

Etienne Lwamba
Ingunn Storhaug
Dr Suvarna Pande
Pierre Marion
Diana Cordova-Aruaz
Dr Shannon Shisler
Dr Esteban J Quiñones
Dr Cornelia Roemling
Anna Sting

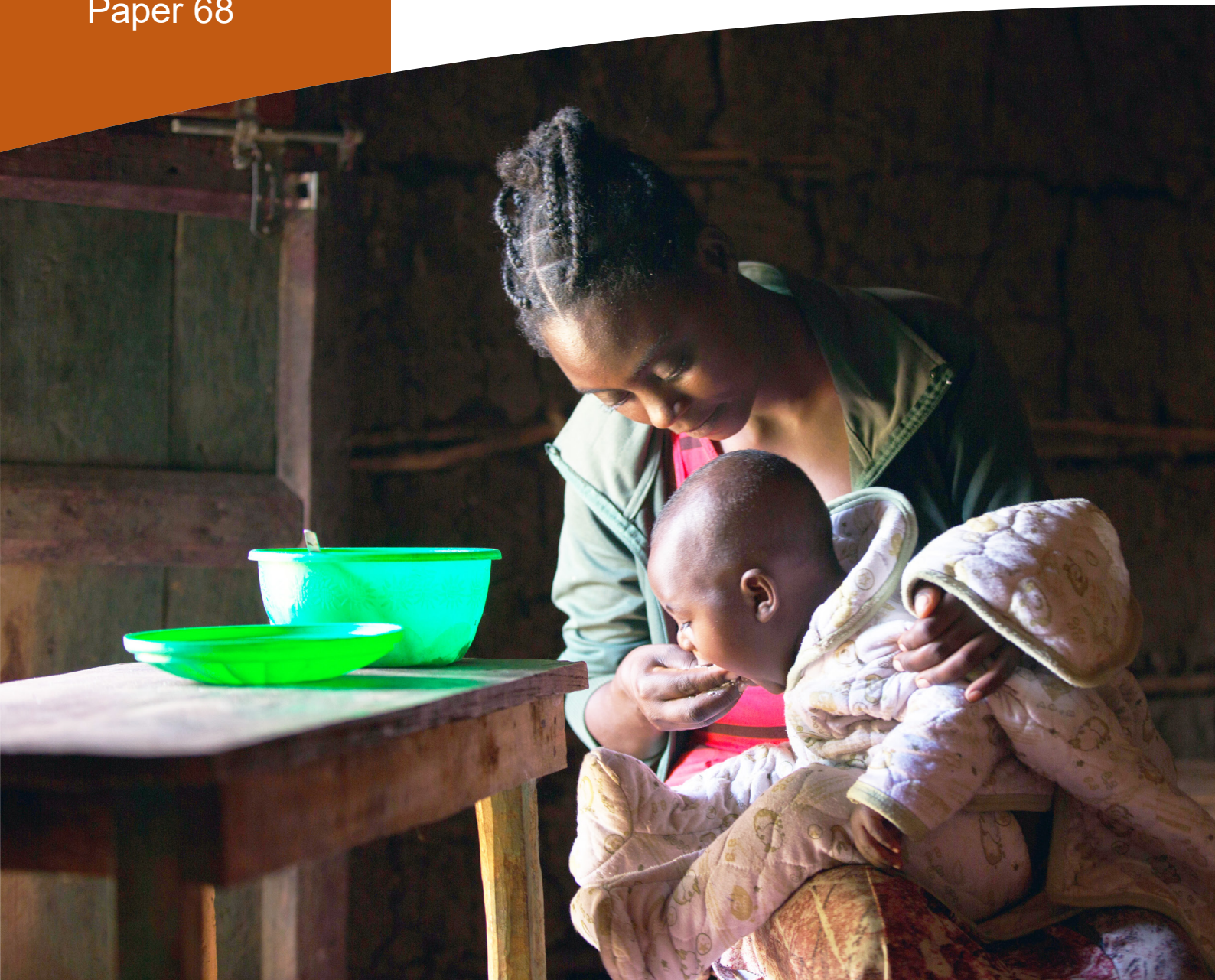
Development cooperation for food security and nutrition

Rapid evidence assessment on the effects of information, capacity strengthening, and behaviour change interventions on food security, nutrition, and environmental food system resilience in Sub-Saharan Africa

February 2026

Working
Paper 68

Health



International
Initiative for
Impact Evaluation



DEval

DEUTSCHES
EVALUIERUNGSMITTEL
DER ENTWICKLUNGS-
ZUSAMMENARBEIT

About 3ie

The International Initiative for Impact Evaluation (3ie) develops evidence on effectively transforming the lives of people experiencing poverty in low- and middle-income countries. Established in 2008, we offer comprehensive support and diverse approaches to achieve development goals by producing, synthesising, and promoting the uptake of impact evaluation evidence. We work closely with governments, foundations, NGOs, development institutions and research organisations to address their decision-making needs. With offices in Washington DC, New Delhi, and London, as well as a global network of leading researchers, we offer deep expertise across our extensive menu of evaluation services.

About this report

This report provides a summary of the evidence available on the effects of development cooperation on food and nutrition security. It presents new insights into the findings of the living Food Systems and Nutrition Evidence and Gap Map, which was initially commissioned by the German Federal Ministry for Economic Cooperation and Development, through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Knowledge for Nutrition Programme. It also presents a rapid evidence assessment that aims to synthesise and appraise the evidence available on the effects of information, capacity strengthening, and behaviour change interventions on food security, nutrition, and environmental food system resilience in Sub-Saharan Africa. The German Institute for Development Evaluation (DEval) commissioned this report within the framework of its multi-annual work programme 2024–2026.

The content of this report is the sole responsibility of the authors and does not represent the opinions of 3ie, its donors, its Board of Commissioners, or DEval. Any errors and omissions are also the sole responsibility of the authors. Please direct any comments or queries to the corresponding author, Etienne Lwamba, at elwamba@3ieimpact.org.

Suggested citation: Lwamba, Etienne, Ingunn Storhaug, Suvarna Pande, Pierre Marion, Diana Cordova-Aruaz, Shannon Shisler, Esteban J Quiñones, Cornelia Roemling, and Anna Sting. 2026. *Development cooperation for food security and nutrition: Rapid evidence assessment on the effects of information, capacity strengthening, and behaviour change interventions on food security, nutrition, and environmental food system resilience in Sub-Saharan Africa*. Working Paper 68, London: International Initiative for Impact Evaluation (3ie). Available at: <http://doi.org/10.23846/WP0068>

Technical editor: Birte Snilstveit
Publications and web design: Akarsh Gupta
Production manager: Mallika Rao

Cover: UNICEF Ethiopia

© International Initiative for Impact Evaluation (3ie), 2026

Development cooperation for food security and nutrition: Rapid evidence assessment on the effects of information, capacity strengthening, and behaviour change interventions on food security, nutrition, and environmental food system resilience in Sub-Saharan Africa

Etienne Lwamba

International Initiative for Impact Evaluation (3ie)

Ingunn Storhaug

3ie and University of East Anglia

Dr Suvarna Pande

3ie and University of East Anglia, School of Global Development

Pierre Marion

3ie and University of Sussex, Business School, Economics Department

Diana Cordova-Aruaz

3ie

Dr Shannon Shisler

3ie

Dr Esteban J Quiñones

3ie

Dr Cornelia Roemling

German Institute for Development Evaluation (DEval)

Anna Sting

DEval

Working Paper 68

February 2026



Acknowledgements

We are grateful to 3ie and DEval colleagues who provided inputs at various stages of the rapid evidence assessment, including the protocol, and supported its administrative, communication, and finance management.

We are particularly grateful to Carolin Wicke, Laura Kunert, Isabel Mank and Amélie zu Eulenburg for their input during the production of this review.

We also express our gratitude to the team of research assistants who supported the data extraction and analysis of this report: Alejandra Paz Rivera Vicencio, Dina Youssef, Jaweriah Hazrana, Manzura Jumaniyazova, Sona Sarin, and Yvan Audrey Kamdem.

We acknowledge and appreciate the contribution of the advisory group for this evidence and gap map and rapid evidence assessment (protocol): Berber Kramer (Senior Research Fellow at IFPRI), Charlotte Coogan (Evaluation and Learning Consultant), Mphumuzi Sukati (Senior Food and Nutrition Officer in the FAO Regional Office for Africa), Geeta Sethi (Advisor at the World Bank), Isaac Gershon Kodwo Ansah (Senior Lecturer at the University for Development Studies), Jessica Fanzo (Professor at Columbia University), Liangzhi (Liang) You (Research Fellow at IFPRI), John M. Ulimwengu (Research Fellow at IFPRI), Ujjwal KC (Research Fellow at the University of Melbourne), Marie Ruel (Director at IFPRI), Nitya Rao (Professor at University of East Anglia), Philomena Orji (Programme Director at Helen Keller International), Mary Wernitz (Former Deputy Director of Operations at the International Committee of the Red Cross), Richard Morgan (Programme Director at Nutrition International), Saul Morris (Director of Programme Services at Global Alliance for Improved Nutrition), Simon Levine (Senior Research Fellow at the Overseas Development Institute), Thalia Sparling (Assistant Professor at the London School of Hygiene and Tropical Medicine), and Tim Frankenberg (President at Tango International).

We also acknowledge and appreciate the contributions and comments of the independent reviewers.

Summary

Background

Climate change and environmental crises are significant drivers of food insecurity and malnutrition in Sub-Saharan Africa (SSA), a region already facing severe challenges to its food system. Environmental risks and crises in the region threaten the six pillars of food security and nutrition (availability, access, utilisation, stability, agency, and sustainability) through rising temperatures, erratic rainfall, and extreme weather events. These risks and crises disproportionately affect vulnerable groups, including smallholder farmers, women, and children. Despite global commitments, including Sustainable Development Goal 2 and the African Union Malabo target to end hunger in Africa by 2025, progress remains off track.

However, building resilience through information, capacity strengthening, and behaviour change (ICSBC) interventions offers a promising solution. These approaches empower food system actors with the knowledge, skills, and motivation to adopt climate-resilient practices. Operating across the production system, food environment, and consumer behaviour domains, such interventions may create enabling conditions for sustainable change. By fostering interconnected pathways for transformation, they may enhance food system resilience and promote improved food security and nutrition outcomes across SSA.

Objectives

Despite the potential of ICSBC interventions to improve food security and nutrition in SSA, there is a lack of rigorous evidence to guide action. This mixed-methods, rapid evidence assessment addresses the gap by building on primary studies from the 3ie Food Systems and Nutrition Evidence and Gap Map. It synthesises quantitative impact evaluations through meta-analyses and complements them with qualitative evidence to analyse how ICSBC interventions may enhance food system resilience. The assessment investigates three key questions:

1. What are the effects of ICSBC interventions on food and nutrition security outcomes in SSA?
2. How do these interventions enhance the resilience of African food systems against climate change risks and crises?
3. Do effects systematically vary by a moderator such as context, intervention features, group vulnerability, or others?

The findings offer policy-relevant evidence to inform the design, delivery, and assessment of effective food system interventions. This work supports progress towards Sustainable Development Goals 2 (Zero Hunger) and 17 (Partnerships for the Goals) by promoting the use of evidence for resilient, equitable food systems across SSA.

Method

This rapid evidence assessment uses the Food Systems and Nutrition Evidence and Gap Map as its main evidence base. Developed by GIZ and updated until July 2024, the map includes over 3,000 studies (2,978 impact evaluations and 239 systematic reviews). In our assessment, we selected a subset of studies on ICSBC interventions and analysed their effect on food security and nutrition in SSA. Following the standards of systematic reviews, we established a participants, interventions, comparisons, outcomes, and study design

(PICOS) framework, applied clear eligibility criteria, and focused on studies from the year 2000 onwards. The studies cover both experimental and qualitative designs.

We assessed the methodological rigour of all quantitative and qualitative studies using 3ie's risk-of-bias and qualitative critical appraisal tools. When data permitted, we conducted meta-analyses and moderator analyses. We also gathered qualitative evidence from descriptive studies and qualitative evaluations to explore the contribution of ICSBC interventions to food system resilience.

Main results

Our rapid evidence assessment comprises 53 quantitative impact evaluations, 20 mixed-methods, qualitative, and process evaluations, and 63 descriptive documents, spanning 53 programmes in 20 SSA countries. While the available evidence provided valuable insights, it also revealed significant limitations and uneven distribution. A substantial concentration of studies focus on *food supply* interventions, with notable gaps in *the food environment* and *consumer behaviour* domains. While all studies measure intervention effects on food security and nutrition, the indicators used among the studies are not evenly distributed across the six pillars of food security and nutrition, with smaller bodies of evidence examining *food agency, stability, and sustainability*.

Our meta-analyses showed promising patterns across intervention domains, indicating that ICSBC interventions primarily support food security and nutrition in SSA, although with nuanced results that should inform funding decisions. While several interventions consistently support food security and nutrition through ICSBC in SSA, their effectiveness largely depends on how well they are adapted to local realities, vulnerabilities, and implementation conditions.

Promising interventions showing statistically significant and positive effects include:

- *Food supply* interventions
 - *Farmer field schools* to improve *food availability, access, diversity, sustainability, and aggregated food security and nutrition*
 - *Agricultural extension services* to increase *food availability, access, diversity, and sustainability*
 - *Workshops and short trainings* to improve *food agency*
 - *Peer-to-peer learning* to increase *food agency and aggregated food security and nutrition*
- *Consumer behaviour* interventions
 - *Peer support and counsellors* for *food agency and aggregated food security and nutrition*
 - *Classes* to improve *aggregated food security and nutrition*
 - *Community meetings* for *food access, food diversity, and food agency*
 - *Healthy food social marketing campaigns* to enhance *food diversity*
- *Food environment* interventions
 - *Storage and distribution capacity strengthening* to improve *food availability and access*

However, the size and consistency of these effects often varied according to contextual factors. The moderator analyses highlighted that contextual factors strongly influence the

effectiveness of these interventions. Geographical settings, socio-political conditions, and environmental vulnerability emerged as critical moderators of impact. Implementation factors also proved decisive, with intervention timing, exposure duration, and specific design elements (e.g., multi-component approaches such as cash transfers) significantly affecting outcomes.

The qualitative analysis highlighted that ICSBC interventions in SSA have the potential to contribute not only to food security and nutrition but also to the development of foundational pathways for food system resilience. By embedding their activities within local environmental and climatic contexts, these interventions could support communities in managing environmental risks through adaptive measures such as livelihood diversification and flexible delivery models. Targeting structural inequalities and resource constraints can enable ICSBC interventions to empower marginalised populations, enhance equitable access to resources and decision-making, and harness local knowledge to strengthen adaptive capacities.

Furthermore, ICSBC interventions that fostered multi-stakeholder collaboration, transparency, and trust emerged as enablers of systemic change, supporting both immediate outcomes and long-term resilience. Designing interventions with explicit consideration of the building blocks of food system resilience—such as: (1) *agency* (empowering individuals and communities with decision-making power and resources in the food system through inclusive and accountable approaches to strengthen their ability to cope with external shocks); (2) *buffering* (establishing reserves, infrastructures, and livelihoods to absorb shocks); (3) *connectivity* (enhancing linkages to support a coordinated response to shocks); and (4) *diversity* (building pluralism across production, consumption, ecological systems, and markets to reduce single-point failures and ensure self-regulating and sustainable food systems)—can further enhance their potential to drive systemic transformation by aligning short-term benefits on food security and nutrition with sustainable, context-sensitive strategies contributing to longer-term resilience.

Implications for policymakers and implementers

- **Prioritise interventions that work for the targeted food security and nutrition pillars.** Interventions such as *agricultural extension services, farmer field schools, peer-to-peer learning groups, nutrition, storage and distribution capacity strengthening, and community-based meetings* demonstrated positive effects on different pillars, including food availability, access, utilisation, and agency. These interventions should serve as foundational programming, particularly where they have shown statistically significant effects across diverse SSA contexts.
- **Design interventions around specific food-security entry points and adapt them to local vulnerabilities.** In the absence of an intervention that works across contexts and outcomes, implementers must strategically align intervention types with specific food security and nutrition pillars based on the needs of target populations and contexts. This requires moving beyond generalised programming by deliberately matching interventions to address the most pressing local challenges and building food security and nutrition through the specific targeting of these pillars.

- **Do not only look at what works, ask ‘for whom?’** The effectiveness of ICSBC interventions depends not only on the type of intervention but also on who participates and benefits from it. Evidence suggests that inclusive, participatory, and targeted design, wherein women, youth, and low-income and rural communities are specifically targeted and meaningfully involved in intervention planning and delivery, may lead to increased success.

Programmes that draw on local knowledge systems, honour traditional food practices, and build community ownership can generate more relevant, trusted, and sustainable results. This is particularly important for historically underserved groups, where power imbalances and structural barriers often reduce access to food system benefits. A human rights-based approach that centres these groups not only improves equity, but strengthens resilience by ensuring that those most vulnerable to shocks are better supported.

- **Embed resilience as a dynamic, systemic goal rather than a fixed outcome.** Building food system resilience requires more than the delivery of technical solutions or an increase in short-term outputs. It involves fostering social, institutional, and ecological capacities that can adapt to shocks and stressors over time. Interventions that promote trust-building, institutional accountability, and inclusive governance are especially important in contexts of environmental fragility or political instability in SSA.

Consideration for building blocks of resilience, such as *agency*, *buffering*, *connectivity*, and *diversity*, can be an entry point towards food system resilience. For example, the effectiveness of interventions is often moderated by timing and external disruptions, such as floods or droughts, emphasising the need for programmes that are flexible, adaptive, and grounded in local realities. Resilience-building must, therefore, be seen as an ongoing, whole-of-system process, with consideration of structural inequalities (e.g., those related to gender, geography, or poverty) explicitly addressed within programme design.

- **Enhance intervention effectiveness through integration, timing, and responsive delivery.** ICSBC interventions can increase their effect through the provision of tangible support, such as seeds, microcredit, or infrastructure. This dual approach addresses both the knowledge gaps and material constraints that often limit uptake or sustainability, especially among vulnerable populations. Furthermore, intervention timing is crucial and requires consideration of agricultural cycles or periods of environmental stress.

Implementers should also invest in culturally and linguistically appropriate communication to ensure that messages resonate with diverse audiences. Finally, strengthening coordination between actors and across sectors, particularly through multi-stakeholder, locally led approaches, can reinforce systems-wide effects and long-term resilience gains.

Implications for researchers

- **Address evidence and geographical gaps, with a focus on vulnerable populations and underrepresented interventions.** Research remains concentrated on *food supply* interventions, with limited coverage of *consumer*

behaviour and *food environment* strategies. There is also a geographical imbalance, with countries facing high food insecurity and environmental risk (e.g., Somalia, the Democratic Republic of the Congo, Niger) underrepresented in the evidence base. Researchers should prioritise these gaps, ensuring new studies consider the needs of women, youth, and marginalised actors in the food system. Targeting these areas will expand the relevance of the evidence base and support more inclusive and effective policy and programming.

- **Enhance study design rigour and employ mixed methods to gain a deeper understanding of what works and for whom.** A large proportion of studies in the current evidence base suffer from a high risk of bias or methodological limitations. To strengthen confidence in results, future research should prioritise robust methodologies while reducing contamination and spillover effects.

At the same time, integrating qualitative insights is essential for capturing contextual and implementation dynamics that shape outcomes. Mixed-methods approaches enable a deeper understanding of intervention mechanisms, barriers to uptake, and the role of trust, power, and local capacity in shaping resilience. Studies should also incorporate heterogeneity analyses to explicitly examine differential outcomes for women, youth, and other vulnerable groups.

- **Track long-term impacts and resilience outcomes through longitudinal and systems-aware approaches.** Short-term evaluations often overlook evidence on how interventions impact resilience over time. Future research should include longitudinal designs that follow participants from baseline through multiple years post-intervention, particularly to observe effects under different environmental conditions. Additionally, outcome measurement must expand beyond food access and utilisation to systematically include agency, sustainability, and stability—pillars central to resilient food systems. Researchers should also clearly document intervention components, delivery contexts, and enabling factors to facilitate synthesis, learning, and uptake. Contributing to and updating evidence gap maps will ensure findings remain accessible and relevant as climate and food system dynamics evolve.

Contents

Acknowledgements	i
Summary	ii
List of figures and tables	viii
Acronyms	ix
Glossary	x
1. Background	1
1.1 The issue: food security and nutrition in Sub-Saharan Africa.....	1
1.2 A solution: Information, capacity strengthening, and behaviour change interventions..	2
1.3 Aims and objectives of the rapid evidence assessment	6
2. Methods	6
2.1 Studies selection	6
2.2 Data extraction and analysis.....	8
3. Characteristics of the available evidence	9
3.1 Search results	9
3.2 Quality of the included evidence	10
3.3 State of evidence.....	12
4. Methodological limitations	17
5. Quantitative analysis of the effects of interventions: What works?	18
5.1 Food availability.....	18
5.2 Food access	20
5.3 Food utilisation	25
5.4 Food stability	30
5.5 Food agency.....	32
5.6 Food sustainability.....	34
5.7 Aggregated food security and nutrition	36
5.8 Discussion: What works and for whom when building food security and nutrition through ICSBC interventions in SSA.....	39
6. Qualitative analysis of the contribution of ICSBC interventions to food system resilience in SSA	42
6.1 Synthesis of qualitative analytical themes.....	43
6.2 Discussion: building resilience in SSA food systems through ICSBC interventions....	55
7. Conclusion	57
7.1 Summary of findings: What works to support food security and nutrition and build resilience through ICSBC interventions in SSA.....	57
7.2 Implications for policymakers and researchers	59
Online appendices	65
References	66

List of figures and tables

Figure 1: The six pillars of food security and nutrition.....	1
Figure 2: Theory of change of ICSBC interventions in environmentally vulnerable and shock-prone settings in SSA	5
Figure 3: PRISMA diagram	10
Figure 4: Risk of bias of included estimates	11
Figure 5: Summary of overall critical appraisal ratings of included primary qualitative studies, process evaluations, and mixed-methods studies (n = 20).....	12
Figure 6: Number of quantitative IEs identified by year of publication.....	13
Figure 7: Map of studies by country	16
Figure 8: What works for food security and nutrition through ICSBC in SSA	40
Table 1: Potential contribution of ICSBC interventions to food security and nutrition in the context of environmental risks and crises	3
Table 2: Summary of criteria determining study eligibility for the REA.....	7
Table 3: Distribution of quantitative IEs by intervention-outcome pairing.....	15
Table 4: Summary of meta-analysis results: effect of ICSBC interventions on food availability	19
Table 5: Summary of moderator analysis results: effect of ICSBC interventions on food availability.....	20
Table 6: Summary of meta-analysis results: effect of ICSBC interventions on food access. 22	
Table 7: Summary of moderator analysis results: effect of ICSBC interventions on food access	23
Table 8: Summary of meta-analysis results: effect of ICSBC interventions on food diversity26	
Table 9: Summary of moderator analysis results: effect of ICSBC interventions on food diversity	27
Table 10: Summary of meta-analysis results: effect of ICSBC interventions on anthropometric outcomes	29
Table 11: Summary of meta-analysis results: effect of ICSBC interventions on food stability	31
Table 12: Summary of meta-analysis results: effect of ICSBC interventions on food agency	33
Table 13: Summary of meta-analysis results: effect of ICSBC interventions on food sustainability.....	35
Table 14: Summary of meta-analysis results: effect of ICSBC interventions on aggregated food security and nutrition.....	38

Acronyms

AGRA	Alliance for Green Revolution in Africa programme
EGM	Evidence and gap map
FSN EGM	Food systems and nutrition evidence and gap map
GRADE	Grading of recommendations, assessment, development, and evaluation
GVI	GDL Vulnerability Index
ICSBC	Information, capacity strengthening, and behaviour change
IE	Impact evaluation
PICOS	Participants, interventions, comparisons, outcomes, study design
REA	Rapid evidence assessment
SR	Systematic review
SSA	Sub-Saharan Africa
WRI	World Risk Index

Glossary

Anaemia	A condition in which someone has too few red blood cells or not enough haemoglobin, which can cause tiredness or weakness.
Anthropometrics	Analyses of a person's body size, shape, and composition. These usually involve measuring height, weight, and arm circumference to help understand someone's nutritional status and overall growth or health.
Capabilities	Skills and knowledge that are shared and developed among people working in the food system (e.g., farmers, sellers, consumers).
Evidence gap map	A visual tool that shows where research exists and where more is needed.
Exposure	The period in which people are involved in or affected by an intervention, programme, or project.
Follow up	The time between the end of the intervention and the start of the measurement of the outcomes.
Food access	The ability to obtain enough healthy food using physical and economic resources, without having to give up other basic needs such as housing or healthcare.
Food agency	The capacity of individuals or groups to make their own decisions about what foods they eat, what foods they produce, and how these are distributed within food systems. This includes participation in food-related decision-making and governance.
Food availability	Having enough good-quality and nutritious food physically present in the area in which people live.
Food diversity	Including different food groups (e.g., fruits, vegetables, grains, pulses, animal products) in the diet to ensure a balance of nutrients for good health.
Food insecurity	Lacking regular access to sufficient, safe, and nutritious food for a healthy and active life.
Food stability	When food remains available, accessible, and well-utilised over time, even during periods of adversity due to bad weather or economic crises.
Food sustainability	Ensuring that food systems provide food security and nutrition for all in such a way that the economic, social, and environmental bases to generate food security and nutrition for future generations are not compromised.
Food utilisation	How well people prepare and eat their food, and whether they have access to clean water, good hygiene, and adequate healthcare to make the most of it.
Hazards	Events or activities (e.g., floods, pollution) that can harm people or damage the environment.
Malnutrition	When a person eats too little, too much, or the wrong balance of nutrients.
Meta-analysis	A type of quantitative analysis that combines evidence using statistical methods to determine overall effects and the magnitude of effect size.
Moderator analysis	A method that allows testing as to whether the effect of an independent variable on a dependent variable changes across different conditions or groups.
Rapid evidence assessment	A type of evidence synthesis that addresses policy and programming questions when time and resources are limited.

Resilience	The capacity of individuals, communities, systems, or countries to anticipate, absorb, adapt to, and recover from shocks and stresses, while maintaining or improving their well-being without compromising long-term development outcomes.
Risk of bias	The extent to which the estimate of impact differs from the true value due to problems in the evaluation or sample design.
Vulnerability	Conditions that increase the likelihood of people being affected or more severely affected by risks, crises, and shocks.

1. Background

1.1 The issue: food security and nutrition in Sub-Saharan Africa

The 1948 Universal Declaration of Human Rights recognises that ‘everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food’ (United Nations 1948, Article 25). Over half a century later, food insecurity and malnutrition remain among the most pressing global challenges, with moderate to severe food insecurity affecting 2.3 billion people globally in 2024 (FAO et al. 2025)

‘Food security exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life’ (FAO 1996). Building on the six-dimensional food security and nutrition framework proposed by Clapp et al. (2022), this concept encompasses availability, access, utilisation, stability, agency, and sustainability (Termine 2024; NJ Office of the Food Security Advocate 2024; Mockshell and Nielsen Ritter 2024; HLPE 2020). Nutrition, on the other hand, refers to how food intake, absorption, and assimilation contribute to health, growth, and disease prevention (Alex 2020; Pilipenko 2023; Krause et al. 2016; Committee on World Food Security 2021; WHO 2024).

Figure 1: The six pillars of food security and nutrition



Note: Definitions drawn from the High-Level Panel of Experts on Food Security and Nutrition (2020). Figure designed by the research team.

Sub-Saharan Africa (SSA) remains among the world's most food-insecure regions, with over 50 percent of the population facing food insecurity—representing double the global average (World Bank 2025). In 2024, 323 million people (20.2 percent of the region's population) were affected by hunger, and 60 percent of the global population that is projected to face hunger by 2030 will be in Africa (FAO et al. 2025). In 2024, of the ten countries with the largest numbers of people facing high levels of acute food insecurity, four were in SSA; of the ten countries with the highest proportion of affected populations, five were in SSA (FSIN and GNAFC 2025).

In addition, malnutrition remains widespread: 30 percent of children under five are stunted, and high levels of wasting are observed across most subregions (FAO et al. 2023). Anaemia prevalence among adult women is also above the global average, particularly in Western and Central Africa, highlighting intra-regional disparities. Eastern Africa faces crises due to conflict, displacement, and climate shocks, with nearly 62 million people acutely food insecure and 834,000 at risk of famine (FAO et al. 2023). Southern and Central Africa struggle with climate shocks, economic challenges, and disease outbreaks, pushing 55 million people into acute food insecurity. Western Africa is affected by economic instability,

conflict, and climate change, with 57 million people experiencing food insecurity (FAO et al. 2023; FSIN and GNAFC 2025).

Across the SSA region, climate change and environmental crises are among the most significant threats to food security and nutrition. The region is highly dependent on rainfed agriculture and pastoralism, making it particularly vulnerable to climate extremes and changing weather patterns (Global Center on Adaptation 2022). Future warming is projected to shorten growing seasons, reduce agricultural yields, increase water stress, and threaten both livestock and fisheries (IPCC 2023). Climate-related disasters have already had devastating impacts. Among them, droughts and floods are some of the most prevalent climate-related risks in the region, and affected 54 million people in 2022 (Global Center on Adaptation 2022).

The interplay between climate change, food security, and nutrition highlights the urgent need for interventions focused on food system resilience, adaptation, and sustainability to meet Sustainable Development Goal 2 and the African Union Malabo target of ending hunger and malnutrition by 2025.¹

To achieve these goals, policymakers, implementers, and researchers must address a number of challenges that extend across all food security and nutrition pillars and appear as key drivers of food insecurity and malnutrition in the region (Mbow et al. 2020; Ingram, Ericksen, and Liverman 2012):

- **Availability:** Rising temperatures, altered rainfall patterns, and extreme weather may reduce agricultural yields, impact food storage, and exacerbate water scarcity.
- **Access:** Climate-induced price volatility may affect low-income households and reduce their purchasing power and food affordability.
- **Utilisation:** Climate change may affect food safety and nutrition quality, potentially reducing protein, iron, and zinc concentrations in staple crops.
- **Stability:** Climate shocks may disrupt food production and distribution, leading to cyclical crises and food shortages.
- **Agency:** Vulnerable groups, including smallholder farmers, children and women, may face increased marginalisation in the food system due to climate pressures.
- **Sustainability:** Unsustainable agricultural practices may contribute to land degradation, biodiversity loss, and long-term threats to food production.

1.2 A solution: Information, capacity strengthening, and behaviour change interventions

Information, capacity strengthening, and behaviour change (ICSBC) interventions are designed to foster positive behavioural change and improved practices among food system actors. According to FAO, these interventions involve tailored communication strategies, multi-channel engagement, and skills development to empower individuals, communities, and institutions (FAO 2022). In the food system, ICSBC interventions target a broad spectrum of stakeholders, including farmers, agricultural extension officers, policymakers, and consumers, with the goal of promoting sustainable and resilient food practices.

¹ African Union. 2014. *Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods*. Addis Ababa: African Union Commission. https://www.resakss.org/sites/default/files/Malabo%20Declaration%20on%20Agriculture_2014_11%2026-.pdf.

Existing literature from various contexts has already shown the potential of ICSBC to improve food security and nutrition. Waddington et al. (2014) emphasised the effectiveness of farmer field schools in enhancing farming practices and incomes by improving knowledge and promoting the adoption of new techniques in low- and middle-income countries. Similarly, Dewidar et al. (2023) highlighted the significant impact of peer support on breastfeeding practices in low- and middle-income countries, demonstrating how timely and intensive support can lead to positive behavioural changes.

In SSA, Watson et al. (2023) illustrated how interventions that integrate agricultural and nutritional capacity strengthening have demonstrated notable improvements in maternal and child nutrition, although their effectiveness varies across different interventions. Finally, Stewart et al. (2015) emphasised the potential of training programmes to introduce new agricultural inputs, although their direct impact on household income varied.

Although none of these studies focused on all aspects of ICSBC or all actors in the food system, they collectively underscored the importance of ICSBC interventions that combine educational campaigns with practical support, and their potential contribution to food security, nutrition, and resilience in vulnerable settings.

The objective of these ICSBC interventions is to develop positive behaviours, skills, and improved practices, to promote and sustain individual, community, and societal behaviour change, and to maintain these appropriate behaviours and practices (FAO 2022). To enable this change towards food security and nutrition, such interventions can build on three interconnected domains as key levers in the food system: food supply, food environment, and consumer behaviour (Table 1).

Table 1: Potential contribution of ICSBC interventions to food security and nutrition in the context of environmental risks and crises

ICSBC Intervention domains	Primary food system target actors	Interventions features
Food supply	Food producers (e.g. farmers, firms, etc.)	Build knowledge and skills in climate-resilient practice for food production.
Food environment	Actors in storage, distribution, packaging, labelling, institutions, etc.	Improve food handling and efficiency to create enabling environments and incentives for better practices.
Consumer behaviour	Food consumers	Increase knowledge of food choices and preparation to build motivation for healthy, sustainable dietary behaviours.

Note: Definitions are from the 3ie Food Systems and Nutrition Evidence and Gap Map (2024), drawing from categories of the High-Level Panel of Experts (2020).

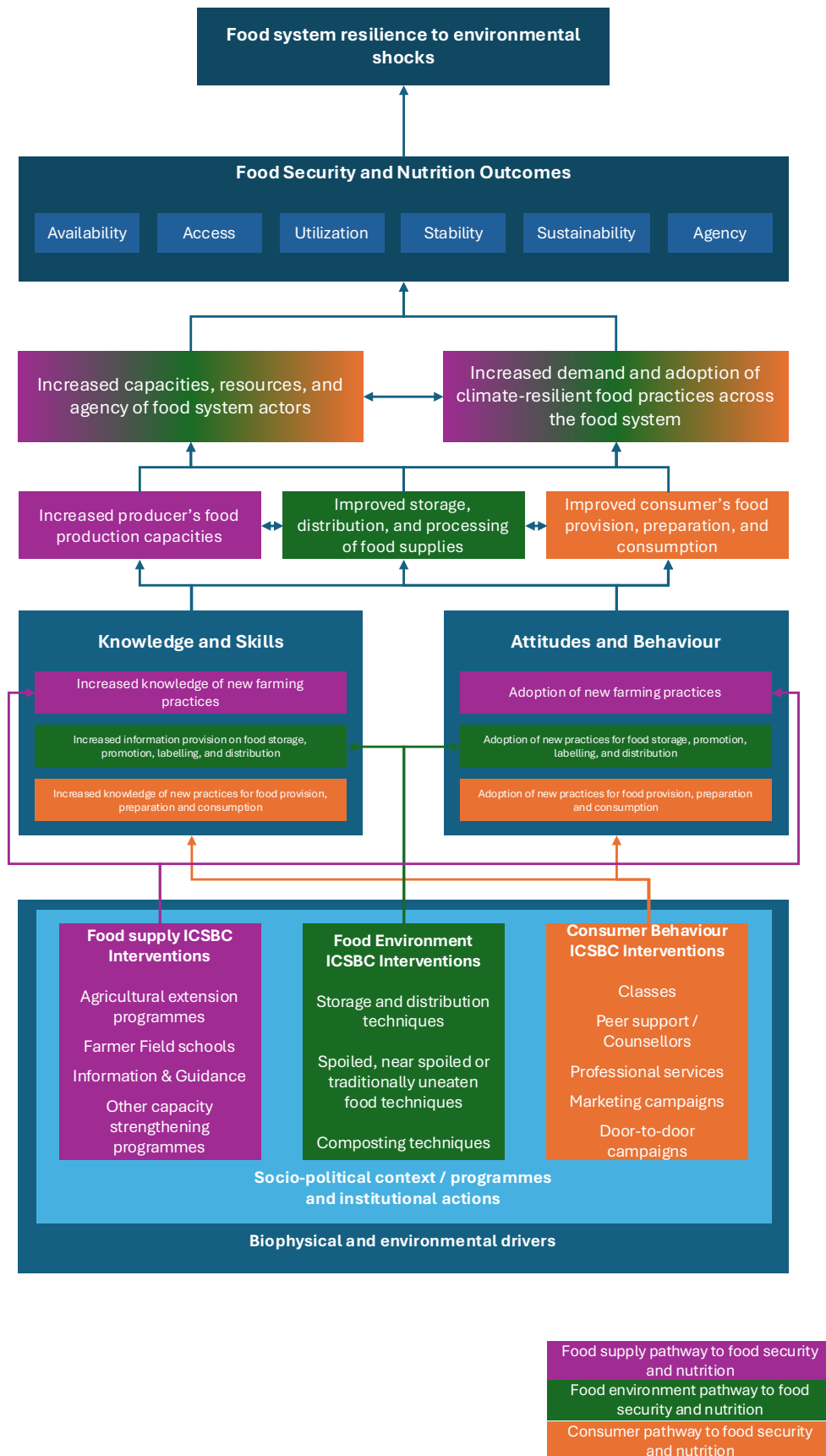
Our theory of change for ICSBC interventions draws from this existing evidence and presents the ways in which ICSBC can address pressing challenges posed by climate change and environmental crises (Figure 2). Such interventions operate through the three interconnected domains of food supply, consumer behaviour, and food environment, aiming to build the knowledge and capacities for sustained behavioural change (HLPE 2020, 2017; FAO 2022; Storhaug et al. 2024).

Together, these intervention domains reinforce one another, increasing the capacities, resources, and agency of food system actors and generating greater demand for climate-

resilient food practices. Through their potential contribution to adaptive and transformative capacities, ICSBC interventions can empower individuals and communities to make informed decisions across the food system, thereby increasing their control over food-related outcomes (AGRA 2021; GPAFSN 2025; Akpata, Toromade, and Ojo 2024; CRFS 2024; Dejene et al. 2011; Committee on World Food Security 2021). This empowerment may support not only recovery from disruptions but also long-term resilience and structural change. Through this systemic and synergistic approach, ICSBC interventions can drive meaningful progress across all six pillars of food security and nutrition and other aspects of food system resilience.

By analysing the effects of ICSBC interventions and their combination with other types of interventions, our research examined pathways to impact of this theory of change. We explored the effects of interventions across the three domains of ICSBC interventions and how they equip food system actors with the capacities and knowledge needed to achieve improved food security and nutrition outcomes (Figure 2).

Figure 2: Theory of change of ICSBC interventions in environmentally vulnerable and shock-prone settings in SSA



Note: Figure designed by the research team.

1.3 Aims and objectives of the rapid evidence assessment

In the effort to achieve Sustainable Development Goal 2 and the Malabo target in SSA, policymakers, implementers, and researchers require evidence on what works to strengthen food security and nutrition, in order to ultimately enhance the resilience of SSA food systems against climate change risks and crises. Despite the potential effects of ICSBC interventions on food security and nutrition in SSA, the [3ie Food Systems and Nutrition \(FSN\) Evidence and Gap Map \(EGM\)](#)² reveals a gap in the availability of rigorous synthesis evidence.

By building on the primary evidence provided in the EGM, this mixed-methods rapid evidence assessment (REA)³ contributes to filling the evidence synthesis gap on the effect of these interventions in SSA, thereby expanding the body of evidence on their effectiveness in improving food security and nutrition outcomes. It explores how these interventions can contribute to enhanced food system resilience, building on a synthesis of qualitative evaluation and evidence. It provides practical and policy-relevant implications for designing, implementing, and evaluating food system interventions.

Our REA addresses the following research questions:

- What are the effects of ICSBC interventions on food security and nutrition outcomes in SSA?
- How do these interventions enhance the resilience of SSA's food systems against climate change risks and crises?
- Do effects systematically vary according to moderators, such as context (e.g., ongoing risk or crisis, region, environmental vulnerability), intervention characteristics, or vulnerable groups?

2. Methods

2.1 Studies selection

This REA leveraged the [FSN EGM](#) as its evidence base, avoiding the need for a new search and screening of quantitative studies. The FSN EGM, first commissioned by the Deutsche Gesellschaft für Internationale Zusammenarbeit and published in 2021 (Moore et al. 2021), systematically maps the literature on food system interventions and their effects on food security and nutrition outcomes in low- and middle-income countries. As one of 3ie's most comprehensive EGMs, it initially included 1,838 impact evaluations (IEs) and 178 systematic

² EGMs are thematic collections of information about IEs and SRs that measure the effects of international development policies and programmes. They present a visual overview of existing and ongoing studies or reviews in a sector or subsector in terms of the types of programmes evaluated and the outcomes measured. This evidence is mapped onto this framework, graphically highlighting the gaps wherein few or no IEs or SRs exist, and where there is a concentration of IEs but no recent high-quality SRs.

³ The REA is a form of evidence synthesis that has been developed to address policy-relevant questions in less time and with fewer resources than what is typically required for SRs (Ganann, Ciliska, and Thomas 2010; Khangura et al. 2012; Collins et al. 2015; Barends, Rousseau, and Briner 2017; Snilstveit et al. 2018). There is no single definition of a rapid review, and recent analyses of study methods highlight the variation in rapid review methods (Hartling et al. 2015; Khangura et al. 2012; Tricco et al. 2015; Fenton Villar 2022). However, such approaches typically involve adjusting traditional SR methods and adopting one or more shortcuts to answer urgent questions more promptly (Schünemann and Moja 2015).

reviews (SRs), and was continuously updated every quarter until July 2024, when it included a total of 3,217 IEs and SRs (Storhaug et al. 2024).

We established the eligibility criteria to identify quantitative studies for this REA in collaboration with an advisory group and the DEval team (see *Acknowledgements* section). These align with the predefined scope and criteria of the FSN EGM, and we applied additional restrictions to ensure feasibility within the timeframe and with the available resources.

Table 2 summarises the study eligibility criteria, following the participants, interventions, comparisons, outcomes, and study designs (PICOS) framework.⁴

Table 2: Summary of criteria determining study eligibility for the REA

Criteria	Description
Participants	People of any age and gender residing in SSA
Interventions ⁵	ICSBC interventions included in the FSN EGM Descriptions of included interventions are available in Online appendix A.
Comparison	No intervention, including pipeline and waitlist controls, and any other intervention
Outcome	Measures of food security and nutrition Descriptions of included outcomes are available in Online appendix A.
Study designs	Quantitative IEs and qualitative evaluations: <ul style="list-style-type: none"> For quantitative IEs, we include studies using an experimental or quasi-experimental design. For qualitative evaluations,⁶ we include studies that collect primary data using mixed-methods or qualitative methods, descriptive quantitative studies, and process evaluations focusing on interventions included in the quantitative IEs. Descriptions of included study designs are available in Online appendix B.
Language	Studies in English
Publication date	Studies published from 2000 onwards
Status of studies	Completed quantitative IEs and qualitative evaluations
Publication Type	Studies published in any outlet, including peer-reviewed journals, working paper series, organisational reports, and unpublished author manuscripts

⁴ The PICOS framework is a tool used to clearly structure research questions, particularly in health and clinical studies. It stands for *population* (the group of people studied), *intervention* (the treatment or action tested), *comparison* (what the intervention is being compared to, such as a placebo or standard treatment, no intervention, a waitlist or pipeline), *outcome* (the result or effect being measured), and *study design* (the type of research method used, such as a randomised trial or observational study). This framework helps to ensure that research questions are focused, consistent, and easy to understand. The full details of the methods are available in the research protocol (Lwamba et al. 2025)

⁵ We define an intervention as an activity or a set of activities implemented in actual settings by individuals or institutions, with the aim of creating a change for the people exposed to it. It covers both internal and external, national and international programmes and policies implemented at the international, regional, national, or subnational level. It is used as a synonym for the following non-exhaustive list: treatment, initiative, programme, project, policy, and activity.

⁶ This is a deviation from the EGM inclusion criteria, as the original FSN EGM did not include qualitative evaluations.

To gather additional evidence on how ICSBC interventions can contribute to food system resilience, we carried out an additional search for qualitative evidence and gathered data from two sources:

- The experimental and quasi-experimental studies included in the assessment (for descriptive and qualitative data); and
- Additional sources of evidence on the interventions, which were covered by the included experimental and quasi-experimental studies (for additional details).⁷

To have been included, these papers must relate to interventions evaluated in the included quantitative IEs and be one or more of the following: a qualitative study collecting primary data using qualitative methods and meeting our minimum standards (see Online appendix C for inclusion criteria and Online appendix D for a list of included studies), a descriptive study, a process evaluation, or a project document.

2.2 Data extraction and analysis

For both quantitative and qualitative studies, trained reviewers performed data extraction and captured various aspects of the studies, including descriptive data, methodological information, and quantitative and qualitative data. A first reviewer independently coded the data. A member of the research team then reviewed the quality of the extracted data, and we resolved any disagreements through discussion between the independent coder and the core team.

In the quantitative meta-analysis, to facilitate cross-study comparisons, we calculated standard effect sizes based on the outcomes reported in the studies. We also addressed dependent effect sizes arising from multiple publications or studies based on the same data by linking related papers and selecting one main study for data extraction.⁸

We assessed unit-of-analysis issues (such as allocation and analysis at different levels), making necessary adjustments, and endeavoured to obtain missing data by contacting study authors. We assessed the included studies' risk of bias using 3ie's risk-of-bias tool (Basak et al. 2024), and considered factors that are common sources of bias in primary studies (e.g., confounding, missing outcome data, and biases in study design and analysis).

We reported the results of the meta-analysis without outliers. For each quantitative analysis, we used the standardised mean difference (SMD) to refer to average effect sizes from random effects meta-analysis, and we used the standardised effect size (\hat{g}) when referring to the results of a single primary study.

For the analysis of the effect size, we followed the thresholds of the grading of recommendations, assessment, development and evaluation ([GRADE](#)) approach: very small (SMD below 0.10), small (SMD below 0.20), moderate (SMD below 0.37), and large (SMD over 0.37). Detailed analyses with and without outliers, and with and without high risk-of-bias estimates, are provided in Online appendix E.

⁷ The search began by identifying programme names from the included quantitative studies, followed by citation searches and online searches (including implementer and funder websites) to locate related qualitative evaluations. Relevant sources included project websites, qualitative research reports, and other grey literature that met the inclusion criteria and aligned with the PICOS framework.

⁸ More details on the methods, calculation of effect sizes, and units of analysis are available in the research protocol (Lwamba et al. 2025)

We also conducted quantitative moderator analyses (e.g., intervention year, unit of analysis, evaluation method, length of follow up, exposure, and multi-component interventions including those with a gender-specific design, gender-inequality context, or hunger and nutrition contexts; see full list and definitions in Online appendix C and moderator analyses in Online appendix E).

The moderator analysis explored how and why results might vary across different variables and the heterogeneity of treatment effects. Through this analysis, we examined specific characteristics, known as moderators, that may influence the size, direction, or significance of effects. Quantitative moderator analysis was only performed when there was: (1) enough data to run a meta-analysis (at least two studies); and (2) a sufficient number of data points in each group (e.g., if all estimates belonged to the same category; in contrast, if only one estimate belonged to a different category, then a quantitative analysis was not possible). If moderation could not be explored quantitatively, we discussed the moderators narratively.

To supplement the FSN EGM, which excluded qualitative evidence, we conducted an additional search to identify and analyse qualitative data linked to the included IEs. This involved extracting qualitative and descriptive data from the selected studies and carrying out a targeted search for relevant reports, process evaluations, and project documents. We conducted a qualitative data extraction related to the context, resilience capacities, and resilience needs and opportunities (BMZ 2021) that we then classified according to their focus on context, population, design and implementation aspects.

Prior to the data extraction, we conducted a single-coded critical appraisal process: all studies, except project documents, were appraised using a mixed-methods tool assessing their rigour, relevance, and trustworthiness. We extracted this data from the quantitative IEs, when available, as well as from the qualitative evidence. We used a thematic synthesis approach with an inductive coding technique to synthesise the qualitative evidence (Thomas and Harden 2008). To identify descriptive themes, we used EPPI-Reviewer's line-by-line coding tool (Thomas et al. 2023). The process was undertaken by a single coder, and quality assessment was carried out by a member of the core team. We grouped codes with common descriptive themes into higher-level analytical themes reported in our analysis.

3. Characteristics of the available evidence

3.1 Search results

As of July 2024, the FSN EGM included a total of 2,978 IEs and 239 SRs for a total of 3,217 records published between 2000 and 2024.⁹ In this body of evidence, we identified 64 unique quantitative IEs with a focus on the effects of ICSBC interventions on food security and nutrition in SSA.

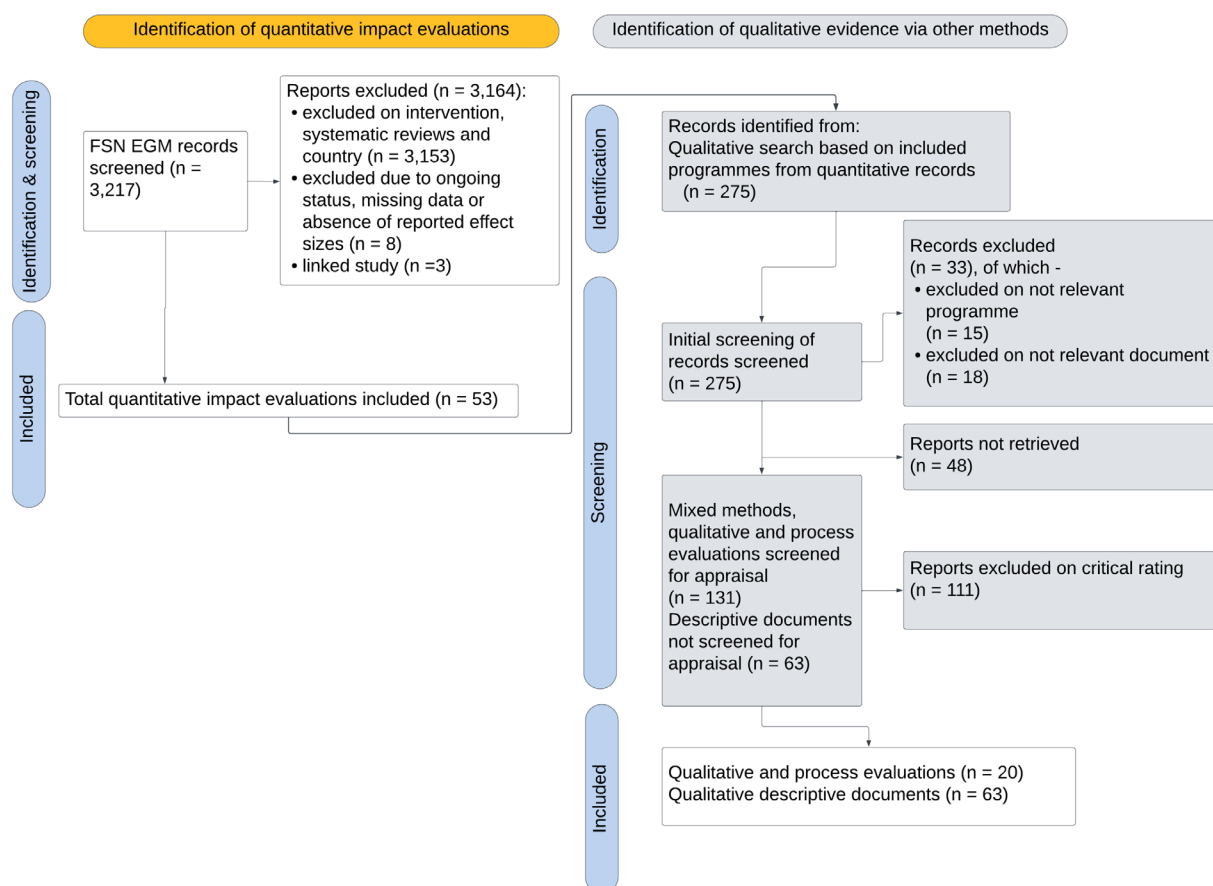
However, following our review of the body of evidence, we excluded eight studies due to their ongoing status, missing data,¹⁰ or absence of reported effect sizes for ICSBC

⁹ See preferred reporting items for systematic reviews and meta-analyses (PRISMA) diagram in Figure 3. For the full FSN EGM PRISMA, see Online appendix F.

¹⁰ We have contacted the main authors to request any missing data. Studies were excluded in the absence of a response from the corresponding author.

intervention components. Three studies were also linked.¹¹ This brought our final body of evidence to 53 unique quantitative IEs. To complement this body of evidence, we identified 20 linked mixed-methods, qualitative, and process evaluations, as well as 63 project documents and descriptive evidence resources.

Figure 3: PRISMA diagram



Note: Figure designed by the research team.

3.2 Quality of the included evidence

3.2.1 Risk of bias of included quantitative studies

We conducted a risk-of-bias assessment on data from 911 estimates of effect sizes (hereafter noted as 'k') from the 53 included quantitative IEs. For quasi-experimental study designs, the assessment of risk of bias for included estimates was based on five domains (selection bias and confounding, spillovers, crossovers and contamination, attrition bias, outcome measurement bias, and reporting bias).

For experimental study designs, we assessed a sixth domain related to the unit of analysis errors: this domain is specific to cluster randomised controlled trials, because if researchers analyse outcomes at the individual level without accounting for the clustering, they ignore the

¹¹ A linked study is an individual study record that belongs to a larger, single evaluation which has resulted in multiple publications. A linked study may present supplementary analyses that complement the findings of the main publication. In such cases, the main study is defined as the most recent journal article, and data from the linked study are incorporated into the analysis when these are not available in the main study.

intra-cluster correlation (i.e., the fact that individuals within a cluster are likely to be more similar to each other than to those in other clusters). This leads to underestimated standard errors, inflated Type I error rates (false positives), and biased (overconfident) conclusions about intervention effects.

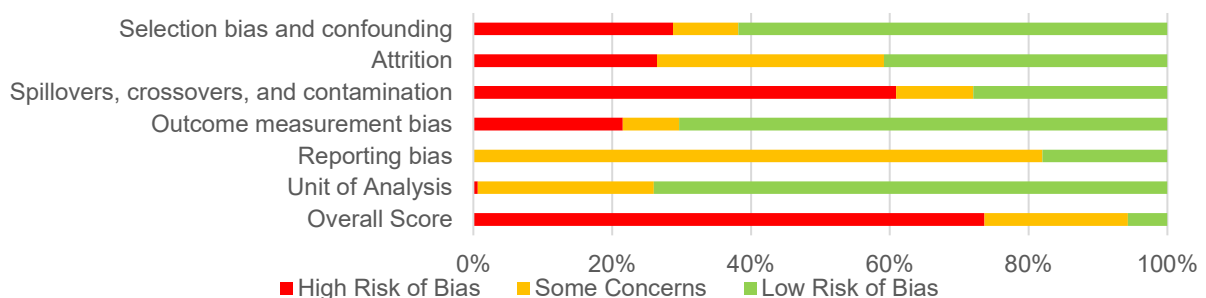
We rated 74% of the included estimates as having an overall high risk of bias (i.e., a high risk of bias in at least one domain; k = 671), 21% as having some concerns related to their risk of bias (i.e., potential issues in one or more domains; k = 188), and 5% as having a low risk of bias (i.e., no identified concerns; k = 52; Figure 4).¹² Similar patterns of bias have been observed in other sectors. For example, across 100 Cochrane reviews, just 6% of randomised controlled trials were rated as low risk of bias, while 61% were rated as high risk of bias (Jørgensen et al. 2016), and 10% of non-randomised studies were rated as low risk of bias (Igelström et al. 2021)

Spillovers and risk of contamination were among the main sources of risk of bias. These were often due to the close geographical proximity between treatment and control groups, which could lead to unintentional exposure to interventions (61% of estimates were rated as high risk of bias in this domain). Additionally, control groups were sometimes exposed to other programmes, which created confounding effects on the outcomes. In other cases, insufficient information was provided to fully assess the risk of spillovers.

The second-most common source of bias was selection bias and confounding, with 29 percent of estimates rated as having a high risk of bias in this domain. Sources of risk of bias from selection and confounding estimates were often due to a lack of sensitivity analysis for hidden bias in statistical matching, failure to establish pre-treatment parallel trends for difference-in-difference methods, or insufficient information on included covariates in the estimation models.

Additional high-risk-of-bias sources included outcome measurement (with 22% of estimates rated as high risk of bias) and attrition (with 27% rated as high risk of bias). However, none of the included estimates were rated as having high risk for reporting bias, which means that the studies had a pre-analysis plan with which the study’s reported outcomes were consistent.

Figure 4: Risk of bias of included estimates



Note: Figure designed by the research team.

Note: The unit of analysis domain is based on a smaller sample of estimates from only experimental study designs (k = 465). Figure designed by the research team.

¹² The overall score is determined as follows. ‘High risk of bias’: any of the bias domains were assessed as ‘no’ or ‘probably no’. ‘Some concerns’: one or several domains were assessed as ‘insufficient information’ and none were ‘no’ or ‘probably no’. ‘Low risk of bias’: all bias domains were assessed as ‘yes’ or ‘probably yes’.

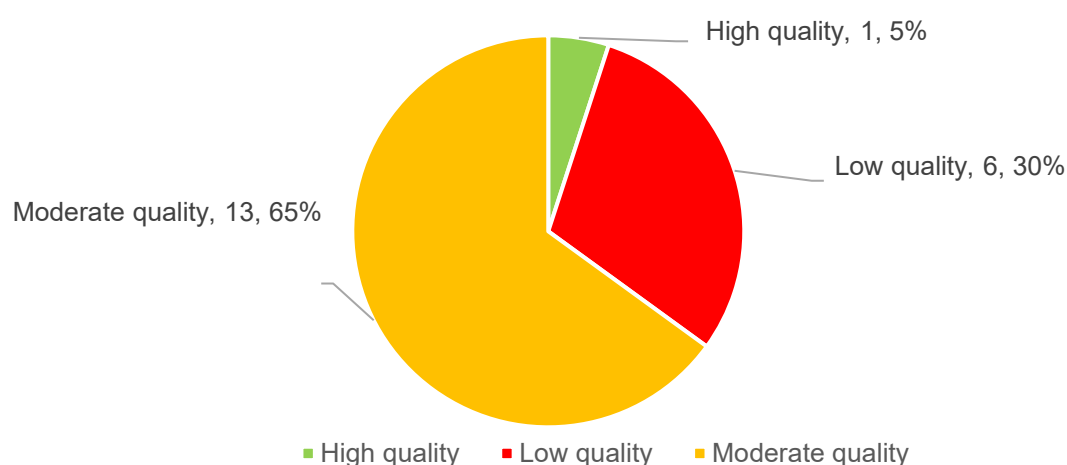
3.2.2 Critical appraisal of included qualitative studies

All included qualitative studies, mixed-methods studies, and process evaluations were eligible for appraisals (n = 131). In total, we rated 111 of these studies as critical quality either during the appraisal screening phase or during the appraisal phase.

We excluded studies with critical methodological flaws from the analysis as they did not meet our minimum standards. The most common issue was the studies' failure to state a clear research design appropriate to address the stated research question and objectives (n = 51). The second-most common reason was the failure to state clear research questions or objectives (n = 18).

Of the remaining 20 studies included in our analysis, we rated 1 study as high quality (5%), 13 as moderate quality (65%), and 6 as low quality (30%; Figure 5).

Figure 5: Summary of overall critical appraisal ratings of included primary qualitative studies, process evaluations, and mixed-methods studies (n = 20)



Note: Figure designed by the research team.

3.3 State of evidence

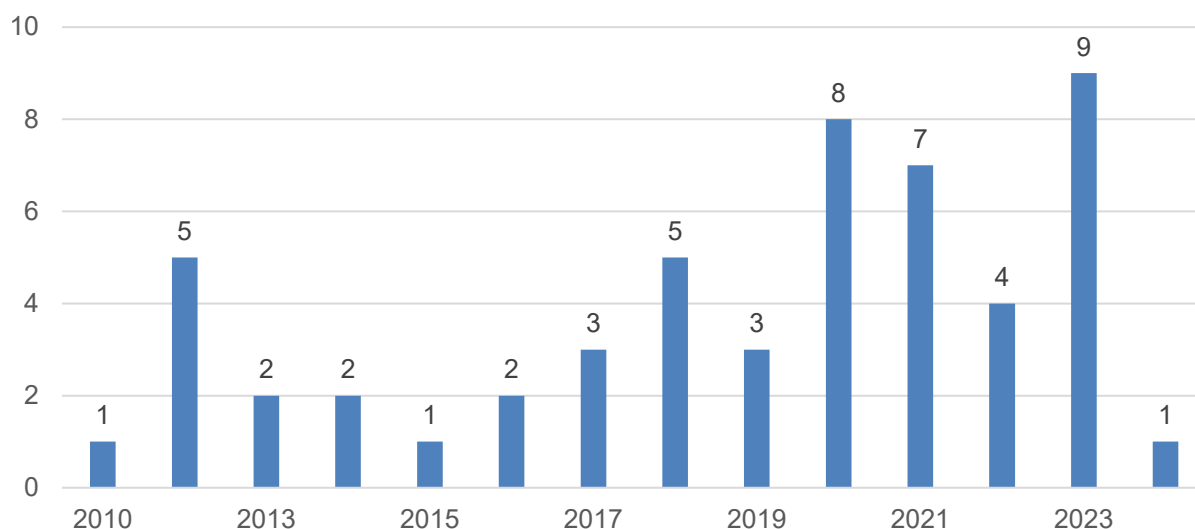
3.3.1 Evolution of the evidence base

We observed an increase in the number of quantitative IEs on the effects of ICSBC interventions on food security and nutrition outcomes in SSA, particularly since 2018 (Figure 6). The studies included in our REA were published between 2010 and 2024, with 81 percent of the body of evidence (n = 43) published after 2015. This accounted for a sixfold increase in the total number of quantitative IEs on this topic during that period, demonstrating an increased interest in evidence on the effectiveness of ICSBC interventions.

A range of factors might help to explain the recent growth in evidence on ICSBC interventions and their effects on food security and nutrition outcomes in SSA. Despite relatively stable overseas development assistance commitments to development food assistance, the launch of the Sustainable Development Goals, particularly Sustainable Development Goal 2 (Zero Hunger), has increased the demand for evidence on *what works* for food security and nutrition (United Nations 2024; Fontdevila 2023). In parallel, debates on the definition of food security and nutrition and how to better target them have increased incentives to better measure outcomes through rigorous evidence (HLPE 2020, 2017).

Finally, the growth of the evidence base in food security and nutrition follows global trends of increasing publications of rigorous evidence across development sectors; this is demonstrated by the growing number of experimental and quasi-experimental studies included in 3ie's [Development Evidence Portal](#) from close to 5,000 studies published before 2015 to over 21,000 as of 2025.

Figure 6: Number of quantitative IEs identified by year of publication



Note: Figure designed by the research team.

3.3.2 Intervention and outcome coverage

Our analysis of the distribution of ICSBC interventions in SSA aligned with trends observed in the wider FSN EGM, and showed an unevenly distributed body of evidence:

- *Food supply* was the most prevalent domain (n = 36, 68%), mainly through farmer field school interventions (n = 15, 28%), agricultural extension services (n = 12, 23%), and *workshops or short trainings*¹³ (n = 11, 21%). A smaller proportion of evidence under this domain was available on *peer-to-peer learning* (n = 6) and *information and guidance* (n = 2).
- There were fewer studies on *consumer behaviour* (n = 21, 40%), which mostly focused on *peer support and counselling* (n = 16, 28%), *classes* (n = 9, 16%), and *community meetings* (n = 8, 14%). In line with the FSN EGM findings, we observed evidence gaps for *healthy food social marketing campaigns* (n = 5), *professional services* (n = 5), and *door-to-door campaigns* (n = 4).
- There were clear evidence gaps in the *food environment* domain (n = 9; 17%), with a single intervention type represented in the body of evidence: *storage and distribution education and capacity strengthening* (n = 9). Despite coverage in other geographies, we did not identify any studies focusing on capacity strengthening on *composting, the use of spoiled or near-spoiled food, or processing and packaging techniques* in SSA.

¹³ To ensure the accuracy of the analysis, the research team proceeded with a review of the intervention categories under the food supply domain, particularly the intervention qualified as *other*. This review identified two additional intervention types: *workshops and short trainings*, targeting farmers, and *peer-to-peer learning*, connecting farmers to share skills and knowledge. The updated list of interventions and definitions is available in Online appendix A.

The greater availability of evidence on food supply interventions might be attributed to a longer-standing focus among researchers on interventions for producers. *Consumer behaviour* and *food environment* interventions have been implemented more recently to improve food security and nutrition (Watson et al. 2023), while *food supply* interventions, such as agricultural extension interventions, date back to the early twentieth century (Jones and Garforth 1997).

Our analysis of outcome distribution across the body of evidence revealed differences in how studies measured food security and nutrition, particularly in terms of the pillars considered (Table 3). Although all studies included in our REA assess food security and nutrition, they consider indicators aligned with different pillars: availability, access, utilisation, stability, agency, and sustainability. We observe two types of outcomes:

- *Single-pillar outcomes*: 39 studies measured food security and nutrition using indicators that we categorised under one of the pillars. The highest concentration was on food access (n = 38, 72%), followed by food utilisation (n = 35, 66%), and food availability (n = 21, 40%). In contrast, fewer studies examined food stability (n = 12), food agency (n = 9), and food sustainability (n = 12).

Some of these studies individually reported multiple outcomes belonging to different pillars: for example, Merchant et al. (2023) analysed the effect of a farmer field school and peer counsellor interventions on the mean household hunger score (food access pillar) and on the mean women's dietary diversity score (food utilisation pillar). Most of the studies provided outcomes belonging to two pillars (n = 22), whilst three studies reported outcomes across the six pillars.

- *Multi-pillar outcomes*: 14 studies measured food security and nutrition using aggregated outcomes that combine indicators from multiple pillars. For example, in Madagascar, Datta et al. (2021) analysed the effects of a class and peer support intervention on the experience of food insecurity in the last seven days. Their aggregated measure of food insecurity included 'cooked food they did not like' (food availability), 'was not able to properly diversify food' (food utilisation), 'had to reduce quantity per meal' (food access), 'had to reduce the number of meals' (food access), 'adults had to reduce amount of food eaten to give to children' (food access), 'had to borrow food or rely on friends and family' (food access), and 'had nothing to eat' (food availability).

Table 3: Distribution of quantitative IEs by intervention-outcome pairing

Interventions			Food security and nutrition outcomes						Total	
<i>Intervention domain</i>	<i>Intervention type</i>	<i>Intervention description</i>	<i>1. Food security - Aggregated</i>	<i>1.1 Food availability</i>	<i>1.2 Food access</i>	<i>1.3 Nutrition, adequacy and utilisation</i>	<i>1.4 Stability</i>	<i>1.5 Agency</i>	<i>1.6 Sustainability</i>	
Food supply	Farmer field schools	Hands-on agricultural training for farmers	6	7	9	8	2	4	4	15
	Agricultural extension services	Trained agents visit communities to teach current practices, organise cooperatives, and engage in other secondary activities	2	6	12	7	2	3	5	12
	Workshop / short training	Provision of ad-hoc or short training to food producers on farming techniques, use of equipment, or best practices	2	5	8	7	3	2	4	11
	Peer-to-peer learning	Facilitation of meetings of food producers to share their knowledge with peers and/or connect with professionals of the same sector	2	2	4	5	1	1	3	6
	Information and guidance	Agricultural information via phone/SMS		2	2	1		1	2	2
Consumer behaviour	Peer support / counsellors	The use of peer support or counsellors to increase healthy eating	7	2	10	15	4	3	1	16
	Classes	The use of a classroom structure to provide messages regarding healthy eating, including classrooms outside of school	3	2	5	9	2			9
	Community meeting	Public meetings for discussion and mobilisation	4	1	6	7	1	3	2	8
	Healthy food social marketing campaigns	Media campaigns promoting healthy eating			4	5	2			5
	Professional services (dietitians / nurses)	Food and nutrition, advice from trained health professionals	1		4	3	1	1		5
	Door to Door	Health messages delivered door-to-door	2		3	4		1		4
Food environment	Storage and distribution, education, and capacity strengthening	Educational programmes to support storage and distribution techniques	2	6	8	5	2	3	4	9
Grand Total			14	21	38	35	12	9	12	53

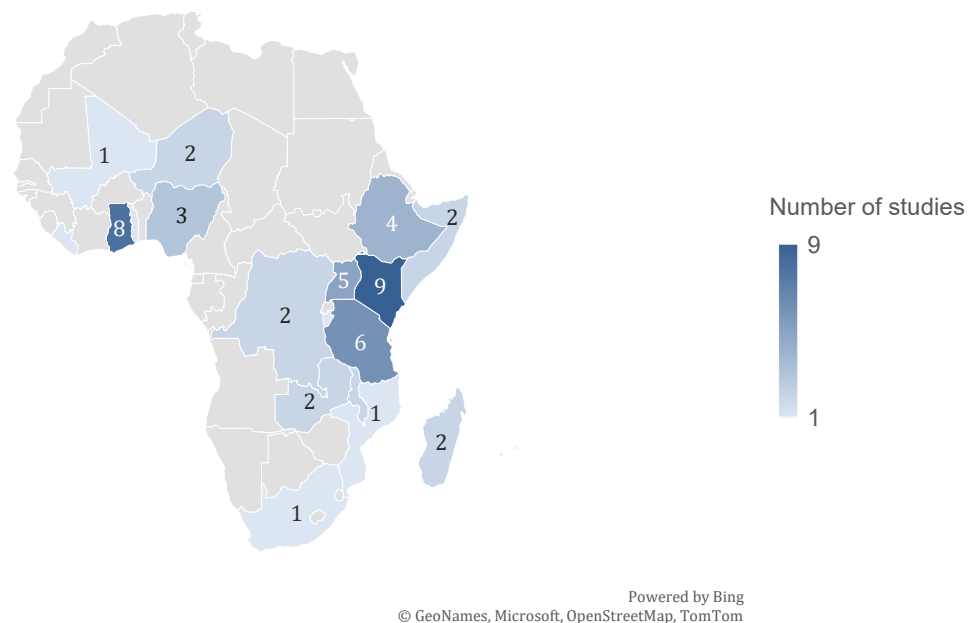
Note: The total of the values displayed ("Grand Total") may differ from the sum of studies per row or column, reflecting that a study may contain multiple interventions and outcomes. Detailed descriptions of the interventions are available in Online appendix A. The process and packaging capacity strengthening and on composting, the use of spoiled or near-spoiled food capacity strengthening did not include any studies in our REA and is not presented in this table.

3.3.3 Geographical and demographic coverage of the evidence

Overall, our body of evidence covered 20 of the 48 countries in SSA (Figure 7). We observed some regional discrepancies regarding clusters and gaps in evidence. In line with overseas development assistance commitments since 2010 (OECD 2025), Eastern Africa represented the primary evidence cluster; studies in the region accounted for 64 percent of our body of evidence.

The evidence base in Eastern Africa was particularly driven by countries such as Kenya (n = 9), Tanzania (n = 6), Uganda (n = 5), and Ethiopia (n = 4). Western Africa represented the region with the second-most overseas development assistance in SSA (OECD 2025) and the second-largest cluster of evidence, with 32 percent of the included quantitative IEs (n = 18). The most reported countries in the region included Ghana (n = 8) and Nigeria (n = 3). However, only three studies focused on interventions implemented in Central (n = 2) or Southern Africa (n = 1).

Figure 7: Map of studies by country



Note: Figure designed by the research team.

Understanding the resilience of SSA food systems to environmental risks and crises requires evidence from the region's most vulnerable settings. In SSA, which is particularly affected by climate change, international indicators over the past 20 years reveal high environmental vulnerability, with projections warning of increasing risks (Bündnis Entwicklung Hilft and Ruhr-Universität Bochum 2025; Climate Vulnerability Forum 2025; Germanwatch 2025; Inter-Agency Standing Committee and European Commission 2025; Smits and Huisman 2024; University of Notre Dame Global Adaptation Initiative 2025).

The distribution of evidence according to country vulnerability characteristics highlighted the challenges that environmental risks and crises raise for conducting rigorous evaluations. Few studies focused on fragile and conflict-affected situations (n = 9). Similarly, we observed evidence gaps in the most environmentally vulnerable countries, such as Chad, South Sudan, and the Central African Republic. Despite widespread environmental vulnerability

across the region, studies were concentrated in areas with relatively lower vulnerability levels. This disparity complicates efforts to fully understand and address the resilience of food systems in the most precarious contexts.

Nonetheless, the analysis revealed a correlation between the types of environmental risk reported in studies and the regional trends reported by international observers. For example, a fourth of the included studies reported an ongoing risk or crisis in the context of their interventions, with floods (n = 7), droughts (n = 12), and epidemics (n = 5 for humans and n = 3 for plants) being the most reported.

When clustered around demographic characteristics, most of the studies were specifically focused on rural and farmer households (n = 34), as well as other actors in the food system (n = 13), including processors, fishers, caregivers, firms, and cooperatives. The body of evidence also covered particularly vulnerable groups facing environmental risks and crises, such as girls, women, and mothers (n = 12), children (n = 7), youth (n = 2), and displaced populations (n = 2). Finally, over half of the included interventions explicitly aimed to build the resilience of the targeted population (n = 31) as their primary objective.

4. Methodological limitations

Despite the rigour of our methodological approach, our REA faced several methodological limitations that might affect the strength and generalisability of our findings. Although we followed most Campbell Collaboration guidelines for SRs, the REA format required an abbreviated search, screening, and data extraction process. One reviewer completed outcome mapping, data extraction, and risk-of-bias assessments, with subsequent quality checks by a second reviewer from the research team. Thus, findings must still be interpreted with greater caution than full SRs, where two independent coders extract the data.

The 53 quantitative studies included in our review varied widely in quality and coverage, and only incorporated studies in English despite the prevalence of French-speaking countries in the region of focus. The overall evidence base has notable gaps, and evidence is unevenly distributed across intervention types, outcome types, and regions within SSA. This uneven spread of evidence led, in some cases, to meta-analyses relying on a small number of estimates, thereby limiting statistical power, especially for moderator analyses.

In addition, we rated 74 percent of effect estimates as having a high risk of bias, mostly due to issues such as spillovers, crossovers, and contamination. Qualitative evidence also varied in quality: of 20 studies, we rated 1 as high quality, 13 as moderate, and 6 as low. These elements might limit our ability to draw robust conclusions about the overall effects of ICSBC interventions on food security and nutrition: more evidence from low-risk-of-bias studies will increase confidence in findings. However, observations on the risk of bias, availability of evidence, and size of effects are consistent with previous syntheses on the topic (Basak et al. 2024; Berretta et al. 2023) and the wider body of evidence on social protection interventions.

Our review relied on a subset of studies from the FSN EGM as of July 2024. It exclusively includes studies from the EGM providing outcomes for ICSBC intervention types classified under the food security outcomes and implemented in SSA. Studies outside of this scope could be a valuable addition to our research. We conducted a complementary search for qualitative evidence but limited this to projects that already included IEs.

Additionally, we were unable to access certain USAID studies due to the removal of data from their platform. As a result, we might have missed some relevant evidence that could strengthen or nuance our findings. Finally, the REA focused exclusively on SSA. Although this regional focus allowed for targeted findings, it limits the generalisability of our conclusions to other settings.

5. Quantitative analysis of the effects of interventions: What works?

The following section reports the findings of the quantitative analysis (meta-analysis and moderator analysis) of the effects of ICSBC interventions on food security and nutrition outcomes. Building on the indicators of food security and nutrition used by the authors, we present the quantitative results against the six pillars of food security and nutrition (availability, access, utilisation, stability, agency, and sustainability) and aggregated food security and nutrition for studies using cross-pillar indicators (detailed analyses with and without outliers, with and without high-risk-of-bias estimates, and full moderator analyses are provided in Online appendix E).

5.1 Food availability

Food availability is the physical presence of food in a person's environment, and also signifies sufficiency in terms of its quantity, quality, and nutritional value (HLPE 2020). Our body of evidence included 21 studies measuring food availability across 10 countries and 21 programmes, with 3 studies using an experimental design and 18 studies using a quasi-experimental design. Commonly reported indicators included food losses (reduction in quantity or quality of food), crop production (quantity or value of a specific crop produced), harvests and yields (amount of a crop collected per unit or land area), and food stocks (quantity of food held in storage by food system actors).

Examples of studies under this food security pillar included a report by Brander et al. (2020) in Tanzania, who analysed the effects of providing Purdue improved crop storage hermetic bags, and three training sessions on improved on-farm storage techniques, on post-harvest losses. An evaluation conducted by Pretari (2019) in Ghana analysed the effect of the Climate-Resilience Agricultural and Food Systems project's promotion of climate change awareness on the food in store from the last harvest.

The meta-analysis revealed that ICSBC interventions improve food availability (Table 4). *Farmer field schools* ($SMD = 0.09$; 95% CI: 0.02 to 0.17; $p = .02$; $k = 5$) *agricultural extension services* ($SMD = 0.12$; 95% CI: 0.05 to 0.19; $p < .001$; $k = 6$), and *storage and distribution capacity strengthening* ($SMD = 0.13$; 95% CI: 0.07 to 0.19; $p < .001$; $k = 6$) led to a very small to small (SMD below 0.10 and 0.20) and statistically significant increase in food availability. As presented in Table 4, other intervention types showed statistically insignificant effects (meaning that the effect observed is not fully attributable to the intervention) or lacked evidence to conduct a meta-analysis, thereby preventing us from analysing the effect of these interventions on food *availability*.

After excluding high-risk-of-bias estimates from our body of evidence, we observed positive, very small to small, and non-significant effects, each based on only one estimate. For *the farmer field schools*, one remained after excluding high-risk-of-bias estimates: In Tanzania, Larsen and Lilleør (2014) analysed the effect of the Rural Initiative for Participatory

Agricultural Transformation (a programme combining hands-on, participatory learning and the introduction of a series of technology options) but observed a statistically insignificant effect on the availability of quality flour ($\hat{g} = -0.004$; 95% CI: -0.1 to 0.1 ; $p = .94$).

For *agricultural extension services* in Ghana, Beyuo and Anyidoho (2022) analysed the effect of a participatory training for agricultural extension officers promoting sustainable soil and water management, and observed a statistically insignificant effect on the yield of maize ($\hat{g} = 0.18$; 95% CI: -0.07 to 0.45 ; $p = .17$). No other interventions had sufficient low-risk-of-bias data to report.

Table 4: Summary of meta-analysis results: effect of ICSBC interventions on food availability

Intervention domains	Intervention types	SMD	95% CI	k (% of high risk of bias estimates)	p-value
Food supply	Farmer field schools	0.09	0.02, 0.17	5 (100%)	.02
	Agricultural extension services	0.12	0.05, 0.19	6 (83%)	<.001
	Workshop / short training [†]	0.005	-0.08, 0.09	4 (100%)	.90
	Peer-to-peer learning	Not enough evidence available to run a meta-analysis			
	Information and guidance	0.15	-0.02, 0.31	2 (100%)	.08
Consumer behaviour	Peer support/counsellors; Classes ¹⁴	0.09	-0.09, 0.26	2 (100%)	.33
	Community meeting	Not enough evidence available to run a meta-analysis			
	Healthy food social marketing campaigns	Not enough evidence available to run a meta-analysis			
	Professional services (dietitians/nurses)	Not enough evidence available to run a meta-analysis			
	Door to Door	Not enough evidence available to run a meta-analysis			
Food environment	Storage/distribution capacity strengthening[†]	0.13	0.07, 0.19	6 (100%)	<.001
	Process and packaging education and capacity strengthening	Not enough evidence available to run a meta-analysis			

Note: SMD = Standardised Mean Difference. 95% CI = 95% Confidence Interval. k = number of estimates. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. The percentage of high risk of bias and "k" does not account for outliers that may be **reported** narratively in case of "low" or "some concerns" risk of bias assessment. Interventions in bold indicate a statistically significant effect. We follow the thresholds of GRADE for the analysis of size of effect: very small ((SMD) ^below 0.10), small ((SMD) ^below 0.20), moderate ((SMD) ^below 0.37), large ((SMD) ^over 0.37).

The moderator analysis showed that context and programme design influenced the effect size of ICSBC interventions on food availability. For *agricultural extension services*, interventions implemented in areas with higher environmental vulnerability, as measured by the GDL Vulnerability Index (GVI), had smaller effects than studies in lower environmental vulnerability contexts. We observed a similar phenomenon for *storage and distribution capacity strengthening*.

¹⁴ The two included studies under the peer support/counsellors and classes intervention categories are multi-component studies analysing both types of interventions together; they have been grouped into one unique category here.

These contexts may face deeper structural environmental challenges that could limit intervention success. However, interventions in areas facing ongoing environmental risks or crises delivered larger effects than those without ongoing risks, suggesting that support had the greatest effect where the need was most immediate. Other intervention types did not show statistically significant variation based on moderator variables, or lacked enough data to conduct moderator analysis (Table 5).

Table 5: Summary of moderator analysis results: effect of ICSCB interventions on food availability

Intervention domains	Intervention types	Moderator analyses
Food supply	Agricultural extension services	<i>Smaller</i> effects of interventions implemented in contexts of higher vulnerability (based on GVI score) compared to lower vulnerability contexts <i>Larger</i> effects of intervention implemented in contexts of ongoing risk or crisis compared to non-affected contexts
Food environment	Storage/distribution capacity strengthening[†]	<i>Smaller</i> effects of interventions implemented in contexts of higher vulnerability (based on GVI score) compared to lower vulnerability contexts

*Note: This table only reports statistically significant findings from moderator analyses. Other moderator analyses are not reported here. Full details on the moderator analyses are available in the technical Online appendix E. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis. Intervention types in **bold** indicate a statistically significant effect on the meta-analysis.*

With only two studies reporting estimates for vulnerable groups, we could not run an additional subgroup meta-analysis. These two studies reported the effects of interventions on female farmers and female-headed households. In Ghana, Tambo et al. (2023) analysed the effects of a pest-risk information service. This programme was implemented during the maize cropping seasons to help farmers manage pest outbreaks by combining satellite data, weather information, and pest modelling to forecast outbreak risks and communicate these to farmers through voice SMS messages. The authors did not observe a statistically significant effect on maize yield among female-headed households ($\hat{g} = 0.40$; 95% CI: -0.04 to 0.85 ; $p > .05$).

In Mali, Osei et al. (2018) reported effects of an Alliance for Green Revolution in Africa (AGRA) programme that provided farmers with face-to-face training on post-harvest handling, quality management, and marketing, while also sending a randomly selected group mobile phone reminders aligned with key stages of the agricultural cycle. The study observed moderate, positive, and statistically significant effects on the reduction of pre-harvest crop losses ($\hat{g} = 0.17$; 95% CI: 0.07 to 0.27 ; $p < .01$), and did not observe a statistically significant effect for the subgroup of female farmers ($\hat{g} = 0.07$; 95% CI: -0.04 to 0.17 ; $p > .05$).

5.2 Food access

Food access refers to the economic, social, and physical resources and means needed to obtain appropriate and nutritious food without compromising satisfactory access to other basic needs (HLPE 2020). Our body of evidence included 38 studies that measure food access, making it the most evaluated pillar. The evidence base encompassed 15 countries and 38 programmes, with 12 studies using an experimental design and 26 studies using a

quasi-experimental design. Commonly reported indicators included the household food insecurity access scale, the value of food consumption (defined as total, per capita or per time period), the household hunger score, and the prevalence of hunger.

These studies included the work of Santoso (2019) in Tanzania, who analysed the effect of the Singida Nutrition and Agroecology Project in 20 villages. In this programme, local mentor farmers were trained using the 'farming for change' curriculum (designed for farmers with limited formal education) and learned through hands-on methods that connected farming with climate change, nutrition, and social equity.

These mentor farmers then shared their knowledge with peers, encouraged household experimentation, and held regular meetings and visits to support learning and problem-solving. Each household received legume seeds to trial new practices, and mentor farmers were given bicycles and a small stipend. The study analysed the effect of the programme on the Household Food Insecurity Access Scale and the proportion of households with moderate hunger.

We found that some ICSBC interventions improve food access (Table 6). *Farmer field schools* showed a small and statistically significant increase in food access ($\overline{SMD} = 0.11$; 95% CI: 0.01 to 0.21; $p = .03$; $k = 7$).

We observed similar direction, magnitude, and significance of effects for *community meetings on food access* ($\overline{SMD} = 0.15$; 95% CI: 0.01 to 0.31; $p = .04$; $k = 5$). *Agricultural extension services* showed positive, very small, and statistically significant effects on food access ($\overline{SMD} = 0.08$; 95% CI: 0.01 to 0.15; $p = .03$; $k = 11$). *Storage and distribution capacity strengthening* showed statistically significant results, with a moderate increase in food access ($\overline{SMD} = 0.16$; 95% CI: 0.07 to 0.26; $p < .001$; $k = 7$).

All other intervention types showed no statistically significant effects (Table 6) or did not have enough evidence to run a meta-analysis. No intervention showed negative and statistically significant effects.

After excluding high-risk-of-bias estimates, most interventions showed either very small, non-significant, positive or negative effects. Overall, they included a very limited number of estimates or lacked sufficient estimates for analysis. After excluding high-risk-of-bias estimates, we observed positive and large effects of *agricultural extension services* ($\overline{SMD} = 0.50$; 95% CI: 0.10 to 0.92; $p = 0.01$; $k = 2$) and *farmer field schools* ($\overline{SMD} = 0.74$; 95% CI: -0.07 to 1.55; $p = 0.07$; $k = 3$), though the latter did not reach statistical significance.

Examples of food production systems studies with low risk of bias include the work of Bonan and Pagani (2018) in Uganda. The authors analysed the effects of junior farmer field schools on the food consumption score, but effects were not statistically significant ($\hat{g} = 0.14$, 95%CI: -0.03 to 0.30, $p > .10$). In Tanzania, Larsen and Lilleør (2014) analysed the effect of the 'rural initiatives for participatory agricultural transformation' approach on the prevalence of hunger. The authors observed a small, positive, and statistically significant effect of the intervention ($\hat{g} = 0.18$, 95%CI: 0.09 to 0.28, $p < .01$).

However, one estimate remained for *peer support and counsellors*. In Ghana, Banerjee et al. (2017) analysed the effects of the Graduating the Ultra Poor project on the experience of days without food in the household and observed a not statistically significant effect of the intervention ($\hat{g} = 0.06$, 95%CI: -0.02 to 0.14, $p > .10$).

Table 6: Summary of meta-analysis results: effect of ICSCB interventions on food access

Intervention domains	Intervention types	SMD	95% CI	k (% of high risk of bias estimates)	p-value
Food supply	Farmer field school[†]	0.11	0.01, 0.21	7 (71%)	.03
	Agricultural extension services[†]	0.08	0.01, 0.15	11 (83%)	.03
	Workshop / short training [†]	0.38	-0.003, 0.75	7 (100%)	.052
	Peer-to-peer learning	0.07	-0.22, 0.35	4 (100%)	.64
	Information and guidance	Not enough evidence available to run a meta-analysis			
	Peer support/counsellors [†]	0.07	-0.001, 0.14	7 (86%)	.07
Consumer behaviour	Classes[†]	-0.31	-0.81, 0.19	4 (100%)	.22
	Community meeting[†]	0.15	0.01, 0.31	5 (100%)	.04
	Healthy food social marketing campaigns [†]	0.07	-0.005, 0.15	3 (100%)	.07
	Professional services (dietitians/nurses) [†]	0.05	-0.003, 0.10	2 (50%)	.07
	Door-to-door	0.07	-0.03, 0.16	3 (100%)	.2
Food environment	Storage/distribution capacity strengthening[†]	0.16	0.07 0.26	7 (100%)	<.001
	Process and packaging education and capacity strengthening	Not enough evidence available to run a meta-analysis			

Note: SMD = Standardised Mean Difference. 95% CI = 95% Confidence Interval. k = number of estimates. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. The percentage of high risk of bias and "k" does not account for outliers that may be reported narratively in case of "low" or "some concerns" risk of bias assessment. Interventions in bold indicate a statistically significant effect. Interventions in bold indicate a statistically significant effect. We follow the thresholds of GRADE for the analysis of the size of effect: very small (SMD below 0.10), small (SMD below 0.20), moderate (SMD below 0.37), and large (SMD over 0.37).

The moderator analysis highlighted that improving food access is a complex challenge. The effectiveness of interventions changed depending on when, where, and how they were delivered. The large number of factors found to influence results suggests that food access is shaped by many overlapping conditions, such as crisis context, vulnerability level, intervention timing, and design choices. This complexity makes it difficult to achieve consistent and widespread effects across different populations and settings (Table 7):

- *Agricultural extension services*: interventions that were implemented more recently had larger effects than those implemented earlier. Further, interventions with longer exposure to intervention activities had smaller impacts than those with shorter exposure. This could mean that ongoing support is needed to maintain results. We also found that studies analysing the effect of interventions that focus on mitigating negative effects of crises tended to show larger effects than those with another focus. Finally, the assessed intervention implemented by international aid agencies showed a larger effect than interventions not involving this actor.
- *Peer-to-peer learning*: evaluations showed a larger effect of interventions implemented in Eastern African than those in Western Africa, and of interventions

mitigating the negative effects of crises compared to interventions not including this aspect.

- *Classes, community meetings, and healthy food social marketing campaigns*: effects were generally smaller when the first year of intervention delivery had been initiated more recently, compared to those implemented earlier. Effects were also smaller when interventions took place in higher-vulnerability areas compared to lower-vulnerability areas, according to indices such as the World Risk Index (WRI), GVI, the ND-GAIN Index, and INFORM.
- *Peer support and counsellors*: the analysis of moderators for *peer support and counsellors* also revealed smaller effects from interventions initiated in more recent years, and from interventions implemented in the context of higher environmental vulnerability, according to the WRI. Similarly, drought appeared to affect intervention impacts: we observed a smaller effect of interventions implemented in drought contexts compared to those in non-affected contexts. Finally, interventions implemented by international aid agencies showed smaller effects than those implemented by other actors.
- *Professional services*: professional services such as assistance from dietitians and nurses were more effective when participants had longer exposure to intervention activities and were followed up with over a longer period.

Table 7: Summary of moderator analysis results: effect of ICSBC interventions on food access

Intervention domains	Intervention types	Moderator analyses
Food supply	Agricultural extension services [†]	<i>Larger</i> effect of interventions initiated in recent years compared to older interventions
		<i>Smaller</i> effect of interventions with longer exposure
		<i>Larger</i> effect of interventions focusing on the mitigation of the negative effects of crises compared to other focuses
Consumer behaviour	Peer support/ counsellors [†]	<i>Larger</i> effect of interventions implemented by international aid agencies
		<i>Larger</i> effect of interventions implemented in Eastern African compared to Western Africa
		<i>Larger</i> effect of interventions mitigating the negative effects of the crisis compared to interventions not including this aspect
Consumer behaviour	Classes [†]	<i>Smaller</i> effects of interventions initiated in more recent years
		<i>Smaller</i> effect of intervention implemented in the context of higher environmental vulnerability (based on WRI)
		<i>Smaller</i> effect of intervention implemented in contexts of drought compared to non-affected contexts
Consumer behaviour	Community meeting [†]	<i>Smaller</i> effect of the intervention implemented by international aid agencies compared to other actors
		<i>Smaller</i> effect of interventions initiated in recent years compared to older interventions
		<i>Smaller</i> effect of interventions implemented in the context of higher vulnerability according to WRI, compared to lower vulnerability contexts
		<i>Smaller</i> effect of interventions initiated in recent years compared to older interventions

Intervention domains	Intervention types	Moderator analyses
		<p><i>Smaller</i> effect of interventions implemented in the context of higher vulnerability according to WRI and GVI, compared to lower vulnerability contexts</p> <p><i>Smaller</i> effect of intervention implemented in contexts of drought compared to non-affected contexts</p> <p><i>Smaller</i> effect of intervention implemented by international aid agencies compared to other actors</p>
	Professional services [†]	<p><i>Larger</i> effect of interventions with longer exposure</p> <p><i>Larger</i> effect of intervention with longer follow-up</p>
	Healthy food social marketing campaigns [†]	<p><i>Smaller</i> effect of interventions initiated in recent years compared to older interventions</p> <p><i>Smaller</i> effect of interventions implemented in the context of higher vulnerability according to the ND-GAIN Index, compared to lower vulnerability contexts</p> <p><i>Smaller</i> effect of interventions in the context of projected higher vulnerability according to INFORM, compared to lower vulnerability contexts</p>

*Note: Table reports statistically significant findings from moderator analyses. Other moderator analyses are not reported here. Details on the moderator analyses are available in the technical Online appendix E. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. Intervention types in **bold** indicate a statistically significant effect on the meta-analysis.*

The body of evidence reporting results for vulnerable groups (n = 6) and the diversity of interventions and comparison groups precluded us from running any additional subgroup analysis of intervention effects. Evidence from independent effects on some of the most vulnerable groups in the context of environmental risks and crises was generally small and inconsistent. The presence of both positive and negative findings underscored the importance of careful targeting, context-specific design, and ongoing monitoring among groups that may require more intensive or longer-term support, such as:

- *Female recipients, female farmers, and female-headed households*: Tambo et al.'s (2023) analysis of the pest-risk information service in Ghana did not observe a statistically significant effect of the intervention on the household hunger scale score of female recipient households ($\hat{g} = -0.37$; 95% CI: -0.81 to 0.07 ; $p > .05$).

In Togo, Briaux et al. (2020) focused on a pilot unconditional cash transfer programme that provided community-based support alongside monthly cash payments to women during the first 1,000 days of their child's life. The intervention increased women's food access to at least three meals in the previous 30 days with a very small, positive, and statistically significant effect ($\hat{g} = 0.09$; 95% CI: 0.01 to 0.18 ; $p = .02$).

Finally, in Mali, Osei et al. (2018) analysed an AGRA programme that organised farmers into cooperatives and provided in-person training. Among female farmers, they did not observe a statistically significant effect of the intervention on hunger incidence ($\hat{g} = -0.02$; 95% CI: -0.16 to 0.13 ; $p > .10$).

- *Children and adolescents*: the study from Briaux et al. (2020) in Togo also did not observe a statistically significant effect of the intervention on minimum meal

frequency among 6 to 23-month-old children ($\hat{g} = 0.01$; 95% CI: -0.08 to 0.10 ; $p > .10$). In Nigeria, Carneiro et al. (2021) analysed the effect of the Child Development Grant Programme, which provided unconditional cash transfers and information on recommended practices for pregnancy and infant care. They did not find a statistically significant effect of the intervention on food expenses for children ($\hat{g} = 0.16$; 95% CI: -0.007 to 0.32 ; $p > .05$). In Tanzania, Wang et al. (2024) analysed the effects of an intervention providing school meals, nutrition education, school gardens, and community workshops, but did not observe a statistically significant effect on food access among adolescents ($\hat{g} = -0.23$; 95% CI: -0.38 to 0.08 ; $p < .05$).

5.3 Food utilisation

Food utilisation is the intake of sufficient, adequate, and safe food to meet nutritional needs, and the proper consumption of nutrition essentials for energy production, immune function, and disease prevention (HLPE 2020). Our body of evidence included 35 studies measuring *food utilisation*, making it the second-most evaluated pillar in our body of evidence. The evidence comprised 16 countries and 35 programmes, with 15 studies using an experimental design and 20 studies using a quasi-experimental design.

The included studies primarily reported indicators of dietary diversity at the household or individual level, such as the number of different food groups consumed over a specific reference period. Other measures included the number of meals (total eating occasions or meal frequency), food intake (amount and type of food consumed), food consumption (intake of specific foods or food groups), and anthropometric measurements (physical measurements of the body used to assess growth, nutritional status, and body composition, including height, weight, and body mass index). To account for differences in indicators, we analysed studies measuring anthropometric outcomes separately from those focusing on dietary diversity.

Examples of studies focusing on *food utilisation* included the MAHAY study by Galasso et al. (2019) in Madagascar, which tested whether adding intensive counselling, lipid-based nutrient supplements, and early childhood stimulation to the existing government-run nutrition education and child-growth monitoring programme could further improve children's nutrition and development. The authors provided findings related to both food diversity and anthropometric indicators. For the former, the study analysed the effect of the intervention on dairy intake, dietary diversity, and the quantity of meat, fish, and egg intake in the last 24 hours. For the latter, the study looked at the effects of the intervention on length-for-age, stunting, and weight-for-age.

5.3.1 Food diversity

The meta-analysis of the effect of ICSCB interventions on *food utilisation through food diversity* showed promising effects among the food supply and consumer behaviour intervention domains (Table 8). Participation in *farmer field schools* led to very small, statistically significant increases in food diversity ($\widehat{SMD} = 0.07$; 95% CI: 0.01 to 0.12 ; $p = .04$; $k = 5$). *Agricultural extension services* ($\widehat{SMD} = 0.14$; 95% CI: 0.06 to 0.22 ; $p < .001$; $k = 6$) and *community meetings* ($\widehat{SMD} = 0.14$; 95% CI: 0.02 to 0.25 ; $p = .02$; $k = 5$) also produced small, statistically significant increases in food diversity.

Finally, ***healthy food social marketing campaigns* resulted in a moderate and statistically significant increase in food diversity ($\widehat{SMD} = 0.29$; 95% CI: 0.11 to 0.48 ; $p <$**

.01; k = 2). However, this effect is only based on two studies. For all other interventions, we did not find statistically significant effects on food diversity.

After removing high-risk-of-bias estimates, very few estimates remained. For *agricultural extension services*, MacPherson and Sterck (2021) analysed the effects of the Kalobeyei Integrated Socio-Economic Development Programme in Kenya on participants' dietary diversity and observed a positive, large, and statistically significant effect ($\hat{g} = 0.41$; 95% CI: 0.17 to 0.64; $p < .01$). For *Farmer field schools*, Bonan and Pagani (2018) analysed the effects of the Uganda Junior Farmer Field Schools programme on the household dietary diversity score but did not observe a statistically significant effect ($\hat{g} = 0.11$; 95% CI: -0.06 to 0.28 ; $p > .10$).

Table 8: Summary of meta-analysis results: effect of ICSSBC interventions on food diversity

Intervention domain	Intervention type	SMD	95% CI	k (% of high risk of bias estimates)	p-value
Food supply	Farmer field schools[†]	0.07	0.01, 0.12	5 (80%)	.04
	Agricultural extension services	0.14	0.06, 0.22	6 (83%)	<.001
	Workshop / short training [†]	0.12	-0.01, 0.24	5 (100%)	.07
	Peer-to-peer learning	0.07	-0.04, 0.19	4 (100%)	.21
	Information and guidance	Not enough evidence available to run a meta-analysis			
Consumer behaviour	Peer support/counsellors [†]	0.03	-0.05, 0.11	6 (100%)	.47
	Classes	0.04	-0.11, 0.20	6 (100%)	.58
	Community meeting	0.14	0.02, 0.25	5 (100%)	.02
	Healthy food social marketing campaigns	0.29	0.11, 0.48	2 (100%)	<.01
	Professional services (dietitians/nurses)	Not enough evidence available to run a meta-analysis			
Food environment	Door to Door [†]	-0.001	-0.11, 0.11	3 (100%)	.97
	Storage/distribution capacity strengthening	0.09	-0.003, 0.14	5 (100%)	.18
	Process and packaging education and capacity strengthening	Not enough evidence available to run a meta-analysis			

Note: SMD = Standardised Mean Difference. 95% CI = 95% Confidence Interval. k = number of estimates. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. The percentage of high risk of bias and "k" does not account for outliers that may be reported narratively in case of "low" or "some concerns" risk of bias assessment. Interventions in bold indicate a statistically significant effect. Interventions in bold indicate a statistically significant effect. We follow the thresholds of GRADE for the analysis of the size of effect: very small (\widehat{SMD} below 0.10), small (\widehat{SMD} below 0.20), moderate (\widehat{SMD} below 0.37), large (\widehat{SMD} over 0.37).

The results of the moderator analyses showed that context, intervention features, and methodology may influence the effectiveness of interventions in different ways (Table 9):

- *Community meetings* targeting rural communities produced larger effects compared to those not targeting these communities. *Community meetings* had a lower effect

when implemented in areas of higher vulnerability (as defined by the ND-GAIN Index) compared to lower vulnerability areas.

- *Workshops/short trainings* produced smaller effects when implemented in higher-vulnerability contexts compared to lower-vulnerability contexts (based on the WRI).
- *Peer support or counselling* interventions were less effective in highly vulnerable settings compared to lower vulnerability areas, according to GVI and in interventions combining ICSBC components with cash transfers (conditional or unconditional), compared to those only providing ICSBC components.
- *Classes* showed smaller effects in areas experiencing drought at the time of the intervention.
- *Storage/distribution capacity strengthening* interventions had larger effects in contexts of higher vulnerability, according to the ND-GAIN Index, compared to lower vulnerability contexts, and smaller effects in contexts of higher vulnerability, according to GVI or a greater risk of crisis in 2050 and 2080, compared to lower vulnerability contexts.

Table 9: Summary of moderator analysis results: effect of ICSBC interventions on food diversity

Intervention domain	Intervention type	Moderator analysis
Food supply	Workshop / short training [†]	<i>Smaller</i> effect of interventions implemented in the context of higher vulnerability (based on WRI score) compared to lower vulnerability contexts <i>Smaller</i> effects of interventions implemented in contexts of higher vulnerability, according to GVI, compared to lower vulnerability contexts <i>Smaller</i> effects of interventions implemented by international aid agencies compared to interventions not involving this actor
	Peer support/counselors	<i>Larger</i> effects of interventions funded by governments compared to interventions not involving this actor <i>Smaller</i> effects of interventions combining the ICSBC components with cash transfers (conditional or unconditional) compared to interventions not including this component
Consumer behaviour	Classes	<i>Smaller</i> effects of interventions in context of drought compared to interventions not facing this hazard <i>Larger</i> effects of interventions implemented among rural communities compared to interventions not targeting this actor
	Community meeting	<i>Smaller</i> effects of interventions implemented in the context of higher vulnerability according to the ND-GAIN Index, compared to lower vulnerability contexts.
	Storage/distribution capacity strengthening	<i>Larger</i> effects of interventions implemented in the context of higher vulnerability, according to the ND-GAIN Index, compared to lower vulnerability contexts. <i>Smaller</i> effects of interventions implemented in contexts of higher vulnerability according to GVI or a greater risk of crisis in 2050 and 2080 compared to lower vulnerability contexts

*Note: Table reports statistically significant findings from moderator analyses. Other moderator analyses are not reported here. Details on the moderator analyses are available in the technical Online appendix E. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. Intervention types in **bold** indicate a statistically significant effect on the meta-analysis.*

The eight studies reporting effect sizes on vulnerable groups were not similar enough to combine within a subgroup analysis. Despite the limited size of the body of evidence, independent studies provided valuable findings on a number of vulnerable groups:

- *Children and adolescents:* In Tanzania, Santoso (2021) analysed the effects of the Singida Nutrition and Agroecology Project and its curriculum of training for farmers on child dietary diversity. Through the provision of results at different time points, they observed the erosion of the intervention's positive and statistically significant effect from large to moderate between July 2016 ($\hat{g} = 0.40$; 95% CI: 0.29 to 0.51; $p < .001$) and January 2019 ($\hat{g} = 0.19$; 95% CI: 0.08 to 0.31; $p < .001$).

In Tanzania, Wang et al. (2024) conducted a randomised controlled trial across six schools with two treatment arms: a full intervention group, which received school meals, nutrition education, school gardens, and community workshops; and a partial intervention group, which received all the same components except school meals. They measured the effects of the two treatment arms on adolescents' diet quality scores, and observed in both cases a positive and statistically significant effect of the intervention—but a much larger effect among beneficiaries of the full intervention group (Partial $\hat{g} = 0.25$; 95% CI: 0.10 to 0.40; $p = .001$; Full $\hat{g} = 2.11$; 95% CI: 1.92 to 2.31; $p < .001$).

Gilligan et al. (2020) looked at improved nutrition through the Integrated Basic Social Services and Social Cash Transfer Pilot Programme in the Oromia and SNNP regions of Ethiopia. The programme integrated support from social workers and community care coalitions to improve access to health, nutrition, education, and complementary services. The authors observed a very small, positive, and not statistically significant effect of the intervention on children's minimum dietary diversity ($\hat{g} = 0.03$; 95% CI: -0.12 to 0.18; $p > .10$).

Galasso et al. (2019) analysed the effects of a lipid-based nutrient supplement and early childhood stimulation intervention in Madagascar. The intervention implemented four treatment arms: (T1) intensive nutrition counselling; (T2) counselling plus child lipid-based nutrient supplements; (T3) counselling plus lipid-based nutrient supplements for pregnant women, breastfeeding mothers, and young children; and (T4) counselling plus early childhood stimulation through home visits. All treatment arms showed no statistically significant effects on children's dietary diversity in the last 24 hours. (T1 $\hat{g} = 0.004$; 95% CI: -0.06 to 0.07 ; $p > .05$; T2 $\hat{g} = 0.01$; 95% CI: -0.05 to 0.08 ; $p > .05$; T3 $\hat{g} = 0.02$; 95% CI: -0.05 to 0.08 ; $p > .05$; T4 $\hat{g} = -0.01$; 95% CI: -0.07 to 0.05 ; $p > .05$).

- *Women:* Galasso et al. (2019) also looked at the effect of the MAHAY study intervention on mothers' dietary diversity scores. The four treatment arms showed a positive and very small effect, but T4 (counselling and early childhood stimulation through home visits) was the only arm with a statistically significant effect (T1 $\hat{g} = 0.02$; 95% CI: -0.05 to 0.08 ; $p > .05$; T2 $\hat{g} = 0.01$; 95% CI: -0.05 to 0.07 ; $p > .05$; T3 $\hat{g} = 0.004$; 95% CI: -0.06 to 0.07 ; $p > .05$; T4 $\hat{g} = 0.07$; 95% CI: 0.002 to 0.13 ; $p = .04$).

In Ghana, Tambo et al. (2023) observed a not statistically significant effect of the pest-risk information service on female-headed household's dietary diversity score ($\hat{g} = -0.29$; 95% CI: -0.72 to 0.15; $p > .10$). Finally, in Togo, Briaux et al. (2020) analysed the effects of an unconditional cash transfer programme combined with

community-based support and did not observe a statistically significant effect on the dietary diversity score of all women ($\hat{g} = 0.05$; 95% CI: -0.03 to 0.13; $p > .10$) and on women of reproductive age ($\hat{g} = 0.001$; 95% CI: -0.08 to 0.08; $p > .10$).

5.3.2 Anthropometric outcomes

Due to the limited number of studies measuring *food security and nutrition* through *anthropometric indicators*, we could only conduct a meta-analysis on a limited number of interventions, all within the consumer behaviour domain: *peer support/counsellors, classes, community meetings, healthy food social marketing campaigns, and professional services (dietitians/nurses)*. None of these interventions showed a significant effect on anthropometric outcomes (Table 10).

After excluding high-risk bias estimates from our meta-analysis, one unique estimate remained from Galasso et al.'s (2019) MAHAY's study in Madagascar. The study randomly assigned participants to one of five groups: the standard government programme (control) or one of four enhanced interventions, as described in Section 5.3.1. They observed a not statistically significant effect of the full package intervention on children's length-for-age Z score ($\hat{g} = -0.01$; 95% CI: -0.07 to 0.06; $p > .10$).

The limited size of the body of evidence limited the ability to run a moderator analysis to one intervention type: *peer support and counsellors*. Although this intervention type did not produce statistically significant effects on anthropometric indicators, the moderator analysis revealed elements that may explain this phenomenon. *Peer support and counselling* were more effective in interventions with longer exposure compared to shorter exposure. However, effects were smaller in settings with high environmental vulnerability (according to the WRI) compared to lower vulnerability settings or interventions aiming for long-term structural transformation, as opposed to interventions that did not include this aspect.

Table 10: Summary of meta-analysis results: effect of ICSBC interventions on anthropometric outcomes

Intervention domain	Intervention type	SMD	95% CI	k (% of high risk of bias estimates)	p-value
Food supply	Farmer field schools	Not enough evidence available to run a meta-analysis			
	Agricultural extension services	Not enough evidence available to run a meta-analysis			
	Workshop / short training	Not enough evidence available to run a meta-analysis			
	Peer-to-peer learning	Not enough evidence available to run a meta-analysis			
	Information and guidance	Not enough evidence available to run a meta-analysis			
Consumer behaviour	Peer support/counsellors	0.01	-0.06, 0.08	6 (83%)	.48
	Classes	-0.04	-0.14, 0.06	4 (100%)	.48
	Community meeting	-0.01	-0.06, 0.04	3 (100%)	.60
	Healthy food social marketing campaigns	0.05	-0.06, 0.16	2 (100%)	.35
	Professional services (dietitians/nurses)	-0.05	-0.24, 0.14	2 (100%)	.61
Food environment	Door to Door	Not enough evidence available to run a meta-analysis			
	Storage/distribution capacity strengthening	Not enough evidence available to run a meta-analysis			
	Process and packaging education and capacity strengthening	Not enough evidence available to run a meta-analysis			

Note: SMD = Standardised Mean Difference. 95% CI = 95% Confidence Interval. k = number of estimates. "+" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. The percentage of high risk of bias and "k" does not account for outliers that may be reported narratively in case of "low" or "some concerns" risk of bias assessment. Interventions in bold indicate a statistically significant effect. Interventions in **bold** indicate a statistically significant effect. We follow the thresholds of GRADE for the analysis of the size of effect: very small (\widehat{SMD} below 0.10), small (\widehat{SMD} below 0.20), moderate (\widehat{SMD} below 0.37), large (\widehat{SMD} over 0.37).

5.4 Food stability

Food stability is the reliable supply of food over time, which involves maintaining adequacy in food availability, access, and utilisation over time, and the ability to maintain these dimensions in the face of risks and crises (HLPE 2020). Our body of evidence comprised 12 studies that measured food stability, covering evidence from 9 countries and 12 programmes, with 5 studies using an experimental design and 7 studies using a quasi-experimental design.

Commonly reported indicators include anxiety over food availability and access (e.g., worry about not having enough food in the lean season, worry about insufficient food for the household), resilience indices (e.g., index of absorptive capacity based on crop diversification, dietary diversity, quantity of food, savings; coping strategies index; resilience capacities), and food insecurity over the course of a year (e.g., number of months in the past 12 in which the household reported experiencing not having enough food).

For example, Pretari (2019) analysed the Climate-Resilient Agriculture and Food Systems project in Ghana, which aimed to build resilience among women and men by promoting resilient livelihood activities, improving the food supply, and regenerating the natural resource base. Pretari's study included an absorptive index indicator assessing factors related to household resilience and well-being, including: (1) diversification of income through off-farm activities and government benefits; (2) crop and dietary diversity; (3) food availability before lean seasons; (4) adequacy of food quantity over the past week; (5) access to drinking water; (6) readiness for weather-related challenges such as low rainfall or flooding; (7) cattle vaccination; (8) savings; (9) ownership of livestock that can be easily traded; and (10) remittances received. These indicators collectively gauged household stability and preparedness against economic and environmental shocks.

Evidence on the effects of ICSBC interventions on food stability was insufficient to assess what works, as it only examined four intervention types, and never exceeded five estimates. **We only observed statistically insignificant results** (Table 11).

Only one estimate remained after excluding those with a high risk of bias. In Ghana, Banerjee et al. (2017) analysed the effects of the Graduating the Ultra Poor project, which provided a comprehensive package of support, including productive asset transfers, financial training, healthcare support, weekly coaching, and cash stipends. The authors looked at the provision of food over time and observed a statistically insignificant effect on all members of the household having enough food every day ($\hat{\theta} = 0.06$; 95% CI: -0.02 to 0.14 ; $p > .10$).

Table 11: Summary of meta-analysis results: effect of ICSBC interventions on food stability

Intervention domain	Intervention type	SMD	95% CI	k (% of high risk of bias estimates)	p-value
Food supply	Farmer field schools	0.08	-0.04, 0.19	2 (100%)	.19
	Agricultural extension services	Not enough evidence available to run a meta-analysis			
	Workshop / short training	0.08	-0.01, 0.17	3 (100%)	.09
	Peer-to-peer learning	Not enough evidence available to run a meta-analysis			
	Information and guidance	Not enough evidence available to run a meta-analysis			
	Peer support/counsellors [†]	0.03	-0.03, 0.08	3 (66%)	.33
	Classes	0.03	-0.04, 0.10	2 (100%)	.39
Consumer behaviour	Community meeting	Not enough evidence available to run a meta-analysis			
	Healthy food social marketing campaigns	Not enough evidence available to run a meta-analysis			
	Professional services (dietitians/nurses)	Not enough evidence available to run a meta-analysis			
	Door to Door	Not enough evidence available to run a meta-analysis			
Food environment	Storage/distribution capacity strengthening	Not enough evidence available to run a meta-analysis			
	Process and packaging education and capacity strengthening	Not enough evidence available to run a meta-analysis			

*Note: SMD = Standardised Mean Difference. 95% CI = 95% Confidence Interval. k = number of estimates. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. The percentage of high risk of bias and "k" does not account for outliers that may be reported narratively in case of "low" or "some concerns" risk of bias assessment. Interventions in bold indicate a statistically significant effect. Interventions in **bold** indicate a statistically significant effect. We follow the thresholds of GRADE for the analysis of the size of effect: very small (\widehat{SMD} below 0.10), small (\widehat{SMD} below 0.20), moderate (\widehat{SMD} below 0.37), and large (\widehat{SMD} over 0.37).*

Based on the limited available evidence, we were unable to conduct moderator analyses to understand the factors that might explain variations between studies.

Two studies provided estimates for vulnerable groups, which were insufficient for a subgroup analysis. Pretari (2019) measured the effects of the Climate-Resilient Agriculture and Food Systems project on the resilience capacities of women-headed households, and did not observe a statistically significant effect on their index of absorptive capacity ($\hat{\theta} = -0.07$; 95% CI: -0.19 to 0.06 ; $p > .10$). Carneiro et al. (2021) examined the Child Development Grant Programme in Nigeria and observed a large, positive, and statistically significant effect on children having enough food in the last year ($\hat{\theta} = 0.37$; 95% CI: 0.20 to 0.53 ; $p < .01$).

While the available evidence on the effects of ICSBC interventions on *food stability* was limited and largely inconclusive, the studies reviewed highlighted the importance of focusing on resilience as a core strategy for achieving lasting food security. Despite the lack of statistically significant impacts across most interventions, the inclusion of resilience-related indicators (e.g., absorptive capacity, coping strategies, dietary and income diversification) underscored the growing recognition that stability is not solely about consistent food supply but also about a household's capacity to anticipate, absorb, adapt and recover from shocks. The studies emphasised the importance of strengthening food system resilience, particularly

among vulnerable populations, to sustain food security in the face of climate variability and other systemic risks.

5.5 Food agency

Food agency is the power to make decisions about food eaten and produced, and the capacity to make decisions and take actions to shape individuals' or communities' relationships with food and food systems. It includes making choices about what to eat, what to produce, and how to produce, process, or distribute food (HLPE 2020). Our body of evidence included 9 studies measuring food agency, making it the least evaluated pillar. The evidence encompassed 6 countries and 9 programmes, comprising 3 studies using an experimental design and 6 studies using a quasi-experimental design.

Commonly reported indicators in the body of evidence included food-decision influence (e.g., the extent to which individuals have a significant influence or decision-making power regarding household food choices), indices of transformative capacity (e.g., composite indicator reflecting a community's or household's ability to enact deeper systemic change in the food system), group membership (e.g., status or extent of participation in social, farmer, or community groups that can influence decisions in the food system), and production decisions (e.g., influence and decision-making power in the agricultural production process).

Examples of studies in this body of evidence included the work of Garbero and Chichaibelu (2018) in Tanzania. They examined the Agricultural Sector Development Programme and Agricultural Service Support Programme, both of which organised farmer field schools and measured the effects of these programmes on participation and inputs in productive decisions and group memberships. In Ethiopia, Abate et al. (2021) studied the Community-Based Integrated Natural Resources Management Project, which provided training in off-farm income-generating activities and offered agricultural extension services. They measured the effect of the intervention on women's participation in watershed committees.

We found that some ICSBC interventions improve food agency, although this finding is nuanced by the limited amount of evidence available, as none of the meta-analyses exceeded five estimates. **Workshops and short trainings produced a small, statistically significant increase in food agency** ($\widehat{SMD} = 0.11$; 95% CI: 0.01 to 0.21; $p = .02$; $k = 3$), **as did peer-to-peer learning on agency** ($\widehat{SMD} = 0.15$; 95% CI: 0.02 to 0.28; $p = .02$; $k = 2$) **and peer support and counsellors** ($\widehat{SMD} = 0.13$; 95% CI: 0.05 to 0.20; $p = .001$; $k = 2$).

Additionally, **community meetings led to very small, statistically significant increases in food agency** ($\widehat{SMD} = 0.09$; 95% CI: 0.02 to 0.16; $p = .01$; $k = 3$). Other interventions failed to show statistically significant effects (Table 12). One estimate remained after excluding those with a high risk of bias (Banerjee et al. [2017] on the effect of the Graduating the Ultra Poor project on women having a major say in food decisions) but did not show significant results.

Table 12: Summary of meta-analysis results: effect of ICSBC interventions on food agency

Intervention domain	Intervention type	SMD	95% CI	k (% of high risk of bias estimates)	p-value
Food supply	Farmer field school	0.11	-0.01, 0.23	4 (100%)	.06
	Agricultural extension services	0.05	-0.14, 0.23	4 (100%)	.62
	Workshop / short training	0.11	0.01, 0.21	3 (100%)	.02
	Peer-to-peer learning	0.15	0.02, 0.28	2 (100%)	.02
	Information and guidance	Not enough evidence available to run a meta-analysis			
	Peer support/counsellors[†]	0.13	0.05, 0.20	2 (100%)	.001
Consumer behaviour	Classes	Not enough evidence available to run a meta-analysis			
	Community meeting	0.09	0.02, 0.16	3 (100%)	.01
	Healthy food social marketing campaigns	Not enough evidence available to run a meta-analysis			
	Professional services (dietitians/nurses)	Not enough evidence available to run a meta-analysis			
	Door to Door	Not enough evidence available to run a meta-analysis			
Food environment	Storage/distribution capacity strengthening	0.11	-0.01, 0.23	4 (100%)	.06
	Process and packaging education and capacity strengthening	Not enough evidence available to run a meta-analysis			

*Note: SMD = Standardised Mean Difference. 95% CI = 95% Confidence Interval. k = number of estimates. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. The percentage of high risk of bias and "k" does not account for outliers that may be reported narratively in case of "low" or "some concerns" risk of bias assessment. Interventions in bold indicate a statistically significant effect. Interventions in **bold** indicate a statistically significant effect. We follow the thresholds of GRADE for the analysis of the size of effect: very small (\widehat{SMD} below 0.10), small (\widehat{SMD} below 0.20), moderate (\widehat{SMD} below 0.37), and large (\widehat{SMD} over 0.37).*

Based on the limited available evidence, we were only able to conduct moderator analyses to understand the factors that might explain variations between studies, for *farmer field schools* and *storage and distribution capacity strengthening*. However, for the latter, none of the moderator analyses' variables significantly contributed to the variation of estimates. For the former, we found that studies analysing the effect of interventions in countries with a higher ND-GAIN Index score (equivalent to a higher vulnerability) showed a larger effect, but that the effect of interventions in countries with a higher WRI score (equivalent to a higher vulnerability) showed a smaller effect.

We also found that studies analysing the effect of interventions in countries projected with higher INFORM 2050 and 2080 scores (equivalent to a higher vulnerability) showed a smaller effect. Finally, studies analysing the effect of interventions focusing on structural transformation to cope with crises showed a smaller effect than those that did not have this focus.

In addition to Banerjee et.al (2017), a limited number of studies analysed effects on vulnerable groups. In Ghana, Pretari (2019) examined the effect of the Climate-Resilient Agriculture and Food Systems project on a women's transformative capacities index, including their control over decisions to sell livestock, participation in community groups, and

access to agricultural land. The authors observed a negative, small, and statistically significant effect of the programme ($\hat{g} = -0.13$; 95% CI: -0.25 to -0.01 ; $p = .03$).

Garbero and Chichaibelu's (2018) analysis of the Agricultural Sector Development Programme and Agricultural Service Support Programme in Tanzania found a positive, small, and statistically significant effect of the interventions on women's participation in influential groups ($\hat{g} = 0.12$; 95% CI: 0.05 to 0.19 ; $p < .001$). Finally, Briaux et al. (2020) studied the effect of a 30-month pilot project providing unconditional cash transfers and community-based support on childhood malnutrition in Togo. The authors found a negative, small, and statistically significant effect of women's empowerment on children's nutrition, health, and education ($\hat{g} = -0.13$; 95% CI: -0.23 to -0.03 ; $p = .01$).

These mixed findings highlighted that simply involving individuals in food systems is not sufficient. Careful design and targeting are crucial to enhancing agency, especially among marginalised groups, meaningfully.

5.6 Food sustainability

Food sustainability is the food system's ability to provide long-term food security and nutrition, as well as the food system practices that contribute to the long-term regeneration of natural, social, and economic systems which ensure the ability to meet long-term food needs (HLPE 2020). Our body of evidence included 12 studies measuring food sustainability covering 7 countries and 12 programmes. One study used an experimental design, and 11 studies used a quasi-experimental design.

Commonly reported indicators included pollution and soil deterioration practices (e.g., use of pesticides, pollution), adoption of climate-resilient or sustainable practices (e.g., adoption of soil and water conservation practices, use of high-yield seeds, crop diversification, sustainable pest control), and institutional adoption of sustainable food production policies (e.g., communal soil and water conservation policies, promotion of integrated pest management).

Examples of studies under this food security pillar included work from Garbero and Chichaibelu (2018) in Tanzania. They assessed the effects of two farmer field school interventions (the Agricultural Sector Development Programme-Livestock, and the Agricultural Service Support Programme) on the adoption of improved sustainable practices. Another example is Sibhatu, Aslihan, and Zucchini's (2022) study in Zambia, where the authors evaluated the effect of the Smallholder Productivity Promotion Programme through the Gini-Simpson Index, which measures crop diversification.

The evidence on the effects of ICSCB interventions on food sustainability was insufficient to confidently assess what works outside of interventions belonging to the food supply domain. Even within this domain, evidence remained scarce, with most interventions covered by two or three estimates.

We found a **moderate and statistically significant increase in food sustainability through farmer field schools** ($\widehat{SMD} = 0.23$; 95% CI: 0.10 to 0.35 ; $p < 0.001$; $k = 3$). **Agricultural extension services resulted in a small and statistically significant increase in food sustainability** ($\widehat{SMD} = 0.13$; 95% CI: 0.02 to 0.24 ; $p = .02$; $k = 5$). No other interventions showed statistically significant results (Table 13), and no estimate remained after removing those with a high risk of bias.

Table 13: Summary of meta-analysis results: effect of ICSBC interventions on food sustainability

Intervention domain	Intervention type	SMD	95% CI	k (% of high risk of bias estimates)	p-value
Food supply	Farmer field schools[†]	0.23	0.10, 0.35	3 (100%)	<.001
	Agricultural extension services	0.13	0.02, 0.24	5 (100%)	.02
	Workshop / short training [†]	0.05	-0.004, 0.12	3 (100%)	.06
	Peer-to-peer learning	0.34	-0.08, 0.77	3 (100%)	.11
	Information and guidance	0.14	-0.09, 0.37	2 (100%)	.22
Consumer behaviour	Peer support/counsellors	Not enough evidence available to run a meta-analysis			
	Classes	Not enough evidence available to run a meta-analysis			
	Community meeting	Not enough evidence available to run a meta-analysis			
	Healthy food social marketing campaigns	Not enough evidence available to run a meta-analysis			
	Professional services (dietitians/nurses)	Not enough evidence available to run a meta-analysis			
Food environment	Door to door	Not enough evidence available to run a meta-analysis			
	Storage/distribution capacity strengthening	0.12	-0.05, 0.29	4 (100%)	.16
	Process and packaging education and capacity strengthening	Not enough evidence available to run a meta-analysis			

Note: SMD = Standardised Mean Difference. 95% CI = 95% Confidence Interval. k = number of estimates. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. The percentage of high risk of bias and "k" does not account for outliers that may be reported narratively in case of "low" or "some concerns" risk of bias assessment. Interventions in bold indicate a statistically significant effect. Interventions in **bold** indicate a statistically significant effect. We follow the thresholds of GRADE for the analysis of the size of effect: very small (\overline{SMD} below 0.10), small (\overline{SMD} below 0.20), moderate (\overline{SMD} below 0.37), large (\overline{SMD} over 0.37).

The scarcity of evidence also limited our ability to run moderator analyses and explore variations of effects between studies to a subset of intervention types. For *agricultural extension services*, we found that interventions implemented in Eastern Africa achieved larger positive effects on food sustainability than those in Western Africa. This might suggest that a difference in farming systems, institutional support, or agricultural environments may have helped these interventions to perform more effectively in the East.

We also found that *agricultural extension* and *storage and distribution capacity strengthening* programmes had smaller effects in areas with higher levels of environmental vulnerability, based on the World Resources Institute's (WRI) vulnerability index, compared to areas with lower vulnerability. For *farmer field school* programmes, effects were smaller in the context of higher projected vulnerability, relative to areas with lower vulnerability.

These results might imply that in communities facing more environmental or socioeconomic challenges, even well-designed interventions may struggle to achieve strong results. In addition, for *workshops and short trainings* and *storage and distribution capacity strengthening*, we observed smaller effects for programmes that were initiated more recently compared to older ones (Table 15).

Table 15: Summary of moderator analysis results: effect of ICSCB interventions on food sustainability

Intervention domains	Intervention types	Moderator analyses
Food supply	Farmer field schools [†]	<p><i>Larger</i> effects of interventions evaluated using statistical matching models relative to ones evaluated using difference-in-differences or fixed-effects</p> <p><i>Smaller</i> effect of interventions in the context of projected higher vulnerability according to INFORM, compared to lower vulnerability contexts</p> <p><i>Larger</i> effect of interventions with an objective to mitigate the negative effects of crises, compared to interventions not including this focus</p>
	Agricultural extension services	<p><i>Larger</i> effect of interventions implemented in Eastern Africa compared to Western Africa</p> <p><i>Smaller</i> effect of interventions implemented in the context of higher vulnerability (based on WRI score) compared to lower vulnerability contexts</p>
	Workshop / short training [†]	<i>Smaller</i> effects of interventions implemented more recently compared to older interventions
	Storage/ distribution capacity strengthening	<p><i>Smaller</i> effect of interventions implemented in the context of higher vulnerability (based on WRI score) compared to lower vulnerability contexts</p> <p><i>Smaller</i> effects of interventions implemented more recently compared to older interventions</p>
Food environment		

Note: Table reports statistically significant findings from moderator analyses. Other moderator analyses are not reported here. Details on the moderator analyses are available in the technical Online appendix E. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. Intervention types in **bold** indicate a statistically significant effect on the meta-analysis.

Two studies provided estimates related to vulnerable groups. This was insufficient to conduct an additional subgroup analysis, but it provided some evidence from specific contexts. In Ghana, Tambo et al. (2023) observed a positive, large, and statistically significant effect of a pest-risk information service intervention among female recipients on the adoption of improved pest-management practices ($\hat{g} = 0.94$; 95% CI: 0.47 to 1.40; $p < .001$).

In Mali, Osei et al. (2018) analysed the effects of an AGRA-approved programme that linked farmers to an aggregator and organised them into cooperatives for shared learning. Among female farmers, they observed a very small, positive, but statistically significant effect on the tackling of practices leading to pre-harvest losses ($\hat{g} = 0.02$; 95% CI: -0.12 to 0.17; $p > .10$).

5.7 Aggregated food security and nutrition

Aggregated food security and nutrition outcomes refer to index measures that combine indicators from two or more of the food security and nutrition pillars. Our body of evidence comprises 14 studies that measured food security and nutrition using cross-pillar aggregated indicators. The evidence base encompassed 12 countries and 14 programmes, with 6 studies using an experimental design and 8 studies using a quasi-experimental design.

Commonly reported indicators in the body of evidence include food security and nutrition indices and the experience of moderate or severe food insecurity. These indicators rely on international indices such as the Food Insecurity Experience Scale, the Household Food Insecurity Access Prevalence or Score, and the Food Security Index, either used independently or combined into aggregated outcomes. They also rely on author-designed indices, combining indicators cutting across food security and nutrition pillars.

One example is a study by MacPherson and Sterck (2021) in Kenya. The authors assessed the effects of the Kalobeyei Integrated Socio-Economic Development Programme on an index of food security based on the Household Food Insecurity Access Prevalence, including nine categories across the food security and nutrition pillars: (1) worrying that the household would not have enough food (availability); (2) were unable to eat preferred food (access); (3) ate limited variety of food (utilisation); (4) ate food they did not want to eat (utilisation); (5) ate smaller meals than needed (access); (6) ate fewer meals in a day (access); (7) had no food at all in the household (access); (8) went to sleep hungry (access); and (9) went a whole day without eating (access).

Despite the scarcity of evidence, especially in the *consumer behaviour* and *food environment* domains, **we observed a promising effect of ICSBC interventions on aggregated food security outcomes (Table 14). Peer-to-peer learning interventions led to moderate and statistically significant increases in aggregated measures of food security and nutrition ($\widehat{SMD} = 0.21$; 95% CI: 0.08 to 0.33; $p = .002$; $k = 2$).**

We also observed very small to small, statistically significant increases in aggregated measures of food security and nutrition through farmer field schools ($\widehat{SMD} = 0.17$; 95% CI: 0.10 to 0.23; $p < .001$; $k = 5$), peer support and counsellors ($\widehat{SMD} = 0.08$; 95% CI: 0.02 to 0.15; $p = .01$; $k = 6$), and classes ($\widehat{SMD} = 0.11$; 95% CI: 0.05 to 0.18; $p < .001$; $k = 2$).

Two estimates under the *peer support/counsellor* intervention type remained after excluding those with a high risk of bias. In Madagascar, Galasso et al. (2019) analysed the effect of the MAHAY study on a household food security score, building on the Household Food Insecurity Scale. The authors observed a statistically insignificant effect of the intervention ($\hat{g} = -0.02$, 95%CI: -0.09 to 0.04 , $p > .05$).

In Ghana, Banerjee et al. (2017) analysed the effects of the Graduating the Ultra Poor project on the food security index, including access to enough food every day, skipped meals, and days without food for adults and children. The authors observed a statistically insignificant effect of the intervention ($\hat{g} = 0.07$, 95%CI: -0.01 to 0.15 , $p > .05$). The average effect of estimates without high risk of bias was not statistically significant ($\widehat{SMD} = 0.02$, 95% CI: -0.08 to 0.11 ; $p = .71$).

Table 14: Summary of meta-analysis results: effect of ICSBC interventions on aggregated food security and nutrition

Intervention domain	Intervention type	SMD	95% CI	k (% of high risk of bias estimates)	p-value
Food supply	Farmer field school[†]	0.17	0.10, 0.23	5 (100%)	<.001
	Agricultural extension services	Not enough evidence available to run a meta-analysis			
	Workshop / short training	-0.09	-0.21, 0.03	2 (100%)	.17
	Peer-to-peer learning	0.21	0.08, 0.33	2 (100%)	.002
	Information and guidance	Not enough evidence available to run a meta-analysis			
Consumer behaviour	Peer support/counsellors[†]	0.08	0.02, 0.15	6 (67%)	.01
	Classes[†]	0.11	0.05, 0.18	2 (100%)	<.001
	Community meeting	0.03	-0.12, 0.18	4 (100%)	.71
	Healthy food social marketing campaigns	Not enough evidence available to run a meta-analysis			
	Professional services (dietitians/nurses)	Not enough evidence available to run a meta-analysis			
Food environment	Door-to-door	Not enough evidence available to run a meta-analysis			
	Storage/distribution capacity strengthening	Not enough evidence available to run a meta-analysis			
	Process and packaging education and capacity strengthening	Not enough evidence available to run a meta-analysis			

*Note: SMD = Standardised Mean Difference. 95% CI = 95% Confidence Interval. k = number of estimates. "†" indicates interventions for which an outlier was identified and removed from the meta-analysis to present the most accurate results. The percentage of high risk of bias and "k" does not account for outliers that may be reported narratively in case of "low" or "some concerns" risk of bias assessment. Interventions in bold indicate a statistically significant effect. Interventions in **bold** indicate a statistically significant effect. We follow the thresholds of GRADE for the analysis of the size of effect: very small (\widehat{SMD} below 0.10), small (\widehat{SMD} below 0.20), moderate (\widehat{SMD} below 0.37), large (\widehat{SMD} over 0.37).*

Moderator analyses allowed us to explore how context and implementation features contributed to variation between study effects for only one intervention type. We found significant moderators for *peer support and counsellor* interventions. When these were combined with conditional or unconditional cash transfers, the reported effects were, on average, larger than those that did not rely on this specific multi-component approach. This finding underscored the added value of integrating financial assistance into behaviour change and counselling strategies.

On average, the effects were larger when the intervention aimed to mitigate the negative effects of crises than for interventions that did not have this focus. Interventions implemented by non-profit organisations reported smaller effects relative to interventions implemented by other types of organisations. Other moderator analyses did not reveal statistically significant differences.

We found very little evidence on vulnerable groups under this outcome. Whilst studies provided measures for women, children, and adolescents in other food security and nutrition pillars, no data were available for these groups under the aggregated food security outcomes. A study by Fuller (2012a) provided evidence on the effects of a food security and

livelihoods support project on fishers and processors in the Democratic Republic of the Congo. The project aimed to strengthen agricultural and fisheries-based livelihoods through capacity strengthening, input, and equipment distribution, and the construction of productive infrastructure.

To measure household food security, the author used six questions adapted from the Household Food Insecurity Access Scale, asking if, in the past four weeks, household members had faced food-related hardships (e.g., eating unwanted food, reducing meal size or frequency, going without food). For each affirmed experience, respondents reported how often it occurred, and a score was calculated based on the frequency of these events. The author observed non-significant results on the effects of the interventions on fishers ($\hat{g} = 0.30$, 95%CI: -0.05 to 0.65 , $p > .05$) and processors ($\hat{g} = -0.20$, 95%CI: -0.48 to 0.08 , $p > .10$).

5.8 Discussion: What works and for whom when building food security and nutrition through ICSBC interventions in SSA

The quantitative analysis of the body of evidence on ICSBC interventions in SSA revealed that several intervention types effectively supported food security and nutrition, while others showed promise depending on the context. Where sufficient data allowed for meta-analyses, we found primarily small to moderate, positive, and statistically significant effects. Across most food security and nutrition pillars, at least one intervention type demonstrated a positive and statistically significant impact. Likewise, most intervention types had a positive effect on at least one outcome, and none showed statistically significant negative effects.

We categorised the findings into four groups (Figure 8):

- Intervention types that *work* in most contexts: showing positive and statistically significant effects regardless of contextual, population, or design features;
- Intervention types that are *promising*: producing positive effects, though these varied depending on implementation context, population, or programme design;
- Intervention types that do not always work: not showing statistically significant effects through meta-analysis, but some individual IEs reported effects in their specific context of implementation; and
- Intervention types for which evidence is missing: having unknown effects due to a lack of available evidence.

Figure 8: What works for food security and nutrition through ICBC in SSA

Intervention Category	Intervention	Food Security and Nutrition Outcomes							
		Food Availability	Food Access	Food utilisation		Food Stability	Food Agency	Food Sustainability	Aggregated Food Security and Nutrition
				Diversity	Anthropometrics				
Food supply	<i>Farmer field school</i>	Green	Green	Green				Light Green	Green
	<i>Agricultural extension services</i>	Light Green	Light Green	Green				Light Green	
	<i>Workshop / short training</i>	Grey	Grey	Grey			Green	Grey	Grey
	<i>Peer-to-peer learning</i>			Grey			Green	Grey	Green
	<i>Information and guidance</i>	Grey						Grey	
Consumer behaviour	<i>Peer support / counsellors</i>	Grey		Grey	Grey		Green		Light Green
	<i>Classes</i>	Grey		Grey	Grey				Green
	<i>Community meeting</i>		Light Green	Light Green	Grey		Green		Grey
	<i>Healthy food social marketing campaigns</i>		Grey	Green	Grey				
	<i>Professional services (dietitians / nurses)</i>		Grey		Grey				
	<i>Door to Door</i>		Grey	Grey					
Food environment	<i>Storage/distribution capacity strengthening</i>	Light Green	Green	Grey			Grey	Grey	
	<i>Process and packaging education and capacity strengthening</i>								

What works in most contexts (positive and statistically significant effect, and not affected by moderators)

What is promising (effects may vary according to context)

What does not always work (not a statistically significant effect)

What is unknown/missing evidence

We identified nine intervention types that consistently worked across diverse settings and contributed to five key outcomes:

- *Food availability: farmer field schools* produced small and positive effects;
- *Food access: storage and distribution capacity strengthening and farmer field schools* produced small and positive effects;
- *Food diversity: healthy food social marketing campaigns, farmer field schools, and agricultural extension services* produced very small to small positive effects;
- *Food agency: workshops and short trainings, peer-to-peer learning, peer support and counsellors, and community meetings* showed very small to small positive effects; and
- *Aggregated food security and nutrition: farmer field schools, peer-to-peer learning, and classes* all led to very small to small positive effects.

Findings on interventions that work on the four pillars mentioned above should be nuanced by the low number of estimates in their respective meta-analyses, which also limited the ability to run moderator analyses and explore the heterogeneity of effects in some instances.

The quantitative analysis highlighted the importance of this heterogeneity according to contextual designs and implementation considerations. Effectiveness often depended on how well the intervention was adapted to local contexts. Several interventions showed promise but required careful tailoring to specific environmental, demographic, or implementation conditions. Our analysis identified five promising intervention types with context-dependent results across five outcome areas:

- *Food availability: agricultural extension services and storage and distribution capacity strengthening* led to very small to small positive effects becoming smaller in contexts of high environmental vulnerability compared to contexts with lower environmental vulnerability;
- *Food access: agricultural extension services* showed moderate positive effects that became larger in recently implemented interventions and with longer exposure to the intervention. *Community meetings* also showed positive effects that varied according to the vulnerability context;
- *Food diversity: community meetings* yielded small effects, but we observed heterogeneity according to moderators, such as showing smaller effects in the context of high vulnerability compared to lower vulnerability;
- *Food sustainability: agricultural extension services and farmer field schools* produced small to moderate positive effects that became smaller in contexts of high environmental vulnerability compared to those of lower vulnerability, or showed larger effects in Eastern Africa compared to Western Africa; and
- *Aggregated food security and nutrition: peer support and counsellors* produced a very small and statistically significant effect that became larger when combined with cash transfers.

The quantitative findings pointed towards the absence of a unique solution to support food security and nutrition through ICSBC in SSA. This highlighted that, if such interventions largely succeed, their effect size depends significantly on the implementer's ability to consider local realities, needs, and opportunities through a locally informed, adaptive, and inclusive design.

Although the quantitative analysis identified *what works*, it also highlighted the importance of knowing *what works for whom*. Our analysis revealed a gap in the evidence regarding what works for vulnerable population groups who often face additional challenges in securing food and nutrition. Although many programmes explicitly targeted women, children, adolescents, displaced people, and rural communities, few evaluations provided subgroup data. This lack of disaggregated evidence limited our ability to assess how interventions specifically affected these vulnerable populations.

Where subgroup data existed, such as for female-headed households, children, and adolescents, we observed differences in the size, direction, and significance of programme effects compared to other beneficiaries. These variations might suggest heterogeneity in intervention effects across population groups, though the evidence was too limited to draw firm conclusions.

We found no impact data for other key vulnerable groups, such as persons with disabilities, marginalised communities, those with limited education or income, or older age groups. This evidence gap highlighted a need to both design interventions that intentionally include vulnerable groups, and to measure and disaggregate their outcomes explicitly. Without doing so, efforts to strengthen food security and nutrition risk leaving behind those who face the greatest barriers.

The observation of evidence gaps in the quantitative analysis confirmed the importance of mixed-methods approaches. While quantitative analysis identified what works and to what extent, qualitative evidence offered additional insight into how and why interventions succeeded or failed in supporting food system resilience, especially in under-documented settings or among vulnerable groups. By capturing local perspectives, implementation challenges, and lived experiences, qualitative data helped to alleviate some of the quantitative evidence gaps, particularly around the heterogeneity of effects, enabling environments, and barriers to participation.

6. Qualitative analysis of the contribution of ICSBC interventions to food system resilience in SSA

Resilience can be broadly defined as the capacity of systems and their actors to prepare for, absorb, adapt to, and recover from shocks and stressors while maintaining long-term functionality and sustainability (Constas et al. 2014; 2021; Berretta et al. 2023; OECD 2014). When applied to the specifics of food systems, we understand food system resilience as the capacity of food systems and their actors to prepare for, absorb, adapt to, and recover from stressors (e.g., climate change, pandemics, economic disruptions) while ensuring stable food security and nutrition (Ensor 2023; Tendall et al. 2015).

While defining food system resilience may be straightforward, FAO highlighted that measuring it is challenging for multiple reasons: the latent construct itself is not directly measurable; there is no single measure of the construct; data are often missing on important components of the food system; and the multidimensional nature of the food system often requires methods for aggregation of data at the country level to capture systems-level resilience (FAO 2021). Indeed, while ensuring access to sufficient, safe, and nutritious food is fundamental to building resilience in individuals, households, and communities, strengthening food system resilience more broadly requires additional leverage and

considerations beyond food security and nutrition outcomes (Bullock et al. 2017; Schipanski et al. 2016; Béné et al. 2016; Haile, Seyoum, and Azmeraw 2022).

Our quantitative analysis (Section 5) revealed effects of several ICSBC interventions on outcomes connected to resilience of food system actors (e.g., food stability, food agency, food sustainability), but also environmental, contextual, or population resilience moderators that may affect these outcomes (e.g., environmental vulnerability, regional focus, scale of intervention). Our qualitative analysis complements the quantitative analysis by exploring additional contributions of ICSBC interventions to other dimensions that could contribute to food system resilience through food system actors.

This section presents evidence from 20 qualitative studies, mixed-methods studies, and process evaluations. We also included 63 descriptive studies, which provided additional evidence to support the themes identified in the qualitative studies. Overall, the qualitative and descriptive studies cover 27 programmes spanning 18 countries, from which 10 analytical themes emerged (see Online appendix D for details on the qualitative studies, mixed methods, and process evaluations).

For each analytical theme, we provide a short policy- and literature-informed presentation of its relevance to building broader food system resilience. We complement this presentation with a synthesis of qualitative evidence drawn from the included studies. We conclude each analytical theme with a short discussion regarding how this consideration in the ICSBC interventions can contribute to strengthening food system resilience.

6.1 Synthesis of qualitative analytical themes

Analytical theme 1: Climate change and environmental factors might constrain programme implementation, limit the uptake of interventions, and push households into precarious coping strategies, particularly in relation to food and nutrition (n = 11; QPM = 7; D = 4).¹⁵

Why this consideration matters for food system resilience:

The 2025 Global Panel on Agriculture and Food Systems highlighted that Sub-Saharan food systems face the challenge of ‘a cascade of crises’ (GPAFSN 2025, 21), among which environmental stresses were particularly prevalent. The report also raised the alarm that some threats are about to intensify, highlighting the need to strengthen food systems to be resilient not just to 1.5 degrees of warming, but to 2 degrees or more (GPAFSN 2025). Building food system resilience in the region will thus require policies, programmes, and approaches to support their transformation and adaptation to climate change (GPAFSN 2025; Mekonnen et al. 2024).

Qualitative evidence from included studies:

The included studies also highlighted climate change as a major constraint to the uptake and continuity of interventions across the region. Recurring droughts, erratic rainfall, floods, and water shortages disrupted planned activities and limited community participation (Biggeri, Ciani, and Ferrannini 2017; Masset et al. 2016). In Ethiopia, the Improved Nutrition through

¹⁵ Data in parentheses provides the total number of studies included in the analytical theme (n), disaggregated between the number of qualitative, process, and mixed-methods evaluations (QPM) and the number of descriptive studies (D).

Integrated Basic Social Services and Social Cash Transfer Pilot Programme faced significant delays due to rainstorms that flooded roads and dried up water sources, making it difficult for staff to reach target communities and for participants to attend sessions (Gilligan 2020).

In Ghana, similar weather-related disruptions undermined the Graduating the Ultra Poor project, halting training sessions, hygiene promotion, and routine data collection (Banerjee et al. 2017). For other programmes, information collection activities such as survey implementation were also affected due to poor weather (Roelen, Devereux, and Dereje 2017). In the Millennium Village Project in Kenya, prolonged drought and severe flooding forced the implementation team to modify delivery mechanisms and provide emergency services to sustain the project (Millennium Promise 2010).

These climate-related disruptions did not just slow down activities; they eroded trust in the interventions themselves and in their ability to support populations in coping with environmental stressors, which is critical for food system resilience. In Kenya, for example, participants in the Millennium Village Project began to express a desire to abandon farming entirely. They described agriculture as too risky due to unpredictable weather, escalating costs, and degrading soils, which discouraged them from engaging in interventions that promoted agricultural resilience (Millennium Promise 2010). South Africa's Homestead Food Production Programme also suffered from the impacts of climate change, which caused migration, particularly among vulnerable populations including youth (Trefry, Parkins, and Cundhill 2014).

Other programmes also suffered from environmental constraints, particularly those related to water. In Uganda, the NOURICITY food safety initiative struggled to meet its goals due to polluted streams and a lack of clean water sources (Fongar et al. 2020). In Ethiopia, crop failures linked to water scarcity undermined participants' ability to adopt improved nutrition and sanitation practices, even when the programme provided relevant guidance (Gilligan 2020).

These cases highlight that interventions could not succeed without simultaneously addressing the environmental systems in which food and nutrition practices took place. Environmental constraints, such as water scarcity and pollution, can undermine food system resilience by decreasing the ability of food system actors to function effectively.

Some programmes, however, managed to adapt in ways that helped participants to cope with environmental stress. In Kenya, the Millennium Village Project supported diversified livelihoods, offering small livestock, tractor services, cooperative support, and microenterprise promotion, which allowed households to absorb climate shocks more effectively (Masset et al. 2016). In Zambia, the Amatheon Outgrower Programme quickly responded to below-average rainfall by adjusting income strategies, enabling participants to maintain financial stability despite poor growing conditions (Amatheon Agri 2017).

Contributing to food system resilience through ICSBC:

In SSA contexts, which are particularly vulnerable to environmental shocks and stressors, ICSBC interventions can be drivers of change for food system resilience, both through their support to households and communities in adapting to climate change and environmental shocks, and through their ability to adapt their approaches to these shocks.

Qualitative evidence showed that climate-related disruptions such as droughts, floods, and water scarcity often constrained programme delivery, reduced participation, and eroded trust in intervention effectiveness, but that some interventions relied on mitigation strategies to absorb and adapt their approaches to these environmental shocks. Lessons from included studies indicate that ICSBC interventions may drive resilience when they are flexible and address environmental realities alongside their behaviour change goals.

These findings highlighted that for ICSBC interventions to contribute effectively to resilience, they must integrate environmental risk considerations, promote adaptive capacities, and support alternative livelihood strategies rather than focusing solely on knowledge or behavioural change in isolation.

Analytical theme 2: Structural inequalities (including gender norms, the urban-rural divide, and socioeconomic vulnerability) appeared as additional instability factors that may weaken the food system resilience (n = 6; QPM = 5; D = 1).

Why this consideration matters for food system resilience:

The analysis of quantitative evidence already highlighted the influence of structural inequalities (e.g., environmental vulnerability, vulnerable groups) on several food security and nutrition outcomes. These structural inequalities also emerged as barriers to food system resilience in the conclusions of international institutions and literature, as they limit the ability of food system actors to mitigate risks and respond to shocks.

In their *ABCD approach* to food system resilience building, De Steenhuijsen Piters et al. (2021) raised the importance of *agency* as a building block of food system resilience. They underscored the need to ‘go beyond the view of vulnerable people as passive victims in the face of external threats or crises’ (Ibid, 6), and to provide the resources required for people and systems to build such agency in the food system. This vision was echoed by the Institute of European Environmental Policy, which emphasised that building sustainable and resilient food systems requires addressing social and environmental inequalities, such as those between urban and rural, poor and rich populations, and across gender lines (Hiller, Bas-Defossez, and Baldock 2021).

Qualitative evidence from included studies:

Studies in our body of evidence also highlighted these structural inequalities, which affected the ability of ICSBC interventions to build resilience. Gender norms and household dynamics limited women’s participation in several programmes.

For example, in Tanzania, women in the Agricultural Sector Development Programme-Livestock and the Agricultural Service Support Programme often missed scheduled sessions because they had to seek permission from their husbands or juggle responsibilities such as cooking, weeding, and collecting firewood (Fakhi and Sikira 2018). In Kenya, women involved in the Millennium Village Project expressed reluctance to join leadership structures or speak up in community meetings. Many cited low literacy and a lack of confidence as reasons for avoiding male-dominated committees (Millennium Promise 2010).

Geographical and infrastructure inequalities further shaped programmes’ ability to enhance food security and nutrition while contributing to food system resilience, with some authors reporting urban and rural gaps in resources. In Nigeria, the National Home-Grown School Feeding Programme highlighted a bias toward urban centres, where better infrastructure

facilitated smoother implementation, while rural areas reported greater difficulties in accessing programme benefits, as well as weaker benefits (Ogidi, Aromolaran, and Ugi 2025).

Authors also reported cases of extreme poverty affecting the livelihoods of participants (Banerjee et al. 2017). In Ethiopia, the Community-Based Integrated Natural Resources Management Project failed to consider important ecological and social differences when selecting intervention sites. By overlooking hydro-climatic conditions and community needs, the programme limited its reach and relevance (IFAD 2021).

Finally, all these characteristics particularly limited the ability of vulnerable groups to cope with crises when they arose. For example, in Kenya, a crisis in milk quantity and quality threatened the competitiveness of the entire industry, but particularly affected smallholder farmers who relied on dairy-milk value chains and, as a consequence, remained poor (Wairimu 2023).

Contributing to food system resilience through ICSBC:

Structural inequalities undermine resilience in the food system because they limit the ability of households and communities to cope with stressors and shocks. However, they also limit the ability of some groups (e.g., women) to fully benefit from interventions that can strengthen their ability to participate in the food system. Our qualitative evidence shows how gender norms, geographical divides, and socioeconomic vulnerability reduced participation and benefit equity.

These findings highlight that ICSBC interventions can support food system resilience by deliberately addressing these structural inequalities through measures such as empowering marginalised groups, tailoring delivery models to rural contexts, or promoting equitable access to resources and decision-making. Tackling these systemic barriers may empower communities, enabling them to adapt to shocks and build more inclusive and resilient food systems over the long term.

Analytical theme 3: The consideration of human, financial, and technical resources, and traditional practices, may facilitate the delivery of culturally adapted resilience-building interventions and prevent harmful approaches in environmentally vulnerable settings (n = 7; QPM = 6; D = 1).

Why this consideration matters for food system resilience:

The Center for Agriculture and Food Systems at Vermont Law School underscored the importance of *inclusivity* for food system resilience approaches, stating that ‘food systems are social systems in which inclusivity is a vital component’ (Harris and Spiegel 2019, 19). For food system resilience to be achieved, processes should be inclusive and involve the perspective of all food system actors, especially the most vulnerable (OECD 2025). The importance of inclusivity in food system resilience has also emerged in advocacy efforts to secure investment in local capacity—by involving communities in agreeing on what is needed to create resilience and building on their knowledge and practice to establish interventions and approaches (Shakya 2016).

Qualitative evidence from included studies:

Several programmes identified a gap between the components of their interventions and the actual conditions of their target populations. Standardised approaches that ignored seasonal,

cultural, or physical constraints led to misalignment. For example, a training scheduled outside of planting seasons in Uganda's National Agricultural Advisory Services programme reduced its relevance (Okoboi, Kuteesa, and Barungi 2013). In Kenya, failing to align with farmers' schedules and habits also resulted in fewer opportunities to benefit from participation in the Wakulima Dairy Ltd programme (Wairimu 2023). In Ethiopia, participants reported being unable to access health posts because of personal limitations (e.g., old age, disability, chronic illness) and a lack of resources to afford transportation (Quinones et al. 2022).

Similarly, some health interventions conflicted with local beliefs or practical limitations, such as long travel distances and a lack of basic supplies. In the Tubaramure programme in Burundi, participants expressed hesitation towards using the intervention's healthcare due to reasons such as an attachment to traditional medicine, long distances to the clinics, and inconsistent service availability (Olney et al. 2013). Even when interventions offered promising solutions, farmers (particularly older or physically constrained individuals) sometimes opted out due to labour intensity or risk aversion (Wairimu 2023).

Finally, interventions to increase crop volume may not consider that farmers see crops as their main source of food. For example, rice farmers in Liberia participating in the Agriculture for Children's Empowerment project would consume rice as a main meal instead of selling it, thereby affecting nutritional, income, and resilience-related outcomes (Rutherford et al. 2016).

Contributing to food system resilience through ICSBC:

Food system resilience-building interventions must be inclusive and contextually grounded, leveraging local human, financial, and technical resources while respecting traditional practices. The evidence showed that interventions that failed to align with these principles lost opportunities to support food security and nutrition further, and fell short of establishing inclusive practices to contribute to wider food system resilience. By integrating local expertise and adopting inclusive approaches, ICSBC interventions can enhance ownership, prevent maladaptive outcomes, and lay the foundation for greater inclusivity—an essential component of long-term food system resilience.

Analytical theme 4: Multi-stakeholder collaboration might build synergies and catalyse structural transformations that may unlock sustainable resilience across the food system (n = 6; QPM = 4; D = 2).

Why this consideration matters for food system resilience:

Policy and research both advocate for the importance of collective action and *connectivity* as drivers of food system resilience. In an article on ways to build resilient local economies, the International Institute for Environment and Development highlighted the need to 'create space for collective action and shared use of resources' (Shakya 2016, 3). They highlighted that this approach to resilience can only be achieved through the involvement of different stakeholders (e.g., pastoralists, farmers, businesses), and that there is a need for reciprocal agreements of support for sustained resilience (Ibid).

Similarly, the OECD listed economic actors, policymakers, demographic groups, and agencies as fundamental actors that food system resilience approaches must engage with for successful programming (OECD 2025). Likewise, the Global Panel on Agriculture and Food Systems for Nutrition recommended participation of all food value chain actors to enhance food system resilience (GPAFSN 2025).

Qualitative evidence from included studies:

Several programmes in the body of evidence relied on these collective approaches involving a wide range of stakeholders across sectors, promoting shared ownership, and generating new opportunities for structural transformation. In Ethiopia, the Improved Nutrition through Integrated Basic Social Services and Social Cash Transfer Pilot Programme created strong partnerships between project officers, agricultural experts, health workers, and water service providers. This cross-sectoral collaboration enabled more integrated support for communities and strengthened the intervention's ability to address food and nutrition insecurity in a coordinated way, while generating bonds between these value chain actors (Gilligan 2020).

Similarly, in Kenya, dairy value chain interventions, such as those by Wakulima Dairy Ltd, brought together actors from both the public and private sectors (including ProDairy, AfricaMilk, veterinary officers, and national agricultural support programmes) to improve milk quality, productivity, and farmer livelihoods (Wairimu 2023). These forms of collaboration not only enhanced technical practices but also improved institutional alignment, creating a platform for sustained engagement and collaboration across the food system.

In other contexts, partnerships extended beyond formal actors to include religious and community organisations. Ethiopia's Community-Based Integrated Natural Resources Management Project, for example, engaged churches and monasteries in awareness-raising sessions on environmental protection. This inclusive approach increased both government ownership and community buy-in, encouraging long-term behavioural change and resource stewardship (IFAD 2021).

Similarly, the Agricultural Value Chains Project in Oromia aligned the interests of cooperatives, firms, local governments, and technical experts, creating incentives that motivated wide-scale participation and investment in value chain development (Biggeri, Ciani, and Ferrannini 2017). These multi-actor models contributed to unlocking the structural changes required to build lasting resilience. They fostered momentum that could extend beyond the initial intervention, supporting replication in other value chains and cooperatives. The NOURICITY project in Uganda followed this approach by involving small informal actors (e.g., local processors, retailers, farmers), recognising their central role in food systems and designing the intervention to support their capacities (Linderhof et al. 2020).

In Kenya's Millennium Village Project, inter-institutional collaboration initiated during the project expanded beyond its scope: the collaboration supported a robust gender equality strategy, which improved women's access to education, income-generating opportunities, and leadership roles (Millennium Promise 2010). This multi-stakeholder approach contributed to addressing some of the socially contextual inequities and barriers to women's participation in the intervention and in their communities, by setting the foundation for collective and inclusive approaches to resilience.

Contributing to food system resilience through ICSCB:

Multi-stakeholder collaboration is critical for food system resilience because it brings together diverse actors to coordinate actions, share resources, and generate systemic change across the food system. Qualitative evidence showed that interventions involving public and private sectors, community groups, and civil society actors could achieve more integrated solutions that not only enhanced food security and nutrition, but also provided opportunities for connectivity across the food system.

Such collaborations may foster shared ownership, improved technical practices, and strengthened institutional alignment, which are essential for sustaining outcomes beyond project lifetimes. These findings suggest that ICSBC interventions can drive resilience across the food system when designed as platforms for collaboration, enabling structural transformation and replication across food value chains and communities.

Analytical theme 5: Existing networks, along with awareness and trust in the programme and institutions, may directly strengthen the resilience of food systems by catalysing participation, ownership, and capacity to manage future shocks (n = 2; QPM = 2; D = 0).

Why this consideration matters for food system resilience:

While interventions can contribute to the formation of networks, building on existing connections is also a resource for food system resilience through interconnection and communication between actors and market segments. In their *ABCD approach to building food system resilience*, De Steenhuijsen Piters et al. (2021) highlighted that this goal can be achieved through both building and maintaining *connectivity* at the community, company, or country level. They argued that connectivity through existing relationships could improve the food system's capacity to respond to shocks through coordinated and united approaches.

Moore et al. (2025) raised this same concept of connectivity as being among the key attributes of food system resilience, and defined it as the ability of food system elements to connect and communicate with one another to mitigate risks and crises.

Qualitative evidence from included studies:

Our body of evidence also reported that, beyond formal partnerships, resilience capacities can also grow from the social characteristics of communities. Trust, familiarity, and awareness of programmes shaped how food system actors engaged with and responded to interventions. In Kenya, farmers involved in group-based activities, such as farmer field schools, reported stronger engagement and more positive perceptions of programme benefits, particularly regarding improvements in milk production and quality (Wairimu 2023). These social networks both reinforced the adoption of good practices and strengthened collective resilience.

Confidence in programme strategies also appeared to encourage sustained participation. In Ethiopia's Agricultural Value Chains Project in Oromia, actors across the value chain clearly understood their roles and perceived direct benefits from the intervention, particularly due to the linkages established between producers and processors. These linkages reduced reliance on intermediaries and helped farmers to secure better prices, thereby improving their economic resilience (Biggeri, Ciani, and Ferrannini 2017).

Farmers and cooperative members expressed more confidence than local government officials in the project's ability to help them manage future risks and shocks, making them a valuable partner in project delivery (Biggeri, Ciani, and Ferrannini 2017). This demonstrated how interventions that are built on strong, transparent relationships, and that acknowledge existing strengths within communities, can foster greater trust and agency among participants.

Contributing to food system resilience through ICSBC:

Existing social networks and trust are essential for resilience across the food system because they foster participation, ownership, and the ability to respond collectively to shocks. While qualitative evidence was limited under this theme, it suggested that interventions leveraging established community connections (e.g., farmer groups, cooperatives) could rely on this

resource to strengthen food security and nutrition benefits and to foster connectivity—a necessary principle of food system resilience. By recognising and strengthening local networks, programmes may enhance both social cohesion and adaptive capacity, laying the foundation for more resilient food systems through networks that endure beyond the life of individual interventions and their effects on food security and nutrition.

Analytical theme 6: Effective, accessible, and context-sensitive communication may determine how well interventions are understood, accepted, and adopted by the local population, and may foster environmental adaptation (n = 5; QPM = 3; D = 2).

Why this consideration matters for food system resilience:

The concept of *connectivity*—highlighted as a core approach for food system resilience—not only relies on existing networks and infrastructures, but also on their ability to connect individuals through shared information and understanding (De Steenhuijsen Piters et al. 2021).

The Institute of European Environmental Policy also highlighted the need for improved communication and access to information in order to build the capacity of food system actors and contribute to their resilience (Hiller, Bas-Defosse, and Baldock 2021). For this connectivity to be successful, approaches must be tailored to the targeted population's means of communication, whether oral, online, or brokered (Mekonnen et al. 2024).

Qualitative evidence from included studies:

Effective communication, especially when sensitive to local languages, dialects, and cultural nuances, was another area that emerged as a core consideration in the body of evidence. Some programmes struggled to convey their objectives and expectations clearly, which sometimes generated confusion or backlash. In Tanzania, for example, messaging around gender equity in the Singida Nutrition and Agroecology Project was misinterpreted, leading to resistance among community mentors (Santoso et al. 2023).

In Ethiopia, the Agricultural Value Chains Project in Oromia faced challenges sharing information across diverse cultural contexts, highlighting the need for context-specific strategies, including mobile tools and e-learning platforms (Biggeri, Ciani, and Ferrannini 2017; UNEP n.d.). Accessible communication, using languages and dialects relevant to the target population, can also be a key implementation resource. As illustrated by experience with Nigeria's Home-Grown School Feeding Programme, this element can level the conditions of intervention access so that people of all backgrounds can benefit from greater ability to adapt to environmental shocks and improved food security and nutrition (Ogidi, Aromolaran, and Ugi 2025).

Contributing to food system resilience through ICSBC:

Effective, accessible, and context-sensitive communication is essential for resilience in the food system. It ensures that interventions are understood, accepted, and adapted to local realities, and it establishes the means of communication necessary for wider connectivity in the food system. Evidence showed that when communication failed to reflect local languages, norms, cultural sensitivities, or commonly used means of communication, it could generate confusion and resistance. However, ICSBC interventions intimately linked to the provision of information and knowledge can foster shared understanding, adaptive learning, and effective communication that can ultimately contribute to community ownership, connectivity, environmental adaptation, and food system resilience.

Analytical theme 7: Trust, transparency, and accountability between project teams, governance actors, and local communities appeared as foundational in the establishment of sustainable partnerships, stability, and collaboration across food system stakeholders (n = 8; QPM = 6; D = 2).

Why this consideration matters for food system resilience:

Accountability is a core requirement for a resilient food system and applies to all actors of the value chain. The International Institute for Environment and Development highlighted the importance of transparent and accountable public funds, as well as the services that hold service providers accountable, thereby allowing stakeholder monitoring and ensuring equity between groups (Shakya 2016).

To sustain food system resilience, multiple perspectives and accountability are required to keep track of objectives and mitigation strategies, and to monitor approaches to cope with stressors across the food system (HYPHA 2024). The OECD summarised these ideas, stating that processes should be *recurring* by incorporating regular reviews, and that learning and accountability mechanisms should be included among the strategies for a resilient food system (OECD 2025).

Qualitative evidence from included studies:

Trust, transparency, and accountability emerged as foundational elements for sustaining engagement across actors in the included programmes. Studies consistently pointed to communication gaps, low transparency, and limited stakeholder involvement as barriers to successful implementation, which ultimately weakened the potential for food system resilience (Rwamigisa et al. 2018).

In Ethiopia and Kenya, for example, unclear selection criteria for cooperatives, and weak information sharing between industries and producers, eroded confidence in the programme's fairness (Wairimu 2023; Biggeri, Ciani, and Ferrannini 2017). Similarly, in Tanzania, participants in a peer-to-peer learning activity highlighted the importance of trust in their mentor's abilities as a driver of their participation in the activities (Santoso et al. 2023).

Conversely, interventions that fostered open dialogue and consistent feedback, such as regular steering committee meetings in the Agricultural Value Chains Project in Oromia, built stronger relationships between implementers and beneficiaries (Biggeri, Ciani, and Ferrannini 2017). In Malawi and Ghana, partnerships with trusted community actors helped to build legitimacy, while in Nigeria, public scepticism over corruption in the Home-Grown School Feeding Programme eroded trust and hindered participation (Ogidi, Aromolaran, and Ugi 2025; Greenpeace 2015; Amatheon Agri 2017).

Contributing to food system resilience through ICSCB:

Trust, transparency, and accountability are foundational to resilience across the food system because they underpin collaboration, equitable participation, and sustainable partnerships. Qualitative evidence highlighted how interventions that prioritised open dialogue, regular feedback mechanisms, and partnerships with trusted local actors could both strengthen relationships and improve programme legitimacy. These practices not only enhanced participation but also fostered collective problem-solving and sustained ownership beyond project lifetimes.

The findings suggest that ICSBC interventions need to embed transparent processes and mechanisms for accountability from the outset, ensuring that all stakeholders share a clear understanding of objectives and responsibilities. Doing so can contribute to building the social capital necessary to respond collectively to shocks and maintain long-term resilience.

Analytical theme 8: Building food system resilience may require the availability of resources, supportive infrastructure, livelihoods, and economic opportunities to generate an enabling environment (n = 5; QPM = 4; D = 1).

Why this consideration matters for food system resilience:

The food system does not function in a silo, but it is connected to the wider spectrum of livelihoods that may strengthen or weaken its resilience. In their list of *policies to promote food system resilience*, the Center for Agriculture and Food Systems (2019) listed a number of livelihoods considerations, such as the means of physical access to food (e.g., transportation and distribution routes, storage capacities) and spare capacities of food systems (e.g., availability of land, farm tools, grain, and seeds), but also the importance of capital diversity—whether social, financial, natural, or physical.

Similarly, in their report on *building sustainable and resilient food systems in Africa*, AGRA underscored the need for upgraded infrastructure that will support food system activities (AGRA 2021), and Moore et al. (2025) listed capital reserves (e.g., social, financial, natural, political) as important *backup* resources that can be used during a disruptive event.

Qualitative evidence from included studies:

One consistent theme across programmes was the importance of tangible inputs and supportive infrastructure in enabling communities to participate meaningfully in ICSBC interventions. In Kenya, for example, the Wakulima Dairy Ltd programme highlighted how logistical challenges (e.g., lack of access to breeding stock, limited credit facilities, delayed soil test results) directly constrained farmers' abilities to meet programme goals (Wairimu 2023). These material limitations reduced not only the efficacy of interventions—underlining the need for adequate financial and infrastructure support—but also their potential support to food system resilience.

In contrast, when interventions successfully combined training with inputs (e.g., fodder seeds, transport, local infrastructure), farmers reported substantial gains, including doubled crop yields, as seen in the Millennium Village Project (Millennium Promise and The Earth Institute 2010). Consideration of factors such as poverty, employment, healthcare, and prevention services could further support livelihoods and build resilience.

Opportunity for economic diversification also emerged as a key enabler of long-term resilience. In Nigeria, the Home-Grown School Feeding Programme not only improved nutritional outcomes but also generated employment in the food manufacturing and service sectors (Ogidi, Aromolaran, and Ugi 2025). Similarly, the Agricultural Value Chains Project in Oromia fostered linkages beyond agriculture, expanding market access and value chain participation across governance and trade domains (Biggeri, Ciani, and Ferrannini 2017).

These cross-sectoral spillovers underscore the importance of aligning ICSBC interventions with broader economic development goals to not only support food security and nutrition but to bring positive externalities to food system resilience through interventions beyond the food system.

Contributing to food system resilience through ICSBC:

Resilient food systems depend on an enabling environment that goes beyond the food system and is supported by resources, infrastructure, and diversified livelihoods. Qualitative evidence showed that ICSBC interventions may benefit from combining training and behaviour change strategies with tangible inputs (e.g., credit facilities, seeds, transport, improved infrastructure) that, in some cases, may not only support food security and nutrition but also contribute to the wider goal of food system resilience by contributing to an enabling environment.

These findings suggest that ICSBC interventions could align with broader economic and infrastructure development strategies to be a resource for more resilient food systems. Such alignment may not only enhance immediate food security and nutrition outcomes but also contribute to strengthening underlying capacities (e.g., financial, physical, and institutional) that enable communities to withstand and recover from shocks.

Analytical theme 9: Government buy-ins and institutional support emerged as important conditions for building an enabling environment that may enhance the sustainability, scalability, and effectiveness of resilience-building initiatives in food systems (n = 3; QPM = 2; D = 1).

Why this consideration matters for food system resilience:

Across policy and research, *governance* appears as a core enabling factor of food system resilience. Without the involvement of national, regional, and local governments in the food system, its resilience cannot be achieved (Hiller, Bas-Defossez, and Baldock 2021). In its *practical approaches to developing resilience strategies for food systems*, the OECD highlighted that food system resilience requires government involvement in order to build policies and approaches towards this objective (OECD 2025).

To enhance government involvement in strengthening food system resilience, international observers highlighted the importance of governance coordination, incorporation of food access into regional and municipal planning, and alignment between nutrition policies and other food system and public health policies (Harris and Spiegel 2019).

Qualitative evidence from included studies:

Institutional and governmental support represented an additional opportunity for ICSBC interventions to contribute to food system resilience. Programmes that aligned with national strategies, such as Ethiopia's Community-Based Integrated Natural Resources Management Project, and its link to the Climate Resilient Green Economy Strategy, gained political buy-in and enhanced the scalability of their results beyond food security and nutrition (IFAD 2021).

Conversely, limited institutional coordination and weak inter-agency linkages restricted the reach and sustainability of other efforts. In Ethiopia's Agricultural Value Chains Project in Oromia, small farm sizes and weak institutional coordination limited farmers' capacity for engagement within value chains. However, the project's alignment with government planning contributed to a positive perception among participants, who viewed this coordination as a valuable foundation for designing broader national agricultural value chain strategies (Biggeri, Ciani, and Ferrannini 2017).

Contributing to food system resilience through ICSBC:

Without institutional commitment and government engagement, it is not possible to build an enabling environment for resilience across food systems. Our body of evidence showed that

programmes that successfully aligned with national strategies and engaged government actors could benefit from political support and scale outcomes beyond immediate food security and nutrition goals.

These experiences underscored that resilience-building interventions require more than technical solutions; they depend on governance structures that facilitate coordination, policy coherence, and resource mobilisation. Government buy-in may not only improve scalability and continuity but also embed interventions within long-term planning frameworks, increasing the likelihood of sustained impact and systemic transformation towards food system resilience.

Analytical theme 10: Interventions that favour economic or environmental gains may lead to a productivity-versus-sustainability dilemma for farmers, which may weaken the long-term resilience of food systems (n = 4; QPM = 3; D = 1).

Why this consideration matters for food system resilience:

Sustainability is also a key condition for building long-term resilience of food systems. It relies on both the ability of the system to maintain food security and nutrition, as well as the sustainable practices of its actors. The Center for Agriculture and Food Systems highlighted this under the concept of *self-regulation*: a food system that can regulate itself without malfunctions, and where disruptions do not cause complete failure (Harris and Spiegel 2019).

The Global Panel on Agriculture and Food Systems for Nutrition noted that food system resilience in SSA will not only rely on food security and nutrition but also on a sustainable, healthy, and diversified access to diets (GPAFSN 2025). AGRA shared a similar observation in its report on food system resilience in Africa, suggesting that building a resilient food system also means making it more sustainable by minimising disruptions (AGRA 2021).

Qualitative evidence from included studies:

Some programmes may present farmers with a trade-off between sustainability and productivity. This can pose a challenge to ensuring profitability for farmer enterprises. The Community-Based Integrated Natural Resources Management Project in Ethiopia promoted environmental conservation structures that addressed sustainability, but failed to provide alternative livelihood opportunities, which, in turn, affected crop productivity and income diversification, which can contribute to resilience (Abate et al. 2021).

This mismatch between making a profit and addressing environmental concerns may also affect farmers' decisions to join a programme (Biggeri, Ciani, and Ferrannini 2017). In contrast, some programmes reported that overemphasising economic outcomes could neglect social and environmental priorities and weaken environmental sustainability (Dengerink 2013).

Contributing to food system resilience through ICSBC:

Sustainability is a core principle of food system resilience that ICSBC interventions can promote and target. The evidence highlighted a persistent tension between short-term productivity gains and long-term sustainability in food systems, particularly among vulnerable populations—which may prioritise short-term individual benefit over long-term contribution to the resilience of the food system.

Through their promotion of long-term sustainable practice that incorporates consideration for immediate food insecurity and malnutrition (particularly among vulnerable groups), ICSBC can contribute to building truly resilient food systems. This may be achieved through a balance of economic growth with sustainable resource use, social equity, and environmental health, ensuring that interventions do not exacerbate vulnerabilities or lock communities into unsustainable practices.

6.2 Discussion: building resilience in SSA food systems through ICSBC interventions

Food system resilience is a complex and multifactorial concept that relies on latent constructs extending beyond the strengthening of food security and nutrition. While the literature highlighted the absence of a single pathway to achieve food system resilience, it acknowledged multiple building blocks that can contribute to its development. The analysis of qualitative evidence on ICSBC interventions in SSA in relation to resilience underscored their potential not only to contribute to food security and nutrition (as presented in the quantitative analysis) but also to establish some of the foundational pathways to food system resilience. The findings highlighted the multifaceted relationship between resilience to environmental risks and crises and the capacity to ensure food security and nutrition for all actors within the food system.

ICSBC interventions have the potential to strengthen food system resilience in SSA when they are designed to be adaptive, inclusive, and integrated within wider institutional and structural frameworks. Environmental shock remains a challenge in this endeavour, and may disrupt programme delivery, reduce participation, and erode trust among communities. Interventions that respond flexibly to these realities by promoting diversified livelihoods, providing alternative income-generating strategies, or adjusting delivery models can support communities to manage risks and sustain engagement. By embedding activities within the environmental and climatic realities of their target contexts, ICSBC programmes may safeguard food security and nutrition outcomes and help to build the adaptive capacity of households and communities in the long term.

Beyond environmental adaptation, ICSBC interventions can enhance resilience by addressing the structural inequalities and resource constraints that shape how communities experience and respond to crises. Gender norms, socioeconomic divides, and rural–urban disparities often limit the ability of households to access, benefit from, and sustain programme outcomes.

Targeted and tailored approaches, such as empowering marginalised groups, adapting delivery models to rural and remote settings, and promoting equitable access to resources and decision-making, can help to overcome these barriers. Moreover, when interventions draw on local knowledge, practices, and capacities, they become more contextually grounded and inclusive. This reinforces both the adaptive capacity of food systems and the foundations for more equitable and sustainable resilience-building strategies.

At the systemic level, ICSBC interventions can serve as platforms for collaboration by fostering trust and strengthening networks across multiple stakeholders. The qualitative evidence suggests that interventions which engage governments, civil society, the private sector, and community actors in coordinated action are likely to generate structural change that extends beyond the life of individual programmes.

Such collaborative approaches may not only improve immediate food security and nutrition outcomes, but also contribute to long-term resilience by embedding resilience-building within broader economic and infrastructural development strategies. Clear communication, transparency, and well-defined roles can further encourage participation, build confidence, and support adaptive capacity through enhanced connectivity and collective action.

Finally, ICSBC interventions that integrate communication strategies adapted to local languages, cultural norms, and preferred channels ensure that information is both accessible and trusted, and can foster connectivity and collaboration across the food system. Alignment with government policies and institutional frameworks can enhance scalability and sustainability, embedding interventions within national planning and resource mobilisation processes. Importantly, programmes that balance short-term economic benefits with long-term sustainability help to avoid trade-offs between productivity and environmental stewardship, thereby safeguarding resilience over time.

Taken together, the qualitative evidence highlighted that ICSBC interventions targeting food system resilience need a holistic approach that is adaptive to environmental shocks, attentive to structural inequalities, collaborative across sectors, and aligned with institutional frameworks. ICSBC interventions may not be the only solution to building food system resilience; however, the qualitative analysis revealed a series of resilience *building blocks* that these interventions may affect. In conformance with the wider policy and research literature, these building blocks of food system resilience can be summarised as follows (Harris and Spiegel 2019; OECD 2025; FAO 2021; GPAFSN 2025; De Steenhuijsen Piters et al. 2021; Moore et al. 2025; AGRA 2021; Hiller, Bas-Defosse, and Baldock 2021):

- *Agency*: Empowering individuals and communities with decision-making power and resources within the food system through inclusive and accountable approaches, thereby strengthening their capacity to cope with external shocks.
- *Buffering*: Establishing reserves, infrastructure, and livelihoods (e.g., food stocks, savings, physical resources) to absorb shocks effectively.
- *Connectivity*: Enhancing physical, informational, institutional, and social linkages to support coordinated responses to shocks.
- *Diversity*: Promoting pluralism across production, consumption, ecological systems, and markets to reduce single points of failure and strengthen self-regulating, sustainable food systems.

Through this combination of strategies targeting building blocks of food system resilience, ICSBC interventions can simultaneously improve food security and nutrition, strengthen the enabling environment, and drive systemic transformation towards more equitable and climate-resilient food systems.

7. Conclusion

7.1 Summary of findings: What works to support food security and nutrition and build resilience through ICSBC interventions in SSA

The mixed-methods analysis revealed several interconnected mechanisms that explained the effects of ICSBC interventions on food security and nutrition, as well as their contribution to the resilience of food systems in SSA in the face of environmental risks and crises. The REA encompassed 53 quantitative IEs, including 18 experimental and 35 quasi-experimental studies, 20 linked mixed-methods and qualitative evaluations, and 63 descriptive documents.

The studies assessed 53 programmes across 20 SSA countries, including 36 multi-component interventions. Despite this comprehensive scope, the evidence remained unevenly distributed. Most studies focused on the food supply domain, while consumer behaviour and food environment domains received less attention. In terms of outcomes, researchers concentrated on food access and utilisation, leaving gaps in evidence for food agency, sustainability, and stability.

Where data existed, both quantitative and qualitative evidence suggested promising impacts of ICSBC interventions across most pillars of food security and nutrition, as well as within the domains of *food supply, food environments, and consumer behaviour*. While ICSBC interventions improved food security and nutrition, the evidence confirmed that no single solution worked universally. Although no meta-analysis reported statistically significant negative effects, no intervention type consistently produced statistically significant positive effects across all food security and nutrition outcomes. In addition, even when the results were significant, the effects tended to be very small to moderate.

The moderator analysis revealed that although several interventions succeed, their effectiveness is highly dependent on their context-specific and population-specific design. We found that the magnitude of effects varied in both positive and negative directions due to factors such as environmental vulnerability, type of funder or implementer, length of exposure to the intervention, length of follow up, and targeting of resilience.

For example, studies analysing the effects of *farmer field schools* on food availability outcomes reported, on average, smaller effects of 0.01 standard deviations in countries with higher GVI scores (equivalent to higher vulnerability, as measured by the GVI) relative to studies in lower environmental vulnerability contexts. Similarly, the effects of *peer support and counsellor* interventions on aggregated measures were smaller by 0.10 standard deviations for interventions funded by non-profit organisations compared to those who were not.

Both qualitative and quantitative sources consistently showed that climate change, environmental risks, and crises played a central role in determining the outcomes of interventions and their ability to build resilience. Environmental shocks not only destabilised communities but also influenced how implementers designed and delivered interventions. For example, environmental conditions affected logistics, shaped household coping strategies, and impacted programme attendance.

Quantitative analyses confirmed that environmental vulnerability, crisis type, and intervention settings influenced the magnitude and significance of programme effects. Qualitative data reinforced this finding by showing that droughts, floods, and heatwaves, and their human consequences (e.g., displacement, epidemics), disrupted participation, affected the delivery of interventions, and created challenges for data collection in vulnerable areas.

The findings highlighted unequal exposure and capacity to respond to environmental shocks across different food system actors. This inequality affected individuals' ability to contribute to and benefit from food systems and ICSBC interventions. Quantitative analyses showed that effects were not homogeneous across the SSA region, as some interventions realised different outcomes in Eastern and Western Africa due to differing environmental conditions and vulnerabilities.

Within regions, rural populations, women, children, and youth faced higher vulnerability. These groups required targeted, tailored interventions to achieve meaningful improvements in food security, nutrition, and resilience. Although many interventions aimed to support these groups, few evaluations reported disaggregated results. The evidence base included data for some subgroups (e.g., female farmers and adolescents) but overlooked others (e.g., persons with disabilities, older adults, marginalised ethnic groups, displaced populations). This limits our current understanding of how interventions work for those most at risk of being left behind.

Additionally, qualitative evidence emphasised the importance of thinking beyond the food system. Qualitative evidence further showed that food system interventions alone could not address the full spectrum of challenges faced by vulnerable communities or guarantee food system resilience. In many contexts, participants lacked basic livelihood resources, such as seeds, credit, infrastructure, or education, which restricted the impact of ICSBC interventions.

Poverty and insecurity forced trade-offs between sustainability and productivity, undermining programme objectives. ICSBC interventions might better support food system resilience when implementers consider broader community needs, such as access to water, healthcare, education, and safety, alongside food and nutrition goals.

Nonetheless, quantitative analyses only provided limited evidence on the additional effect of bundling intervention activities for food security and nutrition outcomes. Although several interventions combined an ICSBC intervention with cash transfers, moderators rarely showed variation in effects, with the exception of *peer support and counsellors* showing larger effects on *aggregated food security and nutrition* when combined with conditional or unconditional cash transfers.

Both quantitative and qualitative findings supported the need for systems-based approaches to food security and nutrition. Most quantitative studies focused on producers and production-related interventions, leaving evidence gaps for other food system actors, such as consumers, processors, and institutions.

However, evidence showed that some interventions targeting *consumer behaviour* and the *food environment* also contributed positively to food security and nutrition outcomes. Qualitative findings reinforced the idea that food system resilience depended on coordinated actions across all food system actors. Strong governance, characterised by transparency,

accountability, multi-stakeholder approaches and support from local authorities, emerged as a key factor in enabling success, as institutions played a crucial role in shaping enabling environments and supporting community-level action that contributes to food system resilience.

Evidence underscored the importance of inclusive, participatory, and locally tailored approaches that are grounded in human rights principles. Qualitative findings emphasised stakeholder engagement and clear communication using local languages and familiar terminology. Because ICSBC interventions rely heavily on participation, implementers needed to design communication strategies that respected participants' knowledge, roles, and contexts.

Adopting a human rights-based approach strengthened these efforts by recognising individuals as rights-holders with agency and by reinforcing principles of equality, accountability, and non-discrimination. The evidence highlighted the importance of leaving no one behind, paying particular attention to vulnerable groups who often face greater barriers to food security and nutrition.

Although many programmes targeted vulnerable groups, few evaluations reported disaggregated data, which limited our ability to assess their specific impacts. Where limited data existed (mainly for female-headed households, children, and adolescents), we observed some differences in specific programme effects, suggesting possible heterogeneity that can only be confirmed through additional evidence. These gaps highlighted the need to design interventions that intentionally include vulnerable populations and measure their food security and nutrition outcomes. Without this, efforts to improve food security, nutrition, and resilience risk excluding those most in need and missing an opportunity to create sustainable change.

7.2 Implications for policymakers and researchers

While there are some exceptions, the overall pattern of evidence suggests that several interventions effectively increase food security and nutrition, with small positive effects, and should be considered in future programming decisions. Due to the small number of studies included in many analyses, most estimates remain imprecise, and we often observe high heterogeneity between studies. The results should be interpreted with some caution, as they are often based on relatively few observations, and most included estimates have a high risk of bias.

However, observations on the risk of bias, availability of evidence, and size of effects are consistent with previous syntheses on the topic (Basak et al. 2024; Berretta et al. 2023) and the wider body of evidence on social protection interventions. The number of findings from the qualitative and quantitative sources provides a rich and promising resource for decision-makers and researchers.

7.2.1 Implications for policymakers and implementers

Overall, the evidence on ICSBC interventions shows promising but mixed results for improving food security, nutrition, and environmental resilience of the food system in SSA, despite the qualifications mentioned above. This REA highlights that while interventions work to improve food security and nutrition with small to moderate positive effects across most food security pillars, their effectiveness varies considerably by context, design features, and implementation approaches.

Based on these findings, we suggest that when designing and implementing ICSCB interventions, policymakers and implementers should consider:

- **Prioritising implementation of interventions that show positive and statistically significant effects on food security and nutrition outcomes in SSA.** These include:
 - *Food supply* interventions:
 - *Farmer field schools* to improve *food availability, access, diversity, sustainability, and aggregated food security and nutrition*
 - *Agricultural extension services* to increase *food availability, access, diversity, and sustainability*
 - *Workshops and short trainings* to improve *food agency*
 - *Peer-to-peer learning* to increase *food agency and aggregated food security and nutrition*
 - *Consumer behaviour* interventions:
 - *Peer support and counsellors* for *food agency and aggregated food security and nutrition*
 - *Classes* to improve *aggregated food security and nutrition*
 - *Community meetings* for *food access, food diversity and food agency*
 - *Healthy food social marketing campaigns* to enhance *food diversity*
 - *Food environment* interventions:
 - *Storage and distribution capacity strengthening* to improve *food availability and access*
- **Matching intervention types to the specific food security and nutrition pillars for which they are most effective. This is more likely to yield meaningful and measurable outcomes, given the diverse pathways through which ICSCB interventions operate.** Strategic targeting of specific food security and nutrition entry points is essential for achieving impact, given that no single ICSCB intervention is effective across all outcomes and contexts. Actors must move beyond broad targeting of food security and nutrition and instead strategically select interventions aligned with their intended entry points, such as food availability, access, utilisation, agency, sustainability, or stability.

By aligning intervention designs with specific food security and nutrition outcomes, decision-makers can maximise impact, ensure efficient resource allocation, and better respond to the complex and context-specific challenges of food insecurity and malnutrition in SSA.

- **Adopting a beneficiary-centred approach that considers *for whom* ICSCB interventions are effective. This is an essential approach; simply identifying which interventions work is insufficient, given substantial variation in outcomes across different populations and contexts.** Evidence from both the quantitative and qualitative analyses underscores substantial heterogeneity in intervention effects, influenced by contextual factors such as levels of environmental vulnerability, target populations, stakeholder involvement in funding or implementation, and the scale or setting of delivery.

Although no consistent patterns emerged across all interventions, these findings highlight the necessity of adopting a beneficiary-centred approach that recognises

variability in outcomes across different population groups. This is particularly salient for marginalised or vulnerable groups (including women and girls, children and youth, and rural communities), for whom evaluations often reported differences in the size, direction, or statistical significance of effects. Effective ICSBC interventions should not only generate measurable impacts on specific food security and nutrition pillars but also maximise positive outcomes across the diverse actors within the food system they aim to support.

- **Recognising that resilience is not a fixed outcome but rather a dynamic and ongoing process that must be nurtured within, across, and beyond the food system.** Strengthening resilience requires more than technical fixes; it necessitates inclusive engagement, trust-building, and investment in social, institutional, and ecological capacities. Without addressing the structural and contextual barriers that limit resilience, especially for vulnerable and marginalised groups, interventions may have limited sustainability or uneven effects. A systems-wide, equity-centred strategy is fundamental for fostering sustainable, adaptable, and just food systems capable of withstanding ongoing and future environmental challenges.
- **Broadening intervention focus beyond food supply** to address underrepresented domains of the food system. While food supply interventions are well-studied, our findings indicate that *storage and distribution capacity strengthening* within the food environment domain, and *peer support* within the consumer behaviour domain, also show significant positive effects that merit greater attention.
- **Adapting to environmental vulnerability as an essential element for success,** particularly in areas with high current or projected environmental vulnerability. Designing context-specific interventions that anticipate and respond to climate variability is essential to avoid disruptions in programme delivery, participant engagement, and food availability, which can undermine the intervention's effectiveness. This may be particularly critical in environmentally vulnerable regions of SSA. The timing of intervention implementation should also be considered and, where possible, aligned to agricultural seasons and periods of acute environmental stress to increase uptake and yield more substantial benefits.
- **Prioritising context-specific approaches and local implementer knowledge** to account for geographical and socio-political variations between Eastern and Western Africa (where intervention effectiveness differed significantly), and maximising intervention effectiveness by emphasising local implementer knowledge.
- **Adopting participatory and multi-stakeholder approaches centred on human rights-based approaches** to secure community buy-in. This generates food system-wide effects and improves the right to food for vulnerable populations. While these principles may seem intuitive, the qualitative evidence provides compelling confirmation of their critical role in ICSBC intervention success.

In this sector, where engagement is at the centre of activities, human rights-based approaches are even more relevant. To increase the likelihood of success, interventions should actively involve community members in design and implementation across all intervention domains. Incorporating local agricultural

knowledge, respecting traditional food practices, and utilising community meeting structures help to create ownership, ensure relevance to local needs and opportunities, and strengthen the enabling environment necessary for sustainable food system transformation.

Effective ICSBC interventions should rely on communication strategies that are locally grounded, culturally appropriate, and delivered in the languages spoken by target communities. Tailoring communication in this way can be a driver of change and ensure impact across food system actors.

- **Targeting interventions to address structural inequalities** related to gender, remoteness, and wealth that create unequal vulnerability. The evidence demonstrates that these factors significantly influence who benefits from interventions, suggesting the need for tailored approaches that specifically consider how to reach the most vulnerable populations.
- **Enhancing intervention design by combining ICSBC components with resource provision.** Consider pairing capacity building with tangible resources (e.g., seeds, credit, infrastructure) to build resilience, especially in contexts where resource constraints are significant barriers.
- **Strengthening institutional frameworks** to create transparent, accountable, and inclusive governance systems. The evidence suggests that the enabling environment created by supportive institutions is critical for sustaining the benefits of ICSBC interventions and building long-term resilience against environmental risks and crises.

7.2.2 Implications for researchers

While the evidence examining ICSBC interventions for food security, nutrition, and environmental resilience in SSA includes some well-studied areas, such as *farmer field schools* and *agricultural extension services* under the *food supply* domain, evidence gaps remain. Overall, the evidence base shows an uneven distribution across intervention types, outcome types, and geographical regions. Additionally, like many fields in development research, many of the reviewed studies have methodological limitations.

Based on these findings, we suggest that when commissioning and designing new research, researchers should consider:

- **Prioritising both primary evidence gaps and geographical gaps.** For example, seek to fill primary evidence gaps for both *consumer behaviour* and *food environment* interventions, and promote the production of evidence on the wider set of food system actors beyond producers. Where feasible, seek to fill geographical gaps in countries such as Somalia, the Democratic Republic of the Congo, Mozambique, Burkina Faso and Niger, which are regularly rated among the most vulnerable contexts, but where evidence is scarce.

Additionally, consider expanding research in Southern and Central Africa, where our review found limited evidence despite these regions facing significant food security challenges and environmental vulnerabilities. Including IEs within new programmes when developing and implementing interventions for which there is a limited evidence base will help to meaningfully fill gaps and support future synthesis efforts.

- **Expanding research on *food environment and consumer behaviour interventions, processing and packaging education, door-to-door approaches, and healthy food social marketing campaigns***, where evidence remains particularly scarce. These intervention types represent critical components of comprehensive food systems approaches, yet the limited evidence base constrains our understanding of their potential to complement well-studied food supply interventions and create synergistic effects across the food system.
- **Improving methodological rigour by bolstering study designs and incorporating mixed-methods approaches.** While some *food supply* interventions are well-studied and show promising results, most estimates had a high risk of bias, with only 5 percent assessed as having a low risk of bias, particularly concerning contamination issues that undermine confidence in the reported effects. Researchers should design studies that minimise risks of spillovers, crossovers, and contamination. When spillovers cannot be controlled at the design stage (e.g., through geographical separation or cluster randomisation), they should be explicitly modelled or adjusted for during analysis.

Additionally, employing mixed-methods approaches that capture both quantitative impacts and qualitative contextual factors is essential. Mixed-methods approaches facilitate a deeper understanding of implementation effectiveness on food security and nutrition outcomes, but also on the considerations and mechanisms contributing to food system resilience.

- **Enhancing outcome measurement and research documentation to support comprehensive food security assessment.** Strategic shifts towards the pillars of agency, stability, and sustainability must be accompanied by a corresponding research approach and evidence to provide timely support for implementation. Our findings show robust evidence clusters on *food access* and *utilisation* outcomes, but *agency, stability, and sustainability* pillars remain underrepresented despite their importance to comprehensive food security.

Additionally, researchers should support evidence synthesis efforts through clear reporting of intervention components and implementation factors, as we found that 22 percent of projects in our quantitative evidence base lacked relevant qualitative information, underscoring the importance of comprehensive documentation to facilitate future knowledge translation and synthesis efforts.

Finally, researchers should aim to disentangle how much of the effect was attributable to each activity, as we found that 66 percent of the included studies provided at least one estimate evaluating the effect of multiple activities.

- **Disaggregating evidence by population group is essential to understanding what works, and for whom, in ICSCB interventions.** The current evidence base reveals notable gaps regarding the effectiveness of interventions for vulnerable or marginalised groups (e.g., women and girls, children and youth, rural populations, persons with disabilities, and individuals with limited education or income). Addressing this gap through evaluations that incorporate heterogeneity analysis will enhance the relevance and utility of research findings.

By systematically examining differential outcomes across demographic and socioeconomic groups, researchers can generate evidence that better informs policymaking and implementation. Such evidence is needed for designing interventions that are effectively tailored to the needs of the most disadvantaged, thereby enhancing the equity and overall impact of ICSCB strategies on food security and nutrition outcomes.

- **Conducting comprehensive longitudinal studies that track interventions from a pre-intervention baseline through extended post-implementation periods to account for shifting environmental conditions and the unpredictable realisation of climate shocks over time.** Research designs should include data collection from before the intervention begins, multiple measurement points during programme implementation, and an extended follow-up period after the project has ended (as impacts may still be manifesting, and the full effects may not be captured without extended longitudinal measurement). Given our finding that timing and recency emerged as statistically significant moderators for some interventions, research designs that capture temporal variations and resilience to specific shocks would substantially strengthen the evidence base beyond the current predominantly short-term evaluations.
- **Contributing to the ongoing update of the FSN EGM** to ensure that new evidence is readily accessible to policymakers and practitioners. As our review was limited to studies available through July 2024, regular updates incorporating new research will be essential to maintain a comprehensive understanding of the evolving evidence landscape on effective interventions.

'Living' EGMs provide continuous evidence surveillance (rather than just a static picture of the evidence) and support rapid evidence synthesis by providing evidence that has already been determined as eligible and has already been coded to the relevant interventions and outcomes. This ensures that decision-makers have access to the most relevant and up-to-date evidence, especially as climate conditions continue to shift.

Online appendices

Online appendix A: List of included interventions and outcomes

<https://3ieimpact.org/sites/default/files/2025-09/DEval-FSN-Report-FINAL-Online-appendix-A.pdf>

Online appendix B: Study designs

<https://3ieimpact.org/sites/default/files/2025-09/DEval-FSN-Report-FINAL-Online-appendix-B.pdf>

Online appendix C: Quantitative and Qualitative analyses tools

<https://3ieimpact.org/sites/default/files/2025-09/DEval-FSN-Report-FINAL-Online-appendix-C.pdf>

Online appendix D: Characteristics tables

<https://3ieimpact.org/sites/default/files/2025-09/DEval-FSN-Report-FINAL-Online-appendix-D.pdf>

Online appendix E: Technical appendices

<https://3ieimpact.org/sites/default/files/2025-09/DEval-FSN-Report-FINAL-Online-appendix-E.pdf>

Online appendix F: Summary of the meta-analyses results

<https://3ieimpact.org/sites/default/files/2025-09/DEval-FSN-Report-FINAL-Online-appendix-F.pdf>

References

Included studies

Quantitative Impact Evaluations

Abate Gashaw Tadesse, de Brauw Alan, Minot Nicholas, Vos Rob, Warner James, Wassie Solomon B, and Yang Shijie. 2021. "Evaluating the Impact of Multi-Intervention Development Projects: The Case of Ethiopia's Community-Based Integrated Natural Resources Management Project." 10.2499/p15738coll2.134856.

Ali Mohamed Kalid, Flacking Renée, Sulaiman Munshi, and Osman Fatumo. 2022. "Effects of Nutrition Counselling and Unconditional Cash Transfer on Child Growth and Family Food Security in Internally Displaced Person Camps in Somalia - A Quasi-Experimental Study." *International Journal of Environmental Research and Public Health* 19 (20): 13441–3441. <https://doi.org/10.3390/ijerph192013441>.

Banerjee, Abhijit, Karlan, Dean, Osei, Robert, Thuysbaert, Bram, and Udry, Christopher. 2017. "Graduation From Ultra Poverty In Ghana." <https://www.povertyactionlab.org/evaluation/graduating-ultra-poor-ghana>.

Barnabas Bulus, Agyemang Sylvester Amoako, Zhllima Edvin, and Bavorova Miroslava. 2023. "Impact of Homegrown School Feeding Program on Smallholders' Farmer Household Food Security in Northeastern Nigeria." *Other* 12 (12): 2408–408. <https://doi.org/10.3390/foods12122408>.

Beyuo, Alexis and Anyidoho Nana Akua. 2022. "An Impact Assessment of Farmer Participation on Food Security in Northwestern Ghana." *The European Journal of Development Research* 34:1831-1856-831–1856. <https://doi.org/10.1057/s41287-021-00444-7>.

Biggeri Mario, Carraro Alessandro, Ciani Federico, and Romano Donato. 2022. "Disentangling the Impact of a Multiple-Component Project on SDG Dimensions: The Case of Durum Wheat Value Chain Development in Oromia (Ethiopia)." *World Development* 153. <https://doi.org/10.1016/j.worlddev.2021.105810>. Linked : Biggeri Mario, Burchi Francesco, Ciani Federico, and Herrmann Raoul. 2018. "Linking Small-Scale Farmers To The Durum Wheat Value Chain In Ethiopia: Assessing The Effects On Production And Wellbeing." *Food Policy* 79:77–91. <https://doi.org/10.1016/j.foodpol.2018.06.001>.

Bonan Jacopo and Pagani Laura. 2018. "Junior Farmer Field Schools, Agricultural Knowledge And Spillover Effects: Quasi-Experimental Evidence From Northern Uganda." *Journal of Development Studies* 54:2007–22. <https://doi.org/10.1080/00220388.2017.1355457>.

Boucher Stephen R, Carter Michael R, Flatnes Jon Einar, Lybbert Travis J, Malacarne Jonathan G, Marenya Paswel, and Paul Laura A. 2022. "Bundling Stress Tolerant Seeds and Insurance for More Resilient and Productive Small-Scale Agriculture." <https://doi.org/10.3386/w29234>
https://www.nber.org/system/files/working_papers/w29234/w29234.pdf.

Brander Michael, Bernauer Thomas, and Huss Matthias. 2020. "Improved On-Farm Storage Reduces Seasonal Food Insecurity Of Smallholder Farmer Households – Evidence From A Randomized Control Trial In Tanzania." *Food Policy*.
<https://doi.org/10.1016/j.foodpol.2020.101891>.

Briaux Justine , Yves Martin-Prevel, Sophie Carles, Sonia Fortin, Yves Kameli, Laura Adubra, Renk Andrea, et al. 2020. "Evaluation of an Unconditional Cash Transfer Program Targeting Children's First-1,000-Days Linear Growth in Rural Togo: A Cluster-Randomized Controlled Trial." *PLoS Medicine* 17 (11): e1003388-1003388.
<https://doi.org/10.1371/journal.pmed.1003388>.

Carneiro Pedro, Kraftman Lucy, Rasul Imran, and Scott Molly. 2021. "Do Cash Transfers Promoting Early Childhood Development Have Unintended Consequences on Fertility?"
https://www.povertyactionlab.org/sites/default/files/research-paper/working_paper_914_Do-Cash-Transfers-Have-Unintended-Effects-On-Fertility_Nigeria_Aug2021.pdf.

Datta Saugato, Martin Joshua, MacLeod Catherine, Rawlings Laura B, and Vermehren Andrea. 2021. "Do Behavioral Interventions Enhance the Effects of Cash on Early Childhood Development and Its Determinants? Evidence from a Cluster-Randomized Trial in Madagascar." <https://openknowledge.worldbank.org/handle/10986/36111>.

Deschamps-Laporte Jean-Philippe. 2013. "The Impact Of Extension Services On Farming Households In Western Kenya - A Propensity Score Approach."
<https://www.oru.se/institutioner/handelshogskolan/forskning/working-papers/working-papers-2013/>.

Fongar Andrea, Linderhof Vincent, Ekesa Beatrice, Dijkxhoorn Youri, and Nalweyiso Martha Dorcas. 2023. "Impact of Healthy Food and Diet Information on Household Food Security: A Randomized Control Trial in Kampala, Uganda." *Other* 6.
<https://doi.org/10.3389/fsufs.2022.1063331>.

Francesconi Gian Nicola and Ruben Ruerd. 2012. "The Hidden Impact Of Cooperative Membership On Quality Management: A Case Study From The Dairy Belt Of Addis Ababa." *Journal of Entrepreneurial and Organizational Diversity* 1 (1): 85–103.
<https://doi.org/10.5947/jjeod.2012.005>.

Freeman Matthew C, Ellis Anna S, Ogutu Emily Awino, Caruso Bethany A, Linabarger Molly, Micek Katie, Muga Richard, et al. 2020. "Impact of a Demand-Side Integrated WASH and Nutrition Community-Based Care Group Intervention on Behavioural Change: A Randomised Controlled Trial in Western Kenya." *BMJ Global Health* 5 (11).
<https://doi.org/10.1136/bmjgh-2020-002806>.

Fuller R. 2012a. "Effectiveness Review: Food Security And Livelihoods Support Among Fishers And Fish Processors, Democratic Republic Of Congo."
<https://reliefweb.int/report/democratic-republic-congo/food-security-and-livelihoods-support-among-fishers-and-fish>.

Fuller Robert. 2012b. "Effectiveness Review: Livestock Commercialisation For Pastoralist Communities In North Dakoro, Niger." <https://oxfamilibrary.openrepository.com/bitstream/10546/262466/1/er-niger-arr-effectiveness-review-121212-en.pdf>.

Galasso Emanuela, Weber Ann M, Stewart Christine P, Ratsifandrihamanana Lisy, and Fernald Lia C. H. 2019. "Effects Of Nutritional Supplementation And Home Visiting On Growth And Development In Young Children In Madagascar: A Cluster-Randomised Controlled Trial." *The Lancet Global Health* 7 (9): E1257–68. [https://doi.org/10.1016/S2214-109X\(19\)30317-1](https://doi.org/10.1016/S2214-109X(19)30317-1).

Gilligan Daniel O, Arrieta Alejandra, Devereux Stephen, Hoddinott John, Kebede Dereje, Ledlie Natasha, Roelen Keetie, and Taffesse Alemayehu Seyoum. 2020. "Impact Evaluation of Improved Nutrition through Integrated Basic Social Services and Social Cash Transfer Pilot Program (IN-SCT) in Oromia and SNNP Regions, Ethiopia: Endline Impact Evaluation Report." <https://www.ifpri.org/publication/impact-evaluation-improved-nutrition-through-integrated-basic-social-services-and-social>.

Grijalva-Eternod Carlos S, Jelle Mohamed, Mohamed Hani, Waller Katie, Hussein Bishar Osman, Barasa Emmanuel, Solomon Andrea, et al. 2023. "Evaluation of Conditional Cash Transfers and mHealth Audio Messaging in Reduction of Risk Factors for Childhood Malnutrition in Internally Displaced Persons Camps in Somalia: A 2 × 2 Factorial Cluster-Randomised Controlled Trial." *PLoS Medicine* 20 (2). <https://doi.org/10.1371/journal.pmed.1004180>.

Iddrisu Mubarak, Aidoo Robert, and Wongnaa Camillus Abawiera. 2020. "Participation in UTZ-RA Voluntary Cocoa Certification Scheme and Its Impact on Smallholder Welfare: Evidence from Ghana." *World Development Perspectives*. <https://doi.org/10.1016/j.wdp.2020.100244>.

IFAD. 2018. "Impact Assessment: Agricultural Sector Development Programme–Livestock (ASDP-L) and Agriculture Service Support Programme (ASSP)." International Fund for Agricultural Development. <https://ideas.repec.org/p/ags/unadia/288463.html>.

Issahaku Gazali and Abdulai Awudu. 2020. "Can Farm Households Improve Food and Nutrition Security through Adoption of Climate-Smart Practices? Empirical Evidence from Northern Ghana." *Wiley Online Library* 42 (3): 559–79. <https://doi.org/10.1093/aep/ppz002>.

Kangmennaang Joseph, Kerr Rachel Bezner, Lupafya Esther, Dakishoni Laifolo, Katundu Mangani, and Luginaah Isaac. 2017. "Impact Of A Participatory Agroecological Development Project On Household Wealth And Food Security In Malawi." *Food Security* 9 (3): 561–76. <https://doi.org/10.1007/s12571-017-0669-z>.

Kithi Laurine, Mugeru Amin, and Geza Bujdoso. 2023. "Impacts of Farmer Field Schools on Food Security and Environmental Conservation in Western Kenya." *African Journal of Agricultural Research* 19 (3): 235–46. <https://doi.org/10.5897/AJAR2020.15388>.

Larsen Anna Folke and Lilleør Helene Bie. 2014. "Beyond The Field: The Impact Of Farmer Field Schools On Food Security And Poverty Alleviation." *World Development* 64:843–59. <https://doi.org/10.1016/j.worlddev.2014.07.003>.

Leroy Jef L, Olney Deanna, and Ruel Marie. 2016. "Tubaramure, A Food-Assisted Integrated Health And Nutrition Program In Burundi, Increases Maternal And Child Hemoglobin Concentrations And Reduces Anemia: A Theory-Based Cluster-Randomized Controlled Intervention Trial." *Journal of Nutrition* 146 (8): 601–8. <https://doi.org/10.3945/jn.115.227462>.

- Luoto Jill E, Aboud Frances E, Fernald Lia C. H, and Singla Daisy R. 2021. "An Implementation Evaluation of A Group-Based Parenting Intervention to Promote Early Childhood Development in Rural Kenya." *BMC Public Health*.
<https://doi.org/10.3389/fpubh.2021.653106>.
- MacPherson Claire and Sterck Olivier. 2021. "Empowering Refugees through Cash and Agriculture: A Regression Discontinuity Design." *Journal of Development Economics* 149.
<https://doi.org/10.1016/j.jdeveco.2020.102614>.
- Mensah-Homiah Joseph, Sakyi-Dawson Owuraku, Bonsu AM, and Marquis Grace S. 2012. "Microenterprise Development Coupled with Nutrition Education Can Help Increase Caregivers' Incomes and Household Accessibility to Animal Source Foods." *African Journal of Food, Agriculture, Nutrition and Development* 12 (1).
<https://doi.org/10.18697/ajfand.49.ENAM4>.
- Merchant Emily V, Odendo Martins, Maiyo Norah, Govindasamy Ramu, Morin Xenia K, Simon James E, and Hoffman Daniel J. 2023. "An Evaluation of Nutrition, Culinary, and Production Interventions Using African Indigenous Vegetables on Nutrition Security Among Smallholder Farmers in Western Kenya." *Frontiers in Nutrition* 10.
<https://doi.org/10.3389/fnut.2023.1154423>.
- Mpiira Robert and Okello Patrick. 2020. "A Multisectoral Approach To Eradication Of Malnutrition In Vulnerable Groups: A Cluster-Randomised Trial." *Lancet Global Health* 7:8.
<https://doi.org/10.31080/ASNH.2020.04.a-multisectoral-approach-to-eradication-of-malnutrition-in-vulnerable-groups-a-cluster-randomized-trial>.
- Ntakyo Proscovia Renzaho and van den Berg Marrit. 2019. "Effect Of Market Production On Rural Household Food Consumption: Evidence From Uganda." *Food Security* 11:1051-1070-051–1070. <https://doi.org/10.1007/s12571-019-00959-2>.
- Okyere Charles Yaw and Kornher Lukas. 2023. "Carbon Farming Training and Welfare: Evidence From Northern Ghana." *Land Use Policy* 134.
<https://doi.org/10.1016/j.landusepol.2023.106932>.
- Osei Robert Darko, Dzanku Fred M, Osei-Akoto Isaac, Asante Felix, Hodey Louis S, Adu Pokuaa N, Adu-Ababio Kwabena, and Coulibaly Massa. 2018. "Impact of Voice Reminders to Reinforce Harvest Aggregation Services Training for Farmers in Mali." <http://3ieimpact.org/evidence-hub/publications/impact-evaluations/impact-voice-reminders-reinforce-harvest-aggregation>. Linked : Dzanku F M and Osei R D. 2018. "Impact of Pre- and Post-Harvest Training Reminders on Crop Losses and Food Poverty in Mali." <https://ageconsearch.umn.edu/record/275924?ln=en>.
- Pan Yao, Sulaiman Munshi, and Smith Stephen C. 2015. "Agricultural Extension And Technology Adoption For Food Security: Evidence From Uganda." <https://www.iza.org/publications/dp/9206/agricultural-extension-and-technology-adoption-for-food-security-evidence-from-uganda>.
- Premand Patrick and Barry Oumar. 2020. "Behavioral Change Promotion, Cash Transfers and Early Childhood Development: Experimental Evidence from a Government Program in a Low-Income Setting."

<https://documents1.worldbank.org/curated/en/756191598464680389/pdf/Behavioral-Change-Promotion-Cash-Transfers-and-Early-Childhood-Development-Experimental-Evidence-from-a-Government-Program-in-a-Low-Income-Setting.pdf>.

Pretari Alexia. 2019. "Resilience In North East Ghana: Impact Evaluation Of The Climate Resilient Agricultural And Food Systems (Crafs) Project." <https://policy-practice.oxfam.org/resources/resilience-in-north-east-ghana-impact-evaluation-of-the-climate-resilient-agric-620889/>

Rusike J, Mahungu N M, Lukombo S S, Kendenga T, Bidiaka S M, Alene A, Lema A, and Manyong V M. 2014. "Does A Cassava Research-For-Development Program Have Impact At The Farm Level? Evidence From The Democratic Republic Of Congo." *Food Policy* 46:193–204. <https://doi.org/10.1016/j.foodpol.2014.03.012>.

Rutherford Diana Duff, Burke Holly M, Cheung Kelly K, and Field Samuel H. 2016. "Impact Of An Agricultural Value Chain Project On Smallholder Farmers, Households, And Children In Liberia." *World Development* 83:70–83. <https://doi.org/10.1016/j.worlddev.2016.03.004>.

Sakketa Tekalign Gutu, Herrmann Raoul, Nkonde Chewa, Lukonde Mwelwa, and Brüntrup Michael. 2022. "The Effects of a Private-Sector Driven Smallholder Support Programme on Productivity, Market Participation and Food and Nutrition Security: Evidence of a Nucleus-Outgrower Scheme From Zambia." <https://www.econstor.eu/handle/10419/267728>
<https://www.econstor.eu/bitstream/10419/267728/1/1828230561.pdf>.

Santoso Marianne V, Bezner Kerr Rachel N, Kassim Neema, Martin Haikael, Mtinda Elias, Njau Peter, Mtei Kelvin, Hoddinott John, and Young Sera L. 2021. "A Nutrition-Sensitive Agroecology Intervention in Rural Tanzania Increases Children's Dietary Diversity and Household Food Security But Does Not Change Child Anthropometry: Results from a Cluster-Randomized Trial." *The Journal of Nutrition* 151 (7): 2010–21. <https://doi.org/10.1093/jn/nxab052>. *Linked paper* : Santoso, Marianne V. 2019. "Evaluating the Impact of a Participatory Nutrition-Sensitive Agriculture Intervention on Women's Empowerment and Child's Diet in Singida, Tanzania" Cornell University ProQuest Dissertations & Theses.

Sibhatu Kibrom T, Arslan Aslihan, and Zucchini Emanuele. 2022. "The Effect of Agricultural Programs on Dietary Diversity and Food Security: Insights From the Smallholder Productivity Promotion Program in Zambia." *Food Policy* 113. <https://doi.org/10.1016/j.foodpol.2022.102268>.

Siewe Francois, Egwuma Henry, Ahmed Ben, Sanni Adunni, Abu Sunday T, Ojeleye Oluwaseun A, Nwahia Cordelia O, Choumbou Raoul Fani Djomo, and Abdulahi Abubakar A. 2023. "A Best-Bet System of Rice Intensification and Poverty Alleviation in Zamfara State, Nigeria: A Mixed Method Analysis." *Agricultural Systems*. <https://doi.org/10.1016/j.agsy.2023.103805>.

Steinke Jonathan, Habtemariam Lemlem Teklegiorgis, Kubitza Christoph, Maczek Markolf, Altincicek Boran, and Sieber Stefan. 2023. "Stronger Food and Nutrition Security Impacts From More Intense Project Participation: Evidence From a Multi-Country Intervention Program." *The Journal of Development Studies* 59 (6): 873–93. <https://doi.org/10.1080/00220388.2023.2182684>.

Tambo Justice A, Mbugua Fredrick, Duah Solomon Agyemang, Oppong-Mensah Birgitta, Ocloo Christopher Yao, and Williams Frances. 2023. "Pest Risk Information, Agricultural Outcomes and Food Security: Evidence From Ghana." *Food Security* 15:1667-1683-667–1683. <https://doi.org/10.1007/s12571-023-01398-w>.

Tesfamariam Bahta Yonas, Owusu-Sekyere Enoch, Emmanuel Donkor, and Elizabeth Tlalang Boipelo. 2018. "The Impact of the Homestead Food Garden Programme on Food Security in South Africa." *Food Security*, 95–110. <https://doi.org/10.1007/s12571-017-0756-1>.

Walton Colleen. 2012. "Sustainable Livelihoods and Food and Nutrition Security of Kenyan Smallholder Farm Women." <https://www.proquest.com/docview/1400266850/>.

Wang Dongqing, Katalambula Leonard K, Modest Andrea R, Ismail Abbas, Malero Augustine, Bray Dayana, Cinq-Mars Haley, et al. 2024. "Meals, Education, and Gardens for In-School Adolescents (MEGA): A Cluster Randomized Trial of Adolescent Nutrition Intervention Packages in Tanzania." *Current Developments in Nutrition* 7 (11). <https://doi.org/10.1016/j.jadohealth.2024.02.032>

Wanjala Bernadette M and Muradian Roldan. 2013. "Can Big Push Interventions Take Small-Scale Farmers Out Of Poverty? Insights From The Sauri Millennium Village In Kenya." *World Development* 45:147–60. <https://doi.org/10.1016/j.worlddev.2012.12.014>.

Wanyama J M, Nyambati E M, Mose L O, Mutoko C, Wanyonyi W M, Wanjekeche E, and Rono S C. 2010. "Assessing Impact Of Soil Management Technologies On Smallholder Farmers' Livelihoods In North Western Kenya." *African Journal of Agricultural Research* 5 (21): 2899–2908. <https://doi.org/10.5897/AJAR.9000066>.

Weinhardt Lance S, Galvao Loren W, Yan Alice F, Stevens Patricia, Mwenyekonde Thokozani Ng'ombe, Ngui Emmanuel, Emer Lindsay, Grande Katarina M, Mkandawire-Valhmu Lucy, and Watkins Susan C. 2017. "Mixed-Method Quasi-Experimental Study of Outcomes of a Large-Scale Multilevel Economic and Food Security Intervention on HIV Vulnerability in Rural Malawi." *AIDS and Behavior* 21 (3): 712–23. <https://doi.org/10.1007/s10461-016-1455-1>.

Qualitative Evaluations

Abate Gashaw Tadesse, de Brauw Alan, Minot Nicholas, Vos Rob, Warner James, Wassie Solomon B, and Yang Shijie. 2021. "Evaluating the Impact of Multi-Intervention Development Projects: The Case of Ethiopia's Community-Based Integrated Natural Resources Management Project." 10.2499/p15738coll2.134856

Abue, Regina Elejie. 2025. "Employment Opportunities in the Agricultural Value Chain: The Role of the Home-Grown School Feeding Policy in Cross River State." <https://transglobalpnet.com/index.php/ijemce/article/view/7>.

Banerjee Abhijit, Karlan, Dean, Duflo, Esther, Osei, Robert, Thuysbaert Bram, Udry Christopher, Goldberg Nathanael, Shapiro Jeremy, Pariente William, and Trachtman Hannah. n.d. "Graduating the Ultra Poor in Ghana | IPA." Accessed February 28, 2025. <https://poverty-action.org/study/graduating-ultra-poor-ghana-0>.

Biggeri, Mario, Federico Ciani, and Andrea Ferrannini. 2017. "Aid Effectiveness and Multilevel Governance: The Case of a Value Chain Development Project in Rural Ethiopia." *The European Journal of Development Research* 29 (4): 843–65. <https://doi.org/10.1057/s41287-016-0064-1>.

Dengerink, J. D. 2013. "Improving Livelihoods with Private Sustainability Standards: Measuring the Development Impact of the UTZ Certified Certification Scheme among Ghanaian Cocoa Farmers." Master Thesis. <https://studenttheses.uu.nl/handle/20.500.12932/15542>.

Fakhi, A., and A. Sikira. 2018. "The Contribution of Agricultural Service Support Programme to Socio-Economic Empowerment of Rural Women in Zanzibar, Tanzania." <https://www.suaire.sua.ac.tz/handle/123456789/2372>.

Fongar, Andrea, Beatrice Ekesa, Youri Dijkxhoorn, and Vincent Linderhof. 2020. "NOURICITY - Technical Report on Qualitative Data Collection (Focus Group Discussions)," December. <https://hdl.handle.net/10568/110491>.

Gilligan, Daniel. 2020. "Impact Evaluation of Improved Nutrition through Integrated Basic Social Services and Social Cash Transfer Pilot Program (IN-SCT) in Oromia and SNNP Regions, Ethiopia." <https://cgspace.cgiar.org/items/9c050c5e-b5c8-4224-ae7-2b7c42d033c1>

IFAD. 2021. "République Fédérale Démocratique d'Éthiopie Projet Communautaire de Gestion Intégrée Des Ressources Naturelles Évaluation de l'impact." International Fund for Agricultural Development. <https://webapps.ifad.org/members/ec/112/docs/french/EC-2021-112-W-P-4.pdf>.

Masset, Edoardo, Dee Jupp, David Korboe, Tony Dogbe, Chris Barnett, Arnab Acharya, and Kelsy Nelson. 2016. "Millennium Villages Evaluation: Midterm Summary Report." https://opendocs.ids.ac.uk/articles/report/Millennium_Villages_Evaluation_Midterm_Summary_Report/26476255.

Ogidi, Modestus, Abiola Aromolaran, and Ugi, Frederick B. 2025. "School Feeding Program in Nigeria: Ethical Issues." *International Journal of Scientific Research and Management (IJSRM)* 13 (02): 8436–62. <https://doi.org/10.18535/ijprm/v13i02.em12>.

Okoboi, Geoffrey, Annette Kuteesa, and Mildred Barungi. 2013. "The Impact of the National Agricultural Advisory Services Program on Household Production and Welfare in Uganda."

Olney, Deanna K., Megan E. Parker, Elyse Iruhiriye, Jef L. Leroy, and Marie T. Ruel. 2013. "A Process Evaluation of the Tubaramure Program for Preventing Malnutrition in Children under 2 Approach (PM2A) in Burundi." <https://hdl.handle.net/10568/152965>.

Quinones, Sarah, Tia Palermo, Maja Gavrilovic, Vincenzo Vinci, Frank Otchere, Essa Chanie Mussa, the ISNP Evaluation Team, et al. 2022. "Knowledge of and Access to Frontline Workers among Poor, Rural Households in Amhara Region, Ethiopia: A Mixed-Methods Study." *BMC Public Health* 22 (1): 2179. <https://doi.org/10.1186/s12889-022-14594-8>.

Roelen, Keetie, Stephen Devereux, and Kebede Dereje. 2017. "Evaluation of the UNICEF Social Cash Transfer Pilot Programme in SNNPR, Ethiopia." <https://transfer.cpc.unc.edu/wp-content/uploads/2021/04/IN-SCT-Midline-report-FINAL-20-jul-17-1.pdf>.

Rutherford Diana Duff, Burke Holly M, Cheung Kelly K, and Field Samuel H. 2016. "Impact Of An Agricultural Value Chain Project On Smallholder Farmers, Households, And Children In Liberia." *World Development* 83:70–83. <https://doi.org/10.1016/j.worlddev.2016.03.004>.

Rwamigisa, Patience B., Regina Birner, Margaret N. Mangheni, and Arseni Semana. 2018. "How to Promote Institutional Reforms in the Agricultural Sector? A Case Study of Uganda's National Agricultural Advisory Services (NAADS)." *Development Policy Review* 36 (5): 607–27. <https://doi.org/10.1111/dpr.12318>.

Santoso, Marianne Victoria, Halle Claire Petrie, Rachel Bezner Kerr, Charlotte Lane, Neema Kassim, Haikael Martin, Elias Mtinda, Esther Lupafya, and Sera Young. 2023. "A Mixed Methods Exploration of the Role of Participation in a Nutrition-Sensitive Agroecology Intervention in Rural Tanzania." *Current Developments in Nutrition* 7 (6): 100098. <https://doi.org/10.1016/j.cdnut.2023.100098>.

Trefry, Amy, John R. Parkins, and Georgina Cundill. 2014. "Culture and Food Security: A Case Study of Homestead Food Production in South Africa." *Food Security* 6 (4): 555–65. <https://doi.org/10.1007/s12571-014-0362-4>.

Wairimu, Edith W. 2023. "Analysis of Technical, Organizational and Institutional Dairy Practices and Their Effect on the Poverty Status of Farm Household in the Highlands of Kenya." Thesis, University of Nairobi. <http://erepository.uonbi.ac.ke/handle/11295/164253>.

Qualitative Descriptive Studies

Abate Mekonnen, Solomon, Dassalegn Daraje Jalata, and Helen Onyeaka. 2024. "Building Resilience in Sub-Saharan Africa's Food Systems: Diversification, Traceability, Capacity Building and Technology for Overcoming Challenges." *ResearchGate*, ahead of print. <https://doi.org/10.1002/fes3.563>.

ACDI/VOCA. n.d. "Agriculture for Children's Empowerment (ACE)." ACDI/VOCA. <https://www.acdivoca.org/projects/agriculture-for-childrens-empowerment-ace/files/10991/agriculture-for-childrens-empowerment-ace.html>.

Adaba, Addis. 2016. "Government of Ethiopia and United Nations Agency to Discuss Future Plans for Rural Development in Country." 2016. <https://ioe.ifad.org/en/w/government-of-ethiopia-and-united-nations-agency-to-discuss-future-plans-for-rural-development-in-country/files/11173/government-of-ethiopia-and-united-nations-agency-to-discuss-future-plans-for-rural-development-.html>.

Adeyanju Dolapo. n.d. "Challenges and Opportunities in Nigeria's Home-Grown School Feeding Program." https://books.google.co.uk/books?hl=en&lr=&id=vdsWEQAAQBAJ&oi=fnd&pg=PA17&ots=mPc6Ych2A&sig=R_b_oXbJ7qPM4beErfI4OVjgBjQ&redir_esc=y#v=onepage&q&f=false.

Alterra Regional development and spatial use, CDI advisory, LEI Green Economy and Landuse, WASS, De Rooij Bertram, Pittore Katherine, and Linderhof Vincent. 2020. "Case-Based Learnings [Urban] Food Systems Uganda : Feeding Cities and Migration." Wageningen: Wageningen Environmental Research.

[https://research.wur.nl/en/publications/fac13d8a-7988-45bf-b297-c483f0904573/files/11067/Alterra - Regional development and spatial use et al. - 2020 - Case-based learnings \[Urban\] food systems Uganda .pdf](https://research.wur.nl/en/publications/fac13d8a-7988-45bf-b297-c483f0904573/files/11067/Alterra - Regional development and spatial use et al. - 2020 - Case-based learnings [Urban] food systems Uganda .pdf).

Amatheon Agri. 2012. "Annual Overview 2012." <https://amatheon-agri.com/wp-content/uploads/2020/08/Amatheon-Agri-Annual-Overview-2012.pdf>.

———. 2014. "Annual Overview 2014." <https://amatheon-agri.com/wp-content/uploads/2020/08/Amatheon-Agri-Annual-Overview-2014.pdf>.

———. 2015. "Annual Overview 2015." <https://www.amatheon-agri.com/public-media/Amatheon-Agri-2015-Annual-Overview.pdf>

———. 2016. "Annual Overview 2016." <https://amatheon-agri.com/wp-content/uploads/2020/08/Amatheon-Agri-Annual-Overview-2016.pdf>.

———. 2017. "Annual Overview 2017." <https://amatheon-agri.com/wp-content/uploads/2020/08/Amatheon-Agri-Annual-Overview-2017.pdf>.

———. 2018. "Annual Report 2018." <https://www.amatheon-agri.com/public-media/Amatheon-Agri-Annual-Report-2018.pdf>.

AUDA-NEPAD. n.d. "Home Grown School Feeding Handbook." <https://www.nepad.org/publication/home-grown-school-feeding-handbook>.

Banerjee, Abhijit, Karlan, Dean, Duflo, Esther, Osei, Robert, Thuysbaert Bram, Udry Christopher, Goldberg Nathanael, Shapiro Jeremy, Pariente William, and Trachtman Hannah. n.d. "Graduating the Ultra Poor in Ghana | IPA." Accessed February 28, 2025. <https://poverty-action.org/study/graduating-ultra-poor-ghana-0>.

Bezner Kerr Rachel N. n.d. "Malawi Farmer to Farmer Agroecology Project." <https://openknowledge.fao.org/server/api/core/bitstreams/b5fd265f-cad7-4baa-a7c9-15f54b69ddec/content/files/10962/content.pdf>.

Brenneis Karina, Reinbott Anika, and Rosa Annkathrin. 2017. "The Potential of Agricultural Value Chains to Improve Nutrition Through Integrated Nutrition Activities."

CABI News. 2017. "Delivering a Pest Risk Information Service to Sub-Saharan Africa." *CABI.Org*. <https://www.cabi.org/news-article/delivering-a-pest-risk-information-service-to-sub-saharan-africa/>.

Canada Global Affairs. 2017. "Project Profile — Farmer-to-Farmer Agroecology in Malawi — Project Browser." 2017. <https://w05.international.gc.ca/projectbrowser-banqueprojets/project-projet/details/S065667001?Lang=eng>.

Carr Edward R. 2008. "The Millennium Village Project and African Development: Problems and Potentials." *Progress in Development Studies* 8 (4): 333–44. <https://doi.org/10.1177/146499340800800403>.

Center for Development Research. n.d. "Partnerships for Healthy Diets and Nutrition in Urban African Food Systems – Evidence and Strategies." *LEAP-Agri*. https://leap-agri.com/?page_id=315_files/11066/leap-agri.com.html.

Colecraft E K. n.d. "The Enhancing Child Nutrition through Animal Source Food Management (ENAM) Project [2004-2009]." <https://www.fao.org/ag/humannutrition/34273-09cbd308d8aa06bda7eddba1ee173c961.pdf>

Daily Nation. 2014. "Kenyan Village an Inspiration in the Achievement of MDGs | Nation." 2014. <https://nation.africa/kenya/life-and-style/dn2/kenyan-village-an-inspiration-in-the-achievement-of-mdgs--938968>.

Datta, Saugato and Rawlings, Laura. n.d. "Human Development Cash Transfer - Behavioral Work - Impact Evaluation 2016-2018." <https://doi.org/10.48529/CR7P-EQ86>.

De Rooij, Bertram, Katherine Pittore, and Vincent Linderhof. 2020. "Case-Based Learnings [Urban] Food Systems Uganda : Feeding Cities and Migration." Wageningen: Wageningen Environmental Research. <https://doi.org/10.18174/536750>.

Department of Agriculture Zambia. 2006. "Budget Statement 2: Agriculture, Conservation and Environment." https://www.researchgate.net/figure/Zambian-Government-Budget-Allocation-for-Agriculture-2006_tbl1_5180068.

Dudych Alanna, Lawson Kaitlyn, Oliver Vanessa, and Perrault Elyse. 2022. "Together Again—Kenyan and Canadians Work Together to Improve Sustainable Livelihoods of Kenyan Smallholder Dairy Farmers." *The Canadian Veterinary Journal* 63 (11): 1106.

FAO. n.d.-a. "Junior Farmer Field and Life Schools (JFFLS) - UGANDA -." https://www.fao.org/fileadmin/user_upload/wa_workshop/docs/FSNL_factsheet_JFFLS_in_Uganda.pdf.

———. n.d.-b. "KARI FFS in Kenya | Tierras y Aguas | Organización de Las Naciones Unidas Para La Alimentación y La Agricultura | Land & Water | Food and Agriculture Organization of the United Nations." <https://www.fao.org/land-water/overview/projects/previous-projects/kari-ffs-in-kenya/es/files/10979/es.html>.

———. n.d.-c. "Proposed Loan and Grant to the Federal Democratic Republic of Ethiopia." https://www.fao.org/fileadmin/user_upload/G77/ifad_96th_EB/EB_2009-96-R-17.doc.

FAO Digital Media Hub. 2017. "Ethiopia, 2017. IFAD / FAO/ WFP Supported Communities." 2017. https://digital-media.fao.org/archive/Ethiopia--2017--IFAD---FAO--WFP-supported-communities-2A6XC5C9SQJ9.html_files/11174/Ethiopia--2017--IFAD---FAO--WFP-supported-communities-2A6XC5C9SQJ9.html.

GIZ. n.d. "eKYC – Deploying a Biometrics System to Combat Hunger and Malnutrition." <https://www.giz.de/expertise/html/61916.html>.

Government of Tanzania. 2006. "Agricultural Sector Development Programme (ASDP)." https://www.gafspfund.org/sites/default/files/inline-files/ASDP_DOCUMENT.pdf.

Greenpeace. 2015. "Financing Ecological Farming in Africa." 2015. https://philea.issuelab.org/resources/27434/27434.pdf_files/10955/27434.pdf.

Haskin Fernald, Lia. n.d. "MAHAY Mikolo (Madagascar)." Lia Haskin Fernald, PhD. <https://www.liahf.com/all-projects/mahay-mikolo-madagascar/files/10717/mahay-mikolo-madagascar.html>.

Ickes Scott B. 2020. "Supportive Evidence for Program Impact Pathways: Food-Assisted Maternal and Child Health and Nutrition Programs Can Produce Sustained Dietary Improvements." *The Journal of Nutrition* 150 (4): 661–62. <https://doi.org/10.1093/jn/nxaa056>.

IFAD. 2008. "President's Report Proposed Supplementary Loan to the United Republic of Tanzania for the Agricultural Sector Development Programme." International Fund for Agricultural Development. <https://webapps.ifad.org/members/eb/95/docs/EB-2008-95-R-23-Rev-1.pdf#page=9.18> files/10633/EB-2008-95-R-23-Rev-1.pdf.

———. 2013a. "Community-Based Integrated Natural Resources Management Project (CBINReMP)." https://www.ifad.org/documents/48415603/49455874/Supervision+mission+October+2013_2.pdf/fd4d90d6-b55e-e0f4-7662-2b9f4a8d9df0?t=1726611763784 files/11158/fd4d90d6-b55e-e0f4-7662-2b9f4a8d9df0.pdf.

———. 2013b. "Empowering Small Farmers through Farmers Field Schools," 2013. <https://reliefweb.int/report/united-republic-tanzania/empowering-small-farmers-through-farmers-field-schools>.

———. 2015. "COUNTRY PROGRAMME EVALUATION." https://www.unevaluation.org/sites/default/files/member_publications/tanzania_2015.pdf.

———. 2017. "Implementation Support and Supervision Mission Report, January - February 2017." <https://www.ifad.org/en/w/corporate-documents/projects-programmes/implementation-support-and-supervision-mission-report-january-february-2017>.

———. 2021. "Ethiopia Community-Based Integrated Natural Resources Management Project in Ethiopia." https://www.unevaluation.org/sites/default/files/member_publications/ETHIOPIA%20IE%20+%20COVER.pdf files/11155/ETHIOPIA IE + COVER.pdf.

Lieberum Maren and Triemer Sabine. n.d. "Global Programme – Food and Nutrition Security, Enhanced Resilience Key Findings from the Nutrition Governance and Mentoring Process." files/11108/Lieberum and Triemer - Global Programme – Food and Nutrition Security, En.pdf.

Linderhof V, Dijkxhoorn Y, Fongar A, Onyango J, and Nalweyiso M. 2019. "Food System Mapping in Kanyanya (Kampala) - Workshop Report." <https://hdl.handle.net/10568/106544> files/11072/Linderhof et al. - 2019 - Food System Mapping in Kanyanya (Kampala) - Work.pdf.

Linderhof Vincent, Dijkxhoorn Youri, Fongar Andrea, Onyango Joel, and Ekesa Beatrice. n.d. "The Kanyanya Food Challenge: The First Results of Mapping the Food System." files/11065/Linderhof et al. - The Kanyanya food challenge the first results of .pdf.

Madsen Sidney and Wezel Alexander. 2020. "Agroecology as a Way to Improve Farmer Livelihoods Now and in the Future: An Example from Malawi." files/10952/Madsen and Wezel - 2020 - Agroecology as a way to improve farmer livelihoods.pdf.

Marquis Grace S. 2017. "Empowering Women to Provide Healthy Diets for Infants and Young Children, Enhancing Child Nutrition through Animal Source Food Management (ENAM) Project in Ghana." SlideShare. 2017.
<https://www.slideshare.net/slideshow/empowering-women-to-provide-healthy-diets-for-infants-and-young-children-enhancing-child-nutrition-through-animal-source-food-management-enam-project-in-ghana-by-grace-marquis-school-of-dietetics-and-human-nutrition-mcgill-university/71994150>.

Michael Stephen. 2017. "Institutions and Policies to Implement the Tanzania Livestock Master Plan."
https://www.academia.edu/67215556/Institutions_and_policies_to_implement_the_Tanzania_livestock_master_plan.

Millennium Promise. 2010. "Millennium Promise 2010 Annual Report." Millennium Promise.
<https://irp-cdn.multiscreensite.com/6fae6349/files/uploaded/Millennium%20Promise%202010%20Annual%20Report%20%28MAY%201%2C%202011%29.pdf>.

Millennium Promise and The Earth Institute. 2010. "Harvests of Development in Rural Africa 'The Millennium Villages After Three Years.'" Millennium Promise.
<https://www.millenniumpromise.org/millennium-promise-alliance-reports-documents-and-publications>.

Mwaki Alex and Alu Edith. n.d. "Msingi Bora: Achieving Sustained Early Child Development Impacts at Scale: A Kenya RCT." files/10987/Mwaki and Alu - Msingi Bora Achieving sustained early child devel.pdf.

NHGSFSP. n.d. "Nigeria Home Grown School Feeding Strategic Plan." <https://docs.wfp.org/api/documents/WFP-0000116838/download/>.

NOURICITY. 2020. "First High-Level Stakeholder Workshop, Accra, November 28, 2019 – NOURICITY." <https://NOURICITY.org/2020/02/10/first-high-level-stakeholder-workshop-accra-nov-28-2019/> files/11077/first-high-level-stakeholder-workshop-accra-nov-28-2019.html.

———. 2022. "Final NOURICITY Workshops in Ghana, August 17th – 18th 2022 – NOURICITY." <https://NOURICITY.org/2022/09/01/final-NOURICITY-workshops-in-ghana-august-17th-18th-2022/> files/11078/final-NOURICITY-workshops-in-ghana-august-17th-18th-2022.html.

Province of Eastern Cape. 2007. "Department of Agriculture Annual Performance Plan 2007/8." 2007. <https://www.treasury.gov.za/default.aspx>.

RECODA. n.d. "Ripat – RECODA." <https://recoda.or.tz/ripat/> files/10666/ripat.html.

Relief Web. 2018. "Food and Nutrition Security Project by GIZ in Malawi." Scaling Up Nutrition. 2018. <https://reliefweb.int/report/malawi/food-and-nutrition-security-project-giz-malawi>.

Ringo, Dominic. n.d. "RIPAT – A Menu Approach in Rural Food Security Promotion." ECHOcommunity. https://www.echocommunity.org/resources/ee22dbfd-e503-42ed-ad7b-865e8b2e2454_files/10677/ee22dbfd-e503-42ed-ad7b-865e8b2e2454.html.

The United Republic of Tanzania. n.d. "AGRICULTURAL SECTOR DEVELOPMENT PROGRAMME PHASE II (ASDP II)." https://asdp.kilimo.go.tz/uploads/2018%205%20ASDP%20II%20OCTOBER%202017.pdf_files/10914/2018_5_ASDP_II_OCTOBER_2017.pdf.

UNDP. 2013a. "AFRICAN AGRIBUSINESS SUPPLIER DEVELOPMENT PROGRAMME (AASDP) TOOLKIT." 2013. https://www.undp.org/sites/g/files/zskgke326/files/publications/UNDP-AFIM-Agrobusiness-Toolkit-2013.pdf_files/10911/UNDP-AFIM-Agrobusiness-Toolkit-2013.pdf.

———. 2013b. "ASDP Africa Training Manual_English_Low Res.Pdf." 2013. https://www.undp.org/sites/g/files/zskgke326/files/publications/ASDP%20Africa%20Training%20Manual_English_Low%20Res.pdf_files/10912/ASDP_Africa_Training_Manual_English_Low_Res.pdf.

UN-HABITAT, Turkana County Government, UNHCR, and From the People of Japan. n.d. "Kalobeueo Settlement Advisory Development Plan (2016-2026)." 2018. [https://unhabitat.org/sites/default/files/2020/08/kalobeyei_advisory_development_plan.pdf_files/11010/KALOBEYEI_SETTLEMENT_ADVISORY_DEVELOPMENT_PLAN_\(2016-2026\).pdf](https://unhabitat.org/sites/default/files/2020/08/kalobeyei_advisory_development_plan.pdf_files/11010/KALOBEYEI_SETTLEMENT_ADVISORY_DEVELOPMENT_PLAN_(2016-2026).pdf).

United Nations Environment Programme (UNEP). n.d. "Learning to Manage Land Sustainably with Climate Change Mitigation Co-Benefits:" https://wocat.net/documents/1080/CCMC1.pdf_files/11169/CCMC1.pdf.

United Nations Global Compact. 2017. "Communication on Progress 2017." https://ungc-production.s3.us-west-2.amazonaws.com/attachments/cop_2017/442741/original/AmatheonAgri-COP-2017.pdf?1512148365.

———. 2021. "COMMUNICATION ON PROGRESS 2021." https://amatheon-agri.com/wp-content/uploads/2021/11/Amatheon-Agri_-_Communication_on_Progress_2021.pdf.

Wiggers Petterik. n.d. "Investing in Rural People in Ethiopia." [files/11171/Wiggers - Investing in rural people in Ethiopia.pdf](files/11171/Wiggers_-_Investing_in_rural_people_in_Ethiopia.pdf).

Other references

AGRA. 2021. *Africa Agriculture Status Report : A Decad of Action : Building Sustainable and Resilient Food Systems in Africa*. https://vcda.afdb.org/en/system/files/attachments/A-Decade-of-Action_-_Building-Sustainable-and-Resilient-Food-Systems-in-Africa.pdf.

Akpata, Joyce, Olutayo Toromade, and Michael Ojo. 2024. *Transforming Food Systems for a Climate-Resilience, Well-Nourished Nigeria*. First. GAIN. <https://doi.org/10.59327/IPCC/AR6-9789291691647>.

Alex, M. 2020. "Role of Nutrition in Maintaining Health." *International Journal of Physical Education, Sports and Health*. https://www.semanticscholar.org/paper/Role-of-nutrition-in-maintaining-health-Alex/a3b4aa759b67d786698459cbf260e2758315da82?utm_source=consensus.

Amatheon Agri. 2017. "Annual Overview 2017." <https://amatheon-agri.com/wp-content/uploads/2020/08/Amatheon-Agri-Annual-Overview-2017.pdf>.

Barends, Eric, Denise Rousseau, and Rob Briner. "CEBMA Guideline for Rapid Evidence Assessments in Management and Organizations," Center for Evidence Based Management, 2017. <https://cebma.org/wp-content/uploads/CEBMA-REA-Guideline.pdf>.

Basak, Kishore Kumer, Etienne Lwamba, Ingunn Storhaug, Pierre Marion, Ashiqun Nabi, Sanghwa Lee, and Shannon Shisler. 2024. "The Effects of Food Systems Interventions on Women's Empowerment: A Rapid Evidence Assessment." 2024th ed. *International Initiative for Impact Evaluation (3ie)*. <https://doi.org/10.23846/WP0062>.

Béné, Christophe, Derek Headey, Lawrence Haddad, and Klaus von Grebmer. 2016. "Is Resilience a Useful Concept in the Context of Food Security and Nutrition Programmes? Some Conceptual and Practical Considerations." *Food Security* 8 (1): 123–38. <https://doi.org/10.1007/s12571-015-0526-x>.

Berretta, Miriam, Meital Kupfer, Shannon Shisler, and Charlotte Lane. "Rapid Evidence Assessment on Women's Empowerment Interventions within the Food System: A Meta-Analysis." *Agriculture & Food Security* 12, no. 1 (May 26, 2023): 13. <https://doi.org/10.1186/s40066-023-00405-9>.

Berretta, Miriam, Sanghwa Lee, Meital Kupfer, Carolyn Huang, Will Ridlehoover, Daniel Frey, Faez Ahmed, et al. "Strengthening Resilience against Shocks, Stressors and Recurring Crises in Low- and Middle-Income Countries: An Evidence Gap Map." *International Initiative for Impact Evaluation (3ie)*, May 10, 2023. <https://doi.org/10.23846/EGM023>.

BMZ. 2021. "Resilience Analyses : Product Sheet." Germany. German Federal Ministry for Economic Cooperation and Development (BMZ). <https://www.bmz.de/resource/blob/100468/produktblatt-resilienzanalyse-eng-barrierefrei-291121.pdf>.

Braimoh, Ademola. 2020. "Building Resilient Food Systems in Africa." *One Earth* 3 (3): 282–84. <https://doi.org/10.1016/j.oneear.2020.08.014>.

Bullock, James M., Kiran L. Dhanjal-Adams, Alice Milne, et al. 2017. "Resilience and Food Security: Rethinking an Ecological Concept." *Journal of Ecology* 105 (4): 880–84. <https://doi.org/10.1111/1365-2745.12791>

Bündnis Entwicklung Hilft & Ruhr-Universität Bochum. 2025. "WeltRisikoBericht." *WeltRisikoBericht (blog)*. 2025. <https://weltrisikobericht.de/worldriskreport/>.

Clapp, Jennifer, William G. Moseley, Barbara Burlingame, and Paola Termine. 2022. "Viewpoint: The Case for a Six-Dimensional Food Security Framework." *Food Policy* 106 (January):102164. <https://doi.org/10.1016/j.foodpol.2021.102164>.

Climate Vulnerability Forum. 2025. "Climate Vulnerability Monitor." Climate Analytics. 2025. <https://climateanalytics.org/projects/cvm3>.

Collins et al., The Production of Quick Scoping Reviews and Rapid Evidence Assessments A How to Guide Joint Water Evidence Group.

Committee on World Food Security. 2021. *CFS Voluntary Guidelines on Food Systems and Nutrition*.
https://www.fao.org/fileadmin/templates/cfs/Docs2021/Documents/CFS_VGs_Food_Systems_and_Nutrition_Strategy_EN.pdf.

Constas, Mark, T.R Frankenberger, and John Hoddinott. "Resilience Measurement Principles - Toward an Agenda for Measurement Design." FSIN Technical Series Paper No.1. Resilience Measurement Technical Working Group: World Food Programme (WFP) and FAO, 2014.
https://www.fsinplatform.org/sites/default/files/paragraphs/documents/FSIN_TechnicalSeries_1.pdf.

CRFS. 2024. *Climate Resilient Food Systems (CRFS) Alliance Advocacy Framework November 2024*.

Dejene, Alemneh, Stephanie Midgley, Makaola Marake, and Selvaraju Ramasamy. 2011. *Strengthening Capacity for Climate Change Adaptation in Agriculture: Experience and Lessons from Lesotho*. Environment and Natural Resources Management Series 18. FAO.

De Steenhuijsen Piters, Bart, Emma Termeer, Deborah Bakker, Hubert Fonteijn, and Herman Brouwer. 2021. *Food System Resilience - Towards a Joint Understanding and Implications for Policy*. Wageningen University. <https://edepot.wur.nl/549244>.

Dewidar, Omar, Jessica John, Aqeel Baqar, Mohamad Tarek Madani, Ammar Saad, Alison Riddle, Erika Ota, et al. 2023. "Effectiveness of Nutrition Counseling for Pregnant Women in Low- and Middle-income Countries to Improve Maternal and Infant Behavioral, Nutritional, and Health Outcomes: A Systematic Review." *Campbell Systematic Reviews* 19 (4): e1361. <https://doi.org/10.1002/cl2.1361>.

Elst, Ir Cornelis van, John T Hoffman, and Carl C J Unis. 2013. *Building Food System Resilience within a Learning Organization*. <https://www.foodprotection.org/members/fpt-archive-articles/2022-07-building-food-system-resilience-within-a-learning-organization/>.

Ensor, Jon. 2023. "Food System Resilience: Concepts, Issues, and Challenges." *Annual Review of Environment and Resources*, March. <https://doi.org/10.1146/annurev-environ-112320-050744>.

FAO, AUC, United Nations Economic Commission for Africa (ECA), and WFP. 2023. *Africa - Regional Overview of Food Security and Nutrition 2023*. FAO; AUC; United Nations Economic Commission for Africa (ECA); WFP; <https://doi.org/10.4060/cc8743en>.

FAO. 1996. "Report of the World Food Summit." Rome: Food and Agriculture Organisation of the United Nations. <https://www.fao.org/4/w3548e/w3548e00.htm>.

———. 2022. Behaviour Change Communication Strategy for Food Security and Agriculture Productivity Project: “You Are What You Eat!” FAO. <https://doi.org/10.4060/cc1050en>.

FAO. 2021. *Resilient Food Systems – A Proposed Analytical Strategy for Empirical Applications*. The State of Food and Agriculture. FAO. <https://doi.org/10.4060/cb7508en>.

FAO, and HLPE. 2024. “Building Resilient Food Systems - HLPE-FSN Consultation on the Scope of the Report.” <https://www.fao.org/fsnforum/index.php/consultation/building-resilient-food-systems-hlpe-scope-report>

FAO, AUC, United Nations Economic Commission for Africa (ECA), and WFP. 2023. Africa - Regional Overview of Food Security and Nutrition 2023. FAO; AUC; United Nations Economic Commission for Africa (ECA); WFP; <https://doi.org/10.4060/cc8743en>.

FAO, IFAD, UNICEF, WFP, and WHO. 2025. The State of Food Security and Nutrition in the World : Addressing High Food Price Inflation for Food Security and Nutrition. Rome. <https://openknowledge.fao.org/server/api/core/bitstreams/483f5991-a2f3-4d8f-8456-4cbdcc229b60/content>.

Fenton Villar, Paul. “Structured Literature Reviews: Building Transparency and Trust in Standards of Reporting Evidence.” IEG Methods and Evaluation Capacity Development Working Paper Series. Washington, DC: Independent Evaluation Group, World Bank, 2022.

Fontdevila, Clara. “Still Waiting for the (Data) Revolution. Examining Supply-Demand Mismatches in the Production of SDG 4 Metrics.” *International Journal of Educational Development* 103 (November 1, 2023): 102928. <https://doi.org/10.1016/j.ijedudev.2023.102928>.

FSIN and GNAFC. 2025. Global Report on Food Crisis 2025. FSIN/GNAC,. Pdf, 34.1 MB, 254 p. <https://doi.org/10.71958/WFP130664>.

Ganann, R., Ciliska, D. & Thomas, H. Expediting systematic reviews: methods and implications of rapid reviews. *Implementation Sci* 5, 56 (2010). <https://doi.org/10.1186/1748-5908-5-56>

Garbero, Alessandra and Chichaibelu, Bezawit Beyene, IFAD IMPACT ASSESSMENT - Agricultural Sector Development Programme – Livestock (ASDP-L) and the Agriculture Service Support Programme (ASSP): Tanzania (2018). Garbero, A., Chichaibelu, B. B., 2018. Impact Assessment Report: The Agricultural Sector Development Programme - Livestock and the Agriculture Service Support Programme, Tanzania. Rome: IFAD, Available at SSRN: <https://ssrn.com/abstract=3389390>

Germanwatch. 2025. “Climate Risk Index 2025 | Germanwatch e.V.” February 12, 2025. <https://www.germanwatch.org/en/cri>.

Global Center on Adaptation. 2022. “Climate Risk in Africa.” GCA. https://gca.org/wp-content/uploads/2023/01/GCA_State-and-Trends-in-Adaptation-2022_Climate-Risks-in-Africa.pdf.

Global Panel on Agriculture and Food Systems for Nutrition (GPAFSN). 2025. *Building Resilience and Enhancing Nutrition in Africa's Food Systems*.
<https://www.glopan.org/brief/africaresilience/>.

Haile, Dereje, Abrham Seyoum, and Alemu Azmeraw. 2022. "Food and Nutrition Security Impacts of Resilience Capacity: Evidence from Rural Ethiopia." *Journal of Agriculture and Food Research* 8 (June): 100305. <https://doi.org/10.1016/j.jafr.2022.100305>.

Harris, Jenileigh, and Emily J Spiegel. 2019. *Food Systems Resilience: Concepts & Policy Approaches*. Center for Agriculture and food systems. https://www.vermontlaw.edu/wp-content/uploads/2024/07/Food-Systems-Resilience_Concepts-Policy-Approaches.pdf.

Hartling, Lisa, Jeanne-Marie Guise, Elisabeth Kato, Johanna Anderson, Naomi Aronson, Suzanne Belinson, Elise Berliner, et al. EPC Methods: An Exploration of Methods and Context for the Production of Rapid Reviews. AHRQ Comparative Effectiveness Reviews. Rockville (MD): Agency for Healthcare Research and Quality (US), 2015.
<http://www.ncbi.nlm.nih.gov/books/NBK274092/>.

Hiller, Nora, Faustine Bas-Defossez, and David Baldock. 2021. *Building Blocks for Food System Resilience in Europe*. Institute for European Environmental Policy (IEEP).
<https://ieep.eu/wp-content/uploads/2022/12/IEEP-2021-Policy-report-Building-Blocks-for-Food-System-Resilience.pdf>.

HLPE. 2017. Nutrition and Food Systems. A Report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Rome.
<https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1155796/>.

HLPE. 2020. "Food Security and Nutrition: Building a Global Narrative towards 2030." Rome: High-Level Panel of Experts (HLPE).

HYPHA. 2024. *Building Food System Resilience*. Government of Jersey.
<https://www.gov.je/SiteCollectionDocuments/Environment%20and%20greener%20living/Buil ding%20Food%20System%20Resilience%20Report.pdf>.

Igelström, Erik, Mhairi Campbell, Peter Craig, and Srinivasa Vittal Katikireddi. 2021. "Cochrane's Risk of Bias Tool for Non-Randomized Studies (ROBINS-I) Is Frequently Misapplied: A Methodological Systematic Review." *Journal of Clinical Epidemiology* 140 (December): 22–32. <https://doi.org/10.1016/j.jclinepi.2021.08.022>.

Ingram, John, Polly Ericksen, and Diana Liverman. 2012. *Food Security and Global Environmental Change*. 1st ed. London: Routledge. <https://doi.org/10.4324/9781849776615>.

Inter-Agency Standing Committee & European Commission. 2025. "INFORM Climate Change." 2025. <https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change>.

Intergovernmental Panel On Climate Change (IPCC). 2023. *Climate Change 2022 – Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. 1st ed. Cambridge University Press. <https://doi.org/10.1017/9781009325844>.

Jørgensen, Lars, Asger S. Paludan-Müller, David R. T. Laursen, et al. 2016. "Evaluation of the Cochrane Tool for Assessing Risk of Bias in Randomized Clinical Trials: Overview of Published Comments and Analysis of User Practice in Cochrane and Non-Cochrane Reviews." *Systematic Reviews* 5 (May): 80. <https://doi.org/10.1186/s13643-016-0259-8>.

Jones, Gwyn, and Chris Garforth. 1997. "Chapter 1 - The History, Development, and Future of Agricultural Extension." 1997. <https://www.fao.org/4/w5830e/w5830e03.htm>.

Khangura S, Konnyu K, Cushman R, Grimshaw J, Moher D. Evidence summaries: the evolution of a rapid review approach. *Syst Rev.* 2012 Feb 10;1:10. doi: 10.1186/2046-4053-1-10. PMID: 22587960; PMCID: PMC3351736.

Krause, Corinna, Kathrin Sommerhalder, Sigrid Beer-Borst, and Thomas Abel. 2016. "Just a Subtle Difference? Findings from a Systematic Review on Definitions of Nutrition Literacy and Food Literacy." *Health Promotion International*, November, daw084. <https://doi.org/10.1093/heapro/daw084>.

Linderhof, Vincent, Fongar, Andrea, Nalweyiso, Martha Dorcas, Onyango, Joel, and Dijkxhoorn, Youri. 2020. "Partnerships for Healthy Diets and Nutrition in Urban African Food Systems – Evidence and Strategies." LEAP-Agri (blog). 2020. https://leap-agri.com/?page_id=315.

Lwamba, Etienne, Ingunn Storhaug, Suvarna Pande, Peirre Marion, Diana Cordova-Arauz, Shannon Shisler, Esteban J. Quiñones, Anna Sting, and Cornelia Roemling. 2025. *Development cooperation for food security and nutrition: Protocol for a Rapid Evidence Assessment on the effects of Information, Capacity Strengthening, and Behaviour Change interventions on food security, nutrition and environmental food system resilience in Sub-Saharan Africa*. London: International Initiative for Impact Evaluation (3ie). <https://3ieimpact.org/sites/default/files/2025-04/Deval-FSNREA-Protocol.pdf>

Mbow, Cheikh, Cynthia E. Rosenzweig, Luis G. Barioni, Tim G. Benton, Mario Herrero, Murukesan Krishnapillai, Alexander C. Ruane, Emma Liwenga, Prajal Pradhan, and Marta G. Rivera-Ferre. 2020. "Food Security." *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*. IPCC. <https://ntrs.nasa.gov/citations/20200001724>.

Michie, Susan, Maartje M. van Stralen, and Robert West. 2011. "The Behaviour Change Wheel: A New Method for Characterising and Designing Behaviour Change Interventions." *Implementation Science* 6 (1): 42. <https://doi.org/10.1186/1748-5908-6-42>.

Misener, Aaron. 2024. "Building Community Food System Resilience & Sustainability." *Arrell Food Institute*, December 2. <https://arrellfoodinstitute.ca/community-food-resilience/>.

Mockshell, Jonathan, and Thea Nielsen Ritter. 2024. "Applying the Six-Dimensional Food Security Framework to Examine a Fresh Fruit and Vegetable Program Implemented by Self-Help Groups during the COVID-19 Lockdown in India." *World Development* 175 (March):106486. <https://doi.org/10.1016/j.worlddev.2023.106486>.

Moore, Elsie, Erin Biehl, Meg Burke, Karen Bassarab, Caitlin Misiaszek, and Roni Neff. 2025. *Food System Resilience: A Planning Guide for Local Governments*. John Hopkins Center for a livable future.

Moore, Nick, Charlotte Lane, Ingunn Storhaug, Amber Franich, Heike Rolker, Josh Furgeson, Thalia Sparling, and Birte Snilstveit. 2021. “The Effects of Food Systems Interventions on Food Security and Nutrition Outcomes in Low- and Middle-Income Countries.” 2021st ed. International Initiative for Impact Evaluation (3ie). <https://doi.org/10.23846/EGM016>

NJ Office of the Food Security Advocate. 2024. “Food Security in New Jersey-A Brief Primer on the Six Dimensions of Food Security.Pdf.” New Jersey: Office of the Food Security Advocate.

<https://www.nj.gov/foodsecurity/documents/Food%20Security%20in%20New%20Jersey-A%20Brief%20Primer%20on%20the%20Six%20Dimensions%20of%20Food%20Security.pdf>.

OECD. 2025. *Practical Approaches to Develop Resilience Strategies for Food Systems*. OECD Food, Agriculture and Fisheries Papers. 217th ed. OECD Food, Agriculture and Fisheries Papers. OECD. <https://doi.org/10.1787/caa2b274-en>.

OECD. Guidelines for Resilience Systems Analysis: How to Analyse Risk and Build a Roadmap to Resilience. OECD Publishing, 2014.

https://www.oecd.org/en/publications/guidelines-for-resilience-systems-analysis-how-to-analyse-risk-and-build-a-roadmap-to-resilience_3b1d3efe-en.html.

Pilipenko, M. V. 2023. “Dietary Nutrition: Past, Present and Future.” *Spravočnik Vrača Obšej Praktiki (Journal of Family Medicine)*, no. 1 (January), 29–32. <https://doi.org/10.33920/med-10-2301-03>.

Schipanski, Meagan E., Graham K. MacDonald, Steven Rosenzweig, et al. 2016. “Realizing Resilient Food Systems.” *BioScience* 66 (7): 600–610. <https://doi.org/10.1093/biosci/biw052>.

Shakya, Clare. 2016. “Seven Ways to Build Resilient Local Economies in Fragile Contexts.” *IIED*. <https://www.iied.org/seven-ways-build-resilient-local-economies-fragile-contexts>.

Schünemann, Holger J., and Lorenzo Moja. “Reviews: Rapid! Rapid! Rapid! ...and Systematic.” *Systematic Reviews* 4, no. 1 (January 14, 2015): 4.

<https://doi.org/10.1186/2046-4053-4-4.B>

Smits, Jeroen, and Janine Huisman. 2024. “The GDL Vulnerability Index (GVI).” *Social Indicators Research* 174 (2): 721–41. <https://doi.org/10.1007/s11205-024-03399-4>.

Snilstveit, Birte, Jennifer Stevenson, Ian Shemilt, Mike Clarke, Emmanuel Jimenez, and James Thomas. “Timely, Efficient, and Living Systematic Reviews: Opportunities in International Development.” 3ie, 2018. <https://cedilprogramme.org/wp-content/uploads/2018/11/Inception-Paper-7-Birte-Snilstveit-Timely-Efficient-and-living-systematic-reviews.pdf>.

Stewart, Ruth, Laurenz Langer, Natalie Rebelo Da Silva, Evans Muchiri, Hazel Zaranyika, Yvonne Erasmus, Nicola Randall, et al. 2015. "The Effects of Training, Innovation and New Technology on African Smallholder Farmers' Economic Outcomes and Food Security: A Systematic Review." *Campbell Systematic Reviews* 11 (1): 1–224.

<https://doi.org/10.4073/csr.2015.16>.

Storhaug, Ingunn, Mark Engelbert, Diana Belén Córdova-Aráuz, Charlotte Lane, Independent consultant, Heike B Rolker, Bristol Veterinary School, University of Bristol Rothamsted Research, et al. 2024. "The Evidence on Food Systems and Nutrition: Insights from a Living Evidence and Gap Map." 2024th ed. International Initiative for Impact Evaluation (3ie). <https://doi.org/10.23846/EGM035>.

Tendall, D. M., J. Joerin, B. Kopainsky, P. Edwards, A. Shreck, Q. B. Le, P. Kruetli, M. Grant, and J. Six. 2015. "Food System Resilience: Defining the Concept." *Global Food Security* 6 (October):17–23. <https://doi.org/10.1016/j.gfs.2015.08.001>.

Termine, Paola. 2024. "Ensuring Food Security: Why Agency and Sustainability Matter." HLPE - High Level Panel of Experts (blog). 2024. <https://www.fao.org/cfs/cfs-hlpe/insights/news-insights/news-detail/ensuring-food-security--why-agency-and-sustainability-matter/en>.

The Campbell Collaboration. 2021. "Campbell Collaboration Systematic Reviews: Policies and Guidelines." The Campbell Collaboration. <https://doi.org/10.4073/cpg.2016.1>.

Thomas, James, and Angela Harden. 2008. "Methods for the Thematic Synthesis of Qualitative Research in Systematic Reviews." *BMC Medical Research Methodology* 8 (1): 45. <https://doi.org/10.1186/1471-2288-8-45>.

Thomas, James, Sergio Graziosi, Jeff Brunton, Zak Ghouze, Patrick O'Driscoll, Melissa Bond, and Anastasia Koryakina. 2023. "EPPI-Reviewer: Advanced Software for Systematic Reviews, Maps and Evidence Synthesis." London: EPPI Centre, UCL Social Research Institute, University College London. <https://eppi.ioe.ac.uk/cms/>.

Tricco, Andrea C., Jesmin Antony, Wasifa Zarin, Lisa Striffler, Marco Ghassemi, John Ivory, Laure Perrier, Brian Hutton, David Moher, and Sharon E. Straus. "A Scoping Review of Rapid Review Methods." *BMC Medicine* 13, no. 1 (September 16, 2015): 224. <https://doi.org/10.1186/s12916-015-0465-6>.

UNDESA. 2023. "Annual Highlights Report: Towards Sustainable Development for All." United Nations Department of Economic and Social Affairs. <https://www.un.org/sites/un2.un.org/files/desa-highlight-report-2022-2023.pdf>.

United Nations. 1948. "Universal Declaration of Human Rights." United Nations. <https://www.un.org/en/about-us/universal-declaration-of-human-rights>.

United Nations. The State of Food Security and Nutrition in the World 2024. FAO; IFAD; UNICEF; WFP; WHO; 2024. <https://doi.org/10.4060/cd1254en>.

University of Notre Dame Global Adaptation Initiative. 2025. "ND-GAIN Country Index." Notre Dame Global Adaptation Initiative. 2025. <https://gain.nd.edu/our-work/country-index/>.

Waddington Hugh, Snilstveit Birte, Hombrados Jorge, Vojtkova Martina, Phillips Daniel, Davies Philip, and White Howard. 2014. "Farmer Field Schools for Improving Farming Practices and Farmer Outcomes: A Systematic Review." <https://onlinelibrary.wiley.com/doi/full/10.4073/CSR.2014.6>.

Watson, Daniella, Patience Mushamiri, Paula Beeri, Toussaint Rouamba, Sarah Jenner, Simone Proebstl, Sarah H. Kehoe, et al. 2023. "Behaviour Change Interventions Improve Maternal and Child Nutrition in Sub-Saharan Africa: A Systematic Review." *PLOS Global Public Health* 3 (3): e0000401. <https://doi.org/10.1371/journal.pgph.0000401>.

WHO. 2024. "Fact Sheets - Malnutrition." 2024. <https://www.who.int/news-room/fact-sheets/detail/malnutrition>.

World Bank. 2025. Food Security Update - June 2025. IBRD, IDA. <https://thedocs.worldbank.org/en/doc/40ebbf38f5a6b68bfc11e5273e1405d4-0090012022/related/Food-Security-Update-117-June-13-2025-2.pdf>.

Working Paper Series

International Initiative for Impact Evaluation
Unit no. 501A, 5th Floor,
Rectangle One, D-4,
Saket District Centre
New Delhi – 110017
India

3ie@3ieimpact.org
Tel: +91 11 4110 2159



www.3ieimpact.org



DEval

DEUTSCHES
EVALUIERUNGSIKITUT
DER ENTWICKLUNGS-
ZUSAMMENARBEIT