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INCLUSION

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A review of methods and tools for youth research in food, land and water systems

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COVER PHOTO: Learning about organic farming for sustainable living, recording data on plant growth for analysis. Photo credit: Shutterstock

ABOUT CGIAR GENDER EQUALITY AND INCLUSION (GENDER ACCELERATOR):

CGIAR Gender Equality and Inclusion is CGIAR's Accelerator designed to put gender equality at the forefront of global agricultural research for development. The Accelerator will transform the way gender research is done, both within and beyond CGIAR, to kick-start a process of genuine change toward greater gender equality and better lives for smallholder farmers everywhere. gender.cgiar.org.

DISCLAIMER

This working paper has been internally peer reviewed, and the opinions expressed herein reflect those of the authors, not necessarily that of the CGIAR Gender Equality and Inclusion (GENDER Accelerator).

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Abstract

Youth participation is essential for fostering innovation in agri-food systems, ensuring food security, strengthening climate resilience and generating employment opportunities for young people. While there is growing advocacy for greater youth involvement in agri-food systems, we need better research methods and tools to understand how best to engage young men and women across all stages of value chains. This paper reviews existing resources that examine youth in agri-food systems, focusing on how current studies and tools assess key dimensions such as agency, access to resources, and the role of formal and informal institutions and structures, including gender and social norms. Using a structured search and screening process, we compiled and analyzed a wide range of publications and methodological tools, with a focus in developing countries. Overall, we found that while youth-related themes are increasingly recognized, substantial gaps remain in how these dimensions and themes are measured, documented and applied in practice. The findings highlight the need for more consistent methodological guidance and more comprehensive tools to support research and program design on youth in agri-food systems.

Keywords: *Youth, agri-food, inclusion, agency, resources, institutions*

1. Introduction

Youth¹ engagement in agri-food systems has steadily decreased over the years (IFAD 2019; FAO 2025). According to FAO (2025) in 2021, globally, approximately 44 percent of employed youth aged 15–24 worked in agri-food systems, down from 54 percent in 2005. This decline is largely driven by reduced youth participation in agriculture, where employment fell from 40 percent to 29 percent over the same period. This growing disconnect between youth and agri-food systems limits the sector’s potential to generate livelihoods and employment opportunities, not only in primary production but also in other key value-chain segments such as processing, marketing and postharvest handling. It also constrains innovation and the ability of agri-food systems to address new or persistent challenges across various value-chain parts that include marketing, processing, post-harvest handling and exporting.

Research has shown that youth participation in agriculture is also influenced by geological and socio-economic shock factors that include climate change events such as droughts, famine and floods; regional economic and political instabilities; the onset and spread of livestock diseases; as well as divestment in programs geared towards youth empowerment and development (Osabohien et al. 2021; Kote et al. 2024; Perezniето 2011).

Despite the disconnect and other disabling factors, agriculture remains the main industry in many lower- and middle-income countries (Sultan et al. 2025) and continues to employ a large share of young people. Youth employment in agri-food systems is particularly high in sub-Saharan Africa and South Asia, where 68 percent and 52 percent of employed youth, respectively, work in agri-food systems, largely concentrated in primary agricultural activities (FAO 2025). Given that young people represent a large group of the global population (1.2 billion), face higher unemployment rates than adults, and remain under-represented in sociocultural and political spaces (Sultan et al. 2025), their inclusion in agri-food systems must extend beyond presence to encompass decent work and decision-making power. This means that inclusion not only supports livelihoods and employment in rural areas but also strengthens innovation, food security and the capacity of agri-food systems to respond to climate-related food and water challenges. Studies show that young people have greater propensity to experiment and innovate and take up digital and modern technologies such as the internet, digital platforms, social media, immersive technologies and artificial intelligence, as well as sustainable practices that contribute to more equitable and environmentally responsible agri-food systems (Begho et al. 2022; Grilli 2022; Kansiime et al. 2025). At the same time, agri-food systems hold significant potential to generate employment, although realizing this potential requires promoting youth engagement that is full, productive and based on decent work, as young women and men are often concentrated in precarious agricultural employment (FAO 2025).

Inclusion in food, land and water systems is intentionally very broad in this working paper, covering rural, urban and peri-urban areas, and all parts of the value chain, both on-farm (pastoralism and crop production) and off-farm (food vendors and processors). [CGIAR’s 2030 Research and Innovation Strategy](#) sets out a 10-year vision of “a world with sustainable and resilient food, land and water systems that deliver diverse, healthy, safe, sufficient and affordable diets, and ensure improved livelihoods and greater social equality, within planetary and regional environmental boundaries.” The strategy defines CGIAR’s mission as: “to deliver science and innovation that advances the positive transformation of food, land, and water systems in a climate crisis” (CGIAR 2024).

1 The United Nations defines youth as people between the age of 15 and 24 years (<https://www.un.org/esa/socdev/documents/youth/fact-sheets/youth-definition.pdf>)

We use the term food, land and water systems interchangeably with agri-food systems. Although not quite as broad, agri-food systems are all the interconnected activities and actors involved in getting food from field to fork. This broad definition encompasses everything from agricultural production and processing to distribution, consumption and waste management (FAO 2021).

Social inclusion has been widely used by development actors since the 2015 United Nations Sustainable Development Goals determined to leave no one behind (Cullen and Debevec 2024). It emphasizes marginalized and underrepresented social groups and inequality in the distribution of wealth. Young people have historically and structurally been excluded from policy dialogues, yet their challenges in engaging in agri-food systems are well documented. For instance, they often lack capital and access to land, cannot acquire loans, and face socio-cultural barriers (particularly women) (FAO 2025).

The growing advocacy for greater youth involvement in food, land and water systems (FAO and AUC 2022; Sultan et al. 2025) underscores the need for research methods and tools that tackle issues of how best to engage young people and inform youth-responsive strategies, policies, investments and programs. Insights from gender and social inclusion research show that targeted resources—such as guidelines, frameworks and methodologies—can be instrumental in driving initiatives that empower rural people, overcome existing barriers, and reinforce sustainable agri-food systems (Cullen and Debevec 2024). Developing and using youth-focused methods and tools in agri-food systems can inform evidence-based policies, strengthen program design, support gainful and decent youth employment, prevent exclusion from rural development and enable cross-country comparisons that facilitate learning and the adoption of best practices.

2. Purpose and scope

The CGIAR Gender Equality, Youth and Social Inclusion Accelerator aims to kick-start a process of deliberate change toward greater gender equality, and improved opportunities for youth and social inclusion across CGIAR. To support the expanded mandate of the platform, this review was requested.

The objective of this paper is to (1) review and map available youth-focused research tools and methods as a set of resources for researchers to investigate how better to include youth in food, land and water systems; and (2) identify gaps and make recommendations where additional efforts are required to enhance the efficacy of youth engagement strategies. The intended audience is the CGIAR research community and other agri-food system researchers and development practitioners and partners.

3. Framework and methodology

3.1 Analytical framework

We used an adapted version of the gender equality and social inclusion framework to structure our findings (Figure 1). The framework focuses on agency, resources and formal and informal rules as three critical areas that affect youth inclusion in agriculture (Nortje et al. 2023). Youth inclusion depends on:

1. *agency*, which is their capacity to make decisions and act
2. *resources*, which is their access to essentials such as land and knowledge
3. *institutional structures*, which is about inclusion and is further influenced by both formal laws and informal social norms.

Together, these three areas create opportunities or barriers to participation in agriculture, as shown in Figure 1.

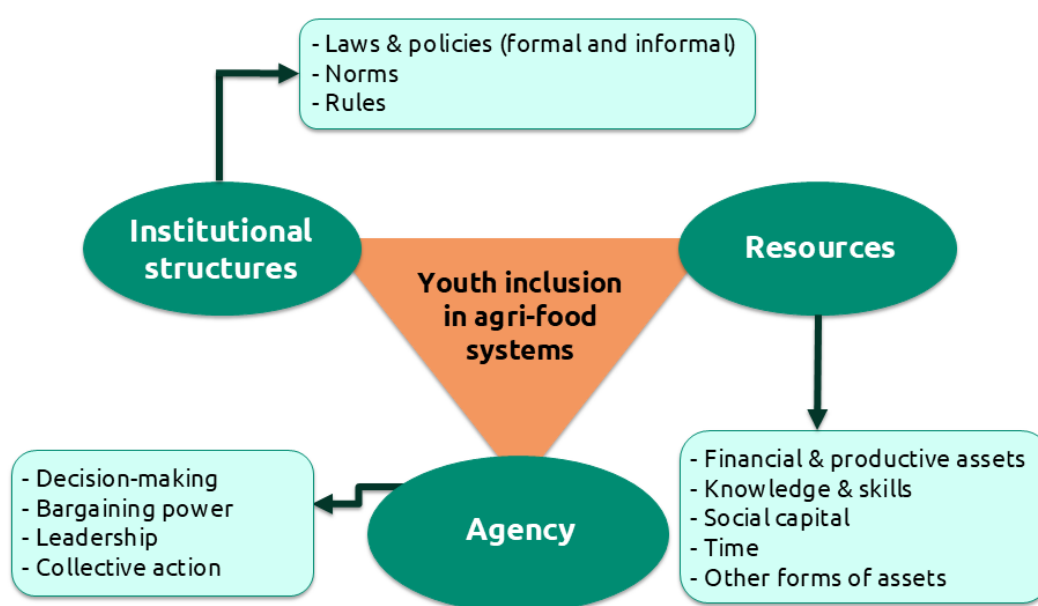


Figure 1. Factors affecting youth in agri-food systems

Source: Adapted from Bill and Melinda Gate Foundation (2020)

3.2 Methods and search terms

The guidelines, methods and tools presented in this paper were identified through searches conducted on Google and Google Scholar, the CGIAR GENDER Impact Platform website, the CGIAR Youth Platform, and the CGIAR repository CGSpace. We used the keyword "youth" combined with "agriculture", "agri-food systems", "inclusion", "research", "development",

“action research”, “methodology”, “agribusiness”, “gender”, “tool/toolkit”, “guide/guidelines”, and “frameworks”. Additional sources were identified through reference-list mining, in which the bibliographies of key studies were examined to uncover further relevant literature.

Following the search, we developed a list of 110 potential papers to include in this review. We screened the papers to ascertain whether they provided valuable research methods or tools for youth inclusion in food, land and water systems. We then developed a database for the included papers, listing the reference, type of publication, description, theme, type of method or tool, methodology used, whether the paper addressed gender or other issues of intersectionality, value-chain information, information on agency, resources, and institutions, intended audience, suggestions on how researchers would use this information, and scale (individual to global). A [link to the database is here](#).

We used a prompt for the artificial intelligence program Microsoft Copilot to extract information for the database (Appendix A). We uploaded the papers to Copilot and transferred the results to the database. We then reviewed the database content to ensure accuracy, consistency and completeness of the extracted information. At the end of this process, 46 papers were included in the review and are discussed in section 4. Results: Overview of selected resources.

Limitations

While efforts were made to capture a wide range of youth-focused research methods and tools, the analysis was only based on the resources assessed, and some relevant materials were likely missed. In addition, the review does not provide an in-depth assessment of all aspects of agency, resources and institutions, as a comprehensive examination of these dimensions would extend beyond the scope and objectives of this paper. Nonetheless, the analysis offers valuable insights into the current landscape of methods and tools used in research on youth in agri-food systems and highlights critical gaps and opportunities for future research and methodological development.

4. Results: Overview of selected resources

4.1 Categories of papers reviewed

The reviewed papers fall into four main categories (Table 1). Most studies focused on the development or use of **method and tool innovations** (19) including frameworks, guidelines and toolkits designed to structure and enhance youth engagement in agri-food systems. A similar number of papers were **exploratory or investigative studies** (16) that examined youth perspectives, behaviors and experiences to identify challenges and opportunities within these systems. Some papers conducted **assessments or evaluations of interventions** (9) analyzing the effectiveness and outcomes of specific programs or policies targeting youth. Only a small subset consisted of **evidence syntheses or systematic reviews** (2) consolidating existing research to highlight trends and gaps.

Table 1. Type of paper, description and count

Type of paper	Description	Count
Method and tool innovations	Covers resources that develop or use research materials such as frameworks, guidelines and toolkits that provide structured approaches for engaging youth in agri-food systems	19
Exploratory or investigative study	Includes research that investigates youth perspectives, behaviors or experiences in agri-food systems, to identify patterns, challenges or opportunities	16
Assessment or evaluation of an intervention	Covers studies that assess or evaluate programs, policies or initiatives involving youth in agri-food systems	9
Evidence synthesis or systematic review	Includes studies that review, synthesize or meta-analyze existing literature or data on youth engagement in agri-food systems	2
<i>Total</i>		<i>46</i>

The papers in the dataset spanned a wide geographic range, with a strong focus on countries in Africa South of the Sahara such as Ethiopia, Ghana, Kenya, Nigeria, South Africa and Tanzania. Several studies also covered Middle East and North Africa contexts like Algeria, Morocco, Tunisia and Yemen. Beyond Africa, the dataset included research from South Asia (e.g., India, Pakistan), Latin America (e.g., Chile) and global or multi-country initiatives.

The methods and tools reviewed varied in how they address intersectionality. While a few studies explicitly included intersectionality to account for the complex identities of youth, most recognized only a few intersectional dimensions. Gender and age were the most consistently used categories, often serving as the primary or sole basis for disaggregation and analysis. Most resources treated these two dimensions as central to understanding diversity among youth, using them to explain differences in participation, access to resources and livelihood outcomes.

Beyond these variables, education level, household income, geographic location and migrant status appeared periodically as secondary variables, typically used to distinguish rural and urban youth, identify patterns of mobility or highlight disparities linked to socioeconomic position. Other intersectionalities, such as marital status, household role, ethnicity, class and disability, were mentioned less often and were rarely operationalized within frameworks or data collection tools. When included, these dimensions tended to appear descriptively rather than as integral analytical components. Overall, while gender and age remained the dominant entry points, intersectional approaches that capture overlapping dimensions of identity and inequality were still limited, constraining the ability of resources to reflect the full diversity of youth experiences in agri-food systems (see Glover and Sumberg 2020).

4.2 Method and tool innovations

The most common types of methods or tools reviewed were frameworks and strategies and toolkits and guidelines, followed by capacity development and training, participatory visual tools, and diagnostic tools (Table 2).

Table 2. Resources that developed method or tool innovations or used existing ones

Method or tool	Number
Frameworks and strategies	5
Toolkits and guidelines	5
Capacity development and training	4
Participatory visual tools	3
Diagnostic tools	2

Five studies developed **frameworks and strategies** to guide the design, monitoring and evaluation of youth engagement in agri-food systems. Resources included a monitoring and evaluation framework to assess training programs aimed at strengthening gender- and youth-responsive research (Irudukunda et al. 2024); a livelihood framework that linked access to resources and assets with inclusion across on-farm, off-farm, and non-farm activities (Nigussie et al. 2024); and a scaling framework integrating production, value addition and market coordination through a cluster-based approach (Belay et al. 2024). Cook et al. (2025) proposed an analytical framework to organize indicators of participation, influence, capacity development and policy impact, while Nchanji et al. (2024) developed a social and behavior change communication strategy using a results-based model and behavioral analysis to strengthen youth and women’s participation in agricultural systems.

Five resources provided **toolkits and guidelines** offering practical methods for integrating youth engagement in agri-food systems (Cruickshank et al. 2022; FAO and AUC 2022; FAO 2024; Cole et al. 2023; Michigan State University 2009). These materials combine participatory design and applied learning through structured exercises, facilitation tools and templates to support implementation and capacity development. FAO and AUC (2022) and FAO (2024) produced guidelines that outline sequential steps for youth-sensitive investment and value-chain analysis, from stakeholder engagement to monitoring and evaluation. Cruickshank et al. (2022) and Cole et al. (2023) developed toolkits that include tools, frameworks and participatory methods to strengthen youth organizations and leadership capacities. The youth farm-stand toolkit (Michigan State University 2009) applied experiential learning to link young people with entrepreneurship and community-based agrifood initiatives. Across these resources, youth engagement is primarily operationalized through participatory consultation, co-design, validation and applied learning. Explicit methodological guidance that positions youth as researchers—responsible for designing, conducting and analyzing research as a pathway for skills development and evidence generation—was not clearly articulated in the reviewed materials.

Four initiatives focused on **capacity development and training models** aimed at enhancing youth engagement in agri-food systems (Pyburn et al. 2016; Kumlachew et al. 2024; Balcha et al. 2024; Wahiu et al. 2020). These initiatives used varied approaches, including guided coaching, vocational instruction, participatory training-of-trainers, and digital literacy programs. Coaching was implemented as a structured action-learning process combining facilitation, mentoring and reflection to help research and project teams integrate gender, youth and nutrition into agricultural innovation systems (Pyburn et al. 2016). A training program provided unemployed youth with technical and business skills, linked to financial institutions to support enterprise creation (Kumlachew et al. 2024). Participatory training-of-trainers models aimed at strengthening the cooperative and organizational capacities of youth and women engaged in land restoration and livelihood diversification (Balcha et al. 2024), while ICT-based training enhanced digital literacy and the use of online platforms for agribusiness communication and marketing (Wahiu et al. 2020).

Three studies used **participatory visual tools** to explore youth perspectives and knowledge in agri-food systems (Shijagurumayum et al. 2024; Hamamouche et al. 2024; Rietveld et al. 2025). These approaches combined visual documentation, reflection and dialogue to enhance participation and collective learning. Shijagurumayum et al. (2024) used photovoice to capture how young people perceive and experience agricultural livelihoods, emphasizing

reflexivity and the adaptation of participatory processes to sustain engagement. Hamamouche et al. (2024) used participatory videos to facilitate intergenerational knowledge exchange and communication between youth, community elders and technical experts on natural resource management. Similarly, Rietveld et al. (2025) draw on semi-structured interviews and photovoice across five countries to examine how agroecology resonates with young women and men and may attract them to farming and rural livelihoods.

Two additional resources developed **diagnostic tools** to assess institutional and policy environments for youth engagement in agriculture (Mudege et al. 2019; FAO 2018). Mudege et al. (2019) provide a diagnostic checklist for assessing how agricultural programs integrate youth perspectives in root, tuber, and banana systems, while FAO (2018) offers a rapid assessment framework to identify institutional capacities, coordination mechanisms, and enabling conditions for youth participation in responsible investment and value chain processes.

4.3 Data collection and analysis methods

Studies developing new tools emphasize innovation, assessments and evaluations and usually use established data collection and analysis methods. We describe these methods used in the assessments of existing interventions and exploratory studies reviewed here.

Surveys and questionnaires were the most frequently used data collection methods across both assessments and exploratory studies. Qualitative consultations—such as interviews, focus group discussions, workshops or dialogues, and narratives—were also used, although less consistently. A smaller number of studies drew on project or administrative records, experimental methods or secondary datasets (Table 3).

Table 3. Type of paper, description and count

Data collection method	Assessments (n = 9)	Exploratory studies (n = 16)
Surveys and questionnaires	7	12
Qualitative consultations (interviews, focus group discussions, workshops/dialogues, narratives)	2	4
Project or administrative records	1	0
Experimental methods	2	0
Secondary or national datasets	2	1

Note: Some studies use multiple methods

Descriptive and inferential statistics were common analytical approaches used in data analysis, reflecting the widespread use of quantitative summaries and basic statistical testing (Table 4). Econometric and statistical modeling techniques were also used by several studies. Qualitative thematic or content analysis was used in only a few cases to interpret perceptions, experiences and contextual factors related to youth engagement. A small number of studies also constructed composite indices to synthesize multiple indicators.

Table 4. Data analysis methods used in selected studies

Data analysis method	Assessments (n = 9)	Exploratory studies (n = 16)
Descriptive and inferential statistics	6	14
Econometric or statistical modeling	6	9
Thematic or content analysis	2	3
Composite index construction	0	2
Secondary or national datasets	2	1

Note: Some studies use multiple methods

4.4 Systematic reviews

Two studies included in the review were systematic reviews, both applying Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA)-guided methodologies to identify and synthesize evidence on youth engagement and skills training in agriculture (Maïga et al. 2020; Boye et al. 2024). These studies relied on structured data extraction from peer-reviewed and grey literature, using surveys, interviews and focus group data as the main sources of evidence. For data analysis, both applied content or thematic synthesis to organize findings.

Both reviews identified important gaps in the evidence base. They found that most studies relied on quantitative and cross-sectional designs, with few applying qualitative, mixed-methods or experimental approaches. The reviews also note a lack of gender-disaggregated analysis, weak documentation of implementation processes and minimal attention to contextual or behavioral factors that shape youth participation in agriculture. These findings point to the need for more systematic, longitudinal and gender-sensitive research to understand how programs influence youth outcomes over time.

5. Results: Agency, resources and institutional structures

This section analyzes how the reviewed literature conceptualized and operationalized three key dimensions of youth inclusion in agri-food systems—agency, resources and institutional structures. We analyzed the dimensions for two types of resources: methods and tools, and assessments and exploratory studies.

5.1 Agency

Following Kabeer (1999) agency refers to the ability to define one’s goals and act on them within the opportunities and constraints of one’s social context.

Across the reviewed materials, agency is conceptualized as both an individual capability and a collective process of participation, leadership and influence. Agency embedded through approaches that strengthen youth decision-making power, enhance confidence and skills, and expand opportunities for self-expression and voice. Most methods and tools reviewed operationalize agency by promoting active engagement in planning, implementation and evaluation processes, emphasizing autonomy and collaboration.

Frameworks such as the Reach–Benefit–Empower–Transform (RBET) framework in the CGIAR Excellence in Agronomy Standard Operating Procedure (Cole et al. 2023) explicitly link empowerment and transformation to shifts in decision-making power and social norms. Similarly, the Global Alliance for Improved Nutrition (GAIN) Youth Engagement Framework (Cook et al. 2025) advances measurable indicators to assess youth influence in governance and policy processes within agri-food systems.

The FAO Gender Equality and Social Inclusion Guidelines (FAO 2024) and the Youth-Sensitive Value Chain Toolkit (Cruickshank et al. 2022) integrate participatory appraisal and stakeholder-mapping processes that position youth as contributors to program design and evaluation. Hamamouche et al. (2024) illustrate this through a participatory video approach in groundwater governance, where youth scouts were trained to produce short films expressing their perceptions of water challenges and their visions for change. Likewise, the PhotoVoice approach in Shijagurumayum et al. (2024) captures how rural youth, particularly young women, articulate their aspirations, perceptions, and challenges in agroecological transitions.

The FAO (2022) *Investment Guidelines for Youth in Agrifood Systems* emphasizes organizing and leadership as one of the pathways for fostering youth participation and influence within agri-food systems. Mudege et al. (2019) include a participatory checklist that guides practitioners and youth to reflect on and evaluate the extent of youth involvement and influence in agricultural initiatives, while Iradukunda et al. (2024) incorporate an empowerment lens in a monitoring and evaluation (M&E) framework on capacity-strengthening for gender- and youth-responsive research.

In contrast to studies focused on methods and tools—where youth agency is embedded in design through participatory and co-creation processes—the assessment and exploratory literature conceptualizes agency primarily as an analytical construct. In these studies, agency is not directly enabled through the research process but is instead measured, modeled or inferred through behavioral indicators, aspirations or perceptions.

Most studies capture agency indirectly, linking participation in programs, skills development, ICT use and income-generating activities to increased autonomy, confidence and capacity to act. Some studies emphasize how exposure, experience and networks expand these capacities, while others associate agency with improved employment, innovation or business performance.

Economic or entrepreneurial agency is typically inferred through proxies such as income generation, enterprise ownership, employment status or asset accumulation (Adeyanju et al. 2021; Uduji et al. 2021; Ogunmodede et al. 2020; Diao et al. 2017). Improvements in these outcomes are interpreted as evidence of enhanced agency, even when empowerment itself is not explicitly measured. For example, Bouichou et al. (2021) examine entrepreneurial intention among Moroccan cooperative members through the Theory of Planned Behavior, using logistic regression to link perceived self-efficacy and risk perception to the likelihood of pursuing self-employment. Henning et al. (2022) analyze youth aspirations and perceptions in South Africa and find that participation in agriculture is driven less by aspirations themselves and more by perceptions related to opportunity, comfort, education and institutional support.

Beyond these economic proxies, some studies operationalize decision-making dimensions of agency. Livelihood decision-making is captured through the ability to make and implement choices related to market participation, diversification or enterprise management (Rogito et al. 2020; Henning et al. 2022; Bouichou et al. 2021). Mdege et al. (2022) show that youth decision-making is shaped by personal factors—such as age, gender, and social class—and by power dynamics within families and communities, distinguishing between strategic long-term agency and tactical short-term actions taken within constraints.

Lachaud et al. (2018) and Chipfupa and Tagwi (2021) analyze psychological agency using self-efficacy or motivation indices to capture the relationship between confidence, initiative and livelihood outcomes. Self-perception-based agency based on attitudes and expectations is

treated as measurable expressions of empowerment (Henning et al. 2022; Bouichou et al. 2021). One study (Chipfupa and Tagwi 2021) integrates psychological dimensions through a composite index of optimism, resilience, and self-confidence to examine how different youth typologies relate to livelihood outcomes.

Collective and political forms of agency appear less frequently. Some studies document participation in cooperatives, youth associations or producer groups (Bouichou et al. 2021; Mudege et al. 2022; Mmbengwa et al. 2021) as enabling conditions for empowerment, yet these are typically treated as contextual variables rather than outcomes of shared agency. Empirical analysis of political agency such as youth influence over governance or organizational decision-making remains rare.

5.2 Resources

This section focuses on youth access to resources—the material, financial, informational and organizational assets that enable their participation in agri-food systems such as access to credit, land, markets, inputs and extension services. Across the 18 methods and tools reviewed, resources are broadly framed as both inputs and enablers of empowerment, emphasizing that youth and women’s ability to act depends on the opportunities, skills and institutional support available to them. While agency captures the power to make and act on decisions, these resources constitute the foundational conditions that make such decisions feasible. We include training and capacity development as a resource because, although they can contribute to agency and are a form of human capital development, these activities are an input rather than a result (like agency or empowerment) of human capital (see Davis et al. 2021).

A subset of the reviewed materials focuses on approaches for building youth capacities and access to productive assets through skills development, training and capacity strengthening. Belay et al. (2024) describe a training workshop that convened researchers, extension agents, cooperatives and farmers to design and scale a community-based sheep breeding framework integrating technical, business and market components. Balcha et al. (2024) highlight training initiatives that enhance youth and women’s skills in market-oriented forage production and beekeeping to support land restoration and livelihood diversification in Ethiopia. Kumlachew et al. (2024) present a CGIAR SAPLING initiative that trains unemployed urban youth in chicken meat frying and marketing to promote poultry consumption and generate employment through a street food enterprise model. Pyburn et al. (2016) outline a coaching-based capacity development approach for agricultural research and development that applies guided action learning to help teams integrate gender, youth, and nutrition considerations into innovation processes.

Methodological resources also highlight access to economic and institutional assets as a key enabling dimension. The Youth-Sensitive Value Chain Toolkit (Cruickshank et al. 2022) proposes diagnostic tools for mapping gender- and age-based disparities in access to productive resources. Lengewa et al. (2024) describe how Youth and Women Quality Centers could function as local hubs that connect young people to affordable quality seed of improved varieties, while Wahiu et al. (2020) illustrate how the Vijabiz project in Kenya leveraged ICT training and digital platforms to expand youth access to financial services, markets and online marketing channels.

Across all reviewed methods and tools, resource access is closely tied to institutional capacity. Reviewed frameworks recognize that youth and women’s access to land, finance and knowledge is mediated by formal and informal systems that determine who participates and under what terms. These dimensions are analyzed in greater detail under the section on formal and informal laws, where governance mechanisms and institutional arrangements are examined more directly.

Across the set of assessment and exploratory studies, resources emerged as the most concrete and measurable dimension of youth engagement in agri-food systems. These studies typically examined financial, physical, informational, social and human resources

that can be quantified and modeled to explain patterns of youth participation, livelihood performance or economic outcomes.

Studies measured youth access to key productive resources such as financial, infrastructural, physical and informational assets. Diao et al. (2017) include indicators such as education, proximity to markets, transportation and electricity to identify patterns related to rural livelihoods in Ghana, while Henning et al. (2022) and Rogito et al. (2020) show that financial services, market access, agricultural support and extension services increase the probability of youth participation in agriculture and its associated value chains.

Across studies, ICT emerges as a cross-cutting resource that expands young people's access to information, markets and productive opportunities in agriculture. Jolex and Tufa (2022) examine how ICT use affects the profitability of young agripreneurs in Malawi, while Katunyo et al. (2018) analyze the factors influencing the intensity of ICT use by youth in agricultural value chains in Busia County, Kenya. Uduji et al. (2021) found that Nigeria's Growth Enhancement Support Scheme (GESS)—which delivers subsidized inputs via a mobile e-wallet platform — enhanced youth farmers' access to information and agricultural technologies, fostering greater adoption of improved inputs and farming innovations.

Social and institutional resources, such as participation in social networks, cooperatives or youth associations, were also prominent in some studies (Mudege et al. 2022; Lengewa et al. 2024; Bertelli et al. 2019) emphasizing the role of social capital in facilitating access to credit, inputs and information while strengthening trust, learning and collective action.

A final category concerns human capital development—capacity development, training and skills building. Numerous impact assessments examined how participation in training influences youth employment, entrepreneurship and innovation. In Nigeria, Adeyanju et al. (2021) found that participants in agricultural training achieved better agribusiness performance and income gains. Lachaud et al. (2018) reported that vocational and business training under the ILO's TREE program in Zimbabwe increased youth earnings and household welfare. Abay et al. (2024) found that soft skills training improved youth's readiness and motivation for employment, though its effects on actual labor market outcomes differed depending on participants' psychological traits. Cross-country evidence from Palmer and King (2010) further indicates that vocational and technical skills programs support transitions to better employment, though access remains unequal.

5.3 Institutional structures

Most frameworks reviewed acknowledge that youth participation is mediated by institutional structures, including both formal policy environments and informal social systems, yet few embed these dimensions as structured analytical components. Tools tended to recognize policy gaps, gender norms or cultural barriers as constraints to equitable participation. However, these elements are largely treated as background context rather than variables to be analyzed or transformed. An example of a resource that operationalizes the enabling environment as a core analytical component, rather than as contextual background, is the Positive Youth Development framework developed under USAID's YouthPower initiative (USAID 2021), which falls outside the agri-food systems focus of this review.

A smaller set of tools, however, begin to operationalize laws and norms more explicitly. The Food and Agriculture Organization's capacity assessment tool (FAO 2018) introduced a policy-screening module that guides users in assessing whether investment frameworks align with responsible agricultural investment principles and youth-related mandates. Lengewa et al. (2024) highlight policy advocacy as a core strategy within their social and behavior change framework, aiming to strengthen enforcement of existing seed quality regulations and improve coordination with government agencies.

Informal norms receive less systematic but more innovative treatment. Participatory approaches aim to make cultural and behavioral norms visible within methodological processes. Hamamouche et al. (2024) use participatory video methods to document

intergenerational power relations and social perceptions of groundwater management, creating space for dialogue and reflection on norm change. In Shijagurumayum et al. (2024), the PhotoVoice tool used in India captures social norms indirectly through participants' narratives and visual expressions, revealing how cultural expectations around age, gender and status shape youth roles, aspirations and participation in agriculture.

Across the assessment and exploratory studies, formal and informal laws were acknowledged as shaping the institutional environment for youth engagement, but they were seldom measured directly. Some studies incorporated formal laws by linking youth outcomes to the broader policy and regulatory environment rather than to program participation alone. For instance, Rogito et al. (2020) and Diao et al. (2023) emphasize how gaps in agricultural and credit policies shape youth access to finance and employment opportunities, while Mmbengwa et al. (2021) highlight the absence of institutional support structures that support youth engagement in agricultural entrepreneurship in South Africa. Palmer and King (2010) argue that governments should foster enabling environments that help youth apply their skills by promoting innovative and sustainable microcredit schemes. Still, across most studies, formal laws remained background context, discussed as part of policy narratives rather than captured through explicit variables on the existence or implementation of laws and programs.

Informal laws—the social rules and expectations that govern legitimacy, access, and decision-making—were more incorporated by studies through perception data and qualitative evidence. Studies such as Henning et al. (2022) and Bouichou et al. (2021) quantified attitudes, perceptions and subjective norms that discourage youth from pursuing agriculture, while Chipfupa and Tagwi (2021) used typology analysis to show how perceptions related to the agricultural sector are influenced by opinions of close family and friends. Other studies including Mudege et al. (2022) and Mukembo et al. (2015) describe how gendered hierarchies, parental support and age-based authority influence young people's participation in agriculture.

6. Gaps in research methods and tools and recommendations for youth inclusion

Despite progress in methodological innovation, several gaps continue to limit the broader application, comparability and institutionalization of youth-focused methods and tools in agri-food systems research.

A recurrent issue is the **limited validation and institutional uptake** of newly developed frameworks for youth inclusion. Many tools remain in pilot or early testing stages, with insufficient replication across regions, sectors or organizations. As a result, their scalability and long-term integration into policy and program cycles remain weak.

Research, particularly AR4D, has a role to play in the uptake and scaling of existing development tools. The role of research should be an enabling and facilitating mechanism for meaningful youth inclusion in agri-food systems by strengthening pathways for youth to create innovative agri-food products and systems, to monitor and address development bottlenecks and to document impact and lessons learned from scaling development tools (CGIAR 2015; Martin et al. 2013; Douthwaite et al. 2017).

Challenges in **measuring change and impact** persist across both qualitative and quantitative approaches to youth tools and studies. Participatory and experiential methods often capture valuable insights into youth experiences but produce outputs that are difficult to quantify, aggregate or compare across contexts. The absence of harmonized indicators also limits efforts to assess participation, empowerment or influence consistently. At the same time, quantitative approaches face their own constraints: many initiatives lack baseline or longitudinal data, making it difficult to measure change over time or attribute outcomes to specific interventions. These limitations, combined with the resource intensity and contextual dependence of participatory and capacity-building approaches, continue to constrain the generation of robust, comparable evidence across settings.

The integration of **intersectional and gender-transformative perspectives** also remains uneven in the reviewed literature. While gender is frequently considered, other intersecting identities, such as age subgroups, ethnicity, disability, migration status or geographic disparities are incorporated only in a few of the reviewed papers (e.g., FAO 2024).

Finally, there is a lack of **conceptual and methodological integration** across the three core dimensions of youth engagement—agency, (access to) resources and institutional structures. Often, these elements are treated in isolation rather than as interdependent components that shape young people's ability to participate and thrive within agri-food systems. Bridging these dimensions and linking shifts in policy frameworks with changes in social norms would strengthen the explanatory power and transformative potential of future research.

For future youth inclusion tools and studies, we provide recommendations based on these gaps.

Youth studies and tools should be targeted for more diverse regions. While most papers focused on Africa, which is understandable given that the region hosts a substantial share of the global youth population, it would be useful to examine youth inclusion in different regions as well.

Much of the focus for learning and capacity development was on training programs or education, but less on practical learning through internships, apprenticeships or mentoring. These dimensions could be useful to instill hands-on learning. **It would also be useful to assess and include practical learning resources.** Partnerships with universities and other academic institutions could help strengthen these pathways, support school-to-work transitions, and enhance hands-on skills development. Relatedly, few tools explicitly support youth participation as researchers, limiting opportunities for young people to develop research skills while contributing to the generation of evidence grounded in youth priorities.

Overall, while informal norms received more attention, there seems to be growing effort to incorporate both legal and cultural structures into youth empowerment evaluations. Formal and informal laws were often mentioned in resources. However, they are not systematically assessed or linked to outcomes. This reflects a broader gap in how structural and normative barriers are addressed in youth-focused assessments. Also, few tools were designed for policy influence. We need to **systematically assess formal and informal laws and norms and link them to outcomes in studies**, as they are a key element of conceptual, analytical, research and development frameworks.

A key priority is to **build strong data systems and longitudinal approaches**, guided by FAIR (Findable, Accessible, Interoperable, Reusable) and CARE (Collective Benefit, Authority to Control, Responsibility, Ethics) data principles to capture change over time. The absence of baseline and follow-up data continues to limit the ability to measure progress or attribute outcomes to specific interventions. Longitudinal and panel designs that follow youth trajectories can generate deeper insights into how participation in agrifood initiatives affects employment, income and empowerment. Achieving this, however, requires sustained political will, institutional commitment and adequate funding to ensure data continuity, long-term monitoring, and the integration of learning into policy and program cycles.

There is a continued need to **strengthen the use of mixed-method and participatory approaches** that bring together the rigor of quantitative analysis and the contextual depth of qualitative inquiry. Some tools already take this direction, but it is important to keep combining participatory methods—such as interviews, focus groups and visual exercises — with quantitative designs to better capture youth perspectives and make findings more relevant for policy and practice. Achieving this in practice requires not only including qualitative methods but ensuring that they are adequately valued and resourced by allocating sufficient budgets and timelines for qualitative data collection and analysis building researcher capacity in qualitative and participatory methods; and providing practical, youth-appropriate qualitative tools.

The growing use of **digital and adaptive data collection tools** has already improved data quality and comparability, and these efforts should continue. Mobile and online platforms make it easier to monitor activities in real time, reduce data entry error, and increase accessibility. New technologies, including AI-assisted systems and chatbots, can also support data organization and analysis, and are increasingly being used to deliver extension services and information directly to farmers, offering opportunities to make research and outreach more efficient and inclusive. To realize these benefits, digital tools should be developed and applied in ways consistent with FAIR and CARE data principles, and with the meaningful involvement of youth as users, contributors and co-designers. At the same time, careful analysis of emerging risks is needed, including the potential to reinforce stereotypes, exclude certain groups, or compromise data privacy. Ongoing attention to standardized metadata, ethical guidelines (see Jones-Garcia et al. 2025a), inclusive governance and validation procedures will help ensure that digital innovations strengthen rather than undermine the quality and equity of research. Juxtaposing qualitative data analysis with digital and adaptive data collection tools can help to better understand how these tools support or hinder youth inclusion (see, e.g., Jones-Garcia et al. 2025b).

Finally, research and tool development should **integrate stronger gender, youth and social inclusion (GEYSI) perspectives, incorporate value-chain analysis**, ensure the **institutionalization of validated frameworks**, and establish **effective feedback loops** so that evidence consistently informs policy, programming, and long-term learning across contexts.

7. Concluding remarks

The growing awareness of the importance of greater youth involvement in food, land and water systems underlines the need for research methods and tools to show how best to engage young people in these systems. Guided by the gender equality and social inclusion framework (Nortje et al. 2023) this paper reviews a sample of youth-focused research tools and methods across three key areas—agency, resources, and institutional structures—within agri-food systems. We analyzed 46 papers and highlight gaps where additional methods and tools are needed to effectively engage young people. Insights from gender and social inclusion research show that targeted resources—such as guidelines, frameworks, methodologies and assessments—can be instrumental in driving inclusion (Cullen and Debevec 2024). Developing and using youth-focused methods and tools in agri-food systems can inform evidence-based policies, strengthen program design, and ensure that youth are not left out of rural development and agri-food system transformation.

By providing research methods and tools for youth inclusion in food, land, and water systems, recognizing key contributions, and identifying research gaps, the paper builds a foundation for more impactful research and interventions by researchers who examine youth inclusion.

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Appendixes

Appendix A. Artificial intelligence prompt for paper analysis on youth in agri-food systems

Please analyze each paper I will upload using only the content provided in the document. Do not make assumptions or include information that is not explicitly stated in the paper. Do not make assumptions or add external information. This analysis is intended to populate an Excel sheet and support a synthesis paper on methods and tools related to youth in agri-food systems. For each paper, provide the following:

1. **Citation**

- Full citation of the paper.

2. **Brief Description**

- A concise summary of the paper's purpose and content.

3. **Main Theme**

- What is the central focus of the paper? (e.g., youth empowerment, education, edutainment, entrepreneurship, etc.)

4. **Type of Method**

- Is the paper proposing a **new method or tool** (e.g., framework, guideline, strategy, training material, toolkit, scenarios)?
- Is the paper conducting an **assessment of an intervention** (e.g., using econometrics, FGDs, surveys)?
- If both are present, specify clearly.

5. **Methodology**

- Specify the methodology used:
 - **Quantitative**: Indicate type (descriptive, correlational, causal, experimental, etc.)
 - **Qualitative**: Indicate type (literature review, key informant interviews, focus group discussions, document review, etc.)
 - **Mixed Methods**: Describe how both types are used.
 - **Other**: If applicable (e.g., spatial analysis)

6. **Intersectionality**

- Is intersectionality (e.g., gender, age, education, socioeconomic status) addressed?
- Specify **how** it is addressed:
 - Only mentioned?
 - Included in the **assessment**?
 - Explicitly considered in the **method/tool** (e.g., guidelines or frameworks include tailored actions for different groups)?

7. **Country or Region**

- Where is the study or intervention taking place?

8. **Value chain**

- Does the study focus on a specific stage of the value chain (specify), address the entire value chain, or leave the scope unspecified?

9. **Digital tool**

- **Are digital tools mentioned or used? (Yes/No)**
- **If yes, how are they used or integrated?**

10. **Dimensions of Youth Empowerment**

Assess whether the paper addresses the following dimensions and **how**. I'm not interested in the results of each paper but how the method or tool mention in the papers addresses those elements. Please include the tool name explicitly in each answer and combine the explanation into a single column for easy copy-paste into Excel."

do not present results in bullet points, right clear sentences to improve understanding. also use nouns before the verbs to clear identify what you are talking about

i. **Agency**

- Specify which types of agency like education, training, leadership, entrepreneurship, access to information, or youth networks are included
- Specify whether they are:
 - Only mentioned
 - Assessed
 - Explicitly integrated into the method/tool

ii. **Access to Resources**

- Are resources like land, credit, inputs, technology, markets, or extension services discussed?
- Specify whether they are:
 - Only mentioned
 - Assessed
 - Explicitly integrated into the method/tool

iii. **Formal and Informal Laws**

- Are policies, laws, legal frameworks or social norms (e.g., gender roles, cultural expectations, policies) discussed?
- Specify whether they are:
 - Only mentioned
 - Assessed
 - Explicitly integrated into the method/tool

11. **Summary Table**

Provide a table summarizing whether each of the three dimensions is addressed and **how**

(mentioned, assessed, or integrated into the method/tool).

12. Audience (Who Should Read the Paper)

- Who is the intended reader or user of the paper? (e.g., researchers, practitioners, policymakers)

13. How Should Researchers Use the Tool

- Briefly describe how the tool or method is intended to be used by researchers or practitioners.

14. Scale of Intervention

- What level is the intervention targeting? (e.g., individual, household, community, organization, national)



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