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## Tracking the gender responsiveness of agricultural research across the research cycle: a monitoring and evaluation framework tested in Uganda and Rwanda

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There is widespread need for gender-responsive agricultural research, yet the question of how this kind of research can be implemented and its success measured needs further interrogation. This paper presents a framework, developed on the basis of literature and validated by experts, for tracking the gender responsiveness of agricultural research throughout the research cycle, from the research plan to the dissemination of research findings. The framework was tested in Uganda and Rwanda on 14 research projects considered to be gender-responsive. Scores on the quantitative tool were triangulated with qualitative data from four case studies. Data was collected between June and August 2016, by reviewing projects' documents and conducting key informant interviews. Our findings show that most of the projects investigated were not sufficiently gender-responsive. The easy-to-use framework presented in this paper provides a much-needed tool for guiding agricultural researchers and partners to design, implement, and measure the gender responsiveness of research projects.

**Keywords:** Monitoring and Evaluation, Gender, Agricultural Research, Assessment Tool, sub-Saharan Africa.

### Introduction

There is increasing interest in gender-responsive development and equitable outcomes, as evidenced by the United Nations Sustainable Development Goals (SDGs), national and regional strategic policies, and the requirements set by donors operating in the development arena (Bill and Melinda Gates Foundation 2012; Kantor 2013; Danielsen et al. 2018). An empirical gender analysis in three African countries reveals that closing the gender gap in agricultural productivity could potentially lift out of poverty as many as 238,000 people in Malawi, 80,000 in Tanzania, and 119,000 in Uganda (UN Women et al. 2015). Other studies highlight that paying attention to gender in agriculture enables better adoption of new technologies and it improves family income, health, and education (Terefe 2020; UN Women et al. 2015; Gates 2014; Quisumbing et al. 2014). Striving for gender-responsive development is critical in order to ensure that everyone benefits equally from development interventions, gender inequalities are not perpetuated, and the impact of development investments is enhanced (Terefe 2020). However, gender equality should not be only a means to other ends, but a value in its own

right. According to a report by the European Institute for Gender Equality (EIGE 2014), gender equality should be considered as a fundamental human right, economic resource, and driver of individual and societal well-being.

Njuki (2016) identifies several factors that call for a better integration of gender responsiveness in agriculture research and development. These include the fact that men and women play different roles and have different needs and constraints, especially in developing countries. In some African and other developing countries, women provide from 43 percent to 63 percent of the agricultural labor (FAO 2011). Traditional roles played by women, such as the one of unpaid caregivers, often go by unrecognized (FAO 2011; Terefe 2020), exacerbating the gender gaps in agriculture. Further marginalization of women stem from their subordinate position in many cultures, which, in turn, contributes to their disempowered status compared to men (Narayan 2015; Whitehead 2006; Young 2006; Fraser 1995).

According to Njuki (2016), attention is needed not only to check *whether* gender issues are integrated into research and development, but also to verify *how* they are actually integrated. While many research organizations and researchers claim

to incorporate gender into their research, there is lack of consensus on what constitutes gender-responsive agricultural research. Meinzen-Dick et al. (2011) and Mercer et al. (2019) warn against the widespread assumption that adding a woman to a research team is equivalent to achieving gender integration. These studies reveal that researchers often mistakenly assume that people are already equipped with knowledge on gender integration by virtue of their sex.

We define gender-responsive research (GRR) as research that considers gender needs/interests, priorities, opportunities, constraints and ensures that both women and men participate in, and benefit from the research processes on equal terms, and are addressed as both the clients (or beneficiaries) and actors (or agents) in agricultural research (Meinzen-Dick et al. 2011; Njega and Gurung 2011). Clarity on observable and measurable characteristics of GRR could enable funders, researchers, and other development practitioners to form an objective judgement on whether what is currently purported as GRR actually lives up to its promises. This calls for a systematic framework and tool which can fruitfully guide the integration and tracking of the gender responsiveness of agriculture research and development processes.

The GRR process further requires robust gender-responsive monitoring and evaluation (M&E) to reveal the extent to which a project has addressed the different needs of men and women and how it has impacted their lives as well as the overall social and economic well-being of the community (Fort et al. 2001). On top of this, such tools could inform and improve project performance during the implementation phase, allowing for midterm adjustments and the identification of lessons for future projects (Fort et al. 2001).

Many scholars (Mercer et al. 2019; Danielsen et al. 2018; Meinzen-Dick et al. 2011) and the World Bank (2012) raise key issues which should be kept in mind when monitoring and evaluating gender-responsive agricultural research. Among other things, these include going beyond the household focus in order to target individual women and men in their households as well as developing gender-responsive quantitative and qualitative indicators. To date, however, we still lack standardized tools for monitoring and evaluating the gender responsiveness of agricultural research projects.

This paper presents findings of a study that sought to develop and test an M&E framework for tracking the gender responsiveness of agricultural research. The framework was tested in two sub-Saharan African research institutions: the National Agricultural Research Organization (NARO) in Uganda and the Rwanda Agriculture Board (RAB). The two institutions were purposely selected for the study due to their efforts in conducting gender-responsive agricultural research and in building gender focal person structures in their organizations.

The rest of the paper is organized into four main sections: Section 2 outlines the key theoretical perspectives that informed our framework; Section 3 describes the methodology for testing the framework itself and the measurement scale, while Section 4 presents key findings. In Section 5, we conclude and give some recommendations.

## Gender-responsive agricultural research: conceptual framework

Gender-responsive agricultural research requires to pay attention to gender throughout the entire research cycle, from the design of a research plan to the subsequent stages of priority setting, research process and products, building institutional capacity to integrate gender, and using gender-sensitive M&E indicators (World Bank 2012; Njuki 2016). Against this backdrop, tracking the gender responsiveness of agricultural research throughout the research cycle entails an examination of the multiple research processes or domains, right from the planning to the dissemination of research outputs. At the *planning and priority setting* stage, a gender analysis provides information about men's and women's needs, priorities, opportunities, constraints which, in turn, can inform the rest of the research process (Meinzen-Dick et al. 2011). Mercer et al. (2019) and Mangheni et al. (2019) argue for greater attention to gender in the priority setting stage in order to counter the tendency of decision makers to leave out gender considerations whenever they do not value it enough. Paying attention to gender in agricultural research requires to set clear gender equality goals, objectives, outcomes, and activities (Njuki 2016; Njega and Gurung 2011; Mercer et al. 2019;). For instance, research goals should go beyond increasing agricultural yields and include additional or different aspects that matter to women farmers (Meinzen-Dick et al. 2011; World Bank et al. 2009). Mercer et al. (2019) show that one of the major constraints to gender responsiveness lies in its under-resourcing, especially in terms of time and funds. Thus, the authors stress the necessity to frame gender in a highly contextualized, technical way from the very first stage of a research process (Mercer et al. 2019).

Secondly, the *research process* itself becomes gender-responsive if there is active consideration of gender in the formation of research teams, selection of research topics, formulation of research questions, hypotheses, study variables, data collection procedures, data analysis, and communication of the research findings (Meinzen-Dick et al. 2011; Elias 2013; Mercer et al. 2019). It is important that the principal investigators involve both female and male scientists in research activities, given that female researchers might be best suited to study female participants in certain socio-cultural contexts (Meinzen-Dick et al. 2011; Elias 2013). For instance, in some communities in Ethiopia and northern Nigeria, there are cultural taboos restricting male researchers' and extension agents' interaction with women farmers (Ragasa et al. 2015). Such social dynamics highlight the importance of building research teams which include both men and women equipped with adequate skills to efficiently implement GRR. Besides, involving women as research participants may provide gender specific knowledge that informs more gender-equitable research agendas and outcomes (Meinzen-Dick et al. 2011).

In terms of *research focus*, research questions, hypotheses, and variables should build on sex-disaggregated data and be informed by relevant literatures and contextual analyses (Meinzen-Dick et al. 2011; Doss and Kieran 2014; Nathalie 2015). Gender-responsive data should be collected on key variables, such as crops and animals raised by men or women farmers,

gender differences in poverty rates, land ownership, malnutrition rates, and how particular crops are utilized by both men and women. Other possible variables include trait preferences, cropping calendars and seasonal workloads of men and women, market opportunities, risks and risk tolerances, access to farming input and technologies, and information (Meinzen-Dick et al. 2011; Elias 2013; Njuki 2016).

Researchers should seek informed consent from both male and female participants and schedule research activities at time and locations/venues which are convenient for both men and women farmers (Elias 2013; Njega and Gurung 2011). The decisions should be context-specific, taking into account women's workloads, mobility, and literacy levels. Attention should also be paid to foster inclusive and meaningful participation of both male and female participants, by, for instance, providing a safe space for participants to freely express their opinions (Elias 2013). In contexts where women are not likely to be open in mixed-gender groups, researchers need to separately interview male and women participants. Data analysis should be sex-disaggregated and the findings should be verified by both male and female participants (Elias 2013).

Gender-responsive agricultural research calls for interdisciplinary research approaches and designs that integrate gender into complex biophysical phenomena (Meinzen-Dick et al. 2011; Mangheni et al. 2019). Contextualizing gender within agricultural research requires gender-responsive mixed methods research designs which are suited to complex problems (Mangheni et al. (2019), ultimately enabling to develop nuanced understandings of women's involvement in agricultural production, marketing, processing, and associated gender-based opportunities and constraints (Meinzen-Dick et al. 2011).

Furthermore, *GRR products*, such as publications, presentations, technologies, and technical reports, should rely on sex-disaggregated data and be grounded in gender analysis. This allows the creation of products that benefit both men and women, enhancing the adoption of new technologies and gender-sensitive policies.

GRR should be also embedded within conducive *institutional environments* with enhanced capacity to integrate gender into research (Njuki 2016; Ragasa et al. 2015). We define institutions as the "rules of the game" of a society (Leković 2011; North 1990), such as a set of rules, compliance procedures, and moral and ethical behavioral norms (Hodgson 2006; Knight 1992; North 1990). Institutions also include governing structures made up of norms, rules, and enforcement mechanisms that order social relations and human interaction (Leković 2011; Manyire and Apekey 2013). Institutions can either be formal, including schools, labor markets, and specific organizational structures such as companies and regulatory bodies (e.g., ministries); or informal, including religion, culture, marriage, family, and caste, which often determine the quality and sustainability of formal institutions (Casson et al. 2010).

Institutions go beyond rules and procedures to include technical capacity, political will<sup>1</sup>, accountability<sup>2</sup>, and incentive mechanisms (Njuki 2016; James-Sebro 2005). These parameters strongly influence the gender responsiveness of agricultural orga-

nizations (IDRC, n.d.). Against this backdrop, regulations and strategies seeking to foster a culture of gender responsiveness should be put in place in all agricultural research organizations (Mangheni et al. 2019). Existing and new policies as well as strategy documents, such as documents related to personnel recruitment and management systems, should emphasize the need for GRR, provide gender budgets, and build meaningful gender capacity and a reward system that incentivizes gender responsiveness (Njuki 2016; Mangheni et al. 2019). Mangheni et al. (2019) further urge agricultural researchers to change the ways in which they design and conduct research, by acquiring some basic gender research skills which can be fruitfully applied to their contexts. Besides, there should be a change in organizational mindset towards including gender equality as a norm. Many times, gender biases related to the identities of women and men are carried to the workplaces. In research, gender biases and perceptions determine whom researchers talk to in the field, consider important, and think should be given accesses to resources (e.g., training) and information (Heilman 2015). There is therefore a need to be conscious of one's own gender biases and to address them in order to produce better equitable research processes and outcomes.

In terms of gender-responsive *monitoring and evaluation*, this can be done at different implementation levels. Firstly, M&E can reveal whether researchers pay sufficient attention to gender throughout the research processes, and, secondly, to measure the impacts of research products on men and women and of gender-equitable outcomes more broadly (Mercer et al. 2019). Danielsen et al. (2018) define gender outcomes as outcomes of projects that enable women to experience positive contributions to their well-being and empowerment, which are critical components of gender transformation. Quantitative and qualitative indicators can be used to inform the M&E process, including to evaluate the number of staff members who are gender-responsive in their work and the ways in which they are gender-responsive. Studies by Mercer et al. (2019) and Meinzen-Dick et al. (2011) caution against following the common practices of evaluation, adoption, and impact assessment adopted by studies focusing on household-level indicators, collecting data from male household heads, and using standardized and predetermined indicators that exclude women's voices. In contrast to these common practices, gender-responsive M&E requires that institutions target both men and women in households and allow to capture individual women's insights and experiences of the project and its impact (Mercer et al. 2019). Similarly, the World Bank (2012) and Fort, Martínez, and Mukhopadhyay (2001) denote that a gender-sensitive M&E system should adopt gender-responsive indicators to reveal the extent to which a project has improved the lives and social and economic well-being of women and men. This also helps to improve project performance during the implementation phase, facilitate midterm adjustments, and derive useful lessons for future projects.

In the context of rural development projects, Fort et al. (2001) explain that gender-responsive M&E should be conducted at different levels: the first level requires to identify and prepare a baseline gender analysis; use the generated data to set goals and priorities; conduct a gender-responsive social assessment;

and, evaluate institutional capacity towards gender responsiveness. Secondly, the design and appraisal level could ensure that gender is integrated into the overall project goals and objectives, developing capacity building to address gender issues, and monitor and evaluate progress. The third level is at the implementation stage and it involves capacity development around gender integration, monitoring, and evaluation; collection of gender-sensitive data; monitoring the research progress against the targets set for the period under evaluation; and providing feedback in order to allow for midterm corrections towards gender-equitable outcomes. The final level involves assessing the impact of gender integration on the overall project as well as on men's and women's wellbeing.

The above presented research nodes – namely, planning and priority setting, research process, research products, and institutional environment – and their associated gender parameters, equipped us with useful critical lenses to develop our gender assessment framework, to which we now turn.

## Methodology

Based on the literature reviewed above, we developed a conceptual framework to guide the assessment of the gender responsiveness of agriculture research projects. The framework consists of six dimensions, observable activities that can be monitored, indicators, and data sources (see Appendix 1 for a concise summary of our GRR assessment framework). The dimensions include: planning and priority setting; research process (researchers, research focus, and methodology); research products; institutional capacity to integrate gender responsiveness into research (at both organizational and individual levels); monitoring and evaluation; communication and dissemination. We developed a tool for operationalizing the framework (see Table 1) comprising of the project background, key components, scale, and weighted score values. The tool was validated by international experts in gender and agriculture<sup>3</sup>. Due to time constraints, this study did not collect data from several institutional leaders and donors, thus missing a consideration of institutional support mechanisms from their perspectives. Future studies could pay attention to this issue.

In order to test the efficacy of our tool, we piloted it to assess the gender responsiveness of the agricultural research projects of two agricultural research organizations, NARO and RAB. Our overarching research question was: What is the level of application of gender to biophysical and socio-economic agricultural research?

A total of 14 agricultural research projects were purposely sampled for quantitative scoring. We targeted projects that were considered to be gender-responsive by the gender focal persons and principal investigators (PIs) of the respective research organizations. Out of the 14 selected projects, we conducted an in-depth qualitative analysis of four case studies (two of which had registered average scores of gender responsiveness, while the other two had very low scores) from both NARO and RAB (see Table 2). This qualitative analysis allowed us to thicken our

understanding of the quantitative scores, by focusing on gender integration during planning and priority setting, research focus and formulation of objectives, implementation and the impact of research technologies on women farmers.

Data were collected between June and August 2016. In total, we conducted interviews with 17 PIs who were leading the 4 selected research projects. The interviews were supplemented with a review of project documents, particularly of proposals and published materials.

## Findings

On the basis of the tool presented in Table 1, we found that an overwhelming majority of the projects (12 out of 14) scored very low on gender responsiveness. Only two out of the 14 projects (one from NARO and one from RAB) registered average scores. Table 3 summarizes these scores and findings.

The qualitative analysis of the four case studies revealed that there was a lack of consistency in considering gender throughout the entire research cycle and a limited intentional attention to produce gender equality outcomes. Indeed, while the gender focal persons and researchers initially perceived these projects to be gender-responsive, the tool showed that this was not the case for most of the projects. The next sections present evidence on how the four case studies attempted to incorporate gender into key stages of the research cycle (i.e., planning and priority setting, research focus determination, research implementation process, research product dissemination, monitoring and evaluation) and the contradictions that emerged in trying to do so.

### *Planning and priority setting: practice vis-à-vis ideal*

In the above, we argued that a gender-responsive research planning requires to conduct a thorough gender analysis in order to inform a gender-responsive research focus. In addition, the project should make adequate budget provisions for gender-specific activities, reflecting its priority and commitment to gender equality outcomes. None of the projects analyzed met these expectations.

One case reported that it “indirectly” conducted a gender analysis by examining the needs and constraints of men, women, and the youth in producing the agricultural commodity of interest (chickpea). The aim was to determine how these different categories of people would benefit from the project. However, what was construed as a gender analysis translated, in practice, into community participatory brainstorming plenary sessions and discussions with different groups. A PI commented that: “we did have community participation but targeting gender was relative and indirect”. Another participant indicated that there was no need to conduct a gender analysis because the production and marketing of the commodity of focus was mainly intended and used by men. Another PI mentioned that the first phase did not have clear gender planning: “[gender] was introduced in the second phase when the World Bank insisted on [it]”. For another project, the PI was not certain whether a gender analysis was

Project Background						
Project title						
Type of project/discipline						
Name of principal investigator						
Sex of principal investigator						
Number of team members (scientists): (i) male (ii) female						
Number of students in project: (i) male (ii) female (iii) had none						
District and country of the project						
Funding organization						
Major objective						
Project beneficiaries						
Project classification: (i) upstream (ii) downstream (iii) combination						
Assessment dimensions and scores						
Dimensions	Components	Yes	No	Weight	Total scores	
<b>A) Planning and priority setting (9 points)</b>						
Research planning	Gender analysis (GA) was conducted during situation analysis and priority setting (i.e., determining project focus)			3		
Priority setting for research agenda	Gender needs/interests identified from the GA informed the research focus			3		
Research budget	Budget includes gender specific activities (gender analysis; gender training and funds for gender technical advice)			3		
<b>B) Research process (14 points)</b>						
Researchers	Team has gender expertise			3		
Balancing biophysical, gender, and social research	The research approach/focus/design has a multidisciplinary focus (integrating pertinent biophysical, gender, and social science aspects)			1		
Research design	Research design is gender focused or gender informed			2		
Implementation/data collection process	Sex-disaggregated data collected from men/women as individuals as opposed to household heads in surveys			3		
Data analysis	Sex-disaggregated data analyzed and written up			3		
Dissemination	Research/technology products designed to reach different stakeholders including women			2		
<b>C) Research products/technologies<sup>1</sup> produced (5 points)</b>						
	The project produced products/technologies appropriate for and used by men and women			3		
	Publications and technical reports presenting sex-disaggregated data			2		
<b>D) M&amp;E (2 points)</b>						
	Provision for using gender-responsive indicators to trace impact			1		
	Provision for collecting sex disaggregated M&E data			1		
Total				30		
<sup>1</sup> Technologies are here defined as "practices or techniques, tools or equipment, know-how and skills, or combination of the aforementioned components that are used to enhance productivity, reduce production and processing costs, and save on scarce resources or inputs, such as labor or energy" (Ragasa 2012, 5).						
Scale for weighting the key dimensions		Overall gender responsiveness scores				
1 = less important		0	= not at all			
2 = important		1-10	= very low			
3 = very important		11-19	= average			
		20-30	= high			

**Table 1** Components, weights, and score values for assessing gender responsiveness.

Project title and period	Organization/country	Objectives	Funding agency
1. Enhancing access to land and security of tenure for the smallholder farmers, especially women in Rwanda Nov 2012-Oct 2014	Rwanda Agriculture Board (RAB) Rwanda	To enhance land tenure security for smallholder farmers, especially women; to improve agricultural productivity and food security in Rwanda; to enhance the understanding among policy makers of the challenges/opportunities of the land registration program and its impacts on smallholder farmers, especially women in Rwanda; to raise community awareness on legal provisions regarding women land rights in Rwanda; and, to enhance the capacity of community leaders and paralegals in resolving land disputes	RAB
2. Utilization of bean innovations for food security and improved livelihoods in Eastern and Central Africa	RAB in collaboration with researchers from Burundi, Rwanda, and Uganda	To obtain high yielding and multiple resistant bush and climbing bean varieties adapted to different agroecological regions of Eastern and Central Africa that meet acceptable local, regional, and international market standards	RAB and ASARECA
3. Promoting production and utilization of chickpea in the southwestern agroecological zone of Uganda (three-year project)	Western Uganda	To improve household food security and nutrition in smallholder farming systems	McKnight Foundation
4. Harnessing crop-livestock integration to enhance food security and livelihoods resilience to effects of climate variability and climate change in Eastern and Central Africa Jan 2012-Dec 2013	Regional: Burundi, Kenya, Tanzania, and Uganda	To improve resilience and sustainable productivity of smallholder dairy and vegetable production units in vulnerable regions of Eastern and Central Africa; to promote pro-poor policies in order to facilitate the transformation of dairy and vegetable production units into sustainable and resilient profit-making enterprises; to empower actors along the smallholder dairy and vegetable value chain; and, to enhance awareness and knowledge of successful gender-responsive information on dairy and vegetable value chain innovations	ASARECA/ World Bank

**Table 2** Profile of the four case projects.

conducted, as clearly illustrated by his response: “But there was someone who was interested in [conducting a gender analysis] and I think she did it . . . though I do not have details on how it was done”.

Findings across all four projects show that insufficient budgets were allocated to support gender activities. In one case, one participant stated that:

*Gender did not have a designated separate budget. The social scientists got very little/small budget and they kept on complaining that the project administration did not consider them serious.*

(Male key informant from NARO, Uganda, 2016)

The interviews with the PIs of the other three projects reflected similar sentiments. Both NARO and RAB employ socio-economists, so the PIs assumed that the organizational budget allocated to socio-economists would cater for gender-related activities. Therefore, the socio-economists who were not gender experts did not feel compelled or incentivized to support gender integration into the agricultural research projects of their research institutes (Mangheni et al. 2021).

Broadly speaking, PIs’ responses reflected misconceptions about what gender analysis entails and how this analysis can inform the articulation of research problems, as well as about the importance of gender budgeting from the outset. Researchers interpreted gender responsiveness at this stage as synonymous with having some female and male farmers participating in the research formative stages. The assessment of the projects in terms of their gender-focused goals, objectives, research questions, and the subsequent interventions broadly revealed an intentional focus on food security and livelihood improvement, time and labor-saving technologies, and work risk reduction for women. Projects scored positively on these gender-responsive indicators since the interventions targeted critical needs of men, women, and children. Although there was no gender analysis at the planning and inception stage, all four project interventions were relevant to both women and men. However, the four projects were largely gender-blind throughout the design and implementation processes. In the absence of intentional targeting, it is unlikely to achieve equal benefits for men and women farmers.

A gender-responsive research process entails the constitution of research teams with appropriate gender expertise and the choice of a suitable interdisciplinary research approach, design,

No	Project name	Score	Gender responsiveness level
Uganda			
1	Evaluating cage productivity in crater lakes in southwestern Uganda	4	very low
2	Up-scaling innovations for quality seed, potato production, and availability in Eastern and Central Africa with Uganda as the focal point)	5	very low
3	Promoting the production and utilization of chickpea in the southwestern agroecological zone of Uganda	6	very low
4	Harnessing crop-livestock integration to enhance food security and livelihoods resilience to effects of climate variability and climate change in Eastern and Central Africa	12	average
5	Knowledge and perceptions of smallholder dairy farmers of cattle disease burdens in selected agroecological zones of Uganda	3	very low
6	Improving market access for pineapple chain actors using the participatory market chain approach (PMCA) in Uganda	0	not at all
7	Regional cashew improvement network for Eastern and Southern Africa	2	very low
8	Pest and disease management of citrus and simsim, 2011-2017	3	very low
9	Commercializing sweet potato production in areas with long dry periods	3	very low
10	NASE 14 development project	6	very low
Rwanda			
11	Enhancing access to land and security of tenure for smallholder farmers, especially women in Rwanda	19	average
12	Utilization of bean innovations for food security and improved livelihoods in Eastern and Central Africa	7	very low
13	Sustainable intensification of maize and legume based farming systems for food security in Eastern and Southern Africa (SIMLESA)	3	very low
14	Bio-fortified potato varieties to help overcome micronutrient malnutrition in East Africa and South Asia, funded by the Harvest Plus Challenge Program through CIAT and IFPRI	1	very low

**Table 3** Gender responsiveness scores of agricultural projects in NARO (Uganda) and RAB (Rwanda).

methods, data collection, and analysis. We found that all the PIs interviewed (including both the PIs who claimed to apply gender in their research and those who did not) had misconceptions about the level of gender expertise needed within their projects. While some thought that it meant having a gender specialist in each team, others thought that it was equivalent to having a PI with gender expertise, having team members who attended some gender training, and having social scientists in the research team. The quotes below show that gender expertise was interpreted as having a researcher knowledgeable about gender issues, without considering what researchers do with this expertise or if this expertise has any impact, ultimately reflecting a “check the box” mentality:

*The team had some gender experts like me. I attended the Training of Trainers (TOT) sensitization on gender training and mainstreaming under ASARECA. So, we had a clue but the expectations of gender focus on our sector were limited.*

(Male key informant from RAB, Rwanda, 2016)

*[In] projects like these, gender does not come out well. We did not have a gender specialist, but we had . . . . . [name] – one of the team members who attended a workshop in Tanzania, and she came back and trained us.*

(Male key informant from RAB, Rwanda, 2016)

*As an institute, we don't have a gender expert, but even NARO does not have a gender expert. We have social economists who do some gender. The project had a social scientist/social economist, livestock health science and animal nutritionist. The social researcher – of the National Livestock Resources Research Institute (NaLIRRI) staff – was instrumental and did the social aspects.*

(Male key informant from NARO, Uganda, 2016)

Participants equated gender expertise to attendance to short-term gender sensitization and/training courses. For instance, the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) gender course mentioned in the first quote lasted seven days. Other gender training courses are often much shorter (Mangheni et al. 2019). Out of the four



projects, only one reported hiring a gender expert, while the rest relied on their own perceived gender knowledge and skills. Most projects depended on gender focal persons who were overburdened by their engagements in multiple teams and who had limited gender research skills. Regarding the gender composition of the research teams, two projects had equal numbers of male and female team members, one project had one woman, while one had only men in the team.

There were also misconceptions about the interpretation of sex-disaggregated data. Although all the four projects reported to have collected sex-disaggregated data, this was not evident from the project documents. Indeed, our findings show that the data was not disaggregated by sex (except in one case where the study was solely focused on women), revealing that the projects lacked an adequate understanding of what collecting sex-disaggregated data entails. At times, they equated this with participation of women and men in research. In one of the projects, the PI reported having “kept beneficiaries at heart” by recognizing and involving them in the research implementation phase. She noted that: “. . . what gives me satisfaction is considering women and men, keeping beneficiaries at heart during [the] development of [a] technology.” However, “keeping beneficiaries at heart” did not translate into clear procedures for collecting and analyzing relevant sex-disaggregated data, or for further analyzing underlying gender social structures. This illustrates that there are still several issues related to the implicit versus explicit knowledge of gender-related research practices, further underscoring the importance of drafting appropriate guidelines and indicators.

Another PI explained his understanding of collecting sex-disaggregated data in terms of the number of women and men reached by the research team, noting that:

*We collected sex-disaggregated data, for instance, like out of 100, women would be like 45, because they had gardens around the lake and use it for water, men would be like 15 percent. We had also children and the rest were youth.*

(Male key informant from NARO, Uganda, 2016)

With respect to the research approach and design, only one case project had used gender-responsive data collection approaches. These approaches included training research assistants in gender data collection methods; sampling women and men as participants; allowing participants to determine the convenient time and venue; and, meeting women in appropriate spaces. The project PI cited multiple adjustments that the team made for creating gender-responsive processes, after pretesting the tools. Specifically, the PI mentioned:

- *Research assistants/enumerators were trained in gender sensitivity, such as body language, general discipline, etiquette on how to talk to men and women respondents, and understanding the questionnaires.*
- *The survey starts at 8:00 am until evening so all the men and women are targeted irrespective of the work they do.*
- *Meeting women in their committees, training them so that they also train others. Because we empowered women to take charge, they were able to spread the news about the project.*

- *The research assistants and enumerators were trained in gender knowledge and research skills, and we worked with them to ensure that they followed the training guidelines they received.*
- *Time and venue were determined by individual communities – most interviews were conducted in the afternoon because most women are engaged in the morning hour.*  
(Male key informant from RAB, Rwanda, 2016)

For three of the four cases, gender-blind processes were reflected by a broad focus on farmers, which failed to take into account the differences between women and men farmers and to advance any gender-responsive method.

### **Research products**

The researchers listed some of the technologies that they promoted in their research projects, among which simple water harvesting and labor-saving technologies, drought tolerant forages and homemade feed technologies, vegetable and milk processing. Reported benefits for women included: improved nutrition due to introduction of nutrient rich crop varieties; reduced work risks due to the design of an improved forage chopper machine that was safer and convenient to handle; and, access to relevant information on market opportunities.

### **Communication and dissemination of research products**

Researchers mentioned that both women and men were targeted during the dissemination meetings of their research products. The four projects adopted participatory dissemination approaches such as gathering both male and female farmers, explaining to them how to use developed technologies, consulting them on appropriate time and venues, involving district officials during the mobilization process, and setting up easily accessible training centers (see Table 4).

In NARO, other dissemination channels included farm trials, phone calls, interaction with community leaders, and public demonstrations of how to use the technologies. In RAB, the dominant method was the radio, followed by community meetings and presentations.

### **Monitoring and evaluation of interventions**

While the PIs mentioned the use of participatory evaluation and involvement of both women and men in mid- and end-term evaluations, there was no clear evidence on how these processes were conducted. All projects lacked clarity on observable and measurable characteristics of GRR that, according to the World Bank (2012), would enable funders, researchers, and other development practitioners to be certain whether what is purported to be GRR should actually be called such. The key dimensions and measurable characteristics that have been proposed to guide the conduct of GRR include planning and priority setting at individual and institutional levels, research implementation, researchers, M&E, and research products.

In Rwanda, one of the projects which was on women and land provides a good example of a gender-responsive M&E process. Another project mentioned having a budget to support a gender-responsive M&E process, yet it was not clear whether and how this process was conducted. The budget was intended to support the involvement of both men and women participants rather than to conduct M&E work, as exemplified by this quote:

*There was a budget item for M&E and this enabled us to reach men and women beneficiaries.*

(Male principal investigator at RAB, Rwanda, 2016)

## Discussion

While gender responsiveness requires to undertake a gender analysis at the planning stage in order to understand participants' needs, priorities, opportunities, constraints, and benefits, and to inform the research focus and priority (Meinzen-Dick et al. 2011; Elias 2013), our findings show that none of the reviewed projects performed such analysis. The researchers who reported that they had carried out gender analysis could neither explain how this was done nor share research products to support their claims. Some PIs felt that they lacked the necessary skills to conduct such analysis, while others showcased limited appreciation of its relevance to their research project.

Employing appropriate research approaches and selecting appropriate participants is crucial to collect relevant gender data (Meinzen-Dick et al. 2011; Mangheni et al. 2019). Our findings reveal that researchers held varied understanding of gender-responsive research approaches. To some, these approaches meant encouraging the participation of both female and male researchers in the research activities. Although this is important, it is not enough as long as other key dimensions are ignored. On top of gender-balanced research teams, both men and women researchers should be well equipped with adequate gender skills to conduct GRR (Njuki 2016).

Collection and analysis of sex-disaggregated data are at the heart of GRR (Meinzen-Dick et al. 2011). Besides, GRR should go beyond simply counting how many women and men are involved in a project and, instead, question the underlying gender relations, norms, practices, and perceptions that shape and/or influence sex-disaggregated data. Unless this is done, gender-based constraints in agriculture, such as unequal access to land and other resources, will be inadequately tackled by agricultural policies and strategies (Meinzen-Dick et al. 2011; Mangheni et al. 2019). None of the assessed projects demonstrated this.

The research processes fell short of the recommended GRR practices, such as seeking informed consent from men and women participants, or conveniently scheduling activities to allow both men and women to participate in the research process (Elias 2013; Njega and Gurung 2011). Scheduling the time and venue for research activities requires researchers to consider women's heavy workloads, restricted mobility, literacy levels, and their need for privacy. Where men and women act as respondents, gender sensitivity requires that the data collection process takes into account the potential existence of gender-based hindrances

to true expression (Elias 2013). Except in one of our four case studies, researchers could not associate their processes with gender-responsive research practices.

Gender-responsive agricultural research should be assessed on its ability to generate products that address the needs of women and men (Njuki 2016). The technologies produced by our case studies could potentially benefit men, women, children, HIV patients, and other vulnerable groups such as the poor, although this was not intentionally specified in their design.

Gender-responsive agricultural research products and interventions are unlikely to be adopted or appreciated if women and men are not effectively targeted during their dissemination through strategies that meaningfully engage them. Given the differences in gender roles, the heavy use of media in Rwanda may be an inappropriate dissemination tool for women, favoring men who own radios and often have leisure time to listen to radio programs. Given the gender division of labor, women spend much of their time working in and outside the home, with little time left for leisure and for listening to radio announcements.

The M&E processes of the case studies (except in one case) fell short of gender-responsive measurables. According to Meinzen-Dick et al. (2011), gender-responsive monitoring and evaluation should include both gender-focused quantitative and qualitative indicators, such as women's involvement in agricultural related work, gender disparities in access to productive resources, and control of incomes. According to the World Bank (2012), adopting gender-responsive indicators allows to elicit the project's impacts on women's and men's socio-economic well-being and to adjust for gender equitable performance. According to Danielsen et al. (2018), projects that include qualitative research are more likely to successfully support gender outcomes compared to approaches that solely rely on biophysical science methods. These arguments buttress the need to embrace mixed methods indicators and data collection methods, and multidisciplinary research approaches in designing and implementing gender-responsive agricultural M&E processes.

## Conclusions and recommendations

The framework developed and tested in this study demonstrates the utility of assessing gender responsiveness. The study found a disconnect between researchers' own rating of gender responsiveness and the scores proposed by our tool. A majority of the research projects which were perceived to be gender-responsive were not consistently gender-responsive across the entire research cycle. We conclude that our framework and tool was able to offer a more accurate and objective measure of the gender responsiveness of agricultural research projects compared to individual self-assessments. Through the use of multiple data types and sources, the study reveals that there exist important contradictions and misconceptions about gender responsiveness.

The paper contributes to the operationalization of gender responsiveness in agricultural research programs by providing an easy to use, practical tool which can guide the design, implementation, and assessment of gender-responsive agricultural research.

Project	Dissemination strategy
1. Enhancing access to land and security of tenure for smallholder farmers, especially women in Rwanda	<ul style="list-style-type: none"> <li>■ Media, i.e., radio programs to share information with a broader audience</li> <li>■ Workshops and community forums targeted at policy makers, community, women leaders, and CBOs.</li> <li>■ Theatres and dramas within the project sites</li> <li>■ Documentary on women’s land rights for wider dissemination of information</li> <li>■ Publications in form of papers, policy briefs, posters, leaflets, pamphlets, and brochures</li> </ul>
2. Utilization of bean innovations for food security and improved livelihoods in Eastern and Central Africa	<ul style="list-style-type: none"> <li>■ Innovation platform committees disaggregated by sex but mainly dominated by women</li> <li>■ Discussions on which varieties are preferred by women and men and why e.g., women prefer beans that take a short time to cook while men focus on varieties that are likely to fetch more money. Other women prefer varieties that grow well in poor soils, especially those who find the cost of fertilizers high, etc.</li> <li>■ Meeting women in their committees, training them to also train others.</li> </ul>
3. Promoting production and utilization of chickpea in agroecological areas in southwestern Uganda	<ul style="list-style-type: none"> <li>■ Dissemination using different pathways</li> <li>■ Farm demonstration, i.e., how to plant a crop</li> <li>■ Agricultural shows like</li> <li>■ Local media like radio, TV, and local newspaper</li> <li>■ On farm trainings, demonstrations and directives ranging from the production to the consumption and market strategies for chickpea</li> </ul>
4. Harnessing crop-livestock integration to enhance food security and livelihoods resilience to effects of climate variability and climate change in Eastern and Central Africa	<ul style="list-style-type: none"> <li>■ One-stop dissemination center determined by where the technology was applied e.g., forage chopper and water harvesting mean gathering farmers where that technology is used</li> </ul>

**Table 4** Project dissemination strategies.

The study thus demonstrates the utility of a systematic gender responsiveness tracking system to counter inconsistencies and weak institutional systems. Given the importance of the gender responsiveness of agriculture research, especially in addressing the needs of both men and women and in ensuring equal access to resources, we recommend that our tool should be used by donors and national agricultural research organizations in order to build systematic evidence on gender-responsive metrics. While the framework and associated assessment tool are easy to use, they require the collection of adequate data through multiple methods, including interviews and review of documentary evidence. This necessitates enough time and resource. -In addition, the data generated calls for self-reporting by researchers and PIs, which necessitates triangulation with other sources, including project resources such as proposals, reports, and other publications.

Attention to gender responsiveness should be intentional and planned from the beginning of a project (i.e., at the project planning and priority setting stage), including planning dedicated budgets to support gender activities and expertise. This would further inform gender requirements and actions in other stages of the research process, products, monitoring and evaluation, communication and dissemination, and the operating institutional environment, as illustrated by our framework. To do so, the commitment of multiple stakeholders is needed, such as researchers,

organization leadership, and donors, combined with an institutionalized accountability mechanism that motivates gender responsiveness.

The paper identified capacity gaps in the gender responsiveness of the research conducted by our two case study research organizations NARO and RAB. While these were identified throughout the entire research cycle, critical gaps were especially found in the researchers’ limited attention to gender at the planning and priority setting stage, and further compounded by critical deficiencies in expertise on gender analysis, as well as a lack of dedicated budgets. These gaps seriously limited the gender responsiveness of the reviewed projects. Our findings offer lessons for agricultural organizations in sub-Saharan Africa and beyond, calling for greater attention to these critical gaps in order to achieve gender responsiveness.

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## Notes

1. Political will refers here to an institution's ability to support the integration of gender in policies and budgeting, while technical capacity indicate the professional qualifications and skills that staff should have to properly integrate gender into their work.
2. Accountability refers here to the mechanisms used to enforce the translation of policies into actions which can lead to greater gender integration. These may include monitoring and evaluation of research results and provision of staff incentives and sanctions.
3. Five international experts based at Makerere University, Cornell University, and the International Development Research Council (IDRC) reviewed the tool for consensus on the components, weights, and score values for assessing gender responsiveness (Table 1).

**Appendix 1** Gender-responsive research assessment framework.

Dimension	Observable / measurable activities	Measurable outputs	Gender responsiveness: indicators / characteristics	Data sources
<b>1. Planning and priority setting</b>	1.1. Stakeholder consultation meetings and other research agenda setting and strategic planning events	1.1.1. Organization of strategic interventions/plans	Gender needs/interests, priorities, preferences, opportunities, benefits, aspirations, and constraints considered and reflected in the organization of strategic interventions/plans  Number of men and women participating in the strategic planning meetings/events as stakeholders	Reports/proceedings of stakeholder consultation meetings
	1.2. Contextual/ situation analysis/needs assessment	1.2.1. Organization of research priorities/ research agenda	Institutional commitment to mainstream gender in research, demonstrated by the priorities of the investments  Goals and objectives capture aspects of interest and priorities of women, e.g., targeting agricultural projects that empower women  Whether the information/data used for situation analysis is sex-disaggregated  Whether a gender analysis is conducted and its findings used to inform the strategic plan and research agenda	Organizational strategic plan/research agenda  Key informants  Gender analysis  Situation analysis reports  Use of participatory approaches  Methodology section
	1.3. Research project proposal development (selection/choice of research team members, choice of research problem/area, conceptualization)	1.3.1. Planned research activities/research proposals	Number of projects with goals and objectives relevant to needs of women/men as identified in the gender analysis (GA)  Number of projects with planned research interventions targeting interests of women as identified in the GA.	Research proposals/reports
		1.3.2. Research project teams and participants	Number of men/women on research project teams  Number of men and women participants	
		1.3.3. Research budget	Proportion of the total amount of the project budgets allocated to areas/topics serving women’s interests.  Proportion of the budgets allocated to the collection and analysis of sex-disaggregated data	Research proposal budgets
	<b>2. Research process (researchers, research focus, and methodology)</b>	<b>Researchers</b>		
2.1. Determining gender qualifications of the research teams		2.1.1. Researcher competencies and profiles (CVs)	Number of researchers on research project teams who have attended at least one gender course  Number of researchers on research teams with adequate gender skills  Number of PIs who indicate that they deliberately sought to have gender expertise in the team  Number of researchers who deliberately aim at having equal representation of men and women farmers in farm research activities	CVs of the researchers Research proposals/reports Interviews with PIs
2.2. Consulting farmers to give feedback on various aspects of the research process and outputs		2.2.1. Stages of the research process where farmers have been involved	Number of men and women farmer participants selected  Number of times farmers have been involved Gender distribution of farmers involved Quality of the feedback and how it improved the subsequent research proposal processes	Attendance lists  Invitation letters/calls for participation  Scoping reports  Final research reports
		2.2.2. Key aspects for which farmers’ feedback has been sought during the research proposal process		
<b>Research focus</b>				
2.3. Determining research questions/hypotheses/variables	2.3.1. Written research questions/hypotheses/variables	Whether research questions/hypotheses/variables are gender focused or gender informed	Research proposals/reports	

Methodology				
	2.4. Sampling of study respondents/study sites	2.4.1. Listed study sites, sampling frame(s), and sampled respondents	Number of steps taken to ensure the representation of gender and unique groups Number of men and women sampled as individuals in household surveys	Research proposals/reports
	2.5. Selection of venues and time for data collection	2.5.1. Planned venues and timing for data collection	Number of times researchers have considered gender-sensitive data collection strategies (i.e., conducive/appropriate time and venue for women to participate in research activities, use of language that women understand) The specific gender-sensitive data collection strategies considered, timing, venue, time, etc.	Research proposals/reports
	2.6. Data collection and analysis	2.6.1. Data analytical frameworks 2.6.2. Data sheets/data files 2.6.3. Data analysis outputs	Number of times of men and women have been involved in giving feedback throughout the research process and for midway outputs Types of feedback given by farmers (men and women) and how this feedback improved the data collection process Presence of gender disaggregated frameworks Data sets with sex-disaggregated data Data analysis considered sex and gender disaggregation and differentiations	Research reports and publications
	2.7. Validation exercise with research participants	2.7.1. Validation workshop reports	Number of researchers that conducted validation meetings/workshops with men and women participants	Validation workshop reports
<b>3. Research Products</b>	3.1. Publishing and presenting results	3.1.1. Publications and presentation of technical reports and technologies	Sex-disaggregated data in publications and technical reports  Technologies that address the needs of women and men as identified in the gender analysis/suited to women's circumstances	Publications and technical reports
<b>4. Institutional capacity to integrate gender into research (at both organizational and individual levels)</b>	4.1. Staff recruitment	4.1.1. List of recruited staff at different levels 4.1.2. Staff qualifications and skills	Number of men and women recruited at different levels Number of staff with gender skills	Staff lists from human resource offices Staff profile and individual capacity assessment survey
	4.2. Staff in service training	4.2.1. List of staff that attended in service training	Number of men and women that attended gender training Number of gender trainings supported by the organization The nature and focus of gender training Whether staff are encouraged to share lessons gained during the gender training and to ask questions on its relevance to their work Whether gender skills are respected within the organization (by peers and leaders)	Training reports, strategic plans Interviews with staff and management
	4.3. Personnel appraisal	4.3.1. Filled-in staff appraisal 4.3.2 Staff rewards system	Whether gender integration is considered for higher rating Rewards/incentives for gender-responsive practices, e.g., staff promotions	Appraisal forms
	4.4. Budgeting	4.4.1. Budgets	Proportion of the budgets allocated to gender activities	Research budgets
	4.5. Designing policies, strategies, and guidelines	4.5.1. Existing policies, strategies, and guidelines	Whether the existing policies, strategies and guidelines integrate gender	Policies, strategies, and guidelines
<b>5. Monitoring and evaluation</b>	5.1. Design and implementation of M&E activities	5.1.1. Gender-sensitive, participative M&E design and data collection processes 5.1.2. Gender-sensitive M&E reports	Availability of a gender focused M&E systems in the institution Whether the M&E assessments focus on the impact of research products on men and women using individuals instead of household indicators A multidisciplinary M&E team (consisting of social and biophysical scientists) Use of mixed methods (qualitative and quantitative) in order to develop a deep understanding of project impacts on men and women	M&E reports Interviews with relevant personnel

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<b>6. Communication and dissemination of results</b>	6.1. Sharing research results with beneficiaries for validation and dissemination of results/technologies use in order to facilitate feedback and knowledge exchange	6.1.1. Revised reports and publications  6.1.2. Clear involvement of balanced men and women groups, including youth	Validation/dissemination/planning meetings composed of men and women participants and researchers	Validation/dissemination reports
	6.2. Conducting stakeholder meetings to plan the next steps	6.2.1. Planning reports that reflect the implications of the research to the different gender groups	Validation/dissemination/planning meetings that utilize gender-sensitive processes (e.g., separate group meetings for women farmers where appropriate)	Interviews with PIs  Planning report

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