



Mapping what we know about the effects of agriculture, land-use change and forestry programmes

Forest degradation, deforestation and agricultural production contribute to almost a quarter of global greenhouse gas (GHG) emissions. The ways in which agricultural and forest lands are managed are critical for climate change mitigation, global food security and achieving the sustainable development goals. To reach emissions reduction targets, while avoiding negative effects on food security and other human well-being outcomes, there is an urgent need to develop effective policies and programmes in the land use and forestry sector.

To develop these effective evidence-informed programmes and policies, the International Initiative for Impact Evaluation (3ie), with support from the Children's Investment Fund Foundation (CIFF), created an evidence gap map (EGM) to take stock of the existing evidence on the effects of interventions in the agriculture, land use and forestry sector.

What is an evidence gap map?

3ie EGMs are thematic collections of impact evaluations and systematic reviews that measure the effects of international development policies and programmes. They are structured around a framework matrix designed to capture the different interventions and outcomes associated with a particular area. Relevant systematic reviews and impact evaluations are mapped onto this framework graphically, identifying where evidence exist and where there are gaps.

In doing this, EGMs identify absolute gaps where few or no primary studies exist and synthesis gaps where there is a concentration of primary studies but no existing high-quality systematic review. 3ie EGMs are available through an online interactive platform on the 3ie website that allows users to explore the studies and reviews that are included.

What did the EGM find about impact evaluations?

We identified 241 experimental or quasi-experimental impact evaluations assessing the effects of several agriculture, land-use and forestry programmes. The EGM shows that key policy questions remain unanswered. Less than 10 per cent of the studies address whether there are trade-offs or potential synergies between programme effects on environmental and human welfare outcomes. The EGM figure on the next page highlights the extensive gaps in the evidence on the effectiveness of these programmes. Here are the main findings.

Interventions: Only four interventions areas have been studied relatively extensively: protected areas, payment for environmental services, decentralised or community-based forest management and agricultural extension and training.

Outcomes: Few studies measure both environmental and human well-being outcomes. Most studies typically focus on either the effects on the environment or effects on people, which makes it difficult to identify potential trade-offs or synergies between them. The studies measuring environmental outcomes mainly rely on proxies for GHG emissions, such as deforestation rates. Only one study assessed GHG emissions, and three assessed carbon capture and storage. Few studies measure the effects on food security (6%).

Geographic coverage: Over half of the identified studies were conducted in only ten countries: Costa Rica, Brazil, China, Indonesia, Mexico, Uganda, Ethiopia, India, Bolivia and Malawi. Out of the 47 countries that are part of REDD or REDD+, we identified evaluations of forestry programmes in only 24 of these countries.

Study design: Only 18 studies (7%) used a randomised evaluation design. The remaining studies use quasi-experimental approaches, such as propensity score matching, instrumental variables and difference-in-differences. Many studies rely on weak methodological designs based on cross-sectional data. However, it is encouraging that more recent studies are increasingly using more robust methods that draw on panel data.

What do high-quality systematic reviews tell us?

Systematic reviews examine and synthesise all the available evidence in an intervention area. We identified 11 systematic reviews assessing the effects of agriculture, land-use and forestry programmes. Six of these reviews received a rating of high or medium confidence - a signifier of the quality of the review¹. Due to the lack of evidence in some intervention areas, the authors of these reviews have suggested caution in interpreting the findings.

The main findings of these reviews have been summarised here.

Decentralised and community-based forest management may reduce deforestation rates, but the effects were modest (Bowler *et al.*, 2011; Samii *et al.*, 2014). The effects on human welfare outcomes were not clear (Samii *et al.*, 2014).

Payments for environmental services were found to have a small effect on reducing deforestation (Samii *et al.*, 2014). Evidence from two studies suggests modest improvements in household incomes. The effects of **terrestrial protected areas** are unknown because there is very little evidence (Pullin *et al.*, 2014).

Farmer field schools (FFS) may improve farmers' knowledge and adoption of more environmentally friendly practices, such as reduced pesticide use. They may also increase agricultural production and income in some contexts (Waddington *et al.*, 2014). The positive effects were however observed for small-scale or pilot programmes; FFSs appear to be less effective when delivered at scale.

Land property rights interventions improved tree crop planting in Ethiopia, Nicaragua and Vietnam (Lawry *et al.*, 2014). Agricultural productivity also improved in some contexts. The gains were more limited in Africa than other regions. The evidence suggests that land property rights interventions have led to an improvement of an average of 15 per cent for human welfare outcomes, measured in terms of income or consumption.

¹ Systematic reviews were appraised using a standardised checklist, available here: http://www.3ieimpact.org/sites/default/files/2019-02/sr_data-base_search_protocol_final_august_2014.pdf

Land-use change and forestry evidence gap map



How to read the EGM

EGMs are presented using an interactive online platform which allows users to explore the evidence base and findings of relevant studies. Bubbles appearing at intersections between interventions and outcomes denote the existence of a study or studies. The larger the bubble, the greater the volume of evidence in that cell. The colours of the bubbles represent the type of evidence and a confidence rating, as indicated in the legend in the figure. In the online version of the EGM, hovering over a bubble, displays a list of all the included studies for that cell. The hyperlinks for these studies lead to user friendly summaries on the 3ie evidence database. Users can filter the evidence by type of evidence, confidence rating (for systematic reviews), region, country, study design and population.

What have we learned?

We urgently need to generate more evidence for determining which interventions are likely to be most effective in reaching emissions reductions targets, while avoiding negative effects on food security and human welfare outcomes. Without better evidence there is a high risk that we waste funding on programmes that fail.

The EGM highlights the need for more and better designed impact evaluations that measure the effects of programmes on both GHG emissions and human welfare outcomes, including food security. Wherever it is feasible, studies should directly measure GHG emissions to test assumptions about the accuracy of using intermediate outcomes, such as deforestation rates, as proxies for emissions.

There are a handful of high quality systematic reviews available, but their findings are limited by the lack of available evidence. There is however potential for new and updated reviews focusing on the interventions with the largest concentration of studies.

Opportunities to use randomised evaluation designs (e.g. through randomised programme roll-out) should be explored, wherever this is possible. Studies that combine counterfactual analysis with process evaluation and qualitative research would allow researchers to also answer the question of why programmes work or don't work and for whom.

For protected areas, payment for environmental services, decentralised or community-based forest management, and agricultural extension and training, there are a substantial number of studies. New or updated systematic reviews will therefore add value.

About this EGM

This summary is based on the forthcoming 3ie EGM, *Land-use change and forestry programmes: evidence on the effects on greenhouse gas emissions and food security, Evidence Gap Map Report 3*, by Snilstveit, B, Stevenson, J, Villar, PF, Eysers, J, Harvey, C, Panfil, S, Puri, J and McKinnon, MC. 2016. The studies included in this gap map are impact evaluations and systematic reviews that evaluate the effects of agriculture, land-use change and forestry programmes on environmental and human welfare outcomes. The authors looked for studies assessing the effects of the following interventions: protected areas, community or decentralised forest management, public, private or civil society legislation related to forests and other land, certification, monitoring and enforcement, payments for environmental services, subsidies, grants and concessions, land rights, agricultural extension, technical and vocational training, information services, road construction and dam construction.

To access the evidence gap map online, visit: gapmaps.3ieimpact.org

3ie is a member-based, international grant-making NGO that has been promoting evidence-informed development policies and programmes since its inception in 2008. We are a global leader in funding and producing rigorous evidence on what works, how, why and at what cost in low- and middle-income countries. We believe that better evidence will make development more effective and improve poor people's lives.

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