

Verification of Certification Activities in West African Cocoa Sector

Review of Statistical Weighting Report: Ghana

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This report describes the findings of a review on statistical weighting report made on scaled-up certification study by the government of Ghana. The review from which the findings are derived was conducted by Fafo commissioned by the International Cocoa Verification Board (ICVB). The findings of the study offer recommendations on technical aspects of statistical weighting that will refine the quality of the study made on child labor in cocoa production sector.

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Background

In 2007/8 the government of Ghana conducted a certification study with the objectives of estimating child labor and worst forms of child labor (WFCL) in cocoa production sector, as well as documenting the incidence of forced adult labor (MMYE/NPECLC 2008). Commissioned by the International Cocoa Verification Board (ICVB), Fafao and Khulisa conducted verification activities on the results reported in the study to evaluate the credibility and the scientific basis of the study. Fafao and Khulisa recommended to the ICVB the unconditional acceptance of the study. The verification report also noted that the results reported in the scaled-up study are valid to the selected sample and the results could not be generalized to all cocoa growing households in Ghana. To this end, the verifiers made a recommendation that these results can be made to be statistically representative and valid for all cocoa growing regions in Ghana if the appropriate statistical weights are computed and employed to the results reported in the study. This recommendation was implemented by the government of Ghana with a clear objective of enhancing the validity of the scaled-up study and presented a revised report in August 2009.

A verification of made on this report, however, identified errors in the formulas used for computing the weights. This was reported in Verification of Weighting Report in September 2009. The government of Ghana corrected these errors and a new weighting report was released in December 2009. This new report “Report on Weighted Data on Cocoa Labour Survey in Ghana (Scale-up study, 2007/2008, December 2009)” is the subject of this verification in which the findings of the review are presented.

Review of weighting procedure: findings

The sample used in the scaled-up study was constructed as a three stage stratified cluster sample, limited geographically to the six cocoa producing regions in Ghana. In the first stage, the unit of selection is *district*, in the second stage is an *enumeration area* (EAs) and in the last stage the unit of selection is a cocoa producing *household*. Development of sampling weights usually starts with the construction of the *base weight* for each sampled unit, to correct for their unequal probabilities of selection. The base weights must reflect the probabilities of selection at each stage. In reviewing the computations of weights outlined in the weighting report (MESW/NPECLC, 2009), we followed the design stages and identified the right formulas that should be used for calculating the probability of selection of the unit in a given stage. The assessment of the three stages is presented as follows.

First Stage

In selecting a district from a given region, the criterion that was used was the amount of cocoa production level in 2003/4 for that district and region. Hence, the districts were selected using a systematic method with probability proportional to the size, and size being the production level for the year 2003/2004 as specified in the scaled up report (MMYE/NPECLC, 2008 page 43.) The appropriate formula has been employed in the weighting report (MESW/NPECLC (December, 2009).

Second stage

The second stage involves the selection of enumeration areas (EAs) using probability proportional to size where size is the number of households. This is described in detail on pages 46-47 of the scaled-up report (MMYE/NPECLC, 2008.) However, this reported procedure was not implemented. Rather, a simple random selection of the enumeration areas among the available EAs was made. Hence such reporting errors are misleading in addition to the limitation of selecting unequal sized EAs with equal probabilities that has implication on introducing a large variance of the estimates.

Third stage

At this stage, 15 households were randomly selected among cocoa producing households and the formulas that are used in the weighting report are found to be correct. The formulas used for computing the weights are summarized in Table 0.1.

Table 0.1 Summary of appropriate formulas and errors found

Stage	Selected unit	Probability of Selection	Notation	Error found
I	District	$p_{r,d} = \frac{M_{r,d}n_r}{M_r}$	$M_{r,d}$: Cocoa production level in each district n_r : Number of districts sampled in each region M_r : Cocoa production level in each region	No
II	Enumeration area (EA)	$p_{r,d,e} = \frac{n_{r,d,e}}{N_{r,d,e}}$	$n_{r,d,e}$: Number of EAs sampled from selected district $N_{r,d,e}$: Total number of cocoa producing households in each selected district	No
III	Household	$p_{r,d,e,h} = \frac{n_{r,d,e,h}}{N_{r,d,e,h}}$	$n_{r,d,e,h}$: Number of cocoa producing households selected in each selected EA $N_{r,d,e,h}$: Total number of cocoa producing households in each selected EA	No
Overall probability of selection		$p_i = p_{r,d} \cdot p_{r,d,e} \cdot p_{r,d,e,h}$		
Formula for sampling weight:		$W_i = \frac{1}{p_i}$		

Conclusions

The objective of this review has been to assess how statistical weighting was employed on the new report released by the government of Ghana (MESW/NPECLC, 2009). Based on the materials presented, we have reviewed the procedures described in computing statistical weights. Our findings indicate that the statistical weights are computed according to the procedure used during the sample selection and no errors were found.

Reporting is a crucial step in any scientific investigation and hence the mis-reporting done regarding the sample procedure on the original certification study is rather unfortunate. Nevertheless, the updated results of the weighting report are expected to inform policy decision and help design appropriate programs to address child labor in the cocoa sector.