Credit decisions for oil palm replanting and long-term investments:

Evidence from oil palm farmers in rural Costa Rica

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INTRODUCTION

In the next 15 years, millions of palm oil plantations are becoming economically unproductive. Thus, farmers will need to replant [1]. Oil palms grow higher each year, through which harvesting becomes harder and productivity decreases gradually after 25-30 years of palm age [2].

Small and medium scale farmers need to find ways to **finance the replanting** of their plots to survive. For those who cannot rely on their own savings, credits play an important role to provide with the necessary financial resources [3].
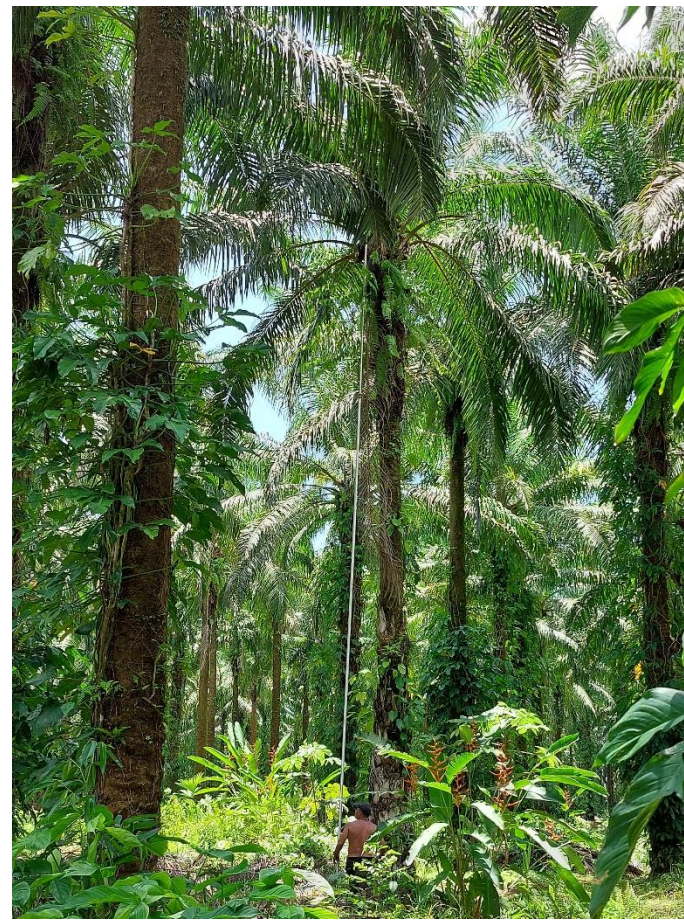
In this context, there are three main challenges:

1. Low **financial literacy**
2. Many farmers had **negative experience** with credits, **indebtedness** in the sector is high
3. Linking to the two previous points: many farmers are **averse** towards taking any kind of credit

We address the literature gap by the following research questions:

I. Is financial literacy influencing replanting?
II. For replanting credits, is it mainly interest rates that farmers are interested in? Which other factors play a role?

Understanding the linkage between financial constraints and replanting better can help us to design policies which helps oil palm smallholders to economically survive.

STUDY CONTEXT AND DATA

The analysis is based on cross-sectional data from the Costa Rican oil palm sector collected from November, 2022 to January, 2023.

Oil palm was introduced during the 20th century in the South Pacific Region in Costa Rica. It was widely adopted in the region after the United Fruit Company's banana plantations were losing productivity [4]. Most of the palm oil is exported to Mexico or other countries, only a fraction is for domestic consumption.

Together with the cooperative *Coopeagropal*, the United Fruit Company successor *Palma Tica* form a **duopoly** structure in the market. The majority of the farmers is under a contract with one of these companies. Contracts are usually used to finance replanting in the sector, but take-up is low as many select into independency.

Study region:
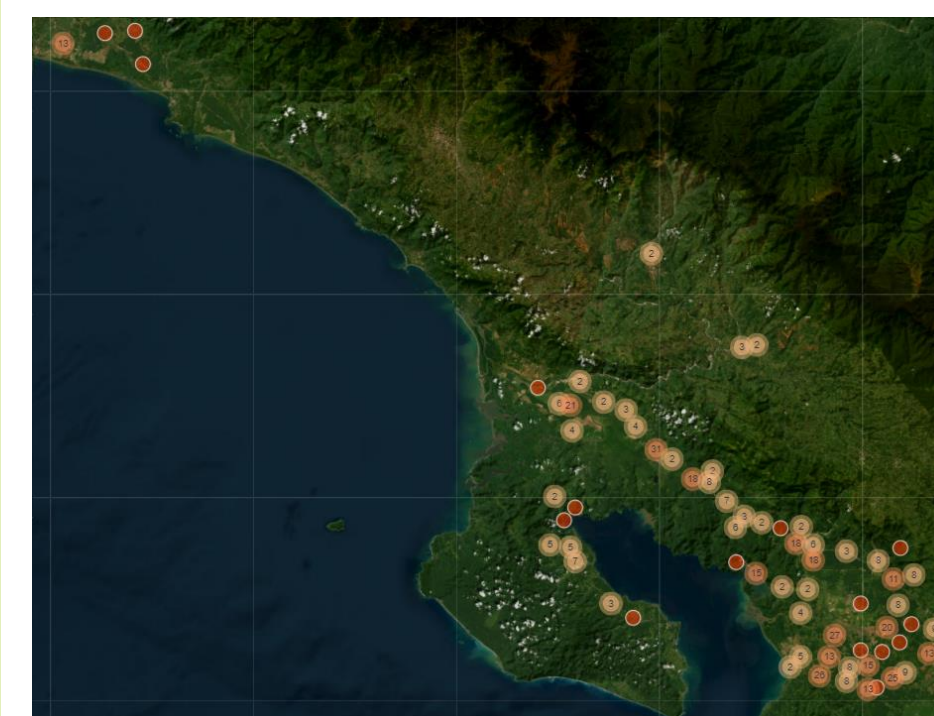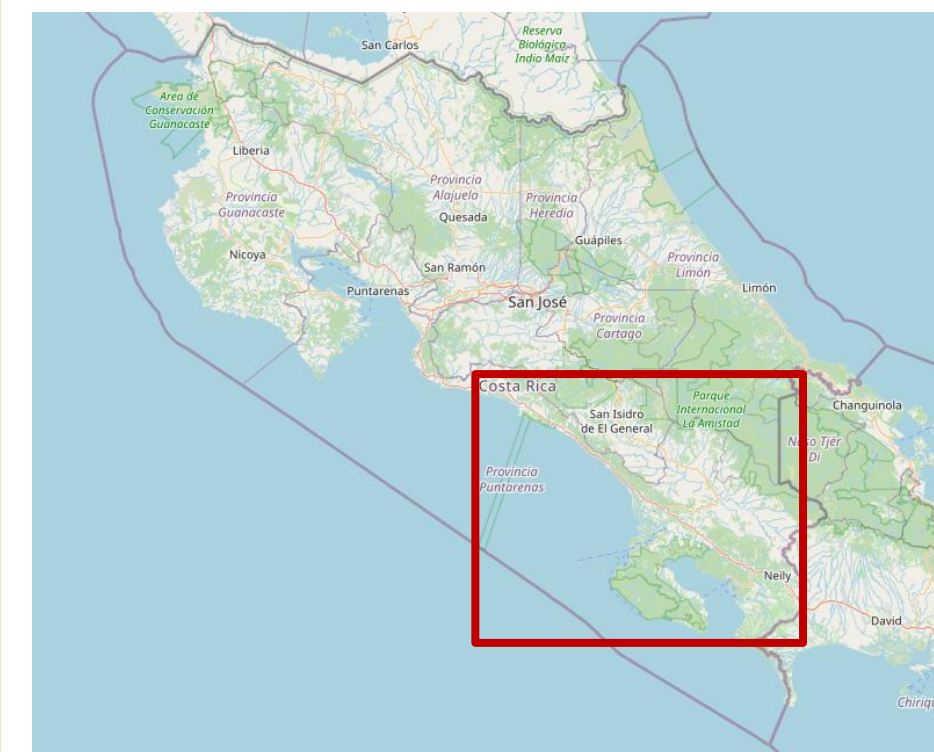
Many farmers in the sector need to replant their plots soon, 21% indicated that they would wish to do so in the next 5 years (see Table 1).

SAMPLE DESCRIPTION

Table 1: Descriptive statistics

	Mean	Std. Dev.
Farm details		
Oil palm age	16.18	7.57
Land use for oil palm (in ha)	10.28	9.97
Replanting		
Replanted in the last 10 years	0.10	0.29
Replanting plans, next 5 years	0.21	0.41
Credit		
Experience with at least 1 credit	0.28	0.45
Financially literate	0.43	0.50
Obs.	514	

MATERIALS AND METHODS

(1) Logit regression analysis:

$$\frac{p(y_f=1)}{1-p(y_f=1)} = \alpha_0 + \alpha_1 FL_f + \alpha_3 X_f$$

y_f	Plan to replant in the next 5 years (1/0)
FL_f	Financial literacy dummy
X_f	Farm level controls

(2) Discrete Choice Experiment approach [5]:

$$U_j = \beta_1 ASC + \beta_2 PS + \beta_3 CA + \beta_4 RS + \beta_5 FI + \beta_6 AI + \beta_7 CD + \beta_8 FT$$

➢ Where the outcome variable U_j stands for the utility of choosing alternative j.
➢ The variable prefixes correspond to the ones in Table 3.
➢ Each participant performed up to 7 rounds of choice between two credits and one opt-out option.

RESULTS

Table 2: Logistic regression model

	RP	RP
Financial literacy	0.73 ***	0.54 **
	(0.24)	(0.24)
Oil palm tree age		0.19 ***
		(0.02)
Replanting experience		0.86 *
(last 10 years)		(0.49)
Controls	No	Yes
Obs.	514	511

Standard errors clustered at village level. Standard errors in parentheses, * p<0.1, ** p<0.05, *** p<0.01.

The decision to replant in the next 5 years is positively and significantly associated with financial literacy, both before and after including controls. Not surprisingly, oil palm tree age and existing replanting experience are also positively associated with the outcome.

Table 3: Mixed logit model

	Attributes	Dummy-coded (D)/ Continuous (C)
ASC	-30.22	
	(59.15)	
Origin from public source	-3.75 ***	(D)
	(0.38)	
Credit Amount	-3.62 ***	(C)
	(0.30)	
Repayment start after 5 years	1.89 ***	(D)
	(0.32)	
Fixed interest rate (15 %)	-13.18 ***	(D)
	(1.41)	
Adjustable interest rate	1.26 ***	(D)
	(0.36)	
Credit duration	-3.84 ***	(C)
	(0.32)	
Financial training sessions	2.26 ***	(D)
	(0.41)	
Obs.	406	

Standard errors in parentheses, * p<0.1, ** p<0.05, *** p<0.01.

CONCLUSIONS

Our findings show that financial literacy influences the decision whether an oil palm plot is replanted or not. Lower interest rates are significantly associated with the choice of a credit for replanting, as are other credit attributes.

Financial literacy matters for long-term investment decisions. Credits can provide the means to replant smallholders' plots. However, more research on the concrete design is needed.

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