

2nd REECAP workshop, Vienna 27th September



Can we measure nature commodification? A framed field experiment in the Lacandon jungle, Mexico

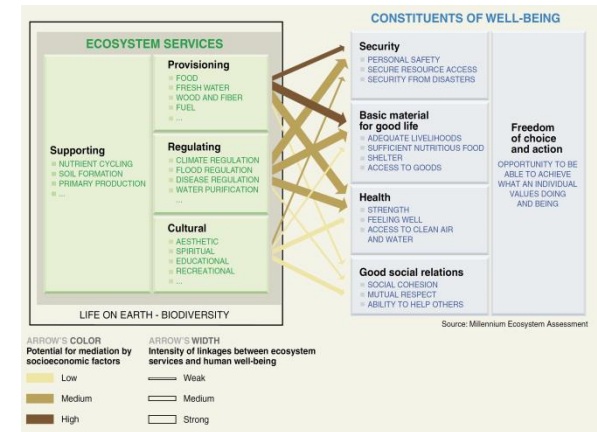
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Note: This is work in progress – the results presented here are preliminary and should not be considered as final



Introduction

- Human-nature relationships conceptualised through different perspectives
 - Ecosystem Services: nature as a provider of human benefits
 - Mother Earth: nature as carer
- Ecosystem services gained prominence as the paradigm for framing environmental research and policy making (Martin-Ortega et al., 2015; Raymond et al., 2013)
- Mainstreaming of ES has also generated new debates and criticisms in relation to nature commodification and crowding-out (Gómez-Baggethun and Ruiz-Pérez, 2011; Kosoy and Corbera, 2010)



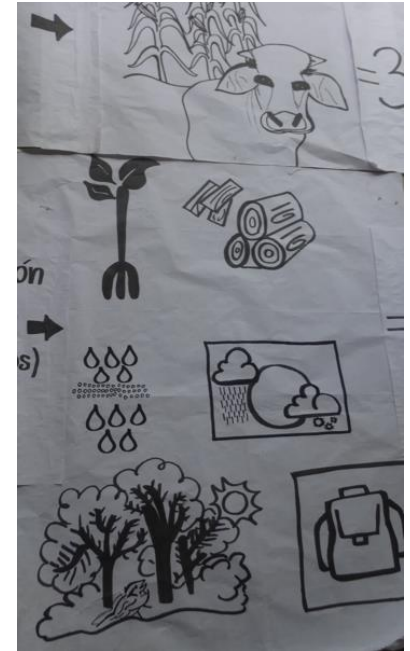
Introduction cont.

- *'the symbolic and institutional changes through which a good or service that was not previously meant for sale enters the sphere of money and market exchange'* (Gómez-Baggethun, 2014)
- Shifting to an economic framing may change mindsets (Vatn, 2000) and conservation logic (Rode et al., 2015)
- Undermine ethical and moral arguments (McCauley, 2006)
- Debate mostly theoretical, few empirical studies
- Use of a framed field experiment to explore framing effects and role of incentives



Method: game description

- Framed field experiment
- Public good game under two framings:
 - Nature as ecosystem services provider (ES)
 - Nature as ‘Mother Earth’ with a focus on care (ME)
- Game represents collective action problems in conservation: how much to contribute to a conservation fund that generates public benefits?
- Role of incentives through a treatment:
 - Payment for Ecosystem Services (ES framing)
 - Compensation for protection (ME framing)



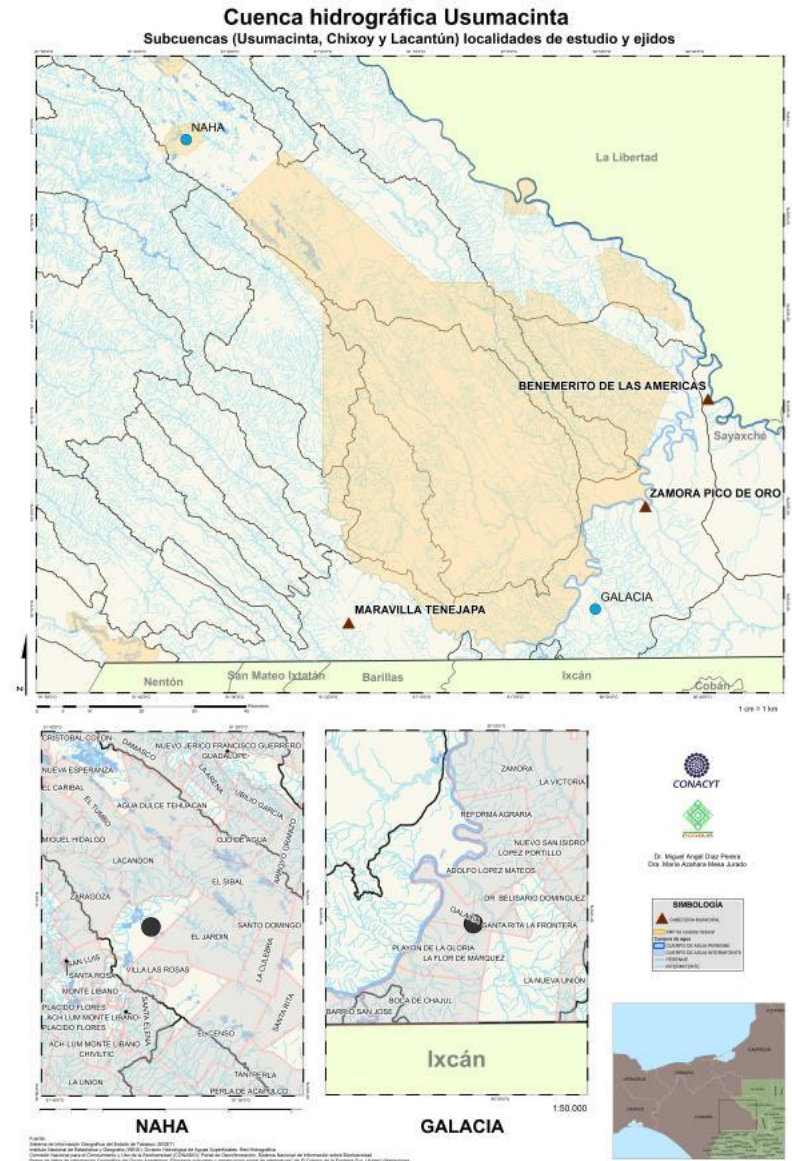
Method: experimental design

Target population :

- 110 participants from three contrasting indigenous communities in Chiapas
 - Naha: Lacandon people
 - Galacia: *ejido* linked to land reform
 - Piru: *ejido* linked to land reform, established in the 80s

'[...] we have a God named Hach Ak Yum. He made us, we're clay, we're sand [...] to harvest and to cut trees we have to ask Hach Ak Yum [...]' (Naha)

'[...] people arrived looking for land [...]' (Piru)



Methods: experimental design cont.

- Participants played in groups of $N=5$; group composition remained constant
- In each round: each player need to invest how much to invest (out of 10 tokens) in agriculture and/or conservation?
- 15 rounds
 - 1-5 baseline
 - 5-10 treatment (incentive)
 - 5-10 post-treatment (incentive removed)
- At the end of the game, earnings translated into an in-kind prize
- 55 ES framing; 55 ME framing

Methods: experimental design cont.

Payoff functions

- Baseline / no incentive:

$$\pi_i = \alpha x_i + \frac{\gamma}{n} (g_i + G_{-i}^*) = \alpha x_i + \frac{\gamma}{n} (w - x_i) + \frac{\gamma}{n} G_{-i}^* \quad x_i \in (0, w)$$

$\alpha > \frac{\gamma}{n}$ and $\alpha < \gamma \rightarrow$ social dilemma, Nash equilibrium is to invest in agriculture

- With incentive

$$\pi_i = \alpha x_i + \beta g_i + \frac{\gamma}{n} (g_i + G_{-i}^*) = \alpha x_i + \beta(w - x_i) + \frac{\gamma}{n} (w - x_i) + \frac{\gamma}{n} G_{-i}^* \quad x_i \in (0, w)$$

$\alpha = \beta + \frac{\gamma}{n} \rightarrow$ two Nash equilibria

- Social optimum is to invest all in conservation



Hypotheses

1. Framing of human-nature relationships influences conservation decisions
2. An incentive (treatment) will increase cooperative conservation under both framings
3. Removal of incentives will have different lasting effects under both framings



Results

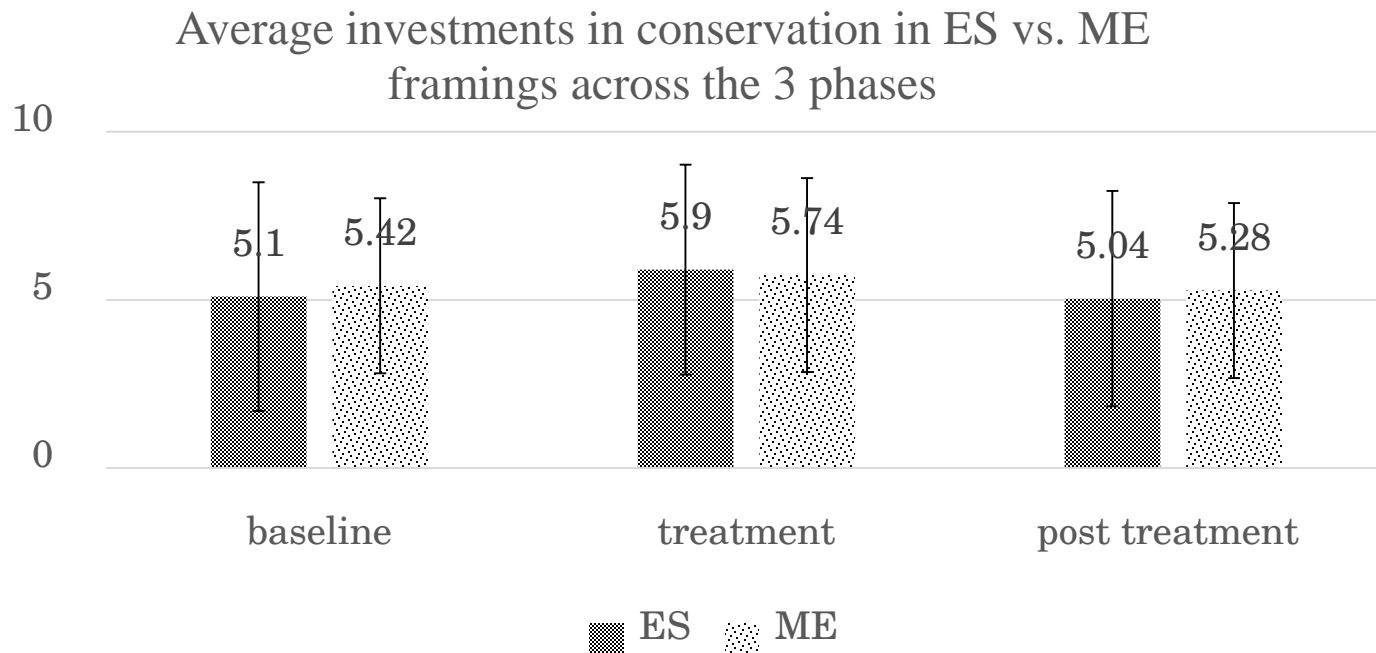
- General effect of framing
- Treatment versus post treatment effects on decisions
- Role of communities and their characteristics

Main measure: average number of tokens that individuals or groups invest in the conservation project



Effect of Framing of human-nature relationships on conservation decisions

- Avg. investment= **5.35** (std 3.27; n = 825) in **ES** and **5.48** (std 2.72, n = 805) in **ME** framing ($p = 0.540$)
- No significant effect of framing on conservation considering all communities and 3 phases together
- Conservation ME > ES for baseline and post-treatment phases but not significant



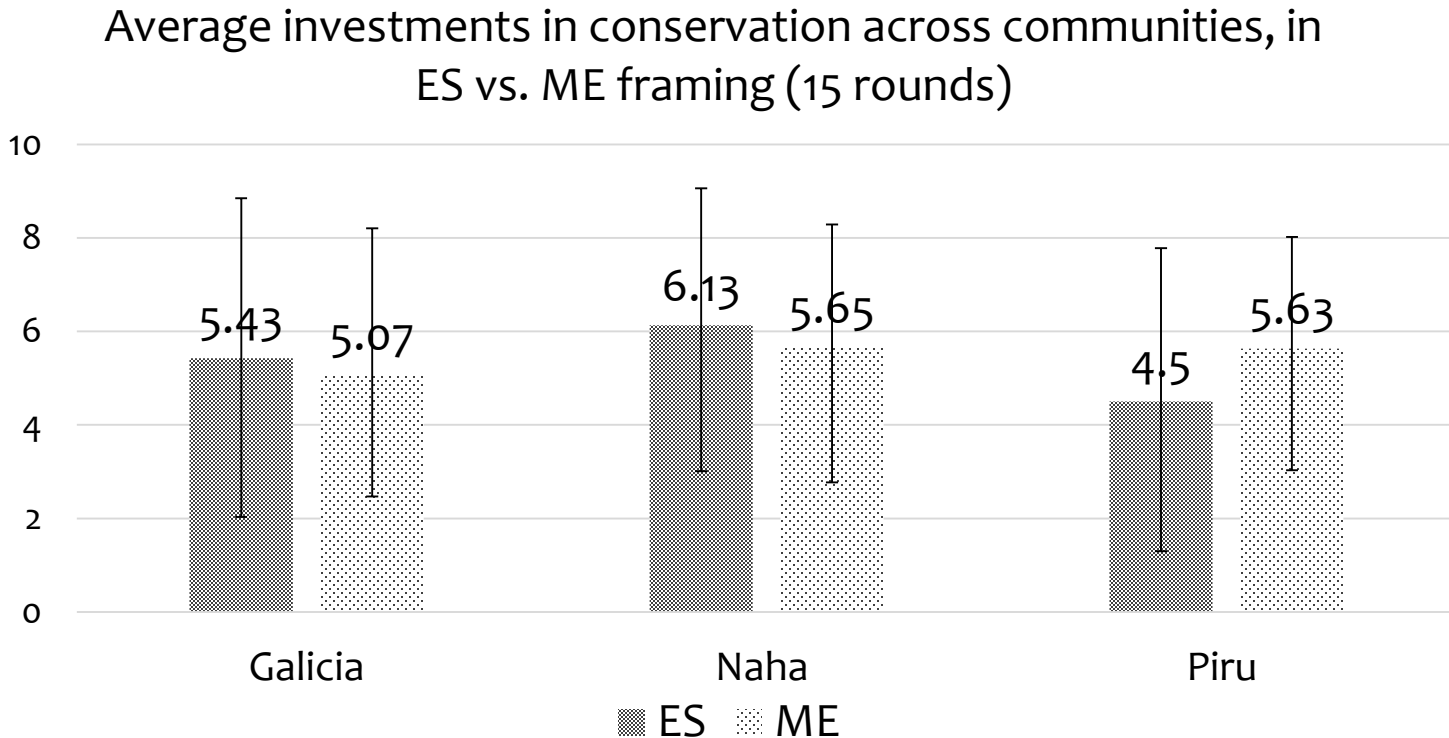
Effect of framing in the baseline

VARIABLES	Model 1	Model 2
	con	con
Framing (ME = 0, ES = 1)	2.056* (1.141)	2.056* (1.153)
round	-0.110 (0.0820)	-0.0872 (0.0878)
Community	-0.616 (1.469)	-0.616 (1.490)
Framing#Naha	1.904** (0.789)	1.904** (0.796)
Framing#Piru	3.340** (1.389)	3.340** (1.402)
Framing#Galacia	-0.654 (1.340)	-0.702 (1.372)
Constant	4.160 (4.510)	4.369 (4.583)
Observations	548	548
Number of idnum		110

Effect of framing and communities on individuals' investment in conservation - Baseline

- Subjects more likely to invest in conservation in the ES framing than in the ME framing?
- Framing effect only significant if interaction framing#community included
- → Characteristics and backgrounds of communities play a role in explaining behaviour under different framings?

Role of communities in explaining decisions?



- Communities behave differently
- Naha invests the most, significantly more than the others, in the 2 framings
- Variation with framing: framing effect significant for Naha and Piru, not for Galicia

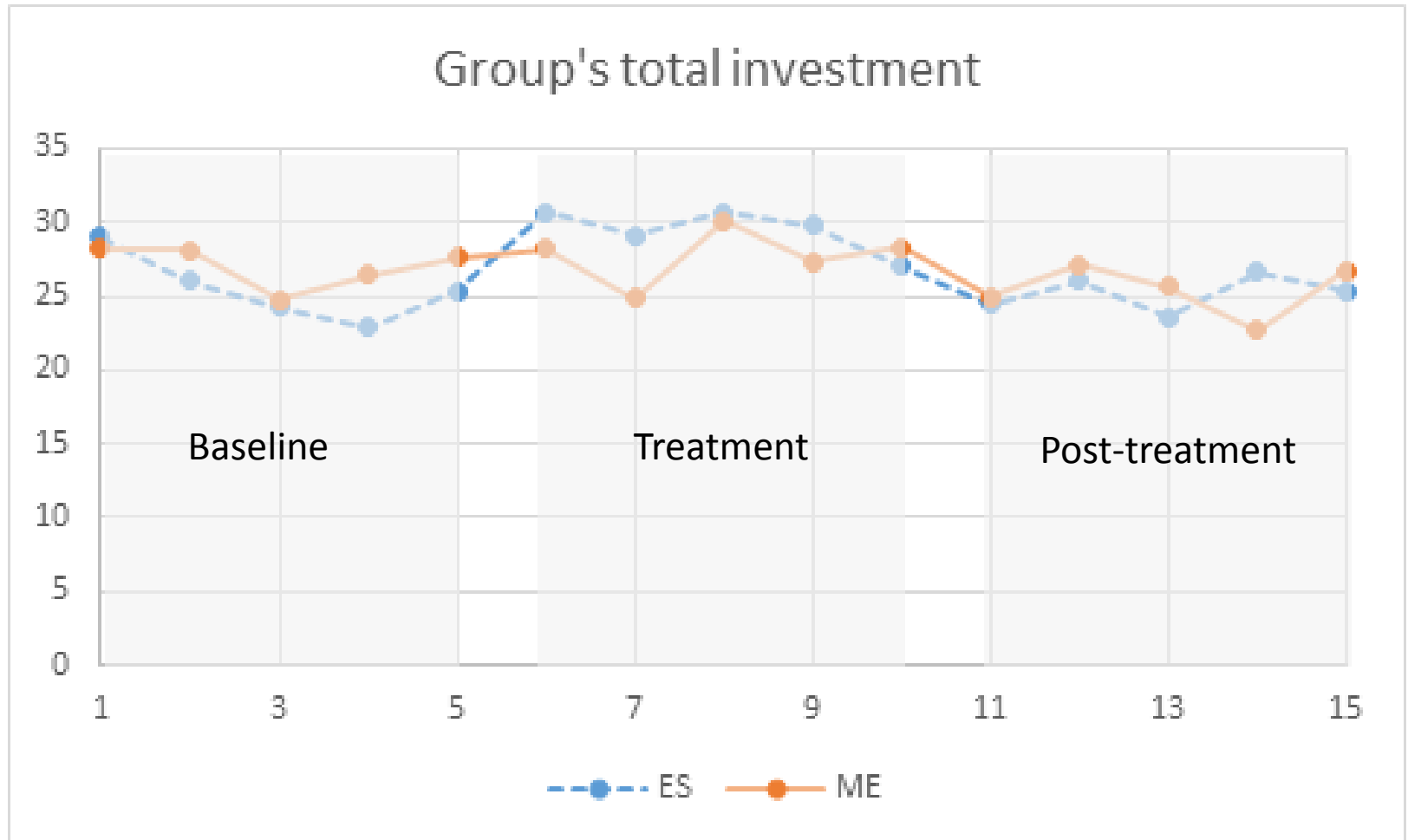
Role of communities in explaining decisions? Cont.

	AGE	FEMALE (%)	EDU	LAND_RIGHT (%)	PSA
GALACIA	36.14 (14.0)	0.66	2.7 (0.94)	0.38	1.67 (0.47)
NAHA	30.9 (9.6)	0.50	1.85 (0.9)	0.25	1.55 (0.5)
PIRU	35.8 (15.2)	0.48	2.6 (1.08)	0.38	1.67 (0.47)

Comparison of relevant socio-economic characteristics across communities

- Background of Naha' subjects are significantly different from the other two communities; this aligns with the difference in their cultural and historical backgrounds
- In the analyses of treatment and post-treatment effects, we differentiate Naha from Galacia/Piru and incorporate the main community characteristics

Treatment and post-treatment effects at a glance

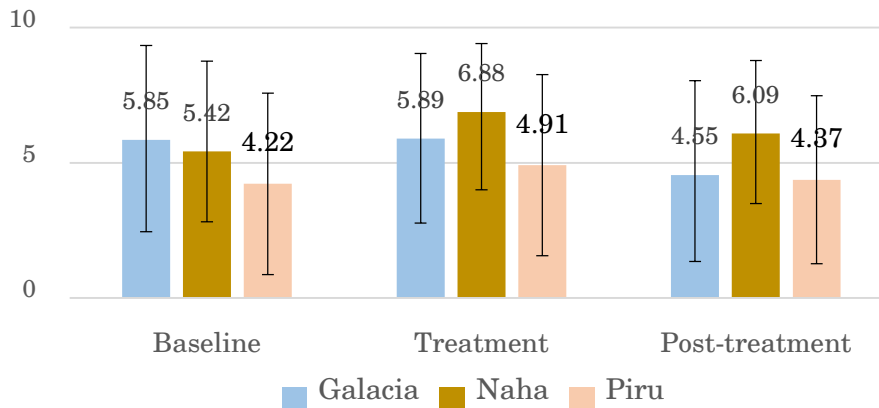


→ No strong change in behaviour at rounds 6 and 11

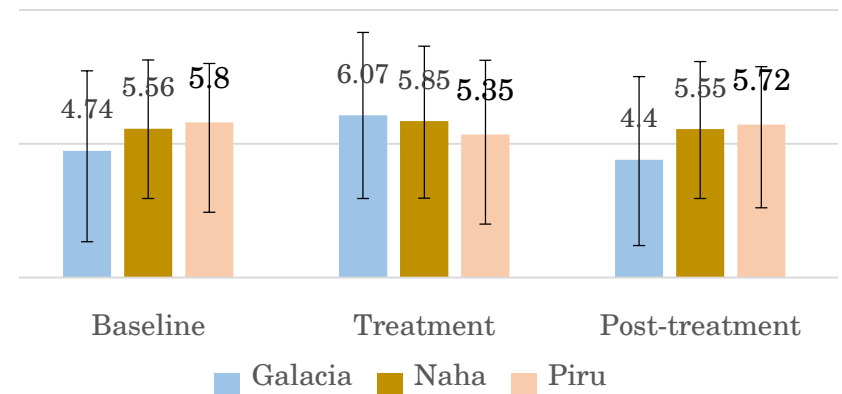
Treatment & post-treatment effect

- Average investment in conservation across all individuals equal to
 - **5.3** in baseline (std 3.1)
 - **5.8** in treatment (std 3.0); ($p = 0.0036$): increase in conservation (yet small)
 - **5.16** in post-treatment (std 2.9); ($p < 0.05$): decline in conservation; not significantly different with the baseline

Average investments in conservation - ES



Average investments in conservation - ME



- **Treatment effect:** ES: Naha and Piru higher investments; ME: Naha and Galacia higher investments, Peru lower
- **Post-treatment effect:** Galacia & Naha: average investment lower under both framings; in Piru: investment diminish under ES framing, and increases under the ME framing. Behaviour differs depending on framing.

Treatment effect Cont.

	ES framing		ME framing	
	Model 1	Model 2	Model 1	Model 2
Dep. Variable = investment in conservation	con	con	con	con
Treatment (baseline = 0, treatment = 1)	2.030**	4.634	0.201	-2.389
	(0.965)	(5.196)	(0.498)	(2.532)
round	-0.114	-0.440	0.0177	0.294
	(0.0971)	(0.574)	(0.0705)	(0.286)
Naha (Naha = 0, Galacia or Piru = 1)	-3.862	-4.005	-4.466	-4.223
	(4.628)	(4.627)	(4.122)	(4.009)
age	-0.0677*	-0.0672*	-0.0662	-0.0664
	(0.0376)	(0.0386)	(0.0472)	(0.0483)
female	-0.132	-0.152	-0.310	-0.309
	(0.596)	(0.611)	(0.460)	(0.469)
education	-0.236	-0.239	-0.533**	-0.535**
	(0.582)	(0.598)	(0.254)	(0.259)
psa	-0.521	-0.531	-2.034***	-2.033***
	(0.964)	(0.986)	(0.397)	(0.406)
land_right	-0.349	-0.373	-0.371	-0.366
	(1.081)	(1.098)	(0.564)	(0.576)
treatment#Galacia/Piru	1.007	1.100	-0.131	-0.117
	(0.743)	(0.736)	(0.749)	(0.763)
Galacia/Piru#age	0.0427	0.0379	0.0549	0.0514
	(0.0618)	(0.0614)	(0.0683)	(0.0661)
female#Galacia/Piru	-1.900*	-2.074*	-1.061	-1.067
	(1.015)	(1.073)	(0.841)	(0.860)
Galacia/Piru#edu	0.879	0.883	1.150***	1.097***
	(0.697)	(0.715)	(0.386)	(0.369)
Galacia/Piru#psa	1.034	1.287	0.787	0.799
	(1.499)	(1.495)	(0.622)	(0.641)
land_right#Galacia/Piru	-2.518*	-2.764*	-0.647	-0.669
	(1.409)	(1.427)	(1.111)	(1.122)
Constant	8.485***	9.162***	12.22***	12.21***
	(1.841)	(2.090)	(1.740)	(1.748)
Observations	504	504	514	514
Number of idnum		51		52

Post-Treatment effect Cont.

Dep. Variable = investment in conservation	ES		ME	
	Model 1	Model 2	Model 1	Model 2
posttreatment	-0.670** (0.315)	-0.686 (2.101)	-0.560 (0.428)	-7.876*** (2.970)
round	-0.0240 (0.0476)	-0.0200 (0.251)	0.0520 (0.0707)	0.882** (0.344)
Naha (Naha = 0, Galacia or Piru = 1)	-7.323* (3.887)	-7.323* (3.975)	-3.176 (4.873)	-3.176 (4.982)
age	-0.107*** (0.0133)	-0.107*** (0.0136)	-0.0411 (0.0373)	-0.0411 (0.0382)
female	-0.0492 (0.504)	-0.0492 (0.515)	-0.931 (0.741)	-0.931 (0.758)
edu	-0.462* (0.237)	-0.462* (0.242)	-0.474 (0.291)	-0.474 (0.297)
psa	0.475 (1.281)	0.475 (1.310)	-1.327** (0.637)	-1.327** (0.651)
land_right	0.406 (1.094)	0.406 (1.119)	-0.230 (0.410)	-0.230 (0.419)
posttreatment#Galacia/Piru	-0.0433 (0.417)	-0.0433 (0.426)	0.235 (0.794)	0.235 (0.811)
Galacia/Piru#age	0.131*** (0.0390)	0.131*** (0.0399)	0.0327 (0.0709)	0.0327 (0.0724)
female#Galacia/Piru	-1.239 (0.988)	-1.239 (1.010)	-1.844* (1.079)	-1.844* (1.103)
Galacia/Piru#edu	1.319*** (0.378)	1.319*** (0.386)	1.271** (0.550)	1.271** (0.563)
Galacia/Piru#psa	-0.168 (1.538)	-0.168 (1.573)	0.413 (0.763)	0.413 (0.780)
land_right#Galacia/Piru	-0.928 (1.354)	-0.928 (1.385)	-1.177 (1.030)	-1.177 (1.053)
Constant	9.933*** (2.268)	10.05*** (2.436)	10.57*** (2.128)	5.641 (3.521)
Observations	500	500	510	510
Number of idnum		50		51

Conclusions

- Monetary incentive/service connotation in the framing does not crowd-out intrinsic motivations to conserve
- From a policy design perspective, framings are relevant
 - (Cheap) opportunity to adapt policies to local framings
 - Requires a good understanding of the cultural and historical context
- Introducing incentives might backfire under certain framings if they're removed
- Limitations: difficult to disentangle issues related to cooperation and group's dynamics

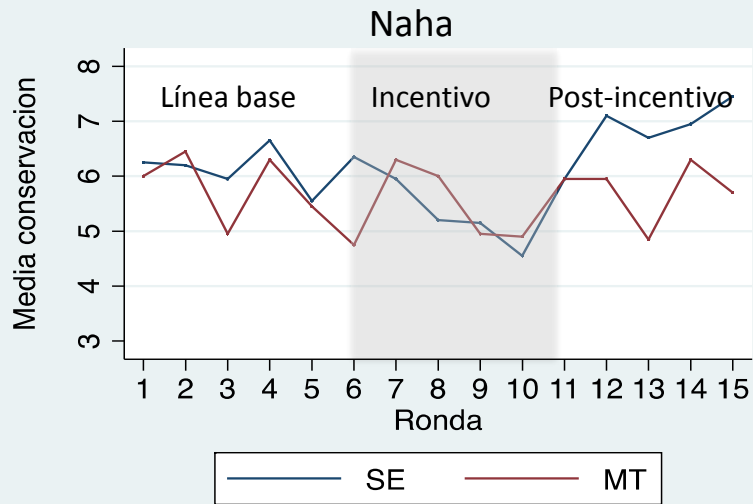
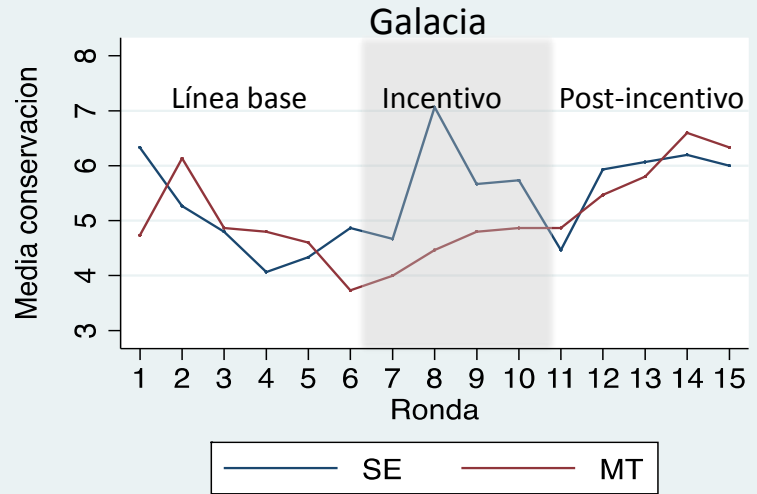
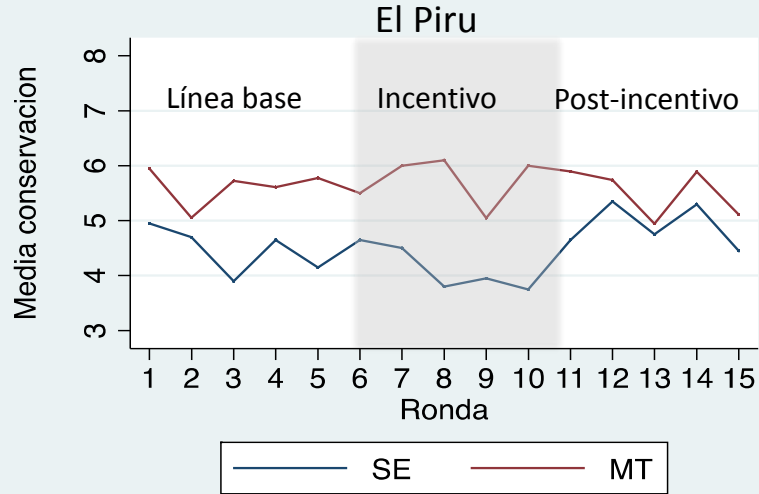
Thanks!

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Appendix 1: Mean conservation per round across communities



Appendix 2:
Mean
conservation
per round
across
communities
Piru vs
Naha/Galacia

VARIABLES	ES framing		ME framing	
	(1) con	(3) con	(1) con	(3) con
treatment	0.999* (0.542)	3.610 (4.790)	-0.609 (0.377)	-3.252 (2.263)
round	-0.113 (0.0969)	-0.440 (0.574)	0.0198 (0.0711)	0.294 (0.286)
sitep	3.567 (4.143)	3.969 (4.237)	5.622 (4.051)	4.427 (4.435)
age	-0.0742 (0.0540)	-0.0742 (0.0552)	0.0240 (0.0221)	0.00514 (0.0262)
female	0.885 (1.769)	0.877 (1.801)	0.777 (1.099)	0.769 (1.163)
edu	0.306 (0.433)	0.308 (0.444)	0.592*** (0.159)	0.351 (0.305)
psa	2.371*** (0.805)	2.388*** (0.821)	-1.879* (0.980)	-1.932** (0.915)
land_right	3.993* (2.153)	4.012* (2.191)	-0.710*** (0.151)	-0.775*** (0.246)
ob.treatment#1.sitep	-0.653 (0.562)	-0.559 (0.562)	-1.346** (0.648)	-1.410** (0.625)
1.sitep#c.age	0.0691 (0.0629)	0.0594 (0.0654)	-0.121** (0.0481)	-0.102** (0.0505)
ob.female#1.sitep	-0.485 (1.800)	-0.611 (1.849)	0.514 (1.160)	0.506 (1.223)
1.sitep#c.edu	0.307 (0.557)	0.299 (0.572)	-0.891*** (0.301)	-0.651* (0.393)
1.sitep#c.psa	-3.586*** (0.993)	-3.535*** (1.046)	0.227 (1.089)	0.279 (1.035)
ob.land_right#1.sitep	3.605 (2.526)	3.552 (2.607)	-1.533 (1.134)	-1.598 (1.173)
Constant	1.150 (4.900)	1.684 (4.914)	5.865*** (2.272)	7.213*** (2.397)
Observations	504	504	514	514
Number of idnum		51		52

Appendix 2:
Mean
conservation
per round
across
communities
Piru vs
Naha/Galacia

VARIABLES	(1) con	(3) con	(4) con	(6) con
posttreatment	-0.00941 (0.533)	-0.0254 (1.783)	0.270 (0.611)	-7.047** (3.012)
round	-0.0240 (0.0476)	-0.0200 (0.251)	0.0520 (0.0707)	0.882** (0.344)
sitep	7.233** (3.645)	7.233* (3.728)	7.150 (6.806)	7.150 (6.958)
age	0.0119 (0.0494)	0.0119 (0.0505)	0.0524 (0.0873)	0.0524 (0.0892)
female	0.342 (1.601)	0.342 (1.638)	0.565 (1.173)	0.565 (1.200)
edu	0.787** (0.393)	0.787* (0.402)	0.769 (1.049)	0.769 (1.073)
psa	0.798 (0.920)	0.798 (0.941)	-0.928 (1.299)	-0.928 (1.328)
land_right	1.200 (2.022)	1.200 (2.068)	0.146 (0.463)	0.146 (0.473)
ob.posttreatment#1.sitep	0.961* (0.521)	0.961* (0.533)	1.459** (0.682)	1.459** (0.697)
1.sitep#c.age	-0.00816 (0.0529)	-0.00816 (0.0541)	-0.159 (0.0991)	-0.159 (0.101)
ob.female#1.sitep	-0.902 (1.621)	-0.902 (1.658)	0.194 (1.330)	0.194 (1.359)
1.sitep#c.edu	-0.0956 (0.432)	-0.0956 (0.441)	-0.919 (1.114)	-0.919 (1.139)
1.sitep#c.psa	-1.561 (1.231)	-1.561 (1.260)	-0.663 (1.361)	-0.663 (1.391)
ob.land_right#1.sitep	0.288 (2.290)	0.288 (2.342)	-1.114 (1.267)	-1.114 (1.295)
Constant	1.208 (4.423)	1.328 (3.883)	1.840 (6.608)	-3.089 (6.908)
Observations	500	500	510	510
Number of idnum		50		51

Appendix 4: Group dynamics

