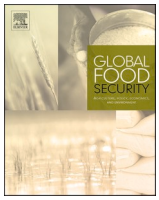
Global Food Security 42 (2024) 100769

Contents lists available at ScienceDirect

Global Food Security

journal homepage: www.elsevier.com/locate/gfs



An evaluative framework for inclusive agricultural value chain policies and interventions – Case: Mali

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ARTICLE INFO

Keywords:
Poverty alleviation
Inclusiveness
Formal institution
Cash crop
Gender
Youth

ABSTRACT

Advancing food security requires multi-level and inclusive approaches. This article presents a novel framework to (E) evaluate the social inclusiveness of policies and interventions (PIs) towards (V) vulnerable social groups in (A) agricultural value chains. The EVA-framework is applicable to any value chain, geography and vulnerable group. We apply it to the irrigated vegetable value chain of Mali, analyzing the social inclusiveness of weighted PIs towards women and youth. We find that respective PI formulation in Mali is largely not inclusive. Only few PIs set specific targets, quotas or a financial budget for women and youth inclusion. To be inclusive PIs need to consult targeted social groups, include clear targets, budgets, and accountability mechanisms, and be monitored and evaluated.

1. Introduction

Advancing food security requires multi-level and inclusive approaches (Graef et al., 2014; Lecoutere et al., 2024; Pyburn et al., 2023). To improve food security and livelihoods, governments and development actors aim to strengthen food production, processing, and trade, i.e., agricultural value chains (AVCs). Vulnerable social groups are, however, often partially or fully excluded from participation in and benefits from AVCs (Carter et al., 2022; Fan and Swinnen, 2020; Ofuoku and Ekorhi-Robinson, 2018; Ros-Tonen et al., 2019; Venn, 2018). Social groups may be vulnerable based on intersecting factors such as their economic or health status, gender, age, or ethnicity (Carter et al., 2022; Ito et al., 2012; Ramirez et al., 2018). Policies and interventions (PIs) are crucial in curbing social exclusion in agricultural development (Devaux et al., 2018; Fan and Swinnen, 2020). Governments, as the stewards of formal institutions, have the power to counteract exclusion and adverse inclusion by conceiving and implementing socially inclusive policies and interventions (SIPIs) to 'leave no one behind' (Dekker and Pouw, 2022; Oehmke et al., 2022; United Nations, 2015).

Agricultural development research has emphasized the importance of generating evidence to support the formulation of effective SIPIs (Koehler et al., 2020). Participatory and socially sensitive data collection methods have been developed to inform policymakers and intervention architects about prevailing inequalities (Alkire et al., 2013; Grabowski et al., 2021; Harris-Fry et al., 2022; Kristjanson et al., 2017; Zulu et al., 2021). Agricultural development research has also determined factors that contribute to a stronger and self-determined engagement of vulnerable groups in AVCs, including improved access to land (Allendorf, 2007; Slavchevska et al., 2017), to credit (Akrong and Kotu, 2022), training (Collett and Gale, 2009), the usage of small-scale irrigation (Bryan and Garner, 2022), or membership in saving groups (Karlan et al., 2017; Lecoutere et al., 2024). A stronger value chain integration holds the prospect of new economic opportunities but may also entail risks such as increased dependencies and compliance pressures, excluding those that cannot comply (Devaux et al., 2018; Vos and Caataneo, 2021). Risks for vulnerable groups may be minimized, e.g., by strengthening farmer groups (Ba et al., 2019; Lecoutere et al., 2024), building their investment capacities (Donovan

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https://doi.org/10.1016/j.gfs.2024.100769
Received 8 January 2024; Received in revised form 29 April 2024; Accepted 18 May 2024
Available online 13 July 2024

and Poole, 2014) and creating employment opportunities along the value chain (Said-Allsopp and Tallontire, 2015; Vos and Caataneo, 2021).

The wealth of research on inequalities, factors for empowerment, and inclusion of vulnerable social groups in agriculture has not translated into a systematic analysis of the respective social inclusiveness of PIs. Pro-poor focused PIs were evaluated in differently structured qualitative reviews (Asiamah, 2021; Bassett and Munro, 2022; Dekker and Pouw, 2022; Singh and Chudasama, 2020). Only a few studies in the gender and agricultural development literature offer a systematic framework to evaluate the social inclusiveness of PIs: Gumucio and Rueda (2015) evaluate and compare climate change policies in Latin America regarding their degree of gender integration, determining a generally low respective degree. Paudyal et al. (2019), also part of the climate policy literature, dyadically assess whether key agricultural policies and programs in Nepal recognize or provision for gender equality, determining that most PIs include targets, e.g., for women's land ownership or their participation in agricultural interventions, while only a few are underpinned by action plans or budget allocations. Diallo (2020) examines an individual policy, the Agriculture Orientation Law (LOA) in Mali, which explicitly declares women and youth as the primary beneficiaries, but thus far did not translate into tangible change for women and youth in terms of their participation in or benefits from agricultural production processes. Notably, none of the encountered publications has taken a value chain perspective nor considered the broader PI environment beyond agricultural policies and interventions.

In this paper, we address the research question of how to systematically assess the social inclusiveness of PIs for more inclusive value chains. We develop a framework to (E) evaluate the social inclusiveness of policies and interventions towards (V) vulnerable social groups in (A) agricultural value chains. We apply the EVA-framework to the national case of Mali, focusing on the social groups of women and youth and the irrigated vegetable value chain (IVVC). SIPIs in Mali are an important national and international concern, with Mali being heavily supported by donors towards achieving greater food security, greater income diversification, and more resilient livelihoods (IMF, 2023; USAID, 2022; WFP, 2023; World Vision, 2022). Irrigated vegetables constitute an essential addition to the nutritional diversity of rural households during the dry season and, as cash crops, provide an important income source and therewith contribution to household food security (Adétonah et al., 2015; Dembele, 2018; Dicko Dembele et al., 2018). IVVCs are thus particularly potent to empower value chain participants but also bear a high risk of increasing intra-household inequalities if women and youth cannot participate and benefit from them. Compared to other value chains, the IVVC requires many enabling factors, including access to water, training, market links, and credit. Also, the perishability of the produce requires particular care, timeliness, and often investments in the value chain functions of processing and sales. We considered this complex case interesting to demonstrate the EVA-framework, since it reflects many potential domains of exclusion.

2. Analytical framework

In this study, we set a broader yet more refined analytical frame than previous studies to assess the social inclusiveness of PIs. Paudyal et al. (2019) dyadically classify policies and programs according to whether they recognize or provide for gender-differentiated impacts of climate change in agriculture. Gumucio and Rueda (2015) discern five increasing levels of gender-specificity, ranging from gender not being mentioned (Grade 1) to gender being included in the objectives and being backed by action plans with clear resource allocation (Grade 5). Their grading system is grounded in the feminist- and gender-transformative development literature that classifies policies as gender-blind or gender-aware, with the latter sub-categorized into gender-neutral, gender-specific, or gender-transformative (Burns and Patouris, 2014; Kabeer and Subrahmanian, 1996; MacArthur et al., 2022). The authors also emphasize the importance of participatory processes underlying policy development and of differentiating the extent of commitment to achieving gender goals (Gumucio and Rueda, 2015; MacArthur et al., 2022).

Our analytical frame is broader since we extend existing graded approaches for evaluating social inclusiveness to interventions and other vulnerable groups. Our frame is more refined since we apply a value chain perspective and define specific inclusion mechanisms for vulnerable groups per value chain function (VCF) to systematically countercheck and grade the social inclusiveness of policies and interventions. Also not being covered by previous frameworks, for the analysis of PI portfolios, we recommend weighting or differentiating PIs according to their importance, i.e. their topicality, influence on the selected value chain, their geographical scope, and/or budget. The differentiation facilitates strategic analysis and dialogues towards improvement.

We define SIPIs as policies and interventions that recognize and foster inclusion mechanisms for vulnerable groups in agricultural value chains. Policies may be laws, regulations, strategies, procedures, administrative actions, or incentives issued by the government. Interventions are activities as part of programs and projects, often linked to specific policies and run by governments, donors, or non-governmental organizations.

The inclusion of a vulnerable group starts with participatory PI framing and formulation, i.e., by incorporating the groups' interests and perspectives (Koehler et al., 2020; Lecoutere et al., 2024; Savard et al., 2018; Tsekleves et al., 2022). PI texts that are inclusive towards a particular social group explicitly address it as a target group, containing quotas, budgets, or grants to ensure their inclusion that would otherwise be at risk (Gumucio and Rueda, 2015). The actual reach and benefit of PIs for particular social groups would have to be measured through direct consultations with these groups as part of the respective governments' or donors' monitoring and evaluation (M&E) efforts (Paudyal et al., 2019). Since different PIs may target different VCFs and address the barriers of different social groups through different inclusion mechanisms, our analytical framework is structured accordingly.

2.1. Value chain functions (VCFs)

An agricultural value chain comprises four consecutive VCFs towards consumption: input provision, farming (crop cultivation/livestock farming), processing, and sales (Jordaan et al., 2014; Rich et al., 2011). Inputs for crop cultivation refer, e.g., to seeds, fertilizers, agro-chemicals, fuel, tools, machinery, and irrigation equipment (Mishra and Dey, 2018; Nchanji and Lutomia, 2021; ten Berge et al., 2019). Inputs for livestock farming refer, e.g., to feed, bedding, veterinary products, or fencing materials (Balehegn et al., 2020; Collishaw et al., 2023). Crop cultivation refers to activities ranging from land preparation, sowing, weeding, fertilization, crop pest and disease management, irrigation, to harvesting (Michalscheck et al., 2018). Livestock farming refers to animal feeding, healthcare, reproduction, and the generation of animal-based products like meat, milk, or eggs. Processing refers to operations that transform, sort, or package produce, to add value, to improve taste, and digestibility and/or to facilitate storage and consumption (Gbashi et al., 2023; Reardon et al., 2021). Sales require storage, collection, distribution, and marketing to reach traders and consumers. Individuals may participate and benefit from VCFs by engaging as manufacturers, farmers, processors and/or traders (Devaux et al., 2018).

2.2. Barriers to participating in and benefiting from VCFs

Vulnerable social groups may face various barriers to participating in and benefiting from AVCs (NEPAD, 2019; Pyburn et al., 2015). Examples of cross-VCF barriers are a lack of knowledge, of access to financial services, lack of capacity for taking care of labor-intensive crops or livestock types, for attending agricultural trainings (Coles and Mitchell,

2010; Johnston et al., 2018; Margolies et al., 2023), for going to markets or assuming off-farm jobs, limited decision-making power in households and communities and cultural norms prohibiting specific value chain activities (Michalscheck et al., 2019; Njiraini et al., 2018; Pyburn et al., 2015). Barriers related to participation in input provision include a lack of specialized training and employment opportunities (Cruickshank et al., 2022; Fimer and Fox, 2014). For farming, vulnerable groups may lack knowledge on best agricultural practices, access to productive resources, and financial means for farm inputs and labor support (Coles and Mitchell, 2010; Leon-Himmelstine et al., 2021; Manda et al., 2020; Rietveld et al., 2020). For processing, vulnerable groups may face difficulties accessing or affording machinery, acquiring technical know-how, processing space, and packaging materials (Cruickshank et al., 2022). For sales, vulnerable groups may lack market linkages, bargaining experience, and a financial buffer that would allow them to not sell their produce when prices are low (Lee et al., 2022; Mulema et al., 2021). General barriers to value chain participation, not only for vulnerable social groups, are infrastructural and service deficiencies, e.g. poor roads, lack of storage- and transportation services, and non-cooperative socio-institutional environments.

2.3. Inclusion mechanisms

Barriers to value chain participation can be counteracted by inclusion mechanisms, i.e., by targeted improvements in the availability and accessibility of resources, services, and opportunities for vulnerable groups (Padilla Pérez and Oddone, 2016; Pyburn et al., 2015). Inclusion mechanisms may be VCF-specific or address barriers across VCFs. Mechanisms to increase inclusion across VCFs comprise improving the availability of roads, access to financial services, facilitating legal business registration, fostering the establishment and good management of cooperatives, improving employment opportunities and access to labor-saving technologies (Frija et al., 2020; Njiraini et al., 2018; Parlasca et al., 2022; Ramirez et al., 2018). Mechanisms to render input provision more inclusive comprise supporting local manufacturing or retail of affordable, accessible, and available inputs and equipment (Devaux et al., 2018). Inclusion mechanisms for crop cultivation may entail supporting capacity building on good agronomic practices and changes in land and water use rights and ownership (Coles and Mitchell, 2010; Pyburn et al., 2015). Processing may become more inclusive through better availability of processing facilities and machinery, packaging materials, and entrepreneurial skills training (Cruickshank et al., 2022; Vos and Caataneo, 2021). Inclusion mechanisms for the sales function comprise a better availability, accessibility, and affordability of storage and market spaces and market information, e.g., on prices and processes (Liverpool-Tasie et al., 2020; Vos and Caataneo, 2021). Beyond relating the inclusion mechanisms to VCFs, they can be assigned to impact areas (IA), i.e., as aimed at improvements in infrastructure, logistics, finance, knowledge, know-how and skills, employment opportunities, technologies, and resource use, and ownership rights.

2.4. Grading social inclusiveness

We define grades for the social inclusiveness of PIs ranging from (grade 0) not mentioning/considering a specific vulnerable group to (grade 3) having set a minimum financial budget, a minimum amount of land to be allocated, or a minimum number of beneficiaries. We also mark policies that clearly outline roles and responsibilities for implementing activities towards inclusion and interventions for which an impact evaluation was available with a +-sign (Table 1).

2.5. EVA-framework

The framework to (E) evaluate the social inclusiveness of policies and interventions towards (V) vulnerable social groups in (A) agricultural value chains consists of three main analytical steps: (1) the selection of relevant PIs, (2) the attribution of PIs to VCFs and (3) the grading of PIs in terms of their inclusiveness towards one or more selected vulnerable social groups. We provide a user-friendly planning format for implementing the EVA-framework in Appendix D. The analysis of a PI-context, e.g. of a strategic, national or international PI-portfolio, using the EVA-framework yields a performance pattern pointing to gaps and opportunities for more socially inclusive policies and interventions, see Fig. 1.

The comparative analysis gains further depth if PIs are weighted according to importance and topicality, revealing historical trends and the inclusiveness performance of current and largest PIs. It is the widened scope to policies and interventions, its applicability to any vulnerable group, the focus on value chain functions and the design for a weighted PI portfolio assessment that distinguish the EVA framework from prior ones.

Table 1
Graded levels (0–3) of social inclusiveness towards specific vulnerable social groups in policies and interventions, adapted from Gumucio and Rueda (2015)

Grade	Level of inclusiveness towards a specific vulnerable social group	
	Policies	Interventions
0	Referring to an inclusion mechanism and or one or more value chain functions, but with no reference to the specific social group	
1	Group-inclusion mentioned in overall policy objectives	Group-inclusion is mentioned in the overall intervention objectives
2	Plans to include group are mentioned in the policy implementation strategy/ mechanism	Plans to include group are mentioned in mode of operation/ scaling model
3	A budget and or a target, e.g., a minimum amount of land or number of benefiting group participants, is set.	A budget and or a target, e.g., minimum amount of land or number of group participants is defined to ensure their inclusion/ benefit of the intervention
+	Clear responsibilities are assigned for implementation	Impact evaluation available

3. Methodology

We apply the EVA-framework to the national PI-context of Mali, focusing on women and youth and the irrigated vegetable value chain (IVVC). With youth, we refer to young men and women in the age range of 15–35 years (Akrong and Kotu, 2022; Fasakin et al., 2022; GAFSP, 2021; IFAD, 2022). This section introduces the case study of Mali, our data collection and analysis.

3.1. Case study

Mali is not on track to achieve zero hunger (SDG2) by 2030 (Sachs et al., 2022). Much of the population of Mali evinces nutritionally deficient diets since fruits, vegetables, and animal-source foods are expensive (GNR, 2021; Wiggins et al., 2023). Mali has been in political crisis since 2012, ranging in place 184 (out of 189) on the Human Development Index (HDI) and place 149 (out of 156) on the Gender Gap Index (GGI), making it one of the poorest and gender unequal countries in the world (BTI, 2022; UNDPR, 2020; WEF, 2021). Mali has progressed in life expectancy, education, and per capita income (UNDPR, 2020). At the same time, gender inequality in education and health has been described as a major obstacle to national human capital development (The World Bank, 2018b). For Mali, youth labor under-utilization ranges at 58% for ages 15–25 (Coulibaly, 2020). Dry season, irrigated vegetable cultivation is an important resilience mechanism since it provides precious nutrition and income at a time of the year when rural unemployment rates are highest, especially among women and youth (UNDP, 2019).

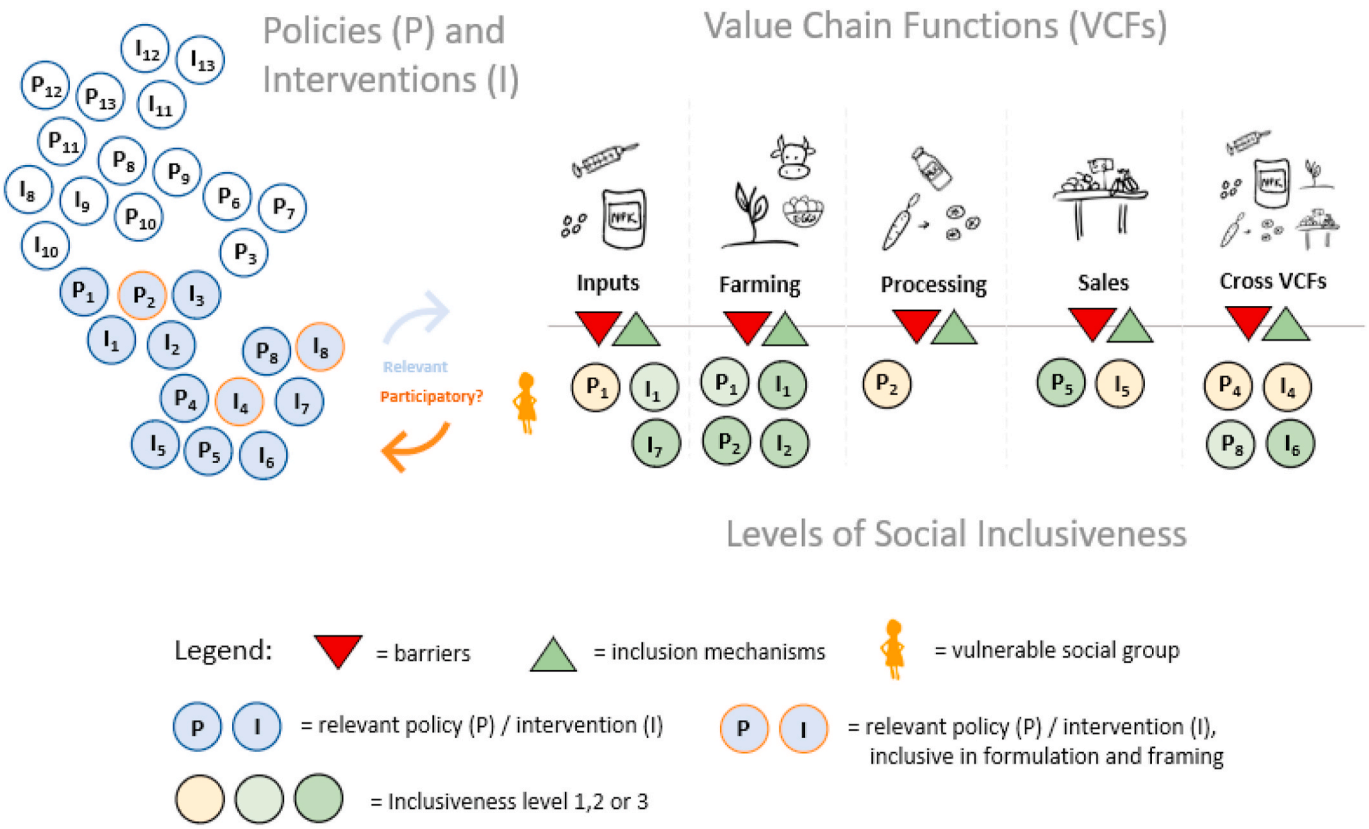

Fig. 1. Graphical summary of the EVA-framework.

3.2. Data collection and dataset

From online sources (governmental websites, FAOLEX, IFAD projects and programme catalogues, NGO websites) and key informants in Mali, we obtained 131 policy and 129 intervention documents (issued 1998 or later). Initial search terms for policies and interventions respectively were "Mali" and the French equivalent terms to poverty reduction-, food security-, climate change adaptation-, environmental-, water management-, rural development-, gender-, youth-, land ownership-, land use-, agricultural development-, agricultural extension-, irrigation development-, agricultural credit- and public-private partnership policies or strategies and projects, programs, or initiatives. We then narrowed down our selection by only including those documents for further analysis that contained one or more of the following key topics: irrigation, hydro-agricultural development, value chain approach, input supply, equipment supply, inclusive private sector development, vegetable production, horticultural product, market gardening, market access, or infrastructure development, resulting into 42 policies and 52 interventions being classified as relevant for this study (see Appendix A; Table A.1 and A.2).

3.3. Data analysis

We applied a qualitative content analysis approach to the PIs (Krippendorff, 2004), coding texts to words, sentences, or themes and structuring the information. Individual policies were coded according to their objectives, targets, thematic areas, rationale, context, guiding principles, target groups, target areas, foci/priorities, implementation strategy, implementation mechanism, specific regulations, or support to the IVVC and gaps related to women and youth inclusion in IVVC. Intervention documents were coded according to their objectives, target groups, key pillars, operational modes, irrigation technologies, youth and gender inclusion, achievements, bottlenecks, and lessons learned. The PI inventories are available in Appendix B. To examine the PI mix and performance, we set up a detailed matrix, listing PIs according to VCFs and inclusion mechanisms (see Appendix C).

We systematically checked the PIs for inclusiveness in formulation and framing based on the grading system outlined in Section 2.4 (see Appendix A). Figs. 3–7 map PIs in time, according to their inclusiveness levels, geographic scopes, or budgets. Tables C1-C5 in Appendix C provide the resulting, simplified, and color-coded PI performance overviews per impact area (IA) and VCF. Table 2 provides detailed overview counts of inclusive (grades 1–3) PIs to determine structural emphases on specific VCFs, IAs, and women versus youth. Through a simplified traffic-light-system, we indicate whether PIs are irrigation- and/or vegetable-specific (yes; green dot) or whether they merely concern the IVVC or the capacities of women and youth as part of general agricultural, water management, or development PIs (no; red dot). We also differentiate and compare governmental (Gov.) and development partner (Non Gov.) interventions. As far as information was available, we also describe the reported impacts of PIs in Section 4.3 (Appendix A) (see Fig. 2).

4. Case study Mali: results

4.1. Women and youth in the IVVC in Mali

The production of irrigated vegetables is economically promising but requires know-how, time, access to land and water resources, and investments in irrigation equipment – factors that constitute barriers to most women and youth in Mali (Nkonya et al., 2020; Roudart and Dave, 2017).

Within rural households in Mali, a woman may be the first, second, or third wife of a male household head, a daughter, or an extended family member, each with different forms of access, interests, and challenges regarding their value chain participation (Heath et al., 2020;

Table 2
Numbers of IVVC-related policies and interventions in Mali addressing women or youth. Counts per impact area and per value chain function. Policies that do not mention women or youth are not counted.

	Input provision				Cultivation				Processing				Sales				Across VCFs			
Impact area (IA)	P		I		P		I		P		I		P		I		P		I	
Infrastructure	0	0	1	0	0	0	3	3	0	0	0	0	1	0	2	0	2	0	1	0
	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Logistics	0	0	2	0	0	0	1	0	0	0	3	0	1	0	3	0	6	1	11	4
	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Finance	2	2	2	0	0	0	10	5	2	2	2	1	0	0	0	0	6	4	12	4
	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Knowledge / Know- How/ Skills	5	3	4	8	15	10	22	11	6	4	11	3	2	0	10	3	8	2	8	8
	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Employment opportunities	6	5	0	1	0	0	2	2	0	0	0	0	2	0	0	0	5	2	6	4
	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Inputs and Technologies	2	0	1	0	5	4	5	2	5	1	4	0	0	0	0	0	7	4	1	1
	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Resource use rights / ownership	0	0	0	0	9	7	12	5	0	0	0	0	0	0	0	0	3	0	1	1
	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

P= policies; I= interventions; VCF= value chain function; IVVC= irrigated vegetable value chain

IA	VCF	
	A	B
	C	D

A = number of policies / interventions addressing the inclusion of women
B = number of policies / interventions addressing the inclusion of youth
C = • none or • one or more of the policies / interventions address(es) irrigated agriculture
D = • none or • one or more of the policies / interventions address(es) vegetables

Sanga et al., 2021; Totin et al., 2021). In general, women in Mali have limited power over and access to productive resources (Adétonah et al., 2015; Birhanu et al., 2022; Totin et al., 2015; Winters and Conroy-Krutz, 2021). No land ownership implies a lack of collateral for taking out loans (Sanga et al., 2021) that would facilitate access to inputs, production and processing technology, or business establishment. Women in Mali also often do not benefit from fertilizer subsidies since subsidized inputs are distributed to and through male household heads, mostly cotton growers (Theriault et al., 2018). Women who farm private plots are expected to use most of their produce for collective meals instead of sales (Guirkinger et al., 2015). Women are perceived as having support- rather than leadership functions on farms and businesses, expected to prioritize domestic tasks (Lesclingand, 2011; Njobe and Kaaria, 2015).

For youth in Mali, on- and off-farm jobs in the agri-food sector are a key source of income (Betcherman and Khan, 2018; Christiaensen et al., 2021). However, the youth lack access to land and formal financial services (African Union, 2019; Muiderman et al., 2016). Many are under- or unemployed, envisioning a future in non-farming activities (Bleck and Lodermeier, 2020). Youth in urban or peri-urban centers may be engaged in input provision or sales. On-farm, young men are considered as household support rather than independent economic entities until they establish their own household. Young women tend to remain in supportive roles even when they get married and move to new lands (SPRING, 2016). Young women in rural communities are typically assigned to work on collective (household) plots; typically, only older, married women may farm individual plots (Sanga et al., 2021). Thus, the youth is not a homogenous social group either. Young men and women have different roles in their households and communities, with gendered and household-wealth-dependent access to resources and IVVC functions.

4.2. *Women and youth inclusion in policy and intervention formulation and framing in Mali*

Although the Government of Mali (GOM) adopted gender-sensitive Integrated Water Resources Management (IWRM) principles in 2006 (GWP, 2019), thus far, only few women have taken part in formulating PIs for irrigation development. While the Strategic Framework for Economic Recovery and Sustainable Development of Mali (GOM--CREDD, 2019) recommends the involvement of women's organizations

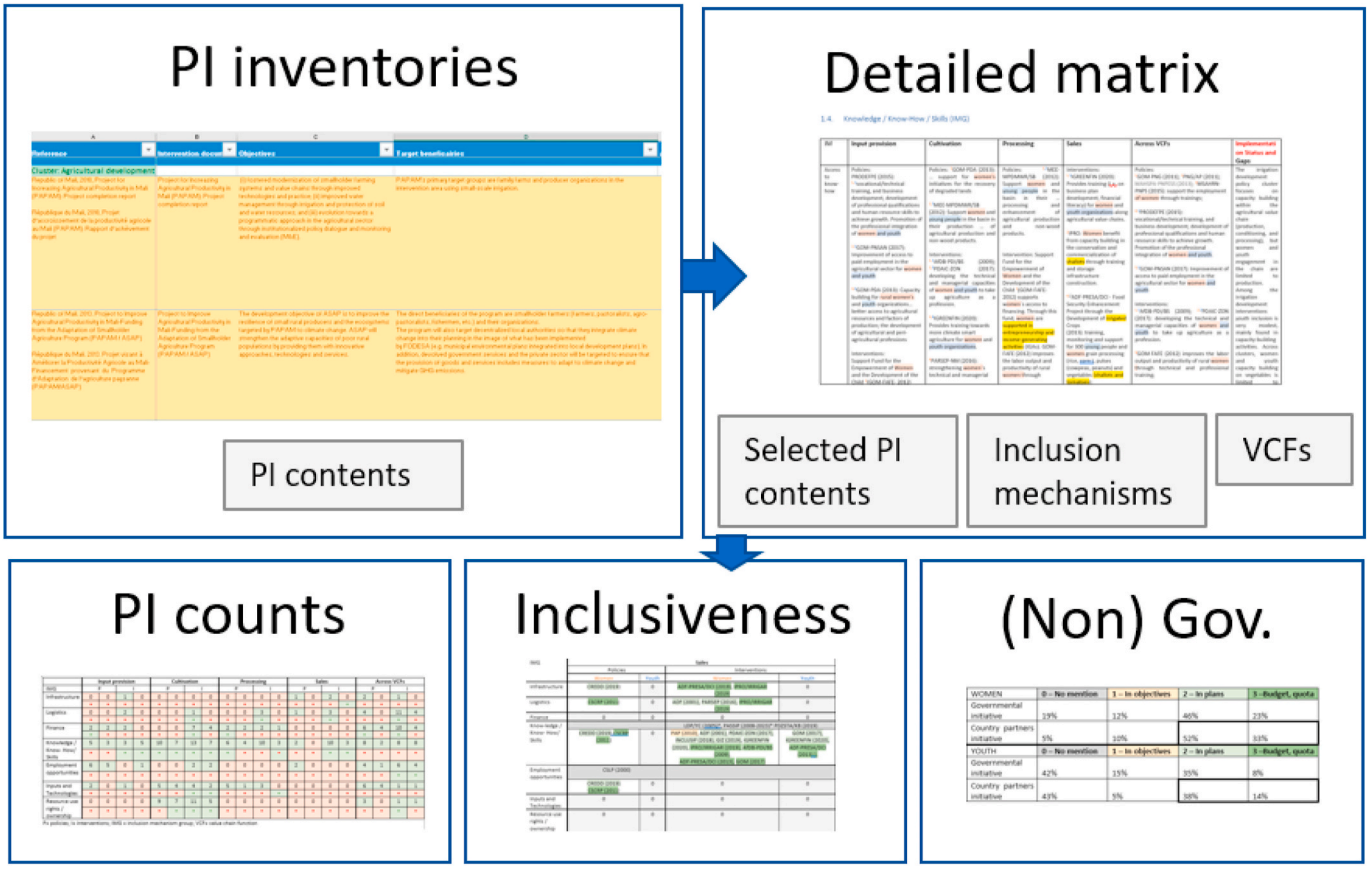

Fig. 2. Data analysis flow-chart.

in formulating monitoring mechanisms, the actual participatory process was confined to document validation workshops with limited civil society representation (Togola, 2018).

Concerning the formulation and framing of interventions, two IVVC-related projects set minimum quotas for women's participation in the design and priority setting: the IPRO/IRRIGAR projects, where 30% of the decision-making staff were women, and the GOM-MAEP contract plan (2019–2023) for the Office of Niger farmers, where at least 10% of the women are involved in the decision-making process of scheme development. For phase I of the AfDB Irrigation Development Program for the Bani and Sélingué Basin (AfDB PDI/BS, 2009), women and youth organizations were involved in the identification and preparation of the program. Also, the AfDB PReSAN-KL project (2014) involved beneficiary men and women in project formulation via a broad consultation and data collection. Other interventions aimed to be inclusive in their design phase, too: the PAPAM (2010) project aimed to ensure the participation of women and young people in planning and assessing priorities for action and investments at a regional level. However, the project was described as insufficiently considering stakeholder needs, leading to deficient designs, missing local institutional support, and an attenuated impact.

Stakeholder participation deficits were observed in the Middle Bani Plain (PMB – GOM, 2009) program and the GIZ (2019) project to support Mali's national program for sustainable small-scale irrigation. The lack of consultation with women and youth led to blind spots and missed opportunities in the gender- and youth-sensitive design of PIs in Mali. Thus overall, policies and interventions in Mali that concern the IVVC directly or indirectly display a low degree of inclusion in their formulation and framing of women or youth.

4.3. Inclusiveness of policy texts and intervention plans and their status of implementation in Mali

While many IVVC-related PIs in Mali mention women and youth as important target groups, only a few effectively set specific targets, quotas, or a financial budget for their inclusion. Figs. 3 and 4 summarize the inclusiveness and topicality of policies and interventions, respectively. We see a general increase in inclusiveness levels over time, but also active policies and recent interventions that are still not or only to a low level inclusive. Among the inclusive (grade 1–3) PIs, a greater number addresses the inclusion of women (N = 31 policies, N = 45 interventions) than of youth (N = 21 policies, N = 27 interventions). There also is a larger number of PIs that is not inclusive (level 0) towards youth (N = 20 policies, N = 25 interventions) than towards women (N = 10 policies, N = 7 interventions). Fig. 5 displays a heatmap with annual counts of interventions according to their inclusiveness towards women and youth.

The heatmaps reveal that most interventions addressing women are clustered around the year 2013 at inclusiveness level 2, while most interventions addressing youth are clustered around the years 2006/2007 at inclusiveness level 0. Most level-3 interventions for women and youth are clustered around the years 2010/2011. It must be noted that our analysis was restricted to interventions that started until the year 2020, leaving the period of 2021 and beyond looking emptier than it is.

Fig. 6 maps interventions according to their budget in millions of USD versus their geographic scope. We see that there are a few large, i.e. national and well-budgeted, interventions that are still active, namely the PDAZAM, 2018 (I18), INCLUSIF, 2018 (I36), IGREENFIN, 2020 (I37) and PDAIC-ZON, 2017 (I46), all level-2 inclusive towards women and youth, as also visible in Fig. 7, mapping intervention inclusiveness levels versus intervention budget.

Table 2 indicates the number of IVVC-related PIs in Mali addressing

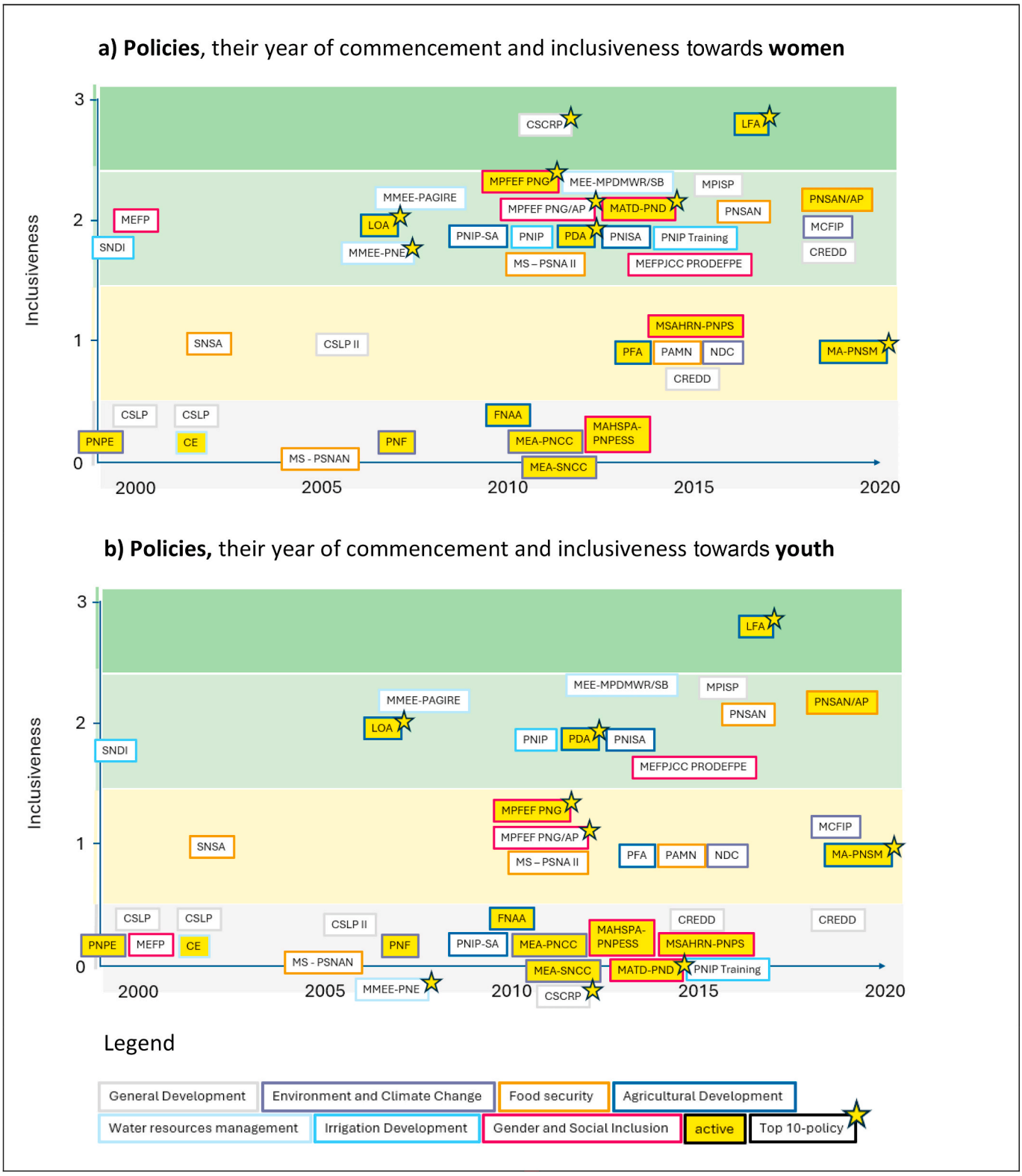

Fig. 3. Policies, mapped in time and according to their inclusiveness-level towards a) women and b) youth.

women and youth, respectively, with counts per impact area and per value chain function. Tables C1-C5 in Appendix C complement the insights by detailing inclusiveness-levels of specific PIs towards women and youth per impact area and value chain function. Most (grade 1–3) inclusive PIs entail VCF-specific provisions (76% of policies, 100% of interventions), see Table 2 and Appendix C. The largest number of policies refer to cultivation (N = 29 for women, N = 21 for youth), followed by input provision (N = 15 for women, N = 10 for youth). Policies fostering women and youth inclusion in crop cultivation mostly focus on building knowledge/know-how and skills (N = 15 for women, N = 10 for youth), on strengthening resource use rights or ownership (N = 9 for women, N = 7 for youth), and on providing inputs and

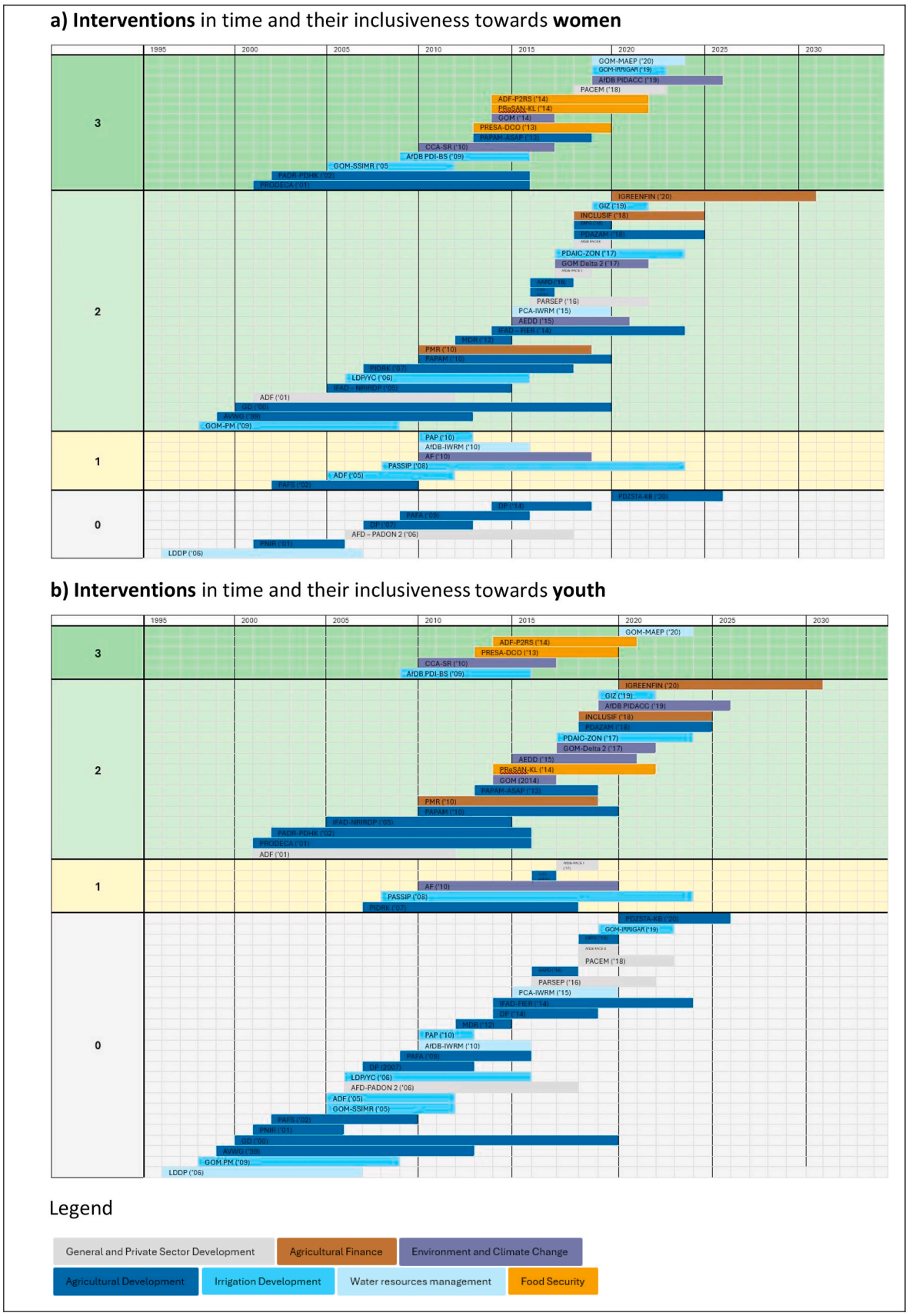

Fig. 4. Interventions mapped according to their time period and inclusiveness-level towards a) women and b) youth.

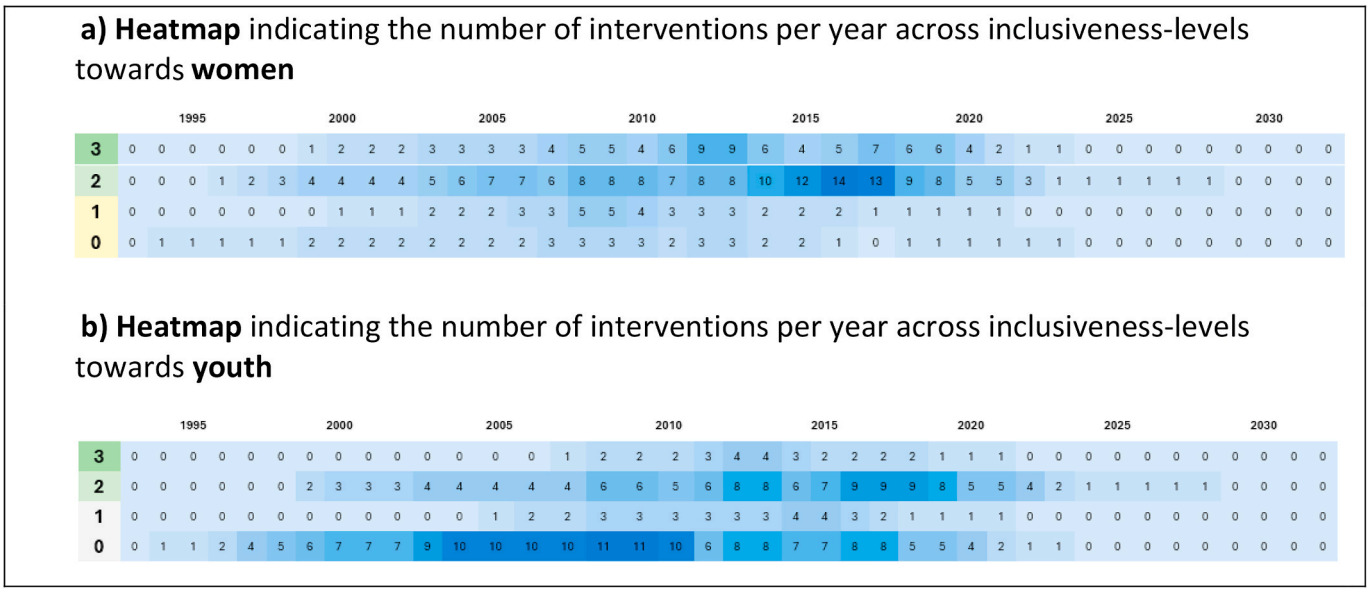

Fig. 5. Heatmaps indicating the number of interventions per year across inclusiveness levels for a) women and b) youth. The darker the blue tone of the respective cell, the more interventions/year.

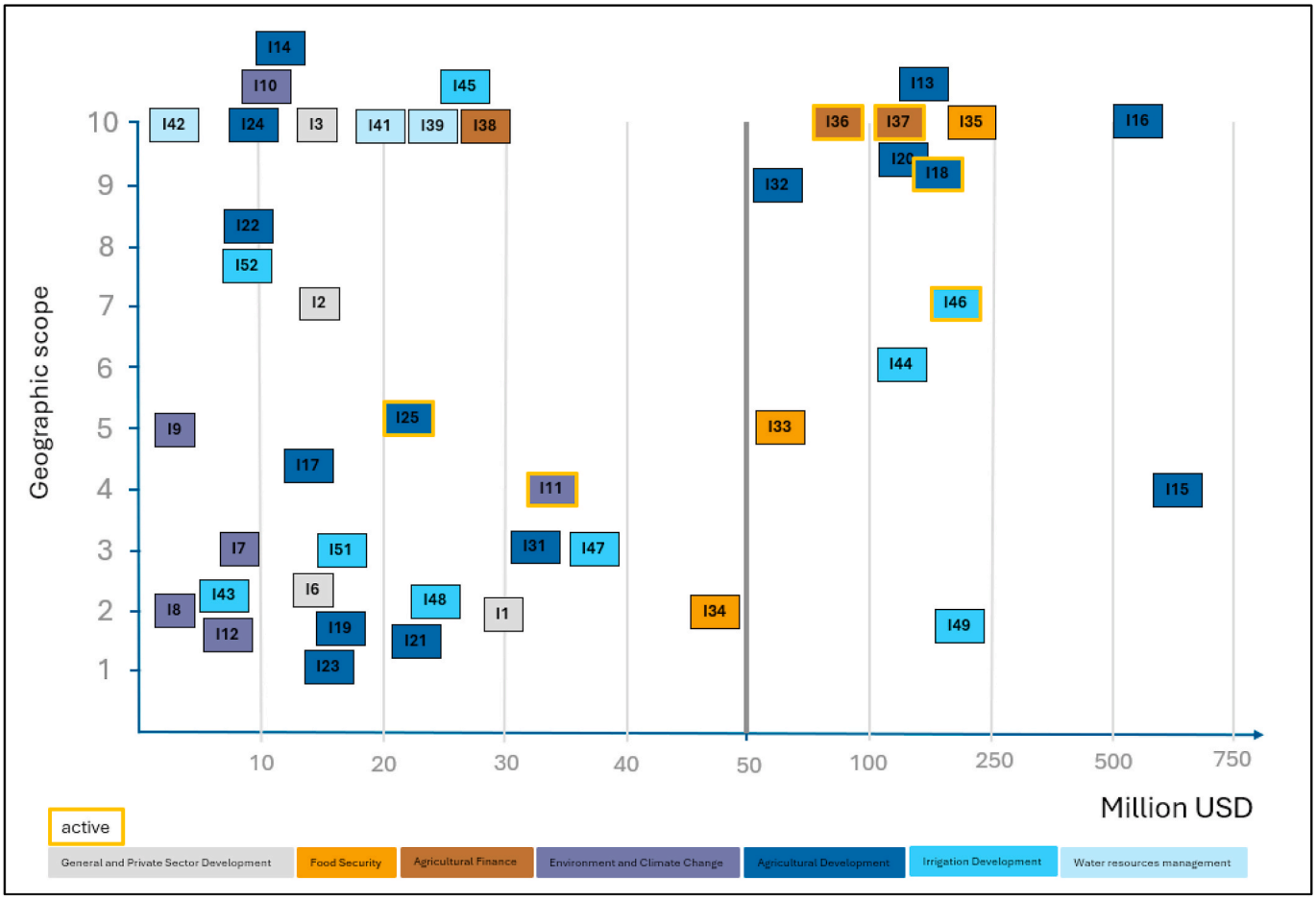

Fig. 6. Intervention budgets versus geographic scope.

technologies (N = 5 for women, N = 4 for youth). Inclusive policies on input provision focus on employment opportunities (N = 6 for women, N = 5 for youth) and on building knowledge/know-how and skills (N = 5 for women, N = 3 for youth). Inclusive (grade 1–3) interventions in Mali evince a similar profile, with most focusing on the VCF of cultivation (N = 55 mentions for women, N = 28 for youth), followed by input provision for the youth (N = 9) and processing for women (N = 19; input provision: N = 10). Thus, most PI support for women and youth

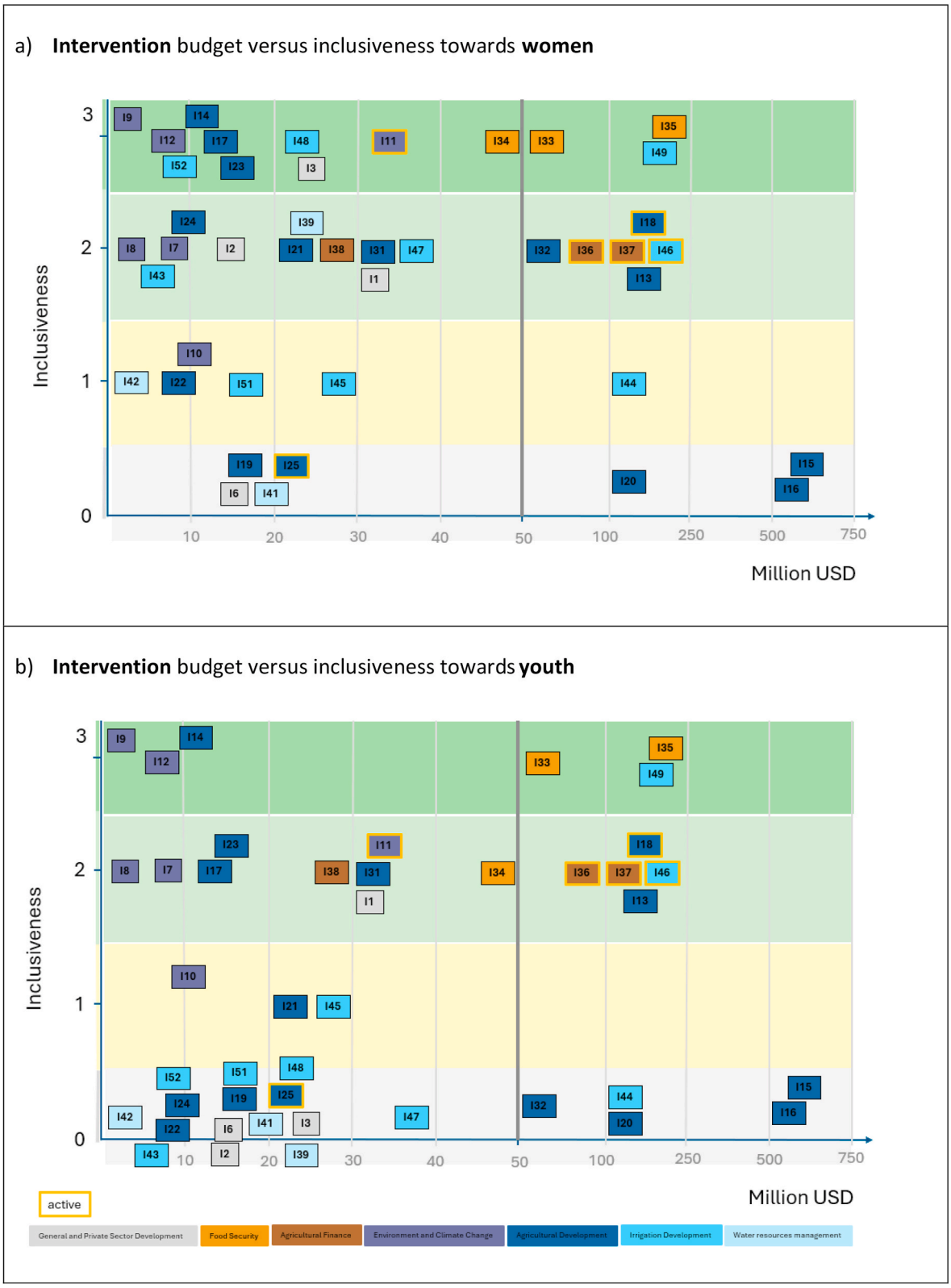

Fig. 7. Intervention budget versus inclusiveness towards a) women and b) youth.

focuses on crop cultivation rather than employment creation, input and equipment provision, processing, or sales. Despite the emphasis on cultivation, there are, e.g., no gender-sensitive or youth-specific seed- or subsidy programs.

To elaborate on a few of Mali's key PIs and dynamics: the National Strategic Framework for Growth and Poverty Reduction (2011, CSCRP) sets guidelines for the application of Gender Sensitive Planning and Budgeting (PBSG). However, none of the subsequent governmental PIs seem to refer to these. Another example of an inclusive policy provision is the Agricultural Land Law—LFA (2017) defining that 15% of the land developed by the GOM should be allocated to women and youth groups or associations. However, the subsequent governmental contract plan

(2019–2023) for the State-Office of Niger (GOM-MAEP, 2020) only sets a target of 10% of land to be allocated to women and youth – undermining the previously set quota.

The non-governmental intervention AfDB PIDACC (2019) has been more ambitious, targeting women with up to 50% of their land allocations. The AfDB PDI-BS (2009) and the GOM-PReSAN-KL (2014) determined a minimum amount of land allocation to women and/or youth. Other (grade 3) inclusive interventions set a minimum number of women and/or youth beneficiaries (ADF-ADRD, 1999; GOM-PADR-PDHK, 2002; IPRO/IRRIGAR, 2019; AfDB PDI-BS, 2009; CCA-SR, 2010; GOM-PAPAM, 2010; GOM-PRESA/DCI, 2013; GOM-PReSAN-KL, 2014; ADF-P2RS, 2014; GOM, 2014; GOM-PACEM, 2018; AfDB PIDACC, 2019; GOM-MAEP, 2020). More recent PIs show a higher grade of women and youth inclusion than their predecessors: while the early Strategic Frameworks for Poverty Reduction (CSLP, 2000; 2002, 2006) did not mention women or youth, the more recent CSCRP (2011) entails a strategy document with PBSG guidelines.

While the National Programme of Rural Infrastructure (2001, PNIR) did not mention women or youth, subsequent regional programs and projects set women and youth as target beneficiaries and/or explicitly mentioned them in their implementation plans (the Rural Development Support Project in the Mopti region, 2001–2011; and the Integrated Rural Development Program for the Kidal region, PIDRK, 2007–2017). Surprisingly, the National Policy for the Promotion of the Social and Solidarity Economy (MAHSPA-PNPESS, 2013) does not refer to women or youth, nor does the Development Programme of the Special Agro-Industrial Transformation Zone of the Koulikoro and Peri-Urban Regions of Bamako (PDZSTA-KB, 2020–2025), although the latter is expected to create jobs, particularly for the local young workforce.

The irrigated vegetable value chain in general and the role of women and youth in it do not seem to be a primary focus of PIs in Mali: although the Malian Agricultural Orientation Law (GOM-LOA, 2006) describes vegetables as a strategic sector, only a few policies focus on market gardens which typically include vegetable production (PNISA, 2014; GOM-PDA, 2013). Neither the National Proximity Irrigation Program of Mali (PNIP) nor the National Priority Investment Plan for the Agricultural Sector (PNIP-SA, 2011–2015) officially targets vegetables. Adétonah et al. (2015) mention that Malian vegetable farmers are unaware of relevant subsidies, and Theriault et al. (2018) report that they thus purchase fertilizers at regular market prices. A USAID-study (2018) reports that about 95% of the subsidized inputs in Mali are designated for cotton and cereal production.

Concerning interventions, the ADF PReSA project (2013, Food Security Enhancement Project through the Development of Irrigated Crops) trained women and young people in vegetable (shallots/tomato) cultivation. The governmental LDP/YC project (2005, Lowland Development Project in Yélimané Circle) aimed to develop market gardens for women groups, introducing small-scale dry season irrigation for cowpea and okra. The governmental Padilla Pérez and Oddone (2016) project also aimed to train women and young pastoralists in market gardening. However, we did not encounter evidence on the LDP/YC (2006–2015) or the Padilla Pérez and Oddone (2016) project outcomes or impacts. The governmental PAP (2010; Priority Development Program in the Field of Local Irrigation), mentions market gardens among the target farm systems. The PAP (2010) mentions women but not youth as target beneficiaries – and does not entail gender-sensitive scaling models, -budgets, or -targets. The GIZ (2019) project to support the national program for sustainable small-scale irrigation includes training on storage, processing, and sales of vegetables. More than 4000 producers (~60% women) have been trained in improved vegetable cultivation practices, post-harvest technologies, processing, and marketing. The AfDB PDI-BS program (2009, Irrigation Development Program in the Bani and Sélingué Basin) aimed to develop 554 ha of vegetable crops to produce about 3620 tons annually. The PDI-BS phase I evaluation report revealed that women received only 7% of the land allocations for market gardening, while the youth benefitted from 38% of the rice-growing areas (no information on vegetable cultivation by youth). The ongoing IGREENFIN (2020, IFADs Greening Agricultural Banks & Financial Sector initiative) has, amongst others, a focus on women and youth and entails financing labor-saving and cost-competitive technologies for developing vegetable gardens. We did not encounter reports or impact evaluations of the IGREENFIN initiative. Neither the PASSIP (2012, Proximity Irrigation Subsector Program) nor the PDAIC-ZON (2017, Project for the Development of Commercial Irrigated Agriculture in the Office du Niger zone) mentions vegetables or market gardens.

Comparing governmental interventions with interventions of development partners, we find that the latter more frequently evince a higher (2 for women, 3 for youth) grade of inclusiveness than governmental interventions, see Table 3.

Concerning implementation and impacts, the GOM's lack of finance, coordination and control impedes the implementation of outlined policy visions and governmental intervention plans (BTI, 2022; Ousmane, 2020; The World Bank, 2018a). Interventions by government and development partners were and are further hampered by security problems (GOM-PAPAM, 2010; GOM-AEDD, 2015; Parlasca et al., 2022; GOM-Delta 2, 2017), hindering participants from joining project activities like design consultations and trainings (KIT, 2020). Specific barriers towards a more inclusive IVVC comprise the current lack of a coherent guiding principles for women and youth inclusion and of official indicators and data to monitor progress on women and youth inclusion (GNR, 2021; Sachs et al., 2022).

5. Conclusions and recommendations

Addressing sources of inequality in policies and interventions (PIs) and ensuring the inclusion of vulnerable social groups is of upmost importance for more sustainable, resilient, just, and equitably accessible food systems (Christiaensen et al., 2021; Fanzo et al., 2021). In this article, we introduced and applied a novel framework to (E) evaluate the social inclusiveness of PIs towards (V) vulnerable social groups in (A) agricultural value chains. The EVA-Framework links to three main literatures: 1) the inclusive value chain literature, that explicitly problematizes inequalities, 2) the inclusive development literature that proposes a transformative agenda for improved social and relational outcomes (Ros-Tonen et al., 2019), and 3) the inclusive policy and intervention literature, with a focus on gender and agricultural development (Gumucio and Rueda, 2015; Paudyal et al., 2019). To place our work into a broader, non-agricultural context of frameworks and tools that analyze inclusiveness, we may refer to the UNESCO analytical framework for inclusive policy design (2015) that is more detailed on the possible root causes for exclusion, providing 20 markers to guide inclusive policy design and delivery but no classification system to evaluate and compare the inclusiveness of existing PI (portfolios). The UNESCO framework recognizes that social exclusion is multidimensional, relational, dynamic, that there are intersecting risks and drivers

Table 3
Percentages of inclusiveness grades among governmental versus country partner initiatives.

		0 – No mention	1 – In Objectives	2 – In plans	3 – Budget, quota
WOMEN	Governmental interventions	19%	12%	42%	27%
	Development partner interventions	7%	12%	54%	27%
YOUTH	Governmental interventions	44%	15%	33%	8%
	Development partner interventions	52%	4%	32%	12%

Source: Authors, based on Annex Table A.2

for exclusion, that exclusion is contextual and multi-layered, and that inclusive policy design requires the participation of stakeholders. The EVA-framework relates to each of these dimensions, in that it suggests to strategically analyze cross-sectoral PI portfolios (multidimensional) and deliberately zooms into the relational lens of high-level governance, recognizing that PIs have the power to contribute to greater inclusivity. The EVA-framework also reveals prevailing topical emphases on particular value chain functions and respective inclusion mechanisms that receive funding and thus political attention. While we recognize that stakeholders (dynamically) move along an inclusion/exclusion continuum, the EVA-framework sets a normative target of aiming at inclusion through PIs at all times and throughout all parts of the value chain. Intersecting risks and drivers of exclusion are recognized i.a. through the diverse inclusion mechanisms that the EVA-framework identifies. Applying the EVA-framework to the case study of Mali illustrated a context with multiple layers of exclusion as well as a lacking PI in-country coherence and coordination. The EVA-framework also recognizes that the first step to inclusive PIs is their inclusive design, i.e. participation of key stakeholders in PI formulation and framing. In Mali and beyond, there is a trend of increasing social inclusiveness in PIs, mainly towards women (Ampaire et al., 2020; Guharay, 2016; Howland et al., 2021; Lecoutere et al., 2024) but also towards youth (OECD, 2017; Savard et al., 2018).

A limitation of our study is a lacking differentiation between different types of women and youth. While these different types are not differentiated in PIs, PIs do have different impacts on these, which should be reflected in M&E studies. An important further reflection on existing PIs would be their categorization as gender-and-youth-neutral, -specific, or -transformative (Gumucio and Rueda, 2015). Our research also does not analyze the inclusiveness locations, i.e., the exact institutional settings taking care of the various dimensions of women and youth inclusion.

To be *de facto* more inclusive, PIs would need to consult, collaborate with, and empower the targeted social groups in formulation and framing, ensuring that sensible, effective, and efficient development pathways are set, that activities are relevant and suitable, and that the risk of adverse impacts is minimized (Briskin et al., 2011; Guharay, 2016; OECD, 2017). PIs also need to encompass clear, streamlined targets and budgets, e.g., minimum amounts of resources (land, water, funds) allocated to the targeted social groups (Gumucio and Rueda, 2015). The implementation of PIs needs to assign clear roles and responsibilities, i.e., set accountability mechanisms for achieving greater inclusion (Howland et al., 2021). Finally, PIs need to be monitored and evaluated for their desired and unintended impacts, taking an adaptive management approach that allows PI adjustments for better resource allocation and greater positive impact for target beneficiaries (ENRD, 2022; ODI, 2020). Howland et al. (2021) highlight that inclusiveness is a long-term trajectory, that a strong and clear inclusive legal framework and inclusive programs are an important basis for change, that it is crucial to demonstrate the benefits and inclusion pathways and that there must be training and sensitization at various institutional and political levels. Multi-level and inclusive approaches to advance food security (Allen and de Brauw, 2018; Graef et al., 2014; Pyburn et al., 2023) can be put into practice through frameworks and case studies, as demonstrated in this paper. The novel EVA-framework allowed us to answer the research question of how to systematically assess the social inclusiveness of PIs for more inclusive value chains. The EVA framework is transferrable across value chains, geographies, and vulnerable groups, constituting a simple yet powerful analytical tool to reveal opportunities to foster a more equitable participation in and benefits from food systems.

CRediT authorship contribution statement

Mirja Michalscheck: Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Sévérin Ekpe:** Investigation, Data curation. **Birhanu Zemadim Birhanu:** Writing – review & editing, Validation. **Tafadzwanashe Mabhaudhi:** Writing – review & editing, Validation. **Minh Thi Thai:** Writing – review & editing, Supervision, Resources, Project administration, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data accessible through links indicated in manuscript appendices.

Acknowledgements

This research was funded by Africa Research in Sustainable Intensification for the Next Generation (RISING) through the U.S. Agency for International Development, under Agreement No. AID-BFS-G-11-00002. This work was also co-funded by the Feed the Future Innovation Lab for Small-Scale Irrigation (ILSSI) through the U.S. Agency for International Development, under the terms of Agreement No. AID-OAA-A-13-00055 and the CGIAR Research Program on Water, Land, and Ecosystems (WLE).

Appendices.

Appendix A

The overview of PIs with their inclusiveness grade and explanation can be downloaded from this link.

Appendix B

The PI inventory (structured PI contents in excel file) can be downloaded from this link.

Appendix C

The detailed matrix, listening the relevant PIs per VCF and inclusion mechanism (group), with differentiated counts and contents for women and youth, can be downloaded from this link.

Appendix D

A user-friendly planning format for implementing the EVA-framework can be downloaded from this link.

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