

# Simple Poverty Scorecards

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# PROBLEM: Direct Measures Are Costly

1-2 day household expenditure survey

Last week, did you eat carrots? How many?

Did you buy them? What price would you have paid, if you had bought them?

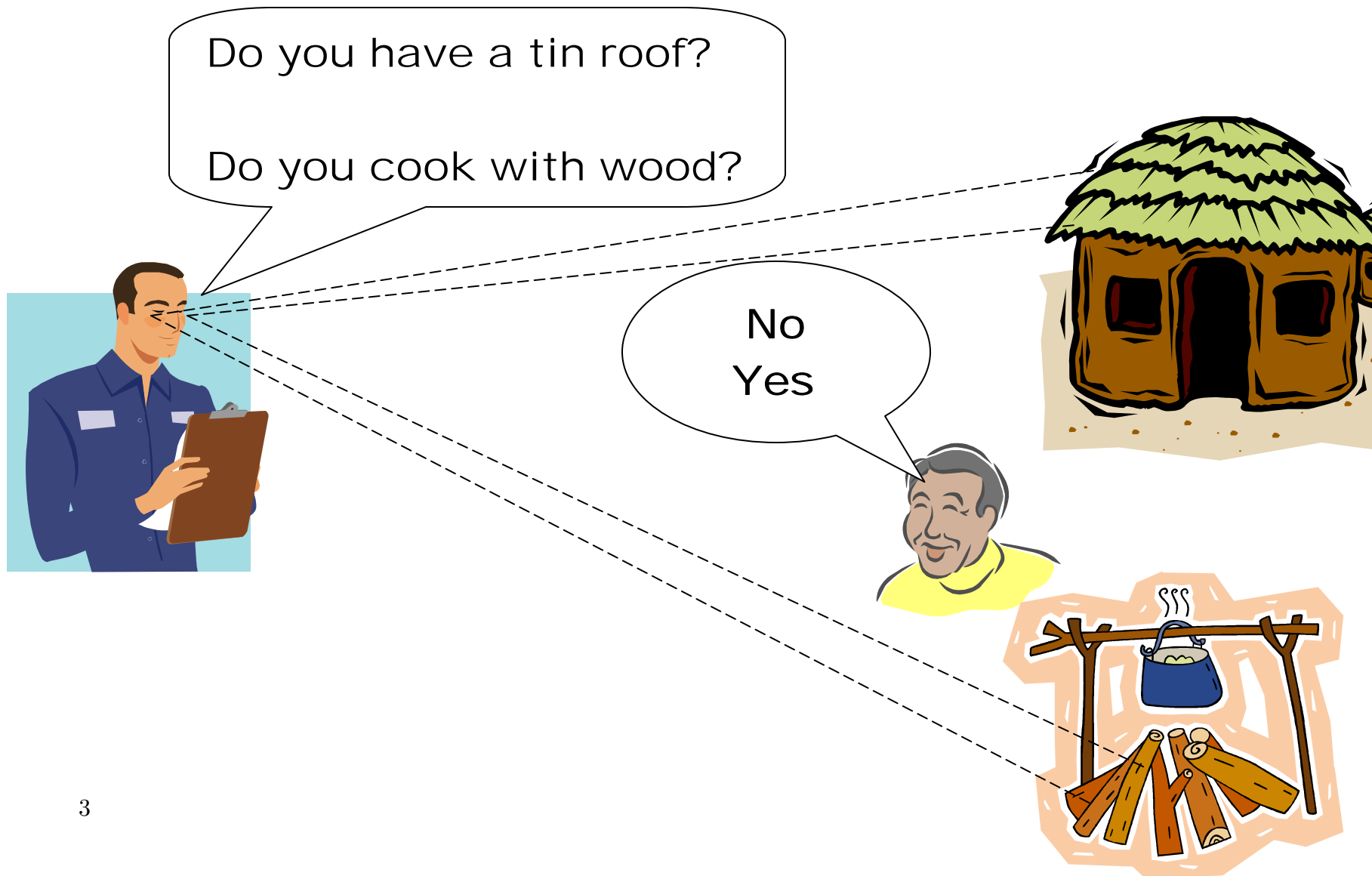
Yes. Ummm, 5, I think.

No. I don't know.



# SOLUTION: Indirect Scoring Costs Less

5-10 minute scorecard with observable indicators



# Features of Poverty Scorecards (PPIs)

1. Objective: Based on national survey data:
  - LSMS-type expenditure measurement
  - Quantitative, observable indicators
2. Accurate: 90-percent confidence, estimates are:
  - +/- 10 pct. points, individual poverty likelihood
  - +/- 2 pct. points, group poverty rate
3. Practical: Accepted and used:
  - Indicators are few and inexpensive-to-collect
  - Simple enough to understand and compute on paper, in the field, in real time (no software)
4. Universal: For all, not just microfinance

## 3 Uses of Poverty Scoring

1. Target services (classify individuals):
  - If score < cut-off, treat as if poor for program purposes
  - Managers choose program's cut-off
2. Measure poverty rates:
  - Report USAID, MiX, Microcredit Summit
  - Managers set goals and track progress
3. Track changes in poverty over time:
  - Measure poverty rates for a group twice
  - Look at change in poverty rates

# Bangladesh Scorecard

Indicator	Value	Points	Total
1. What type of latrine does the household use?	Open field	0	
	Kacha (temporary or permanent) or pit Pacca	8	
	Sanitary or water-seal Pacca	15	
2. How many household members are 11 years old or younger?	4 or more	0	
	3	7	
	2	12	
	1	19	
	0	27	
3. Does any household member work for a daily wage?	Yes	0	
	No	9	
4. How many rooms does the house have (excluding ones used for business)?	1	0	
	2 or 3	3	
	4 or more	12	
5. Do all children ages 6 to 17 attend school?	No	0	
	No children ages 6 to 17	4	
	Yes	5	
6. Does the household own a television set?	No	0	
	Yes	13	
7. How many decimals of cultivable land does the household own?	Less than 34	0	
	34 to 99	2	
	100 to 199	4	
	200 or more	6	
8. What is the main construction material of the walls of the house?	Hemp/hay/bamboo or mud brick	0	
	C.I. sheet/wood	6	
	Brick/cement	7	
9. Does the household own any cattle?	No	0	
	Yes	2	
10. Does the house have a separate kitchen?	No	0	
	Yes	5	

Total:

# PPIs Based on Natl. Survey Data

- B'desh derived from 2001 'Household Income and Expenditure Survey' by Bureau of Statistics
- 7,440 households
- Includes costly LSMS-type expenditure module
- Analyst uses statistics (logit regression) to select indicators and assign points to accurately relate indicators to known poverty status for surveyed HH
- Analyst does not 'make up' points or pick indicators based only on judgment or other countries
- Scorecard derived from 2001 national expenditure survey is then applied to MF clients today

# How Are Indicators Selected?

*'Practicality', not just accuracy*

Pick indicators most strongly linked with poverty (statistics) that also are ('experts'):

- Common sense
- Objective
- Verifiable
- Quick to ask/answer
- Liable to change over time



# How Are Indicators Selected? (cont.)

## Exclude:

- Annual expenditure on clothes & shoes
- Total value of assets
- Ratios, squares, logarithms
- Subjective judgments
- Events in the past

## Include:

- Current presence of physical objects
- Objective and verifiable
- Variety
- Liable to change over time
- Related to Millennium Development Goals

## How Are Points Derived?

- **Logit regression**, transformed so that:
  - All points are zero or positive integers
  - 0 is lowest score (most likely poor)
  - 100 is highest score (least likely poor)
- Transformation **reduces accuracy a little** but promotes ease-of-use and **acceptance**
- Programs can download scorecard & use with **no external help** (with great effort)
- Field workers compute scores on paper, by hand, in real time; **no software needed**

# Bangladesh Example Use

Indicator	Value	Points	Total
1. What type of latrine does the household use?	Open field	0	<b>0</b>
	Kacha (temporary or permanent) or pit Pacca	8	
	Sanitary or water-seal Pacca	15	
2. How many household members are 11 years old or younger?	4 or more	0	<b>12</b>
	3	7	
	2	12	
	1	19	
	0	27	
3. Does any household member work for a daily wage?	Yes	0	<b>0</b>
	No	9	
4. How many rooms does the house have (excluding ones used for business)?	1	0	<b>3</b>
	2 or 3	3	
	4 or more	12	
5. Do all children ages 6 to 17 attend school?	No	0	<b>5</b>
	<del>No children ages 6 to 17</del>	4	
	Yes	5	
6. Does the household own a television set?	No	0	<b>0</b>
	Yes	13	
7. How many decimals of cultivable land does the household own?	Less than 34	0	<b>2</b>
	34 to 99	2	
	100 to 199	4	
	200 or more	6	
8. What is the main construction material of the walls of the house?	Hemp/hay/bamboo or mud brick	0	<b>0</b>
	C.I. sheet/wood	6	
	Brick/cement	7	
9. Does the household own any cattle?	No	0	<b>2</b>
	Yes	2	
10. Does the house have a separate kitchen?	No	0	<b>0</b>
	Yes	5	
Total:			<b>24</b>

# What does a poverty score mean?

Score	Probability (%) that someone with a given score is below \$1/day
0-4	100.0
5-9	94.0
10-14	92.7
15-19	96.6
20-24	80.5
25-29	83.1
30-34	73.9
35-39	61.4
40-44	42.7
45-49	38.8
50-54	19.7
55-59	16.6
60-64	15.5
65-69	2.8
70-74	1.5
75-79	2.8
80-84	13.3
85-89	0.9
90-94	0.0
95-100	0.0

Score of 20–24 means person is 80.5% likely to be poor. (805 of 1,000 people scoring in this range are poor)

Source: Calculations based on 2000 HIES.

# Where do poverty likelihoods come from?

Score	People in national survey with score who were <i>below</i> \$1/day	People in national survey with score (normalized)	Probability (%) that someone with a given score is below \$1/day
0-4	178	178	$178 \div 178 = 100$
5-9	1305	1388	$1305 \div 1388 = 94$
10-14	2221	2395	$2221 \div 2395 = 92.7$
15-19	4320	4472	$4320 \div 4472 = 96.6$
20-24	6240	7752	$6240 \div 7752 = 80.5$
25-29	7640	9193	$7640 \div 9193 = 83.1$
30-34	6574	8900	$6574 \div 8900 = 73.9$
35-39	6737	10971	$6737 \div 10971 = 61.4$
40-44	4050	9488	$4050 \div 9488 = 42.7$
45-49	3041	7830	$3041 \div 7830 = 38.8$
50-54	1600	8117	$1600 \div 8117 = 19.7$
55-59	1095	6589	$1095 \div 6589 = 16.6$
60-64	927	5964	$927 \div 5964 = 15.5$
65-69	137	4969	$137 \div 4969 = 2.8$
70-74	64	4336	$64 \div 4336 = 1.5$
75-79	75	2654	$75 \div 2654 = 2.8$
80-84	282	2121	$282 \div 2121 = 13.3$
85-89	12	1322	$12 \div 1322 = 0.9$
90-94	0	1175	$0 \div 1175 = 0$
95-100	0	188	$0 \div 188 = 0$

Source: Calculations based on 2000 HIES.

A score of 24 corresponds to a poverty likelihood of 80.5% because 6,240 of 7,752 people in Natl. survey (80.5%) had a score of 20–24 and were below \$1/day.

# 1. Estimating Poverty Rates

*The share of clients who are poor is the average of their individual poverty likelihoods.*

B'desh example, portfolio of 3 clients, 1/1/06

Client	Score	Poverty likelihood (%)
A	20	80.5
B	30	73.9
C	40	42.7
Average(=Poverty rate):		65.7

Given 2,000 clients and 90-percent confidence,  
Bangladesh estimate is **accurate to +/- 1.5  
percentage points.**

## 2. Tracking Change in Poverty Rates

*(Change is not the same as impact)*

B'desh example, 3 clients, 1/1/06 to 1/1/07

Client	<u>Score</u>		<u>Poverty likelihood (%)</u>	
	1/1/06	1/1/07	1/1/06	1/1/07
A	20	25	80.5	83.1
B	30	35	73.9	61.4
C	40	45	42.7	38.8
Average(=Poverty rate):			65.7	61.1

$(65.7 - 61.1) \div 65.7 = 7.5\%$  of poor left poverty

Tracking change to +/- 1.0 pct. points w/90-percent confidence requires **n=5,000-10,000**

### 3. Applying Cut-Offs for Targeting

Programs can treat, for their own purposes, people scoring below a cut-off as 'poor':

- Based on a program's **values & mission**
- Program choice does not change \$1/day line used in estimating poverty rates
- Choose to **balance** 'benefit' of **covering** poor versus 'cost' of **leaking** to non-poor
- Scoring **makes explicit** targeting errors that inevitably exist, helping to make targeting intentional and quantitative



# Trade-offs for Targeting Cut-offs, B'desh

<u>Score cut-off</u> (People at or below this score are treated as 'poor' for program purposes)	<u>Coverage of poor</u> (% of truly poor successfully targeted)	<u>Leakage to non-poor</u> (% of truly non-poor mistakenly targeted)
0-4	0.4	0.0
5-9	3.2	0.2
10-14	8.0	0.5
15-19	17.3	0.8
20-24	30.7	3.6
25-29	47.1	6.5
30-34	61.2	10.8
35-39	75.7	18.8
40-44	84.4	28.9
45-49	91.0	37.9
50-54	94.4	50.0
55-59	96.8	60.3
60-64	98.8	69.7
65-69	99.1	78.8
70-74	99.2	86.7
75-79	99.4	91.6
80-84	100.0	95.0
85-89	100.0	97.5
90-94	100.0	99.6
95-100	100.0	100.0

Targeting people scoring 30–34 or less would cover 61.2% of the poor and leak to 10.8% of the non-poor

Source: 2001 HIES and Bangladesh PPI.

# Can We Use Scoring for Targeting at All?

- Depends on costs, benefits, & **alternatives**:
    - Provide data on accuracy
    - **Let programs decide for themselves**
  - For-profiters Visa, AmEx, etc. bet billions on targeting daily, with scorecards much less accurate than these PPIs
  - Used to target public assistance to poor in Mexico, Colombia, Costa Rica, and Chile
- “Among all targeting mechanisms, proxy means tests **[PPIs] produce the best incidence outcomes**”  
— Margaret Grosh, World Bank targeting guru

# Implementation

- If not used, why do it? (Buy-in and ease-of-use)
- Sample, or apply to every client? How often?
- **Data quality is paramount:**
  - Output only as good as input
  - Quality requires training and monitoring
  - Reveal indicator points to field agents?
- Photocopy, ask questions, add up points, apply targeting cut-off policy (if desired)
- File paper scorecard, and perhaps record ID data, score, and indicator values in database
- **Inform management decisions:**
  - GFUSA experience (Jeff Toohig, Frances Sinha)
  - Report poverty rates and changes

# Are PPIs Accurate Enough?

No scorecard is perfect (or even close). But poverty is relatively easy to predict, and even **simple scorecards are almost as accurate as complex ones** ('flat max').

Two aspects of accuracy:

1. Concentrate poor in low scores for targeting
2. Estimated likelihoods and rates match true ones

PPI accuracy is measured correctly, w/no reinvention:

- Tested on data not used to make scorecard
- 'Bootstrap' confidence intervals (standard stats.)
- Targeting accuracy at different cut-offs

Accuracy is almost as high as alternatives, and certainly **'good enough for government work'**

# Overview of PPIs So Far

Country	Poverty line, person/day	% poor	National Survey	# HH	90% confidence (+/- pct. points)	
					Individual pov. like.	Group pov. rate
Bangladesh	\$1	44	'00 HIES	7,440	5	1.5
Bolivia	Bs11 urban Bs8 rural	64	'02 EH	5,741	9	1.3
Haiti	\$1	56	'01 ECVH	7,168	7	1.9
India	\$1	46	'03 SES	41,013	3	0.7
Mexico	P31 rural, P45 urban	48	'02 ENIGH	17,167	N/A	1.0
Morocco	DH10	19	'98/'99 ENNVM	5,129	12	1.6
Pakistan	Rs25	40	'01 PIHS	15,503	10	1.1
Peru	NS7	52	'03 ENAHO	17,629	16	1.1
Philippines	P36	31	'01 APIS	38,014	6	1.0

# Additional Scorecards Done/Planned

## Woller/CGAP/Ford

Cambodia  
El Salvador  
Ethiopia  
Guatemala  
Honduras  
Malawi  
Nepal  
Nicaragua  
Nigeria  
Palestine  
South Africa  
Vietnam

## IRIS/USAID

Albania  
Bangladesh  
Colombia  
East Timor  
Ghana  
Guatemala  
India (2 states)  
Indonesia  
Jamaica  
Kazakhstan  
Madagascar  
Peru  
Tajikstan  
Tanzania  
Uganda, and Vietnam

# Compare: CASH-POR Housing Index

Indicator	Values			Points
	Small	Medium	Big	
1. Size of house?	0	2	4	
2. Structural condition?	Dilapidated	Average	Good	
	0	2	6	
3. Quality of walls?	Poor	Average	Good	
	0	2	6	
4. Quality of roof?	Thatch/leaves	Tin/Iron sheets	Permanent roof	
	0	2	6	
Source: "Overcoming the Obstacles of Identifying the Poorest Families", 2000, Simanowitz, Nkuna, and Kasim.				Total:

- What does 'small' mean? 'Poor'? 'Dilapidated'?
- If score is 10, is the person below \$1/day?
- Are all people with scores of 0 below \$1/day?
- Are there many thatched roofs on brick walls?
- But common-sense, easy-to-use, & well-accepted

# Compare: CGAP PAT

What is it?: Survey 300 clients & non-clients in area, gather indicators and expenditure on clothes & shoes, model principal components, compare terciles of client scores v. non-clients

PAT appears weaker in many aspects (Rosenberg):

- Not based on \$1/day or other poverty line
- Looks at relative poverty, not absolute
- Based special-purpose, local survey, and so uses less and non-national data
- Less easy for users to understand model
- Less easy to use on on-going basis
- One application for 1 org. in 1 place costs about as much as PPI for a whole country

BUT . . . PAT works where there is no or old data



# Compare: IRIS Poverty Tool

What is it?: Build scorecard w/LSMS-type data to estimate expenditure (not probability poor). Label people 'poor' or not by comparing estimated expenditure to poverty line

*IRIS Tools, PPIs are similar in most key ways:*

- Both use LSMS-type expenditure data (IRIS sometimes uses smaller data sets)
- Both depend crucially on data quality
- Similar accuracy (IRIS probably somewhat better)
- Can be used for targeting (IRIS says not to, but its preferred measure of accuracy [BPAC] takes targeting accuracy into account)

*They are so similar that USAID uses both.*

# Differences: IRIS Tools, PPIs

## 1. Transparency (helps get management buy-in):

- PPI **weights are public knowledge** (user can choose to omit from scorecards used in field)
- PPI **formula simpler** (users can understand, no need for logarithms nor spreadsheets)
- PPI **measures accuracy more completely**, in more standard ways (IRIS could do this too)
- PPI recognizes **poverty labels are probabilistic**

## 2. Indicators:

PPI has somewhat fewer, simpler, more objective indicators, **improving data quality** but **reducing accuracy and sensitivity to changes** over time

## 3. Costs of creation and implementation?

# Poverty Scoring Summary

- PPIs are simple, easy-to-use, inexpensive, transparent, objective, and accurate
- They estimate likelihood that a person is poor:
  - Use policy cut-offs for targeting
  - Take average to get portfolio poverty rate
  - Track over time for progress out of poverty
- ‘Practicality’ and accuracy both matter:
  - One page, few indicators, simple weights
  - Field workers can compute scores on paper in real time (no software required)
- Valid for *any* program, not just microfinance
- Very similar in key ways to IRIS Tools

FOR TARGETING THE POOR,  
MEASURING POVERTY RATES,  
and TRACKING CHANGE,  
POVERTY SCORING IS  
SIMPLE,  
INEXPENSIVE,  
TRANSPARENT,  
OBJECTIVE,  
and ACCURATE.