Actor Analysis and Agent Based Modeling in Jambi

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3rd REDD-ALERT Project Annual meeting
28-30 September 2011
Da Lat, Lam Dong, Vietnam

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I. INTRODUCTION

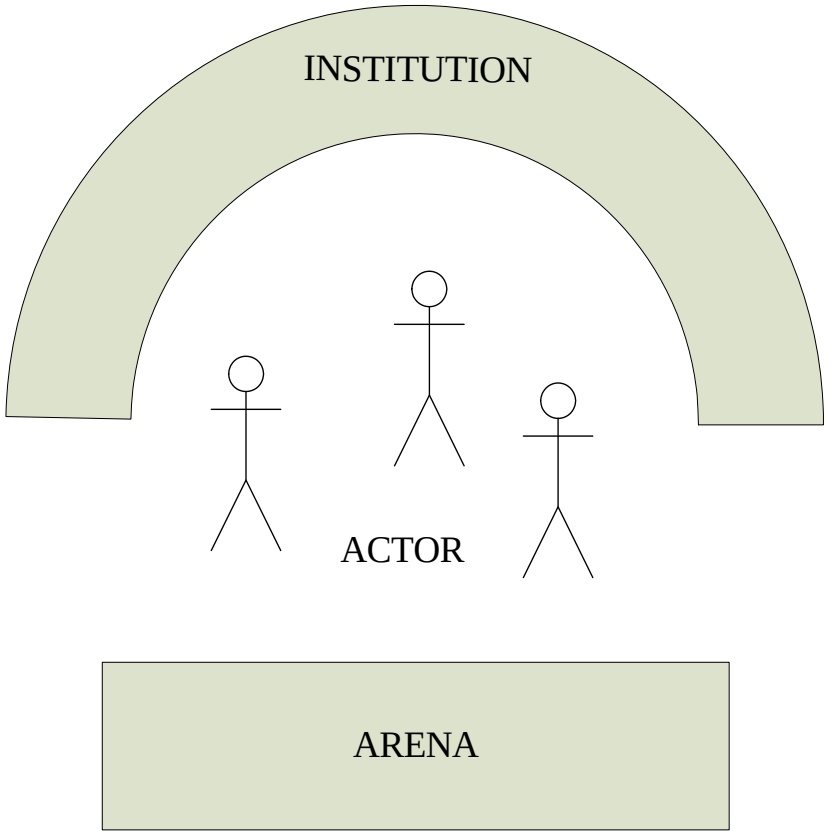
- The atmosphere is a global common, which no one is able to control it.
- Stern (2006) found reducing emissions from deforestation and forest degradation (REDD) is highly cost effective.
- Institutional framework for governing it is still missing. It could lead to “tragedy of the commons’’ (Paavola, 2008), where individuals act independently, solely and rationally consulting their own self-interest (Hardin, 1961).

Research Questions

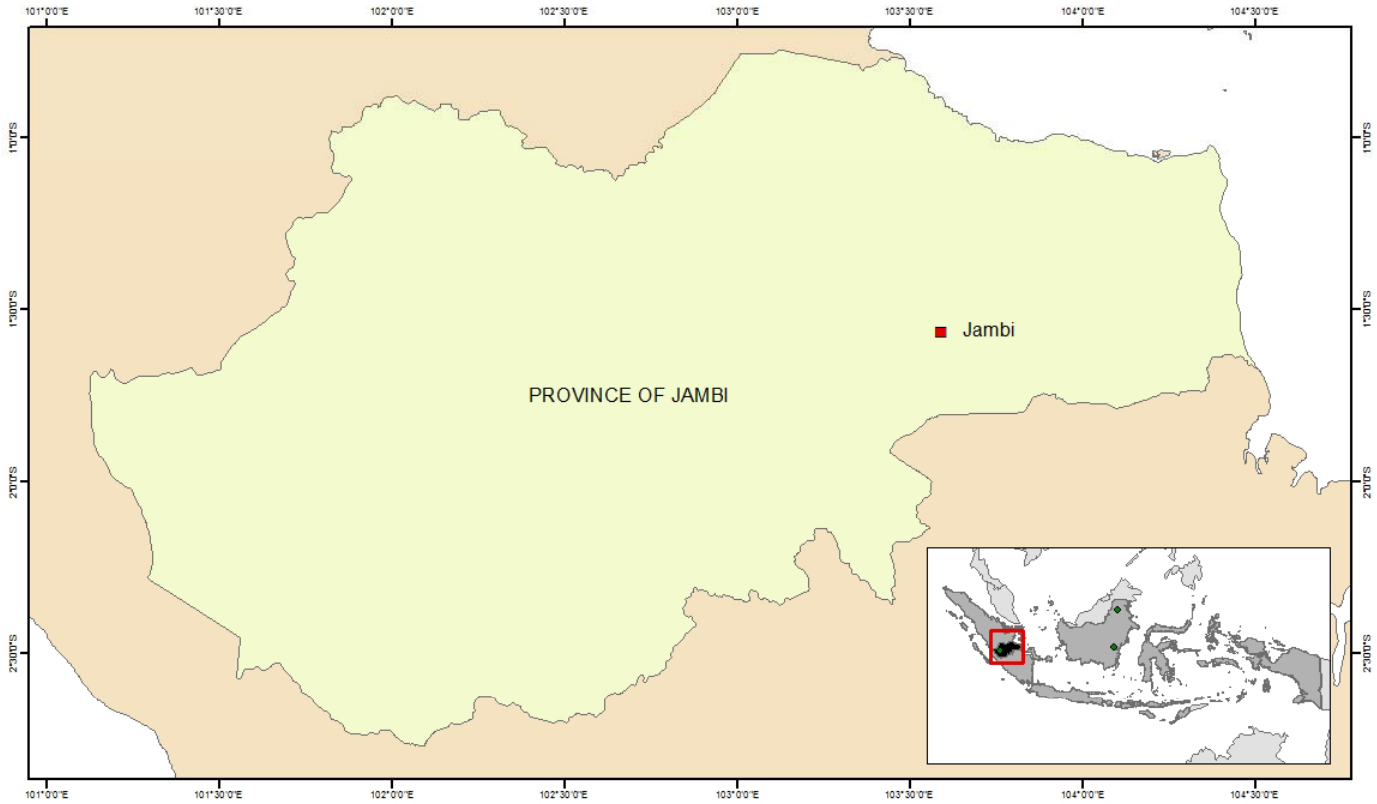
- Do all actors including local community support REDD+? How?
- Can REDD+ work if it is economically not feasible?

II. APPROACH AND METHOD

- Arena, actor and institution (A_2I) interact dynamically.
- 'Arena' is defined as a playing field, in which 'actors' act; under 'Institution' that refers to formal and informal working rules
- Agent-based modeling (ABM) as suggested by Ostrom (2011) to simulate and investigate the commons.



Situation map of Jambi Province, Indonesia



CIFOR

From the actor study: REDD+ Policy characteristics

	Simplifying factors (A)		Neutral (B)	Complicating factor (C)	
Where did the impetus for the policy come from?		Inside the country		Outside the country	v
		Inside the government	v	Outside the government	
Who decided the policy and how?	v	With democratic legislative process		Without democratic legislative process	
		With widespread participation	v	Without widespread participation	
What is the nature of the benefits and to whom do they accrue?		Visible		Invisible	v
		Immediate		Long term	v
		Dramatic	v	Marginal	
What is the nature of the costs and who bears them		Invisible		Visible	v
		Long term		Immediate	v
		Marginal	v	Dramatic	
How complex are the changes?		Few changes		Many changes	v
		Few decision- makers		Many decision makers	v
		Small departure from current practices, roles, and behaviours		Large departure from current practices, roles and behaviours	v
		Limited discretion		Large discretion	v
		Low technical sophistication		High technical sophistication	v
		Low administrative complexity		High administrative complexity	v
		Geographically concentrated		Geographically dispersed	v
		Normal pace		Urgent/emergency pace	v
		Single event		Permanent changes	v
		Low level of conflict about nature and value of the changes		High level of conflict about nature and value of changes	v
Total number of checks:	1		4		15

Political map of REDD+

	Opposition		Support			Opposition	
External sectors				EU-FLEGT office Norway Australia			
Sector position	Anti-system	Legal opposition	Ideological support	Core Support	Ideological support	Legal opposition	Anti-system
Governmental sectors				**DisHut** BLHD	Bappeda BPN BPS Distrans	Disbun	
Social Sectors			Farmers	CIFOR ICRAF		Oil palm companies Forest plantation companies	
Political parties			PAN				
Pressure groups			WARSI SETARA				

REDD+ Policy characteristics and stakeholder knowledge and support

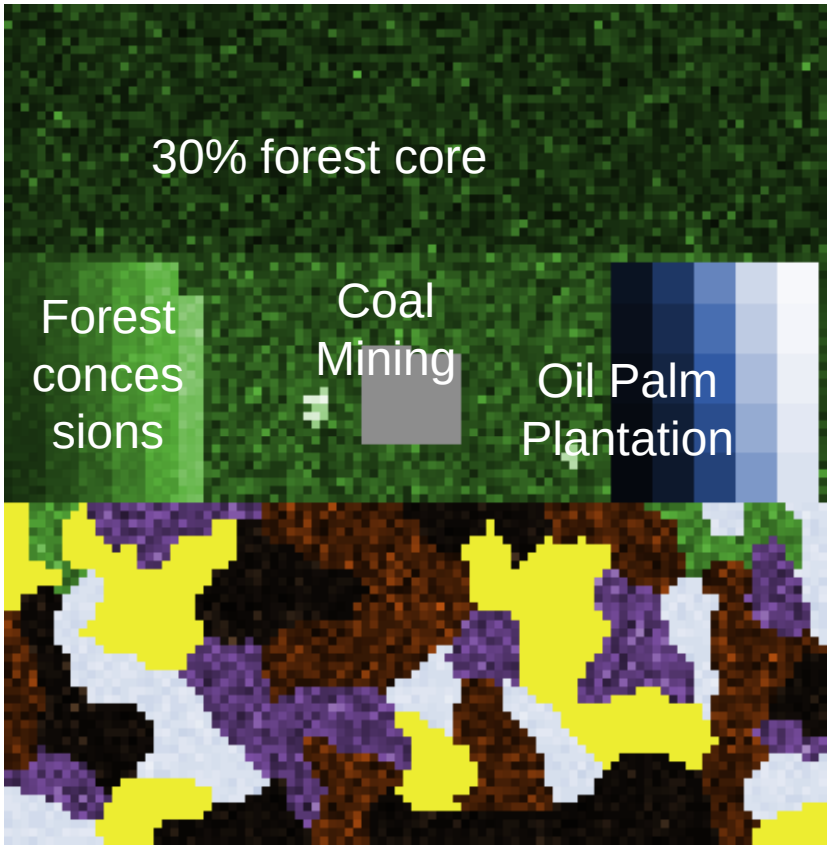
		Implementation of REDD+ Policy		
		Difficult	Medium	Easy
Stakeholder Knowledge and support level mode	High			Goal: Highest probability of success
	Medium	**Current situation**		
	Low	Lowest probability of success		

III. RESULTS

Arena

Sub Arena	Spatially located Actors
Forest core	National park manager; Local community, random logging
Forest margin	Local community
	Forest concessionaires, systematic logging
	Companies (oil palm, coal, rubber)
Mosaic of agricultural lands	Local community (small-scale plantation, logging)
	Plantation companies (large scale)

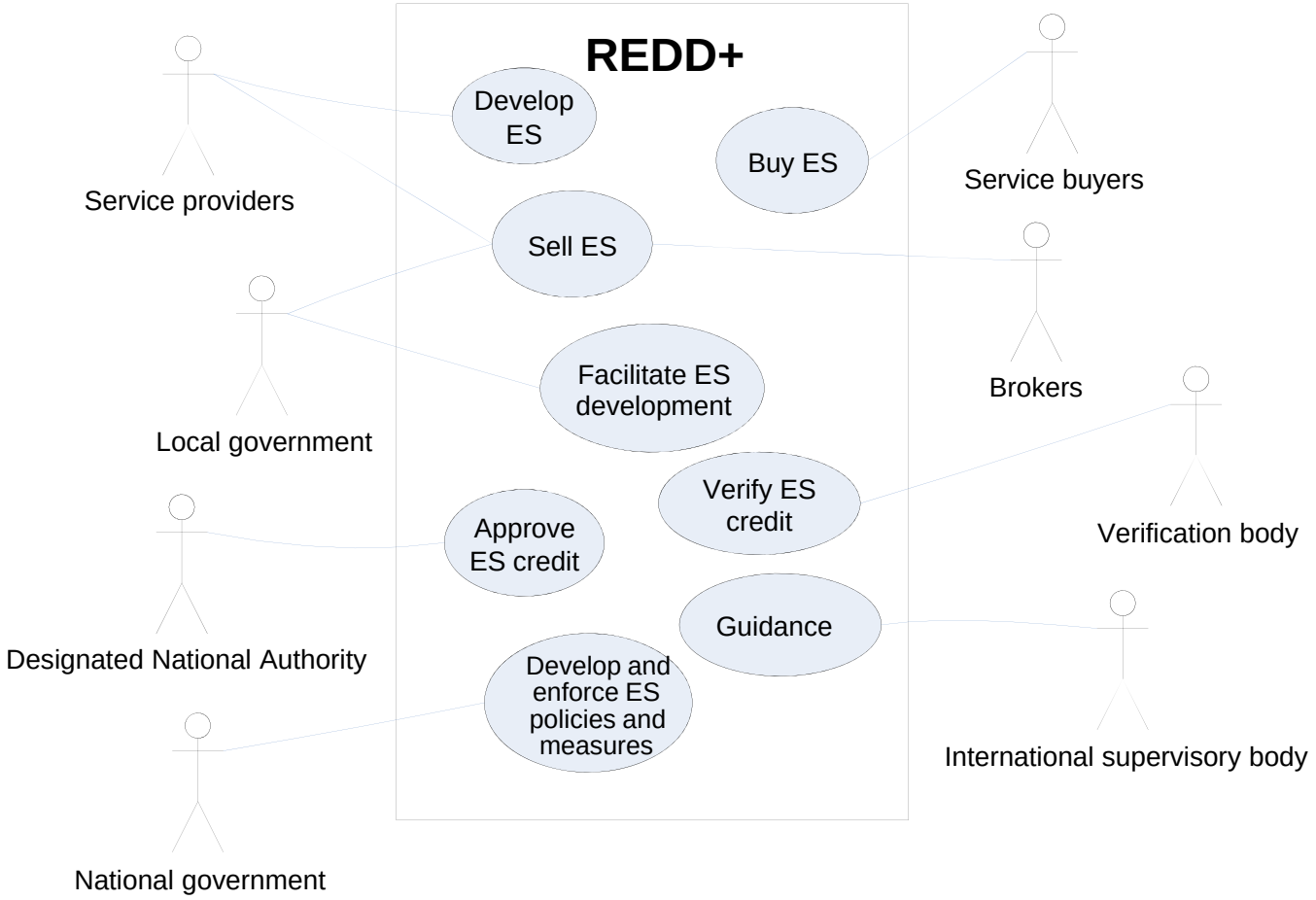
30% forest margin



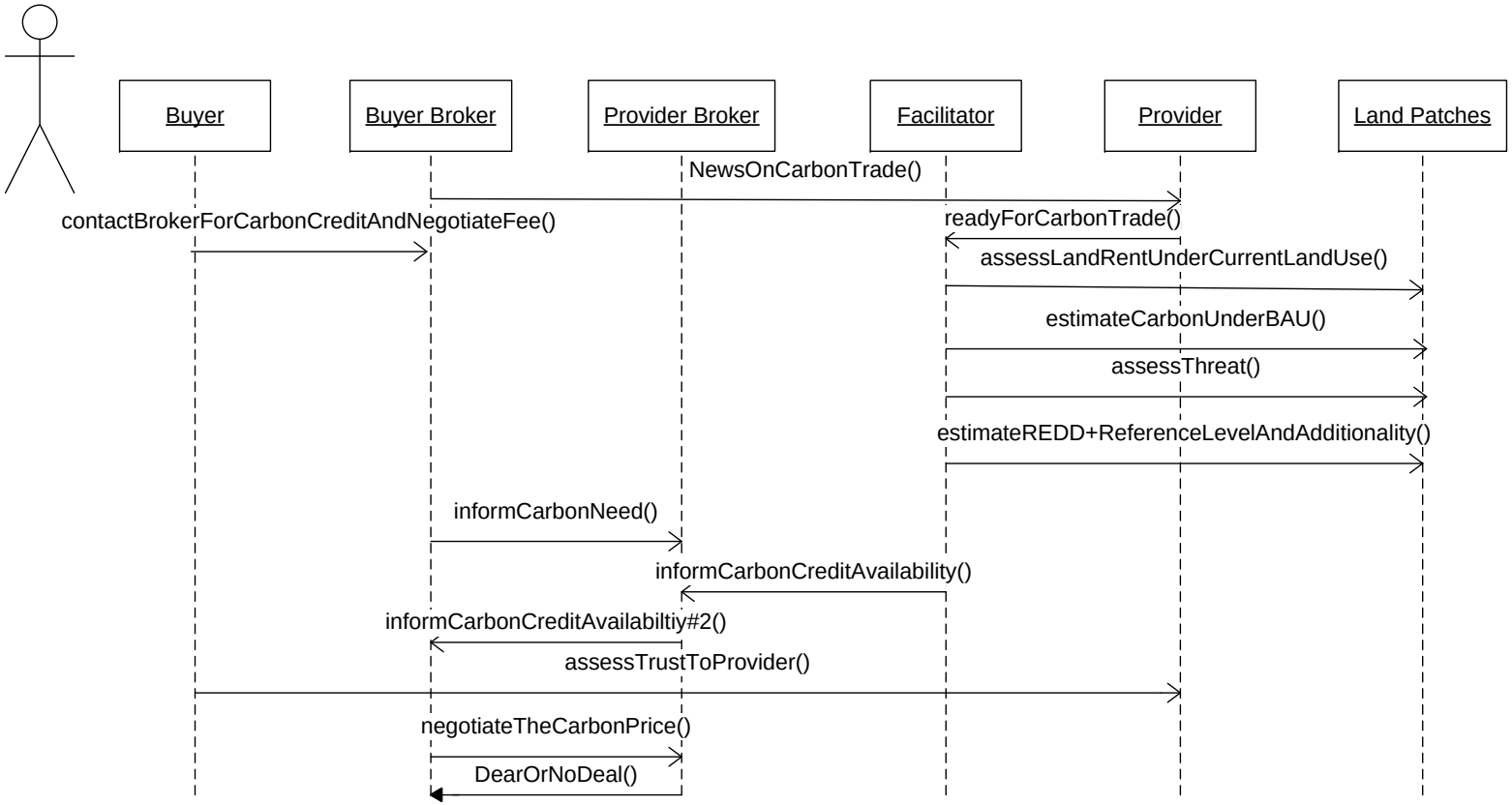
40% mosaic

Chomitz (2007)

Actors' possible interacti on



A possible negotiation



- All actors are basically economically rational, so that opportunity cost of land use matters (a case study in Jambi, Indonesia)

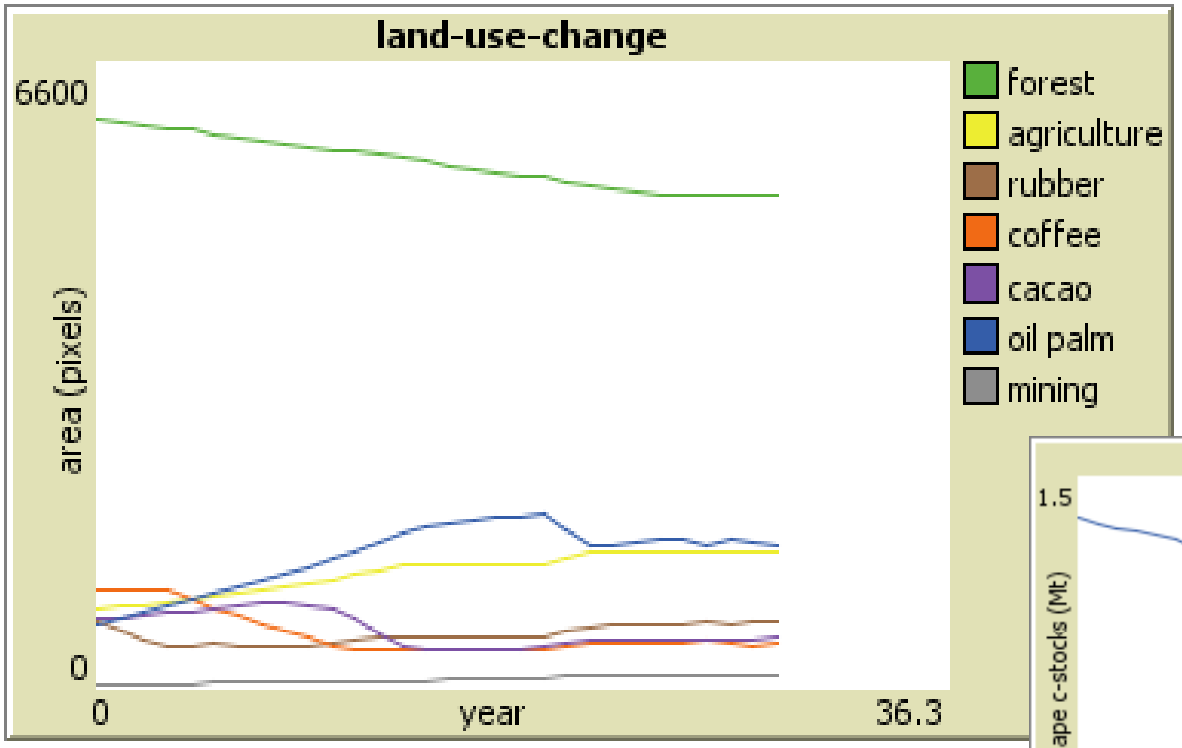
Simulation

- If negotiation can reach agreement then REDD+ work
- Otherwise BAU (Business As Usual)

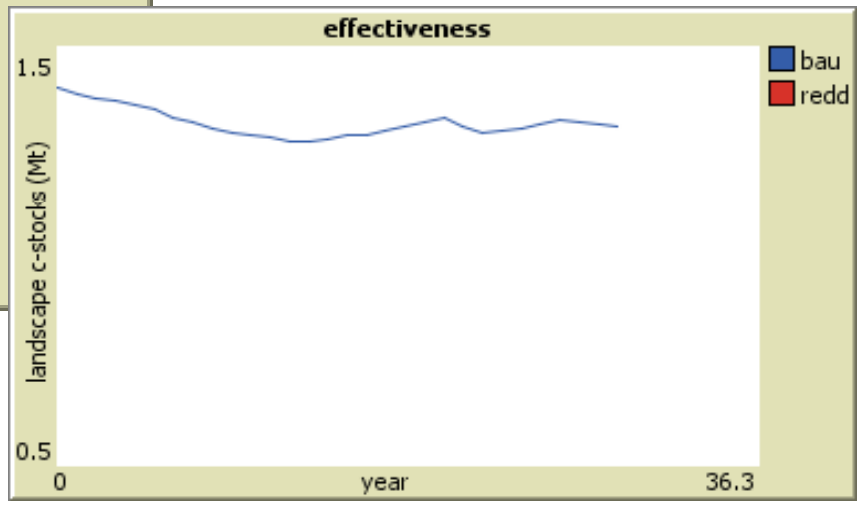
REDD+ Area Agreed

At carbon price (a) $10 (BAU); (b) $15 and (c) $25

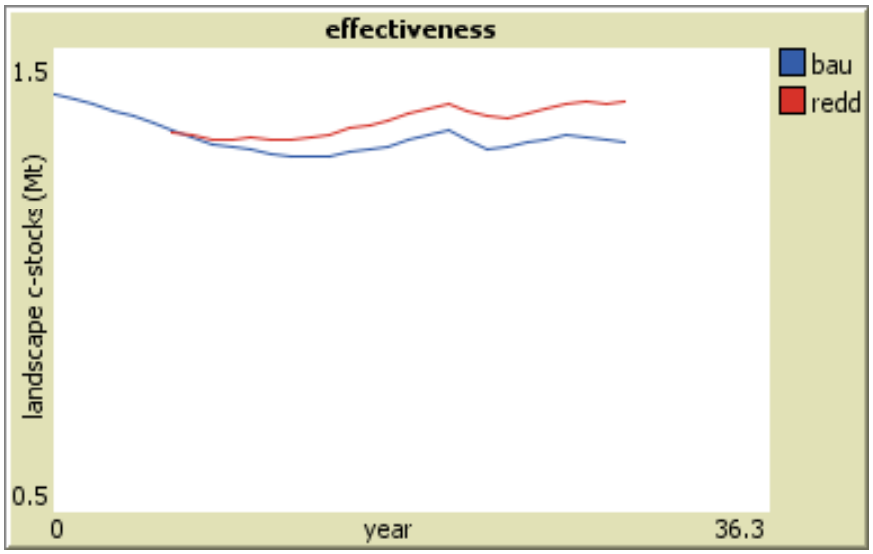
Scenario under BAU



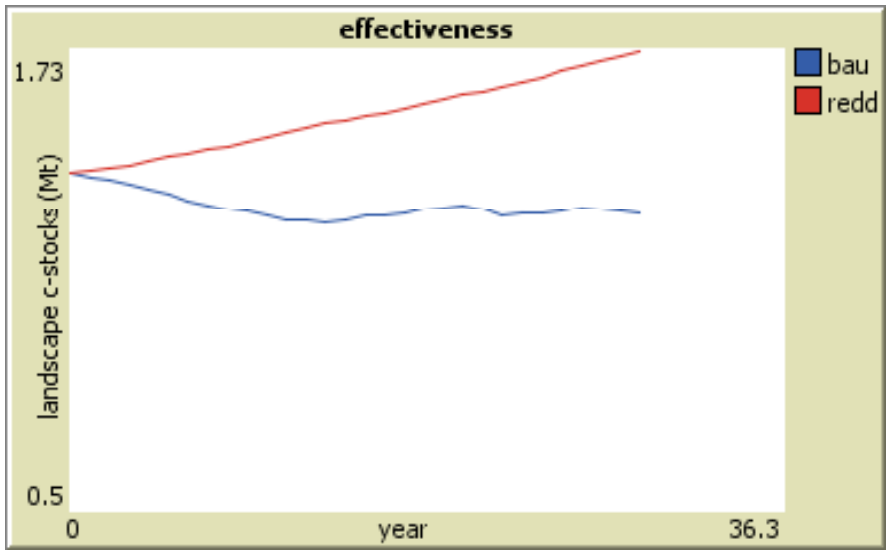
Carbon dynamic



Scenario under REDD+

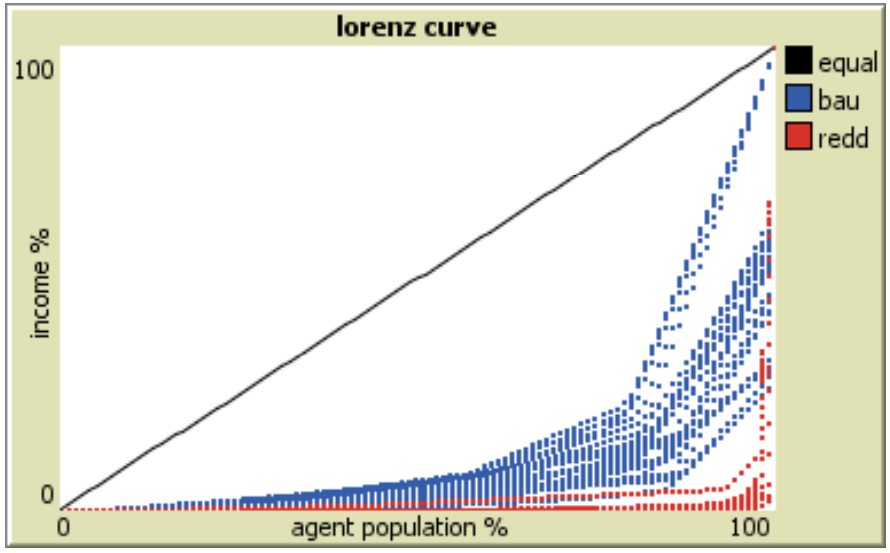


Carbon price at $15

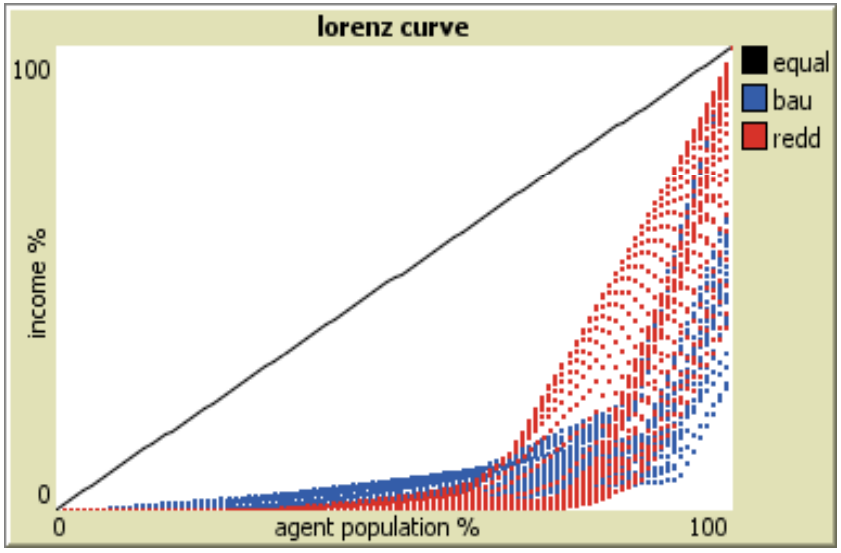


Carbon price at $25

Wealth Distribution



Carbon price at $15



Carbon price at $25

With the increase of the carbon price the wealth distribution is better giving more agents the chance to participate in REDD+.

IV. DISCUSSION

- The problem is whether this price will always be possible.
- The global simulation of the carbon price in the next 30 years is oscillated at $16. But now seems to decrease!!!
- So, it is impossible to use solely carbon price to reduce carbon emissions.

- Can common interests of actors be improved, so that they can reduce carbon emissions, even with a lower carbon price? The service providers *subsidize* the carbon price.
- In other words, can actors' "altruism index" and collective action be improved?

The commons user types

a) Those who always behave in a narrow, self-interested way and never cooperate in dilemma situations (free-riders);

b) Those who are unwilling to cooperate with others unless assured that they will not be exploited by free-riders;

c) Those who are willing to initiate **reciprocal cooperation** in the hope that others will return their trust; and

d) A few genuine **altruists** who always try to achieve higher returns for a group.

Ostrom et al (1999)

Suppose

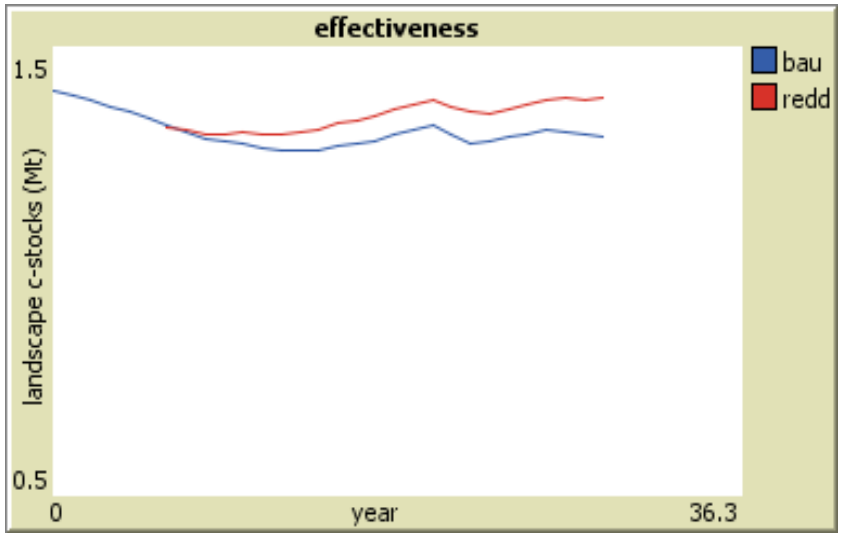
- The altruism index (a) is influenced by how they perceive environmental risk (p), equity (e), reciprocal action (r) or

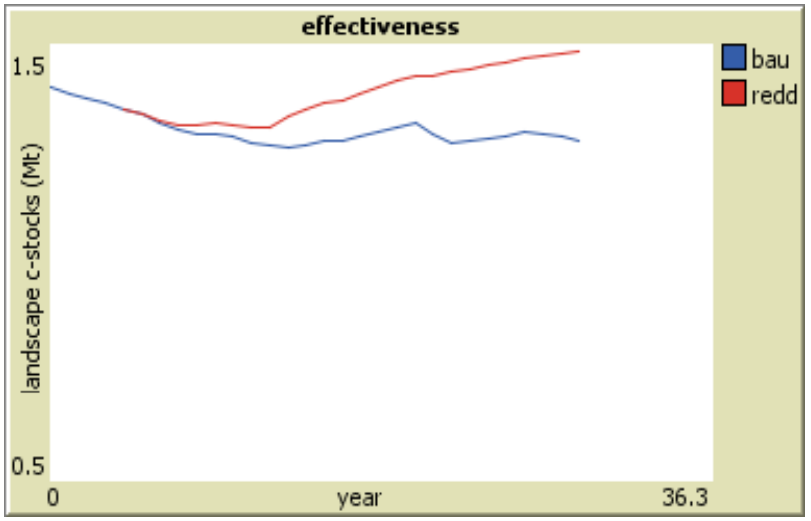
$$a = f(p, e, r)$$

- and ‘p’ is influenced by campaign (c), welfare (w) and environmental threat (t),

$$p = f(c, w, t)$$

- Then effectiveness will increases if for instance the campaign is carried out effectively .





Effectiveness of REDD+ at $ 15/t carbon price but different social awareness

V. CONCLUSION

- Actors are economically rational
- When REDD+ enters the implementation phase in the targeted landscapes, carbon pricing will determine whether it will succeed.
- The carbon price is important, but not everything. carbon emissions will decrease if the ‘altruism’ index of the actors increases.
- REDD+ policy shall incentive and endorse altruism of REDD+ actors

Publication

- Purnomo H, Suyamto D, Abdullah L, Irawati RH. 2011. REDD+ actor analysis and political mapping: an Indonesian case study. Accepted by *Journal of International Forestry Review.*

- Purnomo H, Suyamto D, Irawati RH. 2011. Carbon Trade is Not Enough: An Agent-Based Modelling Approach to Harnessing the Climate Commons. Submitted to *Journal of Mitigation and Adaptation Strategies for Global Change.*

- Purnomo H. 2011. Background Case Study of REDD+ In Indonesia. A draft report.

Thank YOU