

Carbon and Livelihood Outcomes on the Forest-Farm Frontier

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Roadmap for presentation

- Motivation
- Background
- Key questions
- Methods
- Results: Patterns of outcome relationships and drivers
- Intervention mechanisms
- Conclusions



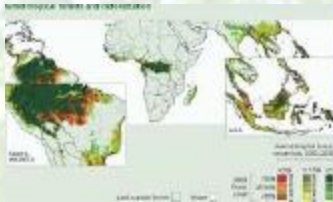
Motivation

- Increasing interest in patterns of outcome relationships; tradeoff or synergy?
- Basic knowledge about drivers of individual outcomes across social and ecological contexts still inadequate
- Identify patterns of relationships among outcomes of interest and the drivers of these patterns



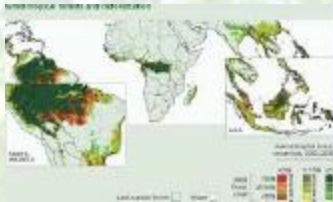
Examples

- Existing knowledge remains basic:
 - high levels of agricultural output associated with low levels of biodiversity and forest cover;
 - roads + low governance associated with high deforestation and biodiversity loss;
- Finer-grained multi-outcome knowledge?
 - What is the association between carbon and aggregate livelihood contributions?
 - Do variations in levels of participation affect relationships between forest cover and livelihoods



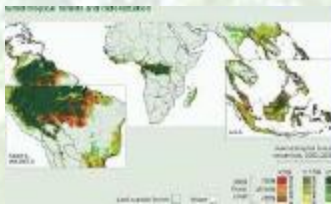
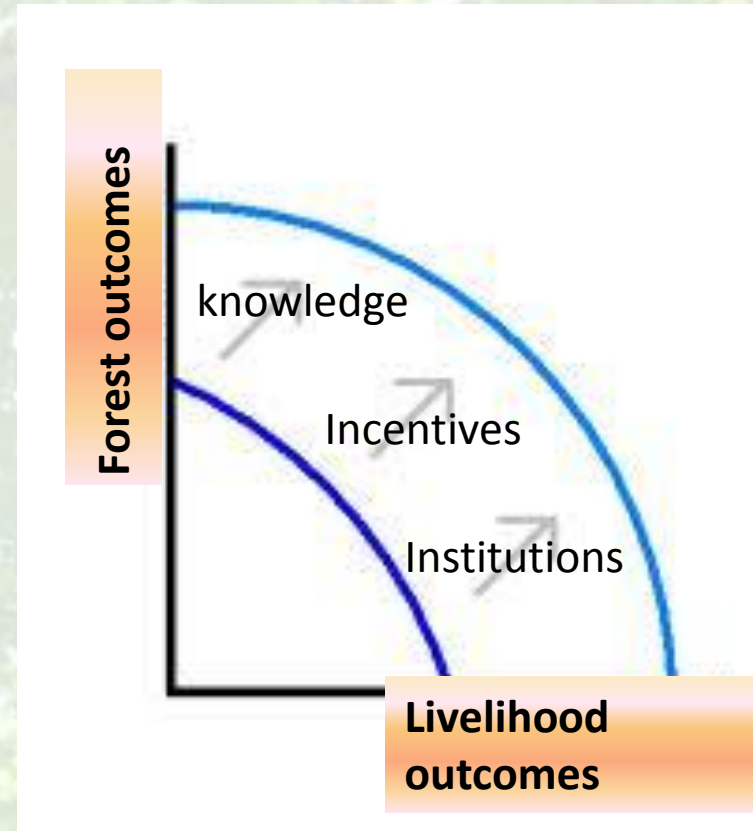
Background

- Overall - Recent reviews provide some sense of distribution and causes of single outcomes; but we do not know how different drivers are associated with outcomes of interest (carbon and livelihoods)
- One reason is that generalizations about relationships are based on limited data, inadequate medium-range theories, and insufficient methods-related advances



Key concerns

- Much discussion over tradeoffs and synergies – but little work that examines effects of given causes on several outcomes together
- Assessing these relationships simultaneously can enable interventions that support multiple improved outcomes



Key Questions

- 1. What are the patterns of relationships between forest cover and livelihoods at the forest-farm frontier, and what are the drivers of observed patterns of relationships?
- 2. What mechanisms do external agencies (government, civil society, donors, and corporate actors) use to influence and alter forest cover and livelihood outcomes at the forest-farm interface? (and with what effect?)



Methods

- Identify existing studies of policies and external interventions with information about impacts on two or more outcomes of interest (carbon, livelihoods, agricultural change, biodiversity)
- Do so through keyword searches, and code the studies for specific information related to outcomes, but also nature of interventions and context



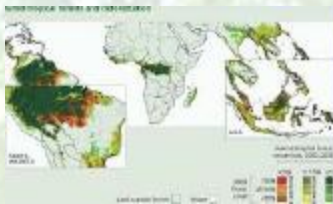
Methods-Research Process

- Using joint keyword searches, identified more than 400 studies; after reviewing abstracts and scanning the studies, 123 coded for information
- Fewer than 15 studies explicitly mention adaptation and carbon/mitigation; we use livelihoods and forest condition/cover as proxies



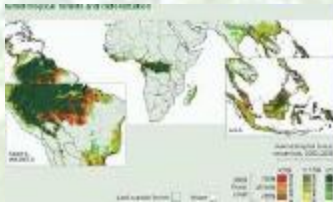
Methods – Specific Focus

- Stated goal of intervention (in term of outcomes)
- Scope of intervention (area and # people)
- Type of pressure (for selective clearing, clear cutting, or both)
- Effectiveness of enforcement



Distribution of cases

Asia = 71;
Africa = 10;
Latin America = 41



Preliminary Results: Outcome Relationships

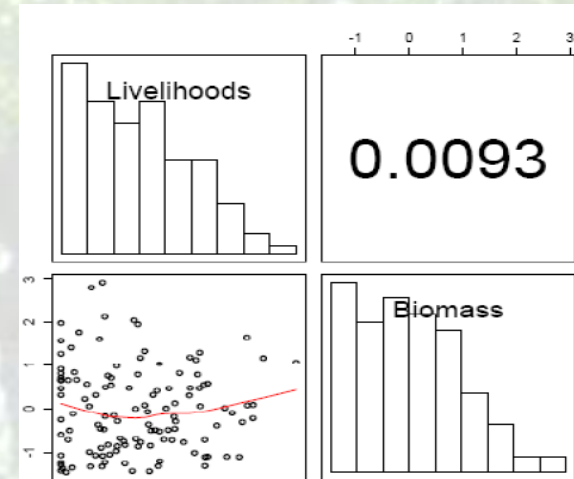
- Relatively few studies provide information on agricultural outcomes and biodiversity (less than 40%); on forest and livelihoods, more than 100 (of 123 cases)
- High (also statistically significant) association between agricultural outcome and livelihoods ($r=0.63$, $n=57$), and forest outcomes and biodiversity (0.52 , $n=48$).



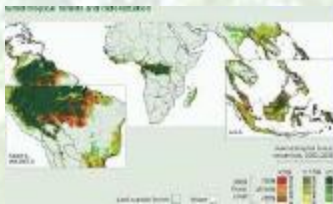
Results: Livelihoods and forest conditions

Positive association ($r=0.41$, $n=98$)

- Why? (some earlier studies find no correlation – Chhatre and Agrawal find a correlation of 0.009 between livelihoods and forest condition for 125 cases of forest commons)

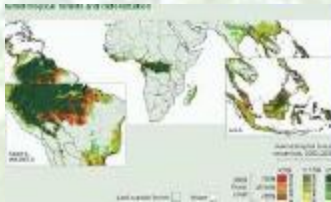


Different universe of cases. Focus of current study -- external interventions aimed at promoting joint outcomes - agriculture part of the focus)



Results: Goals and Pressures

- No statistical association between the stated goal of an intervention and whether the outcomes related to that goal are positive – true for all four goals! (inference: other influences at play wash out the impact of stated objectives; strong unintended outcomes common)
- No statistical association between types and number of pressures and positive or negative outcomes (inference: demographic and economic pressures are mediated by policies and institutions)



Results: Scope of intervention

More ambitious interventions have more indifferent or negative results; focused projects more likely to promote positive outcomes

Scope of Intervention	Livelihood Outcomes		Total
	-1	1	
1	7	33	40
2	12	24	36
3	14	12	26
Total	33	69	102

Pearson chi2 (2) = 9.5358 Pr = 0.008

Scope of Intervention	Forest Condition Outcomes		Total
	-1	1	
1	9	32	41
2	18	22	40
3	14	13	27
Total	41	67	108

Pearson chi2 (2) = 7.5158 Pr = 0.023



Results: Role of enforcement effectiveness

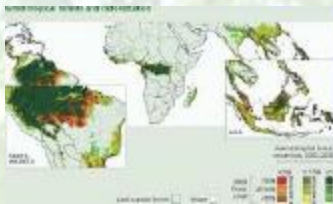
- Strong impact of more effective enforcement on both forest condition and livelihood outcomes

Enforcement Effectiveness	Forest Condition Outcomes		
	-1	1	Total
1	27	14	41
2	3	14	17
3	0	14	14
Total	30	42	72

Pearson chi2(2) = 23.9036 Pr = 0.000
Fisher's exact = 0.000

Enforcement Effectiveness	Livelihood Outcomes		
	-1	1	Total
1	17	20	37
2	3	12	15
3	2	12	14
Total	22	44	66

Pearson chi2(2) = 6.1344 Pr = 0.047
Fisher's exact = 0.066



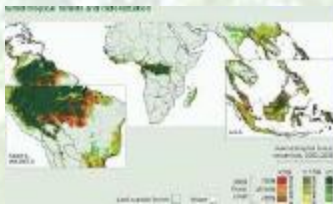
Intervention mechanisms: Information, incentives, institutions



Figure 1: Institutions, Incentives, Information in External Interventions

Distribution

Institutions/regulations=55; Incentives = 20; information = 7; Mixed = 37



Effects of different types of interventions mechanisms

- Use of multiple forms of interventions has a weak statistical association with improved livelihood outcomes, but not with forest outcomes.



Conclusions - methods

- Lack of consistency in data, methods, and approaches limits what can be inferred from secondary literature reviews
- Because of these differences, common patterns are more interesting than lack of associations



Conclusions - Findings

- Importance of scope of policy/project indicates continuing weaknesses in governance mechanisms in the developing world
- Enforcement effectiveness repeatedly found as a key explanatory variable – earlier studies include Gibson et al (2005 World Development), and Chhatre and Agrawal (2008, PNAS)



Future work

- Gain more accurate measures of the scope of the interventions in terms of numbers of people and area
- Undertake more careful statistical analysis
- Focus more on the specific work that different interventions mechanisms (information, incentives, institutions) perform and their relationship to each other

