

**Poverty Assessment Tool Accuracy Submission: Addendum for New Poverty Lines  
USAID/IRIS Tool for East Timor  
Submitted: September 14, 2011**

In order to improve the functionality of the existing PAT for East Timor, the IRIS Center has updated the tool with the following features:

- Re-ran the models at the \$1.25/day line, using the new purchasing power parity (PPP) rates lines released by the World Bank
- Calibrated the model to also allow predictions at the \$2.50/day line
- Incorporated the prediction models into an Epi Info data entry template. This template closely resembles the paper questionnaire and allows the entry, storage, and retrieval of household demographics. The output of the data entry permits poverty prediction at two poverty lines, \$1.25/day and \$2.50/day.
- Revised the paper questionnaire to reflect best practice in survey design

The data source used for the PAT in East Timor remains the same as when the tool was originally submitted for certification, as has the general tool construction process, aside from a more rigorous screening process to ensure that the variables are in line with the project's current best practices for selecting practical indicators. Because of these similarities, this document should be viewed as an addendum to the original tool's certification document. The document proceeds by detailing how the new \$1.25 PPP was applied and by presenting the results at the \$1.25/day and \$2.50/day lines.

Accompanying this document are the revised questionnaire and screenshots of the Epi Info data entry template and output.

### **Updating the poverty line**

The tool originally predicted poverty outreach at the international poverty line of \$1.08/day in 1993 PPP terms. With the release of the 2005 PPP rates and the adoption of the \$1.25/day line in 2005 PPP terms by the World Bank, it seemed prudent to update the PAT to the new line, as well as update the tool to permit predictions at poverty line of \$2.50/day.

The legislation governing the development of USAID tools defines the "very poor" as either the bottom (poorest) 50 percent of those living below the poverty line established by the national government or those living on the local equivalent of less than the international poverty line (\$1.25/day in 2005 PPP terms)<sup>1</sup>. The applicable poverty line

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<sup>1</sup> The congressional legislation specifies the international poverty line as the "equivalent of \$1 per day (as calculated using the purchasing power parity (PPP) exchange rate method)." USAID and IRIS interpret this to mean the international poverty line used by the World Bank to track global progress toward the Millennium Development Goal of cutting the prevalence of extreme poverty in half by 2015. This poverty line has recently been recalculated by the Bank to accompany new, improved estimates of PPP. The applicable 2005 PPP rate for East Timor is \$ 15.9469 per capita each month (the local currency in East Timor is the US dollar).

for USAID tool development is the one that yields the higher household poverty rate for a given country.

In East Timor the applicable threshold is the international poverty line of \$1.25/day in 2005 PPP terms. The value of this line at the time of the survey is \$US 15.9469 per capita each month. This line identifies 34.7% of households as “very poor.”

### Results for \$1.25/day model

Table 1 summarizes the accuracy results achieved by four estimation methods in predicting household poverty relative to the new \$1.25/day poverty line. We use four estimation methods in this case, rather than the eight methods used originally, for two reasons: 1) fewer methods reduces analysis time; 2) the 1-step quantile was shown to be as accurate as 2-step methods in the original data analysis. For East Timor, the most accurate method, on the basis of BPAC, is the 1-step Quantile regression. Therefore, the 1-step Quantile was selected as the best model and used to develop the PAT. Table 2 presents a 2x2 matrix of the poverty status predicted by the model versus the true poverty status according to the expenditure benchmark. Table 3 provides the regression results from the \$1.25/day model.

*Table 1: In-sample Accuracy Results for Prediction at the Legislative Poverty*

<b>East Timor (PPP)</b> \$1.25/day line* Share of “very poor”: 34.7%	<b>Total Accuracy</b>	<b>Poverty Accuracy</b>	<b>Under-coverage</b>	<b>Leakage</b>	<b>PIE</b>	<b>BPAC</b>
<b>Single-step methods</b>						
OLS	77.48	57.50	42.50	22.42	-6.97	37.42
Quantile regression (estimation point: 46)	<b>78.33</b>	<b>69.37</b>	<b>30.63</b>	<b>31.85</b>	<b>0.42</b>	<b>68.15</b>
Linear Probability	78.80	62.28	37.72	23.40	-4.97	47.96
Probit	78.82	63.34	36.66	24.41	-4.25	51.09
* \$1.25/day poverty line is 15.9469 US dollars per capita per month in December 2001 prices.						

*Table 2: Poverty Status of Sample Households, as Estimated by Model and Revealed by the Benchmark Survey (East Timor: 1-step weighted quantile regression)*

	<b>Number of households identified as very poor by the tool</b>	<b>Number of households identified as not very-poor by the tool</b>
<b>Number of “true” very poor households (as determined by benchmark survey)</b>	431 (24.1%)	190 (10.6%)
<b>Number of “true” not very-poor households (as determined by benchmark survey)</b>	198 (11.0%)	973 (54.3%)

**Table 3: Regression Estimates using 1-step Quantile Method for Prediction at the \$1.25/day Poverty Line**

.46 Quantile regression  
 Min sum of deviations 641.6857

Number of obs = 1,792  
 Pseudo R2 = 0.3221

<b>Indicator</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>T</b>	<b>P&gt; t </b>	<b>[95% Conf.</b>	<b>Interval]</b>
Intercept	4.0227	0.1402	28.7000	0.0000	3.7478	4.2977
Household head age	-0.0083	0.0056	-1.4800	0.1400	-0.0193	0.0027
Household size	-0.3452	0.0163	-	0.0000	-0.3772	-0.3132
Household head age squared	0.0001	0.0001	1.1900	0.2320	0.0000	0.0002
Household size squared	0.0173	0.0013	13.8300	0.0000	0.0148	0.0197
Household lives in Central	0.2556	0.0349	7.3200	0.0000	0.1871	0.3241
Household lives in East	0.1089	0.0392	2.7800	0.0050	0.0321	0.1858
Household lives in Rural	-0.0115	0.0358	-0.3200	0.7490	-0.0816	0.0587
Wall is made of rattan or tin	-0.0608	0.0326	-1.8700	0.0620	-0.1247	0.0031
Roof is made of leaves	-0.1380	0.0349	-3.9600	0.0000	-0.2064	-0.0697
Roof is made of concrete, tile, or other	0.0008	0.0527	0.0200	0.9880	-0.1025	0.1041
Number of rooms in the dwelling	0.0706	0.0122	5.7900	0.0000	0.0467	0.0945
Drinking water facility is private	0.2860	0.0433	6.6000	0.0000	0.2009	0.3710
Drinking water facility is shared	0.1121	0.0331	3.3900	0.0010	0.0472	0.1769
Toilet facility is bowl/ bucket	0.2649	0.0395	6.7000	0.0000	0.1874	0.3423
Light source is electricity	0.1371	0.0429	3.2000	0.0010	0.0530	0.2213
Light source is private electricity, petromax, candle or flashlight	0.2036	0.1091	1.8700	0.0620	-0.0104	0.4175
Household owns fan	0.5334	0.0620	8.6000	0.0000	0.4119	0.6550
Household owns farmland	-0.2240	0.0448	-5.0100	0.0000	-0.3118	-0.1363
Number of axes owned	0.0972	0.0243	4.0000	0.0000	0.0496	0.1448
Number of baskets owned	0.0164	0.0060	2.7500	0.0060	0.0047	0.0282
Number of chickens owned	0.0124	0.0024	5.1400	0.0000	0.0076	0.0171
Wall is made of unbaked brick	0.1539	0.0434	3.5500	0.0000	0.0688	0.2390

## Results for \$2.50/day model

Table 4 summarizes the predictive accuracy results for the \$2.50/day poverty line using the Quantile model specification from the \$1.25/day poverty line. The indicators are the same as those in the model for the \$1.25/day line, but the percentile of estimation and the coefficients of the model were allowed to change (compare Tables 3 and 6). This methodology allows the content and length of the questionnaire to remain the same, but permits greater accuracy in predicting at the \$2.50/day poverty line. Table 5 presents a 2x2 matrix of the poverty status predicted by the model versus the true poverty status according to the expenditure benchmark. Table 6 provides the regression results from the \$2.50/day model.

*Table 4: Accuracy Results Obtained for Prediction at the \$2.50/day Poverty Line*

<b>East Timor</b> \$2.50/day Line* Share of Poor: 72.7%	<b>Total Accuracy</b>	<b>Poverty Accuracy</b>	<b>Under-coverage</b>	<b>Leakage</b>	<b>PIE</b>	<b>BPAC</b>
<b>Single-step methods</b>						
Quantile regression (estimation point: 60%)	79.93	86.29	13.71	13.85	0.10	86.15
* \$1.25/day poverty line is 31.89 US dollars per capita per month in December 2001 prices.						

*Table 5: Poverty Status of Sample Households, as Estimated by Model and Revealed by the Benchmark Survey, at \$2.50 Poverty Line*

	<b>Number of households identified as poor by the tool</b>	<b>Number of households identified as not poor by the tool</b>
<b>Number of “true” poor households (as determined by benchmark survey)</b>	1,126 (62.9%)	179 (9.9%)
<b>Number of “true” not poor households (as determined by benchmark survey)</b>	181 (10.1%)	306 (17.1%)

**Table 6: Regression Estimates using 1-step Quantile Method for Prediction at the \$2.50/day Poverty Line**

.60 Quantile regression  
 Min sum of deviations 638.0712

Number of obs = 1,792  
 Pseudo R2 = 0.3231

<b>Indicator</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>T</b>	<b>P&gt; t </b>	<b>[95% Conf.</b>	<b>Interval]</b>
Intercept	4.2441	0.1571	27.0100	0.0000	3.9360	4.5523
Household head age	-0.0069	0.0063	-1.1000	0.2730	-0.0193	0.0055
Household size	-0.3229	0.0188	17.1700	0.0000	-0.3598	-0.2860
Household head age squared	0.0000	0.0001	0.7200	0.4710	-0.0001	0.0002
Household size squared	0.0157	0.0014	11.0800	0.0000	0.0129	0.0185
Household lives in Central	0.2699	0.0404	6.6800	0.0000	0.1907	0.3492
Household lives in East	0.0755	0.0443	1.7000	0.0890	-0.0114	0.1624
Household lives in Rural	-0.0322	0.0402	-0.8000	0.4240	-0.1111	0.0467
Wall is made of rattan or tin	-0.0790	0.0376	-2.1000	0.0360	-0.1527	-0.0053
Roof is made of leaves	-0.1938	0.0407	-4.7600	0.0000	-0.2737	-0.1139
Roof is made of concrete, tile, or other	-0.0805	0.0601	-1.3400	0.1800	-0.1983	0.0373
Number of rooms in the dwelling	0.0576	0.0136	4.2400	0.0000	0.0309	0.0843
Drinking water facility is private	0.2312	0.0505	4.5800	0.0000	0.1321	0.3302
Drinking water facility is shared	0.0913	0.0379	2.4100	0.0160	0.0169	0.1656
Toilet facility is bowl/ bucket	0.2340	0.0457	5.1200	0.0000	0.1443	0.3237
Light source is electricity	0.1530	0.0483	3.1700	0.0020	0.0583	0.2477
Light source is private electricity, petromax, candle or flashlight	0.3879	0.1263	3.0700	0.0020	0.1402	0.6357
Household owns fan	0.5124	0.0739	6.9300	0.0000	0.3674	0.6574
Household owns farmland	-0.2490	0.0503	-4.9500	0.0000	-0.3477	-0.1503
Number of axes owned	0.1095	0.0279	3.9300	0.0000	0.0549	0.1642
Number of baskets owned	0.0152	0.0073	2.0900	0.0370	0.0009	0.0295
Number of chickens owned	0.0079	0.0026	3.1000	0.0020	0.0029	0.0129
Wall is made of unbaked brick	0.1566	0.0490	3.2000	0.0010	0.0606	0.2526