

What have we learnt on designing PES? - A critical economist's view -

Stefanie Engel

Institute for Environmental Decisions, ETH Zurich

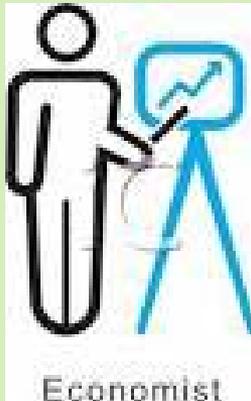


Motivation

- Increase in popularity of PES
- **Mixed evidence on PES performance** (Pattanayak et al. 2010)
 - Low additionality in the Costa Rican (Sills et al. 2005, Sierra/Russman 2006, Sanchez-Azofeifa et al. 2007, Arriagada et al. 2009) and Mexican PES programs (Munoz-Pina et al. 2008)
 - E.g., Biodiversity impacts of agri-environment agreements show mixed results (Kleijn & Sutherland 2003; Kleijn et al. 2006; Riffell et al. 2008; Batary et al. 2011)
- PES is not a policy panacea, but should be part of a policy portfolio to chose from (Muradian et al. 2012) or may be combined with other policies

Focus of this talk: If PES is chosen, how can we design it better? What have we learnt on improved PES design and which open questions remain?

Two perspectives on PES



Conventional economist

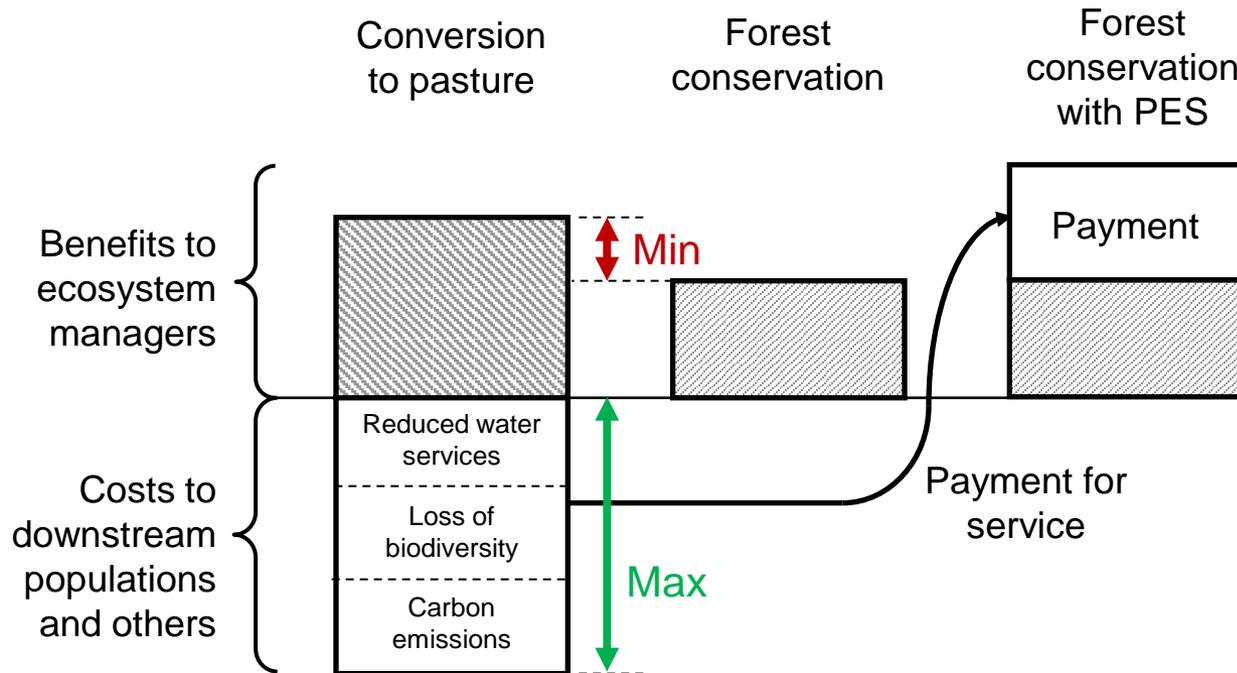
- Effectiveness
- Cost-efficiency
- Poverty alleviation
- Lessons for design
- Trade-offs



Behavioral economist

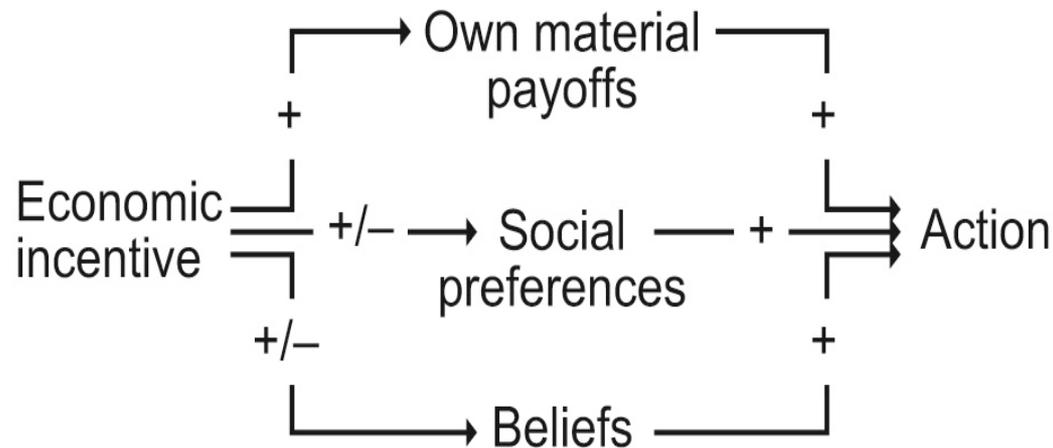
- Impact on intrinsic motivations
 - Crowding effects
- Consideration of indirect effects
- e.g. via perceived fairness, control

The conventional economics of PES



➤ PES as economic incentive to address externality

The behavioral economics of PES



➤ PES as economic incentive may reduce (**crowd out**) intrinsic motivations to act for the public good. This may reduce or even counteract the effectiveness of PES.

Sources: Figure extended from Bowles and Polonía-Reyes 2012; Some sources on crowding effects in other contexts: Frey & Oberholzer-Gee 1997; Cleaver 2000; Gneezy/Rustichini 2000, Frey/Jegen 2001; Fehr/Falk 2002; Heyman/Ariely 2004, Reeson/Tisdell 2007/8, Vatn 2009, Muradian et al. 2012)

Issues in PES design

1. Conditionality
2. Targeting across space (including additionality)
3. Targeting across time (permanence)
4. Group PES
5. PES under weak property rights
6. Leakage

Conditionality: The conventional view

- Conditionality of payments is **THE defining feature and strength of PES** (Ferraro/Simpson 2002, Ferraro/Kiss 2002, Engel et al. 2008, Kinzig et al. 2011)
- Advantage over ICDPs (Ferraro/Kiss 2002)
- PES can be conditional on outcomes (results-based) or on activities (Engel et al. 2008)
- What if factors out of control of land user and difficult to observe affect results?
 - Mix of conditionality on outcomes and on activities may be best (Derissen/Quaas 2013)
 - Relative performance payments (Zabel/Roe 2009)

Conditionality: The behavioral view



- Conditionality requires monitoring and sanctioning
- This may trigger **control aversion** (Bowles/Polonía-Reyes 2012)
- Literature on work contracts suggests that it may be optimal to make only a part of payments conditional (Lindenberg/Foss 2011)
- If factors out of control of land user affect results, could be **perceived as unfair** (Pascual et al. 2010, Corbera/Pascual 2012)
- Could this be reduced by relative performance payments or by making payments at least partly conditional on activities rather than outcomes?
- Crowding effects depend on how social meaning of payments is constructed (Muradian et al. 2012)

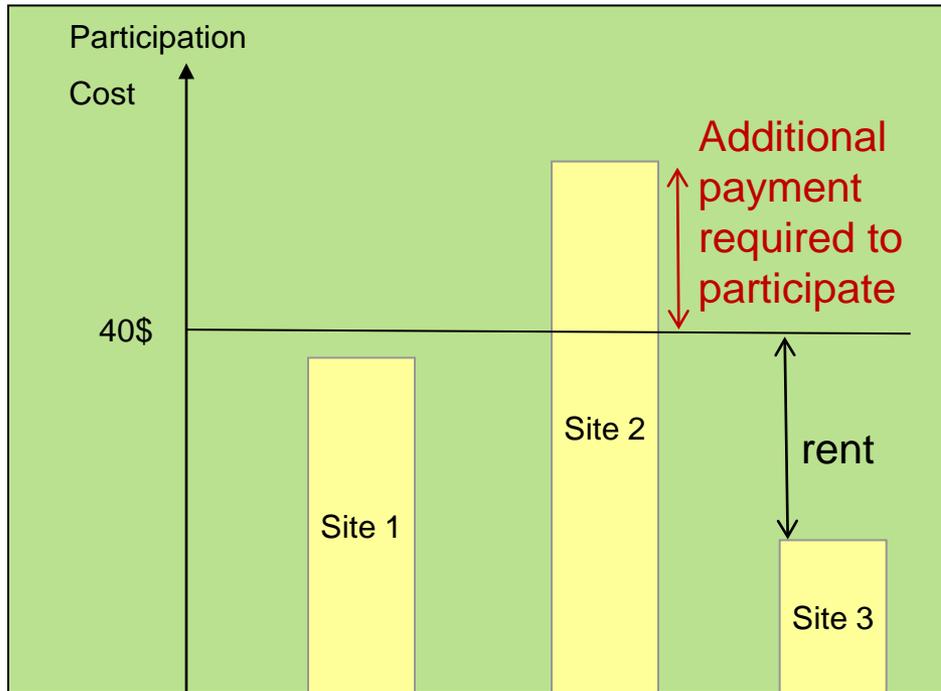
Experimental evidence on crowding effects of PES



(Cardenas et al. 2000, Vollan 2008, Travers et al. 2011, Narloch et al., 2012, Kerr et al. 2012, review in Rode et al. 2013)

- Effect of PES re. crowding is highly location and context specific
- Frameworks developed in close interaction with stakeholders show less crowding out than top-down regulations
- ‘Pay enough or don’t pay at all’
- Crowding out more likely in a context of strong social norms, trust and reciprocity -> less likely to be a problem where PES is most needed?

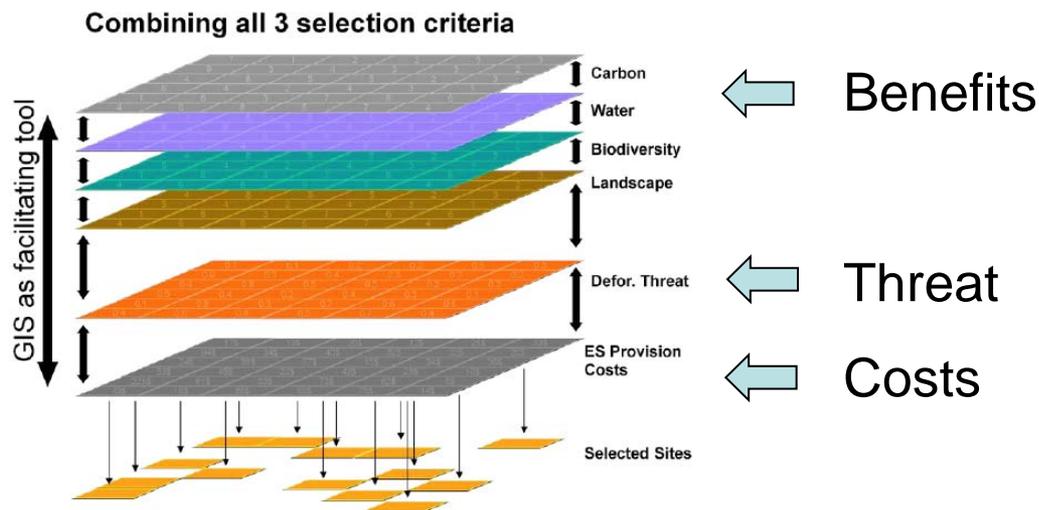
Targeting and additionality: The conventional view



- Fixed payments give high production rent to land managers with low participation costs
- Paying site 3 less and site 2 more could increase total ES, particularly if site 2 is rich in ES and highly threatened to be deforested

Targeting PES according to benefits, participation costs, and threat (additionality of ES provided) can significantly increase the environmental effectiveness and cost-efficiency of PES (Wünscher et al. 2008, Alix-Garcia et al. 2008; similarly Armsworth et al. 2012, Wätzold/Drechsler 2005, Barton et al., 2003, Ando et al. 1998, Polasky et al. 2001, Johst et al. 2002)

Targeting: Example Costa Rica (Wünscher et al. 2008)



➤ ES ~ **double** with given budget!

➤ **Is it worthwhile the increase in implementation costs?**

➤ Costa Rica: **LIKELY YES**. ~ 0.24% of total PSA budget

➤ UK (Armsworth et al. 2012): **YES**. 49-100% increase in biodiversity benefits through targeting & payment differentiation outweighs increase in implementation costs up to 70% of budget.

➤ Could be different in contexts of weak states and lack of data

Targeting: Challenges



- **Complexity of implementation:** Decision support tools (Wätzold et al., 2012)
- **Political and administrative hurdles:** Difficult to change a system once in place; less relevant for new programs
- **Hidden information on participation costs:** Auctions as a potential approach to elicit costs (Ferraro 2008, Whitten et al., 2012)
- **Poverty impacts of targeting:**
 - Unclear, context-dependent (Pagiola et al. 2005).
 - First best: Separate policy for poverty alleviation (Kill two birds with two stones)
 - Second best (Ex. Costa Rica):
 - Facilitate poor's access to PES (group applications, informal title)
 - Incorporate poverty alleviation as additional targeting criterion

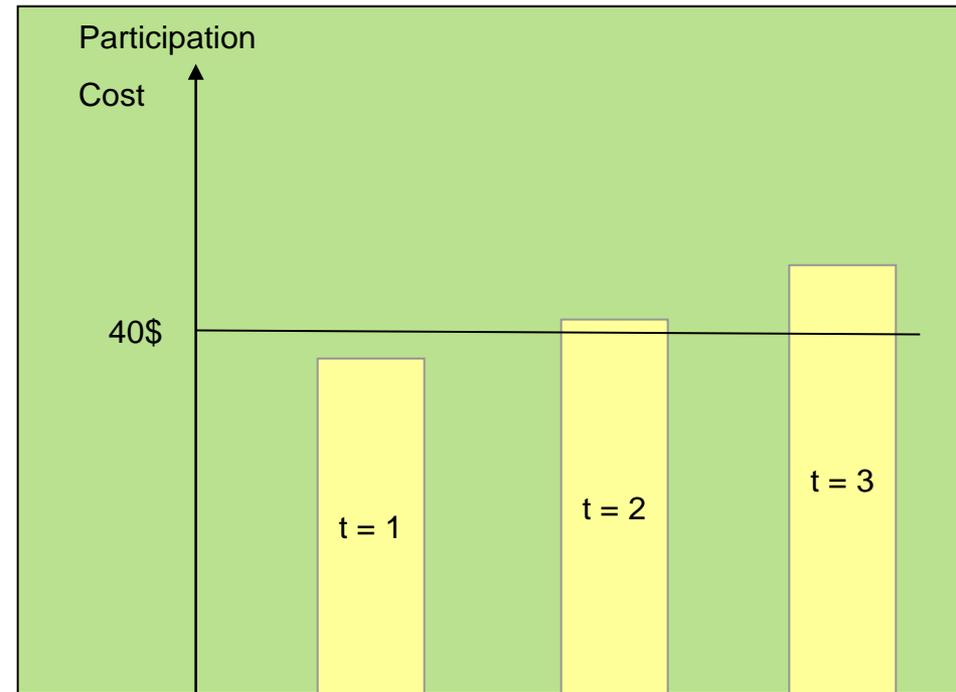
Targeting/ additionality: Behavioral view



- Perceptions of procedural or distributive unfairness can undermine the effectiveness of economic incentives (Fehr and Falk, 2002, Vatn, 2010, Thibaut and Walkers 1978; Folger 1977; Kanfer et al. 1987, Sommerville 2010)
 - Targeting according to additionality -> those who contributed in the absence of payments reduce their contribution (Alpizar et al. 2013)
- Many open research issues, e.g.:
 - Ex. Costa Rica: Land owners conserving forests on lands with low production potential – would they really start deforesting just to protest?
 - What is considered fair/unfair? Targeting could be considered fairer.
 - Do auctions reduce perceived unfairness because payments amounts are proposed by land owners themselves?

Targeting across time (permanence)

- Permanence in emission reductions a major concern regarding REDD+
- At risk due to increasing opportunity costs (growing world demand for food and biofuels)
- May induce land managers to breach REDD+ contracts



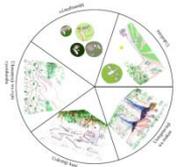
- Idea of linking REDD+ payments to agricultural price index (Benítez et al. 2006, Dutschke/Angelsen 2008)
- Caveat: If opportunity costs increase too much, paying for the activity may no longer be socially optimal (Gregersen et al. 2010, Karsenty et al., 2013)

Targeting across time - Evidence

■ Mixed evidence:



Real options model and simulation for Brazil (Engel et al., in press): Payments indexed to opportunity costs (ag commodity prices) more cost-effective than those linked to carbon prices, but only marginally (1-6% savings)



Choice experiment for Kenya (Veronesi et al. 2014): Indexed payments can sustain reduction in charcoaling even when opportunity costs become very high



Computer-game based experiment in Brazil (Reutemann et al. 2014): No significant difference in deforestation between fixed and indexed payment

- Indices are imperfect measures of opportunity costs
- Indexing introduces an additional source of uncertainty for the land user
- **Indexing payments may not yield as strong cost efficiency benefits as expected; depends on index**

Targeting across time – Behavioral view



- When faced with highly complex decision making under uncertainty, people use simple yet smart heuristics (Rabin/Thaler 2001, Gigerenzer/Selten 2002)
- May explain why indexing does not have much effect and risk preferences play less of a role than expected in our Brazilian study (Reutemann, in progress)
- More studies needed



Group payments – The conventional view

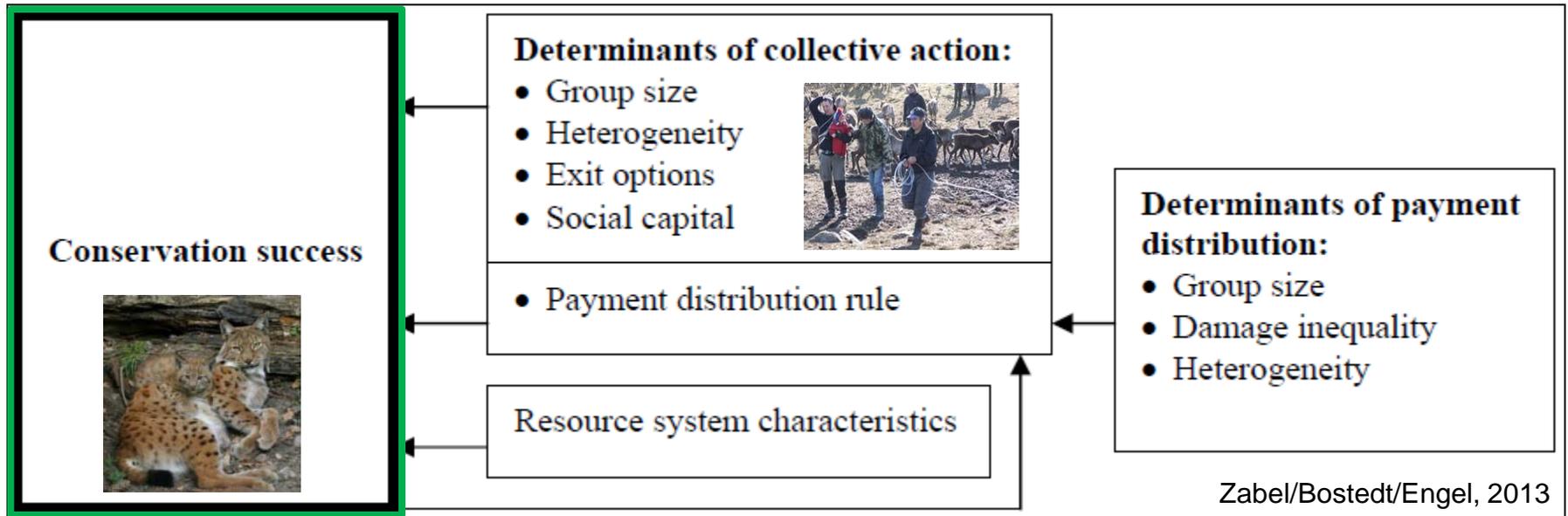
■ **Relevance** of group payments

- **Spatial coordination/Agglomeration bonus** (Ex. Agri-environmental programs; Premium paid for spatially coordinated action; Ex: Netherlands; Parkhurst et al. 2002, Goldmann et al. 2007, Parkhurst /Shogren 2007, 2008, 2011; Banerjee 2011; Hanley et al. 2010, De Vries et al. 2012)
- **Joint property rights** (Ex: developing country forests; *Nielsen and Rice, 2004; Wunder et al., 2008, Missrie and Nelson, 2005*)
- **Environmental outcome observable only at group level** (Ex. water quality, wildlife conservation; e.g., Zabel et al. 2013)

■ **Complexities** of group payments

- **Group as collective ES seller faces commons dilemma** (Gibson and Marks, 1995, cf. Ostrom 1990, Baland/Platteau 1996, Agrawal, 2001)

Group payments – Ex. Sweden



- Besides classic determinants of collective action, **intra-group payment distribution rule** matters for conservation success.
- Groups which distribute payments to individual members proportional to expected damage (herd size) perform better than those investing in village commons.
- Should we impose more favorable distribution rule?

Group payments – The behavioral view

- When faced with collective action dilemmas, majority of people do not act as *homo oeconomicus*, but exhibit pro-social preferences (Ostrom et al. 1999; Fischbacher et al. 2001, Fehr & Gächter 2000, Fehr/Fischbacher 2003)
- Social preferences and beliefs play important role for cooperation and environmental outcomes (Fehr and Schmidt 1999, Fehr and Gächter 2000, Rustagi et al. 2010)
- **The potential for crowding effects of PES thus highly relevant for group PES!!!** (Oldekop et al. 2013)
- Imposing payment distribution rule top-down could trigger control aversion and be counter-productive



PES under weak property rights



- Literature generally sceptical on PES under weak property rights; concerns about political power play and commodification of ecosystem services (Kosoy/Corbera 2010, Boyce 2002, Corbera et al. 2009); REDD+ payments may lead to recentralization of forest resources at the detriment of local communities (Phelps et al. 2010)
- **Game-theoretic model** (Engel et al. 2006, Engel/López 2008, Engel/Palmer 2008, 2011, Engel et al. 2013)
 - PES made to governments can indeed reduce communities' chances to maintain customary rights
 - PES made to communities can increase communities' ability to defend property rights vis-à-vis governments and commercial actors

PES under weak property rights



- Game-theoretic model (cont.)
 - PES design complex. If not well-designed, PES may fail due to (i) community lacking enforcement capacity or (ii) community opting for better logging deal instead of PES.
 - Trade-offs between minimizing payments and targeting the poor.
- How can payments be made in contexts of customary rights? Hybrids of PES and ICDPs – Examples:
 - Paying for scrapwood as eco-charcoal raw material in Kenya (Veronesi et al. 2012)
 - Making microcredit conditions dependent on environmental outcomes (Cranford/Murato 2012)

Leakage

- If PES reduces production of a good, production and environmental damage may be shifted elsewhere
- Options to deal with this
 - Discounting carbon credits for leakage (Murray 2009)
 - ICDP-PES hybrids producing equivalent output while reducing environmental damage



Ex. Kenya: Ecocharcoaling to replace charcoaling, payment conditional on forest conditions



Ex. Brazil: Rotational grazing to increase production per hectare, combined with PES for avoided deforestation

Concluding remarks



Seriously consider the potential for better PES design to improve environmental effectiveness and cost-efficiency, particularly in settings where crowding effects are of less concern:

- payments to individuals, low social capital to start with, clearly defined property rights



Spread of insights into practice has been low; could be partly driven by justified concerns about behavioral implications that should be taken seriously, particularly in contexts of

- group payments
- high social capital
- strong intrinsic motivations

Concluding remarks

- Potential for crowding effects (negative, but also positive!) could be influenced by policy design
- **Research needed on more sophisticated PES design features** (degree of conditionality, monitoring/enforcement mechanisms, targeting/auctions)
- Frameworks developed in close interaction with stakeholders appear to show less crowding out than top-down regulations
- Important to acknowledge trade-offs in PES design