



Findings from Credit Scoring

SUCOFIN

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Financial  Access

The urgently needed replanting of almost 40% of Ghana's smallholder cocoa farms (>700,000 hectares), represents a financing gap of about \$1 billion. This current shortfall threatens the livelihoods of 800,000 households and exacerbates what is already the largest driver of forest loss in Ghana's high forest zone - forest encroachment for new cocoa plantations.

SNV with the help of Financial Access Consulting Services (FACS) aim to build a scalable and replicable model for catalyzing commercial farming towards cocoa replanting and post replanting management services. The regions of focus are Bia West and Juabeso, which form the focus of SNV's partnership with Touton under the Partnership for Productivity, Protection and Resilience in Cocoa Landscapes (3PCRL).

The aspect of SNV and FACS's cooperation, the credit scoring of smallholder cocoa farmers is explained and discussed in this report. In a field visit in March, the team spoke to financial institutions to understand their appetite for extending input loans to farmers, assessed their capacity to do so, and elicited any information these institutions would need to be able to disburse loans. This, along with a good understanding of smallholders' financial, farming and off-taker dynamics, informed the creation of an extensive questionnaire. The results of this questionnaire are analyzed and explained in this report.

Summary of Data

Ten SNV enumerators administered the questionnaire to 1006 smallholders over 3 weeks. In total, the questionnaire had 158 questions. However, due to some questions being asked only to certain farmers, 112 questions were answered on average per questionnaire. An example of this is that the questionnaire asked very specific questions about each plot that a smallholder farms, meaning that if they farm on only 1 plot, fewer questions are asked and answered than if a farmer holds 4 plots.

The questionnaire also recorded the GPS coordinates of the interview. A map with an overview of the farmers' locations, which may not be fully accurate, but nonetheless gives a good overview, is given in Figure 1. To overcome this limitation, their addresses were also asked directly, which may prove more accurate and useful for an MFI to base their decisions on.

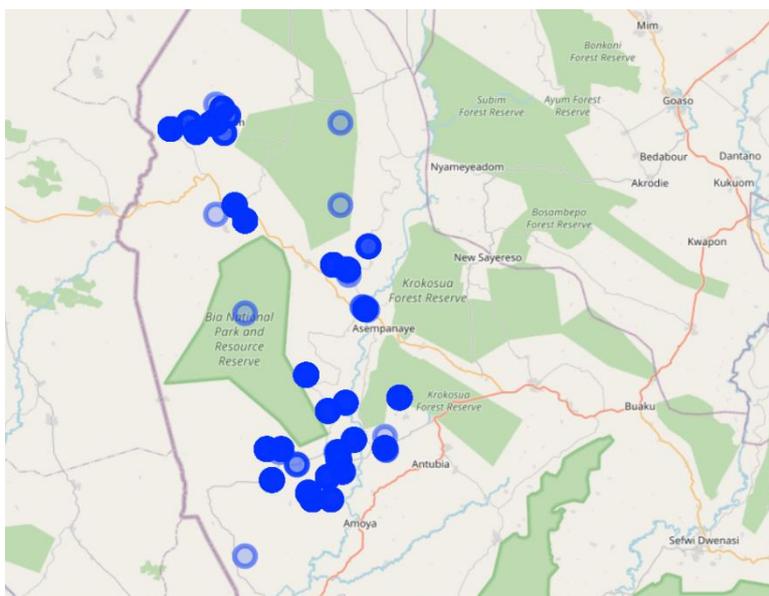


Figure 1 - Smallholders' locations.

Two-thirds of farmers are male, and the median age for the interviewees is 44, but ranges from 18 to 80. The full distribution of ages can be seen in Figure 3.

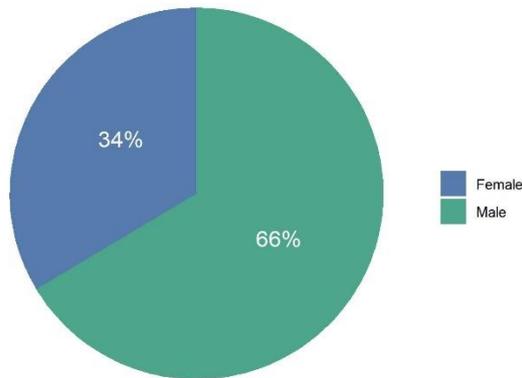


Figure 2 - Age.

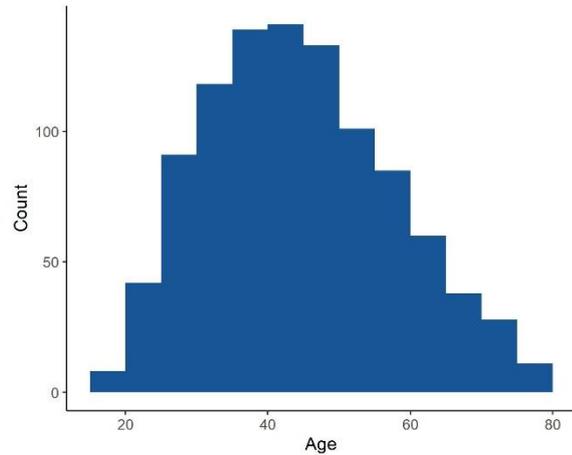


Figure 3 - Gender.

55% of farmers hold just 1 plot on which they grow cocoa, with another 26% farming on 2 plots. The median land size is 8 acres, but there is significant variance between farmers, as can be seen in Figure 4.

Yields per acre vary widely across farmers. As many farmers have conducted (partial) replanting of their plots already, evidenced by the fact that 88 farmers receive just 1 bag per acre from their farm. The median yield per acre is 16.5 bags over the past 3 years.

Furthermore, 42% of farmers have a share-cropping agreement, under which they only keep half of their harvest on average, with the other half going to the owner of the plot. A breakdown of the average number of bags yielded per acre is given in Figure 5.

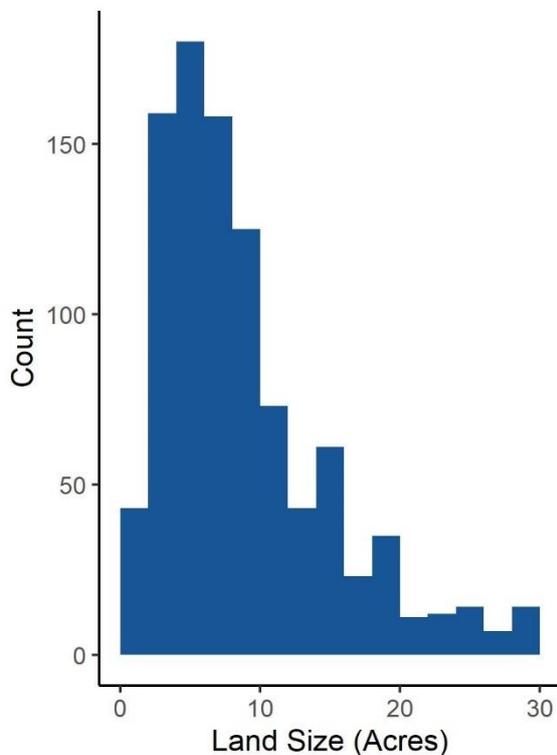


Figure 4 - Yield per acre (in bags).

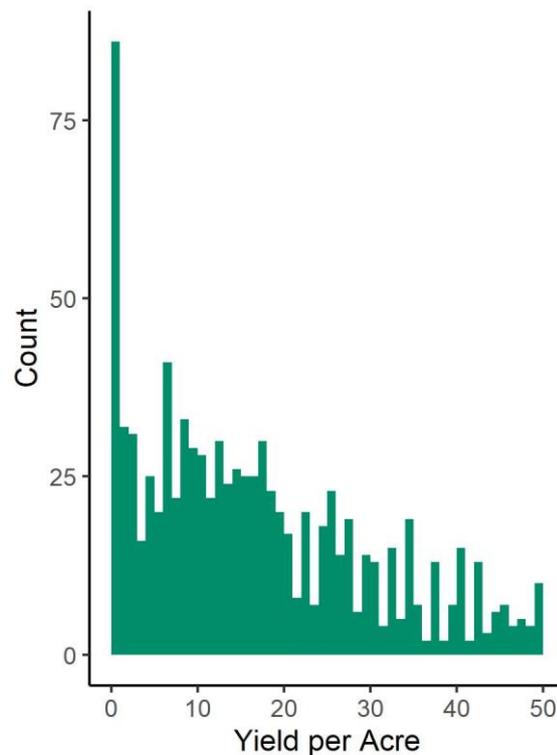


Figure 5 - Farm land size.

Credit Scores

Though these summary statistics give a good overview of the distribution of the various variables of interest, they provide very limited information on the individual farmer level. To address this limitation, and to assess the creditworthiness of farmers directly, the individual responses to the questionnaire were used to create credit scores.

These credit scores are calculated by considering 15 individual credit risk drivers, across 4 categories. A full breakdown of these risk drivers is given in Table 1.

Category	Risk Driver	What it measures	Importance
Applicant Profile	Education	Highest education level passed by the individual	23%
	Age	Age	
	Agri space per family member	Total farm size divided by the number of household members	
	Experience with formal borrowing	Whether they have ever received a loan from a formal institution	
Ownership & Collateral	Land ownership	Number of acres of farmland for which they hold a land title	25%
	Fixed Assets	Number of assets owned out of a pre-specified list	
	Savings	Total value of savings in cash, at a formal institution or at a Village Savings and Loans Association (VSLA)	
	House condition	An index capturing the material of which their walls and roof are made	
Farm Management & Farm Profile	Years of experience	Years of experience growing cocoa	17%
	Farm training	Indicator whether they have received farming or Good Agricultural Practices (GAP) training	
	Yield expectations	An index capturing whether their realized yields were in line with their expectations and the reasons why this was the case	
	Agronomic practices	Implementation of certain GAP practices on the farm	
Financial Profile	Affordability	Requested loan size compared to their annual net income	35%
	Income diversification ratio	Non-cocoa income divided by cocoa income	
	OPEX ratio	OPEX ratio of the cocoa farm	

Table 1 – Credit risk drivers.

The credit scores calculated using this method therefore consider a wide range of credit risk drivers. The risk drivers, their weighting and cut-off points were determined by Financial Access based on best practices, FACS's international experience, FACS's experience with cocoa smallholders in Ghana as well as on the data of the 1006 smallholders in the dataset.

From the credit scores the smallholders received, they were put into one of 5 categories, ranging from A to E, where A holds those farmers with the best scores.

The distribution of Credit Scores can be seen in Figure 6. It has a rough bell-shape, though it is skewed to the left. Overall, 40 smallholders gained over 70% of the total points available, putting them in category A. Another 242 smallholders have a high score. However, the largest group (570) of smallholders fall into category C, where it is hardest to determine whether they are financeable or not.

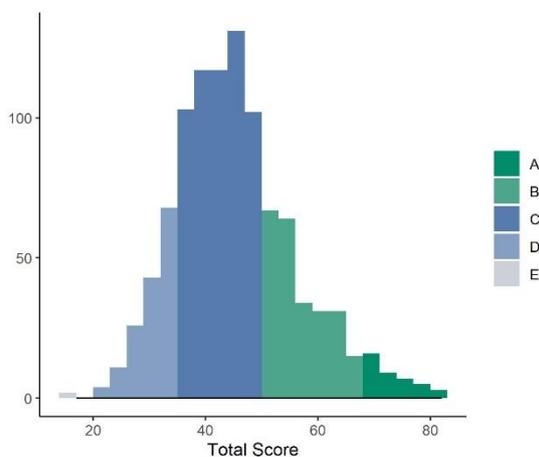


Figure 6 - Credit Scores.

The main reason why so many farmers score in the middle range, is because many farmers' requested loan size is rather large compared to their annual income. This can be seen in Figure 7, where a breakdown of the scores for each credit risk driver is given. Whereas most risk drivers create a good segmentation between individuals scoring low, high or medium scores, the scores for affordability are low across the board, indicating that requested loan sizes are too high. This points to the

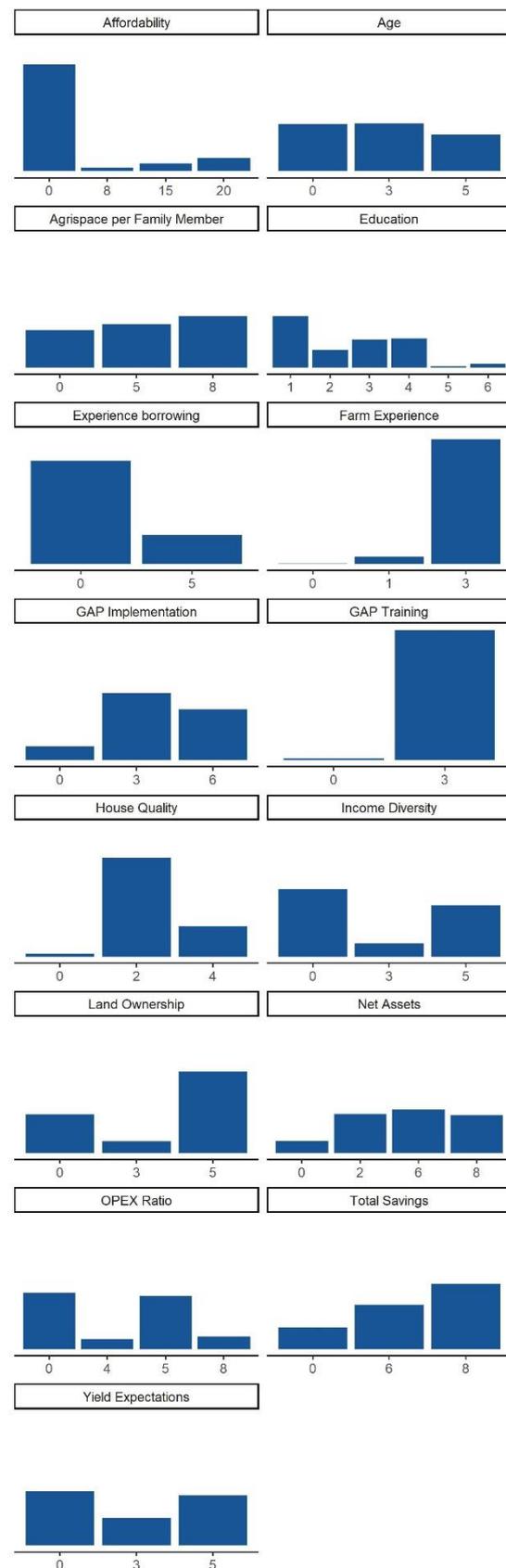


Figure 7 - Breakdown of scores for each Credit Risk Driver.

importance of a partner financial institution closely examining the loan size that would be disbursed to smallholders.

Another way to consider the credit scores, is to examine their composition across the 4 risk categories, which is given in Figure 8. The vertical lines in the figure track the cut-off points between the 5 categories, with E on the left and A on the right. From this figure we can clearly see that the average scores in the Applicant Profile and Farm Profile categories hardly change between the 5 categories. Average scores for Ownership & Collateral increase steeply between categories D and C, but remain stable between C, B and A. The main category that therefore determines whether an individual farmer moves from category C to the clearly financeable buckets of B and A is given by their financial profile. The average score for the financial profile in category C is a low 5.9, but increases to 14.6 in category B and 27.6 in A. This again stresses the importance of ensuring that farmers' requested loan size is examined in detail, and lowered where necessary, by the partner financial institution.

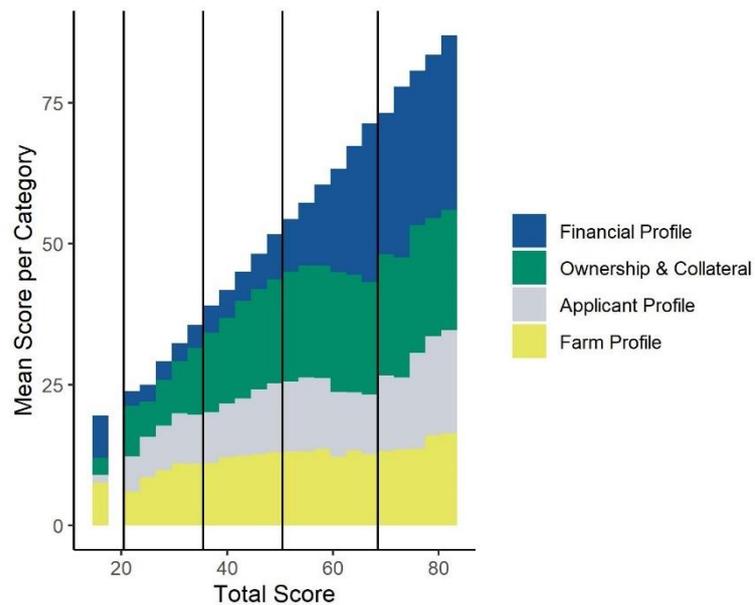


Figure 8 - Breakdown per Risk Category for each Credit Score.

Loan Value

To investigate the loan value in more detail, consider Figure 9, which gives a boxplot of the requested loan size. The green box contains the middle 50% of requested loans, with the horizontal line indicating the median. The two 'tails' stretching out from the box capture the lower and upper 25% of requests. The dots indicate outliers, which are much higher than any other requests made. From this figure we can see that those in category A generally request the smallest loans, improving their affordability. However, between categories B, C and D there seems to be little difference in the requested loan sizes, meaning that the farmers in category B have higher incomes than the others, improving their affordability even though their loan size is the same.

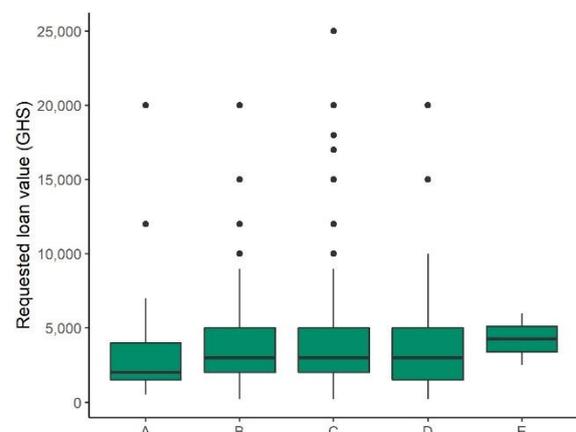


Figure 9 - Requested loan value.

Affordability

As the requested loan size seems to have an outsized adverse effect on the overall credit score, let us consider the credit scores without taking affordability into account. The cut-off points for the final categories is adjusted to consider the loss in weight for the Financial Profile category.

The resulting scores are shown in Figure 10. This shows that, as can clearly be expected, the total scores shift to the left, and a maximum score of only 69 is achieved. However, we also see a decisive shift in smallholders moving up in their final risk category. In this model 74 farmers are classified in category A with another 544 in B.

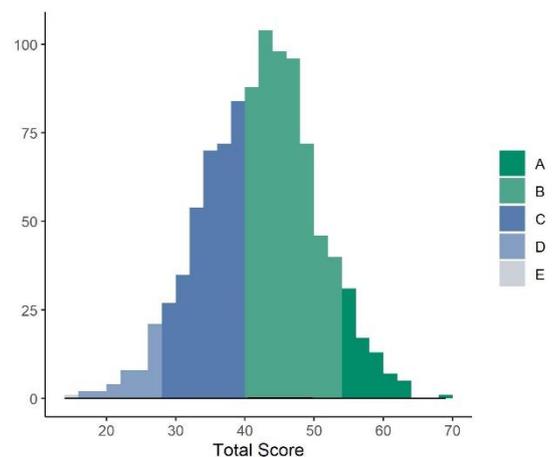


Figure 10 - Credit scores without affordability.

It must be stressed however, that this approach is not recommended. Even though the overall number of smallholders classified as financeable increases, there are disparities at the individual level. For instance, 31 farmers move from category C to B, even though 367 smallholders make the opposite shift. Thus, though on average more farmers move up than down, there are 61 farmers who drop in their final score. Furthermore, as affordability, or the ratio to income to loan repayments, is a key determinant of repayment risk, not considering it in a credit score is a significant lapse of judgement.

Conclusion

From the full analysis FACS conducted on the credit scores, only the important parts of which is discussed in this report, three main conclusions can be drawn.

First, the credit scores successfully distinguish financeable farmers from non-financeable ones. This is evidenced by the fact that the two main categories determining credit scores are the Financial Profile and Ownership & Collateral.

Second, attention must be paid to the loan size requested by farmers. As data collection was done by SNV, smallholders may not have realistic answers to this question, overstating their financial needs. Before acting on these data, a financial institution must therefore carefully consider the appropriate loan size for farmers, especially for those in category C.

Third, as some smallholders have conducted (partial) replanting, their stated yields might be particularly low. It is therefore important to not only consider their current income and repayment capacity, but also their repayment capacity when the new trees start becoming productive.