Credit Modelling System for Smallholder Farmers

Problem Statement

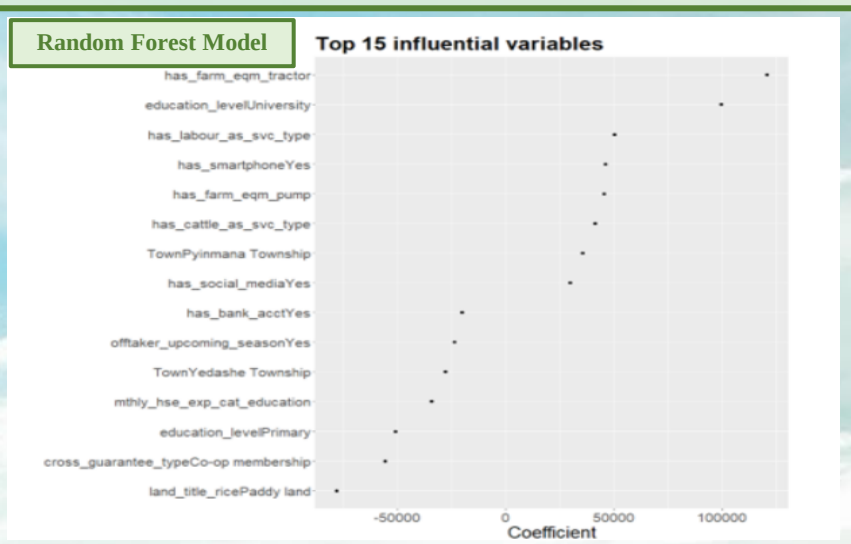
" To create a credit scoring system which assesses farmers' ability to repay and allow for customized loans to be lent to these farmers "

Initial Problems Faced

- Lack of data on the risk assessment of farmers
- Lack of understanding on the real needs and circumstances of farmers
- Various unpredictable factors such as weather conditions

Challenging for Financial Institutions to conduct risk assessment

Regression Model: Determine significant borrowing variables



Methodology

1. Run several regression models to determine significant variables
2. Infer the common significant variables from models such as Lasso, Ridge and Random Forest
3. Run multiple variable regression model and regression tree model with the common variables for predictive analysis

Extract of Loan Amount Estimator via Excel

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Loan Amount Estimation By Models

Loan Amount Indicator - Linear Regression (as per Team)

Questionnaire :		Estimated Loan Amount :	Minimum Loan Amount :	Maximum Loan Amount :
Does farmer have a tractor? (1 = Yes, 0 = No)		MMK -	MMK -	MMK -
How many acres of rice land does farmer have?		Generate Prediction		
How many years of rice farming experience does farmer have?				
Does farmer have land title with regards to paddy land? (Yes = 1, No = 0)		Reset Parameters		
What is the farmer's total equipment sale value?				

Loan Amount Indicator - Regression Tree (as per Team)

Questionnaire :		Estimated Loan Amount :	Minimum Loan Amount :	Maximum Loan Amount :
How many acres of rice land does farmer have?		MMK -	MMK -	MMK -
What is the farmer's total equipment sale value?				
What is the farmer's total monthly household income?		Generate Prediction		
Does farmer have land title with regards to paddy land? (Yes or No)		Reset Parameters		

User Manual

1. Input farmer details in grey cells
2. Click the "Generate Prediction" button to generate the estimated loan amount and corresponding minimum and maximum threshold of loan amount
3. Click on "Reset Parameter" button to reset inputs for further predictions

Extract of Risk Score Card via Excel

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SCORE CARD - EVALUATING A FARMER'S RISK LEVEL

Section A : Farmer's Inputs

I. Farm Conditions	Select Inputs Below :	Score	Max Score Attainable
1 Land ownership	Owned	4	4
2 Type of soil	Clay soft	3	4
3 Climate ($ of dry season)	Dry season > 4 months	1	4
		8 /	12

II. Farmer's Technical Level	Select Inputs Below :	Score	Max Score Attainable
1 Years of experience (years)	3-6 years	3	4
2 Use of certified seed	Always	4	4
3 Apply Phosphate fertilizer	Always	4	4
4 Amount of N applied	Adequate for good yield	3	3
		14 /	15

III. Farmer's Socio Economic	Select Inputs Below :	Score	Max Score Attainable
1 Gender	Female	4	4
2 Age	< 32	2	4
3 Number of household members	<= 5 persons	2	4
4 Number of memebrs contribute financially	>= 4 person	4	4
5 Education level	University	4	4
		16 /	20

1. Enter information collected from farm visits into scorecard template

Section B : Farmer's Risk Assessment Results

SMU Team: Weights can be adjusted based on Agrig8's needs

Farmer Risk Profile Assessment	Score	Weight	Weighted Score	Result
1 Farm Conditions	8	50%	4	Good
2 Farmer's Technical Level	14	25%	3.5	Average
3 Farmer's Socio Economic	16	25%	4	Strong
Total Score	38	100%	11.5	80.85%
Max Score :	*47*			

SMU Team: Classification of Results can be adjusted based on Agrig8's needs

Risk Level of Farmer	Very Low Risk
Loan Amount Recommended	Approve up to 70% of disposable income

2. Farmer's Risk Assessment based on the score obtained in Section A

Reference A : Risk Level to Recommendation Table

Risk Level of Farmer	%	Recommendation
Very Low Risk	> 80%	Approve up to 70% of disposable income
Low Risk	65% - 80%	Approve up to 50% disposable income
Medium Risk	50% - 65%	Review and approve up to 30% of disposable income
High Risk	< 50%	Reject

SMU Team: Recommendations and respective % can be adjusted according to Agrig8's needs

Disposable income per year	MMK	350,000	Cycles per year
Disposable income per cycle	MMK	350,000	1
			Recommended %
Max amount of loan proposed	MMK	175,000	0.5

3. Assessing the maximum amount of loan to be extended to farmers

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