal cardinal numbers that you can do math on. For example, a score of 20 plus a score of 10 is not 30 of anything, just as the letter "A" plus the letter "B" is not the letter "C" (nor anything else).

To get cardinal units, a look-up table is used to convert scores to *poverty likelihoods*, that is, probabilities of being below a poverty line. For the example of 150% of the national line, scores of 45–46 correspond with a poverty likelihood of 62.6 percent, and scores of 47–48 correspond with a poverty likelihood of 45.4 percent (Figure 1).

The poverty likelihood associated with a score varies by poverty line. For example, scores of 45–46 are associated with a likelihood of 9.0 percent for 100% of the national line but with a likelihood of 62.6 percent for the 150% of the national line.

A4.1 Calibrating scores with poverty likelihoods

A given score is associated ("calibrated") with an estimated poverty likelihood that is defined as the share of people in the construction sub-sample who have the score and who live in households with per-capita consumption below a given poverty line.

For the example of 150% of the national line and a score of 45–46 (Figure 13 below), there are 5,079 (normalized) people in the construction sample. Of these, 3,181 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 45–46 is then 62.6 percent, because 3,181 ÷ 5,079 = 0.626 = 62.6 percent.

The same method is used to calibrate all scores with poverty likelihoods for all 18 poverty lines.[54]

[54] To ensure that likelihoods never increase as scores increase, likelihoods across pairs of adjacent scores may be iteratively averaged before grouping scores into ranges. This preserves unbiasedness while keeping users from balking when score ranges with few people would otherwise lead to higher scores being linked with higher likelihoods.

Figure 13: Estimation of poverty likelihoods (150% of national line)

Score	Households in range and < poverty line		All households in range		Poverty likelihood (%)
0–35	3,743	÷	4,114	=	91.0
36–39	3,782	÷	4,873	=	77.6
40–42	3,641	÷	5,288	=	68.8
43–44	2,437	÷	3,572	=	68.2
45–46	3,181	÷	5,079	=	62.6
47–48	2,762	÷	6,084	=	45.4
49–50	2,949	÷	6,496	=	45.4
51–52	2,118	÷	6,303	=	33.6
53–54	1,612	÷	5,609	=	28.7
55–56	1,979	÷	8,140	=	24.3
57–58	1,101	÷	6,690	=	16.5
59–60	692	÷	6,369	=	10.9
61–62	457	÷	6,530	=	7.0
63–64	201	÷	5,813	=	3.5
65–66	85	÷	3,470	=	2.5
67–69	61	÷	5,398	=	1.1
70–73	34	÷	5,210	=	0.6
74–100	0	÷	4,962	=	0.0

Number of all households normalized to sum to 100,000.

A4.2 Objectivity of estimates of poverty likelihoods

Even though scorecard questions are selected partly based on judgment related to non-statistical criteria, the calibration process produces estimates of poverty likelihoods that are objective, that is, derived from monetary poverty lines and from survey data on consumption.[55] Acknowledging that some choices in scorecard construction are informed by judgment in no way impugns the objectivity of the estimated likelihoods; their objectivity depends on using data in score calibration, not on using data (and nothing else) in scorecard construction.

[55] The calibrated likelihoods would be objective even if scorecard construction did not use any data at all. In fact, objective scorecards of proven accuracy are often constructed using only expert judgment (Caire, 2004; Schreiner *et al.*, 2014).

A4.3 Why not use the Logit formula?

The scorecard is based on a Logit regression (Annex 3). This means that poverty likelihoods could be estimated not with a calibrated look-up table but rather with the Logit formula of $2.718281828^{\beta X} \times (1 + 2.718281828^{\beta X})^{-1}$, where β are the Logit coefficients and X is a household's responses.

The scorecard uses the calibration approach is because the Logit formula is difficult to compute by hand and looks frightening. Non-statisticians can understand poverty likelihoods defined as the share of people with a given score in the construction sample who are below a poverty line. A calibrated look-up table also allows program analysts to convert scores to likelihoods without any arithmetic at all. This calibration approach can also improve accuracy, especially with large samples.

Annex 5: Error and margins of error

This annex reports the scorecard's estimation error for head-count poverty rates in a single time period. It also discusses margins of error.

A5.1 Estimation errors

A5.1.1 What is estimation error?

Estimation error is the distance and direction by which a scorecard's estimate tends to miss the true value in the population.

For example, the estimation error of Cambodia's scorecard for snapshot estimates of head-count poverty rates in a single time period by 150% of the national poverty line is –2.5 percentage points (Figure 2).

An unadjusted estimate can usually be improved—that is, moved closer to the true value—by subtracting off the known error. For example, if the unadjusted estimate is 70.5 percent and the error is –2.5 percentage points, then an improved estimate is 70.5 – (–2.5) = 73.0 percent.

A5.1.2 What estimation errors are reported here?

Estimation errors are reported for snapshot estimates of head-count poverty rates in a single time period for all 18 poverty lines. Errors are derived *out-of-sample*; the scorecard (made from the construction sample from the 2017 CSES, Annex 1) is tested with repeated sub-samples from the validation sample that was not used to construct the scorecard. The estimation error is the average of the differences between scorecard estimates and observed poverty rates.

There is no data today on consumption-based poverty in the future, so it is impossible to report estimation error for annual net changes in head-count poverty rates across two time periods. The scorecard cannot be not tested *out-of-time* because it is both constructed and validated with data from a single time period (2017).

In practice, the scorecard—like all poverty-assessment tools—is always applied both out-of-sample and out-of-time. Being out-of-sample violates the assumption that the scorecard is applied to a sample from the same population whose data was used to construct the scorecard. Being out-of-time violates the assumption that the relationships between poverty and scorecard questions are the same as in population whose data was used to construct the scorecard.

The unknown degree of these inevitable violations of the scorecard's assumptions means that actual estimation errors will differ from those reported here in unknowable ways.[56] Still, the errors (and margins of error) reported here are the best available, and it is best to account for them.

A5.1.3 How to estimate estimation errors

Given the scorecard's standard assumptions, an unbiased estimator of *estimation error* is the average of differences between scorecard estimates and observed values in repeated sub-samples from the validation sample.[57]

It is possible to compare estimated and observed poverty rates because the validation sample from the 2017 CSES records actual (not estimated) consumption-based poverty status. The observed poverty likelihood is 100 percent for poor households and 0 percent for non-poor households. For a given poverty line, the observed (not estimated) head-count poverty rate is the household-size-weighted average of observed poverty statuses.

The scorecard can also be applied to the same validation sub-sample (ignoring that actual poverty status is observed) to estimate the poverty rate as the household-size-weighted average of estimated poverty likelihoods (Section 3).

The scorecard's estimation error in a given validation sub-sample is then the difference between the scorecard estimate versus the observed value.

[56] Estimation errors due to being out-of-time can be measured with post-2017 data (say, from the 2020 CSES). Of course, 2020 CSES data will not be available until after 2020, so there will still be some unknown out-of-time error (and out-of-sample error will still be completely unknown).

[57] This is the *bootstrap approach*. The average of the values in repeated samples from the validation sample is an unbiased estimator of the true value in the population of Cambodia as a whole. The population's true value is taken as the value in the 2017 CSES (even though the CSES is itself only a sample).

Different sub-samples from the validation sample result in different errors. The estimate of the scorecard's general *estimation error* is the average of these errors across many sub-samples.[58] In turn, the scorecard estimate's margin of error reflects the extent of the spread of the distribution of all the sub-samples' errors around their average.[59]

A5.1.4 Errors for snapshot estimates of poverty rates in one time period

The first line in Figure 2 ("Estimation error") presents errors for snapshot estimates of poverty rates in one time period for Cambodia's 18 poverty lines.

The average of the absolute value of each error across all poverty lines is about 1.6 percentage points. The largest absolute error is 3.9 percentage points. The error for 150% of the national line is –2.5 percentage points.

A5.2 Margins of error

A5.2.1 What are margins of error?

Like any statistic, a scorecard estimate depends on the particular sample from a population. Because samples are drawn at random, each sample is different, and different samples give different estimates. Scorecard estimates are unbiased—under the standard assumptions—because the average estimate across repeated samples is the same as the single true value in the population.

Unusual luck in any single sample, however, may push an estimate far from the true value. Larger samples provide more chances for luck to even out, so large errors are less likely in larger samples.[60]

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[58] Households in a sub-sample are drawn *with replacement*; each draw comes from the full pool, including households who have already been drawn. Thus, a given household may appear in a given sub-sample once, more than once, or not at all.

[59] Schreiner, 2020 discusses the derivation of errors.

[60] When flipping a fair coin, the true probability of "heads" is 50 percent. *Unbiasedness* means that the average of the share of "heads" in many samples will be close to 50 percent. In a single sample of 10 tosses, however, the chances of at least six "heads" (60 percent of tosses, with an error of at least 10 percentage points) is about 37 percent. In a single sample of 100 tosses, the chances of such a large error is about 3 percent. Larger samples reduce the risk that estimates will be far from true values.

For a given estimate, sample size, and confidence level, the *margin of error* is the range of true population values that are consistent with the estimate.

A margin of error has two parts:

- The margin of error itself (such as ±2.0 percentage points), centered on the estimate
- A confidence level (such as 90 percent) that the true value is in the margin of error

Narrower margins of error or higher confidence levels imply greater chances that the sample-based estimate is closer to the true population value.

To illustrate, suppose that the adjusted estimate of the head-count poverty rate for 150% of the national line with a sample size of n = 1,024 is 73.0 percent and that the margin of error is ±2.3 percentage points with 90-percent confidence.[61] Absent other sources of error and given the scorecard's standard assumptions, this means that there is a 90-percent chance that the true population value is in the range of 73.0 – 2.3 = 70.7 percent to 73.0 + 2.3 = 75.3 percent, with the most-likely true value being the center of the range (the 73.0 percent estimate).

Said another way, "The estimate has a margin of error from 70.7 to 75.3 percent with 90-percent confidence" means that the true population value has a:

- 5-percent chance of being less than 70.7 percent
- 90-percent chance of being between 70.7 and 75.3 percent
- 5-percent chance of being greater than 75.3 percent

A5.2.2 Why do margins of error matter?

Decision-makers should put less weight on estimates with wider margins of error. For example, a pro-poor program can have strong confidence that it is indeed pro-poor if the scorecard estimate of the poverty rate for in-coming participants by 150% of the national poverty line is 50.0 percent with a margin of error from 45.0 to 55.0 percent (±5.0 percentage points) with 80-percent confidence. The all-Cambodia poverty rate of 37.1 percent (Figure 14) is far outside the margin of error, so the true poverty rate of in-coming participants is unlikely to be close to the all-Cambodia rate. If instead the 80-percent margin of error were 30.0 to 70.0 percent, however, then there would be a much higher chance that the poverty rate of in-coming participants is close to that of the average Cambodian and thus that the program is not actually pro-poor.

[61] Most real-world decisions are made with much less than 90-percent confidence.

To date, almost all analyses of scorecard estimates have ignored margins of error. This deficient practice increases the risk of bad decisions.

A5.2.3 Margins of error for snapshot estimates of poverty rates in one time period for the Cambodia scorecard

For sample sizes of n = 16,384 and 90-percent confidence and across all supported poverty lines, the margins of error for snapshot estimates of head-count poverty rates in a single time period are ±0.7 percentage points or smaller (Figure 2).

For sample sizes of n = 1,024, the 90-percent margins of error are ±2.5 percentage points or smaller. Given the scorecard's standard assumptions, this means that in 90 of 100 samples of this size, the true population value is within ±2.5 percentage points of the error-adjusted estimate.

A5.2.4 How to calculate margins of error

The spreadsheet-based PovIt!TM reporting app calculates margins of error for all scorecard estimates discussed here. Analysts may also use the formulas that follow.[62]

[62] Schreiner (2020) discusses the derivation of the formulas.

A5.2.5 Formula for margins of error for snapshot estimates of head-count poverty rates in a single time period

All formulas for margins of error involve the following elements:

$\pm c$ is a margin of error as a proportion (*e.g.*, ±0.020 for ±2.0 percentage points),

z is from the Normal distribution and is $\begin{cases} 1.04 \text{ for confidence levels of 70 percent} \\ 1.28 \text{ for confidence levels of 80 percent} \\ 1.64 \text{ for confidence levels of 90 percent} \end{cases}$,

σ is the standard error of the estimated poverty rate, that is, $\sqrt{\frac{\hat{p} \cdot (1-\hat{p})}{n}} \cdot \varphi$,

$\hat{p}$ is the estimated proportion of sampled people below a poverty line,

φ is the finite population correction factor $\sqrt{\frac{N-n}{N-1}}$,

N is the population size in terms of households (not members of households),

n is the sample size (in terms of interviewed households,
not members of interviewed households), and

α is an adjustment factor specific to the scorecard, estimator, and poverty line.

Given a confidence level that corresponds with z, a sample-based estimate $\hat{p}$, a population N, a sample n, and an adjustment factor α from Figure 2, the formula[63] for the margin of error $\pm c$ is $\pm z \cdot \alpha \cdot \sqrt{\frac{\hat{p} \cdot (1-\hat{p})}{n}} \cdot \sqrt{\frac{N-n}{N-1}}$.

To illustrate, Cambodia's 2017 CSES gives a direct-measure head-count poverty rate for 150% of the national line of $\hat{p}$ = 37.1 percent (Figure 14). The adjustment factor α is 1.00 because $\hat{p}$ is a direct-measure estimate, not an indirect-scorecard estimate. Cambodia in 2017 had a population of households (not people) of N = 3,556,832 people, and the CSES sample size was n = 3,840 households. Given a desired confidence level of 90 percent, z is 1.64. The margin of error $\pm c$ is then about ±1.3 percentage points:

$$\pm z \cdot \alpha \cdot \sqrt{\frac{\hat{p} \cdot (1-\hat{p})}{n}} \cdot \sqrt{\frac{N-n}{N-1}} = \pm 1.64 \cdot 1.00 \cdot \sqrt{\frac{0.371 \cdot (1-0.371)}{3{,}840}} \cdot \sqrt{\frac{3{,}556{,}832-3{,}840}{3{,}556{,}832-1}}.$$

This implies a 90-percent chance that Cambodia's true head-count poverty rate for 150% of the national line in 2017 is in the range of 37.1 – 1.3 = 35.8 percent to 37.1 + 1.3 = 38.4 percent.

A5.2.6 Margins of error for snapshot estimates of numbers of poor people in a single time period

The lower (upper) limit of the margin of error for a snapshot estimate of numbers of poor people is the number of people in participating households, multiplied by the lower (upper) limit of the margin of error of the poverty-rate estimate.

To illustrate, the baseline example in Section 3 has an estimated snapshot poverty rate is 73.0 percent. With 70-percent confidence, the margin of error is about ±32.3 percentage points,[64] from 73.0 – 32.3 = 40.7 percent to 73.0 + 32.3 = 105.3 percent ≈ 100 percent (because a poverty rate cannot exceed 100 percent). The margin of

[63] This formula ignores how sampling variability affects the derivation of the scorecard. It also ignores that interviewed households have different numbers of members, and that larger households are more likely to have higher poverty likelihoods. This leads to an understatement of the margin of error.

[64] The example in Section 3 has N = 1,000, n = 2, and α = 0.99. For 70-percent confidence, z = 1.04. The margin of error $\pm c$ for the head-count poverty-rate estimate is then about $\pm 0.323 \approx \pm 1.04 \cdot 0.99 \cdot \sqrt{\frac{0.730 \cdot (1-0.730)}{2}} \cdot \sqrt{\frac{1{,}000-2}{1{,}000-1}}$.

error is huge because the sample size of $n = 2$ interviewed households is exceedingly small.[65]

The estimated number of people in participating households in the example in Section 3 is 7,000,[66] so the lower limit of the 70-percent margin of error for the estimated number of poor people is 7,000·0.407 = 2,849. The upper limit is 7,000·1.00 = 7,000.

A5.2.7 Margins of error for estimates of the annual net change in head-count poverty rates across two periods for one sample, scored twice

In this case, the formula for the margin of error $\pm c$ is:

$$\pm z \cdot \frac{\alpha}{y} \cdot \sqrt{\frac{\hat{p}_{up} \cdot (1-\hat{p}_{up}) + \hat{p}_{down} \cdot (1-\hat{p}_{down}) + 2 \cdot \hat{p}_{up} \cdot \hat{p}_{down}}{n}} \cdot \sqrt{\frac{N-n}{N-1}},$$

where:

- c, z, α, N, and n are defined as above
- $\hat{p}_{up}$ is the share of members of sampled households that rise above the poverty line
- $\hat{p}_{down}$ is the share of members of sampled households that fall below the poverty line
- y is the household-size-weighted average of years between interviews

Illustrating with the earlier example one sample scored twice (Section 3.3.1), $\hat{p}_{up}$ is the number of household members estimated to rise above a poverty line. This is the absolute value of the sum of the estimated *negative* net changes in the share of members in poor households (from column M in Figure 10, here |–1.139 + (–0.270)| = +1.409), divided by the sum across all sampled households of each household's average household size across baseline and follow-up of 14.0 (from columns E and F). Thus, $\hat{p}_{up}$ = 1.409 ÷ 14 = 0.101.

In turn, $\hat{p}_{down}$ is the share of household members estimated to fall below a poverty line. This is the sum of the estimated *positive* net changes in the number of members in poor households (from column M in Figure 10, here zero), divided by

[65] Yet the formulas for margin of error still apply, and the estimator is still unbiased.
[66] The formula for margin of error for the estimated number of poor people ignores that the estimated number of people in participating households has its own margin of error.

the sum across all sampled households of each household's average household size across baseline and follow-up (14.0). Thus, $\hat{p}_{down} = 0 \div 14 = 0.000$.[67]

The household-size-weighted average of the number of years between interviews y is 3.07.

With sample size $n = 2$ interviewed households, population N of 1,000 households, confidence level of 70 percent ($z = 1.04$), and the α adjustment factor for this estimator of 1.14,[68] the margin of error $\pm c$ is about

$$\pm 0.082 \approx \pm 1.04 \cdot \frac{1.14}{3.07} \cdot \sqrt{\frac{0.101 \cdot (1 - 0.101) + 0 \cdot (1 - 0) + 2 \cdot 0.101 \cdot 0}{2}} \cdot \sqrt{\frac{1{,}000 - 2}{1{,}000 - 1}}.$$

The example's estimated net annual poverty-rate change is –3.3 percentage points, so the 70-percent margin of error is –3.3 – 8.2 = –11.5 percentage points to –3.3 + 8.2 = +4.9 percentage points. The estimate from this tiny sample of $n = 2$ is uninformative; the true net change could easily be negative or positive.

This is why margins of error are useful. Without them, program managers might believe that poverty rates fell by 3.3 percentage points per year, even though the data is also consistent with widely different rates and directions of change.

A5.2.8 Margins of error for estimates of the annual net change in the number of poor people across two periods for one sample, scored twice

The lower (upper) limit of the margin of error for an estimate of annual net change in the number of poor people for one sample, scored twice is the average number of people in participating households from baseline to follow-up, multiplied by the lower (upper) limit of the margin of error of the estimated annual net change in the poverty rate.

To illustrate with the example in Section 3.3.4 for one sample scored twice, the estimated annual net change in the poverty rate is –3.3 percentage points. As just shown, the small sample size of $n = 2$ means that the 70-percent margin of error runs from –11.5 to +4.9 percentage points.

The estimated average number of on-going participating people is 5,950.[69] Thus, the lower limit of the 70-percent margin of error for the estimated annual net

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[67] $\hat{p}_{up} - \hat{p}_{down}$ is the estimated net poverty-rate change. In this particular example, $\hat{p}_{down}$ happens to be zero, so $\hat{p}_{up}$ equals the estimated net poverty-rate change.

[68] Schreiner, 2020.

change in the number of poor people is 5,950·(–0.115) ≈ –684 (a net decrease in poverty), and the upper limit is 5,950·(+0.049) ≈ +292 (a net increase in poverty).

A5.2.9 Margins of error for estimates of the annual net change in head-count poverty rates across two periods for two independent samples

The formula for the margin of error $\pm c$ is $\pm z \cdot \frac{\alpha}{y} \cdot \sqrt{\frac{2 \cdot \hat{p} \cdot (1-\hat{p})}{n}} \cdot \sqrt{\frac{N-n}{N-1}}$,

where z, α, y, $\hat{p}$ and N are defined as above, and n is the sample size of interviewed households at both baseline and follow-up.

Illustrating with the example for two independent samples in Section 3:

- z = 1.04, assuming a desired confidence level is 70 percent
- α = 1.10, the adjustment factor for this estimator[70]
- y = 2.76, the years between the average interview at baseline and follow-up
- $\hat{p}$ = 0.705, the unadjusted estimate of the poverty rate at baseline
- N = 850, the average number of households at baseline (1,000) and follow-up (700)
- n = 2, the sample size for the example in both baseline and follow-up

The margin of error $\pm c$ is $\pm 0.189 \approx \pm 1.04 \cdot \frac{1.10}{2.76} \cdot \sqrt{\frac{2 \cdot 0.705 \cdot (1-705)}{2}} \cdot \sqrt{\frac{850-2}{850-1}}$.

The example's estimated net annual poverty-rate change is –2.0 percentage points. Thus, the 70-percent margin of error is –2.0 – 18.9 = –20.9 to –2.0 + 18.9 = +16.9 percentage points. The tiny sample is again uninformative about the true value in the population. This show why margins of error matter.

A5.2.10 Margins of error for estimates of the annual net change in the number of poor people across two periods for two independent samples

The lower (upper) limit of the margin of error for an estimate of annual net change in the number of poor people for two independent samples is the average number of people in participating households from baseline to follow-up, multiplied by the lower (upper) limit of the margin of error of the estimated annual net change in the poverty rate.

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[69] The formula for margin of error for the estimated number of poor people ignores that the estimated number of people in participating households has its own margin of error.

[70] Schreiner, 2020.

To illustrate, the example in Section 3 for two independent samples estimates the annual net change in the poverty rate as –2.0 percentage points. As just shown, the 70-percent margin of error runs from –20.9 to +16.9 percentage points.

The estimated average number of on-going participating people is 5,600.[71] Thus, the lower limit of the 70-percent margin of error for the estimated annual net change in the number of poor people per year is 5,600 · (–0.209) ≈ –1,170 (a net decrease in poverty), and the upper limit is 5,600 · (+0.169) ≈ +946 (a net increase in poverty).

[71] The formula for margin of error for the estimated number of poor people ignores that the estimated number of people in participating households has its own margin of error.

Annex 6: Formulas for sample size

Before drawing a sample of households to interview, the formulas here can be used to calculate the sample size that corresponds to a program's:

- Desired margin of error for the eventual scorecard estimate
- Desired confidence level for the margin of error, and
- Pre-estimation guess of the true population value to be estimated

These formulas may or may not be useful, for several reasons.

First, programs often collect scorecard data but then fail to report and analyze it. In such cases, the entire project is a waste, so there is no point in worrying about sample size. A solution is to plan and budget for reporting and analysis first. If what is left does not seem to cover at least 1,000 interviews, then ignore the formulas and do as many interviews as the budget allows.

Second, both psychological sample size and statistical sample size matter. On the one hand, samples smaller than $n = 300$ often seem too small to non-statisticians. On the other hand, samples of at least $n = 1{,}000$ usually seem large enough.

Third, calculating an optimal sample size makes sense only if a program:

- Has reason to desire a particular margin of error or level of confidence[72]
- Plans to report and analyze margins of error

If margins of error are not understood or will not be reported and analyzed, then just interview as many participating households as the budget allows.

Fourth, sample-size calculations are sometimes unneeded. For example, using the scorecard for segmenting requires interviewing all relevant participants. Likewise, doing a basic check on the fulfillment of a pro-poor mission is usually easier if all in-coming participants are scored as a routine step of the in-take process rather than somehow deciding at the moment whether to score a given enrollee.

[72] Academic conventions, applied to business, often imply unnecessarily large samples.

In sum, go ahead and knock yourself out with the formulas below if you:

- Reserve resources for reporting and analysis
- Understand margins of error and will use them in reporting and analysis
- Plan to estimate net changes in poverty over time, and
- Have enough budget for at least 1,000 interviews at both baseline and follow-up

Otherwise:

- If checking a pro-poor mission, then score all in-coming participants at in-take
- If segmenting by poverty, then score all relevant participants
- If estimating changes in poverty, then score as many participants as possible

A6.1 Sample-size formula for snapshot estimates of head-count-poverty rates in a single time period

In this case, the formula for the sample size n (the number of participating households to be interviewed) is $n = N \cdot \left(\frac{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p})}{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p}) + c^2 \cdot (N - 1)} \right)$,

where n, c, z, α, and N are defined as in Annex 5, and $\tilde{p}$ is a before-estimation expectation for the poverty rate to be estimated.[73]

The illustration below of the calculation of the sample size n uses these values:

- The population of participating households is N = 10,000
- The desired confidence level for the margin of error is 80 percent, so z = 1.28
- The poverty line is 150% of the national line, so α = 0.99 (Figure 2)
- The pre-estimation expected poverty rate is the all-Cambodia rate for 150% of the national line, so $\tilde{p}$ = 37.1 percent = 0.371 (Figure 14)
- The desired margin of error ±c = ±3.0 percentage points = ±0.030

Given these hypothetical values,

$$n = 10{,}000 \cdot \left(\frac{1.28^2 \cdot 0.99^2 \cdot 0.371 \cdot (1 - 0.371)}{1.28^2 \cdot 0.99^2 \cdot 0.371 \cdot (1 - 0.371) + 0.03^2 \cdot (10{,}000 - 1)} \right) \approx 400.$$

[73] If the population N is "large" relative to the expected sample size n, then the formula is $n = \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \tilde{p} \cdot (1 - \tilde{p})$.

A6.2 Sample-size formula for estimates of annual net changes in head-count-poverty rates across two time periods with one sample scored twice

This formula is two (2), multiplied by the formula for sample size for a snapshot estimate at a point in time. Assuming the same n and $\tilde{p}$ at both baseline and follow-up, then $n = 2 \cdot N \cdot \left(\frac{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1-\tilde{p})}{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1-\tilde{p}) + c^2 \cdot (N-1)} \right)$.[74]

There are n interviews at baseline, and n interviews at follow-up. For this estimator and regardless of the scorecard or poverty line, α = 1.10.[75]

To illustrate with the same hypothetical values as in the example just above (except that α = 1.10), the sample size at baseline n is:

$$2 \cdot 10{,}000 \cdot \left(\frac{1.28^2 \cdot 1.10^2 \cdot 0.371 \cdot (1-0.371)}{1.28^2 \cdot 1.10^2 \cdot 0.371 \cdot (1-0.371) + 0.03^2 \cdot (10{,}000-1)} \right) \approx 978.$$

The sample size at follow-up is also n = 978.

A6.3 Sample-size formula for estimates of annual net changes in head-count-poverty rates across two time periods with two independent samples

The formula for the number of households to interview at both baseline and follow-up n is:[76]

$$2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot [-0.01 + 0.016 \cdot y + 0.56 \cdot p_{\text{pre-baseline}} \cdot (1 - p_{\text{pre-baseline}})] \cdot \sqrt{\frac{N-n}{N-1}},$$

where n, α, z, c, and N are defined as above, y is the number of years between baseline and follow-up, and $p_{\text{pre-baseline}}$ is the population's expected head-count poverty rate prior to the baseline interviews.

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[74] If the N is large relative to n, then the formula is $n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \tilde{p} \cdot (1-\tilde{p})$.

[75] Schreiner, 2020.

[76] Schreiner, 2020.

The illustration below for this formula uses the following values:

- The poverty line is 150% of the national line
- α = 1.14 (regardless of the scorecard or poverty line, Schreiner, 2020)
- The desired confidence level for the margin of error is 80 percent, so $z = 1.28$
- The desired margin of error $\pm c = \pm 3.0$ percentage points = ±0.030
- The number of years between baseline and follow-up is $y = 3$
- The pre-estimation expected pre-baseline poverty rate is the all-Cambodia rate for 150% of the national line: $p_{\text{pre-baseline}} = 37.1$ percent = 0.371 (Figure 14)
- The population of participating households is $N = 10{,}000$

Assuming N is large relative to n so that $\sqrt{\frac{N-n}{N-1}} \approx 1$, the baseline sample size n is:

$$2 \cdot \left(\frac{1.14 \cdot 1.28}{0.03} \right)^2 \cdot [-0.01 + 0.016 \cdot 3 + 0.56 \cdot 0.371 \cdot (1 - 0.371)] \cdot 1 \approx 799.$$

The follow-up sample size is also 799.

Figure 14 (Cambodia): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	1,550	7,109	10,664	14,218	4,752	7,603	9,504	19,008	22,779	4,597	7,743	13,308	52,505	7,266	8,702	10,990	12,169	13,593	17,873
	Rate		11.6	40.6	65.5	3.0	14.8	30.5	84.7	91.2	2.5	15.6	61.2	99.4	12.5	23.4	43.5	52.8	62.8	81.6
Rural	Line	2,290	4,730	7,095	9,460	3,161	5,058	6,323	12,646	15,155	3,059	5,151	8,854	34,932	4,834	5,789	7,312	8,096	9,044	11,891
	Rate		8.7	36.0	63.1	0.6	11.4	26.5	82.8	90.7	0.4	12.2	57.6	99.1	9.2	18.9	38.9	49.1	59.1	79.5
All	Line	3,840	5,301	7,951	10,601	3,543	5,669	7,086	14,172	16,984	3,428	5,773	9,922	39,147	5,417	6,488	8,194	9,073	10,135	13,326
	Rate		9.4	37.1	63.7	1.2	12.2	27.4	83.2	90.8	0.9	13.0	58.5	99.2	10.0	20.0	40.0	50.0	60.0	80.0

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Banteay Meanchey): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	80	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		12.3	33.3	64.5	0.0	14.0	24.2	81.8	87.8	0.0	15.4	54.9	98.7	12.3	17.2	36.9	45.9	57.5
Rural	Line	80	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		7.1	37.7	65.1	0.9	15.1	23.8	85.4	89.3	0.0	15.1	60.5	99.2	8.5	20.8	39.4	50.6	63.0
All	Line	160	5,062	7,592	10,123	3,383	5,413	6,766	13,533	16,218	3,273	5,512	9,475	37,382	5,173	6,195	7,825	8,664	9,678
	Rate		8.8	36.3	64.9	0.6	14.7	23.9	84.3	88.8	0.0	15.2	58.7	99.0	9.8	19.6	38.6	49.1	61.2

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Battambang): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	120	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		12.8	38.8	70.9	2.4	20.5	31.1	87.4	93.7	2.4	20.9	65.2	100.0	14.1	24.3	42.7	53.8	68.0
Rural	Line	120	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		8.0	42.1	69.7	0.0	8.9	33.6	85.2	94.4	0.0	10.1	62.1	100.0	8.3	20.1	45.7	55.2	63.5
All	Line	240	4,925	7,388	9,851	3,292	5,267	6,584	13,169	15,782	3,185	5,364	9,220	36,376	5,034	6,029	7,614	8,430	9,417
	Rate		9.0	41.4	69.9	0.5	11.3	33.1	85.7	94.3	0.5	12.4	62.7	100.0	9.5	21.0	45.1	54.9	64.4

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Kampong Cham and Tboung Khmum): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates														
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	80	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		11.6	38.6	60.0	2.3	13.5	31.4	82.7	90.9	2.3	13.5	60.0	99.1	12.4	24.8	39.5	51.5	60.0
Rural	Line	280	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		10.5	33.8	59.8	0.4	11.8	26.4	81.0	88.4	0.4	13.4	54.7	99.0	10.5	20.0	36.7	47.0	56.0
All	Line	360	4,808	7,212	9,617	3,214	5,142	6,428	12,856	15,407	3,109	5,237	9,001	35,511	4,914	5,885	7,433	8,230	9,194
	Rate		10.6	34.3	59.8	0.6	12.0	26.9	81.2	88.7	0.6	13.4	55.2	99.0	10.7	20.5	37.0	47.5	56.4

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Kampong Chhnang): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	40	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		5.1	12.6	38.3	0.0	6.9	11.6	82.7	87.5	0.0	6.9	29.8	100.0	5.1	11.6	15.7	24.8	33.6
Rural	Line	80	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		17.6	47.1	68.1	1.5	21.4	34.0	83.9	90.8	0.0	21.4	63.7	97.7	18.8	24.7	48.2	53.0	65.4
All	Line	120	4,835	7,252	9,669	3,232	5,170	6,463	12,926	15,491	3,126	5,265	9,050	35,706	4,941	5,918	7,474	8,275	9,244
	Rate		16.1	42.7	64.4	1.4	19.5	31.2	83.7	90.4	0.0	19.5	59.4	98.0	17.0	23.1	44.1	49.4	61.4

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Kampong Speu): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates														
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	80	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		3.1	23.6	45.3	0.0	4.2	11.1	75.9	82.6	0.0	6.0	39.4	96.9	4.2	7.5	25.4	34.6	40.6
Rural	Line	240	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		1.7	26.0	52.5	0.2	2.3	12.1	82.9	92.8	0.0	2.8	46.8	99.2	1.7	5.8	30.1	39.4	47.6
All	Line	320	4,814	7,221	9,628	3,218	5,148	6,435	12,870	15,424	3,113	5,243	9,011	35,552	4,920	5,892	7,442	8,239	9,204
	Rate		1.8	25.7	51.8	0.2	2.5	12.0	82.1	91.7	0.0	3.1	46.0	99.0	2.0	6.0	29.6	38.9	46.9

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Kampong Thom): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates														
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	10	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		20.1	60.8	89.6	0.0	20.1	40.9	100.0	100.0	0.0	20.1	89.6	100.0	20.1	40.9	60.8	75.4	89.6
Rural	Line	120	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		14.9	43.5	72.6	0.0	18.0	34.2	90.6	95.4	0.0	20.2	68.1	100.0	14.9	27.8	47.3	59.1	68.1
All	Line	130	4,732	7,097	9,463	3,163	5,060	6,325	12,650	15,161	3,060	5,153	8,857	34,944	4,836	5,792	7,315	8,099	9,047
	Rate		15.1	44.1	73.2	0.0	18.0	34.4	91.0	95.6	0.0	20.2	68.9	100.0	15.1	28.2	47.8	59.7	68.9

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Kampot): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	20	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		32.5	56.2	76.0	9.3	32.5	56.2	88.8	88.8	0.0	36.7	76.0	100.0	32.5	48.9	56.2	63.8	76.0
Rural	Line	80	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		7.9	36.7	72.9	0.0	10.0	28.2	92.1	98.2	0.0	11.3	66.9	100.0	9.8	15.8	40.9	54.0	71.5
All	Line	100	4,828	7,243	9,657	3,227	5,164	6,455	12,910	15,471	3,122	5,259	9,038	35,660	4,935	5,910	7,464	8,265	9,232
	Rate		10.9	39.0	73.3	1.1	12.8	31.6	91.7	97.1	0.0	14.3	68.0	100.0	12.6	19.8	42.8	55.2	72.1

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Kandal): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates														
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	80	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	16.5	56.0	0.0	2.6	11.7	85.6	91.9	0.0	4.1	51.7	99.2	0.0	6.6	22.5	41.2	53.7
Rural	Line	160	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		5.7	22.6	47.5	0.0	6.6	15.8	71.4	83.0	0.0	6.6	40.3	97.7	5.7	8.9	25.8	33.2	42.6
All	Line	240	4,847	7,271	9,695	3,240	5,184	6,480	12,960	15,532	3,135	5,279	9,074	35,800	4,954	5,933	7,494	8,297	9,268
	Rate		4.9	21.7	48.7	0.0	6.0	15.3	73.3	84.2	0.0	6.2	41.9	97.9	4.9	8.6	25.3	34.3	44.1

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Koh Kong): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	10	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	19.8	28.9	0.0	0.0	11.6	84.0	84.0	0.0	0.0	28.9	100.0	0.0	0.0	19.8	28.9	28.9
Rural	Line	10	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	19.8	28.9	0.0	0.0	11.6	84.0	84.0	0.0	0.0	28.9	100.0	0.0	0.0	19.8	28.9	28.9
All	Line	20	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		7.2	17.0	22.7	0.0	7.2	7.2	45.8	81.6	0.0	7.2	22.7	90.0	7.2	7.2	22.7	22.7	22.7

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Kratié and Mondulkiri): Poverty lines and head-count poverty rates by urban/rural/all in 2017

	Line or		Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
Area	Rate	*n*	100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	20	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		7.2	17.0	22.7	0.0	7.2	7.2	45.8	81.6	0.0	7.2	22.7	90.0	7.2	7.2	22.7	22.7	22.7
Rural	Line	80	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		14.1	27.7	56.6	0.0	14.1	21.1	73.3	87.2	0.0	14.1	55.6	98.4	14.1	15.5	29.5	40.4	56.6
All	Line	100	4,778	7,167	9,556	3,194	5,110	6,387	12,775	15,310	3,090	5,204	8,944	35,289	4,883	5,849	7,387	8,178	9,136
	Rate		13.5	26.9	54.0	0.0	13.5	20.0	71.2	86.8	0.0	13.5	53.1	97.7	13.5	14.9	29.0	39.0	54.0

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Phnom Penh): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates														
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	760	8,498	12,747	16,996	5,680	9,088	11,360	22,721	27,229	5,495	9,255	15,907	62,762	8,685	10,402	13,137	14,546	16,248
	Rate		13.7	49.6	75.8	5.1	18.2	36.6	90.6	94.6	4.5	19.2	71.7	99.5	15.1	29.8	53.0	63.2	73.4
Rural	Line	30	8,498	12,747	16,996	5,680	9,088	11,360	22,721	27,229	5,495	9,255	15,907	62,762	8,685	10,402	13,137	14,546	16,248
	Rate		36.1	67.6	92.3	3.5	36.8	55.9	100.0	100.0	3.5	36.8	89.5	100.0	36.1	52.1	70.1	83.2	89.5
All	Line	790	8,498	12,747	16,996	5,680	9,088	11,360	22,721	27,229	5,495	9,255	15,907	62,762	8,685	10,402	13,137	14,546	16,248
	Rate		15.1	50.8	76.9	5.0	19.4	37.8	91.2	94.9	4.4	20.3	72.8	99.5	16.4	31.2	54.1	64.5	74.5

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Preah Vihear): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	20	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	12.3	44.5	0.0	0.0	0.0	62.5	78.2	0.0	0.0	38.6	100.0	0.0	0.0	22.3	34.3	38.6
Rural	Line	50	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		9.0	38.0	70.8	0.0	15.0	32.1	82.1	94.4	0.0	18.0	61.7	100.0	10.4	21.8	41.6	56.0	64.1
All	Line	70	4,925	7,388	9,850	3,292	5,267	6,584	13,168	15,781	3,185	5,364	9,219	36,375	5,034	6,029	7,614	8,430	9,417
	Rate		7.1	32.7	65.4	0.0	11.9	25.5	78.0	91.1	0.0	14.3	56.9	100.0	8.2	17.3	37.6	51.5	58.8

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Prey Veng): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	20	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	0.0	13.4	0.0	0.0	0.0	46.5	86.7	0.0	0.0	13.4	100.0	0.0	0.0	0.0	8.6	13.4
Rural	Line	200	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		3.9	32.5	60.3	0.6	8.5	22.9	82.3	89.3	0.6	8.5	51.9	98.3	5.8	18.5	33.9	48.5	54.5
All	Line	220	4,747	7,121	9,495	3,173	5,077	6,346	12,693	15,211	3,070	5,170	8,886	35,061	4,852	5,811	7,339	8,126	9,077
	Rate		3.7	30.9	58.0	0.5	8.1	21.7	80.5	89.2	0.5	8.1	50.0	98.4	5.5	17.6	32.2	46.5	52.4

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Pursat): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	30	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		3.7	23.5	45.8	3.7	3.7	17.9	76.0	80.4	3.7	3.7	45.8	100.0	3.7	10.3	23.5	33.7	45.8
Rural	Line	90	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		7.1	32.0	60.4	1.5	12.8	25.1	83.4	91.5	1.5	14.6	54.1	100.0	8.5	19.4	33.8	45.5	56.7
All	Line	120	4,828	7,241	9,655	3,227	5,163	6,454	12,907	15,469	3,122	5,258	9,037	35,655	4,934	5,909	7,463	8,263	9,231
	Rate		6.7	30.9	58.7	1.8	11.7	24.2	82.5	90.2	1.8	13.3	53.1	100.0	7.9	18.3	32.6	44.1	55.4

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Ratanak Kiri): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	20	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		9.3	9.3	34.4	0.0	9.3	9.3	60.3	80.3	0.0	9.3	24.4	99.1	9.3	9.3	9.3	14.5	30.1
Rural	Line	30	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		23.8	41.3	76.2	0.0	23.8	30.8	92.4	92.4	0.0	26.7	68.9	100.0	23.8	30.8	41.3	55.6	76.2
All	Line	50	4,984	7,477	9,969	3,332	5,331	6,663	13,327	15,971	3,223	5,429	9,330	36,813	5,094	6,101	7,706	8,532	9,530
	Rate		20.0	33.0	65.4	0.0	20.0	25.2	84.1	89.3	0.0	22.2	57.4	99.8	20.0	25.2	33.0	45.0	64.3

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Siem Reap): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates														
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	60	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		12.8	48.7	55.5	0.0	12.8	42.7	77.5	81.2	0.0	12.8	52.2	100.0	12.8	24.0	48.7	48.7	52.2
Rural	Line	160	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		7.0	45.0	65.7	0.8	10.5	34.8	83.8	90.5	0.8	11.1	64.2	99.3	7.9	24.4	49.2	53.0	64.4
All	Line	220	4,981	7,471	9,961	3,329	5,327	6,658	13,317	15,959	3,221	5,425	9,323	36,785	5,091	6,097	7,700	8,525	9,523
	Rate		8.5	46.0	63.1	0.6	11.1	36.8	82.2	88.1	0.6	11.5	61.1	99.5	9.1	24.3	49.1	51.9	61.3

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Preah Sihanouk): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates														
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	40	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	11.2	30.5	0.0	0.0	3.5	70.0	89.1	0.0	0.0	28.0	100.0	0.0	0.0	14.8	17.3	28.0
Rural	Line	30	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		0.0	24.3	52.2	0.0	0.0	6.0	68.8	85.5	0.0	0.0	46.8	100.0	0.0	6.0	24.3	38.6	46.8
All	Line	70	5,071	7,607	10,142	3,390	5,423	6,779	13,558	16,248	3,279	5,523	9,492	37,452	5,183	6,207	7,839	8,680	9,696
	Rate		0.0	19.9	44.9	0.0	0.0	5.2	69.2	86.7	0.0	0.0	40.5	100.0	0.0	4.0	21.1	31.5	40.5

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Stung Treng): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	40	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		10.9	49.4	82.8	0.0	14.1	30.3	92.9	98.0	0.0	14.1	77.0	100.0	10.9	19.8	49.4	61.7	77.0
Rural	Line	40	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		10.9	49.4	82.8	0.0	14.1	30.3	92.9	98.0	0.0	14.1	77.0	100.0	10.9	19.8	49.4	61.7	77.0
All	Line	10	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	0.0	5.2	0.0	0.0	0.0	46.7	86.4	0.0	0.0	5.2	93.3	0.0	0.0	0.0	0.0	5.2

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Svay Rieng): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	10	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	0.0	5.2	0.0	0.0	0.0	46.7	86.4	0.0	0.0	5.2	93.3	0.0	0.0	0.0	0.0	5.2
Rural	Line	120	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		13.6	38.6	62.5	3.6	16.8	30.3	78.4	86.0	3.6	18.4	58.2	99.8	13.6	26.8	38.6	49.6	58.2
All	Line	130	4,759	7,139	9,519	3,181	5,090	6,363	12,725	15,250	3,078	5,184	8,909	35,151	4,864	5,826	7,358	8,147	9,100
	Rate		12.8	36.2	59.0	3.4	15.7	28.5	76.5	86.0	3.4	17.2	55.0	99.4	12.8	25.2	36.2	46.6	55.0

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Takéo): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	10	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		20.2	60.4	88.4	0.0	20.2	27.5	88.4	88.4	0.0	20.2	80.2	100.0	20.2	20.2	60.4	70.5	88.4
Rural	Line	240	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		6.0	37.1	64.7	0.7	9.2	27.9	84.5	93.0	0.0	9.2	60.0	99.0	6.0	15.2	41.3	50.8	61.3
All	Line	250	4,747	7,121	9,494	3,173	5,077	6,346	12,692	15,211	3,070	5,170	8,886	35,060	4,852	5,811	7,339	8,125	9,077
	Rate		6.7	38.2	65.9	0.7	9.8	27.9	84.7	92.8	0.0	9.8	61.0	99.1	6.7	15.4	42.3	51.7	62.6

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Oddar Meanchey): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines			
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	20	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		29.3	76.7	94.6	4.5	40.1	68.3	100.0	100.0	4.5	40.1	94.6	100.0	40.1	55.2	76.7	85.1	94.6
Rural	Line	40	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		11.3	63.0	88.7	0.0	18.7	42.9	98.3	100.0	0.0	18.7	84.0	100.0	13.6	32.6	68.3	78.9	85.6
All	Line	60	4,954	7,431	9,907	3,311	5,298	6,622	13,244	15,873	3,203	5,395	9,273	36,585	5,063	6,064	7,658	8,479	9,472
	Rate		15.5	66.1	90.1	1.0	23.7	48.7	98.7	100.0	1.0	23.7	86.4	100.0	19.7	37.8	70.3	80.4	87.6

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Kep): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates															
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	10	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	26.0	74.7	0.0	0.0	16.9	82.4	97.8	0.0	0.0	74.7	100.0	0.0	0.0	33.6	40.4	74.7
Rural	Line	10	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		0.0	18.8	50.8	0.0	0.0	18.8	81.2	81.2	0.0	0.0	50.8	100.0	0.0	9.2	29.8	41.0	50.8
All	Line	20	4,989	7,483	9,977	3,334	5,335	6,669	13,338	15,985	3,226	5,433	9,338	36,844	5,099	6,106	7,712	8,539	9,539
	Rate		0.0	20.7	57.0	0.0	0.0	18.3	81.5	85.5	0.0	0.0	57.0	100.0	0.0	6.8	30.8	40.9	57.0

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Figure 14 (Pailin): Poverty lines and head-count poverty rates by urban/rural/all in 2017

Area	Line or Rate	*n*	Poverty lines and poverty rates														
			National			Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines				
			100%	150%	200%	$1.25	$2.00	$2.50	$5.00	$8.44	$1.90	$3.20	$5.50	$21.70	10th	20th	40th	50th	60th
Urban	Line	10	5,827	8,741	11,655	3,895	6,232	7,790	15,581	18,672	3,768	6,347	10,908	43,039	5,956	7,133	9,009	9,975	11,142
	Rate		0.0	53.8	85.3	0.0	0.0	44.8	100.0	100.0	0.0	8.6	63.4	100.0	0.0	35.6	53.8	63.4	63.4
Rural	Line	10	4,691	7,036	9,381	3,135	5,016	6,271	12,541	15,030	3,033	5,109	8,780	34,643	4,794	5,742	7,251	8,029	8,969
	Rate		0.0	0.0	64.9	0.0	0.0	0.0	75.7	92.6	0.0	0.0	32.8	100.0	0.0	0.0	10.4	20.6	32.8
All	Line	20	5,019	7,528	10,037	3,354	5,367	6,709	13,418	16,080	3,245	5,466	9,394	37,064	5,129	6,143	7,758	8,590	9,596
	Rate		0.0	15.5	70.8	0.0	0.0	12.9	82.7	94.7	0.0	2.5	41.6	100.0	0.0	10.3	22.9	32.9	41.6

Source: 2017 CSES. Poverty rates are percentages. All poverty lines are KHR in average prices in Cambodia as a whole during the 2017 CSES fieldwork.

Tables for
150% of the National Poverty Line

Figure 15 (150% of national line): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	6.6	31.2	0.4	61.8	68.4
<=39	11.2	26.6	1.6	60.6	71.8
<=42	16.2	21.7	3.9	58.3	74.4
<=44	19.8	18.1	5.6	56.5	76.3
<=46	23.5	14.4	8.1	54.0	77.5
<=48	26.8	11.0	11.9	50.3	77.1
<=50	29.4	8.5	15.6	46.5	75.8
<=52	31.8	6.0	19.7	42.5	74.3
<=54	33.9	4.0	24.1	38.0	71.8
<=56	35.0	2.9	28.8	33.3	68.2
<=58	35.7	2.1	34.3	27.8	63.5
<=60	36.9	0.9	39.3	22.8	59.8
<=62	37.4	0.5	44.6	17.5	54.8
<=64	37.5	0.3	47.8	14.3	51.8
<=66	37.7	0.2	52.4	9.7	47.4
<=69	37.9	0.0	55.6	6.5	44.4
<=73	37.9	0.0	59.3	2.8	40.7
<=100	37.9	0.0	62.1	0.0	37.9

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 (150% of national line): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	94.7	17.5	18.0:1
<=39	12.8	87.8	29.7	7.2:1
<=42	20.0	80.7	42.7	4.2:1
<=44	25.4	77.9	52.2	3.5:1
<=46	31.6	74.3	62.0	2.9:1
<=48	38.7	69.4	70.9	2.3:1
<=50	45.0	65.2	77.5	1.9:1
<=52	51.5	61.8	84.0	1.6:1
<=54	58.0	58.4	89.4	1.4:1
<=56	63.8	54.8	92.3	1.2:1
<=58	70.1	51.0	94.4	1.0:1
<=60	76.2	48.5	97.5	0.9:1
<=62	82.0	45.6	98.6	0.8:1
<=64	85.4	44.0	99.1	0.8:1
<=66	90.1	41.8	99.5	0.7:1
<=69	93.5	40.5	100.0	0.7:1
<=73	97.2	39.0	100.0	0.6:1
<=100	100.0	37.9	100.0	0.6:1

Scorecard applied to the validation sample.

Tables for
100% of the National Poverty Line

Figure 15 (100% of national line): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	3.6	5.9	3.4	87.1	90.7
<=39	5.0	4.4	7.8	82.8	87.8
<=42	5.6	3.8	14.4	76.1	81.8
<=44	6.6	2.9	18.8	71.7	78.3
<=46	7.6	1.8	24.0	66.6	74.2
<=48	8.2	1.2	30.5	60.1	68.3
<=50	8.5	0.9	36.5	54.1	62.6
<=52	9.1	0.3	42.4	48.2	57.3
<=54	9.3	0.2	48.7	41.8	51.1
<=56	9.3	0.2	54.5	36.0	45.3
<=58	9.4	0.0	60.6	29.9	39.4
<=60	9.4	0.0	66.8	23.8	33.2
<=62	9.4	0.0	72.5	18.0	27.5
<=64	9.4	0.0	75.9	14.6	24.1
<=66	9.4	0.0	80.6	9.9	19.4
<=69	9.4	0.0	84.0	6.5	16.0
<=73	9.4	0.0	87.7	2.8	12.3
<=100	9.4	0.0	90.6	0.0	9.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 (100% of national line): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	51.2	38.0	1.0:1
<=39	12.8	39.1	53.0	0.6:1
<=42	20.0	28.1	59.7	0.4:1
<=44	25.4	25.9	69.8	0.3:1
<=46	31.6	24.2	81.0	0.3:1
<=48	38.7	21.2	86.9	0.3:1
<=50	45.0	19.0	90.4	0.2:1
<=52	51.5	17.7	96.5	0.2:1
<=54	58.0	16.0	98.0	0.2:1
<=56	63.8	14.5	98.2	0.2:1
<=58	70.1	13.5	100.0	0.2:1
<=60	76.2	12.4	100.0	0.1:1
<=62	82.0	11.5	100.0	0.1:1
<=64	85.4	11.1	100.0	0.1:1
<=66	90.1	10.5	100.0	0.1:1
<=69	93.5	10.1	100.0	0.1:1
<=73	97.2	9.7	100.0	0.1:1
<=100	100.0	9.4	100.0	0.1:1

Scorecard applied to the validation sample.

Tables for
200% of the National Poverty Line

Figure 15 (200% of national line): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	7.0	57.2	0.1	35.8	42.8
<=39	12.5	51.6	0.3	35.6	48.1
<=42	19.0	45.1	1.1	34.8	53.8
<=44	23.5	40.6	1.9	34.0	57.6
<=46	29.1	35.1	2.5	33.3	62.4
<=48	34.7	29.4	4.0	31.9	66.6
<=50	39.4	24.7	5.6	30.3	69.7
<=52	44.3	19.9	7.2	28.7	72.9
<=54	48.6	15.5	9.4	26.5	75.1
<=56	52.2	11.9	11.6	24.3	76.5
<=58	55.8	8.3	14.3	21.6	77.3
<=60	58.8	5.4	17.5	18.4	77.2
<=62	60.5	3.6	21.4	14.4	75.0
<=64	61.6	2.5	23.8	12.1	73.7
<=66	62.7	1.4	27.4	8.5	71.2
<=69	63.5	0.6	29.9	5.9	69.5
<=73	64.0	0.1	33.2	2.7	66.7
<=100	64.1	0.0	35.9	0.0	64.1

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 (200% of national line): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	99.2	10.8	117.1:1
<=39	12.8	97.6	19.5	40.5:1
<=42	20.0	94.6	29.6	17.7:1
<=44	25.4	92.6	36.7	12.6:1
<=46	31.6	91.9	45.3	11.4:1
<=48	38.7	89.6	54.1	8.6:1
<=50	45.0	87.6	61.5	7.1:1
<=52	51.5	86.0	69.0	6.1:1
<=54	58.0	83.8	75.8	5.2:1
<=56	63.8	81.8	81.5	4.5:1
<=58	70.1	79.6	87.0	3.9:1
<=60	76.2	77.1	91.6	3.4:1
<=62	82.0	73.8	94.4	2.8:1
<=64	85.4	72.1	96.0	2.6:1
<=66	90.1	69.6	97.8	2.3:1
<=69	93.5	68.0	99.1	2.1:1
<=73	97.2	65.9	99.8	1.9:1
<=100	100.0	64.1	100.0	1.8:1

Scorecard applied to the validation sample.

Tables for
the $1.25/day 2005 PPP Poverty Line

Figure 15 ($1.25/day 2005 PPP): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	1.0	0.2	6.0	92.8	93.9
<=39	1.1	0.1	11.7	87.1	88.2
<=42	1.1	0.1	18.9	79.9	81.0
<=44	1.1	0.1	24.3	74.5	75.6
<=46	1.1	0.1	30.5	68.3	69.4
<=48	1.1	0.0	37.6	61.3	62.4
<=50	1.1	0.0	43.9	55.0	56.1
<=52	1.2	0.0	50.3	48.5	49.7
<=54	1.2	0.0	56.8	42.0	43.2
<=56	1.2	0.0	62.6	36.2	37.4
<=58	1.2	0.0	68.9	29.9	31.1
<=60	1.2	0.0	75.0	23.8	25.0
<=62	1.2	0.0	80.8	18.0	19.2
<=64	1.2	0.0	84.2	14.6	15.8
<=66	1.2	0.0	88.9	9.9	11.1
<=69	1.2	0.0	92.3	6.5	7.7
<=73	1.2	0.0	96.0	2.8	4.0
<=100	1.2	0.0	98.8	0.0	1.2

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 ($1.25/day 2005 PPP): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	14.7	87.2	0.2:1
<=39	12.8	8.6	93.1	0.1:1
<=42	20.0	5.5	93.1	0.1:1
<=44	25.4	4.3	93.1	0.0:1
<=46	31.6	3.5	93.1	0.0:1
<=48	38.7	2.9	96.4	0.0:1
<=50	45.0	2.5	96.4	0.0:1
<=52	51.5	2.3	98.0	0.0:1
<=54	58.0	2.0	100.0	0.0:1
<=56	63.8	1.9	100.0	0.0:1
<=58	70.1	1.7	100.0	0.0:1
<=60	76.2	1.6	100.0	0.0:1
<=62	82.0	1.4	100.0	0.0:1
<=64	85.4	1.4	100.0	0.0:1
<=66	90.1	1.3	100.0	0.0:1
<=69	93.5	1.3	100.0	0.0:1
<=73	97.2	1.2	100.0	0.0:1
<=100	100.0	1.2	100.0	0.0:1

Scorecard applied to the validation sample.

Tables for
the $2.00/day 2005 PPP Poverty Line

Figure 15 ($2.00/day 2005 PPP): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	4.3	8.3	2.7	84.7	89.0
<=39	5.9	6.7	6.9	80.5	86.5
<=42	7.0	5.6	13.0	74.4	81.4
<=44	8.4	4.2	17.0	70.4	78.9
<=46	9.7	2.9	21.9	65.5	75.2
<=48	10.5	2.1	28.2	59.2	69.7
<=50	11.1	1.5	33.9	53.5	64.6
<=52	11.7	0.8	39.7	47.7	59.4
<=54	12.0	0.6	46.0	41.4	53.4
<=56	12.1	0.5	51.8	35.7	47.7
<=58	12.3	0.3	57.8	29.6	41.9
<=60	12.5	0.1	63.7	23.7	36.2
<=62	12.5	0.0	69.5	18.0	30.5
<=64	12.5	0.0	72.8	14.6	27.1
<=66	12.5	0.0	77.6	9.9	22.4
<=69	12.6	0.0	80.9	6.5	19.1
<=73	12.6	0.0	84.6	2.8	15.4
<=100	12.6	0.0	87.4	0.0	12.6

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 ($2.00/day 2005 PPP): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	61.1	34.1	1.6:1
<=39	12.8	46.2	47.1	0.9:1
<=42	20.0	34.9	55.7	0.5:1
<=44	25.4	33.1	67.0	0.5:1
<=46	31.6	30.6	76.9	0.4:1
<=48	38.7	27.1	83.3	0.4:1
<=50	45.0	24.7	88.4	0.3:1
<=52	51.5	22.8	93.4	0.3:1
<=54	58.0	20.7	95.5	0.3:1
<=56	63.8	18.9	95.9	0.2:1
<=58	70.1	17.5	97.8	0.2:1
<=60	76.2	16.4	99.4	0.2:1
<=62	82.0	15.3	99.7	0.2:1
<=64	85.4	14.7	99.7	0.2:1
<=66	90.1	13.9	99.7	0.2:1
<=69	93.5	13.4	100.0	0.2:1
<=73	97.2	12.9	100.0	0.1:1
<=100	100.0	12.6	100.0	0.1:1

Scorecard applied to the validation sample.

Tables for
the $2.50/day 2005 PPP Poverty Line

Figure 15 ($2.50/day 2005 PPP): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	6.1	21.2	0.9	71.8	77.9
<=39	9.8	17.5	3.0	69.7	79.5
<=42	13.1	14.3	7.0	65.7	78.7
<=44	15.8	11.6	9.7	63.0	78.7
<=46	18.1	9.3	13.5	59.1	77.2
<=48	20.5	6.9	18.2	54.4	74.9
<=50	22.0	5.3	23.0	49.7	71.7
<=52	23.9	3.5	27.6	45.0	68.9
<=54	25.0	2.4	33.0	39.6	64.6
<=56	25.9	1.5	37.9	34.7	60.6
<=58	26.3	1.1	43.8	28.8	55.1
<=60	26.9	0.5	49.3	23.3	50.2
<=62	27.1	0.2	54.8	17.8	45.0
<=64	27.2	0.1	58.1	14.5	41.7
<=66	27.3	0.0	62.8	9.9	37.2
<=69	27.4	0.0	66.1	6.5	33.9
<=73	27.4	0.0	69.8	2.8	30.2
<=100	27.4	0.0	72.6	0.0	27.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 ($2.50/day 2005 PPP): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	87.2	22.4	6.8:1
<=39	12.8	76.7	35.9	3.3:1
<=42	20.0	65.2	47.8	1.9:1
<=44	25.4	62.0	57.6	1.6:1
<=46	31.6	57.1	66.0	1.3:1
<=48	38.7	52.9	74.9	1.1:1
<=50	45.0	49.0	80.6	1.0:1
<=52	51.5	46.3	87.2	0.9:1
<=54	58.0	43.1	91.3	0.8:1
<=56	63.8	40.6	94.6	0.7:1
<=58	70.1	37.5	96.0	0.6:1
<=60	76.2	35.3	98.3	0.5:1
<=62	82.0	33.1	99.2	0.5:1
<=64	85.4	31.9	99.5	0.5:1
<=66	90.1	30.3	99.8	0.4:1
<=69	93.5	29.3	100.0	0.4:1
<=73	97.2	28.2	100.0	0.4:1
<=100	100.0	27.4	100.0	0.4:1

Scorecard applied to the validation sample.

Tables for
the $5.00/day 2005 PPP Poverty Line

Figure 15 ($5.00/day 2005 PPP): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	7.0	76.2	0.0	16.8	23.8
<=39	12.8	70.4	0.0	16.8	29.6
<=42	19.8	63.5	0.3	16.5	36.2
<=44	25.0	58.3	0.4	16.3	41.3
<=46	30.9	52.4	0.7	16.0	46.9
<=48	37.4	45.8	1.3	15.5	52.9
<=50	43.5	39.8	1.5	15.2	58.7
<=52	49.2	34.0	2.3	14.5	63.7
<=54	55.0	28.3	3.0	13.8	68.7
<=56	59.8	23.4	4.0	12.8	72.6
<=58	65.0	18.3	5.1	11.6	76.6
<=60	69.9	13.3	6.3	10.4	80.4
<=62	74.0	9.2	8.0	8.8	82.8
<=64	76.5	6.7	8.8	7.9	84.4
<=66	79.2	4.0	10.9	5.9	85.1
<=69	80.8	2.5	12.7	4.0	84.8
<=73	82.3	1.0	14.9	1.9	84.1
<=100	83.2	0.0	16.8	0.0	83.2

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 ($5.00/day 2005 PPP): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	100.0	8.4	Only poor targeted
<=39	12.8	100.0	15.4	Only poor targeted
<=42	20.0	98.6	23.7	70.2:1
<=44	25.4	98.3	30.0	58.3:1
<=46	31.6	97.7	37.1	42.5:1
<=48	38.7	96.7	45.0	29.4:1
<=50	45.0	96.6	52.2	28.5:1
<=52	51.5	95.6	59.1	21.7:1
<=54	58.0	94.8	66.0	18.3:1
<=56	63.8	93.7	71.9	14.9:1
<=58	70.1	92.7	78.0	12.7:1
<=60	76.2	91.7	84.0	11.1:1
<=62	82.0	90.3	88.9	9.3:1
<=64	85.4	89.6	91.9	8.7:1
<=66	90.1	87.9	95.2	7.3:1
<=69	93.5	86.4	97.0	6.4:1
<=73	97.2	84.7	98.8	5.5:1
<=100	100.0	83.2	100.0	5.0:1

Scorecard applied to the validation sample.

Tables for
the $8.44/day 2005 PPP Poverty Line

Figure 15 ($8.44/day 2005 PPP): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	7.0	83.9	0.0	9.1	16.1
<=39	12.8	78.1	0.0	9.1	21.9
<=42	20.0	70.9	0.1	9.1	29.0
<=44	25.2	65.7	0.2	8.9	34.1
<=46	31.4	59.5	0.2	8.9	40.3
<=48	38.2	52.6	0.5	8.7	46.9
<=50	44.4	46.5	0.6	8.5	52.9
<=52	50.4	40.5	1.1	8.0	58.4
<=54	56.4	34.5	1.6	7.5	63.9
<=56	61.7	29.2	2.1	7.0	68.8
<=58	67.2	23.7	2.9	6.2	73.4
<=60	72.6	18.3	3.6	5.5	78.0
<=62	78.0	12.9	4.0	5.1	83.1
<=64	81.0	9.9	4.4	4.7	85.7
<=66	84.9	6.0	5.2	3.9	88.8
<=69	87.4	3.5	6.1	3.0	90.4
<=73	89.5	1.4	7.6	1.5	91.0
<=100	90.9	0.0	9.1	0.0	90.9

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 ($8.44/day 2005 PPP): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	100.0	7.7	Only poor targeted
<=39	12.8	100.0	14.1	Only poor targeted
<=42	20.0	99.7	22.0	316.6:1
<=44	25.4	99.2	27.7	119.7:1
<=46	31.6	99.3	34.5	149.2:1
<=48	38.7	98.8	42.1	84.5:1
<=50	45.0	98.6	48.8	71.1:1
<=52	51.5	97.8	55.4	45.2:1
<=54	58.0	97.2	62.0	35.2:1
<=56	63.8	96.7	67.9	29.6:1
<=58	70.1	95.9	73.9	23.2:1
<=60	76.2	95.2	79.9	19.9:1
<=62	82.0	95.1	85.8	19.4:1
<=64	85.4	94.9	89.1	18.4:1
<=66	90.1	94.3	93.4	16.4:1
<=69	93.5	93.5	96.1	14.3:1
<=73	97.2	92.1	98.5	11.7:1
<=100	100.0	90.9	100.0	10.0:1

Scorecard applied to the validation sample.

Tables for
the $1.90/day 2011 PPP Poverty Line

Figure 15 ($1.90/day 2011 PPP): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	0.9	0.1	6.1	92.9	93.8
<=39	1.0	0.0	11.8	87.2	88.2
<=42	1.0	0.0	19.0	79.9	80.9
<=44	1.0	0.0	24.4	74.6	75.6
<=46	1.0	0.0	30.6	68.4	69.4
<=48	1.0	0.0	37.7	61.3	62.3
<=50	1.0	0.0	44.0	55.0	56.0
<=52	1.0	0.0	50.5	48.5	49.5
<=54	1.0	0.0	57.0	42.0	43.0
<=56	1.0	0.0	62.8	36.2	37.2
<=58	1.0	0.0	69.1	29.9	30.9
<=60	1.0	0.0	75.2	23.8	24.8
<=62	1.0	0.0	81.0	18.0	19.0
<=64	1.0	0.0	84.3	14.6	15.7
<=66	1.0	0.0	89.1	9.9	10.9
<=69	1.0	0.0	92.5	6.5	7.5
<=73	1.0	0.0	96.2	2.8	3.8
<=100	1.0	0.0	99.0	0.0	1.0

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 ($1.90/day 2011 PPP): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	13.2	90.9	0.2:1
<=39	12.8	7.8	97.7	0.1:1
<=42	20.0	5.0	97.7	0.1:1
<=44	25.4	3.9	97.7	0.0:1
<=46	31.6	3.2	97.7	0.0:1
<=48	38.7	2.6	97.7	0.0:1
<=50	45.0	2.2	97.7	0.0:1
<=52	51.5	1.9	97.7	0.0:1
<=54	58.0	1.8	100.0	0.0:1
<=56	63.8	1.6	100.0	0.0:1
<=58	70.1	1.5	100.0	0.0:1
<=60	76.2	1.3	100.0	0.0:1
<=62	82.0	1.2	100.0	0.0:1
<=64	85.4	1.2	100.0	0.0:1
<=66	90.1	1.1	100.0	0.0:1
<=69	93.5	1.1	100.0	0.0:1
<=73	97.2	1.1	100.0	0.0:1
<=100	100.0	1.0	100.0	0.0:1

Scorecard applied to the validation sample.

Tables for
the $3.20/day 2011 PPP Poverty Line

Figure 15 ($3.20/day 2011 PPP): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	4.6	9.2	2.4	83.8	88.4
<=39	6.6	7.2	6.2	80.0	86.6
<=42	7.7	6.1	12.4	73.8	81.5
<=44	9.2	4.6	16.2	70.0	79.1
<=46	10.4	3.4	21.2	65.0	75.4
<=48	11.2	2.6	27.5	58.7	69.9
<=50	12.0	1.8	33.0	53.2	65.3
<=52	12.7	1.1	38.8	47.5	60.2
<=54	13.0	0.8	45.0	41.2	54.2
<=56	13.2	0.6	50.6	35.6	48.7
<=58	13.5	0.3	56.6	29.6	43.1
<=60	13.7	0.1	62.5	23.7	37.4
<=62	13.7	0.0	68.2	18.0	31.7
<=64	13.7	0.0	71.6	14.6	28.3
<=66	13.7	0.0	76.3	9.9	23.6
<=69	13.8	0.0	79.7	6.5	20.3
<=73	13.8	0.0	83.4	2.8	16.6
<=100	13.8	0.0	86.2	0.0	13.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 ($3.20/day 2011 PPP): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	65.8	33.5	1.9:1
<=39	12.8	51.5	47.8	1.1:1
<=42	20.0	38.3	55.6	0.6:1
<=44	25.4	36.1	66.5	0.6:1
<=46	31.6	32.9	75.5	0.5:1
<=48	38.7	29.0	81.3	0.4:1
<=50	45.0	26.7	87.3	0.4:1
<=52	51.5	24.7	92.3	0.3:1
<=54	58.0	22.4	94.1	0.3:1
<=56	63.8	20.6	95.6	0.3:1
<=58	70.1	19.2	97.7	0.2:1
<=60	76.2	18.0	99.4	0.2:1
<=62	82.0	16.8	99.7	0.2:1
<=64	85.4	16.1	99.7	0.2:1
<=66	90.1	15.3	99.7	0.2:1
<=69	93.5	14.8	100.0	0.2:1
<=73	97.2	14.2	100.0	0.2:1
<=100	100.0	13.8	100.0	0.2:1

Scorecard applied to the validation sample.

Tables for
the $5.50/day 2011 PPP Poverty Line

Figure 15 ($5.50/day 2011 PPP): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	7.0	51.6	0.1	41.4	48.3
<=39	12.5	46.1	0.3	41.1	53.6
<=42	18.6	39.9	1.4	40.0	58.6
<=44	23.1	35.4	2.3	39.1	62.2
<=46	28.3	30.3	3.3	38.1	66.4
<=48	33.3	25.3	5.4	36.0	69.3
<=50	37.4	21.1	7.6	33.9	71.3
<=52	42.0	16.6	9.5	31.9	73.9
<=54	46.0	12.6	12.0	29.4	75.4
<=56	49.0	9.5	14.8	26.7	75.7
<=58	51.7	6.8	18.4	23.1	74.8
<=60	54.2	4.4	22.0	19.4	73.6
<=62	55.8	2.8	26.2	15.2	71.0
<=64	56.6	1.9	28.8	12.7	69.3
<=66	57.6	0.9	32.4	9.0	66.6
<=69	58.2	0.3	35.2	6.2	64.4
<=73	58.4	0.1	38.7	2.7	61.2
<=100	58.5	0.0	41.5	0.0	58.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 ($5.50/day 2011 PPP): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	99.2	11.9	117.1:1
<=39	12.8	97.6	21.3	40.5:1
<=42	20.0	92.9	31.8	13.0:1
<=44	25.4	90.9	39.5	10.0:1
<=46	31.6	89.5	48.3	8.5:1
<=48	38.7	86.0	56.8	6.1:1
<=50	45.0	83.2	63.9	4.9:1
<=52	51.5	81.5	71.7	4.4:1
<=54	58.0	79.3	78.5	3.8:1
<=56	63.8	76.8	83.8	3.3:1
<=58	70.1	73.8	88.3	2.8:1
<=60	76.2	71.1	92.5	2.5:1
<=62	82.0	68.0	95.3	2.1:1
<=64	85.4	66.3	96.7	2.0:1
<=66	90.1	64.0	98.5	1.8:1
<=69	93.5	62.3	99.5	1.7:1
<=73	97.2	60.1	99.8	1.5:1
<=100	100.0	58.5	100.0	1.4:1

Scorecard applied to the validation sample.

Tables for
the $21.70/day 2011 PPP Poverty Line

Figure 15 ($21.70/day 2011 PPP): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	7.0	92.2	0.0	0.8	7.8
<=39	12.8	86.4	0.0	0.8	13.6
<=42	20.0	79.2	0.0	0.8	20.8
<=44	25.4	73.8	0.0	0.8	26.1
<=46	31.6	67.6	0.0	0.8	32.3
<=48	38.7	60.6	0.0	0.8	39.4
<=50	44.9	54.3	0.1	0.7	45.6
<=52	51.4	47.8	0.1	0.7	52.0
<=54	57.8	41.4	0.2	0.6	58.4
<=56	63.6	35.6	0.2	0.6	64.2
<=58	69.9	29.3	0.2	0.6	70.5
<=60	76.0	23.2	0.2	0.6	76.6
<=62	81.8	17.4	0.2	0.6	82.4
<=64	85.1	14.1	0.3	0.5	85.6
<=66	89.6	9.6	0.5	0.3	90.0
<=69	93.0	6.2	0.5	0.3	93.4
<=73	96.6	2.6	0.6	0.2	96.8
<=100	99.2	0.0	0.8	0.0	99.2

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 ($21.70/day 2011 PPP): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	100.0	7.1	Only poor targeted
<=39	12.8	100.0	12.9	Only poor targeted
<=42	20.0	99.8	20.2	485.2:1
<=44	25.4	99.8	25.6	615.4:1
<=46	31.6	99.9	31.8	765.7:1
<=48	38.7	99.9	39.0	937.4:1
<=50	45.0	99.7	45.2	367.4:1
<=52	51.5	99.8	51.8	420.4:1
<=54	58.0	99.7	58.2	287.0:1
<=56	63.8	99.7	64.1	302.5:1
<=58	70.1	99.7	70.4	332.2:1
<=60	76.2	99.7	76.6	361.4:1
<=62	82.0	99.7	82.4	388.8:1
<=64	85.4	99.7	85.8	326.1:1
<=66	90.1	99.5	90.4	196.9:1
<=69	93.5	99.5	93.8	204.4:1
<=73	97.2	99.4	97.4	172.8:1
<=100	100.0	99.2	100.0	124.8:1

Scorecard applied to the validation sample.

Tables for
the First-Decile (10th-Percentile) Poverty Line

Figure 15 (First-decile (10th-percentile) line): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	3.7	6.6	3.3	86.4	90.1
<=39	5.3	5.0	7.5	82.2	87.5
<=42	5.9	4.4	14.1	75.6	81.5
<=44	7.1	3.2	18.3	71.4	78.5
<=46	8.2	2.2	23.5	66.2	74.4
<=48	8.7	1.6	30.0	59.7	68.4
<=50	9.0	1.3	36.0	53.7	62.8
<=52	9.7	0.6	41.8	47.9	57.6
<=54	9.9	0.4	48.0	41.6	51.6
<=56	10.0	0.4	53.9	35.8	45.8
<=58	10.1	0.2	60.0	29.7	39.8
<=60	10.3	0.0	65.9	23.8	34.1
<=62	10.3	0.0	71.7	18.0	28.3
<=64	10.3	0.0	75.0	14.6	25.0
<=66	10.3	0.0	79.8	9.9	20.2
<=69	10.3	0.0	83.2	6.5	16.8
<=73	10.3	0.0	86.8	2.8	13.2
<=100	10.3	0.0	89.7	0.0	10.3

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 (First-decile (10th-percentile) line): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	53.4	36.3	1.1:1
<=39	12.8	41.4	51.4	0.7:1
<=42	20.0	29.6	57.5	0.4:1
<=44	25.4	27.9	68.7	0.4:1
<=46	31.6	25.8	79.0	0.3:1
<=48	38.7	22.5	84.4	0.3:1
<=50	45.0	20.1	87.6	0.3:1
<=52	51.5	18.8	93.7	0.2:1
<=54	58.0	17.1	96.2	0.2:1
<=56	63.8	15.6	96.5	0.2:1
<=58	70.1	14.4	98.1	0.2:1
<=60	76.2	13.5	100.0	0.2:1
<=62	82.0	12.6	100.0	0.1:1
<=64	85.4	12.1	100.0	0.1:1
<=66	90.1	11.5	100.0	0.1:1
<=69	93.5	11.0	100.0	0.1:1
<=73	97.2	10.6	100.0	0.1:1
<=100	100.0	10.3	100.0	0.1:1

Scorecard applied to the validation sample.

Tables for
the First-Quintile (20th-Percentile) Poverty Line

Figure 15 (First-quintile (20th-percentile) line): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	5.6	15.1	1.5	77.8	83.4
<=39	8.5	12.2	4.3	75.0	83.5
<=42	10.4	10.3	9.7	69.6	80.0
<=44	12.5	8.2	12.9	66.4	78.9
<=46	14.5	6.2	17.1	62.2	76.6
<=48	15.9	4.8	22.8	56.5	72.4
<=50	17.2	3.5	27.8	51.5	68.7
<=52	18.6	2.1	32.9	46.4	65.0
<=54	19.5	1.2	38.5	40.8	60.3
<=56	19.9	0.8	43.9	35.4	55.3
<=58	20.3	0.4	49.8	29.5	49.8
<=60	20.5	0.2	55.7	23.6	44.1
<=62	20.7	0.0	61.3	18.0	38.6
<=64	20.7	0.0	64.7	14.6	35.3
<=66	20.7	0.0	69.4	9.9	30.5
<=69	20.7	0.0	72.8	6.5	27.2
<=73	20.7	0.0	76.5	2.8	23.5
<=100	20.7	0.0	79.3	0.0	20.7

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 (First-quintile (20th-percentile) line): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	79.3	26.9	3.8:1
<=39	12.8	66.2	41.0	2.0:1
<=42	20.1	51.8	50.2	1.1:1
<=44	25.4	49.2	60.5	1.0:1
<=46	31.6	45.8	70.0	0.8:1
<=48	38.7	41.1	76.8	0.7:1
<=50	45.0	38.2	83.0	0.6:1
<=52	51.5	36.1	89.7	0.6:1
<=54	58.0	33.6	94.0	0.5:1
<=56	63.8	31.2	96.2	0.5:1
<=58	70.1	28.9	97.9	0.4:1
<=60	76.2	26.9	99.1	0.4:1
<=62	82.0	25.2	99.8	0.3:1
<=64	85.4	24.2	99.8	0.3:1
<=66	90.1	22.9	99.8	0.3:1
<=69	93.5	22.1	100.0	0.3:1
<=73	97.2	21.3	100.0	0.3:1
<=100	100.0	20.7	100.0	0.3:1

Scorecard applied to the validation sample.

Tables for
the Second-Quintile (40th-Percentile) Poverty Line

Figure 15 (Second-quintile (40th-percentile) line): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	6.9	33.6	0.1	59.4	66.3
<=39	11.7	28.8	1.1	58.4	70.1
<=42	16.9	23.6	3.2	56.4	73.2
<=44	21.0	19.5	4.5	55.1	76.0
<=46	24.8	15.7	6.8	52.8	77.6
<=48	28.4	12.0	10.2	49.3	77.7
<=50	31.0	9.4	13.9	45.6	76.7
<=52	33.9	6.6	17.5	42.0	75.9
<=54	35.9	4.5	22.0	37.5	73.4
<=56	37.3	3.1	26.5	33.1	70.4
<=58	38.1	2.4	32.0	27.6	65.7
<=60	39.3	1.2	36.9	22.6	61.9
<=62	39.8	0.6	42.1	17.4	57.3
<=64	40.0	0.4	45.3	14.2	54.3
<=66	40.2	0.3	49.9	9.6	49.8
<=69	40.5	0.0	53.0	6.5	47.0
<=73	40.5	0.0	56.7	2.8	43.3
<=100	40.5	0.0	59.5	0.0	40.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 (Second-quintile (40th-percentile) line): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	98.1	17.0	50.3:1
<=39	12.8	91.3	28.9	10.5:1
<=42	20.1	84.2	41.7	5.3:1
<=44	25.4	82.5	51.8	4.7:1
<=46	31.6	78.6	61.3	3.7:1
<=48	38.7	73.5	70.2	2.8:1
<=50	45.0	69.1	76.7	2.2:1
<=52	51.4	65.9	83.8	1.9:1
<=54	58.0	62.0	88.8	1.6:1
<=56	63.8	58.5	92.2	1.4:1
<=58	70.1	54.4	94.2	1.2:1
<=60	76.2	51.6	97.1	1.1:1
<=62	82.0	48.6	98.5	0.9:1
<=64	85.4	46.9	98.9	0.9:1
<=66	90.1	44.6	99.3	0.8:1
<=69	93.5	43.3	100.0	0.8:1
<=73	97.2	41.6	100.0	0.7:1
<=100	100.0	40.5	100.0	0.7:1

Scorecard applied to the validation sample.

Tables for
the Median (50th-Percentile) Poverty Line

Figure 15 (Median (50th-percentile) line): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	6.9	44.1	0.1	48.8	55.7
<=39	12.4	38.6	0.4	48.6	61.0
<=42	18.2	32.8	1.9	47.1	65.3
<=44	22.4	28.6	3.0	46.0	68.4
<=46	27.3	23.7	4.3	44.7	72.1
<=48	31.7	19.3	7.0	42.0	73.6
<=50	35.1	15.9	9.9	39.1	74.2
<=52	39.0	12.0	12.4	36.5	75.6
<=54	42.3	8.7	15.7	33.3	75.6
<=56	44.7	6.3	19.1	29.9	74.6
<=58	46.3	4.7	23.8	25.2	71.5
<=60	47.9	3.1	28.3	20.6	68.5
<=62	49.2	1.8	32.7	16.3	65.5
<=64	49.8	1.2	35.5	13.5	63.3
<=66	50.4	0.6	39.7	9.3	59.7
<=69	50.9	0.1	42.6	6.4	57.3
<=73	51.0	0.0	46.2	2.8	53.8
<=100	51.0	0.0	49.0	0.0	51.0

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 (Median (50th-percentile) line): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	98.1	13.5	50.3:1
<=39	12.8	97.0	24.4	32.2:1
<=42	20.1	90.7	35.7	9.8:1
<=44	25.4	88.1	43.9	7.4:1
<=46	31.6	86.5	53.6	6.4:1
<=48	38.7	81.8	62.1	4.5:1
<=50	45.0	78.1	68.8	3.6:1
<=52	51.5	75.8	76.5	3.1:1
<=54	58.0	73.0	82.9	2.7:1
<=56	63.8	70.1	87.6	2.3:1
<=58	70.1	66.1	90.8	1.9:1
<=60	76.2	62.8	93.8	1.7:1
<=62	82.0	60.1	96.5	1.5:1
<=64	85.4	58.4	97.7	1.4:1
<=66	90.1	55.9	98.8	1.3:1
<=69	93.5	54.5	99.8	1.2:1
<=73	97.2	52.5	100.0	1.1:1
<=100	100.0	51.0	100.0	1.0:1

Scorecard applied to the validation sample.

Tables for
the Third-Quintile (60th-Percentile) Poverty Line

Figure 15 (Third-quintile (60th-percentile) line): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	7.0	53.4	0.1	39.6	46.5
<=39	12.5	47.9	0.3	39.3	51.8
<=42	18.8	41.6	1.2	38.4	57.2
<=44	23.3	37.1	2.1	37.5	60.8
<=46	28.6	31.7	3.0	36.6	65.3
<=48	33.9	26.5	4.9	34.7	68.6
<=50	38.0	22.4	7.0	32.6	70.6
<=52	42.8	17.6	8.7	30.9	73.7
<=54	47.1	13.3	11.0	28.6	75.7
<=56	50.3	10.0	13.6	26.1	76.4
<=58	53.2	7.2	16.9	22.7	75.9
<=60	55.8	4.6	20.4	19.2	74.9
<=62	57.3	3.0	24.6	15.0	72.4
<=64	58.2	2.2	27.1	12.5	70.7
<=66	59.3	1.1	30.8	8.8	68.1
<=69	59.9	0.4	33.5	6.1	66.0
<=73	60.3	0.1	36.9	2.7	63.0
<=100	60.4	0.0	39.6	0.0	60.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 (Third-quintile (60th-percentile) line): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	99.2	11.5	117.1:1
<=39	12.8	97.6	20.7	40.5:1
<=42	20.1	93.8	31.2	15.1:1
<=44	25.4	91.6	38.6	10.9:1
<=46	31.6	90.5	47.4	9.5:1
<=48	38.7	87.4	56.1	6.9:1
<=50	45.1	84.4	63.0	5.4:1
<=52	51.5	83.0	70.9	4.9:1
<=54	58.0	81.1	78.0	4.3:1
<=56	63.9	78.8	83.4	3.7:1
<=58	70.2	75.9	88.1	3.1:1
<=60	76.2	73.2	92.3	2.7:1
<=62	82.0	70.0	95.0	2.3:1
<=64	85.3	68.2	96.4	2.1:1
<=66	90.1	65.8	98.2	1.9:1
<=69	93.5	64.1	99.3	1.8:1
<=73	97.2	62.0	99.8	1.6:1
<=100	100.0	60.4	100.0	1.5:1

Scorecard applied to the validation sample.

Tables for
the Fourth-Quintile (80th-Percentile) Poverty Line

Figure 15 (Fourth-quintile (80th-percentile) line): Percentages of people by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=35	7.0	73.2	0.0	19.8	26.8
<=39	12.6	67.6	0.2	19.6	32.3
<=42	19.6	60.6	0.5	19.3	38.9
<=44	24.8	55.4	0.6	19.2	44.0
<=46	30.7	49.5	0.9	18.9	49.5
<=48	37.2	43.1	1.5	18.3	55.4
<=50	43.2	37.1	1.8	17.9	61.1
<=52	48.8	31.4	2.7	17.1	65.9
<=54	54.3	25.9	3.7	16.1	70.4
<=56	58.9	21.3	4.9	14.9	73.8
<=58	63.6	16.6	6.5	13.3	77.0
<=60	68.2	12.0	8.0	11.8	80.1
<=62	71.8	8.4	10.2	9.6	81.4
<=64	74.1	6.1	11.2	8.6	82.7
<=66	76.6	3.6	13.5	6.3	82.9
<=69	78.1	2.1	15.3	4.4	82.6
<=73	79.3	0.9	17.8	1.9	81.3
<=100	80.2	0.0	19.8	0.0	80.2

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Figure 16 (Fourth-quintile (80th-percentile) line): Share of all people who are targeted (that is, score at or below a cut-off), share of targeted people who are poor, share of poor people who are targeted, and number of poor people successfully targeted per non-poor person mistakenly targeted

Targeting cut-off	% all people who are targeted	% targeted people who are poor	% poor people who are targeted	Poor people targeted per non-poor person targeted
<=35	7.0	100.0	8.7	Only poor targeted
<=39	12.8	98.7	15.8	77.9:1
<=42	20.0	97.7	24.4	41.7:1
<=44	25.4	97.6	30.9	40.2:1
<=46	31.6	97.1	38.2	33.1:1
<=48	38.7	96.1	46.3	24.5:1
<=50	45.0	95.9	53.8	23.3:1
<=52	51.5	94.8	60.8	18.2:1
<=54	58.0	93.7	67.7	14.8:1
<=56	63.8	92.3	73.4	12.0:1
<=58	70.1	90.8	79.3	9.9:1
<=60	76.2	89.5	85.1	8.6:1
<=62	82.0	87.6	89.5	7.1:1
<=64	85.4	86.9	92.4	6.6:1
<=66	90.1	85.1	95.5	5.7:1
<=69	93.5	83.6	97.4	5.1:1
<=73	97.2	81.7	98.9	4.5:1
<=100	100.0	80.2	100.0	4.1:1

Scorecard applied to the validation sample.

References

Adams, Niall M.; and David J. Hand. (2000) "Improving the Practice of Classifier Performance Assessment", *Neural Computation*, Vol. 12, pp. 305–311.

Brown, Caitlin; Ravallion, Martin; and Dominique van de Walle. (2018) "A Poor Means Test? Econometric Targeting in Africa", *Journal of Development Economics*, Vol. 134, pp. 109–124.

Caire, Dean. (2004) "Building Credit Scorecards for Small-Business Lending in Developing Markets", link of 19 July 2020.

_____; and Mark Schreiner. (2012) "Cross-Tab Weighting for Credit Scorecards in Developing Markets", link of 19 July 2020.

Coady, David; Grosh, Margaret; and John Hoddinott. (2004) *Targeting of Transfers in Developing Countries*, link of 19 July 2020.

Dawes, Robyn M. (1979) "The Robust Beauty of Improper Linear Models in Decision Making", *American Psychologist*, Vol. 34, No. 7, pp. 571–582.

Diamond, Alexis; Gill, Michael; Rebolledo Dellepiane, Miguel Angel; Skoufias, Emmanuel; Vinha, Katja; and Yiqing Xu. (2016) "Estimating Poverty Rates in Target Populations: An Assessment of the Simple Poverty Scorecard and Alternative Approaches", World Bank Policy Research Working Paper No. 7793, link of 19 July 2020.

Dupriez, Olivier. (2018) "An Empirical Comparison of Machine-Learning Classification Algorithms", link of 19 July 2020.

Grosh, Margaret; and Judy L. Baker. (1995) "Proxy-Means Tests for Targeting Social Programs: Simulations and Speculation", World Bank LSMS Working Paper No. 118, link of 19 July 2020.

Hammond, Allen L.; Kramer, William J.; Katz, Robert S.; Tran, Julia T.; and Courtland Walker. (2007) *The Next 4 Billion: Market Size and Business Strategy at the Base of the Pyramid*, link of 19 July 2020.

Hand, David J. (2006) "Classifier Technology and the Illusion of Progress", *Statistical Science*, Vol. 22, No. 1, pp. 1–15.

Haslett, Stephen. (2012) "Practical Guidelines for the Design and Analysis of Sample Surveys for Small-Area Estimation", *Journal of the Indian Society of Agricultural Statistics*, Vol. 66, No. 1, pp. 203–212.

Hoadley, Bruce; and Robert M. Oliver. (1998) “Business Measures of Scorecard Benefit”, *IMA Journal of Mathematics Applied in Business and Industry*, Vol. 9, pp. 55–64.

IRIS Center. (2007) “Manual for the Implementation of USAID Poverty-Assessment Tools”, link of 19 July 2020.

Jolliffe, Dean; and Espen Beer Prydz. (2016) “Estimating International Poverty Lines from Comparable National Thresholds”, *Journal of Economic Inequality*, Vol. 14, pp. 185–198.

Kolesar, Peter; and Janet L. Showers. (1985) “A Robust Credit-Screening Model Using Categorical Data”, *Management Science*, Vol. 31, No. 2, pp. 124–133.

Lovie, Alexander D.; and Patricia Lovie. (1986) “The Flat-Maximum Effect and Linear Scoring Models for Prediction”, *Journal of Forecasting*, Vol. 5, pp. 159–168.

Matul, Michal; and Sean Kline. (2003) “Scoring Change: Prizma’s Approach to Assessing Poverty”, Microfinance Centre for Central and Eastern Europe and the New Independent States Spotlight Note No. 4, link of 19 July 2020.

Myers, James H.; and Edward W. Forgy. (1963) “The Development of Numerical Credit-Evaluation Systems”, *Journal of the American Statistical Association*, Vol. 58, No. 303, pp. 779–806.

Narayan, Ambar; and Nobuo Yoshida. (2005) “Proxy-Means Tests for Targeting Welfare Benefits in Sri Lanka”, World Bank Report No. SASPR–7, link of 19 July 2020.

Navajas, Sergio; Schreiner, Mark; Meyer, Richard L.; Gonzalez-Vega, Claudio; and Jorge Rodriguez-Meza. (2000) “Microfinance and the Poorest of the Poor: Theory and Evidence from Bolivia”, *World Development*, Vol. 28, No. 2, pp. 333–346.

Ravallion, Martin. (2009) “How Relevant Is Targeting to the Success of an Anti-Poverty Program?”, *World Bank Research Observer*, Vol. 24, No. 2, pp. 205–231.

Rutstein, Shea Oscar; and Kiersten Johnson. (2004) “The DHS Wealth Index”, DHS Comparative Reports No. 6, link of 19 July 2020.

Schreiner, Mark. (2020) “Scorocs Simple Poverty Scorecard Tool: Uganda”, link of 19 July 2020.

_____. (2016) “Popular Science”, link of 19 July 2020.

_____. (2015a) “Scorocs Simple Poverty Scorecard Tool: Cambodia”, link of 19 July 2020.

_____. (2015b) “There’s No Place Like Home? How the Interview Method Affects Results with the Progress out of Poverty Index®”, link of 19 July 2020.

_____. (2014) “The Process of Poverty-Scoring Analysis”, link of 19 July 2020.

_____. (2013) “Scorocs Simple Poverty Scorecard Tool: Bangladesh”, link of 19 July 2020.

_____. (2012) “An Expert-Based Poverty Scorecard for Rural China”, link of 19 July 2020.

_____. (2009) “Scorocs Simple Poverty Scorecard Tool: Cambodia”, link of 19 July 2020.

_____. (2006) “Is One Simple Poverty Scorecard Enough for India?”, link of 19 July 2020.

_____. (2005a) “La Herramienta del Índice de Calificación de la Pobreza™ de Scorocs: México”, link of 19 July 2020.

_____. (2002) *Scoring: The Next Breakthrough in Microfinance?* CGAP Occasional Paper No. 7, link of 19 July 2020.

_____. (1997) *A Framework for the Analysis of the Performance and Sustainability of Subsidized Microfinance Organizations with Application to BancoSol of Bolivia and the Grameen Bank of Bangladesh*, link of 19 July 2020.

_____; Matul, Michal; Pawlak, Ewa; and Sean Kline. (2014) “Poverty Scoring: Lessons from a Microlender in Bosnia-Herzegovina”, *Poverty and Public Policy*, Vol. 6, No. 4, pp. 407–428.

Sharif, Iffath Anwar. (2009) “Building a Targeting System for Bangladesh Based on Proxy-Means Testing”, World Bank Social Protection Discussion Paper No. 0914, link of 19 July 2020.

Stillwell, William G.; Barron, F. Hutton; and Ward Edwards. (1983) “Evaluating Credit Applications: A Validation of Multi-Attribute Utility-Weight Elicitation Techniques”, *Organizational Behavior and Human Performance*, Vol. 32, pp. 87–108.

Tarozzi, Alessandro; and Angus Deaton. (2009) “Using Census and Survey Data to Estimate Poverty and Inequality for Small Areas”, *Review of Economics and Statistics*, Vol. 91, No. 4, pp. 773–792.

Toohig, Jeff. (2008) “PPI® Pilot Training Guide”, link of 19 July 2020.

Wainer, Howard. (1976) “Estimating Coefficients in Linear Models: It Don’t Make No Nevermind”, *Psychological Bulletin*, Vol. 83, pp. 223–227.

World Bank. (2017) “What is New”, October 10, link of 19 July 2020.

_____. (2015) “Purchase Power Parities and the Real Size of World Economies”, link of 19 July 2020.

_____. (2013) “Shared Prosperity: A New Goal for a Changing World”, link of 19 July 2020.

_____. (2012) *Targeting Poor and Vulnerable Households in Indonesia*, link of 19 July 2020.

_____. (2008) “Global Purchasing Power Parities and Real Expenditures”, link of 19 July 2020.

Zeller, Manfred. (2004) “Review of Poverty Assessment Tools”, link of 19 July 2020.