

What we know about how policies can enable sustainable land use



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April 2024: Good news for nature?

The screenshot shows the Science journal website. At the top left is the 'Science' logo. To the right are navigation links: 'Current Issue', 'First release papers', 'Archive', and 'About'. A 'Submit manuscript' button is in the top right. Below the navigation is a breadcrumb trail: 'HOME > SCIENCE > VOL. 384, NO. 6694 > THE POSITIVE IMPACT OF CONSERVATION ACTION'. Below this is a lock icon, 'RESEARCH ARTICLE', and 'CONSERVATION'. Social media icons for Facebook, X, LinkedIn, and others are on the right. The main title is 'The positive impact of conservation action'. Below the title are the authors: PENNY F. LANGHAMMER, JOSEPH W. BULL, JAKE E. BICKNELL, JOSEPH L. OAKLEY, MARY H. BROWN, MICHAEL W. BRUFORD, STUART H. M. BUTCHART, JAMIE A. CARR, DON CHURCH, [...], AND THOMAS M. BROOKS. There is a '+23 authors' button and a link to 'Authors Info & Affiliations'.

- Global-meta analysis of studies evaluating “conservation actions”
- Two thirds of cases effective, often with large effect sizes

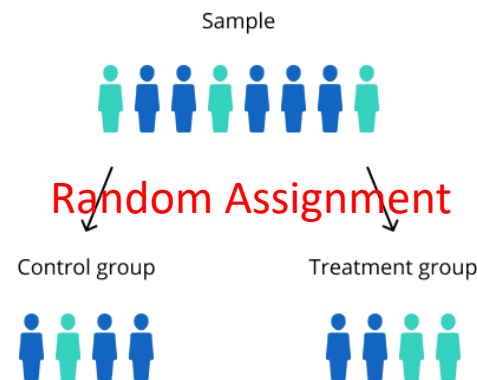
Content

- Why is it so hard to find out what works?
- From naïve to counterfactual-based evaluation
- Evidence on forest conservation policy (main focus)
- Evidence on other policies (overview)
- Conclusions & outlook

The policy evaluation challenge

- Not all “conservation actions” are policies
- Many policies cannot be randomized
- (Some) policy makers do not like to be evaluated
- Almost all policy outcomes are subject to selection bias

Standard Evaluation Design (e.g. drug testing)



But, it can be done!

- From naïve to counterfactual-based evaluation
- From experimental to quasi-experimental methods
- Harnessing new (big) data



Naïve vs counterfactual-based evaluations

Example: Protected Areas in Costa Rica

Protected before 1979 (control:
never protected and forested
in 1960)

Approaches

Matching approaches*

Covariate matching

[N matched controls]

Covariate matching with calipers

[N outside calipers]

[N matched controls with calipers]

Conventional conservation science approaches

Difference in means (DIM)‡

DIM: controls within 10 km of protected area

[N available controls]

DIM: controls within 10 km of PA, include plots

deforested pre-protection

{N protected plots}

[N available controls]

Baseline reference estimate

-0.111 (0.029)

[933]

-0.124 (0.019)

[411]

{924}

-0.438

-0.375

[3866]

-0.497

{1996}

[4956]

-0.392

N protected plots

2711

N available controls

(10371)



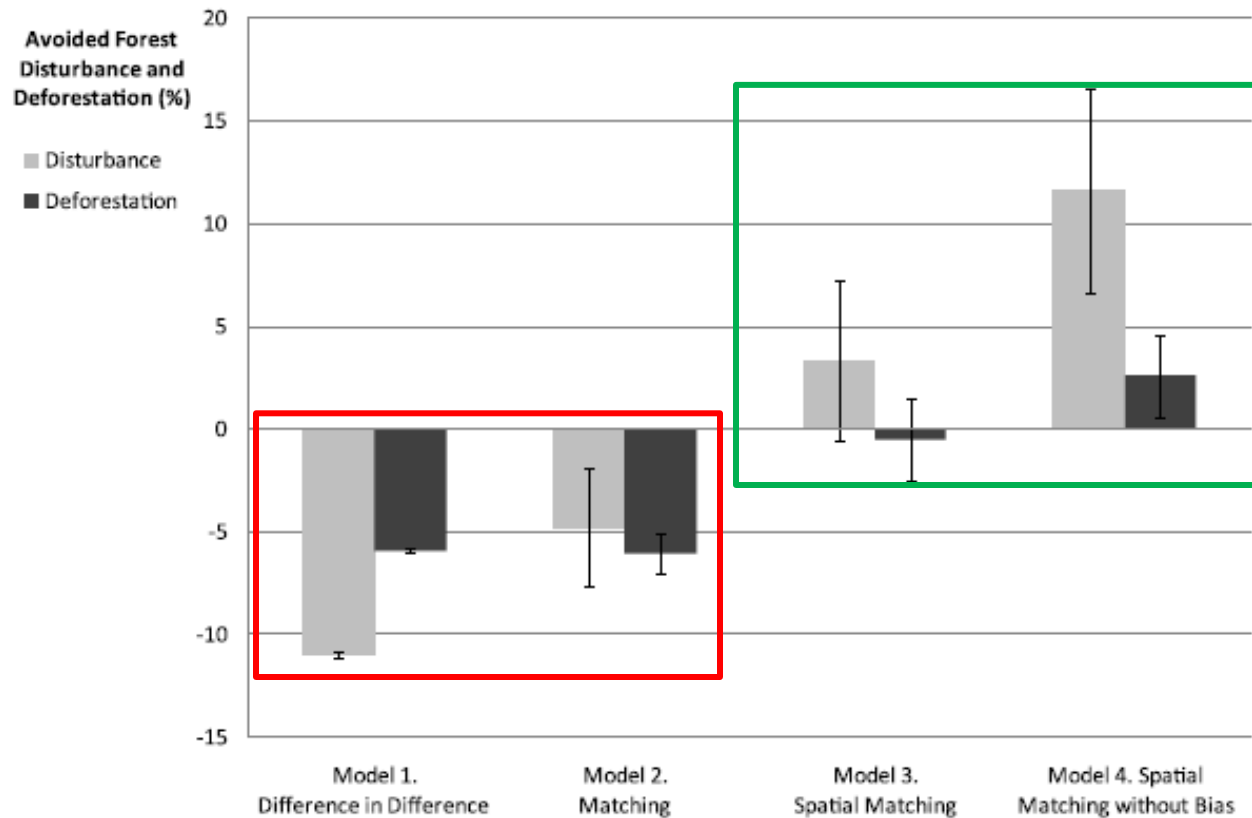
*Standard errors for post-matching estimates, using variance formula in ref. 35, are in parenthesis.

†P > 0.10; all other estimates significant at P < 0.01.

‡A Chi-squared test is used to evaluate the difference in means.

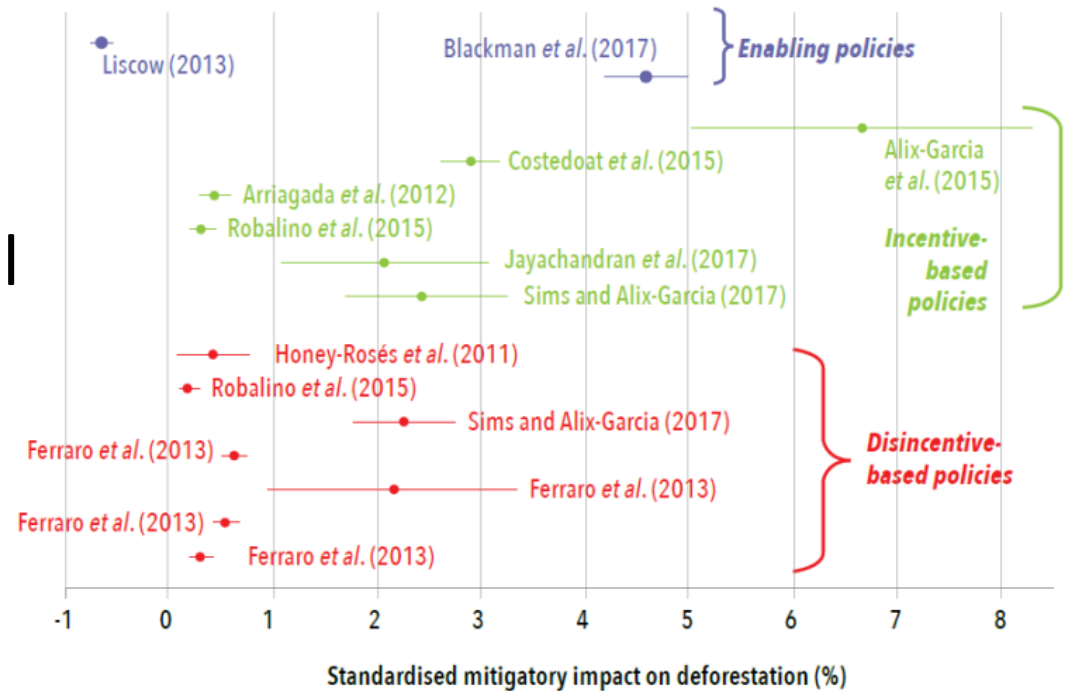
Naïve vs counterfactual-based evaluations

Example: Conservation Payments in Mexico



Comparing single evaluations

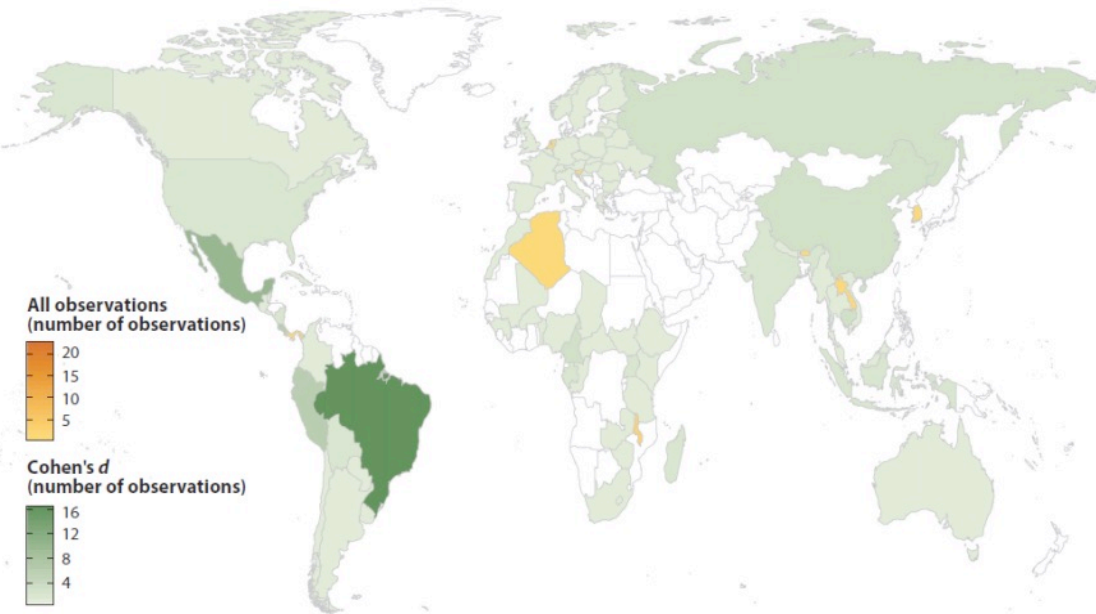
- Most policies work
- Impacts are rather small
- Effectiveness varies across contexts



Börner et al. 2018

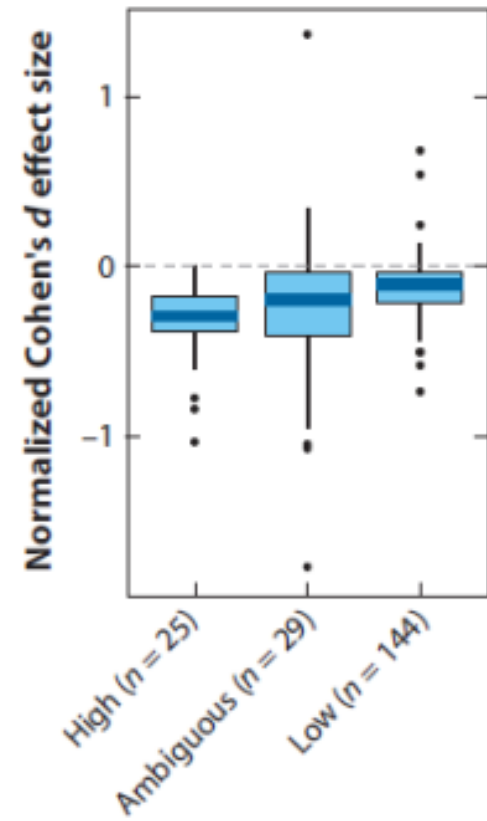
Meta-analyses for systematic evidence

Global sample of 136 forest conservation policy effects



Börner et al. 2020

Comparing impacts across (pressure) contexts



What we know: Forest conservation policies

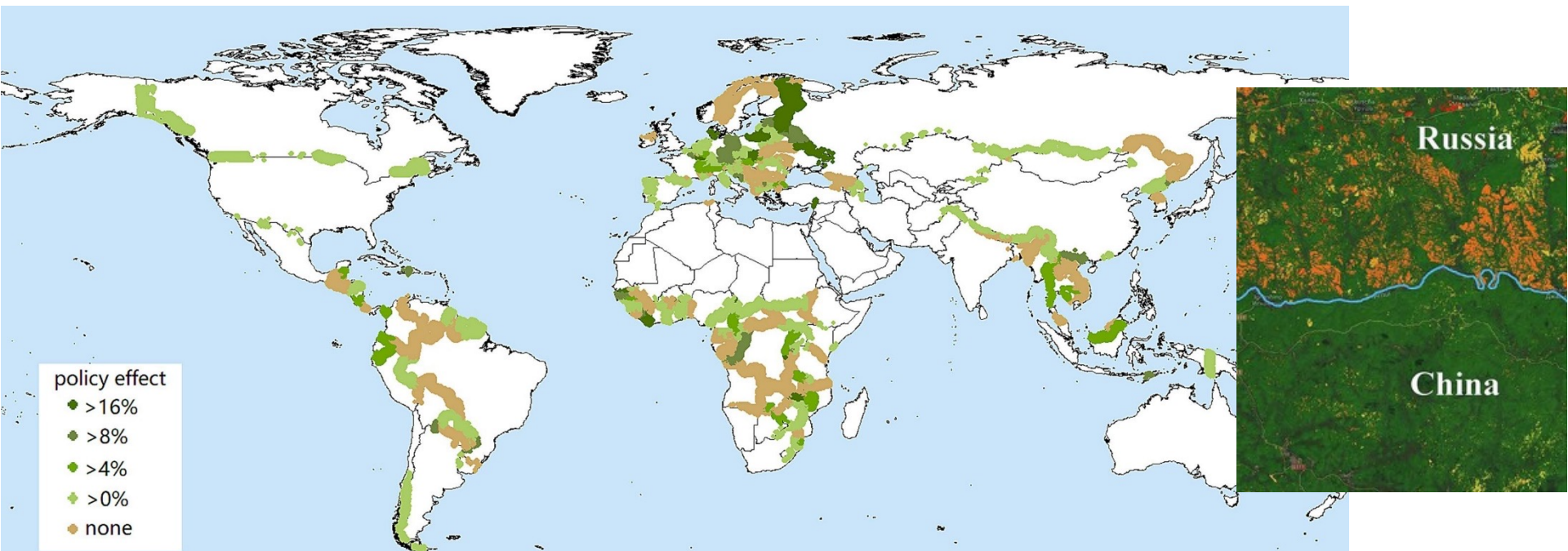
- No policy instrument is generally better than another
- Effectiveness increases when:
 - Conservation policies are spatially targeted to where the problem (e.g. deforestation) occurs
 - Implementation capacity (including funding) is sufficient and backed by political will
 - Other (e.g. agricultural/infrastructure policies) are coherently aligned
- Income effects often, but not always, positive

What we know little about: Forest conservation policies

- Role of contextual moderators (in general)
- Policy costs (e.g. implementation & opportunity costs)
- Conservation policy tradeoffs (e.g. with poverty and equality)
- Interactions with other (conservation) policies
- Policy leakage and other undesirable (and potentially also desirable) spillovers

Importance of context

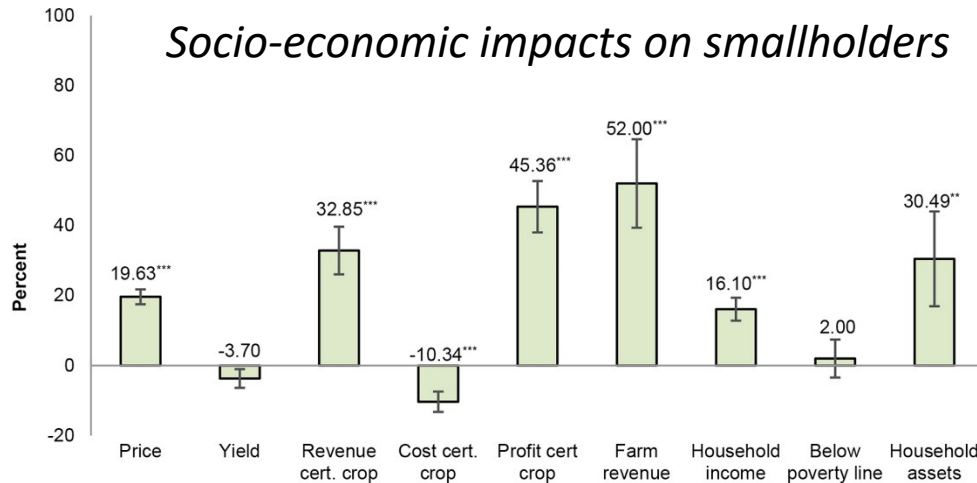
- Global analyses comparing differences in forest cover across borders
- Cumulative effects of governance quality and other context factors produce large difference between countries



Wuepper et al. (2024)

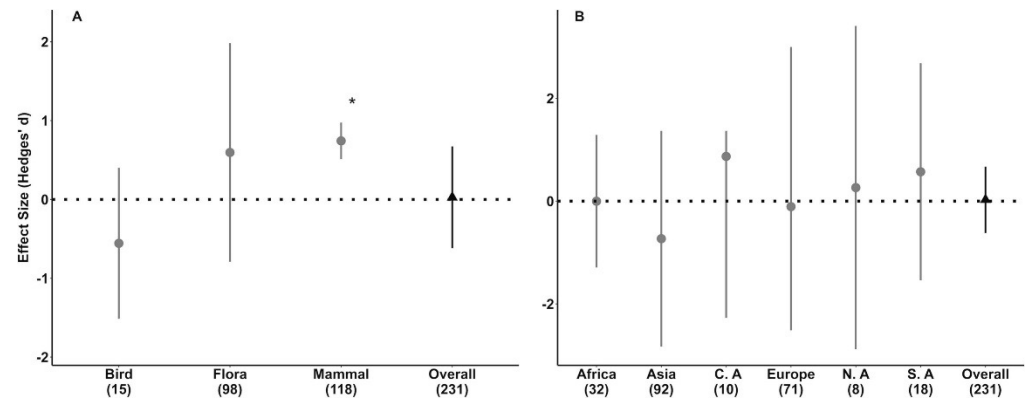
Other policies & governance measures

Sustainability standards



Meemken et al. (2020)

Forest certification impacts on biodiversity



Matias et al. (2024)

Outlook

- Rigorous evaluation is only just arriving in the field of environmental and land use policy
 - Huge evidence gaps
- Many new opportunities for evaluation enabled by new data types (e.g. remote sensing, digitalization)
- Implications for modelling (including consequential LCA!) and scenario development as well as for theory building