



VirginiaTech

Utilization of Soil Conservation Practices in Central Haiti

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Introduction

- State and history of agriculture and natural resources in Haiti



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- Soil conservation practices



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- Research objectives



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- Research objectives
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- Preliminary results
- Future research



Agriculture and Natural Resources in Haiti



Agriculture and Natural Resources in Haiti

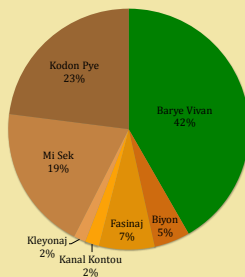


Soil Conservation Practices

- Barye Vivan – Living barrier or hedgerow
- Biyon – Extended mound or embryonic terrace, usually adjoining a parallel furrow
- Fasnaj – Trash barrier built along the contour
- Mi Sek – Rock wall that creates a dry wall bench as sediment builds up
- Kodon Pye – Rock barrier less substantial than a mi sek



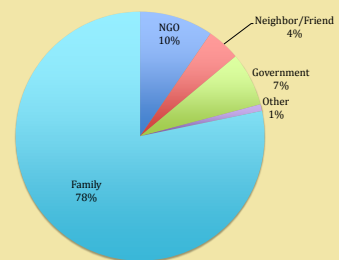
Soil Conservation Practices



Frequency of Soil Conservation Practice



Soil Conservation Practices



Source of Soil Conservation Practice



Research Objectives

- Adoption of live and dead soil conservation practices



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- Adoption of live and dead soil conservation practices
- Intensity of use of soil conservation practices across the farm



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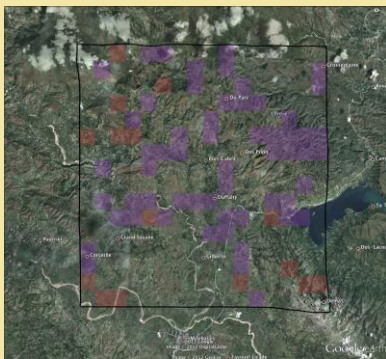
- Adoption of live and dead soil conservation practices
- Intensity of use of soil conservation practices across the farm
- Perceived differences between live and dead soil conservation practices



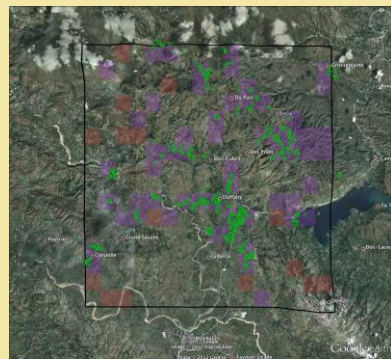
Household Survey



Household Survey



Household Survey





Variable	Description	Mean	SD
AVE_PDIST	Average dist. to plots	26.67	32.72
AVE_PYRS	Average years cultivated	13.43	12.61
RATIOIRR	Ratio of ag. land irrigated	0.07	0.22
RATIOPOP	Ratio of land considered poor	0.12	0.32
RATIOFLT	Ratio of land considered flat	0.54	0.45
RATIOOWN	Ratio of land under secure tenure	0.77	0.39
DISTPLOT	Distance to plot	27.85	37.68
YEARCULT	Years cultivation	14.32	15.67
IRRIG_YN	Irrigation dummy var.: 1=irrigated	0.08	0.26
SPOOR_YN	Soil quality dummy var.: 1=poor soil	0.12	0.32
FLAT_YN	Slope dummy var.: 1=flat	0.53	0.50
PLOTAREA	Area of plot in karo	0.49	0.38
TENUR_YN	Tenure dummy var.: 1=secure tenure	0.8	0.40
TOT_LAND	Total ag. land in karo	1.28	0.94
NUM_PLOT	Number of plots	2.54	0.95
CROP_DIV	Crop Gini-Simpson index	0.57	0.20
DIST_MRK	Distance to markets in meters	2781.94	2258.36
FEMA_PER	Females (>12) per karo	3.63	4.51
MALE_PER	Males (>12) per karo	3.58	4.10
NUM_CHLD	Number of children (12 or younger)	1.53	1.42
HQH_AGE	Age of head of household	46.58	14.27
HQH_EDU	Number of years of school for HqH	2.95	3.45
CHAR_REV	Net income from charcoal sales	411.43	1053.37
TOTALHAR	Total ag. income	3038.14	4137.067
NONAGREV	Nonagricultural income	3187.51	4097.08
VAL_LIVE	Value of livestock (HTD)	4361.65	5184.65
NUM_TREE	Number of mature fruit trees	20.57	45.68
AMT_LOAN	Amount of loans taken in 2011	410.23	999.16



Analytical Methods

We use a **probit model** to examine the household's decision to adopt live and dead conservation practices.

We observe a decision variable

$$D_i = \begin{cases} 1 & \text{if } U_{i1} > U_{i0} \\ 0 & \text{if } U_{i1} \leq U_{i0} \end{cases}$$

The probability that $D_i = 1$ can be expressed as a function of observed household characteristics



Analytical Methods

A **tobit model** is used for intensity of use.

We observe the amount of land (Y_i) on which a household uses live or dead conservation practices.

Y_i is a censored dependent variable.

The tobit model takes into consideration the probability of using a practice so that the relationship between and can be properly defined.



Soil Conservation Adoption

Variable	Live Barriers			Dead Barriers		
	Marginal Effect	Standard Error	z	Marginal Effect	Standard Error	z
DISTPLOT	0.00410	0.00038	1.06	-0.00032	0.00040	-0.80
YEARCULT	-0.00144	0.00111	-1.30	0.00187	0.00092	2.03
IRRIG_YN	-0.05008	0.05950	-0.84	-0.00254	0.05953	-0.04
SPOOR_YN	0.10634	0.05609	0.53	-0.13304	0.03371	-3.95
FLAT_YN	-0.16929	0.03462	-4.88	-0.15997	0.03288	-4.86
PLOTAREA	-0.03144	0.05609	-0.56	0.01172	0.05345	0.22
TENUR_YN	-0.01111	0.04254	-0.26	0.02954	0.03765	0.78
TOT_LAND	0.00320	0.02738	0.12	0.01094	0.02721	0.40
NUM_PLOT	-0.00648	0.02243	-0.29	-0.03540	0.02162	-1.64
CROP_DIV	0.12308	0.08871	1.38	0.06712	0.08082	0.83
DIST_MRK	0.17260 x 10 ⁻⁴	0.6316 x 10 ⁻⁴	2.73	0.55873 x 10 ⁻⁴	0.6127 x 10 ⁻⁴	0.91
FEMA_PER	-0.02176	0.01132	-1.92	-0.01062	0.00711	-1.49
MALE_PER	-0.00994	0.00687	-1.01	0.01198	0.00674	1.78
NUM_CHLD	0.00635	0.01116	0.48	-0.00498	0.01092	-0.45
HQH_AGE	0.00089	0.00140	0.64	-0.00299	0.00129	-2.13
HQH_EDU	-0.00548	0.00500	-1.10	-0.00350	0.00467	-0.75
CHAR_REV	0.21289 x 10 ⁻⁴	0.6557 x 10 ⁻⁴	3.24	0.72146 x 10 ⁻⁴	0.5735 x 10 ⁻⁴	1.26
NONAGREV	0.17260 x 10 ⁻⁴	0.4157 x 10 ⁻⁴	0.51	0.39173 x 10 ⁻⁴	0.3719 x 10 ⁻⁴	0.11
VAL_LIVE	0.24989 x 10 ⁻⁴	0.2805 x 10 ⁻⁴	0.89	0.43163 x 10 ⁻⁴	0.2656 x 10 ⁻⁴	0.16
NUM_TREE	0.00050	0.00035	2.55	-0.00034	0.00049	-0.75
AMT_LOAN	0.30881 x 10 ⁻⁴	0.1174 x 10 ⁻⁴	2.63	-0.43051 x 10 ⁻⁴	0.1344 x 10 ⁻⁴	-3.39



Intensity of Use

Variable	Live Barriers			Dead Barriers		
	Marginal Effect	Standard Error	z	Marginal Effect	Standard Error	z
AVE_PDIST	0.81463 x 10 ⁻⁴	0.00059	0.14	0.00011	0.00059	-0.19
AVE_PYRS	-0.00013	0.00195	-0.05	0.00072	0.00183	0.4
RATIOIRR	-0.07778	0.10109	-0.77	-0.00076	0.00881	-0.09
RATIOPOP	-0.03963	0.06373	0.62	-0.20445	0.09057	-2.24
RATIOFLT	-0.10489	0.05374	-1.95	-0.30781	0.04724	-2.28
RATIOOWN	-0.03571	0.06092	-0.59	0.04031	0.05318	0.76
TOT_LAND	0.04048	0.04258	0.95	0.06346	0.03794	1.67
NUM_PLOT	0.06491	0.03014	2.15	-0.02133	0.02795	-0.78
CROP_DIV	0.02654	0.10995	0.24	0.04124	0.10246	0.41
DIST_MRK	0.12852 x 10 ⁻⁴	0.9323 x 10 ⁻⁴	1.38	0.89515 x 10 ⁻⁴	0.8474 x 10 ⁻⁴	1.06
FEMA_PER	-0.0245	0.01127	-2.17	0.00832	0.00653	1.28
MALE_PER	-0.00033	0.01011	-0.03	0.00666	0.00647	1.03
NUM_CHLD	-0.01148	0.01404	-0.82	0.00604	0.01323	0.46
HQH_AGE	-0.90512 x 10 ⁻⁴	0.00162	-0.05	-0.00277	0.00161	-1.66
HQH_EDU	-0.00052	0.00659	-0.08	-0.00513	0.00595	-0.86
CHAR_REV	0.25273 x 10 ⁻⁴	0.1641 x 10 ⁻⁴	1.54	-0.16381 x 10 ⁻⁴	0.1866 x 10 ⁻⁴	-0.88
TOTALHAR	0.22662 x 10 ⁻⁴	0.4933 x 10 ⁻⁴	0.46	-0.33317 x 10 ⁻⁴	0.4971 x 10 ⁻⁴	-0.67
NONAGREV	-0.21963 x 10 ⁻⁴	0.5408 x 10 ⁻⁴	-0.41	-0.25838 x 10 ⁻⁴	0.5307 x 10 ⁻⁴	-0.49
VAL_LIVE	-0.67208 x 10 ⁻⁴	0.3801 x 10 ⁻⁴	-0.18	-0.74209 x 10 ⁻⁴	0.3513 x 10 ⁻⁴	-0.21
NUM_TREE	0.00075	0.00035	2.16	-0.00054	0.00055	-0.99
AMT_LOAN	0.3380 x 10 ⁻⁴	0.2015 x 10 ⁻⁴	1.66	-0.33464 x 10 ⁻⁴	0.2611 x 10 ⁻⁴	-1.28



Conclusions

- Plot specific characteristics play a dominant and significant role in both the adoption and intensity of use of conservation practices.
- Market access is an important driver of the adoption of live barriers.
- Households view live barriers, such as fence rows or tree plantings, and other non-productive soil conservation practices differently.
- Households are more likely to establish live barriers on plots they perceive as having poorer soil, and they are more likely to establish dead conservation practices on plots they perceive as having better soil.
- Land tenure status does not appear to be a significant incentive or deterrent to the adoption and use of common soil conservation practices.



Future Research

- What are the production gains associated with soil conservation practices?
- What do existing conservation agriculture practices contribute to household income and crop yields?
- How do climate, health, and market uncertainties and shocks affect on and off-farm decisions and coping mechanisms?

Bwè dlo nan vè, respekte vè.

If you drink water in a glass, respect the glass