Determinants of Organic Fertilizers Utilization among Smallholder Coffee Farmers in Vietnam

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Introduction

- The Vietnamese coffee sector has achieved becoming the 2nd largest producer and exporter of coffee globally not only by taking advantage of beneficial climatic conditions, but also through the utilization of exorbitant artificial fertilizers in its agricultural systems to gain a high output.
- The environment, however, suffered greatly as a result. Furthermore, climate change has caused this sector to be in danger of losing its position in the international market.
- Considering the industry's crucial role in the nation's socioeconomic advancement, sustainability is essential.

→ The objective of this study is to improve the usage of organic fertilizers among Vietnamese coffee farmers by finding out the factors that impact the selection of organic fertilizers in the consideration of the impact of credit participation on this decision.

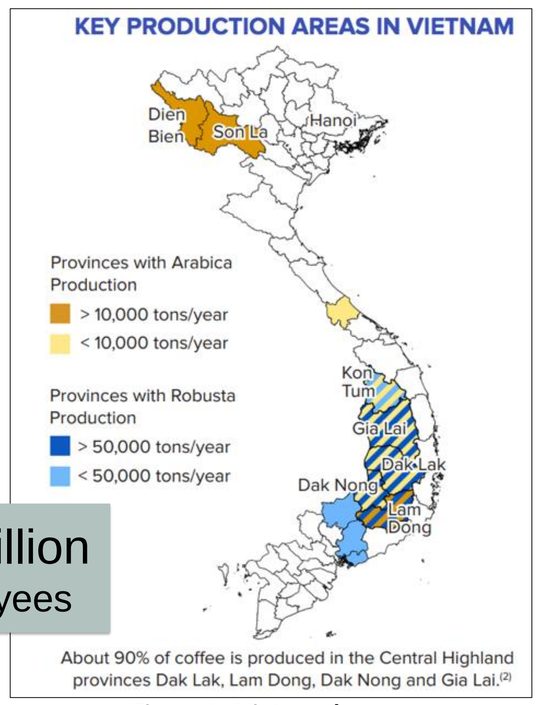


Figure 1: Vietnam's map

0.5 million employees

$USD 3 billions (15% total agri.exports)

About 620,000 ha

(Source: Vietnam's General Statistic Office data)

Methodology

- To achieve the objective, **bivariate probit regression model** is employed.

$$Y_{im} = 1 \text{ if } Y_{im}^* > 0 \text{ and 0 otherwise } (i= 1,2;\ m = 1,2,\ldots M)$$

$$Y_{im}^* = X_{im}^* \beta_m + \varepsilon_{im}$$

- **The theoretical background of this study institutes:**
  (1) theory of adaptation (focus on organic fertilizer adoption)
  (2) concept of intersectionality (social inequalities between major vs minority groups)
  (3) resources-based review (human, physical, financial capitals, relation capital, …)
- **Data collection:**
  - From May-July 2022
  - **Dak Lak** province in the Central Highland, Vietnam
  - Multistage sampling technique: 139 farmers (questionnaires)
- **Coffee variety:**
  - Robusta (590,000 ha)
  - Arabica (30,000 ha)
- **Key coffee-growing provinces:**
  - Dak Lak (190,000 ha)
  - Lam Dong (162,000 ha)

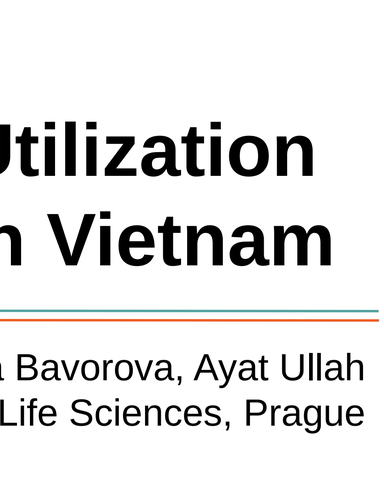
Findings

- Descriptive results:

Human capital

	Male	Female
Gender	90	49
Family worker (Aver = 1.9)	101 (1 worker) 19 (2 workers) 4 (3 workers)	103 (1 worker) 6 (2 workers)

	Value
Age	50 (Aver. year-old)
Experience	25.6 (Aver. years)
Attend Training	47 (never) 52 (seldomly, <1 time/5 year) 23 (occasionally, 2-3 times/5 year) 1 (frequently, 1 time/yearly) 0 (very often, >=2 times/year)



Physical capital

	Value
Livestock	31/139
Mixed crops	2.17 (Pepper: 105/139, Durian: 93/139, Avocado: 46/139, etc.)
Aging-coffee age	47 (Aver. year-old)
Distance to farm	5.1 (km)

- Results from bivariate probit regression model:

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Organicfertilizer						
Age	.0232246	.0145211	1.60	0.110	-.0052362	.0516853
Gender	-.7560051	.3120316	-2.42	0.015	-1.367576	-.1444345
Ethnic	-.5491277	.3600451	-1.53	0.127	-1.254803	.1565476
Experience	-.0064637	.0181875	-0.36	0.722	-.0421105	.029183
Family_Workers	.0582154	.1879056	0.31	0.757	-.3100728	.4265035
Attend_Trainning						
1	.3251108	.4479026	0.73	0.468	-.5527622	1.202984
2	.8536996	.4709401	1.81	0.070	-.0693261	1.776725
3	1.67518	.6406381	2.61	0.009	.4195529	2.930808
4	-5.673325	3604.199	-0.00	0.999	-7069.774	7058.428
Mixedcrops	.0180225	.1314508	0.14	0.891	-.2396162	.2756613
Agingcoffeeage	.0016176	.0129528	0.12	0.901	-.0237694	.0270046
Livestocks	1.090766	.4607702	2.37	0.018	.1876729	1.993859
Farmermembership						
2	.7751281	.5202321	1.49	0.136	-.2445082	1.794764
3	5.38896	2177.671	0.00	0.998	-4262.767	4273.545
4	.9009916	.3806906	2.37	0.018	.1548518	1.647131
_cons	-.8220564	.8787589	-0.94	0.350	-2.544392	.9002795

Credit						
Age	-.0259079	.0143146	-1.81	0.070	-.053964	.0021481
Gender	.0079585	.2451385	0.03	0.974	-.4725041	.488421
Ethnic	.0175475	.3050344	0.06	0.954	-.580309	.6154039
Experience	.0260004	.0169975	1.53	0.126	-.0073142	.0593149
Family_Workers	.2077117	.1469304	1.41	0.157	-.0802666	.4956899
Attend_Trainning						
1	-.5107591	.4194098	-1.22	0.223	-1.332787	.3112689
2	-.2739821	.4271369	-0.64	0.521	-1.111155	.5631908
3	-.4841786	.5045995	-0.96	0.337	-1.473175	.5048182
4	-6.63993	1009.615	-0.01	0.995	-1985.45	1972.17
Mixedcrops	-.0984486	.1132457	-0.87	0.385	-.3204061	.1235089
Agingcoffeeage	.0070771	.0099261	0.71	0.476	-.0123778	.0265319
Livestocks	-.2604755	.2932572	-0.89	0.374	-.8352491	.3142981
Farmermembership						
2	.3483162	.3870282	0.90	0.368	-.4102452	1.106878
3	-.6063325	.5859502	-1.03	0.301	-1.754774	.5421088
4	-.4612122	.3060157	-1.51	0.132	-1.060992	.1385676
_cons	1.137902	.7386958	1.54	0.123	-.3099148	2.58572

Conclusions

The study recommend that policymakers should
(1) focus more on group of only chemical-fertilizer farmers
(2) promote cooperatives and companies using organic fertilizers
(3) provide more training courses

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