2ÈME CONGRÈS INTERDISCIPLINAIRE DU DÉVELOPPEMENT DURABLE

COMMENT ACCÉLÉRER LA TRANSITION ?

Microfinance for Ecosystem Services

Lessons from Proyecto CAMBio in Nicaragua

(a quantitative analysis of drivers and characteristics of rural clients and the effectiveness of payments for ecosystems)

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Introduction

- Poor households and micro-enterprises:
  A. are affected by environmental degradation
  B. their activities damage local environment

- Green Microfinance (Hall, 2008; Schuite and Pater, 2008; Allet, 2014)
  financial and non-financial services with triple bottom line:
  profit-planet-people

- MF and Ecosystems (Cranford, 2011, Forcella 2012, Cranford and Mourato, 2014)
  rural microfinance that supports environmentally friendly economic rewarding activities:
  agroforestry, organic farming, silvopasture, etc.

Introduction

Microfinance for Ecosystems: new and unexplored field, however extremely relevant...

- rural poverty
- environmental degradation
- climate change
- ...

some large scale programmes implemented:
Proyecto CAMBio phase 1 and 2, MeBA, ...

Research Questions

1. Is microfinance for ecosystem management able to induce positive environmental outcomes?

2. Are environmental incentives effective tools to reward the environmental improvement of farm land?

Subquestions

1'. What are the characteristics of microfinance clients/products that influence the evolution of the environmental value of their farm?

2'. What are the clients' characteristics that influence the provision of PES, and how do they interact with MFIs' credit strategy?

Literature Review

There is not too much literature, however two visions emerge:

1. monetary incentives and specific green credits foster the optimal allocation of environmental services (Ferraro and Simpson, 2002)

2. complexity of socio-environmental system interacts with external interventions and it indirectly foster dominant development pathways (Hiedanpaa and Bromley, 2014; Bastiaensen et. al., 2015)

Qualitative empirical studies on green microfinance for ecosystems seems to support the second vision (Forcella, 2012; Lucheschi, 2014; Bastiaensen et. al., 2015, Huybrechs et. al. 2015, Forcella and Lucheschi, 2015)

Methodology

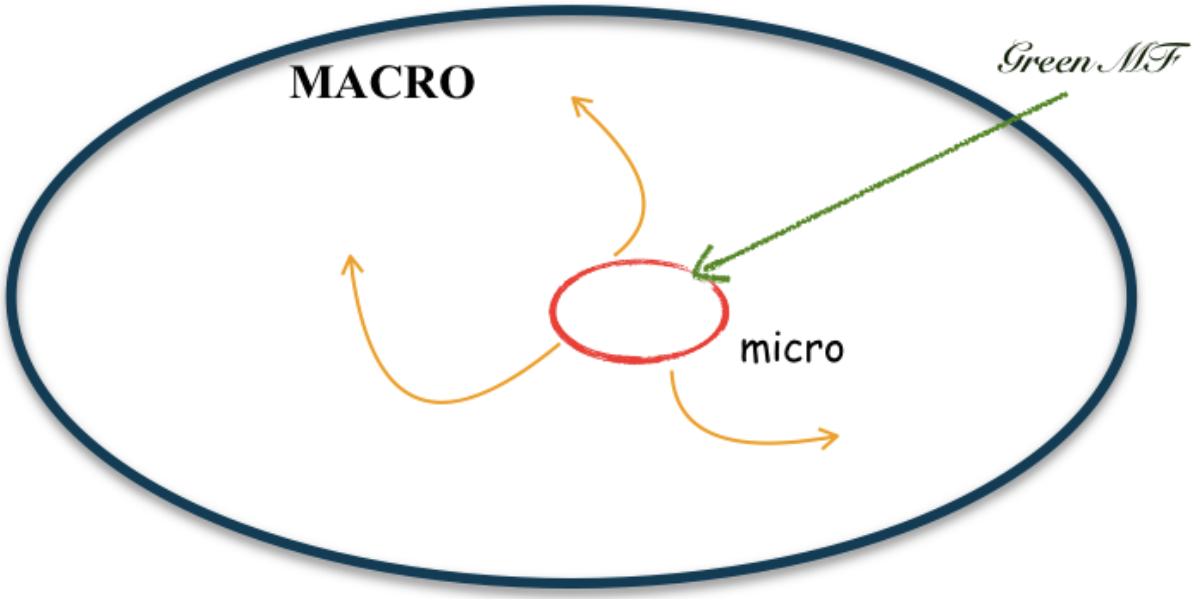
We study Proyecto CAMBio:
first large scale MF and Ecosystems programme

5 Central American Countries, 2007-2013, GEF-CABEI-UNDP
Credit, TA, PES, Guarantee

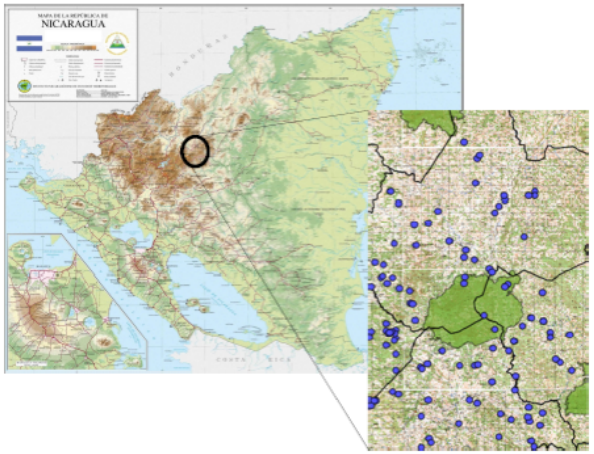
We focus on Nicaragua: FDL + Nitlapan
Credit + TA + PES
PES -> 14% of Credit

Programme very successful !
More than 1000 farmers, 2000 USD average
PAR30 -> 0,7%
1,6 Ha invested in, more than 90% of clients succeed

Common Goods and Green MF



Methodology



Extensive interviews to 128 producers:
88 with P CAMBio, 40 without

Use of ecosystem/biodiversity/CO2 capture indicators per Ha: Evolution in 5 years

	Carbon index	Biodiversity index	Ecosystem Services Index
Annual crops	0	0	0
Degraded pasture	0	0	0
Natural pasture without trees	0.1	0.1	0.2
Improved pasture without trees	0.4	0.1	0.5
Sun-grown coffee	0.2	0.3	0.5
Natural pasture with low tree density (<30/ha)	0.3	0.3	0.6
Natural pasture with high tree density (>30/ha)	0.4	0.4	0.8
Living fences (per km)	0.4	0.45	0.85
Windbreaks (per km)	0.5	0.6	1.1
Improved pasture with low tree density (<30/ha)	0.5	0.3	0.8
Improved pasture with high tree density (>30/ha)	0.7	0.6	1.3
Monoculture fruit plantation	0.4	0.3	0.7
Fodder banks	0.5	0.3	0.8
Fodder banks with woody species	0.5	0.4	0.9
Cocoa with shade	0.5	0.6	1.1
Shade-grown coffee	0.7	0.6	1.3
Scrub habitats	0.8	0.6	1.4
Riparian forest	0.7	0.8	1.5
Secondary forest	1	0.9	1.9

two side t-test and
Mann-Whitney-Wilcoxon test (MWW)
Multivariate Regressions

Dataset

Table 3: Profile of the respondent rural producers and comparison with regional data: descriptive statistics

	Number of observations	Min	Max	SE	Mean	Regional Data	National
Producers with PC	**128**	0	1	0,465	**0,688**	-	-
Producers with PC for Agroforestry	88	0	1	0,397	0,807	0,786	0,697
Producers with PC for Silvopasture	88	0	1	0,397	0,193	0,214	0,303
Evolution Ecosystem value per Ha	**128**	**-0,938**	**1,3**	**0,329**	**0,137**	-	-
Evolution Biodiversity per Ha	**128**	**-0,522**	**0,6**	**0,158**	**0,058**	-	-
Evolution CO2 Capture per Ha	**128**	**-0,415**	**0,7**	**0,176**	**0,078**	-	-
Evolution Ecosystem value Total	128	-14,49	52,29	9,46	5,49	-	-
Evolution Biodiversity value Total	128	-6,51	22,05	4,16	2,45	-	-
Evolution CO2 Capture per Total	128	-7,98	30,24	5,38	3,04	-	-
Number of planted trees with PC	63	20	1000	205,6	**173,0**	162,9	-
Density of planted trees with PC	62	9,5	1428,6	193,4	120,4	81,4	-
Surface invested in P CAMBio (Ha)	78	0,175	14,7	2,28	**2,07**	1,98	-
Credit PC Agroforestry (USD)	70	469,5	10000	2386,0	**3066,4**	2508,1	1795,1
Credit PC Silvopasture (USD)	17	669,6	6000	1688,3	**2282,9**	3139,3	2669,4
Credit No PC received last 5 years (USD)	122	0	62000	9445,4	**6132,0**	-	-
Environmental Reward: PES (USD)	84	65,7	1400	317,1	**390,4**	381,7	-
Environmental Reward per tree (USD/tree)	62	0,34	12	2,54	**3,04**	3,1	-
Ecosystem Index per Ha 5 years ago	128	0,122	2,1	0,365	0,894	-	-
Biodiversity Index per Ha 5 years ago	128	0,067	1,09	0,176	0,424	-	-
Carbon Index per Ha 5 years ago	128	0,056	1,01	0,193	0,470	-	-
Total farm surface 5 years ago	128	0,875	150,15	26,19	**19,66**	-	-
Cattle as Principal Activity 5 years ago	127	0	1	0,358	**0,150**	-	-
Diversified production 5 years ago	127	0	1	0,244	**0,063**	-	-
Coffee as Principal Activity 5 years ago	127	0	1	0,496	**0,575**	-	-
Change principal activity to Coffe	126	0	1	0,325	**0,119**	-	-
Change principal activity to Cattle	126	0	1	0,176	**0,032**		
Change principal activity to diversified prod.	126	0	1	0,295	**0,095**		
Evolution in the surface of the farm (Ha)	128	-18,73	56	9,92	**3,49**		
Access to electric grid	126	0	1	0,500	0,452		
Family working force in the farm	127	0	1	0,252	0,659		
Social Capital	128	0	2	0,615	0,625		

RESULTS

Evolution farm environmental value

Table 7: OLS regressions for the evolution of environmental value of the farm

		Evolution Ecosystem EVOIseHa	Evolution Biodiversity EVOBioHa	Evolution CO2 Capture EVOCiHa
Credit PC Agroforestry	PCAF	4.26e-06	1.14e-06	3.71e-06
Credit PC Silvopasture	PCSP	1.59e-05	2.06e-06	1.48e-05
Credit No PC received last 5 y	TOTCRNOPC	**4.69e-06***	**2.21e-0.6***	**2.48e-06***
Ecosystem Index Ha 5 y ago	ESIHA5y	**-0.609*****	-	-
Biodiversity Index Ha 5 y ago	BIOIHA5y	-	**-0.600*****	-
Carbon Index Ha 5 y ago	COiHA5y	-	-	**-0.628*****
Total farm surface 5 y ago	TOTHA5	-1.77e-03	-6.51e-04	**-1.17e-03***
Principal Activity cattle 5y ago	CATTLE5y	6.22e-02	2.25e-02	4.25e-02
Diversified production 5y ago	DIV5y	6.22e-02	3.05e-02	3.74e-02
Principal Activity coffee 5y ago	COFFE5y	9.00e-02	4.02e-02	5.18e-02
Change to Coffe	ChCoffee	**0.275*****	**0.125*****	**0.150*****
Change to Cattle	ChCattle	**-0.211***	**-0.116****	**-9.77e-02***
Change to diversified	ChDiv	-4.45e-03	-6.836e-03	8.917e-04
Evolution in area of the farm	ToTEvoHa	**- 6.73e-03*****	**-3.92e-03*****	**-2.73e-03****
Access to electric Grid	AcElGrid	4.43e-02	1.74e-02	2.60e-02
Family working force	FAMIndex	**-0.187****	**-9.78e-02*****	**-9.32e-02****
Social Capital	SOCIALIndex	-2.06e-02	1.31e-02	-1.76e-03
Number Observations	_	115	115	115
R2	_	0,678	0,682	0,674
F	_	13.88	14,14	13,63
Prob > F	_	0,000	0,000	0,000

t test: * p < 0.10; ** p < 0.05; *** p < 0.01

RESULTS

Effectiveness of environmental incentives

Table10: OLS regressions for Environmental Subsidies

		PES (USD)	PES (USD)	PES (USD)	Log PESperTree	Log PESperTree	Log PESperTree
Evolution of Ecosystem value per Ha of the farm	EVOIseHa	-7.96	-	-	0,209	-	-
Evolution of biodiversity value per Ha of the farm	EVOBioHa	-	-17,83	-	-	0,420	-
Evolution of Ecosystem value per Ha of the farm	EVOCiHa	-	-	-17,39	-	-	0,382
Number of planted trees with PC	ARBPC1	**0,408*** **	**0,409*** **	**0,409*** **	**-1,84e-03*** **	**-1,84e-03*** **	**-1,84e-03*** **
Density of planted trees with PC	TreeHaPC1	**-0,545****	**-0,545****	**-0,547****	**-3,21e-03*** **	**-3,23*** **	**-3,20e-03*** **
Total volume of credit received in the last 5 years without	TOTCrNoPC 5y	**7,43e-03***	**7,42E-03***	**7,42e-03***	-1,23E-05	-1,21E-05	-1,22E-05
P CAMBio for AF (1) or SP (0)	AF	**198,12*** **	**198,25*** **	**198,00*** **	**0,410****	**0,408****	**0,414****
Total farm surface 5 y ago	TOTHA5	**8,93*** **	**8,93*** **	**8,92*** **	**1,55e-02*** **	**1,54e-02*** **	**1,55E-02*** **
Cattle as Principal Activity 5y ago	CATTLE5y	-117,64	-117,87	-117,24	7,60E-02	8,38E-02	6,84E-02
Diversified production 5y ago	DIV5y	16,07	16,25	15,68	**0,686****	**0,682****	**0,686****
Coffee as Principal Activity 5y ago	COFFE5y	15,36	15,46	15,24	2,23E-02	1,82E-02	2,20E-02
Evolution in area of the farm	ToTEvoHa	**10,08***	**10,05***	**10,10***	**3,88e-02*** **	**3,94e-02*** **	**3,82e-02*** **
Access to electric Grid	AcElGrid	-54,95	-55,06	-54,57	-	-	-
Family working force in the farm	FAMIndex	117,13	116,91	117,11	-	-	-
Social Capital	SOCIALInde x	-28,65	-28,51	-28,56	-	-	-
Number Observations	_	56	56	56	57	57	57
R2	_	0,8228	0,8228	0,8228	0,7611	0,7547	0,7557
F	_	15	15	15	10,29	14,15	14,23
Prob > F	_	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000

t test: * p<0.10; ** p<0.05; *** p<0.01

Conclusions

- Green Credits do not have a significant effect on the evolution of the environmental value of the farm
- The evolution of the environmental value of the farm is influenced by the underlying territorial dynamics in term of e.g. change of activity, land cumulation, historical environmental value of the farm, etc.
- PES do not reward environmental improvement
- The PES is influenced by other characterises and MF strategies: it rewards assets, access to credit, specific activities, land accumulation, reduction of trees density

Conclusions

Microfinance for Ecosystems services can be successfully implemented by certain MFIs

However:

territorial dynamics and complexity of human - environmental system should be understood

Green Credits and PES should cope with underlining dynamics and articulate with the various actors to redirect habits and local development pathways.

Thanks for your precious attention !