Simple Poverty Scorecard®
Nepal

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This document is available at `SimplePovertyScorecard.com`

Abstract

The Simple Poverty Scorecard® uses 10 low-cost indicators from Nepal's 2010 Living Standards Survey to estimate the likelihood that a household has consumption below a given poverty line. Field workers can collect responses in about ten minutes. The scorecard's accuracy is reported for a range of poverty lines. The scorecard is a practical way for pro-poor programs in Nepal to measure poverty rates, to track changes in poverty rates over time, and to segment clients for differentiated treatment.

Version note

This paper uses 2010 data and Nepal's new definition of *poverty*. It replaces Caire *et al.* (2009), which uses 2003/4 data and Nepal's previous definition of *poverty*. The new 2010 scorecard here and its new-definition poverty lines should be used from now on. Existing users can still measure change over time using "legacy" poverty lines with a baseline from the 2003/4 scorecard and a follow-up from the 2010 scorecard.

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Simple Poverty Scorecard®

			Name	Identifier
Interview ID:				
Interview date:		Participant:		
Country:	NPL	Field agent:		
Scorecard:	002	Service point:		
Sampling wgt.:		Number of household members:		

Indicator	Response	Points	Score
1. How many household members are there?	A. Eight or more	0	
	B. Seven	6	
	C. Six	8	
	D. Five	12	
	E. Four	19	
	F. Three	30	
	G. One or two	34	
2. In what type of job did the male head/spouse work the most hours in the past seven days?	A. No male head/spouse	0	
	B. Does not work, or paid wages on a daily basis or contract/piece-rate in agriculture	0	
	C. Paid wages on a daily basis or contract/piece-rate in non-agriculture	4	
	D. Self-employed in agriculture	5	
	E. Self-employed in non-agriculture	7	
	F. Paid wages on a long-term basis in agriculture or non-agriculture	8	
3. How many bedrooms does your residence have?	A. None	0	
	B. One	2	
	C. Two	7	
	D. Three or more	11	
4. Main construction material of outside walls?	A. Bamboo/leaves, unbaked bricks, wood, mud-bonded bricks/stones, or no outside walls	0	
	B. Cement-bonded bricks/stones, or other material	6	
5. Main material roof is made of?	A. Straw/thatch, or earth/mud	0	
	B. Tiles/slate, or other	2	
	C. Wood/planks, or galvanized iron	6	
	D. Concrete/cement	7	
6. Does your residence have a kitchen?	A. No	0	
	B. Yes	5	
7. What type of stove does your household mainly use for cooking?	A. Open fireplace, mud, kerosene stove, or other	0	
	B. Gas stove, or smokeless oven	3	
8. What type of toilet is used by your household?	A. None, household non-flush, or communal latrine	0	
	B. Household flush	6	
9. How many telephone sets/cordless/mobile does your household own?	A. None	0	
	B. One	8	
	C. Two or more	14	
10. Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, is any of it irrigated?	A. No	0	
	B. Yes, but none irrigated	3	
	C. Yes, and some irrigated	6	

Score:

Back-Page Worksheet:
Members of the Household

Write down the name and identification number of the client and of yourself as the enumerator, as well as the service point that the client uses and the service point from which you work. Record the date of the interview and the date when the client first participated with the organization. Then read to the respondent:

Please tell me the names of all members of your household. Someone is a household member *if he or she currently lives with the other household members (and has done so for at least six of the past 12 months or intends to do so for at least six months), eats with the other household members, and shares income and expenses with the other household members.*

Write down the first names of all household members. Then write the total number of members in the scorecard header next to "# Household members:" and circle the response to the first indicator.

Keep in mind the full definition of *household member* in the "Guidelines for the Interpretation of Scorecard Indicators".

Name
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.
Total number of members:

Look-up table for converting scores to new-definition poverty likelihoods

	Poverty likelihood (%), new-definition lines							
		National			USAID	Intl. 2005 PPP		
Score	Food	100%	150%	200%	'Extreme'	$1.25	$2.00	$2.50
0–4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
5–9	38.9	100.0	100.0	100.0	66.3	100.0	100.0	100.0
10–14	32.3	77.8	100.0	100.0	45.6	82.1	100.0	100.0
15–19	20.7	64.6	92.7	100.0	41.4	67.5	95.2	100.0
20–24	14.6	59.3	91.2	99.4	32.7	64.8	95.0	99.6
25–29	9.3	49.8	85.1	96.2	25.0	58.4	90.9	98.1
30–34	7.4	38.9	78.0	94.7	20.9	45.1	84.6	96.9
35–39	3.9	25.9	68.3	90.6	9.3	31.2	77.9	92.8
40–44	2.0	17.7	57.3	84.5	5.6	21.6	69.8	86.9
45–49	0.0	9.6	44.6	74.9	2.8	12.7	58.6	80.4
50–54	0.0	5.3	32.5	61.7	1.8	6.4	44.5	65.5
55–59	0.0	3.5	25.2	53.5	0.9	4.6	36.4	57.7
60–64	0.0	1.8	12.3	36.0	0.0	2.3	17.7	42.3
65–69	0.0	0.4	8.2	27.1	0.0	0.8	14.0	34.0
70–74	0.0	0.2	4.6	16.8	0.0	0.4	7.7	19.4
75–79	0.0	0.0	1.8	7.8	0.0	0.3	4.5	9.6
80–84	0.0	0.0	0.9	5.2	0.0	0.2	1.5	7.2
85–89	0.0	0.0	0.0	0.7	0.0	0.0	0.0	3.2
90–94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Look-up table for converting scores to legacy-definition poverty likelihoods

	Poverty likelihood (%), legacy-definition lines		
	National	Intl. 2005 PPP	
Score	**100%**	**$1.25**	**$2.50**
0–4	100.0	100.0	100.0
5–9	65.0	92.2	100.0
10–14	60.3	91.1	100.0
15–19	46.5	75.5	100.0
20–24	36.3	72.2	100.0
25–29	25.9	65.9	98.8
30–34	16.6	55.4	97.8
35–39	8.7	42.9	94.2
40–44	5.7	28.4	89.9
45–49	1.2	16.2	80.9
50–54	0.5	9.2	71.8
55–59	0.2	2.7	56.0
60–64	0.0	1.7	41.0
65–69	0.0	0.0	29.2
70–74	0.0	0.0	14.0
75–79	0.0	0.0	5.5
80–84	0.0	0.0	2.1
85–89	0.0	0.0	0.0
90–94	0.0	0.0	0.0
95–100	0.0	0.0	0.0

Note on measuring changes in poverty rates over time using legacy lines with the 2003/4 and 2010 scorecards

This paper uses data from the 2010 NLSS and Nepal's new definition of *poverty*. It replaces Caire *et al.* (2009), which uses 2003/4 data and Nepal's previous definition of *poverty*. The new 2010 scorecard here should be used from now on.

Some organizations in Nepal already use the 2003/4 scorecard. Even after switching to the new 2010 scorecard here, these legacy users can still measure changes in poverty rates over time with existing baseline estimates from the 2003/4 scorecard and follow-up estimates from the 2010 scorecard. This can be done because the 2010 scorecard is calibrated not only to new-definition poverty lines but also to "legacy" poverty lines that use Nepal's previous definition of *poverty*. Hybrid estimates of change based on the two scorecards are valid as long as they use a legacy line.[1] It is not known whether hybrid estimates of change will be compatible with future estimates of change based solely on new-definition lines and the 2010 scorecard.

In sum, both first-time and legacy users should use the new 2010 scorecard and the new-definition poverty lines. Looking forward, this establishes a baseline with the best, most policy-relevant poverty lines. Looking backward, legacy users can still salvage existing estimates when measuring change in poverty rates over time.

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[1] Scores for the 2003/4 scorecard are converted to poverty likelihoods via look-up tables in Caire *et al.* (2009). Scores for the 2010 scorecard use look-up tables in this paper. For the example of the legacy $1.25/day line, poverty likelihoods for scores from the 2003/4 scorecard come from the look-up table on p. 110 of Caire *et al.* (2009). For the 2010 scorecard and this line, the relevant look-up table is on p. 168 of this paper. For legacy lines, the two scorecards' poverty likelihoods—but not their scores—are comparable.

Simple Poverty Scorecard®
Nepal

1. Introduction

This paper presents the Simple Poverty Scorecard®. Pro-poor programs in Nepal can use it to estimate the likelihood that a household has consumption below a given poverty line, to estimate a population's poverty rate at a point in time, to track changes in a population's poverty rate over time, and to segment participants for differentiated treatment.

The direct approach to poverty measurement via consumption surveys is difficult and costly. As a case in point, Nepal's 2010 Living Standards Survey (NLSS) runs about 70 pages. In addition to hundreds of non-consumption items, enumerators asked about 200 consumption items, many with multiple sub-items. An example consumption item is, "How many days has the household consumed fine rice in the past seven days? How much fine rice did your household consume in the past seven days? What was the value of this fine rice consumed? What was the main source of this fine rice? Now then, how many days has the household consumed coarse rice in the past seven days? . . ."

In comparison, the indirect approach via poverty scoring is simple, quick, and inexpensive. It uses ten verifiable indicators (such as "How many bedrooms does your residence have?" and "What type of stove does your household mainly use for

cooking?") to get a score that is highly correlated with poverty status as measured by the exhaustive NLSS survey.

The Simple Poverty Scorecard® differs from "proxy means tests" (Coady, Grosh, and Hoddinott, 2004) in that it is transparent, it is freely available, and it is tailored to the capabilities and purposes not of national governments but rather of local, pro-poor organizations. The feasible poverty-measurement options for local organizations are typically blunt (such as rules based on land-ownership or housing quality) or subjective and relative (such as participatory wealth ranking facilitated by skilled field workers). Estimates from these approaches may be costly, their accuracy is unknown, and they are not comparable across places, organizations, nor time.

Poverty scoring can be used to measure the share of a program's participants who live in households whose per-capita consumption is below a given poverty line, for example, the Millennium Development Goals' $1.25/day line at 2005 purchase-power parity (PPP). USAID microenterprise partners can use scoring with the new-definition $1.25/day line to report how many of their participants are "very poor".[2] Scoring can also be used to measure net movement across a poverty line over time. In all these cases, the Simple Poverty Scorecard® provides a consumption-based, objective tool with known accuracy. While consumption surveys are costly even for governments, some

[2] USAID defines a household as "very poor" if its daily per-capita consumption is below the highest of the new-definition $1.25/day 2005 PPP line (NPR55.43 in Nepal in 2010, Figure 1) or the new-definition USAID "extreme" line that divides people in households below Nepal's new-definition national poverty line into two equal-size groups (NPR42.84).

local pro-poor organizations may be able to implement an inexpensive poverty-assessment tool to help with monitoring and (if desired) targeting.

The statistical approach here aims to be understood by non-specialists. After all, if managers are to adopt poverty scoring on their own and apply it to inform their decisions, then they must first trust that it works. Transparency and simplicity build trust. Getting "buy-in" matters; proxy means tests and regressions on the "determinants of poverty" have been around for three decades, yet they are rarely used to inform decisions by local, pro-poor organizations. This is not because they do not work, but because they are presented (when they are presented at all) as tables of regression coefficients incomprehensible to non-specialists (with cryptic indicator names such as "`LGHHSZ_2`" and with points with negative values and many decimal places). Thanks to the predictive-modeling phenomenon known as the "flat maximum", simple scoring approaches can be about as accurate as complex ones (Schreiner, 2012a; Caire and Schreiner, 2012).

Beyond its simplicity and transparency, the Simple Poverty Scorecard®'s technical approach is innovative in how it associates scores with poverty likelihoods, in the extent of its accuracy tests, and in how it derives formulas for standard errors. Although these accuracy tests are simple and commonplace in statistical practice and in the for-profit field of credit-risk scoring, they have rarely been applied to poverty-assessment tools.

The scorecard is based on data from the 2010 NLSS from Nepal's Central Bureau of Statistics (CBS). Indicators are selected to be:

- Inexpensive to collect, easy to answer quickly, and simple to verify
- Strongly correlated with poverty
- Liable to change over time as poverty status changes
- Applicable in all regions of Nepal

All points in the scorecard are non-negative integers, and total scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). Non-specialists can collect data and tally scores on paper in the field in about ten minutes.

Poverty scoring can be used to estimate three basic quantities. First, it can estimate a particular household's *poverty likelihood*, that is, the probability that the household has per-capita consumption below a given poverty line.

Second, poverty scoring can estimate the poverty rate of a group of households at a point in time. This is the average poverty likelihood of households in the group.

Third, poverty scoring can estimate changes in the poverty rate for a group of households (or for two independent samples of households that are both representative of the same population) between two points in time. This is the baseline/follow-up change in the average poverty likelihood of the group(s).

Poverty scoring can also be used for targeting or segmentation. To help managers choose an appropriate score cut-off for their purposes, this paper reports several measures of accuracy for a range of possible cut-offs.

This paper presents a single scorecard whose indicators and points are derived from household consumption data and Nepal's new-definition national poverty line. Scores from this one scorecard are calibrated to poverty likelihoods for eight new-definition poverty lines and three legacy poverty lines.[3]

The scorecard is constructed and calibrated using half of the data from the 2010 NLSS. The other half is used to validate the scorecard's accuracy for estimating households' poverty likelihoods, for estimating groups' poverty rates at a point in time, and for targeting.

All three scoring estimators are *unbiased*. That is, they match the true value on average in repeated samples when constructed from (and applied to) a single, unchanging population at a point in time. Like all predictive models, the specific scorecard here is constructed from a single sample and so misses the mark to some unknown extent when applied to a different population or when applied after 2010.[4]

Thus, while the indirect scoring approach is less costly than the direct survey approach, it is also biased when applied in practice. (The survey approach is unbiased by definition.) There is bias because the scorecard must assume that the future relationships between indicators and poverty in all possible groups of households will be the same as in the construction data. Of course, this assumption—inevitable in predictive modeling—holds only partly.

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[3] Section 2 below discusses the new and legacy definitions of *poverty*.

[4] Important examples include nationally representative samples at a different point in time or sub-groups that are not nationally representative (Tarozzi and Deaton, 2009).

When applied to the validation sample with 1,000 bootstraps of $n = 16{,}384$, the average difference between scorecard estimates of groups' poverty rates and the true rates at a point in time with the new-definition national line is +0.4 percentage points. The average absolute difference across all 11 new-definition and legacy lines is about 0.8 percentage points, and the maximum absolute difference is 1.5 percentage points. These differences are due to sampling variation rather than bias; the average difference would be zero if the whole 2010 NLSS were to be repeatedly redrawn and divided into subsamples before repeating the entire process of constructing and validating scorecards.

The 90-percent confidence intervals for these estimates are ±0.5 percentage points or less. For $n = 1{,}024$, the 90-percent intervals are ±2.2 percentage points or less.

Section 2 below describes data and poverty definitions. Sections 3 and 4 describe scorecard construction and offer guidelines for use in practice. Sections 5 and 6 detail the estimation of households' poverty likelihoods and of groups' poverty rates at a point in time. Section 7 discusses estimating changes in poverty rates over time, and Section 8 covers targeting. Section 9 places the scorecard here in the context of similar exercises for Nepal. The last section is a summary.

2. Data and poverty lines

This section discusses the data used to construct and validate the Simple Poverty Scorecard®. It also documents the poverty definitions to which scores are calibrated.

2.1 Data

The scorecard is based on data from the 5,988 households in the 2010 NLSS fielded by Nepal's CBS from the first week of April 2010 to the first week of February 2011. This is Nepal's most recent national consumption survey.

For the purposes of poverty scoring, the households in the 2010 NLSS are randomly divided into two sub-samples:

- *Construction and calibration* for selecting indicators and points and for associating scores with poverty likelihoods
- *Validation* for measuring accuracy with data not used in construction or calibration

2.2 Poverty rates

A *poverty rate* is the share of units in households in which total household consumption (divided by the number of household members) is below a given poverty line. The unit is either the household itself or a person in the household. Each household member has the same poverty status (or estimated poverty likelihood) as does the household as a whole.

Suppose a program serves two households. The first household is poor (its per-capita consumption is less than a given poverty line), and it has three members, one of whom is a program participant. The second household is non-poor and has four members, two of whom are program participants.

Poverty rates are either at the household-level or person-level. If the program defines its *participants* as households, then the household level is relevant. The estimated household-level poverty rate is the equal-weighted average of poverty statuses (or estimated poverty likelihoods) across households with participants. In the example here, this is $\frac{1 \cdot 1 + 1 \cdot 0}{1 + 1} = \frac{1}{2} = 0.5 = 50$ percent. In the "$1 \cdot 1$" term in the numerator, the first "1" is the first household's weight, and the second "1" is the first household's poverty status (poor). In the "$1 \cdot 0$" term in the numerator, the "1" is the second household's weight, and the "0" is the second household's poverty status (non-poor). The "$1 + 1$" in the denominator is the sum of the weights of the two households. Each household has a weight of one (1) because the unit of analysis is the household.

Alternatively, a person-level rate is relevant if a program defines all people in households that benefit from its services as *participants*. In the example here, the person-level rate is the household-size-weighted average of poverty statuses for households with participants, or $\frac{3 \cdot 1 + 4 \cdot 0}{3 + 4} = \frac{3}{7} = 0.43 = 43$ percent. In the "$3 \cdot 1$" term in the numerator, the "3" is the first household's weight because it has three members, and the "1" is its poverty status (poor). In the "$4 \cdot 0$" term in the numerator, the "4" is

the second household's weight because it has four members, and the zero is its poverty status (non-poor). The "$3 + 4$" in the denominator is the sum of the weights of the two households. A household's weight is its number of members because the unit of analysis is the household member.

As a final example—one that pertains to what is likely the most common situation in practice—a program counts as *participants* only those household members with whom it deals with directly. For the example here, this means that some—but not all—household members are counted. The person-level rate is now the participant-weighted average of the poverty statuses of households with participants, or $\frac{1 \cdot 1 + 2 \cdot 0}{1 + 2} = \frac{1}{3} = 0.33 = 33$ percent. The first "1" in the "$1 \cdot 1$" in the numerator is the first household's weight because it has one participant, and the second "1" is its poverty status (poor). In the "$2 \cdot 0$" term in the numerator, the "2" is the second household's weight because it has two participants, and the zero is its poverty status (non-poor). The "$1 + 2$" in the denominator is the sum of the weights of the two households. Each household's weight is its number of participants because the unit of analysis is the participant.

To sum up, estimated poverty rates are weighted averages of households' poverty statuses (or estimated poverty likelihoods), where the weights are the number of relevant units in the household. When reporting, organizations should explain who is counted as a *participant* and why.

Figure 1 reports poverty rates and poverty lines (both new-definition and legacy-definition) for Nepal for both households and people in 2010. Figure 2 is similar, covering each of Nepal's 12 poverty-line regions. Person-level poverty rates are included in Figures 1 and 2 because these are the rates reported by governments and used in most policy discussions. Household-level poverty rates are also reported because—as discussed above—household-level poverty likelihoods can be straightforwardly converted into poverty rates for other units of analysis. This is also the reason why the Simple Poverty Scorecard® is constructed, calibrated, and validated with household weights.

2.3 Poverty status, consumption, and poverty lines

Poverty status is whether a household is poor or non-poor. It is determined by whether per-capita aggregate household consumption is less than a poverty line. Thus, the definition of *poverty status* has two elements: a poverty line, and a way to measure household consumption.

Two definitions of *poverty status* have been applied to Nepal's 2010 NLSS. The "legacy" definition was used with the 1995/6 and 2003/4 NLSS (CBS, 2005). As a shorthand, this definition is referred to as *legacy lines*, even though the definition covers both consumption and poverty lines.

The second definition of *poverty status*—called here *new-definition lines*—improves aspects of the legacy lines to fit better with international good practice (CBS, no date; CBS and World Bank, no date).

Both the legacy-definition lines and the new-definition lines were applied to both the 2003/4 NLSS and the 2010 NLSS to produce two distinct—but internally consistent—estimates of changes in poverty rates over time. From now on, Nepal plans to use only the new-definition lines.

The scorecard here is constructed with the new-definition national line and calibrated both to new-definition lines and to legacy lines. This permits existing users of the 2003/4 scorecard in Caire *et al.* (2009) to switch to the new 2010 scorecard here without having to start over from scratch when measuring change over time, and it allows the use of the higher-quality new-definition lines from now on.

2.3.1 New-definition lines

Nepal's new-definition lines are based on Ravallion's (1988) cost-of-basic-needs method. It starts with a per-capita "food" line that is the cost of a food basket providing 2,200 Calories (CBS, no date; CBS and World Bank, no date). The shares of the items in the food basket are those observed—based on a seven-day recall period—in the 2010 NLSS for households who per-capita food-plus-non-food consumption falls in the 10^{th} to 50^{th} percentiles. The cost of the food basket is adjusted to reflect price differences—derived from the 2010 NLSS—across twelve poverty-line regions. For Nepal as a whole, the new-definition food line is NP32.68 per person per day, giving a household-level poverty rate of 4.1 percent and a person-level poverty rate of 5.3 percent (Figure 1).

The new-definition food-plus-non-food line (called here the "new-definition national line", or "100% of the new-definition national line") is the new-definition food line, plus the cost of non-food necessities. For a given poverty-line region, this is taken as the new-definition food line, plus the amount of non-food consumption observed in the 2010 NLSS for households whose total (food-plus-non-food) per-capita consumption is within 10 percent of the new-definition food line, with smaller weights for households further from the line. For Nepal overall, this new-definition national line is NPR52.77 per person per day, giving poverty rates of 20.0 percent (households) and 25.2 percent (people, Figure 1).

2.3.2 Legacy-definition lines

Of the nine poverty lines in Caire *et al.* (2009), only three "legacy" lines are calibrated to the new scorecard here: the national line, $1.25/day 2005 PPP, and $2.50/day. The other six lines from Caire *et al.* are not relevant because:

- The food line is so low that almost no households are below it
- The USAID "extreme" line is relative, so its estimates of change do not make sense
- Lines based on 1993 PPP have been superceded by lines based on 2005 PPP
- The $3.75/day 2005 PPP line is so high that almost all households are below it

Nepal's legacy-definition lines are like the new-definition lines, except for a few small things and four larger differences (CBS and World Bank, no date):

- The food-item recall period is "a typical month" instead of the "last seven days"
- There are six poverty-line regions instead of twelve
- The daily caloric benchmark is 2,124 instead of 2,200
- The method of estimating the rental value of owner-occupied housing is cruder

In the 2010 NLSS, the legacy national line is NPR39.22 per person per day, giving a household-weighted poverty rate of 9.5 percent and a person-weighted poverty rate of 12.5 percent (Figure 1). For the legacy $1.25/day 2005 PPP line, poverty rates are 27.7 percent (households) and 34.5 percent (people).

2.4 Additional poverty lines

Because local, pro-poor programs in Nepal may want to use different or various poverty lines, this paper calibrates scores from its single scorecard to poverty likelihoods for eight new-definition lines and three legacy lines:

- New-definition food
- 100% of new-definition national
- 150% of new-definition national
- 200% of new-definition national
- New-definition USAID "extreme"
- New-definition $1.25/day 2005 PPP
- New-definition $2.00/day 2005 PPP
- New-definition $2.50/day 2005 PPP
- 100% of legacy-definition national
- Legacy-definition $1.25/day 2005 PPP
- Legacy-definition $2.50/day 2005 PPP

The new-definition USAID "extreme" line is defined as the median per-capita consumption of people (not households) in a given poverty-line region who are below that region's new-definition national line (United States Congress, 2004).

The new-definition and legacy-definition \$1.25/day 2005 PPP lines are derived from:

- 2005 PPP exchange rate of NPR26.47 per \$1.00 (World Bank, 2008)
- Consumer Price Index for Nepal of:[5]
  - — Average in 2005: 120.2863
  - — First week of April 2010 to first week of February 2011 (during NLSS fieldwork): 201.5102
- Average all-Nepal new-definition national line (Figure 1): NPR52.77
- Average all-Nepal legacy-definition national line (Figure 1): NPR39.22
- New-definition national line for each of twelve new-definition poverty-line regions (Figure 2)
- Legacy-definition national line for each of twelve new-definition poverty-line regions (Figure 2)

Using the formula from Sillers (2006), the all-Nepal new-definition \$1.25/day 2005 PPP line (which is the same as the all-Nepal legacy-definition \$1.25/day line) is:

$$\left(\text{2005 PPP exchange rate}\right) \cdot \$1.25 \cdot \left(\frac{\text{CPI}_{\text{Apr.'10 to Feb.'11}}}{\text{CPI}_{2005}}\right) =$$

$$\left(\frac{\text{NPR26.47}}{\$1.00}\right) \cdot \$1.25 \cdot \left(\frac{201.5102}{120.2863}\right) = \text{NPR55.43}.$$

These lines applies to Nepal as a whole. At the household level, the new-definition \$1.25/day line is adjusted for cost-of-living differences across poverty-line regions by multiplying the all-Nepal new-definition \$1.25/day line by a given poverty-line region's new-definition national line and then dividing it by the all-Nepal new-definition national line. The legacy-definition \$1.25/day line is likewise adjusted across poverty-line regions using the regional legacy-definition national lines and the all-Nepal

[5] The CPI is spliced together from several series in issues of Nepal's *Quarterly Economic Bulletin*, `red.nrb.org.np/publications/economic_bulletin`, retreived 10 April 2013.

legacy-definition national line. Thus, the average all-Nepal $1.25/day lines are identical under the new definition and the legacy definition, but they differ by poverty-line region.

USAID microenterprise partners who use the Simple Poverty Scorecard® to report poverty rates to USAID should use the new-definition $1.25/day 2005 PPP line. This is because USAID defines "very poor" as those households whose consumption is below the highest of two lines:

- New-definition $1.25/day 2005 PPP (NPR55.43, Figure 1)
- New-definition USAID "extreme" line (NPR42.84).

3. Scorecard construction

For Nepal, about 110 candidate indicators are initially prepared in the areas of:

- Family composition (such as the number of household members)
- Education (such as school attendance)
- Housing (such as the number of bedroomss)
- Ownership of durable assets (such as stoves)
- Employment (such as the main type of job done by the male head/spouse)
- Agriculture (such as the use or ownership of irrigated agricultural land)

Figure 3 lists the candidate indicators, ordered by the entropy-based "uncertainty coefficient" (Goodman and Kruskal, 1979) that measures how well a given indicator predicts poverty on its own.

The scorecard also aims to measure *changes* in poverty through time. This means that, when selecting indicators and holding other considerations constant, preference is given to more sensitive indicators. For example, the ownership of a telephone is probably more likely to change in response to changes in poverty than is the age of the male head/spouse.

The scorecard itself is built using the new-definition national poverty line and Logit regression on the construction sub-sample. Indicator selection uses both judgment and statistics. The first step is to use Logit to build one scorecard for each candidate indicator. Each scorecard's power to rank households by poverty status is measured as "c" (SAS Institute Inc., 2004).

One of these one-indicator scorecards is then selected based on several factors (Schreiner *et al.*, 2004; Zeller, 2004). These include improvement in accuracy, likelihood of acceptance by users (determined by simplicity, cost of collection, and "face validity" in terms of experience, theory, and common sense), sensitivity to changes in poverty, variety among indicators, applicability across regions, relevance for distinguishing among households at the poorer end of the consumption distribution, and verifiability.

A series of two-indicator scorecards are then built, each based on the one-indicator scorecard selected from the first round, with a second candidate indicator added. The best two-indicator scorecard is then selected, again based on "c" and judgment about how to best balance the non-statistical criteria. These steps are repeated until the scorecard has 10 indicators that work well together.

The final step is to transform the Logit coefficients into non-negative integers such that total scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line).

This algorithm is similar to the common R^2-based stepwise least-squares regression. It differs from naïve stepwise in that the selection of indicators considers both statistical[6] and non-statistical criteria. The non-statistical criteria can improve robustness through time and helps ensure that indicators are simple, sensible, and acceptable to users.

[6] The statistical criterion for selecting an indicator is not the p value of its coefficient but rather its contribution to the ranking of households by poverty status.

The single scorecard here applies to all of Nepal. Evidence from Indonesia (World Bank, 2012), Bangladesh (Sharif, 2009), India and Mexico (Schreiner, 2006 and 2005a), Sri Lanka (Narayan and Yoshida, 2005), and Jamaica (Grosh and Baker, 1995) suggests that segmenting poverty-assessment tools by urban/rural does not improve targeting accuracy much, although segmentation in general may improve the bias and precision of estimates of poverty rates (Tarozzi and Deaton, 2009).

4. Practical guidelines for scorecard use

The main challenge of scorecard design is not to maximize statistical accuracy but rather to improve the chances that the scorecard is actually used (Schreiner, 2005b). When scoring projects fail, the reason is not usually statistical inaccuracy but rather the failure of an organization to decide to do what is needed to integrate scoring in its processes and to train and convince its employees to use it properly (Schreiner, 2002). After all, most reasonable scorecards have similar targeting accuracy, thanks to the empirical phenomenon known as the "flat maximum" (Caire and Schreiner, 2012; Hand, 2006; Baesens *et al.*, 2003; Lovie and Lovie, 1986; Kolesar and Showers, 1985; Stillwell, Barron, and Edwards, 1983; Dawes, 1979; Wainer, 1976; Myers and Forgy, 1963). The bottleneck is less technical and more human, not statistics but organizational-change management. Accuracy is easier to achieve than adoption.

The scorecard here is designed to encourage understanding and trust so that users will want to adopt it and use it properly. Of course, accuracy matters, but it is balanced against simplicity, ease-of-use, and "face validity". Programs are more likely to collect data, compute scores, and pay attention to the results if, in their view, scoring does not imply a lot of additional work and if the whole process generally seems to make sense.

To this end, Nepal's scorecard fits on one page. The construction process, indicators, and points are simple and transparent. Additional work is minimized; non-specialists can compute scores by hand in the field because the scorecard has:

- Only 10 indicators
- Only categorical indicators
- Only simple weights (non-negative integers, and no arithmetic beyond addition)

The scorecard (and its back-page worksheet) is ready to be photocopied. A field worker using Nepal's paper scorecard would:

- Record the names and identifiers of the participant, the field worker, and the relevant organizational service point
- Record the date that the participant first participated with the organization
- Record the date of the scorecard interview
- Complete the back-page worksheet with each household member's name
- Based on the back-page worksheet, record household size and the response to the first indicator
- Read each of the remaining nine questions one-by-one from the scorecard, drawing a circle around the relevant response options and their points, and writing the points' values in the far right-hand column
- Add up the points to get the total score, and write it down at the bottom
- Implement targeting policy (if any)
- Deliver the paper scorecard to a central office for data entry and filing

Of course, field workers must be trained. The quality of outputs depends on the quality of inputs. If organizations or field workers gather their own data and believe that they have an incentive to exaggerate poverty rates (for example, if funders reward them for higher poverty rates), then it is wise to do on-going quality control via data review and random audits (Matul and Kline, 2003).[7] IRIS Center (2007a) and Toohig

[7] If a program does not want field workers to know the points associated with indicators, then it can use a version of the scorecard that does not display the points

(2008) are useful nuts-and-bolts guides for budgeting, training field workers and supervisors, logistics, sampling, interviewing, piloting, recording data, and controlling quality.

In particular, while collecting scorecard indicators is relatively easier than alternative ways of measuring poverty, it is still absolutely difficult. Training and explicit definitions of terms and concepts in the scorecard are essential, and field workers should scrupulously study and follow the "Guidelines for the Interpretation of Indicators" found in this paper just after the reference section, as these guidelines are an integral part of the Simple Poverty Scorecard®.[8]

For the example of Nigeria, Onwujekwe, Hanson, and Fox-Rushby (2006) find distressingly low inter-rater and test-retest correlations for indicators as seemingly simple as whether the household owns an automobile. At the same time, Grosh and Baker (1995) find that gross underreporting of assets does not affect targeting. For the first stage of targeting in a conditional cash-transfer program in Mexico, Martinelli and Parker (2007, pp. 24–25) find that "underreporting [of asset ownership] is widespread but not overwhelming, except for a few goods . . . [and] overreporting is common for a

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and then apply the points and compute scores later at a central office. Schreiner (2012b) argues that hiding points in Colombia (Camacho and Conover, 2011) did little to deter cheating and that—in any case—cheating by the user's central office was more damaging than cheating by field agents and respondents. Even if points are hidden, field workers and respondents still know which response options are associated with greater poverty.

[8] The guidelines here are the only ones to be imparted to field workers. All other issues of interpretation are to be left to the judgment of the individual field workers and respondents, as this seems to be what Nepal's CBS did when it fielded the 2010 NLSS.

few goods, which implies that self-reporting may lead to the exclusion of deserving households". Still, as is done in Mexico in the second stage of its targeting process, most false self-reports can be corrected (or avoided in the first place) by field agents who make a home visit. This is the suggested procedure if a local, pro-poor organization in Nepal is using the Simple Poverty Scorecard® for targeting.

In terms of sampling design, an organization must make choices about:

- Who will do the scoring
- How scores will be recorded
- What participants will be scored
- How many participants will be scored
- How frequently participants will be scored
- Whether scoring will be applied at more than one point in time
- Whether the same participants will be scored at more than one point in time

In general, the sampling design should follow from the organization's goals for the exercise, the questions to be answered, and the budget.

The non-specialists who apply the scorecard with participants in the field can be:

- Employees of the organization
- Third parties

Responses, scores, and poverty likelihoods can be recorded on:

- Paper in the field, and then filed at a central office
- Paper in the field, and then keyed into a database or spreadsheet at a central office
- Portable electronic devices in the field, and then uploaded to a database

Given a population relevant for a particular business question, the participants to be scored can be:

- All relevant participants (a census)
- A representative sample of relevant participants
- All relevant participants in a representative sample of relevant field offices
- A representative sample of relevant participants in a representative sample of relevant field offices

If not determined by other factors, the number of participants to be scored can be derived from sample-size formulas (presented later) to achieve a desired confidence level and a desired confidence interval.

Frequency of application can be:

- As a once-off project (precluding measuring change)
- Every two years (or at any other time interval, allowing measuring change)
- Each time a field worker visits a participant at home (allowing measuring change)

When a scorecard is applied more than once in order to measure change in poverty rates, it can be applied:

- With a different set of participants
- With the same set of participants

An example set of choices are illustrated by BRAC and ASA, two microfinance titans in Bangladesh (each with more than 7 million participants) who use the Simple Poverty Scorecard® (Schreiner, 2013a). Their design is that loan officers in a random sample of branches score all participants each time they visit a homestead (about once a year) as part of their standard due diligence prior to loan disbursement. They 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. ASA's and BRAC's sampling plans cover 25,000–50,000 participants each.

5. Estimates of household poverty likelihoods

The sum of scorecard points for a household is called the *score*. For Nepal, scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). While higher scores indicate less likelihood of being below a line, the scores themselves have only relative units. For example, cutting the score in half increases the likelihood of being below a given poverty line, but does not double it.

To get absolute units, scores must be converted to *poverty likelihoods*, that is, probabilities of being below a poverty line. This is done via simple look-up tables. For the example of the new-definition national line, scores of 25–29 have a poverty likelihood of 49.8 percent, and scores of 30–34 have a poverty likelihood of 38.9 percent (Figure 4).

The poverty likelihood associated with a score varies by poverty line. For example, scores of 25–29 are associated with a poverty likelihood of 49.8 percent for the new-definition national line but of 58.4 percent for the new-definition $1.25/day 2005 PPP line.[9]

[9] Starting with Figure 4, many figures have 11 versions, one for each of the 11 poverty lines. To keep them straight, they are grouped by poverty line. Single tables pertaining to all lines are placed with the tables for the new-definition national line.

5.1 Calibrating scores with poverty likelihoods

A given score is associated ("calibrated") with a poverty likelihood by defining the poverty likelihood as the share of households in the calibration sub-sample who have the score and who are below a given poverty line.

For the example of the new-definition national line (Figure 5), there are 7,472 (normalized) households in the calibration sub-sample with a score of 25–29. Of these, 3,718 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 25–29 is then 49.8 percent, because 3,718 ÷ 7,472 = 49.8 percent.

To illustrate with the new-definition national line and a score of 30–34, there are 8,342 (normalized) households in the calibration sample, of whom 3,245 (normalized) are below the line (Figure 5). The poverty likelihood for this score is then 3,245 ÷ 8,342 = 38.9 percent.

The same method is used to calibrate scores with estimated poverty likelihoods for the other 10 poverty lines.[10]

Figure 6 shows, for all scores and separately for new-definition and legacy-definition lines, the likelihood that a given household's consumption falls in a range demarcated by two adjacent poverty lines.

[10] To ensure that poverty likelihoods always decrease as scores increase, it is sometimes necessary to average likelihoods iteratively across series of adjacent scores before grouping scores into ranges. This preserves unbiasedness, and it keeps users from balking when sampling variation in score ranges with few households leads to higher scores being linked with higher poverty likelihoods.

For the example of the new-definition lines, the daily per-capita consumption of a household with a score of 25–29 falls in the following ranges with probability:

- 9.3 percent below the food line
- 15.7 percent between the food and USAID "extreme" lines
- 24.8 percent between the USAID "extreme" and 100% of the national lines
- 8.6 percent between 100% of the national and $1.25/day lines
- 26.7 percent between $1.25/day and 150% of the national lines
- 5.8 percent between 150% of the national line and $2.00/day liness
- 5.2 percent between $2.00/day and 200% of the national lines
- 1.9 percent between 200% of the national and $2.50/day lines
- 1.9 percent above $2.50/day

For the legacy-definition lines, the distribution of per-capita consumption for a household with a score of 25–29 is:

- 25.9 percent below 100% of the national line
- 40.1 percent between 100% of the national and $1.25/day lines
- 32.9 percent between $1.25/day and $2.50/day lines
- 1.2 percent above $2.50/day

Even though the scorecard is constructed partly based on judgment related to non-statistical criteria, the calibration process produces poverty likelihoods that are objective, that is, derived from quantitative poverty lines and from survey data on consumption. The calibrated poverty likelihoods would be objective even if the process of selecting indicators and points for the scorecard did not use any data at all. In fact, objective scorecards of proven accuracy are often constructed using only expert judgment to select indicators and points (Fuller, 2006; Caire, 2004; Schreiner *et al.*, 2004). Of course, the scorecard here is constructed with both data and judgment. The fact that this paper acknowledges that some choices in scorecard construction—as in any statistical analysis—are informed by judgment in no way impugns the objectivity of

the poverty likelihoods, as this depends on using data in score calibration, not on using data (and nothing else) in scorecard construction.

Although the points in the Nepal scorecard are transformed coefficients from a Logit regression, (untransformed) scores are not converted to poverty likelihoods via the Logit formula of 2.718281828^{score} x $(1+ 2.718281828^{score})^{-1}$. This is because the Logit formula is esoteric and difficult to compute by hand. Non-specialists find it more intuitive to define the poverty likelihood as the share of households with a given score in the calibration sample who are below a poverty line. Going from scores to poverty likelihoods in this way requires no arithmetic at all, just a look-up table. This approach to calibration can also improve accuracy, especially with large samples.

5.2 Accuracy of estimates of households' poverty likelihoods

As long as the relationships between indicators and poverty do not change over time, and as long as the scorecard is applied to households that are representative of the same population from which the scorecard was originally constructed, then this calibration process produces unbiased estimates of poverty likelihoods. *Unbiased* means that in repeated samples from the same population, the average estimate matches the true value. The scorecard also produces unbiased estimates of poverty rates at a point in time and unbiased estimates of changes in poverty rates between two points in time.[11]

[11] This follows because these estimates of groups' poverty rates are linear functions of the unbiased estimates of households' poverty likelihoods.

Of course, the relationships between indicators and poverty do change to some unknown extent over time and also across sub-groups in Nepal's population. Thus, the scorecard will generally be biased when applied after February 2011 (the last month of fieldwork for the 2010 NLSS) or when applied with sub-groups that are not nationally representative.

How accurate are estimates of households' poverty likelihoods, given the assumption of constant relationships between indicators and poverty over time, and given the assumption of a sample that is representative of Nepal as a whole? To find out, the scorecard is applied to 1,000 bootstrap samples of size $n = 16{,}384$ from the validation sample. Bootstrapping entails:

- Score each household in the validation sample
- Draw a new bootstrap sample *with replacement* from the validation sample
- For each score, compute the true poverty likelihood in the bootstrap sample, that is, the share of households with the score and with consumption below a poverty line
- For each score, record the difference between the estimated poverty likelihood (Figure 4) and the true poverty likelihood in the bootstrap sample
- Repeat the previous three steps 1,000 times
- For each score, report the average difference between estimated and true poverty likelihoods across the 1,000 bootstrap samples
- For each score, report the two-sided intervals containing the central 900, 950, and 990 differences between estimated and true poverty likelihoods

For each score range and for $n = 16{,}384$, Figure 7 shows the average difference between estimated and true poverty likelihoods as well as confidence intervals for the differences.

For the new-definition national line, the average poverty likelihood across bootstrap samples for scores of 15–19 in the validation sample is too low by 3.7 percentage points. For scores of 20–24, the estimate is too high by 3.9 percentage points.[12]

For the new-definition national line, the 90-percent confidence interval for the differences for scores of 15–19 is ±3.5 percentage points (Figure 7). This means that in 900 of 1,000 bootstraps, the difference between the estimate and the true value is between –7.2 and –0.2 percentage points (because –3.7 – 3.5 = –7.2, and –3.7 + 3.5 = –0.2). In 950 of 1,000 bootstraps (95 percent), the difference is –3.7 ± 4.0 percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is –3.7 ± 5.1 percentage points.

For a handful of scores, Figure 7 shows large differences between estimated poverty likelihoods and true values. This is because the validation sample is a single sample that—thanks to sampling variation—differs in distribution from the construction/calibration sub-samples and from Nepal's population. For targeting, however, what matters is less the difference in all score ranges and more the difference in score ranges just above and below the targeting cut-off. This mitigates the effects of

[12] These differences are not zero, despite the estimator's unbiasedness, because the scorecard comes from a single sample. The average difference by score range would be zero if samples were repeatedly drawn from the population and split into sub-samples before repeating the entire process of scorecard construction/calibration and validation.

bias and sampling variation on targeting (Friedman, 1997). Section 8 below looks at targeting accuracy in detail.

In addition, if estimates of groups' poverty rates are to be usefully accurate, then errors for individual households' poverty likelihoods must largely balance out. As discussed in the next section, this is generally the case.

Another possible source of differences between estimates and true values is overfitting. The scorecard here is unbiased, but it may still be *overfit* when applied after the end of the NLSS fieldwork in February 2011. That is, it may fit the data from the 2010 NLSS so closely that it captures not only some timeless patterns but also some random patterns that, due to sampling variation, show up only in the 2010 NLSS but not in the overall population of Nepal. Or the scorecard may be overfit in the sense that it is not robust when relationships between indicators and poverty change over time or when it is applied to non-nationally representative samples.

Overfitting can be mitigated by simplifying the scorecard and by not relying only on data but rather also considering theory, experience, and judgment. Of course, the scorecard here does this. Combining scorecards can also reduce overfitting, at the cost of greater complexity.

Most errors in individual households' likelihoods do balance out in the estimates of groups' poverty rates (see later sections). Furthermore, at least some of the differences will come from non-scorecard sources such as changes in the relationships between indicators and poverty, sampling variation, changes in poverty lines,

inconsistencies in data quality across time, and imperfections in cost-of-living adjustments across time and geographic regions. These factors can be addressed only by improving data quantity and quality (which is beyond the scope of the scorecard) or by reducing overfitting (which likely has limited returns, given the scorecard's parsimony).

6. Estimates of a group's poverty rate at a point in time

A group's estimated poverty rate at a point in time is the average of the estimated poverty likelihoods of the individual households in the group.

To illustrate, suppose an organization samples three households on 1 January 2013 and that they have scores of 20, 30, and 40, corresponding to poverty likelihoods of 59.3, 38.9, and 17.7 percent (new-definition national line, Figure 4). The group's estimated poverty rate is the households' average poverty likelihood of (59.3 + 38.9 + 17.7) ÷ 3 = 38.6 percent.

Be careful; the group's poverty rate is *not* the poverty likelihood associated with the average score. Here, the average score is 30, which corresponds to a poverty likelihood of 38.9 percent. This differs from the 38.6 percent found as the average of the three individual poverty likelihoods associated with each of the three scores. Unlike poverty likelihoods, scores are ordinal symbols, like letters in the alphabet or colors in the spectrum. Because scores are not cardinal numbers, they cannot be added up or averaged across households. Only three operations are valid for scores: conversion to poverty likelihoods, distributional analysis (Schreiner, 2012a), or comparison—if desired—with a cut-off for targeting. The safest rule to follow is: Always use poverty likelihoods, never scores.

6.1 Accuracy of estimated poverty rates at a point in time

For the Nepal scorecard applied to 1,000 bootstraps of $n = 16{,}384$ from the validation sample, the maximum absolute difference between the estimated poverty rate at a point in time and the true rate is 1.5 percentage points (Figure 9, summarizing Figure 8 across poverty lines). The average absolute difference across the 11 poverty lines is about 0.8 percentage points. At least part of these differences is due to sampling variation in the division of the 2010 NLSS into two sub-samples.

When estimating poverty rates at a point in time, the bias reported in Figure 9 should be subtracted from the average poverty likelihood to make the estimate unbiased. For the Nepal scorecard and the new-definition national line, bias is +0.4 percentage points, so the unbiased estimate in the three-household example above is 38.6 – (+0.4) = 38.2 percent.

In terms of precision, the 90-percent confidence interval for a group's estimated poverty rate at a point in time with $n = 16{,}384$ is ±0.5 percentage points or less (Figure 9). This means that in 900 of 1,000 bootstraps of this size, the estimate (after subtracting off bias) is within 0.5 percentage points of the true value.

For example, suppose that the average poverty likelihood in a sample of $n =$ 16,384 with the Nepal scorecard and the new-definition national line is 38.6 percent. Then estimates in 90 percent of such samples would be expected to fall in the range of 38.6 – (+0.4) – 0.5 = 37.7 percent to 38.6 – (+0.4) + 0.5 = 38.7 percent, with the most likely true value being the unbiased estimate in the middle of this range (38.6 – (+0.4)

= 37.2 percent). This is because the original (biased) estimate is 38.6 percent, bias is +0.4 percentage points, and the 90-percent confidence interval for the new-definition national line is ±0.5 percentage points (Figure 9).

6.2 Formula for standard errors for estimates of poverty rates

How precise are the point-in-time estimates? Because the estimates are averages, they have (in "large" samples) a Normal distribution and can be characterized by their average difference vis-à-vis true values, together with the standard error of the average difference.

To derive a formula for the standard errors of estimated poverty rates at a point in time from indirect measurement via poverty-assessment tools (Schreiner, 2008a), first note that the textbook formula (Cochran, 1977) that relates confidence intervals with standard errors in the case of direct measurement of ratios is $\pm c = \pm z \cdot \sigma$, where:

$\pm c$ is a confidence interval as a proportion (*e.g.*, ± 0.02 for ± 2 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, $\sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \phi$,

$\hat{p}$ is the estimated proportion of households below the poverty line in the sample,

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

N is the population size, and

n is the sample size.

For example, Nepal's 2010 NLSS estimates a household-level poverty rate for the new-definition national line of $\hat{p} = 20.0$ percent (Figure 1) by direct measurement. If

this estimate came from a sample of $n = 16{,}384$ households from a population N of 5,776,252 (the number of households in Nepal in 2010), then the finite population correction ϕ is $\sqrt{\frac{5{,}776{,}252 - 16{,}384}{5{,}776{,}252 - 1}} = 0.9986$, which can be taken as $\phi = 1$. If the desired confidence level is 90-percent ($z = 1.64$), then the confidence interval $\pm c$ is

$$\pm z \cdot \sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}} = \pm 1.64 \cdot \sqrt{\frac{0.200 \cdot (1 - 0.200)}{16{,}384}} \cdot 1 = \pm 0.513 \text{ percentage points.}$$

Poverty scoring, however, does not measure poverty directly, so this formula is not applicable. To derive a formula for the Nepal scorecard, consider Figure 8, which reports empirical confidence intervals $\pm c$ for the differences for the scorecard applied to 1,000 bootstrap samples of various sizes from the validation sample. For example, with $n = 16{,}384$ and the new-definition national line, the 90-percent confidence interval is ± 0.465 percentage points.[13]

Thus, the 90-percent confidence interval with $n = 16{,}384$ is ± 0.465 percentage points for the Nepal scorecard and ± 0.513 percentage points for direct measurement. The ratio of the two intervals is $0.465 \div 0.513 = 0.91$.

[13] Due to rounding, Figure 8 displays 0.5, not 0.465.

Now consider the same case, but with $n = 8{,}192$. The confidence interval under direct measurement is $\pm 1.64 \cdot \sqrt{\frac{0.200 \cdot (1 - 0.200)}{8{,}192}} \cdot 1 = \pm 0.725$ percentage points. The empirical confidence interval with the Nepal scorecard and the new-definition national line (Figure 8) is ±0.660 percentage points. Thus for $n = 8{,}192$, the ratio of the two intervals is $0.660 \div 0.725 = 0.91$.

This ratio of 0.91 is the same for $n = 8{,}192$ and for $n = 16{,}384$. It turns out that across all sample sizes of 256 or more in Figure 8, the average ratio turns out to be 0.91, implying that confidence intervals for indirect estimates of poverty rates via the Nepal scorecard and the new-definition national poverty line are—for a given sample size—about 9 percent narrower than confidence intervals for direct estimates via the 2010 NLSS. This 0.91 appears in Figure 9 as the "α factor" because if $\alpha = 0.91$, then the formula for confidence intervals c for the Nepal scorecard is $\pm c = \pm z \cdot \alpha \cdot \sigma$. That is, the formula for the standard error σ for point-in-time estimates of poverty rates via scoring is $\alpha \cdot \sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}}$.

In general, α can be more or less than 1.00. When α is less than 1.00, it means that the scorecard is more precise than direct measurement. This occurs for all 11 poverty lines in Figure 9.

The formula relating confidence intervals with standard errors for poverty scoring can be rearranged to give a formula for determining sample size before measurement. If $\tilde{p}$ is the expected poverty rate before measurement, then the formula

for sample size n from a population of size N that is based on the desired confidence level that corresponds to z and the desired confidence interval $\pm c$ is

$n = N \cdot \left(\frac{z^2 \cdot \alpha^2 \cdot \widetilde{p} \cdot (1 - \widetilde{p})}{z^2 \cdot \alpha^2 \cdot \widetilde{p} \cdot (1 - \widetilde{p}) + c^2 \cdot (N - 1)} \right)$. If the population N is "large" relative to the sample size n, then the finite population correction factor ϕ can be taken as one (1), and the formula becomes $n = \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \widetilde{p} \cdot (1 - \widetilde{p})$.

To illustrate how to use this, suppose the population N is 5,776,252 (the number of households in Nepal while the 2010 NLSS was in the field), suppose $c = 0.03825$, $z = 1.64$ (90-percent confidence), and the relevant poverty line is the new-definition national line so that the most sensible expected poverty rate $\widetilde{p}$ is Nepal's overall poverty rate for that line in 2010 (20.0 percent at the household level, Figure 1). The α factor is 0.92 (Figure 9). Then the sample-size formula gives

$n = 5{,}776{,}252 \cdot \left(\frac{1.64^2 \cdot 0.91^2 \cdot 0.200 \cdot (1 - 0.200)}{1.64^2 \cdot 0.91^2 \cdot 0.200 \cdot (1 - 0.200) + 0.03825^2 \cdot (5{,}776{,}252 - 1)} \right) = 244$, which not too far from the sample size of 256 observed for these parameters in Figure 8 for the new-definition national line. Taking the finite population correction factor ϕ as one (1) gives the same answer, as $n = \left(\frac{0.91 \cdot 1.64}{0.03825} \right)^2 \cdot 0.200 \cdot (1 - 0.200) = 244$.[14]

[14] Although USAID has not specified required confidence levels nor intervals, IRIS Center (2007a and 2007b) says that a sample size of $n = 300$ is sufficient for USAID reporting. USAID microenterprise partners in Nepal should report using the new-definition \$1.25/day 2005 PPP line. Given the α factor of 0.88 for this line (Figure 9), an expected before-measurement household-level poverty rate of 20.0 percent (the all-

Of course, the α factors in Figure 9 are specific to Nepal, its poverty lines, its poverty rates, and this scorecard. The derivation of the formulas, however, is valid for any poverty-assessment tool following the approach in this paper.

In practice after the end of fieldwork for the NLSS in February 2011, a program would select a poverty line (say, the new-definition national line), note its participants' population size (say, $N = 10{,}000$ participants), select a desired confidence level (say, 90 percent, or $z = 1.64$), select a desired confidence interval (say, ±2.0 percentage points, or $c = \pm 0.02$), make an assumption about $\widetilde{p}$ (perhaps based on a previous measurement such as the household-level poverty rate for the new-definition national line for Nepal overall of 20.0 percent in the 2010 NLSS in Figure 1), look up α (here, 0.91, Figure 9), assume that the scorecard will still work in the future and for non-nationally representative sub-groups,[15] and then compute the required sample size. In this illustration, $n = 10{,}000 \cdot \left(\frac{1.64^2 \cdot 0.91^2 \cdot 0.200 \cdot (1 - 0.200)}{1.64^2 \cdot 0.91^2 \cdot 0.200 \cdot (1 - 0.200) + 0.02^2 \cdot (10{,}000 - 1)} \right) =$ 819.

Nepal rate for 2010, Figure 1), and a confidence level of 90 percent, then $n = 300$ implies a confidence interval of $\pm\, 0.88 \cdot 1.64 \cdot \sqrt{\frac{0.200 \cdot (1 - 0.200)}{300}} = \pm 3.3$ percentage points.

[15] This paper reports accuracy for the scorecard applied to the 2010 validation sample, but it cannot test accuracy for later years or for other groups. Performance after February 2011 will resemble that in the 2010 NLSS with deterioration over time to the extent that the relationships between indicators and poverty status change.

7. Estimates of changes in poverty rates over time

The change in a group's poverty rate between two points in time is estimated as the change in the average poverty likelihood of the households in the group. This paper does not test estimates of change over time for Nepal, so it can only suggest approximate formulas for standard errors. Nevertheless, the relevant concepts are presented here because, in practice, pro-poor organizations in Nepal can apply the scorecard to collect their own data and measure change through time.

7.1 Warning: Change is not impact

Scoring can estimate change. Of course, poverty could get better or worse, and scoring does not indicate what caused change. This point is often forgotten or confused, so it bears repeating: poverty scoring simply estimates change, and it does not, in and of itself, indicate the reason for the change. In particular, estimating the impact of participation requires knowing what would have happened to participants if they had not been participants. Knowing this requires either strong assumptions or a control group that resembles participants in all ways except participation. To belabor the point, poverty scoring can help estimate the impact of participation only if there is some way to know—or explicit assumptions about—what would have happened in the absence of participation. And that information must come from somewhere beyond poverty scoring.

7.2 Calculating estimated changes in poverty rates over time

Consider the illustration begun in the previous section. On 1 January 2013, an organization samples three households who score 20, 30, and 40 and so have poverty likelihoods of 59.3, 38.9, and 17.7 percent (new-definition national line, Figure 4). Adjusting for the known bias of +0.4 percentage points (Figure 9), the group's baseline estimated poverty rate is the households' average poverty likelihood of [(59.3 + 38.9 + 17.7) ÷ 3] – (+0.4) = 38.2 percent.

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

- Score a new, independent sample, measuring change across samples
- Score the same sample at follow-up as was scored at baseline

By way of illustration, suppose that two years later on 1 January 2015, the organization samples three additional households who are in the same population as the three original households (or suppose that the same three original households are scored a second time) and finds that their scores are now 25, 35, and 45 (poverty likelihoods of 49.8, 25.9, and 9.6 percent, new-definition national line, Figure 4). Adjusting for the known bias, the average poverty likelihood at follow-up is [(49.8 + 25.9 + 9.6) ÷ 3] – (+0.4) = 28.0 percent, an improvement of 38.2 – 28.0 = 10.2 percentage points.[16]

[16] Of course, such a huge reduction in poverty in two years is highly unlikely, but this is just an example to show how poverty scoring can be used to estimate change.

Thus, about one in 10 participants in this hypothetical example crossed the poverty line in 2013/5.[17] Among those who started below the line, about one in four (10.2 ÷ 38.2 = 26.7 percent) on net ended up above the line.[18]

7.3 Accuracy for estimated change in two independent samples

This paper does not measure the accuracy of scorecard estimates of changes in groups' poverty rates over time. In practice, of course, local pro-poor organizations can still use the Nepal scorecard to estimate change. The rest of this section suggests approximate formulas for standard errors that may be used.

For two equal-sized independent samples, the same logic as in the previous section can be used to derive a formula relating the confidence interval c with the standard error σ of a scorecard's estimate of the change in poverty rates over time:

$$\pm c = \pm z \cdot \sigma = \pm z \cdot \alpha \cdot \sqrt{\frac{2 \cdot \hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}} \, .$$

Here, z, c, $\hat{p}$ and N are defined as above, n is the sample size at both baseline and follow-up,[19] and α is the average (across a range of bootstrapped sample sizes) of the ratio of the observed confidence interval from a poverty-assessment tool and the theoretical confidence interval under direct measurement.

[17] This is a net figure; some people start above the line and end below it, and vice versa.
[18] Poverty scoring does not reveal the reasons for this change.
[19] This means that, for a given precision and with direct measurement, estimating the change in a poverty rate between two points in time requires four times as many measurements (not twice as many) as does estimating a poverty rate at a point in time.

As before, the formula for standard errors can be rearranged to give a formula for sample sizes before indirect measurement via a scorecard, where $\tilde{p}$ is based on previous measurements and is assumed equal at both baseline and follow-up:

$n = 2 \cdot N \cdot \left(\frac{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p})}{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p}) + c^2 \cdot (N - 1)} \right)$. If ϕ can be taken as one, then the formula becomes $n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \tilde{p} \cdot (1 - \tilde{p})$.

This α has been measured for 11 countries (Schreiner, 2013a, 2013b, 2012c, 2010, 2009a, 2009b, 2009c, 2009d; Chen and Schreiner, 2009; and Schreiner and Woller, 2010a and 2010b). After averaging α across poverty lines and survey years within each country, the simple average of α across countries is 1.15. This is as reasonable a figure as any to use for Nepal.

To illustrate the use of this formula to determine sample size for estimating changes in poverty rates across two independent samples, suppose the desired confidence level is 90 percent ($z = 1.64$), the desired confidence interval is ± 2 percentage points ($\pm c = \pm 0.02$), the poverty line is the new-definition national line, $\alpha = 1.15$, $\hat{p} = 0.200$ (the household-level poverty rate in 2010 for the new-definition national line in Figure 1), and the population N is large enough relative to the expected sample size n that the finite population correction factor ϕ can be taken as one. Then the baseline sample size is $n = 2 \cdot \left(\frac{1.15 \cdot 1.64}{0.02} \right)^2 \cdot 0.200 \cdot (1 - 0.200) \cdot 1 = 2{,}846$, and the follow-up sample size is also 2,846.

7.4 Precision for estimated change for one sample, scored twice

Analogous to previous derivations, the general formula relating the confidence interval $\pm c$ to the standard error σ when using a scorecard to estimate change for a single group of households, all of whom are scored at two points in time, is:[20]

$$\pm c = \pm z \cdot \sigma = \pm z \cdot \alpha \cdot \sqrt{\frac{\hat{p}_{12} \cdot (1 - \hat{p}_{12}) + \hat{p}_{21} \cdot (1 - \hat{p}_{21}) + 2 \cdot \hat{p}_{12} \cdot \hat{p}_{21}}{n}} \cdot \sqrt{\frac{N - n}{n - 1}},$$

where z, c, α, N, and n are defined as usual, $\hat{p}_{12}$ is the share of all sampled households that move from below the poverty line to above it, and $\hat{p}_{21}$ is the share of all sampled households that move from above the line to below it.

The formula for confidence intervals can be rearranged to give a formula for sample size before measurement. This requires an estimate (based on information available before measurement) of the expected shares of all households who cross the poverty line $\tilde{p}_{12}$ and $\tilde{p}_{21}$. Before measurement, a conservative assumption is that the change in the poverty rate will be zero, which implies $\tilde{p}_{12} = \tilde{p}_{21} = \tilde{p}_{*}$, giving:

$$n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \tilde{p}_{*} \cdot \sqrt{\frac{N - n}{n - 1}}.$$

[20] See McNemar (1947) and Johnson (2007). John Pezzullo helped find this formula.

Because $\widetilde{p}_*$ could be anything between 0 and 0.5, more information is needed to apply this formula. Suppose that the observed relationship between $\widetilde{p}_*$, the number of years y between baseline and follow-up, and $p_{\text{pre-baseline}} \cdot \left(1 - p_{\text{pre-baseline}}\right)$ is—as in Peru (Schreiner, 2009e)—close to:

$$\widetilde{p}_* = -0.02 + 0.016 \cdot y + 0.47 \cdot \left[p_{\text{pre-baseline}} \cdot \left(1 - p_{\text{pre-baseline}}\right)\right].$$

Given this, a sample-size formula for a group of households to whom the Nepal scorecard is applied twice (once after February 2011 and then again later) is

$$n = 2 \cdot \left(\frac{\alpha \cdot z}{c}\right)^2 \cdot \left\{-0.02 + 0.016 \cdot y + 0.47 \cdot \left[p_{\text{pre-baseline}} \cdot \left(1 - p_{\text{pre-baseline}}\right)\right]\right\} \cdot \sqrt{\frac{N - n}{n - 1}}.$$

In Peru (the only source of a data-based estimate, Schreiner, 2009e), the average α across years and poverty lines is about 1.30.

To illustrate the use of this formula, suppose the desired confidence level is 90 percent ($z = 1.64$), the desired confidence interval is ±2.0 percentage points ($\pm c = \pm 0.02$), the poverty line is the new-definition national line, the sample will first be scored in 2013 and then again in 2016 ($y = 3$), and the population N is so large relative to the expected sample size n that the finite population correction factor ϕ can be taken as one. The pre-baseline poverty rate p_{2010} is taken as 20.0 percent (Figure 1), and α is assumed to be 1.30. Then the baseline sample size is

$n = 2 \cdot \left(\frac{1.30 \cdot 1.64}{0.02}\right)^2 \cdot \left\{-0.02 + 0.016 \cdot 3 + 0.47 \cdot \left[0.200 \cdot (1 - 0.200)\right]\right\} \cdot 1 = 2{,}346$. The same group of 2,346 households is scored at follow-up as well.

8. Targeting

When an organization uses poverty scoring for targeting, households with scores at or below a cut-off are labeled *targeted* and treated—for program purposes—as if they are below a given poverty line. Households with scores above a cut-off are labeled *non-targeted* and treated—for program purposes—as if they are above a given poverty line.

There is a distinction between *targeting status* (scoring at or below a targeting cut-off) and *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 an organization's policy choice that depends on a cut-off and on an indirect estimate from a scorecard.

Targeting is successful when households truly below a poverty line are targeted (*inclusion*) and when households truly above a poverty line are not targeted (*exclusion*). Of course, no scorecard is perfect, and targeting is unsuccessful when households truly below a poverty line are not targeted (*undercoverage*) or when households truly above a poverty line are targeted (*leakage*).

Figure 10 depicts these four possible targeting outcomes. Targeting accuracy varies by the cut-off score; a higher cut-off has better inclusion (but worse leakage), while a lower cut-off has better exclusion (but worse undercoverage).

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 total net benefits (Adams and Hand, 2000; Hoadley and Oliver, 1998).

Figure 11 shows the distribution of households by targeting outcome for Nepal. For an example cut-off of 29 or less, outcomes for the new-definition national line in the validation sample are:

- Inclusion: 10.5 percent are below the line and correctly targeted
- Undercoverage: 9.5 percent are below the line and mistakenly not targeted
- Leakage: 7.7 percent are above the line and mistakenly targeted
- Exclusion: 72.3 percent are above the line and correctly not targeted

Increasing the cut-off to 34 or less improves inclusion and undercoverage but worsens leakage and exclusion:

- Inclusion: 13.1 percent are below the line and correctly targeted
- Undercoverage: 6.9 percent are below the line and mistakenly not targeted
- Leakage: 13.4 percent are above the line and mistakenly targeted
- Exclusion: 66.6 percent are above the line and correctly not targeted

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

Benefit per household correctly included	x	Households correctly included	–
Cost per household mistakenly not covered	x	Households mistakenly not covered	–
Cost per household mistakenly leaked	x	Households mistakenly leaked	+
Benefit per household correctly excluded	x	Households 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 11 for a given 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 program that uses targeting—with or without scoring—should thoughtfully consider

how it values successful inclusion or 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 "Total Accuracy" (IRIS Center, 2005; Grootaert and Braithwaite, 1998). With "Total Accuracy", total net benefit is the number of households correctly included or correctly excluded:

Total Accuracy =	1	x	Households correctly included	–
	0	x	Households mistakenly undercovered	–
	0	x	Households mistakenly leaked	+
	1	x	Households correctly excluded.	

Figure 11 shows "Total Accuracy" for all cut-offs for the Nepal scorecard. For the new-definition national line in the validation sample, total net benefit is greatest (82.8) for cut-offs of 29 or less or 24 or less, with about five in six households in Nepal correctly classified.

"Total Accuracy" weighs successful inclusion of households below the line the same as successful exclusion of households above the line. If a program valued inclusion more (say, twice as much) than exclusion, it could reflect this by setting the benefit for inclusion to 2 and the benefit for exclusion to 1. Then the chosen cut-off would maximize (2 x Households correctly included) + (1 x Households correctly excluded).[21]

As an alternative to assigning benefits and costs to targeting outcomes and then choosing a cut-off to maximize total net benefit, a program could set a cut-off to

[21] Figure 11 also reports "BPAC", discussed in the next section.

achieve a desired poverty rate among targeted households. The third column of Figure 12 ("% targeted who are poor") shows, for the Nepal scorecard applied to the validation sample, the expected poverty rate among households who score at or below a given cut-off. For the example of the new-definition national line, targeting households who score 29 or less would target 18.2 percent of all households (second column) and produce a poverty rate among those targeted of 57.7 percent (third column).

Figure 12 also reports two other measures of targeting accuracy. The first is a version of inclusion ("% of poor who are targeted"). For the example of the new-definition national line with the validation sample and a cut-off of 29 or less, 52.5 percent of all poor households are targeted.

The final targeting measure in Figure 12 is the number of successfully targeted poor households for each non-poor household mistakenly targeted (right-most column). For the new-definition national line with the validation sample and a cut-off of 29 or less, including 1.4 poor households means leaking to 1 non-poor household.

9. Context of poverty-assessment tools in Nepal

This section discusses seven existing poverty-assessment tools for Nepal in terms of their goals, methods, definitions of *poverty*, data, indicators, cost, bias, and precision. In general, the advantages of the Simple Poverty Scorecard® are its:

- Use of data from the latest nationally representative consumption survey
- Accuracy for targeting that is probably similar to that of alternatives
- Reporting of bias and precision from out-of-sample tests, including formulas for standard errors
- Feasibility for local, pro-poor programs, due to its simplicity and transparency

9.1 Gwatkin *et al.*

Gwatkin *et al.* (2007) construct a poverty-assessment tool for Nepal with an approach that they use in 56 countries with Demographic and Health Surveys (Rutstein and Johnson, 2004). They use Principal Components Analysis to make an asset index from simple, low-cost indicators available for the 8,602 households in Nepal's 2001 DHS. The PCA index is like the scorecard here except that, because the DHS does not collect data on consumption, it is based on a different conception of poverty, its accuracy vis-à-vis an consumption-based poverty is unknown, and it can only be assumed to be a proxy for long-term wealth/economic status.[22] Well-known examples of the PCA asset-

[22] Nevertheless, the indicators are similar and the "flat maximum" is important, so carefully built PCA indexes and consumption-based poverty-assessment tools may pick up the same underlying construct (perhaps "permanent income", see Bollen, Glanville, and Stecklov, 2007), and they may rank households much the same. Comparisons of rankings by PCA indexes and consumption-based poverty-assessment tools include

index approach include Stifel and Christiaensen (2007), Zeller *et al.* (2006), Filmer and Pritchett (2001), and Sahn and Stifel (2000 and 2003).

The 12 indicators in Gwatkin *et al.* are similar to those in the scorecard here in terms of their simplicity, low cost, and verifiability:

- Characteristics of the residence:
  - — Presence of electricity
  - — Type of floor
  - — Source of drinking water
  - — Type of cooking fuel
  - — Type of toilet arrangement
  - — Number of people per sleeping room
- Ownership of consumer durables:
  - — Radio
  - — Television
  - — Telephone
  - — Bicycle
- Agriculture:
  - — Ownership of livestock
  - — Whether any household members work their own or family's agricultural land

Gwatkin *et al.* suggest three possible uses for their index:

- Segmenting households by the quintile of their index to see how health, population, and nutrition vary with socio-economic status
- Monitoring (via exit surveys) how well local health-service posts reach the poor
- Measuring local coverage of health services via small-scale surveys

The first goal is akin to targeting, and the last two goals deal with performance monitoring, so the PCA index would be used much like the Simple Poverty Scorecard®.

Filmer and Scott (2012), Lindelow (2006), Sahn and Stifel (2003), Wagstaff and Watanabe (2003), and Montgomery *et al.* (2000).

Still, the Gwatkin *et al.* index is more difficult and costly than the scorecard. While the scorecard requires adding up 10 integers, some of which are usually zero, Gwatkin *et al.*'s asset index requires adding up 35 numbers, each with five decimal places and half with negative signs.

Unlike the PCA index, the scorecard here is linked directly to an consumption-based poverty line. Thus, while both approaches can rank households, only the scorecard can estimate consumption-based poverty status.

In essence, Gwatkin *et al.*—like all PCA indexes—define *poverty* in terms of the indicators and points in the index itself. Thus, the index is not a proxy standing in for something else (such as consumption). Instead, the index is a direct measure of a non-consumption-based definition of *poverty*. There is nothing wrong—and a lot right—about defining *poverty* in this way, but it is not as common as an consumption-based definition.

The asset-based approach defines people as *poor* if their assets (physical, human, financial, and social) fall below a threshold. Arguments for the asset-based view include Carter and Barrett (2006), Schreiner and Sherraden (2006), Sahn and Stifel (2003), and Sherraden (1991). The main advantages of the asset-based view are that:

- Asset ownership is easier to measure accurately than consumption
- Access to resources in the long term—and thus capacity to produce income and to consume—depends on the control of assets
- Assets get at capability more directly, the difference between, say, "Does income permit adequate sanitation?" versus "Does the toilet drain to a septic tank?"

While the asset view and the income/consumption view are distinct, they are also tightly linked. After all, income/consumption are flows of resources received/consumed from the use of stocks of assets. Both views are low-dimensional simplifications—due to practical limits on definitions and measurement—of a higher-dimensional and more complete conception of the production of human well-being.

9.2 Filmer and Scott

Filmer and Scott (2012) test (on 11 countries, including Nepal) how well ranks from several types of asset indexes correlate with ranks from:

- Other asset indexes
- Consumption as directly measured by a survey
- Consumption as estimated by a regression (that is, by a poverty-assessment tool)

They find that different approaches to constructing asset indexes generally lead to similar rankings vis-à-vis the benchmarks of directly measured consumption and regression-estimated consumption. This result is strongest for countries where regression works well for predicting consumption and for less-poor countries with larger shares of non-food consumption.

For Nepal, Filmer and Scott use data on 3,373 households in the 1995/6 NLSS to select 20 indicators that—as in Gwatkin *et al.* and in this paper—are simple, low-cost, and verifiable:

- Characteristics of the residence:
  - Type of walls
  - Type of floors
  - Type of roof
  - Type of windows
  - Type of toilet arrangement
  - Rooms per person
- Ownership of consumer durables:
  - Furniture
  - Electric fan
  - Heater
  - Pressure lamp
  - Radio/cassette
  - Television
  - Refrigerator/freezer
  - Sewing machine
  - Telephone
  - Bicycle
  - Motorbike
  - Car
  - Camera
  - Jewelry

Filmer and Scott's goal is to establish general properties of approaches to constructing asset indexes, not to provide asset indexes that local, pro-poor organizations can use. Thus, they do not report the tool's points nor standard errors.

9.3 Sahn and Stifel (2003)

Like Gwatkin *et al.* and this paper, Sahn and Stifel (2003) seek a low-cost, practical way to measure poverty. They build an asset index using factor analysis (a sister of PCA) using 3,388 households in Nepal's 1995/6 NLSS. They seek "to see if there exist simpler and less demanding alternatives to collecting data on expenditure for purposes of measuring economic welfare and ranking households" (p. 484). Their motivation is similar to that of the Simple Poverty Scorecard®: they want tools that are affordable and feasible given constraints on budgets and non-specialists' technical resources, and they want to make comparisons over time and across countries without the complications and assumptions required for direct measurement via consumption surveys. Like this paper, they also seek a tool for targeting.

Sahn and Stifel's nine indicators are simple, inexpensive, and verifiable:

- Characteristics of the residence:
  - Type of floor
  - Source of drinking water
  - Type of toilet arrangement
- Education of the household head
- Ownership of consumer durables:
  - Radio
  - Television
  - Refrigerator
  - Bicycle
  - Motorized transport

To check coherency between the asset index and reported consumption in the 1995/6 NLSS[23] and between the asset index and child nutrition, Sahn and Stifel rank households in Nepal based on the index, on consumption, and on height-for-age. For each pair, they judge the coherence of the two rankings by the distance between a given household's decile ranks. They conclude that the asset index predicts long-term nutritional status no worse than does current consumption, and does so more inexpensively and simply. They also report that the asset index predicts consumption worse than does a poverty-assessment tool (that is, a least-squares regression that predicts consumption based on household demographics, education, residence quality, and access to public services). Finally, they find that measurement error is worse for consumption than for their index.

Sahn and Stifel report only *in-sample* tests; that is, they check accuracy with the same data that is used to construct the index in the first place. In-sample tests overstate accuracy. In contrast, this paper reports only *out-of-sample* tests with data that is not used to construct the scorecard. This is the most stringent—and most appropriate—way to test accuracy.

Sahn and Stifel do not report measures that would allow a comparison of the ranking ability—with consumption as the benchmark—of their asset index versus the scorecard here.

[23] Sahn and Stifel check the index against consumption because it is a common proxy for living standards, not because they believe consumption should be the benchmark.

9.4 Filmer and Pritchett

Like Gwatkin *et al.* (2007) and Sahn and Stifel (2003), Filmer and Pritchett (FP, 2001) use a PCA asset index as a proxy for long-term wealth/economic status. Their goal is to relate economic status to school enrollment in India (not Nepal). They conclude that their index for India predicts enrollment as least as well as current consumption predicts enrollment.

To support their method, FP want to compare households' rankings by their index with rankings by consumption, but their data for India lacks consumption. They thus build an analogous index with Nepal's 1995/6 NLSS. FP do not report the indicators or points for this index.

To compare ranks, FP order households in Nepal's 1995/6 NLSS twice, once by their index and a second time by consumption. For each ranking, they classify households as bottom-40 percentile, middle-40 percentile, or top 20-percentile. They judge the coherence of the rankings by comparing how households are classified across these three classes by the index versus by consumption.

Which is the better proxy for consumption, the asset index or the Simple Poverty Scorecard®? On the one hand, the comparison favors the scorecard in that—unlike the index—it is designed as a proxy for consumption. On the other hand, FP build their

index and test it with the same data, and such in-sample testing overstates accuracy. This puts the new scorecard—tested out-of-sample—at a disadvantage.[24]

Using the new-definition national poverty line, about 29 percent of households in the validation sample from Nepal's 2010 NLSS are in the bottom-40 percentiles by both poverty scores and consumption, versus 26 percent of people for the FP asset index and the 1995/6 NLSS. Likewise, 23 percent of all households coincide on poverty scores and consumption in the middle-40 percentiles, against 19 percent of people for the index. Finally, 13 percent of households are in the top-20 percentiles on both poverty scores and consumption, versus 11 percent of people for the index.

[24] There are other differences as well. FP divide aggregate household consumption by the number of members raised to the power of 0.6 (instead of number of members). Also, FP use person weights (instead of household weights).

9.5 Central Bureau of Statistics

CBS (2005)[25] uses ordinary least-squares regression on the logarithm of per-capita consumption to associate poverty with nine indicators:

- Demographics:
  - — Number of household members
  - — Number of household members 6-years-old or younger
  - — Sex of the household head
  - — Age of the household head
  - — Caste/ethnicity of the household head
- Education of the household head
- Employment of the household head:
  - — Sector
  - — Whether wage-employed or self-employed
- Land ownership

The goal is to "simulate the effect of a change in characteristics on the probability of being poor" (p. 22). For example, CBS presents the average percentage change in the national poverty rate if all households went from having no small children to having one small child.

[25] See also World Bank (2006).

The paper finds that greater poverty is associated with more small children, larger households, female headship, younger headship, lower castes, lower education, agriculture, non-wage employment, and less land ownership. Other than to reinforce awareness of poverty's incidence among various groups, the policy usefulness of this (and other) "poverty profiles" is unclear. After all, the results are mostly common sense (and if they were not, they would not be accepted). Furthermore, governments usually cannot (for example) create or destroy wage jobs or small children, except perhaps in the long term by doing things (such as stabilizing the macroeconomy) that they already know that they should do anyway.

9.6 Haslett and Jones

Haslett and Jones (2006) adapt the "poverty mapping" approach of Elbers, Lanjouw, and Lanjouw (2003) to estimate poverty rates at the level of 976 sub-districts (*ilaka*) in Nepal.[26] Their main purpose is to inform the design and targeting of transfers.

Haslett and Jones first construct a single poverty-assessment tool for Nepal as a whole using robust regression to estimate the logarithm of consumption with data from the 2003/4 NLSS, considering only indicators that match items in Nepal's 2001 population census. The resulting tool is then applied to the census data to estimate poverty rates for the legacy-definition national line at the *ilaka* level. Such estimates would not be possible with only the 2003/4 NLSS due to its smaller sample size. Finally, Haslett and Jones make "poverty maps" that quickly show how estimated poverty rates vary across areas in a way that makes sense to non-specialists.

Poverty mapping in Haslett and Jones has much in common with the poverty scoring here in that they both:

- Build a poverty-assessment tool with nationally representative survey data and then apply it to other data on groups that may not be nationally representative
- Build a single tool that applies to all of Nepal
- Use simple, verifiable indicators that are quick and inexpensive to collect
- Provide unbiased estimates when their assumptions hold
- Estimate poverty rates for groups
- Report bias and standard errors
- Reduce overfitting by selecting indicators with statistical and non-statistical criteria
- Seek to be useful in practice and so aim to be transparent to non-specialists

[26] Haslett and Jones also make poverty maps for even smaller areas (wards and VDCs), as well as maps of caloric intake and child malnutrition.

Strengths of poverty mapping include that it:

- Has formally established theoretical properties
- Can be applied straightforwardly to distributional measures of well-being (such as the poverty gap) that go beyond head-count poverty rates
- Requires data on fewer households for construction and calibration
- Includes community-level indicators, increasing accuracy and precision
- Uses only indicators that are collected by a census

Strengths of poverty scoring include that it:

- Is simpler in terms of both construction and application
- Tests accuracy empirically
- Associates poverty likelihoods with scores non-parametrically
- Surfaces estimates of poverty likelihoods for individual households
- Reports simple formulas for standard errors

The basic difference between the two approaches is that poverty mapping seeks to help governments to target pro-poor policies, while poverty scoring seeks to help local pro-poor organizations to manage their social performance.[27] On a technical level, Haslett and Jones estimate consumption directly, whereas the Simple Poverty Scorecard® here estimates poverty likelihoods.[28]

[27] Another apparent difference is that the developers of poverty mapping (Elbers, Lanjouw, and Lanjouw, 2003; Demombynes *et al.*, 2004) say that poverty mapping is too inaccurate to be used for targeting at the household level. In contrast, Schreiner (2008b) supports household-level targeting as a legitimate, potentially useful application of poverty scoring. In Elbers *et al.* (2007), the developers of poverty mapping seem to take a small step away from their original position.

[28] Haslett and Jones note (p. 61) that "the benefits of the [poverty-mapping] methodology accrue when interest is in several non-linear functions of the same target variable, as in the case here of six poverty measures defined on household per-capita consumption, or in distributional properties. If only a single measure were of interest, it might be worthwhile to consider direct modelling of this. For example, small-area

Haslett and Jones' 20 indicators for Nepal are:

- Demographics:
  - — Number of household members (and—after subtracting off six—its square interacted with poverty-line region, and its interaction with household size after subtracting off six)
  - — Share of household members who are 6-years-old or younger
  - — Share of household members who are ages 7 to 14
  - — Share of household members who are adult men
  - — Age of the household head
  - — Caste/ethnicity/religion of the household head
- Employment: Whether a former household member has migrated abroad (and its interaction with the sex of the household head, and its interaction with the poverty-line region, and its interaction with the caste/ethnicity/religion of the household head)
- Characteristics of the residence:
  - — Type of construction (and its interaction with poverty-line region)
  - — Tenancy status (and its interaction with type of construction)
- Ownership of agricultural assets:
  - — Poultry interacted with urban/rural
  - — Land interacted with urban/rural (and its interaction with the share of household members who are adult men)
- Community averages at the level of wards or VDCs:
  - — Use of LPG as a cooking fuel
  - — Use of a flush toilet
  - — Share of households in which women own land
  - — Mortality rate due to infectious disease
  - — Share of people 15-years-old or older who have completed fifth grade
  - — Share of households with electricity
  - — Share of households who are rural and who have a television
  - — Elevation from sea level
  - — Land slope

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estimates of poverty incidence could be derived by estimating a logistic regression model for incidence in the survey data". This is exactly what the scorecard here does.

Haslett and Jones' scorecard is too complex for local, pro-poor organizations. In particular, field workers cannot compute interactions, squares, and shares, and collecting indicators for region and caste/ethnicity/religion may be politically infeasible. It would also be difficult to match up the household and its location with average values for its ward or VDC.

Because the Nepal census does not measure consumption, Haslett and Jones cannot test accuracy out-of-sample. Unlike most poverty-mapping documents, however, they do report in-sample bias and standard errors for an estimated poverty rate for Nepal as a whole by applying their tool back to the full 2003/4 NLSS. Using the legacy-definition national line, their in-sample bias is +2.7 percentage points. The standard error—after adjusting for survey design—is 0.015 (n = 3,192), implying an in-sample α factor of 1.84. For comparison, out-of-sample bias for the scorecard in Caire *et al.* (2009) with this poverty line and the 2003/4 NLSS at the person level is –1.5 percentage points, and the out-of-sample α factor—without adjusting for survey design and with n = 4,096—is 1.07. Thus, poverty scoring when applied at the national level with Nepal's 2003/4 NLSS, is less biased than poverty mapping. The α factors are not comparable, as they are computed differently.

9.7 IRIS Center

IRIS Center (2009) was commissioned to build a poverty-assessment tool (PAT) for use by USAID's microenterprise partners in Nepal for reporting the share of their participants who are "very poor". The IRIS PAT uses the same data as Caire *et al.* (2009).

The PAT supports two 2005 PPP poverty lines:

- $1.25/day (household-level poverty rate of 52.6 percent)
- $2.50/day (poverty rate not reported)

In general, the PAT is like the scorecard here, except that it:

- Uses older data (2003/4 rather than 2010)
- Has a more indicators (18 rather than 10)
- Estimates consumption (rather than poverty likelihoods), and classifies a given household as either 100-percent-below or 100-percent-above a poverty line, even though some households with estimated consumption on one side of a given line have true consumption on the other side

After comparing several statistical approaches,[29] IRIS settles on quantile regression that, based on the values of indicators for a given household, estimates the 56^{th} percentile of the distribution of the logarithm of per-capita household consumption. A household is counted as *poor* if this estimate is less than a given poverty line.

[29] Thanks to the "flat maximum", all methods have similar "Total Accuracy".

The PAT's 18 indicators are simple and verifiable:

- Demographics:
  - — Number of household members (and its square)
  - — Age of the head of the household (and its square)
- Education:
  - — Whether the head of the household is literate
  - — Share of members that are literate
- Characteristics of the residence:
  - — Number of bedrooms
  - — Type of floor
  - — Type of cooking fuel
  - — Type of toilet arrangement
- Asset ownership:
  - — Radios or cassette players
  - — Televisions or VCRs
  - — Cameras or camcorders
  - — Refrigerators or freezers
  - — Motorcycles or scooters
- Agricultural assets:
  - — Land
  - — Number of buffaloes
  - — Number of cows
- Location of the residence:
  - — Urban/rural
  - — Region

IRIS reports accuracy in terms of:

- Bias of estimated poverty rates at a point in time[30]
- Targeting (inclusion, undercoverage, leakage, and exclusion)[31]
- The Balanced Poverty Accuracy Criterion, USAID's standard for certifying PATs

[30] IRIS (2005) calls bias the "Poverty Incidence Error" (PIE). In their consumption-estimation approach, it is the absolute difference between undercoverage and leakage.
[31] IRIS' targeting results appear to be unweighted.

IRIS Center (2005) introduced BPAC. It considers accuracy in terms of inclusion and in terms of the absolute difference between undercoverage and leakage (that is, bias). The formula is $\text{BPAC} = 100 \cdot \left(\frac{\text{Inclusion} - \mid \text{Undercoverage} - \text{Leakage} \mid}{\text{Inclusion} + \text{Undercoverage}} \right)$.

Because bias is the difference between undercoverage and leakage, and because the normalization term $\frac{100}{\text{Inclusion} + \text{Undercoverage}}$ matters only when comparing poverty-assessment tools across populations with different poverty rates, the formula boils down to $\text{BPAC} = \text{Inclusion} - \mid \text{Bias} \mid$.

Expressing BPAC as $\text{Inclusion} - \mid \text{Bias} \mid$ helps to show why BPAC is not useful for comparing the PAT with the Simple Poverty Scorecard®. Regardless of whether undercoverage differs from leakage and given the assumptions discussed earlier in this paper, the scorecard produces unbiased estimates of poverty rates. While BPAC can be used to compare alternative tools under the PAT's consumption-estimation approach, it does not make sense to apply it to the scorecard's poverty-likelihood approach. This is because, when estimating poverty rates, the scorecard does not use a cut-off to classify households as either 100-percent poor or 100-percent non-poor. Instead, households have an estimated poverty likelihood somewhere in the range of 0 to 100 percent. If a user of the Simple Poverty Scorecard® sets a targeting cut-off, then that cut-off matters only for targeting, and it does not affect the estimation of poverty rates at all.

In any case, both the PAT and the scorecard give unbiased estimates of poverty rates (after subtracting off known bias), so any distinction between their accuracy must

relate to targeting or to the precision of their estimates of poverty rates. A comparison along these dimensions, however, is not possible for Nepal, for two reasons. First, IRIS uses the 2003/4 NLSS, so any comparison would be with the scorecard in Caire *et al.* (2009), not the one in this paper. Second, IRIS' $1.25/day 2005 PPP poverty line differs from that in Caire *et al.* (2009). Based on personal communication with Prem Sangraula, Caire *et al.* (2009) followed the World Bank in defining an all-Nepal $1.25/day line of NPR30.30 per person per day in average prices from January 2003 to December 2004. Caire *et al.* then adjust this for price differences across poverty-line regions as discussed in Section 2. This gives a household-level poverty rate of 47.8 percent. In contrast, IRIS sets the $1.25/day line to NPR31.51 in average 2003 prices and does not adjust for regional price differences, giving a household-level poverty rate of 52.6 percent.[32] Of course, it makes sense to adjust for regional differences in prices. Furthermore, IRIS reports out-of-sample bias and precision only for a slightly different $1.25/day poverty line whose value is unreported. In sum, there is no good way to make an apples-with-apples comparison of bias and precision between the IRIS PAT and the scorecard here or in Caire *et al.* (2009).

Although IRIS reports the PAT's targeting accuracy and although the BPAC formula considers targeting accuracy, IRIS says that the PAT should not be used for

[32] When IRIS' across-the-board $1.25/day poverty line is applied to the entire 2003/4 NLSS, the household-level poverty rate is 51.8 percent. It may be that the 52.6 percent rate reported by IRIS applies only to its construction sample.

targeting.[33] IRIS also doubts that the PAT can be useful for measuring change, noting that "it is unclear that the tools will be able to identify real changes in poverty over time due to their inherent measurement errors. Unless the changes in the poverty rate are exceptionally large and the tools exceptionally accurate, the changes identified are likely to be contained within the margin of error."[34]

Targeting and estimating changes over time are possible uses that are supported for the Simple Poverty Scorecard®. This paper reports targeting accuracy as well as formula for standard errors for measures of change over time so that users can decide for themselves whether accuracy is adequate for their purposes.

[33] `povertytools.org/faq/faq.html#11`, retrieved 19 February 2009.
[34] `povertytools.org/faq/faq2.html`, retrieved 7 December 2012.

10. Conclusion

Pro-poor programs in Nepal can use the Simple Poverty Scorecard® to segment clients for differentiated treatment as well as to estimate:

- The likelihood that a household has consumption below a given poverty line
- The poverty rate of a population at a point in time
- The change in the poverty rate of a population over time

The scorecard is inexpensive to use and can be understood by non-specialists. It is designed to be practical for pro-poor organizations in Nepal that want to improve how they monitor and manage their social performance.

The scorecard is constructed with data from Nepal's 2010 NLSS. It replaces an earlier scorecard based on the 2003/4 NLSS by Caire *et al.* (2009). For now on, only the new 2010 scorecard should be used because it is based on the latest data and because it is calibrated to Nepal's new definition of *poverty*. The new scorecard is also calibrated to three "legacy" poverty lines that follow Nepal's previous definition of *poverty*. Estimated poverty likelihoods from the two scorecards are compatible for legacy lines, so existing users can—if desired—estimate changes over time with a baseline from the old scorecard and a follow-up from the new scorecard.

The new scorecard is constructed with half of the 2010 NLSS data, calibrated to eight new-definition poverty lines and three legacy-definition lines, and tested on the other half of the 2010 data.

Bias and precision are reported for estimates of households' poverty likelihoods, groups' poverty rates at a point in time, and changes in groups' poverty rates over

time. Of course, the scorecard's estimates of changes are not the same as estimates of program impact. Targeting accuracy is also reported.

When the scorecard is applied to the validation sample, the maximum absolute difference between estimates versus true poverty rates for groups of households at a point in time is 1.5 percentage points. Across the 11 poverty lines, the average absolute difference is about 0.8 percentage points. Unbiased estimates may be had by subtracting the known bias from the original estimates. For $n = 16{,}384$ and 90-percent confidence, the precision of these differences is ± 0.5 percentage points or better.

If an organization wants to use the scorecard for targeting, then the results here provide useful information for selecting a cut-off that fits its values and mission.

Although the statistical technique is innovative, and although technical accuracy is important, the design of the scorecard focuses on transparency and ease-of-use. After all, accuracy is irrelevant if an organization feels so daunted by a scorecard's complexity or its cost that it does not even try to use it. For this reason, the scorecard is kept simple, using ten indicators that are simple, low-cost, and verifiable. Points are all zeros or positive integers, and scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). Scores are converted to poverty likelihoods via simple look-up tables, and targeting cut-offs are likewise straightforward to apply. The design attempts to facilitate adoption by helping managers understand and trust scoring and by allowing non-specialists to generate scores quickly in the field.

In summary, the Simple Poverty Scorecard® is a practical, objective way for local, pro-poor programs in Nepal to estimate consumption-based poverty rates, track changes in poverty rates over time, and target services. The same approach can be applied to any country with similar data.

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Guidelines for the Interpretation of Scorecard Indicators

The following is based on extracts found and then translated from Nepalese to English by Ram Dayal Rajbanshi (with the help of Muhammad Awais Butt) from:

Central Bureau of Statistics (2009) "Interviewer Manual", Kathmandu [the *Manual*].

General interviewing guidelines

Who should be the respondent?

According to the *Manual*, the preferred respondent is the head of the household. If the head is absent from the residence at the time of the interview, then the interviewer—in consultation with the household members present—should choose another adult household member who is at least 10-years-old to be the respondent.

Guidelines related to specific scorecard indicators

1. How many household members are there?
    A. Eight or more
    B. Seven
    C. Six
    D. Five
    E. Four
    F. Three
    G. One or two

According to the *Manual*, a person is counted as a *household member* if he/she fulfills all the following conditions:

- Lives with the other household members
- Eats with the other household members
- Shares income and expenses with the other household members
- Currently fulfills the three criteria above and has done so for at least six of the past 12 months, or intends to do so for at least six months. The following examples are *household members* even though they have not been in the household for six months:
    — Newborns less than 6-months-old
    — Newly married daughters-in-law/sons-in-law
    — Anyone now residing with the household who intends to stay permanently

Please note of the following applications of these criteria:

- Someone who has left the household permanently is not counted as a *household member* even if he/she lived at least six of the past 12 months with the household
- Hired help (such as domestic servants or farm hands) are counted as *household members* if they fulfill the criteria above, even if they do not have a blood relationship with other members of the household
- People who live in the same residence but who do not share meals together are not be counted as members of the same household (for example, two brothers who live in the same house but who do not share meals and household expenses)
- People who eat together but who live in different residences are not counted as members of the same household

2. In what type of job did the male head/spouse work the most hours in the past seven days?
    A. No male head/spouse
    B. Does not work, or paid wages on a daily basis or contract/piece-rate in agriculture
    C. Paid wages on a daily basis or contract/piece-rate in non-agriculture
    D. Self-employed in agriculture
    E. Self-employed in non-agriculture
    F. Paid wages on a long-term basis in agriculture or non-agriculture

According to the *Manual*, the *household head* runs the household and oversees its income/expenses/finances. When it comes to the activities of the household, the head is presumed to be the most knowledgable member. The head can be male or female.

For the purposes of the Simple Poverty Scorecard®:, the *male head/spouse* is defined as:

- The household head, if the head is male
- The spouse/partner/companion of the household head, if the head is female
- Non existent, if the head is female and if she does not have a spouse/partner/companion who is also a member of her household

According to the *Manual*, the *past seven days* are the last seven days before the day of interview. For example, if the interview is on Wednesday, January 10, then the last seven days covers the period from Wednesday, January 3 to Tuesday, January 9.

According to the *Manual*, a *self-employed* person has a business in which he/she has invested and for which he/she is the residual claimant to any profits/losses. In contrast, a *wage-earner* is paid regardless of the business' profits/losses. A person who works his/her own land is not considered to be a wage-earner but rather to be self-employed.

Wage earners may be in agriculture or non-agriculture. Agricultural wage earners may have long-term jobs or work on a monthly/seasonal basis. Wage jobs that are related to agriculture but not directly in agriculture (for example, a wage job in a rice mill) are counted as non-agricultural.

According to the *Manual*, work in animal husbandry (for example, raising poultry, rabbit-keeping, bee-keeping, goat-rearing etc.) is considered to be *non-agricultural*.

3. How many bedrooms does your residence have?
    A. None
    B. One
    C. Two
    D. Three or more

According to the *Manual*, this refers to rooms used exclusively for sleeping. For example, a room does not count as a bedroom if it is used as a kitchen as well as for sleeping.

If a household's residence includes multiple buildings, then count all the bedrooms in all of the buildings.

4. Main construction material of outside walls?
    A. Bamboo/leaves, unbaked bricks, wood, mud-bonded bricks/stones, or no outside walls
    B. Cement-bonded bricks/stones, or other material

According to the *Manual*, this question refers to the exterior wall of the residence. It does not include any compound/boundary wall that surrounds the residence.

5. Main material roof is made of?
    A. Straw/thatch, or earth/mud
    B. Tiles/slate, or other
    C. Wood/planks, or galvanized iron
    D. Concrete/cement

The *Manual* offers no guidelines for this indicator.

6. Does your residence have a kitchen?
    A. No
    B. Yes

According to the *Manual*, a *kitchen* must have both walls and a roof. If the household cooks in a place without both walls and roof, then it does not count as having a kitchen.

7. What type of stove does your household mainly use for cooking?
    A. Open fireplace, mud, kerosene stove, or other
    B. Gas stove, or smokeless oven

According to the *Manual*, the types of stoves are defined as follows:

- *Open fireplace*: An open fire on the ground made with stone, iron rods, etc.
- *Mud*: An ordinary stove made of mud
- *Kerosene stove*: A stove that consists of a wick in kerosene
- *Other*: Any type of stove not otherwise included here, for example, a heater
- *Gas stove*: A stove that burns LPG
- *Smokeless oven*: A specially designed stove with a vent or chimney for smoke

8. What type of toilet is used by your household?
    A. None, household non-flush, or communal latrine
    B. Household flush

According to the *Manual*, a *communal latrine* is a latrine used by more than one household. It is usually very rudimentary, and it may or may not include a flushing system.

A *household flush* is a toilet for the exclusive use of the household which washes away waste with the help of a machine or bucket to a sewage system or septic tank.

9. How many telephone sets/cordless/mobile does your household own?
    A. None
    B. One
    C. Two or more

The *Manual* offers no guidelines for this indicator.

10. Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, is any of it irrigated?
    A. No
    B. Yes, but none irrigated
    C. Yes, and some irrigated

According to the *Manual*, *agricultural land* does not include kitchen gardens or land on which the residence is built. It does include, however, fields, uplands, lowlands etc. that are used for agriculture, regardless of whether they are irrigated.

Land is *sharecropped-in* if the household uses the land in exchange for dividing the harvest with the landlord according to some rule.

Land is *mortgaged-in* if the household uses the land in exchange for a fixed cash payment (rent).

Land is *irrigated* if it is watered by human effort, that is, by some means other than rain and ice-melt.

Figure 1: New-definition poverty lines and poverty rates for all of Nepal by sub-sample, poverty line, and household-level/person-level

Line or rate	Person or HH level	# HHs surveyed	% with per-capita daily household expenditure below a poverty line							
			National				USAID	Intl. 2005 PPP		
			Food	100%	150%	200%	'Extreme'	$1.25	$2.00	$2.50
All Nepal										
Line		5,988	32.68	52.77	79.16	105.54	42.84	55.43	88.69	110.86
Rate	Household		4.1	20.0	45.8	65.6	9.7	23.0	53.7	68.7
Rate	Person		5.3	25.2	53.7	72.5	12.6	28.7	61.4	75.5
Construction/calibration: Selecting indicators and points, and associating scores with likelihoods										
Rate	Household	2,979	4.1	20.0	45.9	65.5	9.7	23.1	53.7	68.7
Rate	Person		5.3	25.0	54.0	72.4	12.5	28.9	61.5	75.4
Validation: Measuring accuracy of 2010 scorecard										
Rate	Household	3,009	4.1	20.0	45.8	65.7	9.6	22.9	53.7	68.6
Rate	Person		5.4	25.3	53.4	72.6	12.6	28.5	61.3	75.5
Change in poverty rates in construction/calibration and validation samples										
Rate	Household		+0.0	–0.0	–0.0	+0.1	–0.0	–0.1	+0.0	–0.0
Rate	Person		+0.1	+0.1	–0.3	+0.1	+0.0	–0.2	–0.1	+0.0

Source: Nepal's 2010 Living Standards Survey

Poverty lines are NPR per person per day in average prices from Feburary 2010 to February 2011.

Poverty rates are percentages.

Figure 1: Legacy-definition poverty lines and poverty rates for all of Nepal by sub-sample, poverty line, and household-level/person-level

Line or rate	Person or HH level	# HHs surveyed	% with per-capita daily household expenditure below a poverty line		
			National	Intl. 2005 PPP	
			100%	$1.25	$2.50
All Nepal					
Line		5,988	39.22	55.43	110.86
Rate	Household		9.5	27.7	68.8
Rate	Person		12.5	34.5	75.5
Construction/calibration: Selecting indicators and points, and associating scores with likelihoods					
Rate	Household	2,979	9.6	27.3	68.7
Rate	Person		12.5	33.8	75.7
Validation: Measuring accuracy of 2010 scorecard					
Rate	Household	3,009	9.4	28.2	68.8
Rate	Person		12.4	35.2	75.4
Change in poverty rates in construction/calibration and validation samples					
Rate	Household		–0.1	+0.5	+0.0
Rate	Person		–0.1	+0.7	–0.2

Source: Nepal's 2010 Living Standards Survey

Poverty lines are NPR per person per day in average prices from February 2010 to February 2011.

Poverty rates are percentages.

Figure 2: Poverty lines and poverty rates by poverty-line region, poverty line, and household/person

		Poverty line (NPR per day per person) and poverty rate (%)										
		New-definition lines								Legacy-definition lines		
			National			USAID	Intl. 2005 PPP			Natl.	Intl. 2005 PPP	
Region	***n***	**Food**	**100%**	**150%**	**200%**	**'Extreme'**	**$1.25**	**$2.00**	**$2.50**	**100%**	**$1.25**	**$2.50**
Mountains												
Poverty line	408	36.41	54.41	81.61	108.81	42.11	57.15	91.44	114.30	39.23	55.45	110.89
Household poverty rate		9.9	33.4	59.6	77.7	15.3	36.3	66.1	80.2	16.6	35.4	76.9
Person poverty rate		13.9	42.2	69.0	85.2	21.1	45.5	75.3	87.2	23.2	43.9	85.2
Urban Kathmandu												
Poverty line	864	40.04	112.14	168.21	224.28	87.22	117.79	188.47	235.59	51.40	72.64	145.29
Household poverty rate		0.1	9.8	35.2	55.7	4.5	12.2	44.2	59.4	0.9	2.2	24.5
Person poverty rate		0.1	11.0	39.0	59.0	5.0	14.1	48.6	63.3	1.2	2.8	27.3
Urban Hill												
Poverty line	480	32.36	53.63	80.45	107.27	45.49	56.34	90.14	112.68	41.83	59.12	118.23
Household poverty rate		1.0	6.8	17.2	33.5	3.1	7.4	23.3	37.1	1.8	8.4	39.8
Person poverty rate		1.3	8.7	20.8	37.5	4.2	9.3	27.4	40.9	2.2	11.1	43.3
Urban Terai												
Poverty line	672	32.16	57.90	86.85	115.80	49.08	60.82	97.31	121.63	41.83	59.12	118.23
Household poverty rate		1.2	17.4	37.5	54.8	8.5	20.9	44.0	58.6	5.8	19.7	56.5
Person poverty rate		1.4	22.0	44.6	62.0	11.0	26.0	51.3	65.7	7.2	24.6	63.5
Rural Hills Eastern												
Poverty line	384	33.70	45.34	68.02	90.69	39.40	47.63	76.21	95.26	40.48	57.21	114.42
Household poverty rate		3.1	11.9	40.8	65.8	5.8	14.0	49.2	68.9	7.5	28.1	81.2
Person poverty rate		4.1	15.9	47.7	73.2	7.8	18.6	56.6	76.2	10.2	34.3	86.2
Rural Hills Central												
Poverty line	480	33.53	51.20	76.80	102.40	37.01	53.78	86.05	107.57	40.48	57.21	114.42
Household poverty rate		7.6	22.2	40.4	57.5	10.4	23.8	47.5	61.8	12.0	25.1	64.8
Person poverty rate		10.5	29.3	49.0	64.9	14.7	31.3	55.9	69.0	16.8	33.7	71.5

Figure 2 (cont): Poverty lines and poverty rates by poverty-line region, poverty line, and household/person

		Poverty line (NPR per day per person) and poverty rate (%)										
		New-definition lines								Legacy-definition lines		
			National			USAID	Intl. 2005 PPP			Natl.	Intl. 2005 PPP	
Region	***n***	**Food**	**100%**	**150%**	**200%**	**'Extreme'**	**$1.25**	**$2.00**	**$2.50**	**100%**	**$1.25**	**$2.50**
Rural Hills Western												
Poverty line	480	34.35	50.49	75.73	100.97	43.12	53.03	84.85	106.06	37.73	53.32	106.65
Household poverty rate		4.5	21.6	47.2	66.2	11.5	23.3	56.4	70.8	7.3	24.5	71.2
Person poverty rate		5.2	28.0	56.1	74.9	14.0	30.0	65.3	79.2	9.6	31.9	79.5
Rural Hills Mid-western and Far-western												
Poverty line	516	32.26	44.81	67.21	89.61	35.81	47.07	75.31	94.13	37.73	53.32	106.65
Household poverty rate		11.0	31.8	66.1	84.4	15.6	37.5	73.1	86.0	23.7	54.7	89.5
Person poverty rate		13.5	36.8	72.6	89.5	18.4	43.4	79.4	91.3	28.1	62.6	93.9
Rural Terai Eastern												
Poverty line	480	31.05	46.18	69.27	92.36	37.90	48.51	77.62	97.02	37.26	52.66	105.31
Household poverty rate		1.4	16.4	46.4	69.7	7.9	19.7	55.3	72.4	7.6	28.5	79.9
Person poverty rate		1.6	20.9	53.4	74.6	10.4	24.4	62.2	77.4	10.0	34.5	83.7
Rural Terai Central												
Poverty line	480	30.85	48.05	72.08	96.11	39.68	50.48	80.76	100.95	37.26	52.66	105.31
Household poverty rate		1.8	19.4	47.5	69.1	9.1	24.0	56.3	72.2	6.3	26.0	73.7
Person poverty rate		2.1	23.1	54.7	74.5	11.6	28.6	62.3	77.7	7.7	30.0	79.2
Rural Terai Western												
Poverty line	348	29.06	43.83	65.75	87.66	37.40	46.04	73.67	92.08	36.04	50.93	101.87
Household poverty rate		2.5	16.4	44.7	64.5	8.1	18.3	51.9	65.9	11.1	36.1	69.7
Person poverty rate		3.7	22.3	55.6	74.8	11.0	24.1	62.5	76.4	14.2	45.7	79.7
Rural Terai Mid-western and Far-western												
Poverty line	396	30.13	47.45	71.17	94.90	37.57	49.84	79.75	99.68	36.04	50.93	101.87
Household poverty rate		4.6	26.2	55.2	73.9	12.5	29.7	63.0	75.3	12.9	39.1	76.1
Person poverty rate		6.2	31.0	61.6	78.9	15.4	34.9	69.7	80.2	16.0	44.9	81.0

Figure 3: Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
1,368	How many household members are 12-years-old or younger? (Four or more; Three; Two; One; None)
1,344	How many household members are 11-years-old or younger? (Four or more; Three; Two; One; None)
1,316	How many household members are 13-years-old or younger? (Four or more; Three; Two; One; None)
1,271	How many household members are 14-years-old or younger? (Four or more; Three; Two; One; None)
1,258	How many household members are 16-years-old or younger? (Four or more; Three; Two; One; None)
1,253	How many household members are 15-years-old or younger? (Four or more; Three; Two; One; None)
1,221	Do all household members ages 7 to 11 currently attend school, including institutional/private schools? (No; Yes, and all go to private schools; Yes, and at least one goes to an institutional/private school; No one is 7- to 11-years-old)
1,193	How many household members are 17-years-old or younger? (Five or more; Four Three; Two; One; None)
1,172	Do all household members ages 7 to 13 currently attend school, including institutional/private schools? (No; Yes, and all go to private schools; Yes, and at least one goes to an institutional/private school; No one is 7- to 13-years-old)
1,150	How many household members are 18-years-old or younger? (Five or more; Four Three; Two; One; None)
1,124	How many telephone sets/cordless/mobile does your household own? (None; One; Two or more)
1,090	Do all household members ages 7 to 14 currently attend school, including institutional/private schools? (No; Yes, and all go to private schools; Yes, and at least one goes to an institutional/private school; No one is 7- to 14-years-old)
1,006	How many household members are 16-years-old or younger? (Three or more; Two; One; None)
985	Do all household members ages 7 to 15 currently attend school, including institutional/private schools? (No; Yes, and all go to private schools; Yes, and at least one goes to an institutional/private school; No one is 7- to 15-years-old)
980	Is there a mobile telephone in your dwelling unit? (No; Yes)

Figure 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
951	Do all household members ages 7 to 16 currently attend school, including institutional/private schools? (No; Yes, and all go to private schools; Yes, and at least one goes to an institutional/private school; No one is 7- to 16-years-old)
945	Main material roof is made of? (Straw/thatch, or earth/mud; Tiles/slate, or other; Wood/planks, or galvanized iron; Concrete/cement)
932	Does your residence have a toilet/bathroom? (No; Yes)
906	What type of toilet is used by your household? (No toilet, household non-flush, or communal latrine; Household flush (connected to septic tank or municipal sewer)
898	What is the main source of lighting for your dwelling? (Biogas, or other; Electricity, with joint meter; Kerosene; Electricity, with no meter; Solar; Electricity, with individual meter)
890	Do all household members ages 7 to 17 currently attend school, including institutional/private schools? (No; Yes, and all go to private schools; Yes, and at least one goes to an institutional/private school; No one is 7- to 17-years-old)
863	How many household members are there? Eight or more; Seven; Six; Five; Four; Three; One or two)
822	If your household owns any televisions/VCRs/VCD players, does it also have cable T.V.? (No television/VCR/VCD player; Television/VCR/VCD player, but no cable; Television/VCR/VCD player and cable)
815	Do all household members ages 7 to 18 currently attend school, including institutional/private schools? (No; Yes, and all go to private schools; Yes, and at least one goes to an institutional/private school; No one is 7- to 18-years-old)
770	How many rooms does your household occupy in total? (One; Two; Three; Four; Five; Six; Seven or more)
742	What kind of fuel is used most often by your household for cooking? (Leaves/rubbish/straw/thatch; Dung; Firewood, kerosene, or other; Cylinder gas, or biogas)
710	How many televisions/VCRs/VCD players does your household own? (None; One; Two or more)

Figure 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
659	The windows are fitted with . . .? (No windows/no covering, or other; Shutters; Screens/glass)
654	What type of stove does your household mainly use for cooking? Open fireplace, mud, kerosene stove, or other; Gas stove, or smokeless oven)
625	Do all household members ages 6 to 11 currently attend school? (No; Yes; No members ages 6 to 11)
602	Do all household members ages 6 to 12 currently attend school? (No; Yes; No members ages 6 to 12)
588	Main construction material of outside walls? (No outside walls, bamboo/leaves, unbaked bricks, wood, or mud-bonded bricks/stones; Cement-bonded bricks/stones, or other material)
566	Is there cable T.V. in your dwelling unit? (No; Yes)
565	Do all household members ages 6 to 13 currently attend school? (No; Yes; No members ages 6 to 13)
556	What is the highest class that the male head/spouse completed? (None; Pre-school or kindergarten, or Class 1 to Class 4; Class 5 or 6; No male head/spouse; Class 7 or 8; Class 9 or higher)
527	Foundation of dwelling? (Wooden pillar; Mud-bonded; Cement-bounded; Pillar-bonded, or other)
524	How many fans does your household own? (None; One; Two or more)
511	How many bedrooms does your residence have? (None; One; Two; Three or more)
499	Do all household members ages 6 to 14 currently attend school? (No; Yes; No members ages 6 to 14)
456	What is the highest class that the female head/spouse completed? (None; No female head/spouse; Pre-school or kindergarten, or Class 1 to 4; Class 5 or higher)
441	Does your household own any bicycles, motorcycles/scooters, or motor cars? (None; Only bicycle; Motorcycle/scooter or motor car (regardless of bicycle))
429	Does your residence have a kitchen? (No; Yes)
426	Do all household members ages 6 to 15 currently attend school? (No; Yes; No members ages 6 to 15)
420	Do all household members ages 6 to 16 currently attend school? (No; Yes; No members ages 6 to 16)
389	How many household members 18-years-old or younger currently attend a institutional/private school? (None; One; Two or more)

Figure 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
387	Does your household own any cameras (still/movie)? (No; Yes)
384	In what occupation did the male head/spouse work the most hours in the past seven days? (Does not work; Elementary occupations; Skilled agricultural and fishery workers; Craft and related trade workers, or plant and machine operators and assemblers; No male head/spouse; Service workers and shop and market sales workers; Armed forces, legislators, senior officials, and managers, professionals, technicians and associated professionals, or clerks)
377	Can the male head/spouse read and write a letter? (No; No male head/spouse; Yes)
369	Do all household members ages 6 to 17 currently attend school? (No; Yes; No members ages 6 to 17)
360	Does your household own any motorcycles/scooters or motor cars? (No; Yes)
352	Can the female head/spouse read and write a letter? (No; No female head/spouse; Yes)
346	Is there a land-line telephone in your dwelling unit? (No; Yes)
342	Do all household members ages 6 to 18 currently attend school? (No; Yes; No members ages 6 to 18)
336	Does your household own any refrigerators or freezers? (No; Yes)
312	Where does your drinking water come from? (Spring water, or river; Open well; Piped outside the house; Hand pump/tubewell, or other; Piped into the house, or covered well)
284	In their occupation in which they worked the most hours in the past seven days, how many household members were not skilled agricultural and fishery workers nor in elementary occupations? (None; One; Two or more)
272	What is your present occupancy status? (Owned, does not rent out part, provided free of charge by relatives, landlord, or employer, squatting, or other; Renter; Owned, rents out part)
250	In what occupation did the female head/spouse work the most hours in the past seven days? (Elementary occupations; Skilled agricultural and fishery workers; Does not work; No female head/spouse; Service workers and shop and market sales workers, craft and related trade workers, or plant and machine operators and assemblers; Armed forces, legislators, senior officials, managers, professionals, technicians, associated professionals, or clerks)

Figure 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
238	How big is the inside of the dwelling in square feet? (1 to 199; 200 to 249; 250 to 349; 350 or more)
220	In what type of job did the male head/spouse work the most hours in the past seven days? (No male head/spouse; Does not work, or paid wages on a daily basis or contract/piece-rate in agriculture; Paid wages on a daily basis or contract/piece-rate in non-agriculture; Self-employed in agriculture; Self-employed in non-agriculture; Paid wages on a long-term basis in agriculture or non-agriculture)
214	How does your household dispose of its garbage mainly? (Dumped and used for fertilizer, or other; Dumped; Burned/buried; Collected by garbage truck, or private/community collector)
196	Does your household own any computers/printers? (No; Yes)
187	In what type of job did the female head/spouse work the most hours in the past seven days? (Paid wages on a daily basis or contract/piece-rate in agriculture; Paid wages on a daily basis or contract/piece-rate in non-agriculture; Self-employed in agriculture; Does not work; No female head/spouse; Paid wages on a long-term basis (agriculture or non-agriculture), or self-employed in non-agriculture)
186	In their occupation in which they worked the most hours in the past seven days, how many household members were skilled agricultural and fishery workers or in elementary occupations? (Three or more; Two; One; None)
173	In their job in which they worked the most hours in the past seven days, were any household members paid wages on a daily basis or by contract/piece-rate? (Yes; No)
167	Are you connected to a sanitary system for liquid wastes? (No; Open drains; Soak pit; Underground drains)
152	What is the language used in the household? (Tamang; Bhojpuri; Maithili; Other; Nepali; Tharu (Dagaura/Rana); Newar)
148	Does your household own any heaters? (No; Yes)
133	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, is any of it irrigated? (No; Yes, but none irrigated; Yes, and some irrigated)
122	Does your household own any radios/cassettes/CD players? (No; Yes)

Figure 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
116	Does your household own any sewing machines? (No; Yes)
115	Does your household own, sharecrop-in, or mortgage-in any agricultural land? (Only sharecropped-in or mortgaged-in; None; Both owned and sharecropped-in/mortgaged-in; Only owned)
101	Does your household own any bicycles? (No; Yes)
97	What is the present marital status of the male head/spouse? (Re-married, or widower; Single person, divorced, or separated; Poly-married; No male head/spouse; Never-married)
97	In their job in which they worked the most hours in the past seven days, how many household members were in agriculture (whether in wage-employment or self-employment)? (Three or more; Two; One; None)
92	In their job in which they worked the most hours in the past seven days, how many household members were not in agriculture (whether in wage-employment or self-employment)? (None; One; Two or more)
88	Is this dwelling unit occupied by your household only? (Yes; No)
85	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, did any household members work in agriculture in the job in which they worked the most hours in the past seven days? If yes, does the household own any ploughs, tractors, carts, water pumps, threshers, trolleys, or generators/diesel engines? (Has agricultural land and someone works in agriculture, but does not own large agricultural implements; Has agricultural land, someone works in agriculture, and owns large agricultural implements; Has agricultural land, but no one works in agriculture; No agricultural land)
84	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, did any household members work in agriculture in the job in which they worked the most hours in the past seven days? If yes, does the household own any he/she buffaloes? (No agricultural land; Has agricultural land, but no one works in agriculture; Has agricultural land and someone works in agriculture, but does not own he/she buffaloes; Has agricultural land, someone works in agriculture, and owns he/she buffaloes)

Figure 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
72	How many household members can read and write a letter? (None; One; Two or more)
72	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, did any household members work in agriculture in the job in which they worked the most hours in the past seven days? If yes, does the household own any bullocks/cows? (Has agricultural land and someone works in agriculture, but does not own bullocks/cows; Has agricultural land, someone works in agriculture, and owns bullocks/cows; Has agricultural land, but no one works in agriculture; No agricultural land)
72	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, did any household members work in agriculture in the job in which they worked the most hours in the past seven days? If yes, does the household own any goats/castrated goats? (Has agricultural land and someone works in agriculture, but does not own goats/castrated goats; Has agricultural land, someone works in agriculture, and owns goats/castrated goats; Has agricultural land, but no one works in agriculture; No agricultural land)
70	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, did any household members work in agriculture in the job in which they worked the most hours in the past seven days? If yes, does the household own any bullocks/cows, he/she buffaloes, yaks/naks, or horses/donkeys/mules? (Has agricultural land and someone works in agriculture, but does not own bullocks/cows, he/she buffaloes, yaks/naks, or horses/donkeys/mules; Has agricultural land, someone works in agriculture, and owns bullocks/cows, he/she buffaloes, yaks/naks, or horses/donkeys/mules; Has agricultural land, but no one works in agriculture; No agricultural land)
70	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, did any household members work in agriculture in the job in which they worked the most hours in the past seven days? If yes, does the household own any poultry/ducks/pigeons? (Has agricultural land and someone works in agriculture, but does not own poultry/ducks/pigeons; Has agricultural land, someone works in agriculture, and owns poultry/ducks/pigeons; Has agricultural land, but no one works in agriculture; No agricultural land)

Figure 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
69	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, did any household members work in agriculture in the job in which they worked the most hours in the past seven days? If yes, does the household own any ploughs, tractors, carts, water pumps, threshers, trolleys, or generators/diesel engines? (Has agricultural land and someone works in agriculture, but does not own large agricultural implements; Has agricultural land, someone works in agriculture, and owns large agricultural implements; Has agricultural land, but no one works in agriculture; No agricultural land)
68	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, did any household members work in agriculture in the job in which they worked the most hours in the past seven days? If yes, does the household own any bullocks/cows, he/she buffaloes, goats/castrated goats, he/she sheep, yaks/naks, pigs/pork, or horses/donkeys/mules? (Has agricultural land and someone works in agriculture, but does not own bullocks/cows, he/she buffaloes, goats/castrated goats, he/she sheep, yaks/naks, pigs/pork, or horses/donkeys/mules; Has agricultural land, someone works in agriculture, and owns bullocks/cows, he/she buffaloes, goats/castrated goats, he/she sheep, yaks/naks, pigs/pork, or horses/donkeys/mules; Has agricultural land, but no one works in agriculture; No agricultural land)
67	Does your household own, sharecrop-in, or mortgage-in any agricultural land? If yes, did any household members work in agriculture in the job in which they worked the most hours in the past seven days? If yes, does the household own any he/she sheep, yaks/naks, pigs/pork, or horses/donkeys/mules? (Has agricultural land and someone works in agriculture, but does not own he/she sheep, yaks/naks, pigs/pork, or horses/donkeys/mules; Has agricultural land, someone works in agriculture, and owns he/she sheep, yaks/naks, pigs/pork, or horses/donkeys/mules; Has agricultural land, but no one works in agriculture; No agricultural land)
49	Did the male head/spouse do any work in the past seven days in wage employment or self-employment, whether in agriculture or non-agriculture? (No; Yes)
44	Do any household members suffer from a chronic illness? (No; Yes)

Figure 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
41	Does the female head/spouse suffer from a chronic illness or any physical, visual, hearing, visual and hearing, speech, or mental disability? (No; No female head/spouse; Yes)
41	Do any household members suffer from any physical, visual, hearing, visual and hearing, speech, or mental disability? (Yes; No)
36	In their occupation in which they worked the most hours in the past seven days, how many household members were skilled agricultural and fishery workers? (Three or more; Two; One; None)
29	In their job in which they worked the most hours in the past seven days, how many household members were in wage-employment (whether in agriculture or non-agriculture)? (Two or more; One; None)
29	What is the religion of the head of the household? (Kirant, Jain, Christian, Shikh, Bahai, or other; Buddhist; Hindu; Islam)
24	Does your household own any washing machines? (No; Yes)
23	Does your residence have a living room or a dining room? (No; Yes)
21	In their occupation in which they worked the most hours in the past seven days, were any household members not skilled agricultural and fishery workers? (No; Yes)
19	Does the male head/spouse suffer from a chronic illness or any physical, visual, hearing, visual and hearing, speech, or mental disability? (No; Yes; No male head/spouse)
19	In their job in which they worked the most hours in the past seven days, how many household members were self-employed (whether in agriculture or non-agriculture)? (Three or more; Two; One; None)
8	Is there a kitchen garden? (No; Yes)
8	Do any household members suffer from a chronic illness or any physical, visual, hearing, visual and hearing, speech, or mental disability? (Yes; No)

Figure 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
7	In the past seven days, how many household members did any work in wage employment or self-employment, whether in agriculture or non-agriculture? (None; One; Two; Three or more)
4	Did the female head/spouse do any work in the past seven days in wage employment or self-employment, whether in agriculture or non-agriculture? (Yes; No; No female head/spouse)
1	Does your household own any pressure lamps/petromaxes? (Yes; No)
0	In their job in which they worked the most hours in the past seven days, were any household members paid salaries on a long-term basis? (No; Yes)

Source: 2010 NLSS and 100% of the new-definition national poverty line

Tables for
100% of the New-Definition National Poverty Line

(and Tables Pertaining
to All Eight New-Definition Poverty Lines
and all Three Legacy-Definition Poverty Lines)

Figure 4 (100% of the new-definition national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	77.8
15–19	64.6
20–24	59.3
25–29	49.8
30–34	38.9
35–39	25.9
40–44	17.7
45–49	9.6
50–54	5.3
55–59	3.5
60–64	1.8
65–69	0.4
70–74	0.2
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 5 (100% of the new-definition national line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	109	÷	109	=	100.0
5–9	299	÷	299	=	100.0
10–14	1,143	÷	1,469	=	77.8
15–19	2,132	÷	3,301	=	64.6
20–24	3,281	÷	5,534	=	59.3
25–29	3,718	÷	7,472	=	49.8
30–34	3,245	÷	8,342	=	38.9
35–39	2,312	÷	8,940	=	25.9
40–44	1,703	÷	9,598	=	17.7
45–49	930	÷	9,700	=	9.6
50–54	542	÷	10,148	=	5.3
55–59	289	÷	8,237	=	3.5
60–64	142	÷	7,849	=	1.8
65–69	24	÷	6,855	=	0.4
70–74	8	÷	5,340	=	0.2
75–79	0	÷	3,019	=	0.0
80–84	0	÷	1,876	=	0.0
85–89	0	÷	1,290	=	0.0
90–94	0	÷	551	=	0.0
95–100	0	÷	70	=	0.0

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

Figure 6 (All new-definition poverty lines): Probability that a given household's consumption falls in a range demarcated by two adjacent new-definition poverty lines

	Likelihood (%) of having expenditure in ranges demarcated by new-definition poverty lines								
	<Food	=>Food and <USAID	=>USAID and <100% Natl.	=>100% Natl. and <$1.25/day	=>$1.25/day and <150% Natl.	=>150% Natl. and <$2.00/day	=>$2.00/day and <200% Natl.	=>200% Natl. and <$2.50/day	=>$2.50/day
Score	<NPR32.68	=>NPR32.68 and <NPR42.84	=>NPR42.84 and <NPR52.77	=>NPR52.77 and <NPR55.43	=>NPR55.43 and <NPR79.16	=>NPR79.16 and <NPR88.69	=>NPR88.69 and <NPR105.54	=>NPR105.54 and <NPR110.86	=>NPR110.86
0–4	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5–9	38.9	27.5	33.7	0.0	0.0	0.0	0.0	0.0	0.0
10–14	32.3	13.3	32.2	4.3	17.9	0.0	0.0	0.0	0.0
15–19	20.7	20.7	23.2	3.0	25.2	2.5	4.8	0.0	0.0
20–24	14.6	18.1	26.6	5.5	26.4	3.8	4.4	0.2	0.4
25–29	9.3	15.7	24.8	8.6	26.7	5.8	5.2	1.9	1.9
30–34	7.4	13.5	18.0	6.2	33.0	6.5	10.1	2.2	3.1
35–39	3.9	5.4	16.6	5.4	37.1	9.6	12.8	2.2	7.2
40–44	2.0	3.6	12.2	3.8	35.8	12.5	14.7	2.4	13.1
45–49	0.0	2.8	6.8	3.2	31.9	14.0	16.3	5.5	19.6
50–54	0.0	1.8	3.6	1.1	26.1	12.1	17.2	3.8	34.5
55–59	0.0	0.9	2.6	1.1	20.6	11.2	17.0	4.2	42.3
60–64	0.0	0.0	1.8	0.5	10.0	5.3	18.4	6.3	57.7
65–69	0.0	0.0	0.4	0.4	7.4	5.8	13.2	6.9	66.0
70–74	0.0	0.0	0.2	0.2	4.2	3.1	9.2	2.6	80.6
75–79	0.0	0.0	0.0	0.3	1.6	2.6	3.3	1.9	90.4
80–84	0.0	0.0	0.0	0.2	0.7	0.6	3.7	2.0	92.8
85–89	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.5	96.8
90–94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
95–100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

Note: All poverty likelihoods in percentage units.

Figure 6 (All legacy-definition poverty lines): Probability that a given household's consumption falls in a range demarcated by two adjacent legacy-definition poverty lines

	Likelihood (%) of having expenditure in ranges demarcated by legacy-definition poverty lines			
	<100% Natl.	=>100% Natl. and <$1.25/day	=>$1.25/day and <$2.50/day	=>$2.50/day
Score	<NPR39.22	=>NPR39.22 and <NPR55.43	=>NPR55.43 and <NPR110.86	=>NPR110.86
0–4	100.0	0.0	0.0	0.0
5–9	65.0	27.2	7.8	0.0
10–14	60.3	30.8	9.0	0.0
15–19	46.5	29.0	24.5	0.0
20–24	36.3	35.9	27.8	0.0
25–29	25.9	40.1	32.9	1.2
30–34	16.6	38.8	42.4	2.2
35–39	8.7	34.3	51.3	5.8
40–44	5.7	22.7	61.5	10.1
45–49	1.2	15.0	64.7	19.1
50–54	0.5	8.8	62.6	28.2
55–59	0.2	2.5	53.3	44.0
60–64	0.0	1.7	39.3	59.0
65–69	0.0	0.0	29.2	70.8
70–74	0.0	0.0	14.0	86.0
75–79	0.0	0.0	5.5	94.5
80–84	0.0	0.0	2.1	97.9
85–89	0.0	0.0	0.0	100.0
90–94	0.0	0.0	0.0	100.0
95–100	0.0	0.0	0.0	100.0

Figure 7 (100% of the new-definition national line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+20.0	9.0	10.5	13.5
10–14	+4.1	4.8	5.9	7.8
15–19	–3.7	3.5	4.0	5.1
20–24	+3.9	2.8	3.3	4.7
25–29	–0.0	2.4	2.9	3.8
30–34	+8.2	2.2	2.6	3.4
35–39	+0.0	2.0	2.4	2.9
40–44	+1.1	1.5	1.8	2.3
45–49	–2.4	1.9	2.0	2.2
50–54	–1.0	1.0	1.1	1.4
55–59	–2.2	1.7	1.8	2.0
60–64	–0.6	0.7	0.8	1.1
65–69	–1.2	1.0	1.1	1.3
70–74	+0.0	0.1	0.2	0.2
75–79	+0.0	0.0	0.0	0.0
80–84	–1.0	0.9	1.0	1.3
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (100% of the new-definition national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–0.6	62.0	70.8	80.5
4	+0.3	29.5	35.3	44.9
8	+0.1	20.9	24.8	33.6
16	+0.3	14.7	17.2	22.4
32	+0.4	10.2	12.0	16.3
64	+0.5	7.5	8.7	10.8
128	+0.3	5.2	6.1	8.0
256	+0.4	3.8	4.5	5.9
512	+0.5	2.6	3.1	4.2
1,024	+0.5	1.8	2.2	2.9
2,048	+0.5	1.3	1.6	2.2
4,096	+0.4	0.9	1.1	1.4
8,192	+0.5	0.7	0.8	1.0
16,384	+0.4	0.5	0.5	0.8

Figure 9 (All new-definition poverty lines): Average differences between estimates and true values for poverty rates of a group of households at a point in time, precision, and the α factor for precision, scorecard applied to the validation sample

	New-definition poverty line							
		National			USAID	Intl. 2005 PPP		
	Food	100%	150%	200%	'Extreme'	$1.25	$2.00	$2.50
Estimate minus true value								
Scorecard applied to validation sample	+0.1	+0.4	+1.5	+1.2	+0.4	+0.6	+1.3	+1.5
Precision of difference								
Scorecard applied to validation sample	0.3	0.5	0.5	0.5	0.4	0.5	0.5	0.5
α factor for standard errors								
Scorecard applied to validation sample	0.99	0.91	0.86	0.81	0.96	0.88	0.84	0.80

Differences between estimates and true values are displayed in units of percentage points.

Precision is measured as 90-percent confidence intervals in units of ± percentage points.

Differences and precision estimated from 1,000 bootstrap samples of size n = 16,384.

α is estimated from 1,000 bootstrap samples of n = 256, 512, 1,024, 2,048, 4,096, 8,192, and 16,384.

Figure 9 (All legacy-definition poverty lines): Average differences between estimates and true values for poverty rates of a group of households at a point in time, precision, and the α factor for precision, scorecard applied to the validation sample

	Legacy-definition poverty line		
	National	Intl. 2005 PPP	
	100%	$1.25	$2.50
Estimate minus true value			
Scorecard applied to validation sample	+0.6	–0.6	–0.1
Precision of difference			
Scorecard applied to validation sample	0.3	0.5	0.5
α factor for standard errors			
Scorecard applied to validation sample	0.93	0.87	0.79

Differences between estimates and true values are displayed in units of percentage points.
Precision is measured as 90-percent confidence intervals in units of ± percentage points.
Differences and precision estimated from 1,000 bootstrap samples of size $n = 16{,}384$.
α is estimated from 1,000 bootstrap samples of $n = 256$, 512, 1,024, 2,048, 4,096, 8,192, and 16,384.

Figure 10 (All poverty lines): Possible targeting outcomes

True poverty status		Targeting segment: Targeted	Targeting segment: Non-targeted
		Inclusion	**Undercoverage**
	Below poverty line	Under poverty line Correctly Targeted	Under poverty line Mistakenly Non-targeted
		Leakage	**Exclusion**
	Above poverty line	Above poverty line Mistakenly Targeted	Above poverty line Correctly Non-targeted

Figure 11 (100% of the new-definition national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	19.9	0.0	80.0	80.1	–98.9
<=9	0.3	19.6	0.1	80.0	80.3	–96.3
<=14	1.4	18.5	0.4	79.6	81.0	–83.4
<=19	3.7	16.3	1.5	78.5	82.2	–55.7
<=24	6.8	13.2	4.0	76.1	82.8	–12.5
<=29	10.5	9.5	7.7	72.3	82.8	+43.6
<=34	13.1	6.9	13.4	66.6	79.7	+32.8
<=39	15.5	4.5	20.0	60.1	75.5	–0.0
<=44	17.1	2.8	27.9	52.1	69.3	–39.8
<=49	18.3	1.6	36.4	43.6	61.9	–82.4
<=54	19.1	0.8	45.8	34.3	53.4	–129.2
<=59	19.6	0.4	53.5	26.5	46.1	–168.0
<=64	19.8	0.1	61.2	18.9	38.7	–206.3
<=69	19.9	0.0	67.9	12.1	32.0	–240.1
<=74	19.9	0.0	73.2	6.8	26.7	–266.7
<=79	19.9	0.0	76.3	3.8	23.7	–281.9
<=84	20.0	0.0	78.1	1.9	21.9	–291.1
<=89	20.0	0.0	79.4	0.6	20.6	–297.6
<=94	20.0	0.0	80.0	0.1	20.0	–300.3
<=100	20.0	0.0	80.0	0.0	20.0	–300.7

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (100% of the new-definition national line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	0.5	Only poor targeted
<=9	0.4	82.4	1.7	4.7:1
<=14	1.9	76.4	7.2	3.2:1
<=19	5.2	70.7	18.3	2.4:1
<=24	10.7	63.1	33.8	1.7:1
<=29	18.2	57.7	52.5	1.4:1
<=34	26.5	49.4	65.6	1.0:1
<=39	35.5	43.7	77.6	0.8:1
<=44	45.1	38.1	85.9	0.6:1
<=49	54.8	33.5	91.8	0.5:1
<=54	64.9	29.5	95.8	0.4:1
<=59	73.1	26.8	98.2	0.4:1
<=64	81.0	24.5	99.3	0.3:1
<=69	87.9	22.7	99.8	0.3:1
<=74	93.2	21.4	99.9	0.3:1
<=79	96.2	20.7	99.9	0.3:1
<=84	98.1	20.4	100.0	0.3:1
<=89	99.4	20.1	100.0	0.3:1
<=94	99.9	20.0	100.0	0.2:1
<=100	100.0	20.0	100.0	0.2:1

Tables for
the New-Definition Food Poverty Line

Figure 4 (New-definition food line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	38.9
10–14	32.3
15–19	20.7
20–24	14.6
25–29	9.3
30–34	7.4
35–39	3.9
40–44	2.0
45–49	0.0
50–54	0.0
55–59	0.0
60–64	0.0
65–69	0.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (New-definition food line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+15.8	10.1	11.8	14.8
10–14	–0.3	4.9	5.9	7.5
15–19	+5.1	2.6	3.1	4.1
20–24	–2.1	2.1	2.4	3.0
25–29	–3.5	2.5	2.7	3.0
30–34	+2.1	1.0	1.2	1.6
35–39	+1.4	0.6	0.8	1.0
40–44	+0.7	0.4	0.6	0.7
45–49	–0.5	0.4	0.5	0.5
50–54	–0.2	0.2	0.2	0.2
55–59	–1.2	0.9	0.9	1.1
60–64	+0.0	0.0	0.0	0.0
65–69	+0.0	0.0	0.0	0.0
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (New-definition food line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+0.0	7.3	53.0	62.4
4	+0.1	15.4	18.6	26.8
8	–0.2	10.4	13.6	18.4
16	+0.0	7.6	9.4	13.2
32	+0.1	5.5	6.7	8.7
64	+0.1	3.9	4.4	6.1
128	+0.1	2.8	3.3	4.2
256	+0.1	2.0	2.4	3.1
512	+0.1	1.4	1.7	2.3
1,024	+0.1	1.0	1.2	1.7
2,048	+0.1	0.7	0.9	1.1
4,096	+0.1	0.5	0.6	0.8
8,192	+0.1	0.4	0.4	0.5
16,384	+0.1	0.3	0.3	0.4

Figure 11 (New-definition food line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	4.1	0.1	95.8	95.9	–96.1
<=9	0.1	4.0	0.3	95.6	95.7	–87.0
<=14	0.7	3.5	1.2	94.6	95.3	–38.7
<=19	1.2	2.9	4.0	91.9	93.1	+3.8
<=24	2.2	2.0	8.6	87.3	89.4	–106.7
<=29	3.1	1.0	15.0	80.8	84.0	–263.1
<=34	3.6	0.5	22.9	72.9	76.6	–452.9
<=39	3.9	0.3	31.6	64.2	68.1	–663.0
<=44	4.0	0.2	41.1	54.8	58.7	–891.8
<=49	4.0	0.1	50.7	45.1	49.1	–1,124.8
<=54	4.1	0.1	60.9	35.0	39.1	–1,368.8
<=59	4.1	0.0	69.0	26.9	31.0	–1,565.6
<=64	4.1	0.0	76.9	19.0	23.1	–1,755.0
<=69	4.1	0.0	83.7	12.1	16.3	–1,920.5
<=74	4.1	0.0	89.1	6.8	10.9	–2,049.4
<=79	4.1	0.0	92.1	3.8	7.9	–2,122.2
<=84	4.1	0.0	93.9	1.9	6.1	–2,167.5
<=89	4.1	0.0	95.2	0.6	4.8	–2,198.7
<=94	4.1	0.0	95.8	0.1	4.2	–2,212.0
<=100	4.1	0.0	95.9	0.0	4.1	–2,213.7

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (New-definition food line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	48.9	1.3	1.0:1
<=9	0.4	32.4	3.2	0.5:1
<=14	1.9	35.3	16.0	0.5:1
<=19	5.2	23.0	28.8	0.3:1
<=24	10.7	20.1	51.9	0.3:1
<=29	18.2	17.3	75.8	0.2:1
<=34	26.5	13.6	87.4	0.2:1
<=39	35.5	10.9	93.0	0.1:1
<=44	45.1	8.8	95.9	0.1:1
<=49	54.8	7.3	97.0	0.1:1
<=54	64.9	6.3	97.9	0.1:1
<=59	73.1	5.7	100.0	0.1:1
<=64	81.0	5.1	100.0	0.1:1
<=69	87.9	4.7	100.0	0.0:1
<=74	93.2	4.4	100.0	0.0:1
<=79	96.2	4.3	100.0	0.0:1
<=84	98.1	4.2	100.0	0.0:1
<=89	99.4	4.2	100.0	0.0:1
<=94	99.9	4.1	100.0	0.0:1
<=100	100.0	4.1	100.0	0.0:1

Tables for
150% of the New-Definition National Poverty Line

Figure 4 (150% of the new-definition national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	92.7
20–24	91.2
25–29	85.1
30–34	78.0
35–39	68.3
40–44	57.3
45–49	44.6
50–54	32.5
55–59	25.2
60–64	12.3
65–69	8.2
70–74	4.6
75–79	1.8
80–84	0.9
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (150% of the new-definition national line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+20.0	9.0	10.5	13.5
10–14	+1.0	0.9	1.0	1.3
15–19	–3.8	2.5	2.6	2.7
20–24	+2.4	1.9	2.3	2.9
25–29	+1.1	1.8	2.0	2.7
30–34	+6.9	2.1	2.5	3.4
35–39	+3.0	2.1	2.5	3.1
40–44	+2.7	2.2	2.6	3.3
45–49	–4.9	3.6	3.8	4.2
50–54	+2.5	1.9	2.2	2.9
55–59	+3.5	1.9	2.4	3.1
60–64	–2.4	2.1	2.2	2.6
65–69	+3.6	1.1	1.3	1.6
70–74	+0.2	1.2	1.5	2.0
75–79	+0.7	0.6	0.8	1.0
80–84	–0.5	0.9	1.1	1.5
85–89	–0.7	0.7	0.8	0.9
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (150% of the new-definition national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–2.1	67.9	76.4	93.3
4	+1.6	33.3	40.2	52.6
8	+1.9	24.8	29.3	37.5
16	+2.0	16.7	19.5	27.1
32	+1.8	11.9	14.2	19.1
64	+1.7	8.7	10.4	14.1
128	+1.5	6.2	7.3	9.7
256	+1.4	4.3	5.3	7.5
512	+1.4	3.2	3.8	5.4
1,024	+1.5	2.2	2.6	3.3
2,048	+1.5	1.5	1.8	2.6
4,096	+1.5	1.1	1.3	1.8
8,192	+1.5	0.8	0.9	1.2
16,384	+1.5	0.5	0.6	0.8

Figure 11 (150% of the new-definition national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	45.7	0.0	54.2	54.3	–99.5
<=9	0.3	45.5	0.1	54.1	54.5	–98.4
<=14	1.8	44.0	0.1	54.1	55.9	–92.0
<=19	4.9	40.8	0.2	54.0	58.9	–77.9
<=24	9.9	35.9	0.8	53.4	63.3	–55.0
<=29	16.2	29.6	2.0	52.2	68.5	–24.9
<=34	22.2	23.6	4.3	49.9	72.1	+6.4
<=39	28.1	17.7	7.4	46.8	75.0	+38.8
<=44	33.5	12.3	11.5	42.7	76.2	+71.6
<=49	38.4	7.4	16.3	37.9	76.3	+64.3
<=54	41.7	4.1	23.2	31.0	72.7	+49.3
<=59	43.6	2.2	29.5	24.7	68.3	+35.5
<=64	44.9	0.9	36.1	18.1	63.1	+21.2
<=69	45.4	0.4	42.5	11.7	57.1	+7.2
<=74	45.7	0.1	47.5	6.7	52.4	–3.8
<=79	45.7	0.1	50.5	3.7	49.5	–10.2
<=84	45.8	0.0	52.3	1.9	47.7	–14.2
<=89	45.8	0.0	53.6	0.6	46.4	–17.0
<=94	45.8	0.0	54.1	0.1	45.9	–18.2
<=100	45.8	0.0	54.2	0.0	45.8	–18.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (150% of the new-definition national line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	0.2	Only poor targeted
<=9	0.4	82.4	0.7	4.7:1
<=14	1.9	94.9	3.9	18.5:1
<=19	5.2	95.5	10.8	21.5:1
<=24	10.7	92.4	21.6	12.2:1
<=29	18.2	89.2	35.4	8.3:1
<=34	26.5	83.7	48.5	5.1:1
<=39	35.5	79.2	61.4	3.8:1
<=44	45.1	74.4	73.2	2.9:1
<=49	54.8	70.2	83.9	2.4:1
<=54	64.9	64.2	91.0	1.8:1
<=59	73.1	59.6	95.3	1.5:1
<=64	81.0	55.5	98.1	1.2:1
<=69	87.9	51.7	99.1	1.1:1
<=74	93.2	49.0	99.8	1.0:1
<=79	96.2	47.5	99.9	0.9:1
<=84	98.1	46.7	100.0	0.9:1
<=89	99.4	46.1	100.0	0.9:1
<=94	99.9	45.8	100.0	0.8:1
<=100	100.0	45.8	100.0	0.8:1

Tables for
200% of the New-Definition National Poverty Line

Figure 4 (200% of the new-definition national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	100.0
20–24	99.4
25–29	96.2
30–34	94.7
35–39	90.6
40–44	84.5
45–49	74.9
50–54	61.7
55–59	53.5
60–64	36.0
65–69	27.1
70–74	16.8
75–79	7.8
80–84	5.2
85–89	0.7
90–94	0.0
95–100	0.0

Figure 7 (200% of the new-definition national line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+20.0	9.0	10.5	13.5
10–14	+0.0	0.0	0.0	0.0
15–19	+0.8	0.6	0.7	0.8
20–24	+0.4	0.5	0.6	0.8
25–29	+0.1	0.9	1.2	1.5
30–34	+3.8	1.4	1.6	2.2
35–39	+3.9	1.5	1.8	2.3
40–44	+2.0	1.7	2.0	2.5
45–49	–1.4	2.0	2.3	3.0
50–54	–0.5	2.1	2.4	3.0
55–59	+1.4	2.4	2.7	4.1
60–64	–2.5	2.3	2.7	3.6
65–69	+5.0	2.1	2.5	3.5
70–74	+1.2	2.0	2.5	3.5
75–79	+0.7	1.7	2.1	2.8
80–84	+1.8	1.4	1.6	2.0
85–89	–0.2	0.8	0.9	1.2
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (200% of the new-definition national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–0.7	69.4	81.8	88.9
4	+0.8	29.5	36.7	49.8
8	+0.8	22.1	25.3	34.1
16	+1.2	15.4	18.3	24.2
32	+1.2	11.0	13.8	18.2
64	+1.3	7.6	9.4	12.2
128	+1.1	5.5	6.7	8.8
256	+1.1	4.0	4.8	5.8
512	+1.1	2.7	3.3	4.2
1,024	+1.2	1.9	2.4	3.1
2,048	+1.2	1.4	1.7	2.3
4,096	+1.2	1.0	1.2	1.7
8,192	+1.2	0.7	0.8	1.1
16,384	+1.2	0.5	0.6	0.8

Figure 11 (200% of the new-definition national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	65.6	0.0	34.3	34.4	–99.7
<=9	0.3	65.4	0.1	34.2	34.6	–98.9
<=14	1.8	63.9	0.1	34.2	36.0	–94.4
<=19	5.1	60.6	0.1	34.2	39.3	–84.4
<=24	10.5	55.2	0.2	34.1	44.7	–67.6
<=29	17.7	48.0	0.4	33.9	51.6	–45.3
<=34	25.3	40.4	1.2	33.1	58.5	–21.0
<=39	33.1	32.6	2.4	31.9	65.0	+4.4
<=44	41.1	24.6	4.0	30.3	71.4	+31.1
<=49	48.5	17.2	6.2	28.1	76.6	+57.2
<=54	55.0	10.7	9.9	24.4	79.4	+82.5
<=59	59.3	6.4	13.8	20.5	79.8	+79.0
<=64	62.6	3.1	18.4	15.9	78.4	+71.9
<=69	64.3	1.4	23.5	10.8	75.1	+64.2
<=74	65.3	0.4	27.9	6.4	71.7	+57.5
<=79	65.6	0.1	30.7	3.7	69.2	+53.3
<=84	65.7	0.0	32.4	1.9	67.6	+50.7
<=89	65.7	0.0	33.7	0.6	66.3	+48.7
<=94	65.7	0.0	34.2	0.1	65.8	+47.9
<=100	65.7	0.0	34.3	0.0	65.7	+47.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (200% of the new-definition national line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	0.2	Only poor targeted
<=9	0.4	82.4	0.5	4.7:1
<=14	1.9	96.2	2.7	25.1:1
<=19	5.2	98.0	7.7	48.6:1
<=24	10.7	98.4	16.0	61.5:1
<=29	18.2	97.6	27.0	39.9:1
<=34	26.5	95.5	38.6	21.3:1
<=39	35.5	93.3	50.4	13.9:1
<=44	45.1	91.1	62.5	10.3:1
<=49	54.8	88.6	73.9	7.8:1
<=54	64.9	84.7	83.7	5.5:1
<=59	73.1	81.1	90.3	4.3:1
<=64	81.0	77.2	95.2	3.4:1
<=69	87.9	73.2	97.9	2.7:1
<=74	93.2	70.1	99.4	2.3:1
<=79	96.2	68.1	99.8	2.1:1
<=84	98.1	66.9	100.0	2.0:1
<=89	99.4	66.1	100.0	2.0:1
<=94	99.9	65.7	100.0	1.9:1
<=100	100.0	65.7	100.0	1.9:1

Tables for
of the New-Definition USAID "Extreme" Line

Figure 4 (New-definition USAID "extreme" line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	66.3
10–14	45.6
15–19	41.4
20–24	32.7
25–29	25.0
30–34	20.9
35–39	9.3
40–44	5.6
45–49	2.8
50–54	1.8
55–59	0.9
60–64	0.0
65–69	0.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (New-definition USAID "extreme" line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16{,}384$ with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+21.6	12.1	14.4	19.6
10–14	–5.6	5.5	6.6	8.6
15–19	+6.0	3.5	4.1	5.3
20–24	–4.2	3.4	3.6	4.2
25–29	–0.4	2.1	2.4	3.5
30–34	+4.9	1.7	2.0	2.3
35–39	+1.3	1.2	1.5	1.9
40–44	–0.1	1.0	1.2	1.5
45–49	+0.0	0.7	0.8	1.2
50–54	+0.2	0.4	0.5	0.7
55–59	–1.7	1.2	1.3	1.4
60–64	–0.3	0.2	0.3	0.3
65–69	+0.0	0.0	0.0	0.0
70–74	–0.1	0.1	0.2	0.2
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (New-definition USAID "extreme" line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+0.4	50.0	60.2	71.4
4	+0.1	21.8	27.3	38.2
8	–0.0	16.3	19.1	25.1
16	+0.2	11.7	14.1	18.1
32	+0.4	8.5	10.4	12.9
64	+0.4	5.8	6.8	8.6
128	+0.4	4.0	4.8	6.6
256	+0.4	2.9	3.5	4.3
512	+0.4	2.0	2.3	2.9
1,024	+0.4	1.4	1.7	2.3
2,048	+0.4	1.0	1.2	1.6
4,096	+0.4	0.7	0.9	1.1
8,192	+0.4	0.5	0.6	0.8
16,384	+0.4	0.4	0.5	0.6

Figure 11 (New-definition USAID "extreme" line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	9.5	0.0	90.3	90.4	–97.7
<=9	0.2	9.3	0.2	90.1	90.3	–93.2
<=14	1.1	8.5	0.8	89.4	90.5	–69.3
<=19	2.2	7.3	2.9	87.3	89.6	–22.5
<=24	4.2	5.4	6.4	83.9	88.1	+33.4
<=29	6.1	3.5	12.0	78.3	84.4	–25.0
<=34	7.5	2.1	18.9	71.3	78.8	–97.6
<=39	8.2	1.4	27.1	63.1	71.4	–183.0
<=44	8.8	0.8	36.1	54.1	62.9	–277.3
<=49	9.1	0.5	45.5	44.7	53.8	–375.3
<=54	9.3	0.3	55.4	34.8	44.2	–478.6
<=59	9.5	0.1	63.5	26.8	36.3	–562.4
<=64	9.6	0.0	71.3	19.0	28.6	–644.0
<=69	9.6	0.0	78.1	12.1	21.7	–715.5
<=74	9.6	0.0	83.5	6.8	16.4	–771.1
<=79	9.6	0.0	86.5	3.8	13.4	–802.6
<=84	9.6	0.0	88.3	1.9	11.5	–822.2
<=89	9.6	0.0	89.6	0.6	10.2	–835.7
<=94	9.6	0.0	90.2	0.1	9.6	–841.4
<=100	9.6	0.0	90.3	0.0	9.6	–842.1

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (New-definition USAID "extreme" line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	1.1	Only poor targeted
<=9	0.4	59.1	2.5	1.4:1
<=14	1.9	56.6	11.1	1.3:1
<=19	5.2	43.4	23.4	0.8:1
<=24	10.7	39.4	44.1	0.7:1
<=29	18.2	33.5	63.6	0.5:1
<=34	26.5	28.2	78.2	0.4:1
<=39	35.5	23.2	85.8	0.3:1
<=44	45.1	19.5	91.6	0.2:1
<=49	54.8	16.6	94.9	0.2:1
<=54	64.9	14.4	97.3	0.2:1
<=59	73.1	13.0	99.5	0.1:1
<=64	81.0	11.8	99.8	0.1:1
<=69	87.9	10.9	99.8	0.1:1
<=74	93.2	10.3	100.0	0.1:1
<=79	96.2	10.0	100.0	0.1:1
<=84	98.1	9.8	100.0	0.1:1
<=89	99.4	9.6	100.0	0.1:1
<=94	99.9	9.6	100.0	0.1:1
<=100	100.0	9.6	100.0	0.1:1

Tables for
of the New-Definition $1.25/Day Poverty Line

Figure 4 (New-definition $1.25/day line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	82.1
15–19	67.5
20–24	64.8
25–29	58.4
30–34	45.1
35–39	31.2
40–44	21.6
45–49	12.7
50–54	6.4
55–59	4.6
60–64	2.3
65–69	0.8
70–74	0.4
75–79	0.3
80–84	0.2
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (New-definition $1.25/day line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+20.0	9.0	10.5	13.5
10–14	–1.8	3.8	4.5	6.3
15–19	–7.3	5.2	5.5	5.9
20–24	+5.3	2.7	3.3	4.5
25–29	+3.0	2.4	2.8	3.6
30–34	+9.4	2.2	2.6	3.5
35–39	+0.7	2.0	2.5	3.3
40–44	+0.8	1.7	2.1	2.7
45–49	–2.9	2.3	2.4	2.6
50–54	–0.6	1.0	1.1	1.4
55–59	–1.4	1.3	1.3	1.7
60–64	–2.3	1.6	1.7	1.9
65–69	–0.9	0.8	0.9	1.3
70–74	+0.1	0.2	0.2	0.3
75–79	+0.3	0.0	0.0	0.0
80–84	–0.8	0.8	0.9	1.3
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (New-definition $1.25/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–0.4	68.4	76.0	81.5
4	+0.8	31.0	36.2	47.7
8	+0.6	21.5	25.1	35.0
16	+0.5	15.5	19.0	23.5
32	+0.7	10.9	12.7	16.5
64	+0.8	7.8	9.4	12.2
128	+0.6	5.3	6.5	8.8
256	+0.7	3.8	4.6	6.0
512	+0.7	2.7	3.3	4.3
1,024	+0.7	1.9	2.3	3.1
2,048	+0.7	1.4	1.6	2.2
4,096	+0.6	0.9	1.1	1.6
8,192	+0.7	0.7	0.8	1.0
16,384	+0.6	0.5	0.6	0.8

Figure 11 (New-definition $1.25/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	22.8	0.0	77.1	77.2	–99.0
<=9	0.3	22.5	0.1	77.0	77.4	–96.7
<=14	1.5	21.3	0.3	76.8	78.3	–85.0
<=19	4.0	18.9	1.2	75.9	79.8	–60.1
<=24	7.3	15.6	3.4	73.7	81.0	–21.3
<=29	11.4	11.4	6.7	70.4	81.8	+29.5
<=34	14.5	8.4	12.0	65.1	79.6	+47.4
<=39	17.3	5.6	18.2	59.0	76.3	+20.6
<=44	19.3	3.6	25.7	51.4	70.7	–12.5
<=49	20.9	2.0	33.9	43.3	64.2	–48.0
<=54	21.8	1.1	43.1	34.0	55.8	–88.4
<=59	22.3	0.5	50.8	26.3	48.6	–122.1
<=64	22.7	0.2	58.3	18.8	41.5	–154.8
<=69	22.8	0.1	65.0	12.1	34.9	–184.2
<=74	22.9	0.0	70.3	6.8	29.6	–207.4
<=79	22.9	0.0	73.4	3.8	26.6	–220.6
<=84	22.9	0.0	75.2	1.9	24.8	–228.7
<=89	22.9	0.0	76.5	0.6	23.5	–234.4
<=94	22.9	0.0	77.1	0.1	22.9	–236.8
<=100	22.9	0.0	77.1	0.0	22.9	–237.1

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (New-definition $1.25/day line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	0.5	Only poor targeted
<=9	0.4	82.4	1.5	4.7:1
<=14	1.9	82.2	6.7	4.6:1
<=19	5.2	76.3	17.3	3.2:1
<=24	10.7	68.2	31.9	2.1:1
<=29	18.2	62.9	50.0	1.7:1
<=34	26.5	54.6	63.4	1.2:1
<=39	35.5	48.8	75.6	1.0:1
<=44	45.1	42.9	84.5	0.8:1
<=49	54.8	38.2	91.4	0.6:1
<=54	64.9	33.6	95.3	0.5:1
<=59	73.1	30.5	97.6	0.4:1
<=64	81.0	28.0	99.3	0.4:1
<=69	87.9	26.0	99.8	0.4:1
<=74	93.2	24.5	99.9	0.3:1
<=79	96.2	23.8	99.9	0.3:1
<=84	98.1	23.3	100.0	0.3:1
<=89	99.4	23.0	100.0	0.3:1
<=94	99.9	22.9	100.0	0.3:1
<=100	100.0	22.9	100.0	0.3:1

Tables for
of the New-Definition $2.00/Day Poverty Line

Figure 4 (New-definition $2.00/day line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	95.2
20–24	95.0
25–29	90.9
30–34	84.6
35–39	77.9
40–44	69.8
45–49	58.6
50–54	44.5
55–59	36.4
60–64	17.7
65–69	14.0
70–74	7.7
75–79	4.5
80–84	1.5
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (New-definition $2.00/day line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+20.0	9.0	10.5	13.5
10–14	+1.0	0.9	1.0	1.3
15–19	–2.7	1.8	1.9	1.9
20–24	+1.5	1.4	1.7	2.3
25–29	+0.6	1.4	1.7	2.3
30–34	+4.0	1.8	2.1	2.8
35–39	+3.7	1.9	2.3	2.9
40–44	+0.2	2.0	2.4	3.1
45–49	–3.8	3.0	3.2	3.7
50–54	+1.8	2.1	2.5	3.0
55–59	+7.3	2.2	2.6	3.5
60–64	–4.8	3.4	3.6	3.9
65–69	+6.6	1.2	1.4	1.8
70–74	+0.2	1.6	1.9	2.7
75–79	+0.7	1.4	1.7	2.4
80–84	–0.4	1.0	1.2	1.6
85–89	–0.7	0.7	0.8	0.9
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (New-definition $2.00/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–1.8	70.7	83.4	93.7
4	+1.3	33.5	40.8	52.2
8	+1.6	24.4	28.5	38.3
16	+1.9	16.6	20.1	25.0
32	+1.7	12.4	15.0	18.4
64	+1.5	8.7	10.5	13.5
128	+1.3	6.0	7.1	9.7
256	+1.2	4.4	5.1	6.5
512	+1.2	3.0	3.7	5.2
1,024	+1.3	2.2	2.6	3.3
2,048	+1.3	1.5	1.8	2.5
4,096	+1.3	1.1	1.2	1.6
8,192	+1.3	0.8	0.9	1.2
16,384	+1.3	0.5	0.6	0.8

Figure 11 (New-definition $2.00/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	53.6	0.0	46.3	46.4	–99.6
<=9	0.3	53.4	0.1	46.2	46.5	–98.6
<=14	1.8	52.0	0.1	46.2	48.0	–93.2
<=19	5.0	48.7	0.2	46.1	51.1	–81.1
<=24	10.2	43.6	0.5	45.7	55.9	–61.1
<=29	17.0	36.8	1.2	45.1	62.0	–34.6
<=34	23.7	30.0	2.8	43.5	67.2	–6.5
<=39	30.3	23.4	5.1	41.1	71.5	+22.5
<=44	37.1	16.6	7.9	38.3	75.5	+53.0
<=49	43.2	10.5	11.6	34.7	77.9	+78.5
<=54	47.8	5.9	17.1	29.2	77.0	+68.2
<=59	50.3	3.4	22.8	23.5	73.8	+57.6
<=64	52.3	1.4	28.7	17.6	69.9	+46.6
<=69	53.1	0.7	34.8	11.5	64.5	+35.2
<=74	53.5	0.2	39.7	6.6	60.1	+26.2
<=79	53.7	0.1	42.6	3.7	57.4	+20.8
<=84	53.7	0.0	44.4	1.9	55.6	+17.4
<=89	53.7	0.0	45.6	0.6	54.4	+15.1
<=94	53.7	0.0	46.2	0.1	53.8	+14.0
<=100	53.7	0.0	46.3	0.0	53.7	+13.9

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (New-definition $2.00/day line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	0.2	Only poor targeted
<=9	0.4	82.4	0.6	4.7:1
<=14	1.9	94.9	3.3	18.5:1
<=19	5.2	96.4	9.3	26.7:1
<=24	10.7	95.0	18.9	18.8:1
<=29	18.2	93.3	31.6	14.0:1
<=34	26.5	89.4	44.2	8.5:1
<=39	35.5	85.6	56.5	5.9:1
<=44	45.1	82.4	69.1	4.7:1
<=49	54.8	78.9	80.4	3.7:1
<=54	64.9	73.6	89.0	2.8:1
<=59	73.1	68.8	93.7	2.2:1
<=64	81.0	64.6	97.4	1.8:1
<=69	87.9	60.4	98.7	1.5:1
<=74	93.2	57.4	99.6	1.3:1
<=79	96.2	55.8	99.9	1.3:1
<=84	98.1	54.8	100.0	1.2:1
<=89	99.4	54.1	100.0	1.2:1
<=94	99.9	53.8	100.0	1.2:1
<=100	100.0	53.7	100.0	1.2:1

Tables for
of the New-Definition $2.50/Day Poverty Line

Figure 4 (New-definition $2.50/day line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	100.0
20–24	99.6
25–29	98.1
30–34	96.9
35–39	92.8
40–44	86.9
45–49	80.4
50–54	65.5
55–59	57.7
60–64	42.3
65–69	34.0
70–74	19.4
75–79	9.6
80–84	7.2
85–89	3.2
90–94	0.0
95–100	0.0

Figure 7 (New-definition $2.50/day line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+20.0	9.0	10.5	13.5
10–14	+0.0	0.0	0.0	0.0
15–19	+0.8	0.6	0.7	0.8
20–24	+0.6	0.5	0.6	0.8
25–29	+1.3	0.9	1.1	1.5
30–34	+4.3	1.2	1.5	2.0
35–39	+2.2	1.2	1.5	1.8
40–44	+0.2	1.5	1.7	2.3
45–49	+0.6	1.9	2.2	2.9
50–54	–2.7	2.3	2.5	3.1
55–59	+3.0	2.3	2.7	3.9
60–64	–1.3	2.3	2.7	3.8
65–69	+9.6	2.2	2.6	3.7
70–74	+1.5	2.2	2.6	3.6
75–79	–0.5	2.5	2.8	3.6
80–84	+3.4	1.5	1.7	2.2
85–89	–0.3	1.6	2.0	2.4
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (New-definition $2.50/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–0.5	69.1	76.5	91.2
4	+1.0	28.8	34.1	46.5
8	+0.8	21.1	24.5	32.5
16	+1.3	14.9	18.0	22.7
32	+1.4	10.7	13.2	17.9
64	+1.5	7.5	9.0	11.5
128	+1.3	5.4	6.7	8.8
256	+1.4	3.8	4.6	6.1
512	+1.4	2.6	3.2	4.3
1,024	+1.5	1.8	2.2	3.0
2,048	+1.5	1.3	1.6	2.0
4,096	+1.5	1.0	1.2	1.6
8,192	+1.5	0.7	0.8	1.1
16,384	+1.5	0.5	0.6	0.8

Figure 11 (New-definition $2.50/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	68.5	0.0	31.4	31.5	–99.7
<=9	0.3	68.3	0.1	31.3	31.7	–98.9
<=14	1.8	66.8	0.1	31.3	33.1	–94.6
<=19	5.1	63.5	0.1	31.3	36.4	–85.1
<=24	10.5	58.1	0.2	31.2	41.8	–69.0
<=29	17.8	50.8	0.4	31.0	48.8	–47.5
<=34	25.6	43.1	1.0	30.4	56.0	–24.1
<=39	33.6	35.0	1.9	29.5	63.1	+0.7
<=44	42.0	26.6	3.1	28.3	70.3	+26.9
<=49	49.8	18.8	5.0	26.4	76.2	+52.4
<=54	56.8	11.8	8.1	23.3	80.1	+77.4
<=59	61.4	7.2	11.7	19.7	81.1	+82.9
<=64	65.0	3.6	16.0	15.4	80.4	+76.7
<=69	67.0	1.7	20.9	10.5	77.4	+69.5
<=74	68.1	0.5	25.1	6.3	74.3	+63.4
<=79	68.4	0.2	27.8	3.6	72.0	+59.5
<=84	68.5	0.1	29.6	1.8	70.4	+56.9
<=89	68.6	0.0	30.8	0.6	69.2	+55.2
<=94	68.6	0.0	31.3	0.1	68.7	+54.4
<=100	68.6	0.0	31.4	0.0	68.6	+54.3

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (New-definition $2.50/day line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	0.2	Only poor targeted
<=9	0.4	82.4	0.5	4.7:1
<=14	1.9	96.2	2.6	25.1:1
<=19	5.2	98.0	7.4	48.6:1
<=24	10.7	98.4	15.4	61.5:1
<=29	18.2	97.9	26.0	46.8:1
<=34	26.5	96.3	37.2	26.3:1
<=39	35.5	94.7	49.0	18.0:1
<=44	45.1	93.2	61.2	13.7:1
<=49	54.8	90.9	72.5	10.0:1
<=54	64.9	87.5	82.8	7.0:1
<=59	73.1	84.0	89.5	5.2:1
<=64	81.0	80.3	94.7	4.1:1
<=69	87.9	76.2	97.6	3.2:1
<=74	93.2	73.0	99.2	2.7:1
<=79	96.2	71.1	99.7	2.5:1
<=84	98.1	69.9	99.9	2.3:1
<=89	99.4	69.0	100.0	2.2:1
<=94	99.9	68.7	100.0	2.2:1
<=100	100.0	68.6	100.0	2.2:1

Tables for
100% of the Legacy-Definition National Poverty Line

Figure 4 (100% of the legacy-definition national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	65.0
10–14	60.3
15–19	46.5
20–24	36.3
25–29	25.9
30–34	16.6
35–39	8.7
40–44	5.7
45–49	1.2
50–54	0.5
55–59	0.2
60–64	0.0
65–69	0.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (100% of the legacy-definition national line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+30.4	11.5	13.4	17.5
10–14	+8.3	5.4	6.6	8.8
15–19	+4.6	3.5	4.1	5.9
20–24	+7.2	2.5	2.9	3.6
25–29	–3.6	2.9	3.1	3.5
30–34	+4.2	1.4	1.6	2.0
35–39	+0.2	1.2	1.5	2.0
40–44	+0.2	1.0	1.2	1.6
45–49	–2.1	1.5	1.5	1.7
50–54	–0.3	0.3	0.4	0.5
55–59	–1.4	1.0	1.1	1.2
60–64	+0.0	0.0	0.0	0.0
65–69	+0.0	0.0	0.0	0.0
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (100% of the legacy-definition national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+1.7	50.0	65.0	79.5
4	+0.8	21.5	26.6	40.6
8	+0.6	15.8	18.4	26.1
16	+0.7	11.6	14.1	18.6
32	+0.8	7.8	9.5	13.5
64	+0.7	5.7	6.7	9.2
128	+0.6	4.1	4.7	6.3
256	+0.6	2.9	3.5	4.6
512	+0.6	2.0	2.3	3.0
1,024	+0.7	1.4	1.6	2.1
2,048	+0.6	1.0	1.2	1.5
4,096	+0.6	0.7	0.9	1.1
8,192	+0.6	0.5	0.6	0.8
16,384	+0.6	0.3	0.4	0.5

Figure 11 (100% of the legacy-definition national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	9.3	0.0	90.6	90.7	–97.7
<=9	0.2	9.2	0.2	90.4	90.6	–93.3
<=14	1.1	8.4	0.8	89.8	90.8	–68.9
<=19	2.4	7.0	2.7	87.8	90.3	–19.1
<=24	4.2	5.3	6.6	84.0	88.2	+30.4
<=29	6.4	3.0	11.8	78.8	85.2	–25.2
<=34	7.5	1.9	19.0	71.6	79.1	–101.5
<=39	8.3	1.1	27.2	63.4	71.7	–188.3
<=44	8.9	0.5	36.2	54.4	63.3	–284.1
<=49	9.2	0.2	45.6	45.0	54.2	–383.8
<=54	9.3	0.1	55.6	35.0	44.2	–490.4
<=59	9.4	0.0	63.7	26.9	36.3	–576.5
<=64	9.4	0.0	71.6	19.0	28.4	–659.8
<=69	9.4	0.0	78.4	12.1	21.6	–732.5
<=74	9.4	0.0	83.8	6.8	16.2	–789.2
<=79	9.4	0.0	86.8	3.8	13.2	–821.3
<=84	9.4	0.0	88.7	1.9	11.3	–841.2
<=89	9.4	0.0	90.0	0.6	10.0	–854.9
<=94	9.4	0.0	90.5	0.1	9.5	–860.7
<=100	9.4	0.0	90.6	0.0	9.4	–861.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (100% of the legacy-definition national line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	1.2	Only poor targeted
<=9	0.4	55.7	2.4	1.3:1
<=14	1.9	56.1	11.2	1.3:1
<=19	5.2	47.1	25.9	0.9:1
<=24	10.7	38.8	44.1	0.6:1
<=29	18.2	35.1	67.8	0.5:1
<=34	26.5	28.4	80.1	0.4:1
<=39	35.5	23.4	88.2	0.3:1
<=44	45.1	19.7	94.2	0.2:1
<=49	54.8	16.8	97.5	0.2:1
<=54	64.9	14.3	98.6	0.2:1
<=59	73.1	12.9	100.0	0.1:1
<=64	81.0	11.6	100.0	0.1:1
<=69	87.9	10.7	100.0	0.1:1
<=74	93.2	10.1	100.0	0.1:1
<=79	96.2	9.8	100.0	0.1:1
<=84	98.1	9.6	100.0	0.1:1
<=89	99.4	9.5	100.0	0.1:1
<=94	99.9	9.4	100.0	0.1:1
<=100	100.0	9.4	100.0	0.1:1

Tables for
of the Legacy-Definition $1.25/Day Poverty Line

Figure 4 (Legacy-definition $1.25/day line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	92.2
10–14	91.1
15–19	75.5
20–24	72.2
25–29	65.9
30–34	55.4
35–39	42.9
40–44	28.4
45–49	16.2
50–54	9.2
55–59	2.7
60–64	1.7
65–69	0.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (Legacy-definition $1.25/day line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+33.8	12.5	14.8	19.0
10–14	–2.4	2.3	2.8	3.8
15–19	–1.0	3.2	3.9	5.5
20–24	+3.1	2.6	3.1	4.0
25–29	–5.0	3.5	3.8	4.2
30–34	+4.3	2.2	2.5	3.3
35–39	+4.5	2.1	2.5	3.5
40–44	–0.8	1.9	2.4	3.2
45–49	–6.7	4.3	4.4	4.7
50–54	–1.7	1.5	1.6	2.0
55–59	–2.8	1.9	2.0	2.2
60–64	–0.1	0.7	0.9	1.1
65–69	+0.0	0.0	0.0	0.0
70–74	–1.4	1.1	1.1	1.5
75–79	+0.0	0.0	0.0	0.0
80–84	–1.0	0.9	1.0	1.3
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (Legacy-definition $1.25/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–2.2	63.5	74.9	83.2
4	–0.3	31.8	37.8	50.9
8	–0.7	23.5	27.6	36.6
16	–0.7	16.3	20.2	27.2
32	–0.6	11.7	13.7	18.5
64	–0.5	8.2	9.7	12.2
128	–0.6	5.5	6.8	8.3
256	–0.6	4.1	4.9	6.2
512	–0.6	2.8	3.3	4.7
1,024	–0.6	2.0	2.4	3.2
2,048	–0.5	1.4	1.7	2.3
4,096	–0.6	1.0	1.2	1.5
8,192	–0.6	0.7	0.9	1.2
16,384	–0.6	0.5	0.6	0.8

Figure 11 (Legacy-definition $1.25/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	28.1	0.0	71.8	71.9	–99.2
<=9	0.3	27.9	0.1	71.7	71.9	–97.5
<=14	1.6	26.6	0.3	71.5	73.1	–87.6
<=19	4.2	24.0	1.0	70.8	75.0	–66.8
<=24	8.1	20.1	2.6	69.2	77.3	–33.3
<=29	13.5	14.7	4.7	67.1	80.5	+12.2
<=34	17.9	10.4	8.7	63.1	81.0	+57.3
<=39	21.5	6.8	14.0	57.8	79.2	+50.3
<=44	24.2	4.0	20.8	51.0	75.2	+26.2
<=49	26.4	1.8	28.4	43.4	69.8	–0.6
<=54	27.6	0.7	37.4	34.4	62.0	–32.4
<=59	28.0	0.2	45.1	26.6	54.7	–60.0
<=64	28.1	0.1	52.9	18.9	47.0	–87.4
<=69	28.1	0.1	59.7	12.1	40.2	–111.7
<=74	28.2	0.0	65.0	6.8	35.0	–130.4
<=79	28.2	0.0	68.0	3.8	32.0	–141.1
<=84	28.2	0.0	69.9	1.9	30.1	–147.7
<=89	28.2	0.0	71.2	0.6	28.8	–152.2
<=94	28.2	0.0	71.7	0.1	28.3	–154.2
<=100	28.2	0.0	71.8	0.0	28.2	–154.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (Legacy-definition $1.25/day line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	0.4	Only poor targeted
<=9	0.4	69.3	1.0	2.3:1
<=14	1.9	86.1	5.7	6.2:1
<=19	5.2	80.9	14.8	4.2:1
<=24	10.7	75.6	28.7	3.1:1
<=29	18.2	74.1	47.7	2.9:1
<=34	26.5	67.3	63.3	2.1:1
<=39	35.5	60.5	76.0	1.5:1
<=44	45.1	53.8	85.9	1.2:1
<=49	54.8	48.2	93.6	0.9:1
<=54	64.9	42.4	97.6	0.7:1
<=59	73.1	38.3	99.3	0.6:1
<=64	81.0	34.7	99.7	0.5:1
<=69	87.9	32.0	99.7	0.5:1
<=74	93.2	30.2	99.9	0.4:1
<=79	96.2	29.3	99.9	0.4:1
<=84	98.1	28.8	100.0	0.4:1
<=89	99.4	28.4	100.0	0.4:1
<=94	99.9	28.2	100.0	0.4:1
<=100	100.0	28.2	100.0	0.4:1

Tables for
of the Legacy-Definition $2.50/Day Poverty Line

Figure 4 (Legacy-definition $2.50/day line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	100.0
20–24	100.0
25–29	98.8
30–34	97.8
35–39	94.2
40–44	89.9
45–49	80.9
50–54	71.8
55–59	56.0
60–64	41.0
65–69	29.2
70–74	14.0
75–79	5.5
80–84	2.1
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (Legacy-definition $2.50/day line): Average bootstrapped differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

	Difference between estimate and true value			
		Confidence interval (± percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+11.2	7.0	8.3	10.9
10–14	+0.0	0.0	0.0	0.0
15–19	+0.0	0.0	0.0	0.0
20–24	+1.0	0.5	0.6	0.8
25–29	+1.6	0.9	1.0	1.4
30–34	+2.1	1.0	1.1	1.5
35–39	+2.1	1.1	1.3	1.7
40–44	+1.3	1.4	1.7	2.2
45–49	–2.5	2.1	2.2	2.7
50–54	+1.2	2.0	2.3	3.1
55–59	–2.3	2.4	2.8	3.8
60–64	–4.2	3.2	3.4	3.9
65–69	–0.3	2.5	3.1	4.0
70–74	–0.5	2.1	2.5	3.6
75–79	–6.6	4.6	4.9	5.6
80–84	+0.0	1.1	1.3	1.8
85–89	–2.2	1.8	1.9	2.1
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (Legacy-definition $2.50/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–1.0	65.4	75.9	91.9
4	–0.7	30.0	34.7	44.6
8	–0.4	20.4	24.4	32.2
16	–0.1	14.5	17.6	23.9
32	–0.1	10.5	12.9	17.4
64	+0.0	7.3	8.6	11.5
128	–0.2	5.1	6.0	8.4
256	–0.1	3.7	4.6	5.9
512	–0.2	2.6	3.1	4.6
1,024	–0.1	1.9	2.2	2.8
2,048	–0.1	1.3	1.5	1.9
4,096	–0.1	1.0	1.2	1.4
8,192	–0.1	0.7	0.8	1.1
16,384	–0.1	0.5	0.6	0.8

Figure 11 (Legacy-definition $2.50/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	0.1	68.7	0.0	31.2	31.3	–99.7
<=9	0.4	68.4	0.0	31.2	31.5	–98.9
<=14	1.8	67.0	0.0	31.2	33.0	–94.6
<=19	5.1	63.7	0.0	31.2	36.3	–85.0
<=24	10.6	58.2	0.1	31.1	41.7	–69.0
<=29	17.9	50.9	0.3	30.9	48.8	–47.6
<=34	25.9	42.9	0.6	30.6	56.5	–23.8
<=39	34.1	34.7	1.4	29.8	64.0	+1.1
<=44	42.7	26.1	2.4	28.8	71.5	+27.5
<=49	50.7	18.1	4.1	27.1	77.8	+53.3
<=54	57.8	11.0	7.1	24.1	81.9	+78.4
<=59	62.4	6.4	10.7	20.5	82.9	+84.4
<=64	65.8	3.0	15.2	16.0	81.8	+77.9
<=69	67.7	1.1	20.2	11.0	78.7	+70.7
<=74	68.4	0.4	24.8	6.4	74.8	+64.0
<=79	68.7	0.1	27.5	3.7	72.4	+60.0
<=84	68.8	0.0	29.3	1.9	70.6	+57.4
<=89	68.8	0.0	30.6	0.6	69.4	+55.6
<=94	68.8	0.0	31.1	0.1	68.9	+54.8
<=100	68.8	0.0	31.2	0.0	68.8	+54.7

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 12 (Legacy-definition $2.50/day line): By score cut-off, the share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have consumption below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	0.1	100.0	0.2	Only poor targeted
<=9	0.4	90.7	0.5	9.8:1
<=14	1.9	98.0	2.7	48.5:1
<=19	5.2	99.3	7.5	135.4:1
<=24	10.7	99.0	15.4	101.2:1
<=29	18.2	98.5	26.0	64.0:1
<=34	26.5	97.7	37.7	42.2:1
<=39	35.5	96.2	49.6	25.3:1
<=44	45.1	94.7	62.0	18.0:1
<=49	54.8	92.6	73.7	12.5:1
<=54	64.9	89.1	84.0	8.2:1
<=59	73.1	85.3	90.7	5.8:1
<=64	81.0	81.2	95.6	4.3:1
<=69	87.9	77.0	98.3	3.4:1
<=74	93.2	73.4	99.4	2.8:1
<=79	96.2	71.4	99.8	2.5:1
<=84	98.1	70.1	99.9	2.3:1
<=89	99.4	69.2	100.0	2.3:1
<=94	99.9	68.9	100.0	2.2:1
<=100	100.0	68.8	100.0	2.2:1