Interventions to improve resilience and food security in the Middle East, Sahel, and Horn of Africa regions

A rapid evidence gap map

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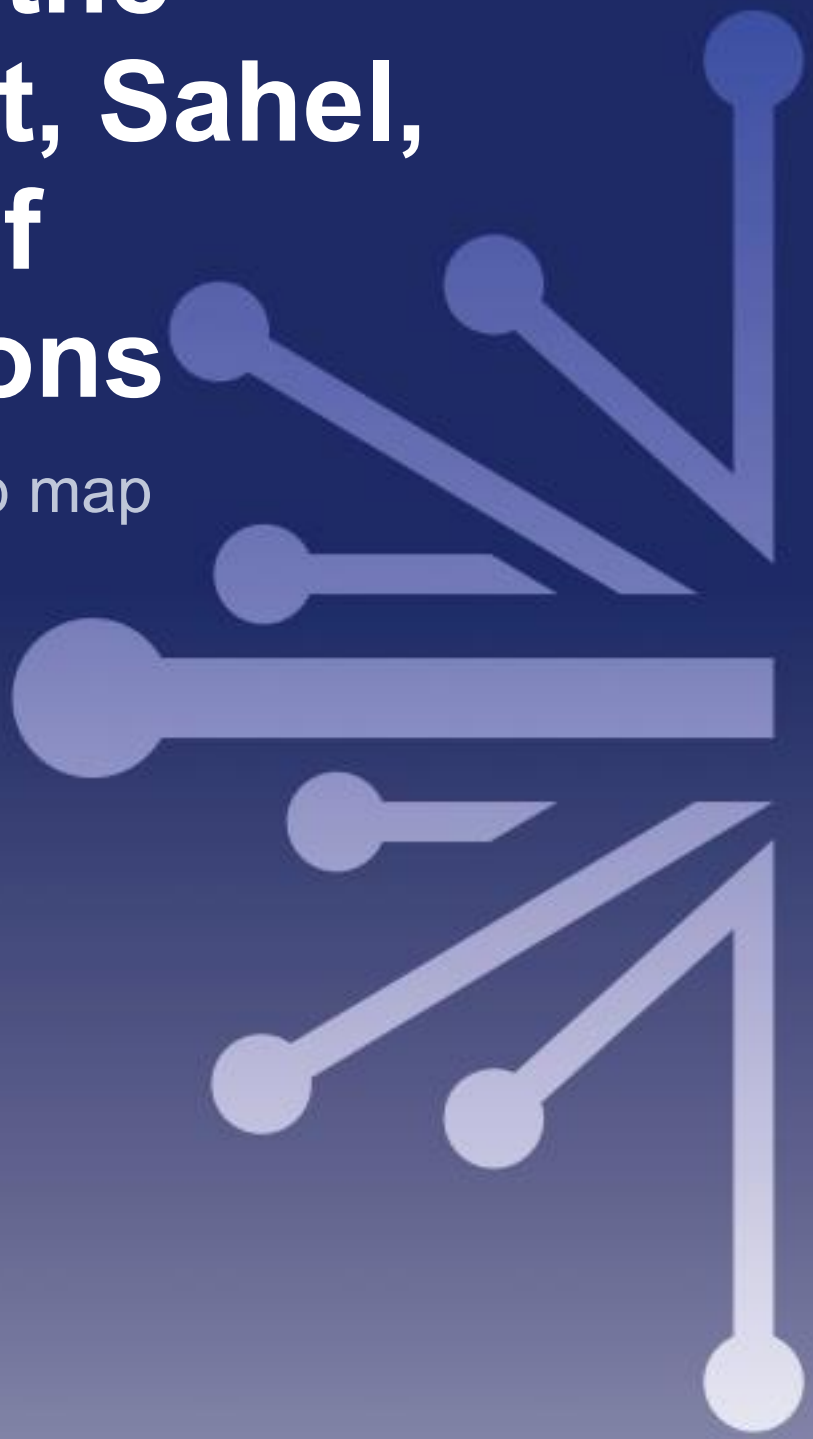
June 2025



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About the Research Commissioning Centre

The Foreign, Commonwealth and Development Office (FCDO) Research Commissioning Centre (RCC) has been established to commission and manage research to enhance development and foreign policy impact. Led by the International Initiative for Impact Evaluation (3ie), the University of Birmingham, and an unmatched consortium of UK and global research partners, the RCC aims to commission different types of high-quality research in FCDO's key priority areas.

About the report

This report presents the results of an exercise to map the evidence on interventions to improve food security and resilience in the Middle East, Sahel, and Horn of Africa. To accommodate FCDO strategic priorities, this map was created in a rapid fashion by drawing on several recently conducted evidence maps rather than conducting a new search.

Review process

This report was reviewed by Anil Thota, Tess Morris, and anonymous reviewers at FCDO and the International Development Research Centre.

Funding

This project is funded by Global Research and Technology Development (GRTD), the research portfolio of the UK government's Foreign, Commonwealth and Development Office (FCDO). It is managed through its Research Commissioning Centre (RCC), led by 3ie and the University of Birmingham. The authors bear sole responsibility for the content of this report, and any errors and omissions are the authors' sole responsibility. Please direct any comments or queries to the corresponding author, Mark Engelbert, at mengelbert@3ieimpact.org

Suggested citation: Ravat, Z. Engelbert, M. and Bell, A.B. (2025). *Interventions to improve resilience and food security in the Middle East, Sahel, and Horn of Africa regions: A rapid evidence gap map.* 30pp.

Interventions to improve resilience and food security in the Middle East, Sahel, and Horn of Africa regions: A rapid evidence gap map

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Summary of key findings

Ensuring resilience in the face of climate change, conflict, and socioeconomic instability is a central goal of global development policy. Food security is a critical component of resilience, particularly in the Sahel, Middle East, and Horn of Africa regions, where interconnected challenges such as water scarcity, reliance on food imports, volatile prices, and disrupted pastoral systems exacerbate vulnerabilities (Grist et al. 2014; Läderach et al. 2021; Boyd et al. 2013; Desmidt et al. 2021).

To support efforts aimed at improving resilience and food security in these regions, we conducted a rapid evidence gap map (EGM). This EGM provides access to rigorous evidence on the effectiveness of interventions in these areas, guiding evidence-informed policymaking while identifying critical evidence gaps to inform future research and evaluation priorities. In particular, this EGM adopted a scope and approach tailored to inform the design of a specific upcoming evidence programme from the UK's Foreign, Commonwealth and Development Office (FCDO). The EGM contains 733 impact evaluations and 238 systematic reviews. An interactive version of the map is available online.

Evidence is very unevenly distributed across countries.
The evidence on resilience and food security is highly unevenly distributed across countries. While countries like Ethiopia and Kenya have substantial evidence bases, others, particularly conflict-affected regions such as Sudan, South Sudan, and Syria, have very limited research. This pattern highlights a need for more research in underrepresented countries to address context-specific challenges.

Existing evidence centres heavily on a handful of interventions focusing on agricultural production and the provision of cash and food.
A significant proportion of existing evidence focuses on interventions aimed at agricultural productivity, social protection, and land and resource management. Commonly studied approaches include improving agricultural technologies, productivity-related training, and direct provision of cash, assets, or food. Less focus is directed to interventions targeted at livestock management, infrastructure investments, and institutional resilience.

Evidence on outcomes is also unevenly distributed, with little research on institutional outcomes.
Outcomes are unevenly measured across the evidence base. Most studies focus on food security, livelihoods, and nutrition-related outcomes, with particular attention to food insecurity, income generation, and anthropometric measures. However, institutional resilience outcomes, sustainability metrics, and women's empowerment – especially dimensions like self-esteem and decision-making – are underexplored. This imbalance suggests a need for broader evaluation criteria to fully understand the impacts of interventions across multiple domains.

Few studies account for gender and equity in their research designs.
Gender and equity are rarely built into research designs within our evidence base. Most studies do not explicitly address these dimensions, and when they do, the approach is usually through subgroup analysis by sex. This gap underscores the need to purposefully integrate gender and equity into both the design and evaluation of interventions.

Most systematic reviews have major methodological limitations.
Nearly two-thirds of the included systematic reviews were rated with low confidence using a standardised checklist. The remaining reviews were roughly evenly divided between high and medium confidence ratings. All completed systematic reviews included in this EGM were appraised using a standardised checklist and assigned a rating of “low”, “medium”, or “high”, indicating our confidence in the review’s conclusions given how it was conducted. Of the 233 completed systematic reviews in our sample, nearly 60 per cent (113 reviews) have received “low confidence” ratings, with the remainder split roughly equally between ratings of “medium” (45 reviews; 19%) and “high” (55 reviews, 24%).

Specific design features of future research will be critical to filling the evidence gaps identified in this EGM.
The EGM findings reveal a highly uneven evidence base, with significant gaps in representation across many countries in the Sahel and Middle East regions, including Chad, Mauritania, South Sudan, and Sudan. There are also notable gaps in the coverage of interventions and outcomes. Future research should prioritize evaluating interventions in these understudied areas, with a particular focus on institutional resilience, environmental sustainability, and women’s empowerment.

Effectiveness studies on food security and resilience in these regions should centre gender and equity in their research designs. This includes collecting data that supports meaningful subgroup analysis, measuring inequality-related outcomes, and ensuring interventions are inclusive, equitable, and tailored to communities' diverse needs.

Contents

Abbreviations

CGIAR	Consultative Group for International Agricultural Research
EGM	Evidence Gap Map
FCDO	Foreign, Commonwealth and Development Office (UK)
MENA	Middle East and North Africa
USAID	United States Agency for International Development

Building resilience and food security is an urgent need, especially in fragile settings

Resilience is a concept, widely used across academic disciplines and areas of professional practice, to capture (with some variation) the capacity of an entity (a person, a community, or other systems, for example) to maintain a state or property, or return to it, under or following a shock or stress (Holling 2001; Assarkhaniki, Rajabifard, and Sabri 2020). For development professionals, it means the "capacity over time of a person, household or other aggregate unit to avoid poverty in the face of various stressors and in the wake of myriad shocks" (Barrett and Constas 2014) or the ‘‘capacity that ensures stressors and shocks do not have long-lasting adverse development consequences" (Constas, Frankenberger, and Hoddinott 2014). In the context of critical infrastructure, the OECD defines resilience as "the capacity of systems to absorb a disturbance, recover from disruptions and adapt to changing conditions while retaining essentially the same function as prior to the disruptive shock." (Linkov et al. 2018)The importance of building resilience in development is at least two-fold. First, people do better in general when they are able to manage uncertainty and respond to shocks. Second, the acute and longer-term impacts of climate change are uncertain (including a 4- to 6-fold increase in the frequency of heatwaves, along with marked decreases and delays in seasonal rainfall in the Western Sahel (Tesfaye 2022), so that investing pro-actively in people's futures means investing in their capacities to absorb and adapt to change.

Food security – measured as the four connected dimensions of **availability** (the supply of food), **access** (how people can obtain it), **utilization** (how that food contributes to nutrition), and **stability** (the variation and uncertainty in each of the other three dimensions) (World Bank, n.d.) – is a critical component of community and food system resilience in the Sahel, Middle East, and Horn of Africa regions. The World Bank has spent nearly $1B to address food insecurity in Middle East and North Africa (MENA) countries (World Bank 2023), where high water scarcity contributes to a reliance on food imports; coupled with unstable currencies and exposure to global price and supply chain volatility (Ben Mimoune, Nejla and El Shehaby, Hana 2023), this creates some of the highest grain and vegetable prices in the world in MENA countries (WFP 2024).

Where food and water resources are scarce, heterogeneous, and uncertain, connectivity is critical. Food security and food system resilience challenges overlap in the Sahel, for example, where corridors for transhumant pastoralism connect northern wet season grasses and southern dry season agricultural residues (Ayantunde et al. 2014). Increasing agricultural settlement disrupts movement and grass availability along these corridors; together with greater variability in rainfall driving herds southward, this contributes to the perennial colocation of cattle and crops in space (McGuirk and Nunn 2020), bringing conflict, damage, and the loss of both food security and resilience.

Why this EGM is needed, and why it was done rapidly

This EGM addresses needs that are both general and specific. It serves the general need for an understanding of the evidence base on resilience and food security in some of the world's

most vulnerable places. The EGM also addresses a specific need of FCDO. We discuss each aim in turn.

The general need for this EGM is based on the fact that resilience to climate change, conflict, and socioeconomic instability have been of growing interest to international development agencies, as evidenced by the large investments of the World Bank and others in this sector. The Sahel region remains challenged by a multitude of crises such as severe violence, political and governance volatility, chronic poverty, climate change, and a weakening social fabric – all of which are drivers of food security (UN OCHA 2024). Food insecurity and severe acute malnutrition among children have been alarmingly on the rise over the past five years, with 11.6 million people facing food insecurity and 2.2 million children reported as malnourished in 2023 (UN OCHA 2024). Likewise, close to 50 million people are estimated to be food insecure in the Greater Horn of Africa region, subject to both severe drought and the impacts of severe flooding, alongside public health challenges of disease outbreaks such as measles and cholera, and lingering fallout from the COVID-19 pandemic(WHO 2024). The Middle East region, too, is vulnerable to shocks. A dependency on food imports can leave populations vulnerable to food insecurity, which can be exacerbated by other regional issues such as water scarcity and political instability. Given the centrality of resilience to development efforts in the region and the considerable investments being made, it is important for policy and programming decisions to be based on the best available evidence about what strategies are most effective.

The EGM also supports FCDO's future investment into research activities that build evidence on what works to improve food security and livelihoods in vulnerable communities, with a focus on the Middle East, horn of Africa and Sahel regions. This EGM therefore serves as a starting point for FCDO in identifying priority areas for the research that will be conducted under new investments. FCDO's timeline for designing new investments on this issue do not accommodate a typical EGM timeline of six months or more, so a rapid approach was necessary.

What is an Evidence Gap Map (EGM)?

EGMs organise rigorous evidence of effectiveness thematically, aiding policymakers, practitioners, and researchers in making informed decisions within a specific thematic area. The map organises the body of evidence over a framework of interventions and outcomes that represents a theoretical linkage to the concepts of the theme. EGMs improve accessibility to existing evidence, aiding in prioritizing future research by mapping studies in a field based on interventions and outcomes. Along with the volume of evidence, EGMs also report the type of evidence (completed or ongoing, impact evaluations (IEs), or systematic reviews (SRs)), research gaps, and SR confidence rating reflecting the degree to which SRs followed gold-standard methodology. The results are displayed on 3ie's platform, offering a graphical and interactive representation of the evidence in a matrix form. The interactive map allows users to filter evidence in the EGM by region, country, evaluation method, population characteristics among other options. EGMs do not provide information on interventions' effectiveness and cost-benefit analysis.

What are the objectives of this EGM?

This EGM has several objectives, related to both its general and specific purposes:

- Identify and characterise impact evaluations and systematic reviews aimed at improving resilience and food security in the Middle East, Sahel, and Horn of Africa regions.
- Highlight potential evidence gaps of primary evidence and synthesis opportunities.
- Inform FCDO about the most significant gaps in the evidence base – in terms of interventions, outcomes, geography, and equity – that should be addressed by future research.
- Serve as a starting point for discussions about follow-on scoping activities from this EGM that will further support FCDO's decision making. To this end, throughout the report and in the concluding section, we highlight potential areas of follow-on work.

The conceptual framework for this EGM repurposes the frameworks of recent EGMs on resilience and food security

The EGM intervention and outcome framework was developed to capture interventions targeting resilience and food security. As this is a rapid map and the scope is broad, the framework was developed using previous EGMs conducted by 3ie on topics of **resilience** (Berretta et al. 2023), **agriculture** (Engelbert et al. 2023), **food security** (Storhaug et al. 2024), and **humanitarian contexts** (Yavuz et al. 2022) to encompass a comprehensive range of interventions and outcomes. We reviewed the framework of each of these previous EGMs to identify interventions and outcomes that would also fit with our new EGM's objectives as outlined above. The process of constructing a framework from existing EGMs was done in consultation with the Food and Agriculture team of FCDO.

The interventions are grouped into five main categories:

Agricultural productivity and markets: Interventions aimed at improving agricultural productivity and resilience. These include efforts to improve market functions and linkages, access to inputs, agricultural productivity information and food production.

Infrastructure development: Covers investments related to the construction, reconstruction or maintenance of infrastructure.

Building inclusive and resilient institutions: This includes interventions that strengthen institutions' responsiveness and accountability and effectively prepare for risks and shocks.

Land and resource management: A range of production, marketing, and livelihood adaptation strategies to address disasters, combat climate change, and promoting sustainable natural resource management.

Social protection and food security: Interventions directed at providing social assistance or care services targeted at the poor and vulnerable, including in-kind or cash support to individuals or families to enhance food security and help them cope with the impacts of economic or other shocks.

Our Methods

Overall methodological approach

This EGM was created to inform the design of a specific evidence initiative with a fixed timeframe, which could not accommodate the usual EGM process of conducting a new search for evidence. Therefore, this EGM draws entirely from the pool of studies already identified in the existing EGMs that were used to construct this EGM's intervention/outcome framework. To our knowledge, the approach of relying solely on previous EGMs to create a rapid EGM is a novel one. Our approach highlights the potential for EGMs to be developed within short timeframes by drawing on existing work on similar thematic areas.

Each of the four constituent EGMs followed a comprehensive and systematic approach as outlined in Snilstveit and colleagues (2016; 2017). This approach included a comprehensive literature search of academic and grey literature,[1] screening of search results, data extraction of included studies, and critical appraisal of systematic reviews, along with quality assurance at all stages. Detailed methods are available in the reports for the constituent EGMs.

In constructing the dataset for this EGM, we restricted the sample to impact evaluations conducted in countries in the Sahel, Middle East, and Horn of Africa regions (see Appendix A for a full list of included countries). We included any systematic review with a focus on low- and middle-income countries generally.

Process of mapping previous EGM frameworks to this one

Correspondences between the intervention/outcome categories in the constituent EGMs and the desired categories in this EGM were not always perfect. For example, some categories in the constituent EGM frameworks were broader than those in our framework, and thus might corresponded to multiple categories in our framework. To aid with correct classification of studies according to our framework, we relied on other metadata available for each study, in particular the intervention/outcome classifications for each study according to the coding scheme for the Development Evidence Portal (DEP). That is, we used the DEP's classifications of interventions/outcomes to disambiguate between different possible classifications of the same study into the categories in our framework. For a small number of cases, even the combination of the coding in the constituent EGMs and the DEP coding were insufficient to identify the correct category in our framework for a particular study. In these cases, we manually reviewed each study to identify the appropriate categories in our framework. Appendix A contains a description of the reclassification rules that we used to categorise studies according to our framework, as well as any categories where we performed manual review.

[1] "Grey literature" refers to research that is not published in traditional outlets for academic literature (e.g., journals and books). Most commonly, grey literature takes the form of reports issued by think tanks and other organisations with a particular thematic focus. Each of the EGMs we drew on for this report identified a list of relevant organisations and searched their websites for relevant research that met the EGMs' criteria. Details of the sites searched can be found in the reports for each of the EGMs.

How multi-component interventions are classified

Many impact evaluations measure the impact of interventions that combine multiple components. It is important to distinguish between studies that measure the impact of an intervention activity (e.g., facilitating access to credit) that is offered as part of a multi-component package (e.g., in combination with farmer field schools) from the same activity conducted in isolation. This is especially true with respect to interventions designed to increase resilience. Since resilience is a muti-faceted capacity, improving it will often require addressing multiple binding constraints simultaneously.

To ensure multi-component interventions are represented accurately in our description of the evidence base, we first looked for particular combinations of components that are evaluated together particularly frequently. We identified three such combinations that had each been evaluated as a package in at least 15 studies in our sample. For each of these we created new categories in our framework that comprise these common intervention packages. These combinations were: (1) access to improved agricultural inputs combined with agricultural training/extension; (2) cash/asset transfers combined with food provision/vouchers; and (3) food processing (primarily fortification) combined with food provision/vouchers.

For combinations of intervention components that appeared less frequently in our dataset, we first checked whether all components belonged to the same intervention domain (e.g., although the components are distinct, they all fall into the domain of agricultural production or of social protection). If so, we placed these combinations into a “multi-component” category specific to that domain (e.g., “Social protection multi-component”). For interventions where the components came from different domains (e.g., an agricultural production intervention combined with a social protection intervention), we placed these in a special “Cross-domain multi-component” category.

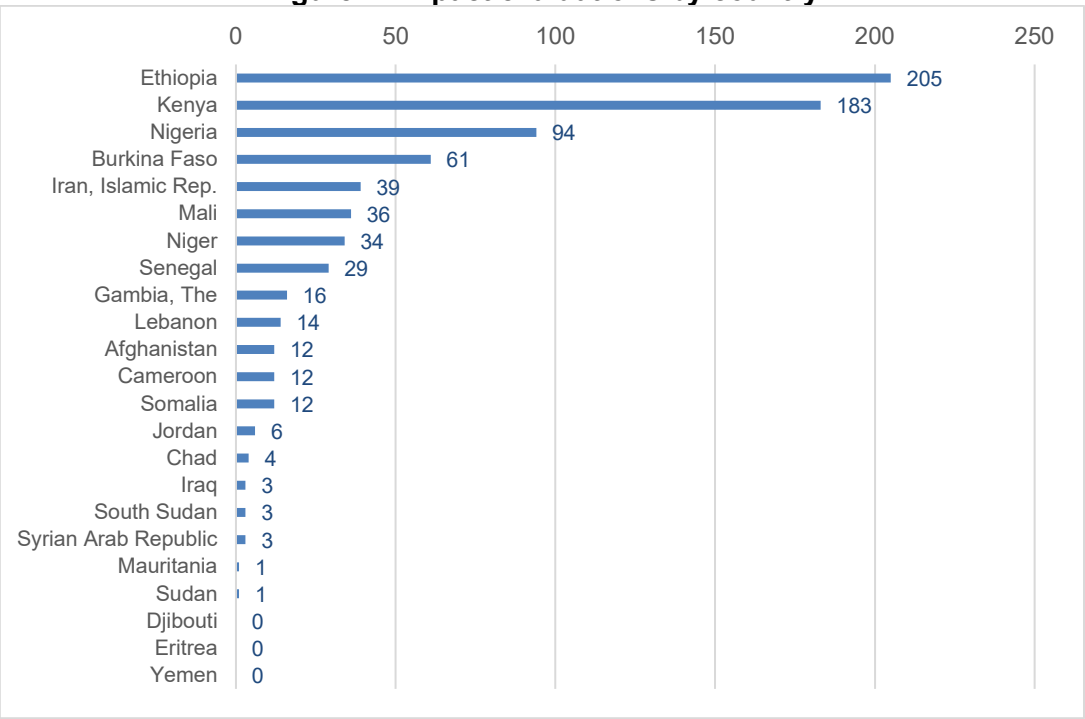
Key Findings

Our EGM contains 746 impact evaluations and 238 systematic reviews.

1. Evidence is very unevenly distributed across countries.

Countries like Ethiopia and Kenya have substantial evidence bases, with over 175 studies in each country (Figure 1). Other countries have seen very little attention in the impact research literature on resilience and food security. These include, for example, Sudan and Mauritania (1 study each), as well as Iraq, South Sudan, and Syria (3 studies each). Three countries—Djibouti, Eritrea, and Yemen—have not been the subject of any impact evaluations in our sample.

Figure 1: Impact evaluations by country



2. Existing evidence centres heavily on a handful of interventions focusing on agricultural production and provision of cash and food.

A handful of interventions dominate the effectiveness literature on interventions to promote resilience and food security (Figure 2). Interventions primarily focus on agricultural productivity, social protection, and land and resource management. Across all intervention domains, we see uneven distributions of evidence, with some intervention categories evaluated much more than others.

Agricultural productivity and markets is the most commonly studied domain, with 322 studies (42%) evaluating interventions within this area. Evidence in this domain is concentrated in three main categories: productivity-related training and extension services (n = 102 IEs), improving access to agricultural technologies (n = 87), and interventions combining both approaches (n = 62). Together, these categories account for more than three-quarters of the evidence in the domain. Notable gaps include employment assistance (n = 1), provision of market information (n = 1), and business and financial capacity support systems (n = 5), each with five or fewer evaluations. Similar trends emerge for SRs, with the exception of the food processing and packaging intervention category, where there are more SRs than impact evaluations (SRs = 34; IEs = 25). In terms of possible opportunities for synthesis, value chain and market linkage activities have 10 evaluations but no SRs.

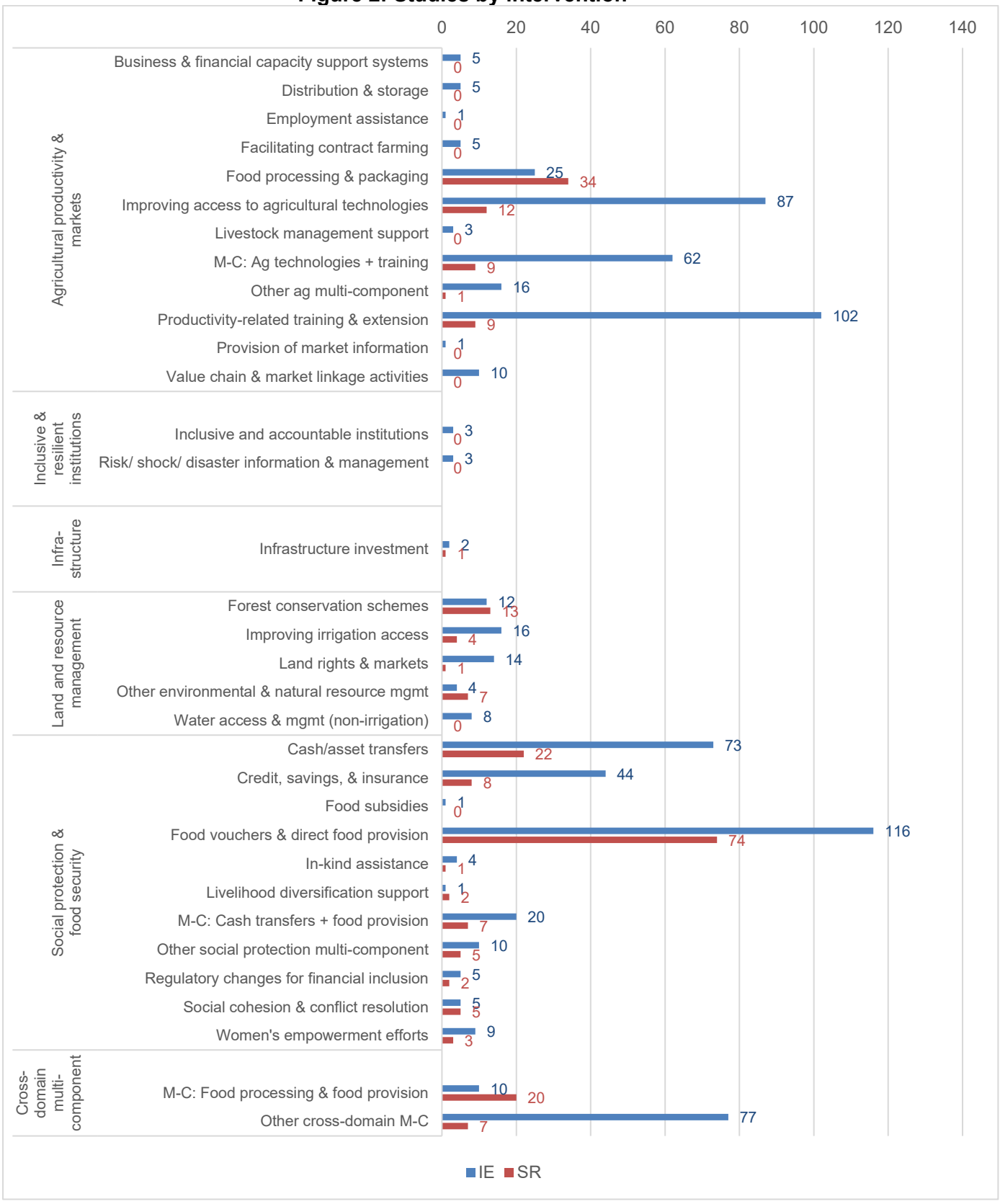
The resilient institutions and infrastructure domains have the fewest evaluations, with a combined total of just eight IEs. Both intervention categories in the inclusive and resilient institutions domain have fewer than five evaluations and no SRs.

The land and resource management domain shows a relatively even distribution of studies across three of its five categories: forest conservation schemes (n = 12), improving irrigation access (n = 16), and land rights management (n = 14). Only one evaluation in this domain focused on a multi-component intervention. In terms of reviews, the distribution is more uneven, with forest conservation schemes (n = 13) accounting for most of the SRs in this domain.

Social protection and food security is the second-largest domain, accounting for 38% (n = 288) of IEs included in this EGM. Over two-thirds of the studies in this domain focus on two intervention categories: food vouchers and direct provision of food (n = 115) and cash/asset transfers (n = 84). Most of the remaining intervention categories have five or fewer studies. Only three categories—credit, savings, and insurance (n = 46); combined cash transfers and food provision interventions (n = 21); and women's empowerment efforts (n = 11)—have more than ten evaluations.

Some IEs in the map applied to more than one category, they were captured as multi-component studies in the framework. Nearly a quarter of the studies (n = 185) provided estimates for multi-component interventions, which are represented as individual categories in Figure 2.

Figure 2: Studies by intervention



Note: “M-C” stands for “multi-component” interventions

Because studies from Ethiopia and Kenya predominate in our dataset, it is important to consider to what extent trends in the evidence for those two countries are driving the trends

we observe in our sample as a whole. In other words, it may be the case that the pattern of which interventions are most commonly studied looks different in the rest of our sample, but these differences are masked by the trends in Kenya and Ethiopia. However, when excluding studies conducted in Kenya or Ethiopia from the analysis, we find that the distribution of studies across intervention categories is broadly similar, although there is somewhat greater attention to food provision/voucher interventions beyond Ethiopia and Kenya (30% of studies) than when those two countries are included (21% of studies). A comparison of the breakdown of the interventions with and without Kenya and Ethiopia in the dataset is presented in Appendix B.

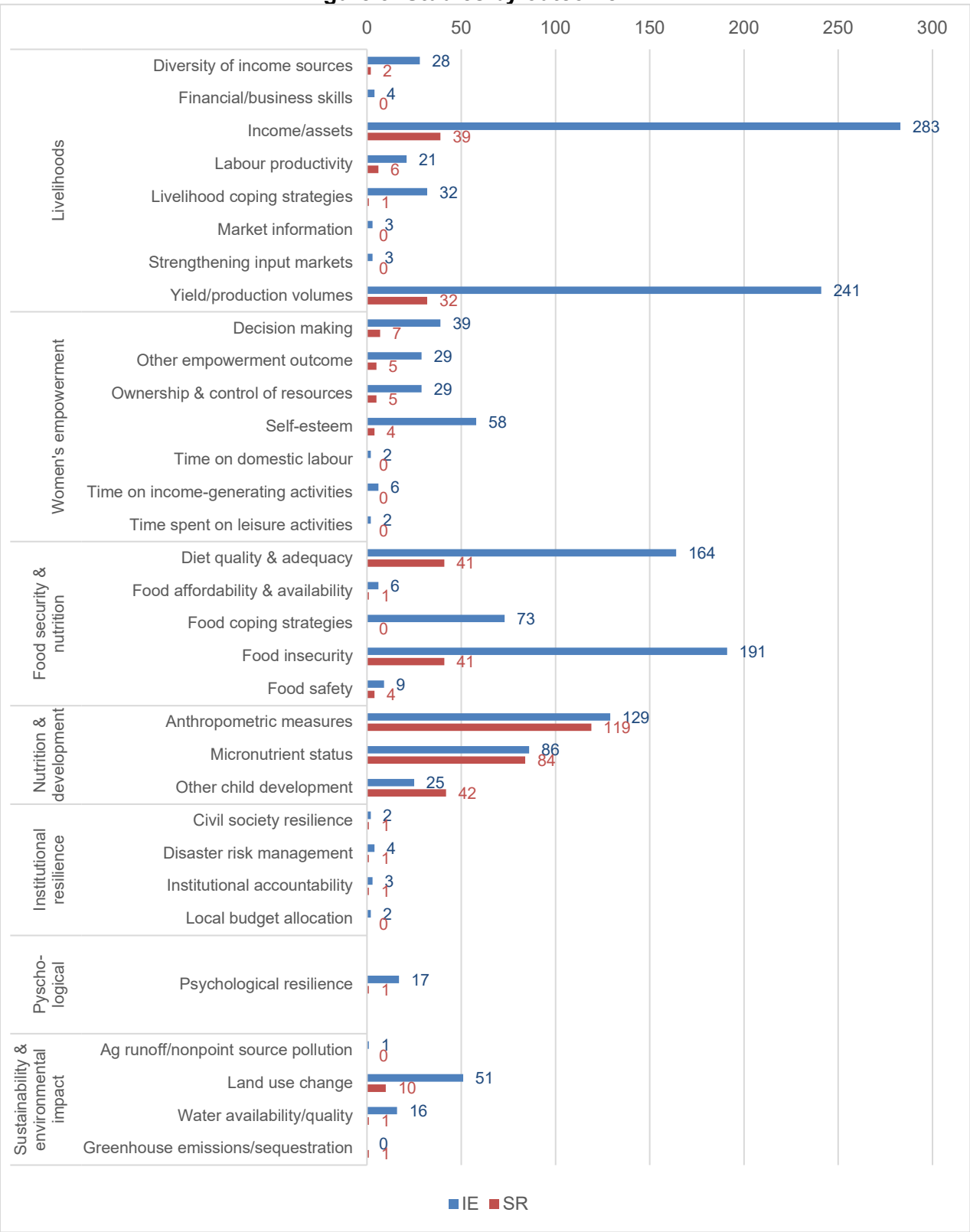
3. Evidence on outcomes is also unevenly distributed, with little research on institutional outcomes.

Figure 3 highlights varying levels of impact evaluations measuring outcomes across domains, with food security and nutrition, and livelihoods being the most studied. Key outcomes such as food insecurity (n = 197), diet quality and adequacy (n = 166), income/assets (n = 285), and yield/production volumes (n = 248) are measured most frequently in these domains. Less attention is given to outcomes such as livelihood coping strategies (n = 34), diversity of income sources (n = 29), and food coping strategies (n = 25). However, limited evidence exists for food affordability and availability (n = 7), food safety (n = 10), and market information (n = 3), while outcomes such as food loss (n = 1) and strengthening input markets (n = 2).

Other domains also show significant disparities. The institutional resilience domain has very few studies, with no outcome categories having more than five studies. In total, just studies measured outcomes in this domain, with civil society resilience and local budget allocation both being measured in just two studies. Outcomes related to the sustainability and environmental impact domain mostly focus on land use change (n = 51), followed by water availability and quality (n = 12), but no evaluations measuring agricultural pollution and greenhouse gas emissions. Nutrition and development feature a more equally distributed evidence base on anthropometric measures (n = 126) and micronutrient status (n = 88), although other child development outcomes are measured in fewer studies (n = 24). Similarly, women's empowerment outcome categories are fairly distributed with outcomes on decision-making (n = 39), ownership of resources (n = 30), and other empowerment outcomes (n=29) in a similar range while outcomes like self-esteem (n = 15) and in particular time on income-generating activities (n = 3) seldomly measured.

We see similar trends for SRs with outcomes in food security and nutrition, livelihoods, and nutrition and development, with outcomes such as diet quality and adequacy and food insecurity (n = 43 for both), anthropometric measures (n=127), micronutrient status (n = 89), other child development (n=42) and income/assets (n = 41) measured more often. However, several domains, such as institutional resilience and psychological resilience, are measured less frequently, with many outcomes showing only one or no SRs.

Figure 3: Studies by outcome

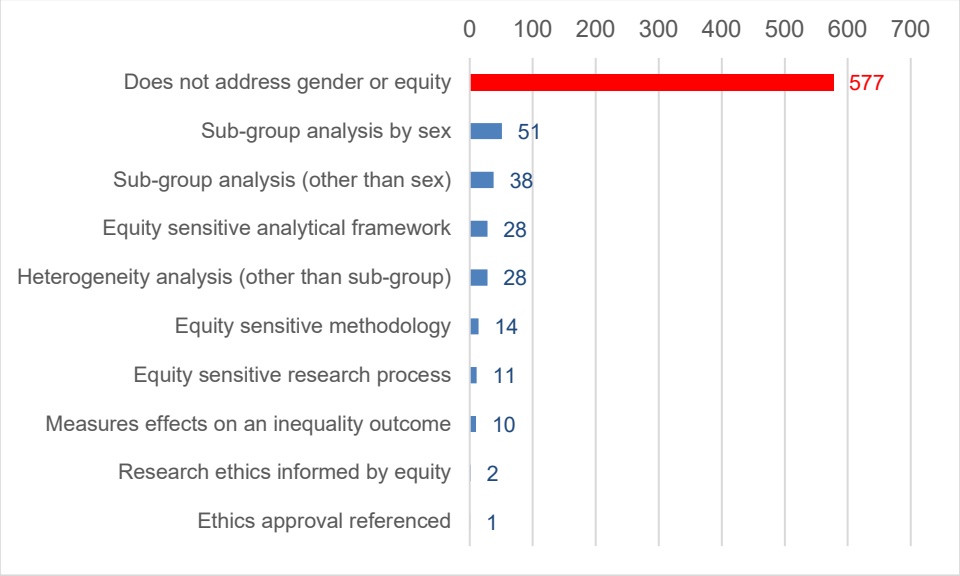


4. Few studies account for gender and equity in their research designs.

Nearly 80 per cent of impact evaluations do not take account of gender or equity in their research designs (Figure 4). Of those that do, the most common approach is to conduct sub-

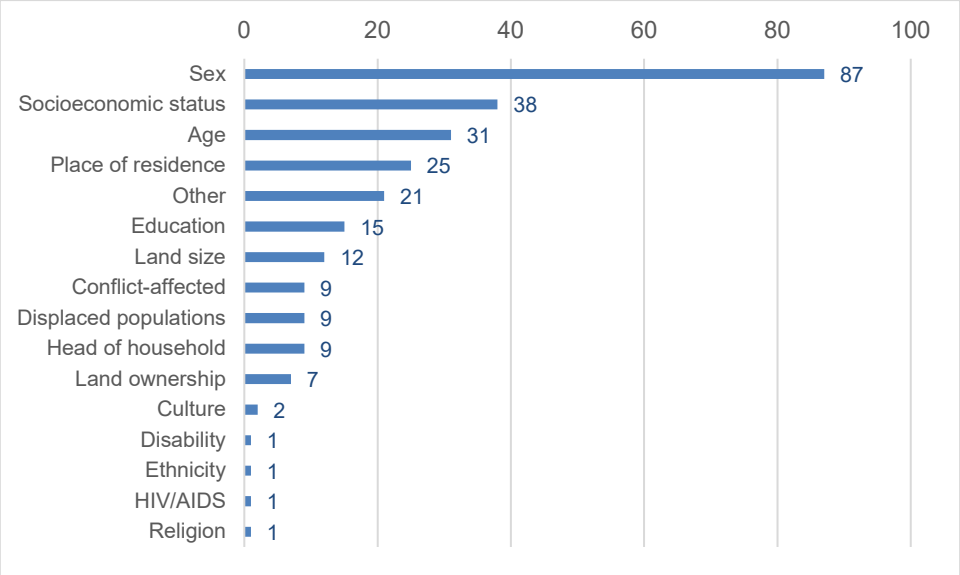
group analysis, most frequently by sex (about 7% of evaluations), though sometimes by other characteristics (5%).

Figure 4: Impact evaluations by equity focus



Among the approximately 20 per cent of evaluations that do address gender or equity considerations, about half (85 studies, 51%) do so by considering sex (Figure 5). Of particular note given the themes of this EGM, only a small number of studies consider effects on populations affected by conflict or displacement (9 studies each).

Figure 5: Impact evaluations by equity dimension



5. Impact evaluations are most commonly funded by USAID, FCDO, CGIAR, and the Gates Foundation

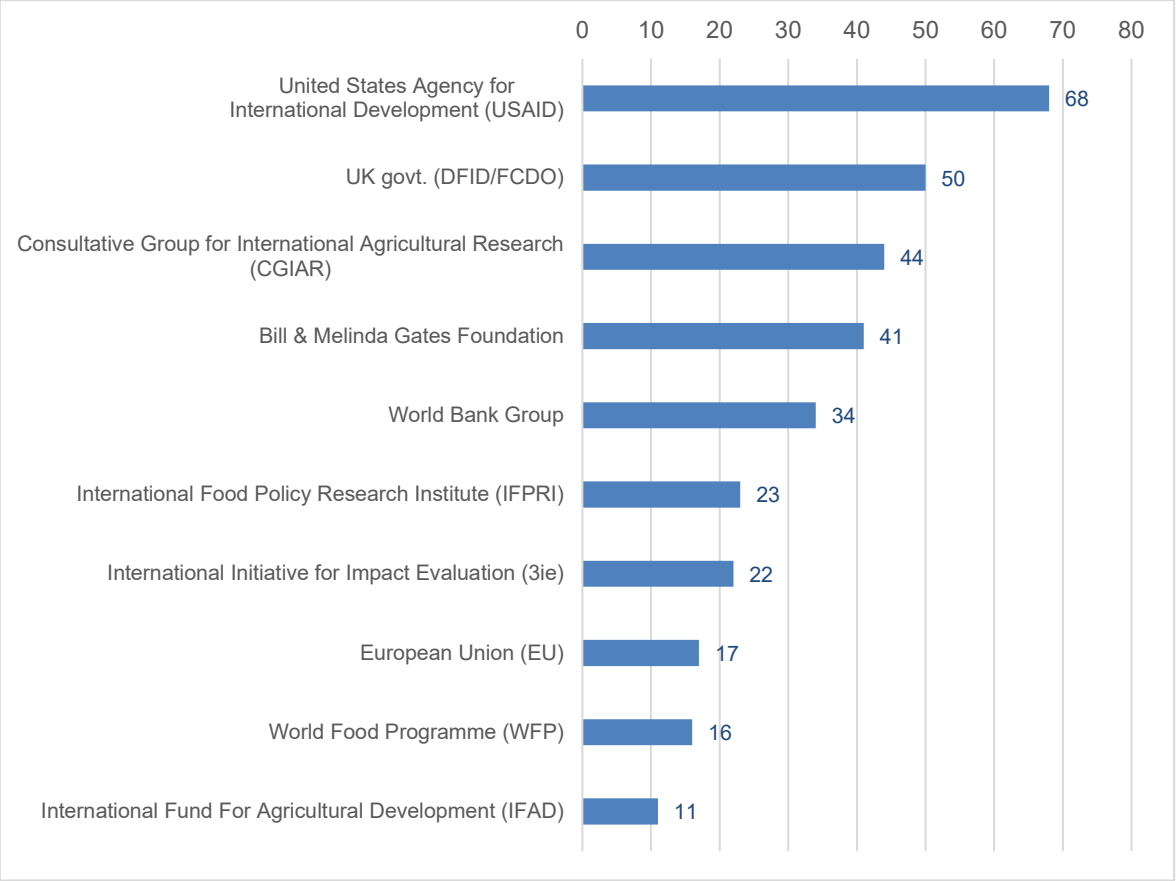
As FCDO prepares to embark on an initiative to fund impact evaluation research focused on the topics/countries covered in this EGM, it may be useful to have an understanding of the current funding landscape for this type of research. For example, FCDO may wish to explore

the research portfolios assembled by organisations that have been especially active in this space, or discuss lessons learned with personnel at these organisations who have managed relevant research initiatives. Facilitating such conversations could be a potential follow-on activity from this report.

A handful of research funding agencies have been particularly active in supporting impact evaluations in this area. USAID, FCDO,[2] CGIAR, and the Gates foundation have each funded at least 40 impact evaluations in our sample (Figure 6). Our data suggest FCDO in particular has been most active in Ethiopia with 17 evaluations and in Kenya with 15 evaluations (Appendix B, Figure B.3). Some less commonly studied countries have received particular attention from certain funders, such as the World Bank in Niger (n = 6) and the Gates Foundation in Nigeria (7 studies).

As of the time of writing, the funding landscape for effectiveness research in L&MICs is changing rapidly. The future status of USAID remains uncertain, and shifting funding priorities within the UK government may also affect FCDO's role in supporting effectiveness research in L&MICs. Taken together, recent trends suggest that, at least in the near term, funding from some of the biggest players in this space may diminish, resulting in larger research gaps unless other funders increase their activity to compensate.

Figure 6: Top research funders include USAID and FCDO

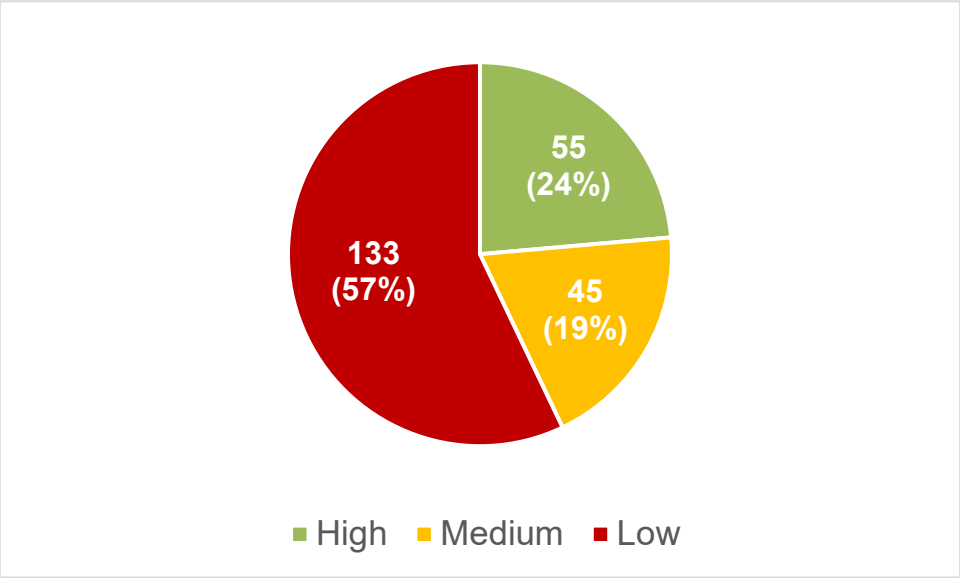


[2] For purposes of analysis, we have grouped together studies funded by FCDO with those funded by the former UK Department for International Development (DFID).

6. Most systematic reviews have major methodological limitations

All completed systematic reviews included in this EGM were appraised using a standardised checklist and assigned a rating of “low”, “medium”, or “high”, indicating our confidence in the review’s conclusions given how it was conducted. Of the 233 completed systematic reviews in our sample, nearly 60 per cent (n = 113) have received “low confidence” ratings, with the remainder split roughly equally between ratings of “medium” (n = 45; 19%) and “high” (n = 55, 24%).

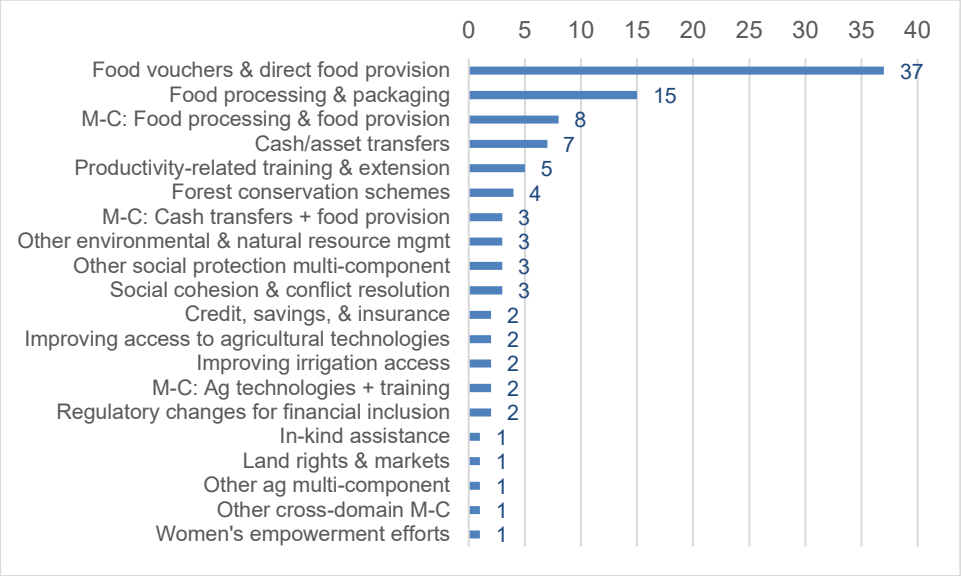
Figure 7: Most systematic reviews have received “low confidence” ratings



Many EGM reports provide a summary of findings contained in the high- and medium-confidence systematic reviews included in the map, as these provide the most trustworthy evidence about the most effective interventions for improving outcomes of interest. In other words, EGMs overall provide a good overview of where evidence does and does not exist; summarising rigorous SRs provides a good overview of what the evidence says about what is effective.

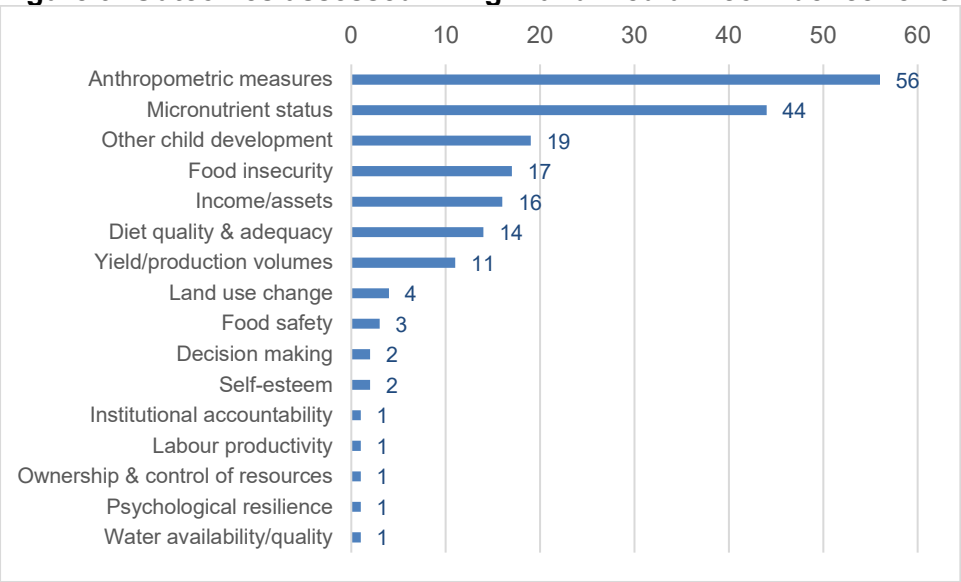
However, as this is a rapid map with a large number of such reviews (n=100), a summary of SR findings would be impractical. Instead we present the breakdown of high/medium confidence reviews by intervention (Figure 9) and by outcome (Figure 10). Summarising the findings on particular interventions or outcomes of interest contained across these SRs could be a potential follow-on activity from this report.

Figure 8: Interventions assessed in high- and medium-confidence reviews



Note: “M-C” stands for “multi-component” interventions.

Figure 9: Outcomes assessed in high- and medium-confidence reviews



7. There are potential synthesis gaps on agricultural training, irrigation, and access to credit.

Synthesis gaps occur when there is a cluster of impact evaluations all measuring the effect of a particular type of intervention on particular types of outcomes, but there is no recent, high-quality systematic review synthesising these primary studies. These areas would benefit from an effort to synthesise existing knowledge and provide actionable guidance based on the best available evidence.

Our map suggests there are several such clusters of evaluations. The following intervention-outcome combinations have at least 10 impact evaluations, but either no systematic reviews or only low-confidence reviews:

- Effect of agricultural productivity training on livelihood coping strategies (11 evaluations)
- Effect of irrigation access interventions on income/assets (10 evaluations)
- Effect of credit/savings/insurance on production volumes (11 evaluations)

Conclusions and implications

List of Gaps

- **Minimal evidence from a number of countries**
- Inadequate evidence on **women's empowerment interventions**
- Very little evidence on interventions and outcomes related to **infrastructure** and **resilience at the institutional level**
- Interventions and outcomes related to **environmental sustainability** have limited evidence.
- Interventions/outcomes on **livestock/pastoralist livelihoods are understudied** relative to crop production
- Research designs are **rarely equity-sensitive**

Overall applicability and quality of the evidence

The uneven distribution of the literature across intervention and outcome types constrains the use of rigorous evidence to promote resilience in a holistic way. Food security and resilience both comprise many facets that are interrelated, meaning that addressing particular facets without addressing others may have limited impact. While there exists a robust evidence base on some key components of resilience and food security – including agricultural production and nutrition – the limited evidence available for other facets – such as institutional stability, infrastructure, and livelihood diversification – limits the extent to which holistic approaches to building resilience can draw on rigorous evidence.

A limitation of the current evidence base is that many of the most frequently measured outcomes are best understood as plausible proxies for resilience, rather than direct measures of resilience per se. Resilience, and its component capacities, are latent properties that we observe only when shocks occur (Engle 2011; Barrett et al. 2021). Researchers sometimes observe major shocks in the course of a planned intervention (e.g., Smith and Frankenberger 2022 in Ethiopia) but such observations cannot necessarily be planned – the more a 'shock' can be planned for, the less likely it is that it would be experienced as a shock. Thus, understandably, we see many more studies that identify indicators or indices of resilience as outcomes – increases in assets, capitals (including human, social, and natural), or patterns of behaviour – that are connected by theory to adaptive capacities and that can be observed to some extent in a cross-section, or in ex-post statistical matching approaches (to observe differences in response to an observed shock).

These approaches depend on the theoretical link from observables through to latent resilience and adaptive capacities, which yet requires further empirical validation.

The distribution of evidence in this EGM – particularly the focus on Kenya and Ethiopia – suggests a 'streetlamp' effect may be at work. That is, these countries may have been the subject of so much research because they are where the greatest investments and progress have been made. Transhumant pastoralism – with seasonal movement across colonial land borders – is a critical component of both food systems resilience and food security in the Sahel region (Ayantunde et al. 2014). Regional bodies across the Sahel offer protocols for transhumance across land borders (ECOWAS in West Africa, since 1998; and IGAD in East Africa, since 2018), but the ways in which regional declarations have translated into rights and protections for pastoralists differs both across and within them.

Kenya, Ethiopia, and Tanzania have experienced the greatest international support for land governance, for example (Flintan, Robinson, and Bello 2021); while in Ghana, *fulani* herders still face expulsion in contravention of the ECOWAS regional protocol (Adzande 2019). Systems of rights and conflict management engage food system and resource user actors beyond pastoralists, whose own rights and power differ strongly according to place. Multi-layered, multi-actor 'messy' agreements on land tenure appear to be the most effective, with the implication that progress is complex and place specific. Together, these factors present a challenge to generalizing evidence elsewhere across the Sahel where place-specific conflicts remain.

Strengths and limitations of this EGM

Although this EGM was conducted rapidly, it benefits from the fact that it draws on existing work that was conducted according to recognised best practices for systematic evidence mapping. These previous EGMs all adopted systematic and rigorous methods for conducting comprehensive searches, identifying eligible studies, and categorising each study's interventions and outcomes. By combining insights from these EGMs, we gained a comprehensive understanding of the evidence base on resilience and food security from multiple perspectives.

Although this EGM has adopted a systematic approach, some limitations should be noted. Firstly, given the timeline and use case, this EGM did not conduct independent literature searches. The previous EGMs were all conducted in 2022 or after and so are relatively up to date, but our EGM may be missing some of the latest evidence.

This EGM also focuses exclusively on quantitative impact evaluations and systematic reviews that attribute effects to specific interventions. Other types of evidence, which might also be useful for policymakers, were excluded. Lastly, it does not include the effects of shocks or disasters on food systems, as these are not considered interventions but rather uncoordinated activities. While we recognise that understanding these effects could be valuable to policymakers, they fall outside the scope of the previous EGMs and thus were not included.

Implications for future research

Effectiveness studies on food security and resilience in these regions should set gender and equity at the core of their research designs, by collecting data that allows for meaningful subgroup analysis, measuring inequality-related outcomes, and adopting equity-sensitive analytical frameworks. For instance, it is important not to measure food security only at the household level, as there can be substantial intra-household disparities in access to food, particularly in the geographical areas covered in this EGM (De Vreyer and Lambert 2021; Coates et al. 2018; Akerele 2011).

Future research should prioritise evaluating interventions in understudied countries, particularly in the Middle East and across the Sahel Many countries in these regions have seen only minimal attention in the impact evaluation literature. These include most countries in the Middle East, as well as a number of countries across the Sahel (Chad, Mauritania, South Sudan, Sudan) and in the Horn of Africa (Djibouti, Eritrea). While evidence from other countries can provide some guidance for policy and programming initiatives in understudied countries, the most useful evidence will be context-specific. It is worth noting, in particular, that the recent regime change in Syria may heighten the need for evidence on effective strategies in this vulnerable situation. Increased global attention to Syria in the wake of the regime change may present a unique opportunity to generate some useful evidence.

Future research should aim to address the evidence gaps in institutional and environmental sustainability-focused interventions and outcomes. When looking at gaps for both interventions and outcomes, we see that the interventions targeted at institutional resilience, infrastructure investments, and environmental sustainability are underexplored. Likewise, related outcomes such as institutional accountability, local budget allocation, land use change, and water quality are also rarely measured. Expanding evidence in these areas can provide a broader understanding of long-term resilience and sustainable development.

There is a need to supplement research on crop production with additional research on livestock management and pastoral livelihoods. Our sample reveals a skewed focus in the agricultural literature towards crop production interventions and outcomes, with comparatively little attention given to livestock. Given the importance of pastoral livelihoods throughout the Middle East and Sahel, additional evidence is needed to guide design and delivery of interventions to support pastoralist communities.

Longer-term, higher-frequency data collection in impact evaluation is critical for providing true measures of transformative capacity and food security stability. Food security and resilience are areas of human-environment research where the need for longer-term, higher-engagement panel studies is critical and clear. A typical panel study conducted within a 3-4 year project might most easily observe ‘absorptive’ capacity in practice, as households weathered small-to-medium shocks differently, and possibly ‘adaptive’ capacity as well, as some experienced more significant shocks and responded with shifts to their homes, livelihoods, or patterns of consumption. However, ‘transformative’ capacity is much harder to observe, in part because it is a response to lower-likelihood, higher impact shocks (and less likely to happen within 1-2 survey waves), and in part because transformative

responses may remove respondents from a sample in a way that is challenging to manage in a short-term project (e.g., pastoral household settles into agriculture in different area).

Food security is similarly multidimensional (availability, access, utilization, and stability) and similarly hard to observe in typical impact evaluations. Availability, access, and nutritional quality can be highly variable over time, and the stability dimension of food security helps to characterize whether respondents face ambiguity or uncertainty around food, or simply variation (e.g., seasonal) that they can plan for. Higher-frequency measures provide demonstrably better signals of food security (Bell et al. 2021; 2019), while longer-term engagements increase the range of conditions captured by data, and thus external validity (Bell and Engelbert 2025).

Potential follow-on activities

The findings of this EGM suggest several possible areas of follow-on work that may support FCDO's decision making in the design of FCDO's future research investments.

- **Review of best practices for conducting equity-sensitive evaluations**: One of our key recommendations is that future research should adopt a deliberate equity lens to ensure that we are building the evidence base on how to reduce inequalities. Follow-on work could review established guidelines and recommendations (e.g., O'Neill et al. 2014; Morgan et al. 2016) and conduct interviews with experts on equity-sensitive research practices to ensure FCDO is well placed to incorporate current best practices into the design of a future research programme on this agenda.
- **Summarising findings from high- and medium-confidence systematic reviews on interventions or outcomes of interest**: We have identified above the intervention and outcome areas that have been covered in the most rigorous systematic reviews. Follow-on work could involve summarising the findings of reviews covering particular interventions or outcomes of interest. This would provide an overview of the most reliable evidence about the effects of particular interventions, and/or the most effective ways to improve particular outcomes. A caveat to this possible workstream is that the studies included in systematic reviews may have been conducted predominantly in geographical areas beyond those that would be the focus of a new FCDO programme; hence, the evidence these reviews contain may be limited in its contextual relevance.
- **Identifying and summarising the most geographically relevant evidence**: Our data give us insight into where impact evaluation research has and has not been conducted, at the country level. However, there is of course considerable heterogeneity within each country in terms of the contextual factors that may affect how resilience-focused interventions function. An area of follow-on work could therefore be to perform more detailed geographical classifications of studies included in the EGM, to identify those that take place in sub-national regions that are of greatest interest to FCDO when considering the geographical scope of a new programme. An analysis of these studies could be conducted to provide more fine-grained recommendations about evidence gaps for future FCDO research investments to prioritise than can be derived from our current country-level data.

- **Review of best practices for conducting rigorous impact evaluation research in fragile or conflict-affected settings**: It is likely that some of the places we have identified as critically understudied are understudied precisely because they present challenging contexts in which to conduct rigorous research. These challenges will be particularly acute for efforts, which we recommend, to conduct longer-term studies to effectively measure effects on resilience. Thus, follow-on work could review the published literature on best practices for conducting and managing high-quality research in these circumstances, along with key informant interviews of researchers and research commissioners with relevant experience.
- **Facilitating conversations with funders who have been active in this space**: This could involve reviewing the portfolios of major funders of impact evaluation research identified in this report to identify the most relevant work they have supported, and arranging structured conversations with these funders about lessons learned.

Acknowledgements

We are grateful to Tess Morris and Ellie Shillito at FCDO for useful guidance and feedback during the course of creating this EGM. We also wish to thank Diana Córdova-Arauz for excellent assistance with classifying included studies, and Maciej Respekta for invaluable assistance with creating the online map. Anil Thota and anonymous colleagues at IDRC provided useful feedback on a draft of this report, for which we are grateful.

References

Adzande, Patience. 2019. “Migration of Pastoralists in Africa: Reflections on Practical and Policy Implications.” *African Human Mobility Review* 5 (2). https://doi.org/10.14426/ahmr.v5i2.885.

Akerele, Dare. 2011. “Intra-Household Food Distribution Patterns and Calorie Inadequacy in South-Western Nigeria.” *International Journal of Consumer Studies* 35 (5): 545–51. https://doi.org/10.1111/j.1470-6431.2010.00981.x.

Assarkhaniki, Zahra, Abbas Rajabifard, and Soheil Sabri. 2020. “The Conceptualisation of Resilience Dimensions and Comprehensive Quantification of the Associated Indicators: A Systematic Approach.” *International Journal of Disaster Risk Reduction* 51 (December):101840. https://doi.org/10.1016/j.ijdrr.2020.101840.

Ayantunde, Augustine A., Rainer Asse, Mohammed Y. Said, and Abdou Fall. 2014. “Transhumant Pastoralism, Sustainable Management of Natural Resources and Endemic Ruminant Livestock in the Sub-Humid Zone of West Africa.” *Environment, Development and Sustainability* 16 (5): 1097–1117. https://doi.org/10.1007/s10668-014-9515-z.

Barrett, Christopher B., and Mark A. Constas. 2014. “Toward a Theory of Resilience for International Development Applications.” *Proceedings of the National Academy of Sciences* 111 (40): 14625–30. https://doi.org/10.1073/pnas.1320880111.

Barrett, Christopher B., Kate Ghezzi-Kopel, John Hoddinott, Nima Homami, Elizabeth Tennant, Joanna Upton, and Tong Wu. 2021. “A Scoping Review of the Development Resilience Literature: Theory, Methods and Evidence.” *World Development* 146 (October):105612. https://doi.org/10.1016/j.worlddev.2021.105612.

Bell, Andrew Reid, and Mark Engelbert. 2025. “When Does New Information Encourage Adoption, and Where Can We Observe It: A Synthesis of 3ie’s Thematic Window on Agricultural Innovation.” *Forthcoming in World Development Perspectives*.

Bell, Andrew Reid, Mari Roberts, Kathryn Grace, Alexander Morgan, Md Ehsanul Haque Tamal, Mary E Killilea, and Patrick S Ward. 2021. “How High Frequency Food Diaries Can Transform Understanding of Food Security.” *Environmental Research Letters* 16 (4): 041002. https://doi.org/10.1088/1748-9326/abe674.

Bell, Andrew Reid, Patrick Ward, Md. Ehsanul Haque Tamal, and Mary Killilea. 2019. “Assessing Recall Bias and Measurement Error in High-Frequency Social Data Collection for Human-Environment Research.” *Population and Environment* 40 (3): 325–45. https://doi.org/10.1007/s11111-019-0314-1.

Ben Mimoune, Nejla and El Shehaby, Hana. 2023. “Breaking the Cycle: How Can the MENA Region Tackle Food Insecurity?” *Middle East Council on Global Affairs* (blog). February 28, 2023. https://mecouncil.org/publication/food-insecurity-in-the-middle-east-and-north-africa/.

Berretta, Miriam, Sanghwa Lee, Meital Kupfer, Carolyn Huang, Will Ridlehoover, Daniel Frey, Faez Ahmed, et al. 2023. “Strengthening Resilience against Shocks, Stressors and Recurring Crises in Low- and Middle-Income Countries: An Evidence Gap Map.” Evidence Gap Map 23. New Delhi: International Initiative for Impact Evaluation (3ie). https://developmentevidence.3ieimpact.org/egm/building-resilient-societies-in-low-and-middle-income-countries-an-evidence-gap-map.

Boyd, Emily, Rosalind J. Cornforth, Peter J. Lamb, Aondover Tarhule, M. Issa Lélé, and Alan Brouder. 2013. “Building Resilience to Face Recurring Environmental Crisis in African Sahel.” *Nature Climate Change* 3 (7): 631–37. https://doi.org/10.1038/nclimate1856.

Coates, Jennifer, Bryan N. Patenaude, Beatrice Lorge Rogers, Alemzewed Challa Roba, Yitbarek Kidane Woldetensay, Addisalem Fikre Tilahun, and Kathryn L. Spielman. 2018. “Intra-Household Nutrient Inequity in Rural Ethiopia.” *Food Policy* 81 (December):82–94. https://doi.org/10.1016/j.foodpol.2018.10.006.

Constas, Mark A., Timothy R. Frankenberger, and John Hoddinott. 2014. “Resilience Measurement Principles: Toward an Agenda for Measurement Design.” Resililence Measurement Technical Working Group 1. Food Security Information Newwork. https://www.fsinplatform.org/sites/default/files/paragraphs/documents/FSIN_TechnicalSeries_1.pdf.

De Vreyer, Philippe, and Sylvie Lambert. 2021. “Inequality, Poverty, and the Intra-Household Allocation of Consumption in Senegal.” *The World Bank Economic Review* 35 (2): 414–35. https://doi.org/10.1093/wber/lhz052.

Desmidt, Sophie, Oriol Puig, Adrien Detges, Pia Van Ackern, and Fabien Tondel. 2021. “Climate Change and Resilience in the Central Sahel.” European Centre for Development Policy Management. https://doi.org/10.55317/CASC011.

Engelbert, Mark, Zafeer Ravat, Katherine Quant, Maciej Respekta, Fiona Kastel, Carolyn Huang, Dan Frey, et al. 2023. “Agriculture-Led Growth in Low- and Middle-Income Countries: An Evidence Gap Map.” Evidence Gap Map 26. New Delhi: International Initiative for Impact Evaluation (3ie). https://developmentevidence.3ieimpact.org/egm/agriculture-led-growth-in-low-and-middle-income-countries-an-evidence-gap-map.

Engle, Nathan L. 2011. “Adaptive Capacity and Its Assessment.” *Global Environmental Change* 21 (2): 647–56. https://doi.org/10.1016/j.gloenvcha.2011.01.019.

Flintan, Fiona, Lance Robinson, and Mary Allen Bello. 2021. “A Review of Tenure and Governance in the Pastoral Lands of East and West Africa.” SPARC. https://www.sparc-knowledge.org/publications-resources/review-tenure-and-governance-pastoral-lands-east-and-west-africa.

Grist, Natasha, Beatrice Mosello, Rebecca Roberts, and Lyndsay Mclean Hilker. 2014. “Resilience in the Sahel: Building Better Lives with Children.” London: ODI. https://media.odi.org/documents/9369.pdf.

Holling, C. S. 2001. “Understanding the Complexity of Economic, Ecological, and Social Systems.” *Ecosystems* 4 (5): 390–405. https://doi.org/10.1007/s10021-001-0101-5.

Läderach, Peter, Julian Ramirez-Villegas, Steven D. Prager, Diego Osorio, Alexandra Krendelsberger, Robert B. Zougmoré, Bruno Charbonneau, Han van Dijk, Ignacio Madurga-Lopez, and Grazia Pacillo. 2021. “The Importance of Food Systems in a Climate Crisis for Peace and Security in the Sahel.” *International Review of the Red Cross* 103 (918): 995–1028. https://doi.org/10.1017/S1816383122000170.

Linkov, Igor, Benjamin D. Trump, Kelsey Poinsatte-Jones, Patrick Love, William Hynes, and Gabriela Ramos. 2018. “Resilience at OECD: Current State and Future Directions.” *IEEE Engineering Management Review* 46 (4): 128–35. https://doi.org/10.1109/EMR.2018.2878006.

McGuirk, Eoin, and Nathan Nunn. 2020. “Transhumant Pastoralism, Climate Change, and Conflict in Africa.” *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3753152.

Morgan, Rosemary, Asha George, Sarah Ssali, Kate Hawkins, Sassy Molyneux, and Sally Theobald. 2016. “How to Do (or Not to Do)… Gender Analysis in Health Systems Research.” *Health Policy and Planning* 31 (8): 1069–78. https://doi.org/10.1093/heapol/czw037.

O’Neill, Jennifer, Hilary Tabish, Vivian Welch, Mark Petticrew, Kevin Pottie, Mike Clarke, Tim Evans, et al. 2014. “Applying an Equity Lens to Interventions: Using PROGRESS Ensures Consideration of Socially Stratifying Factors to Illuminate Inequities in Health.” *Journal of Clinical Epidemiology* 67 (1): 56–64. https://doi.org/10.1016/j.jclinepi.2013.08.005.

Smith, Lisa C., and Timothy R. Frankenberger. 2022. “Recovering from Severe Drought in the Drylands of Ethiopia: Impact of Comprehensive Resilience Programming.” *World Development* 156 (August):105829. https://doi.org/10.1016/j.worlddev.2022.105829.

Snilstveit, Birte, Raag Bhatia, Kristen Rankin, and Beryl Leach. 2017. “3ie Evidence Gap Maps: A Starting Point for Strategic Evidence Production and Use.” Working Paper 28. New Delhi: International Initiative for Impact Evaluation (3ie). http://3ieimpact.org/evidence-

hub/publications/working-papers/3ie-evidence-gap-maps-starting-point-strategic-evidence.

Snilstveit, Birte, Martina Vojtkova, Ami Bhavsar, Jennifer Stevenson, and Marie Gaarder. 2016. “Evidence & Gap Maps: A Tool for Promoting Evidence Informed Policy and Strategic Research Agendas.” *Journal of Clinical Epidemiology* 79 (November):120–29. https://doi.org/10.1016/j.jclinepi.2016.05.015.

Storhaug, Ingunn, Mark Engelbert, Diana Córdova-Arauz, Charlotte Lane, Heike B. Rolker, Nick Moore, Veronika Tree, and Birte Snilstveit. 2024. “The Evidence on Food Systems and Nutrition: Insights from a Living Evidence and Gap Map.” Evidence Gap Map. New Delhi: International Initiative for Impact Evaluation (3ie). https://developmentevidence.3ieimpact.org/egm/food-systems-and-nutrition-evidence-gap-map.

Tesfaye, Beza. 2022. “Climate Change and Conflict in the Sahel.” 11. Discussion Paper Series on Managing Global Disorder. New York: Council on Foreign Relations: Center for Preventive Action. https://www.cfr.org/report/climate-change-and-conflict-sahel.

UN OCHA. 2024. “Sahel Dashboard: Humanitarian Overview.” United Nations Office for the Coordination of Humanitarian Affairs. July 30, 2024. https://www.unocha.org/publications/report/nigeria/sahel-dashboard-humanitarian-overview-30-july-2024.

WFP. 2024. “Month of Fasting Begins in the Middle East as the Region Grapples with Unprecedented Hunger | World Food Programme.” World Food Program. March 11, 2024. https://www.wfp.org/news/month-fasting-begins-middle-east-region-grapples-unprecedented-hunger.

WHO. 2024. “Drought and Food Insecurity in the Greater Horn of Africa.” World Health Organization. July 30, 2024. https://www.who.int/emergencies/situations/drought-food-insecurity-greater-horn-of-africa.

World Bank. 2023. “Food System Resilience in the Middle East and North Africa.” World Bank. September 18, 2023. https://www.worldbank.org/en/news/immersive-story/2023/09/18/food-system-resilience-in-the-middle-east-and-north-africa.

———. n.d. “What Is Food Security? There Are Four Dimensions.” Text/HTML. World Bank. Accessed December 4, 2024. https://www.worldbank.org/en/topic/agriculture/brief/food-security-update/what-is-food-security.

Yavuz, Cem, Paul Fenton Villar, Miriam Berretta, Ashiqun Nabi, Chris Cooper, and Shannon Shisler. 2022. “Improving Food Security in Humanitarian Emergencies: An Evidence Gap Map.” Evidence Gap Map. New Delhi: International Initiative for Impact Evaluation (3ie). https://developmentevidence.3ieimpact.org/egm/food-security-in-humanitarian-settings-egm.