

Development investment and performance of agroecological approaches in low- and middle-income countries



RESEARCH PROGRAM ON
**Climate Change,
Agriculture and
Food Security**



A Rapid Evidence Review

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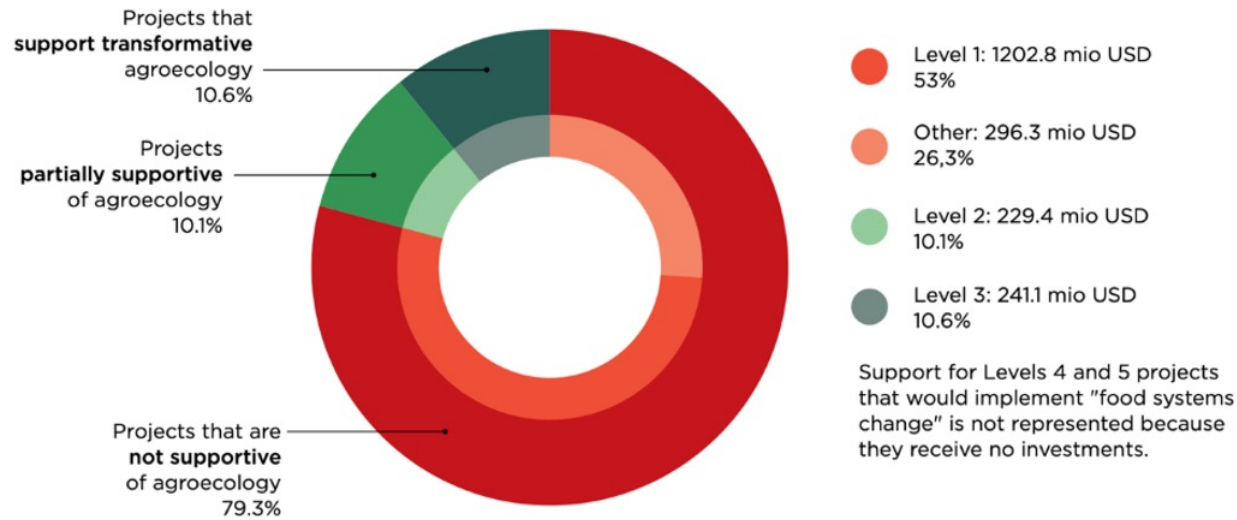
April 2021



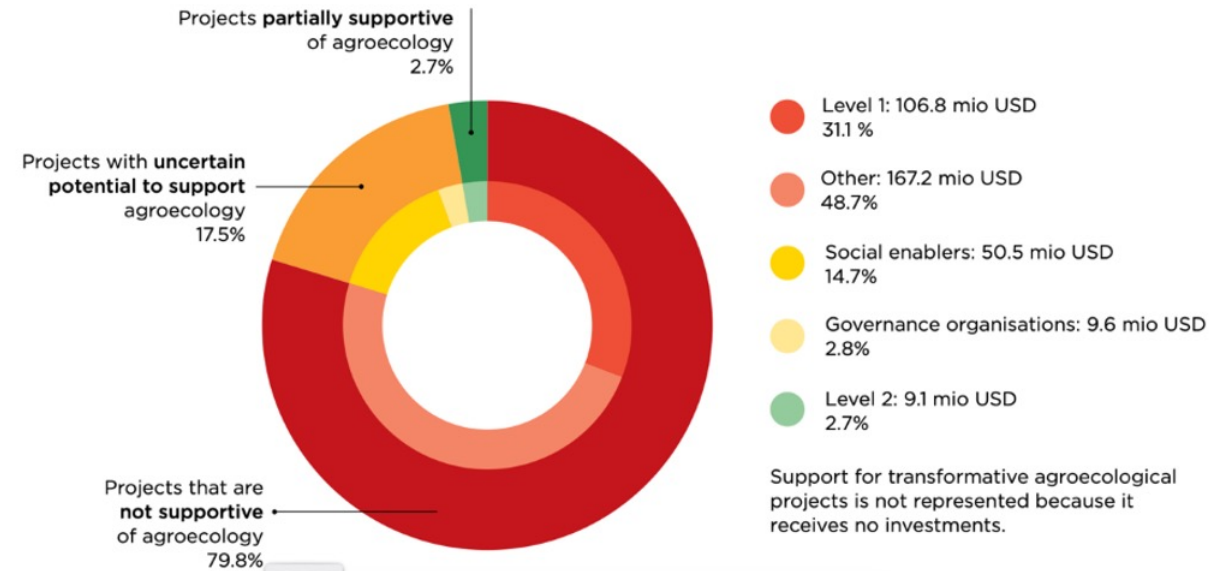
State of investment in agroecology

[Biovision and IPES Food 2020](#); [CIDSE 2020](#)

Total investments per category in USD millions for the total amount of GCF agricultural projects



Total investments per category in USD millions of EU flows towards FAO, IFAD and WFP (2016-2018)



[CIDSE 2020](#)

- Most donors at least partly fund projects with agroecological principles
- However, most agricultural investment (63%) is reinforcing or tweaking existing systems, *not transforming food systems toward sustainability*

Objectives

Synthesize the quality and strength of the evidence for:

1) the impacts of agroecological approaches on climate change adaptation and mitigation in major agricultural systems in low- and middle-income countries (LMICs), and

2) the programming approaches and conditions supporting large-scale transitions to agroecological approaches.



**Agroecology
& climate
change
rapid
evidence
review**

PERFORMANCE OF
AGROECOLOGICAL
APPROACHES IN LOW- AND
MIDDLE- INCOME COUNTRIES

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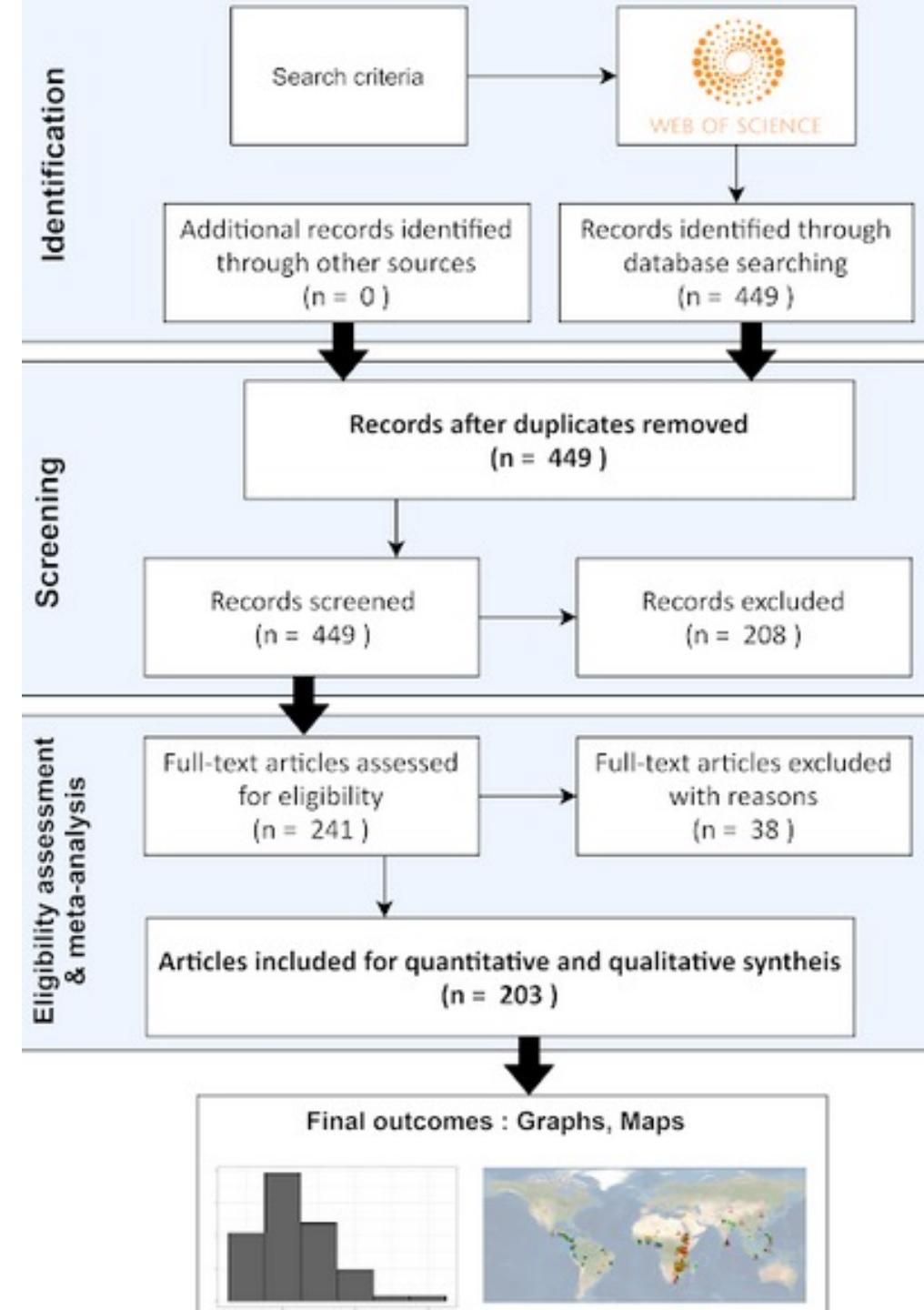
Methods

Impacts of agroecological approaches on climate outcomes

- 1) A synthesis of available information, evidence and identification of gaps from 19 published systematic reviews (18 papers identified)
- 2) Deep dives on primary evidence gaps associated with agroecology nutrient and pest management (138 papers systematically identified and reviewed)

Program approaches for achieving agroecology at scale

Semi-structured interviews of 12 donors and implementation organizations



Climate change impacts of agroecology

Multiple lines of evidence indicate that agroecology supports adaptation and carbon sequestration.

1) Diversification provided clearest impacts

- Benefits for crop yields, regulation and supporting services for climate change adaptation (**strong evidence, high agreement**)
- Impacts on C sequestration (**medium evidence, medium agreement**) that support mitigation

Widespread evidence agriculture simplification is occurring globally with inadvertent disservices (reduced soil health, climate, pollination, pest control)

SCIENCE ADVANCES | RESEARCH ARTICLE

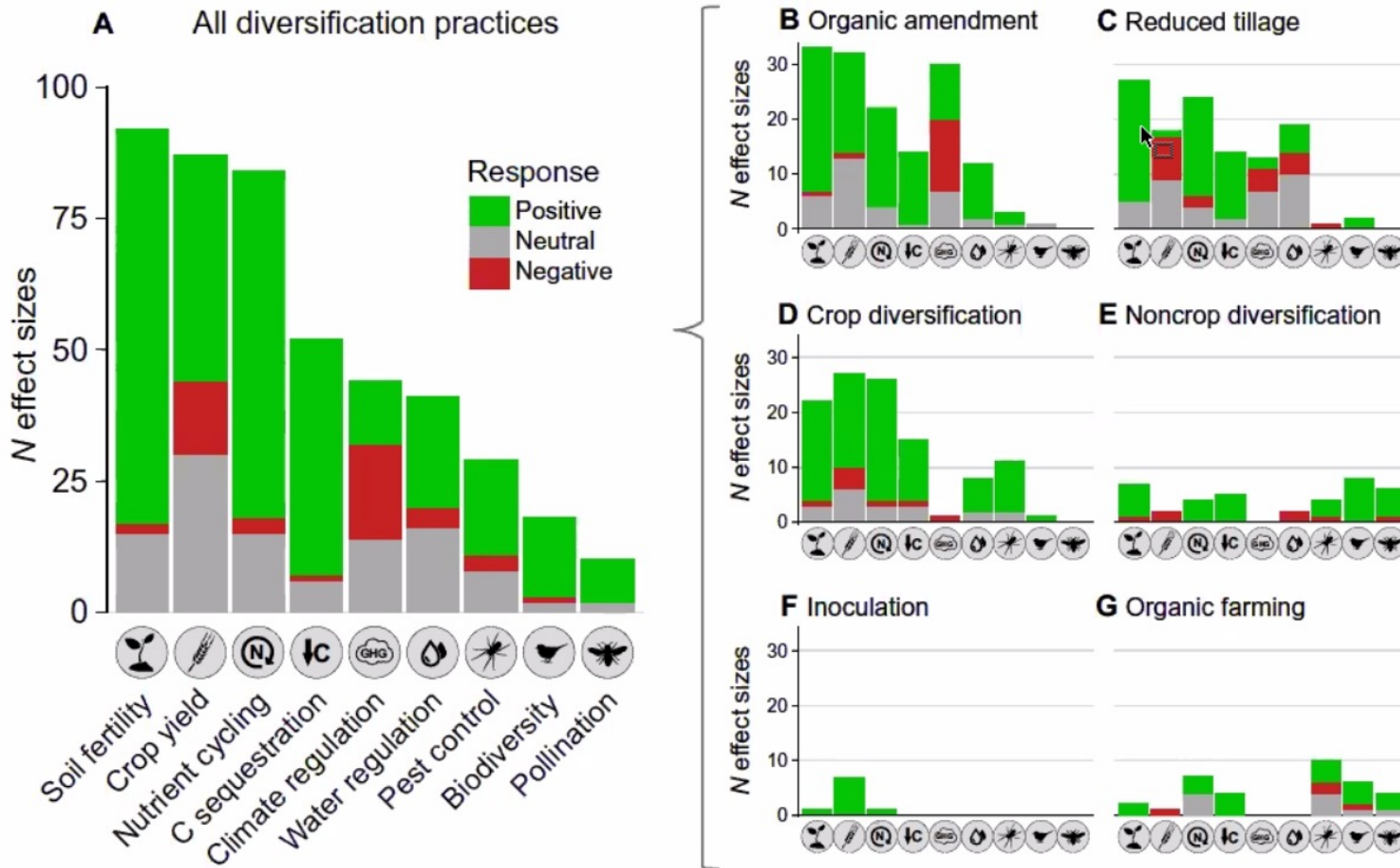


Fig. 1. Vote count reveals that agricultural diversification practices generally have a positive impact on biodiversity and ecosystem services. Number of reported effect sizes with a significant positive (green), negative (red), or neutral (gray) response to agricultural diversification, overall (A) and to each category of diversification practice separately (B to G). The systematic review comprises 456 effect sizes from 98 meta-analyses based on 6167 original studies (fig. S1). Diversification practice and ecosystem service categories were based on classifications following (8, 9) and (13, 14, 27), respectively (tables S1 and S2).

Climate change impacts of agroecology

2) More evidence exists for impacts of agroecological redesign of whole systems for climate change adaptation than single practices (medium evidence, medium agreement)

Especially for:

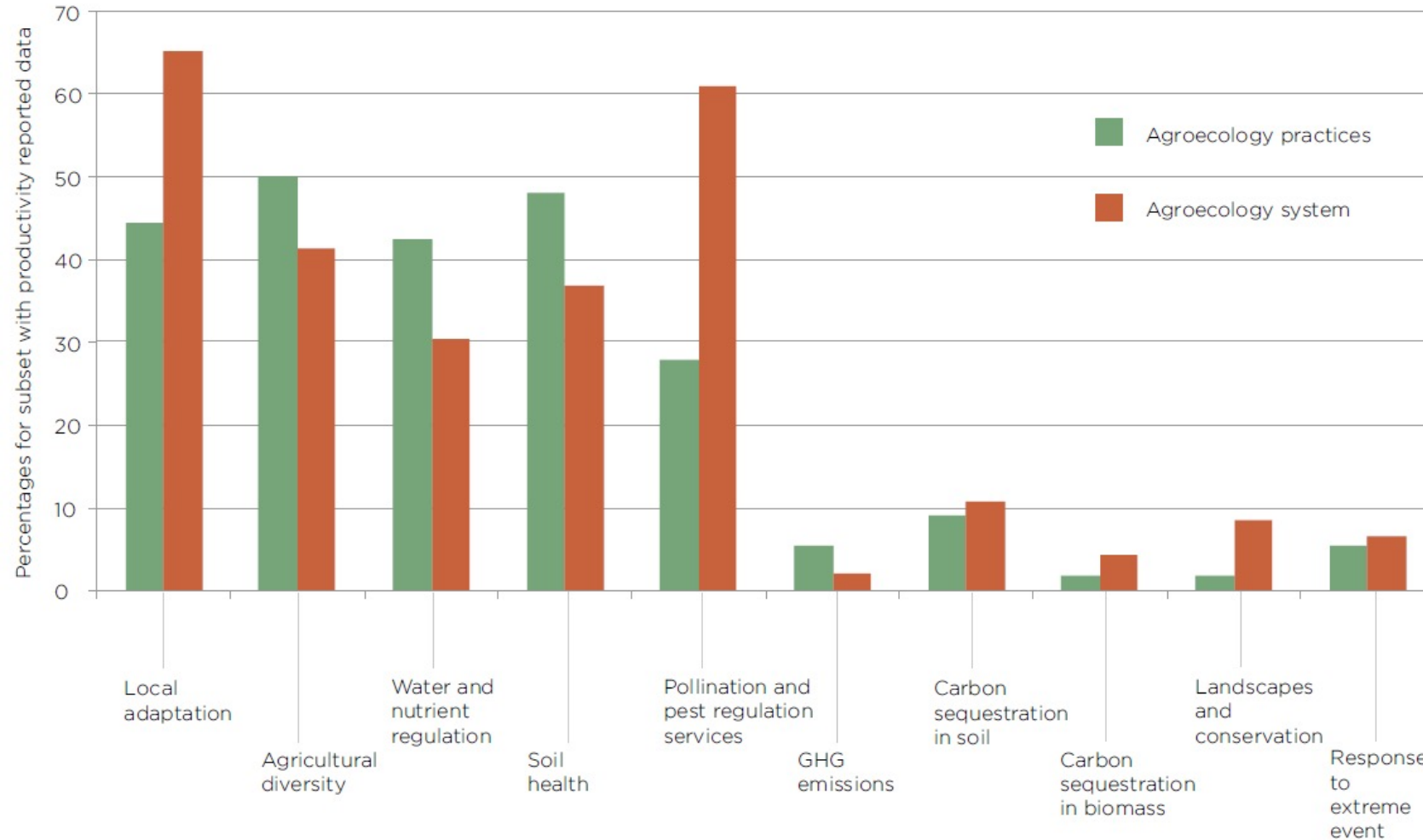
- Pollination and pest regulation
- Local adaptive capacity

Examples of whole system agroecology redesign:

- Agroforestry
- Organic agriculture

Climate co-benefits of agroecology – literature

In addition to production



Percentage of papers reporting evidence for co-benefits in addition to production (100 papers), for climate change adaptation and mitigation of agroecological nutrient and pest management for practices and whole system.

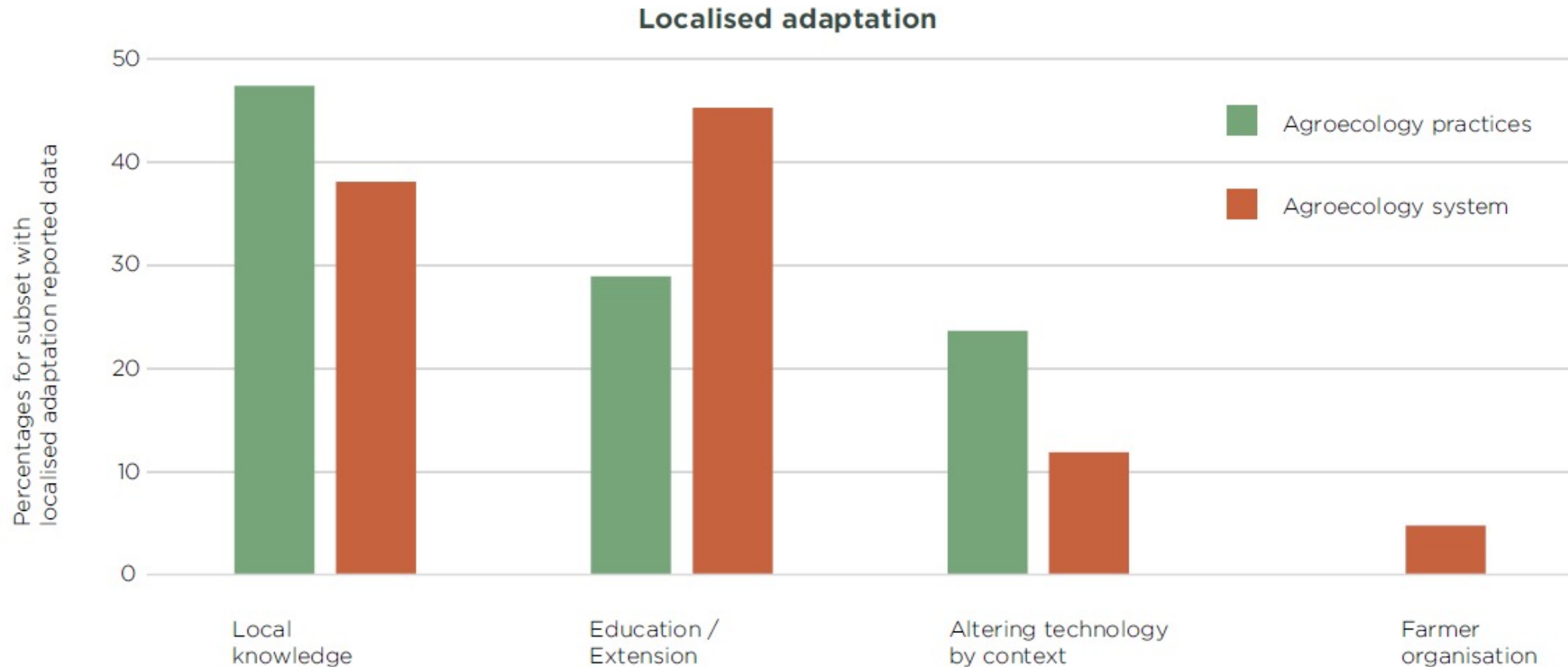
Climate change impacts of agroecology

3) Adaptive capacity is strongly linked to evidence for climate change adaptation (medium evidence, high agreement)

Especially for these farmer-based processes:

- capacity building
- participatory processes at the farmer- or community-level to support agricultural innovation
- Local fit - technology by context

Adaptive capacity and local engagement improves climate change outcomes – literature

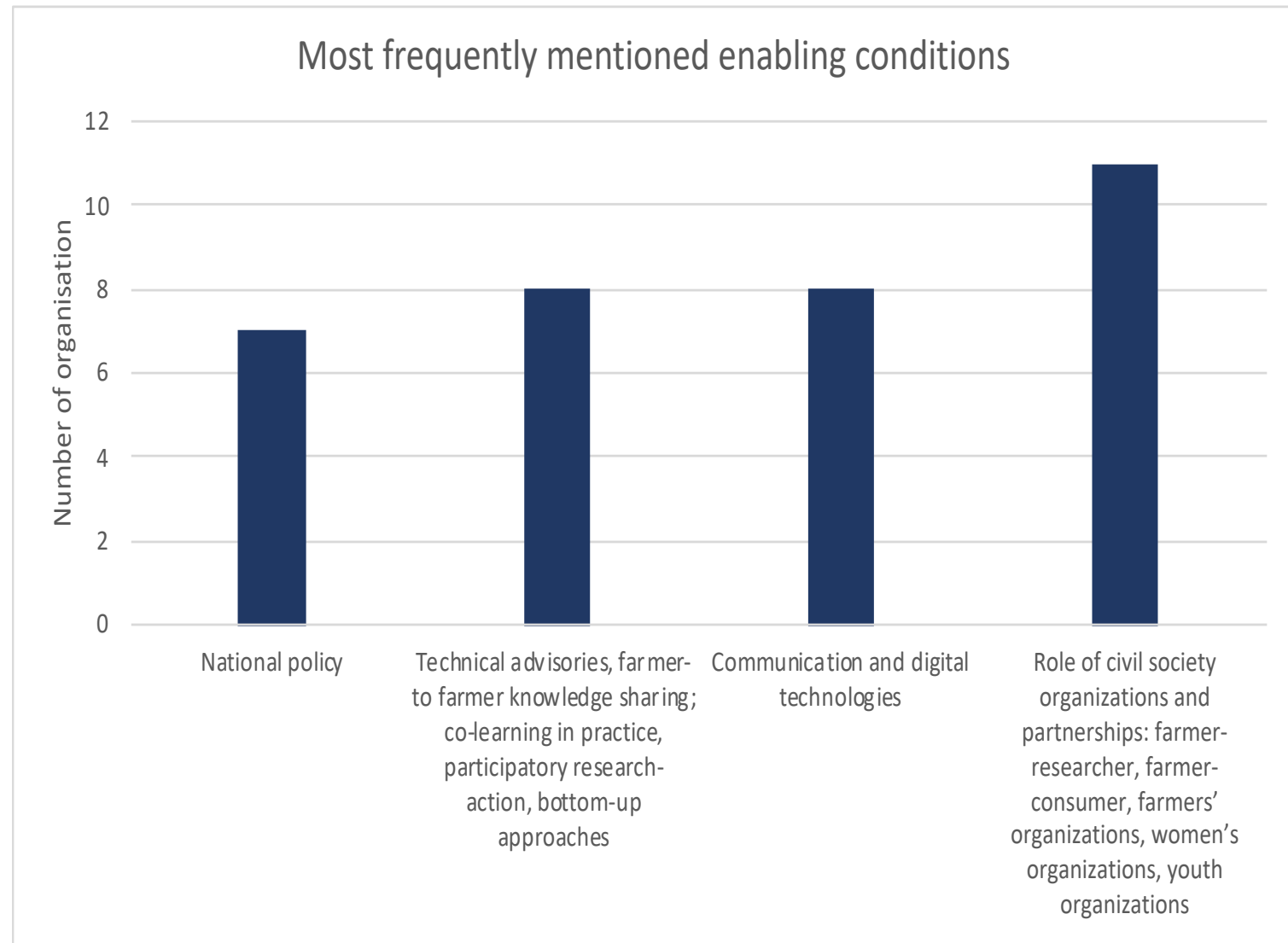


Deep dive source: AE nutrient and pest management were assessed for investment in adaptive capacity through local knowledge, education, and fit of technology by context for practices (38 papers) and whole system design (42 papers).

Climate change impacts of agroecology

4) Most common enabling conditions for scaling agroecology

- Role of civil society organisations and partnerships
- Communication and digital technologies, especially videos
- Technical advisories, including farmer-to-farmer knowledge sharing and co-learning
- National policy



Source: Programme interviews with 12 donors and program implementers

Recommendations

- 1. Focus on content** of approaches and outcome-based definitions and indicators (*go beyond the agroecology label*)
- 2. Prioritize approaches** with strong evidence and high agreement:
 - **Diversification** of farm products, practices and land-use
 - **Processes** that support farmer innovation, co-learning and adaptation of innovations to local contexts
 - *Agroecology frameworks are only one way to promote these*
- 3. Better link funding and indicators for environment and climate change outcomes** e.g., TAPE (FAO), SI Assessment framework (USAID)

Research priorities

- Cost-effectiveness of agroecological approaches and achieving agroecological outcomes at large scales
- How to scale processes that support farmer innovation, co-learning and adaptation of innovations to local contexts
- Research gaps: agroecology vs conventional, greenhouse gas emissions and adaptation to extreme weather, particularly in tropical and low-income countries
- South-South research collaboration

Thank you!

