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Gender Attitudes in Agriculture and Positivity Bias

A Survey Experiment in Four Countries in Sub-Saharan Africa

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Abstract

Extensive prior research has demonstrated that reducing gender discrimination enhances women's empowerment, promotes more inclusive livelihoods, increases agricultural productivity, and improves other development outcomes. This study aims to contribute to documenting and informing the measurement of gender attitudes that relate directly to reaching, benefiting, and empowering women through agricultural innovations. By analyzing data from 8,051 survey respondents across study sites in Democratic Republic of the Congo, Ethiopia, Nigeria, and Rwanda, our findings emphasize both commonalities and differences in gender attitudes across different contexts. Furthermore, by including a survey-based experiment during data collection, we assess whether gender-attitude statements vary depending on whether they are presented in a positive frame (focusing on equality) or in a negative frame (focusing on inequality). On average, rural women and men respondents across all countries supported more than half of the gender-equality statements. Some gender-inequality attitudes persisted across the four countries but varied in magnitude and by location, age group, and specific statement or theme. Framing matters: respondents exposed to a positive framing supported 16 percent more gender-equality statements than those exposed to a negative framing. The study highlights two main implications. First, the findings indicate the importance of considering both restrictive attitudes and those that reflect gender-equality opportunities as being in the vanguard. Accordingly, gender-focused interventions should adopt strategies that challenge normative views of women as supporting rather than leading actors in agriculture and economic activities. Second, gender-attitude measures do not perfectly align with country-level gender-equality indicators or with empowerment at the intrahousehold level. They therefore capture a distinct dimension and merit their own indicators.

Keywords: Agriculture, gender attitudes, measurement, survey experiment, Africa

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1. Introduction

Gender attitudes are beliefs about the appropriate roles of men and women in the division of paid labor, home-based work, and caregiving (Davis and Greenstein, 2009; Walter 2018). Attitudes and beliefs are personal, individual, and internally motivated. They often but do not always align with social norms, which are interdependent, collective, and extrinsically motivated (IRH, 2022). Social norms are informal rules of behavior within a society or group that are upheld by sanctions when they are ignored (Cislaghi and Heise 2018). Positive attitudes toward gender equality are associated with greater support for women's rights, equal opportunities, and the rejection of discriminatory norms (UN Women, 2020). Attitudes and norms about gender roles can impede achieving these and other important development outcomes (Kantor 2013; Cole et al. 2014; Seymour et al. 2023). They are intrinsically linked to girls' and women's economic and social opportunities (Kosec et al. 2021) and have been shown to affect girls' educational achievements (Alan, Ertac and Mumcu 2018), women's employment and earnings (Corrigall and Konrad 2007; Fortin 2015; Lietzmann and Frodermann 2021), and women's access to resources (Agarwal 1997; Deere & Doss 2006, Lambrecht 2016).

Since the 1970s and 1980s, recognizing the significance of gender roles in shaping societal outcomes, national surveys have included measures of gender attitudes, often assessing respondents' agreement or disagreement with a male breadwinner model (Walter 2018). Attitudes can change over time, however, and are multidimensional: individuals may have gender-inequality attitudes in some domains but gender-equality attitudes in others (Knight and Brinton 2017; Dernberger and Pepin 2020; van Damme and Pavlopoulos 2022). Therefore, the measurement of gender attitudes should be customized to the specific study topic and repeated whenever changes in attitudes are anticipated, such as through planned development interventions.

Pervasive gender attitudes and norms exist throughout the agrifood system that most rural women and men in low- and middle-income countries depend on for their livelihoods (Rietveld et al. 2023). Acknowledging these gender-based constraints and discriminatory attitudes and norms is a necessary first step toward changing them. Experts have emphasized that acknowledging and working around these constraints without challenging them (gender-accommodative approaches) is not effective; rather, engaging with and reducing or overcoming gender-based constraints related to gender attitudes and norms (gender-transformative approaches) is critical to the success of interventions (Doss 2018; Elias et al. 2024; Quisumbing and Doss 2021). Where gender discriminatory attitudes persist, they could be the focus of targeted interventions aimed at achieving gender-transformative outcomes (Quisumbing et al. 2023).

The first objective of our study is to contribute to the documentation and measurement of gender attitudes that may pose challenges or create opportunities, especially for women working in agrifood systems. Drawing on survey data from 8,051 men and women from smallholder farm households in the Democratic Republic of the Congo (DRC), Ethiopia, Nigeria, and Rwanda, we describe agriculture-related gender attitudes and examine how they vary by gender, age group, location, and type of activity or thematic area. More specifically, we focus on gender attitudes across four themes: information access, farming, off-farm employment, and unpaid household responsibilities.

Eliciting accurate responses to capture people's opinions or attitudes, alongside other topics that might expose a degree of subjectivity, is not straightforward. Significant differences in key indicators can arise from factors such as question ordering (Ambler et al. 2021; Tauseef et al. 2025), how and to whom questions are asked (Bardasi et al. 2011), and how questions are framed (e.g., in the case of subjective well-being (Beegle et al. 2012; Ravallion et al. 2016). Survey responses to gender-attitude statements are also sensitive to framing. For example, in Tunisia, Reitmann et al. (2020) found that an equality (positive) frame triggered

responses that were less biased against women. In Norway, national leaders were more likely to support gender quotas that were positively framed (Teigen & Karlsen 2020).

The second objective of our study, therefore, is to contribute to the emerging literature on how framing affects the measurement of gender attitudes. To our knowledge, few large-scale studies have examined the robustness of gender-attitude statements with respect to subtle differences in framing. By randomly assigning respondents to statements framed in terms of gender equality (positive framing) or gender inequality (negative framing), we assess the impact of framing on the measurement of gender attitudes and whether these effects vary across statements or respondents. Systematic and sizeable differences in framing effects might warrant concern and call for careful consideration when relying on these measures for program targeting and causal inferences.

The third objective of our study is to analyze whether gender-attitude measures align with other commonly used measures of gender (in)equality. The growing recognition of the need to address gender inequality has led to the development of a range of indicators—from country-level to intrahousehold level measures—that track changes in gender (in)equality over time. Widely used country-level measures include the Gender Social Norms Index (GSNI), the Gender Development Index (GDI), the Gender Inequality Index (GII), the Global Gender Gap Index (GGGI), and the Social Institutions and Gender Index (SIGI). At the micro level, the Women's Empowerment in Agriculture Index (WEAI) and subsequent variations have become commonly used household-level indicators for measuring women's empowerment in farm households (Alkire et al. 2013; Malapit et al. 2017, 2019). Each of these indicators captures a combination of distinct domains related to gender inequality across a broad set of domains. However, none of them capture gender attitudes.

The paper is structured as follows. Section 2 provides background on the measurement of gender attitudes in and outside the agriculture sector. Section 3 describes the study sites, sample, and methodology. Section 4 presents the results, organized into four parts: a descriptive analysis of gender attitudes, an analysis of their determinants, an estimation of the framing effect, and a correlation analysis between gender attitudes, empowerment, and country-level gender indicators. Section 5 concludes with a summary of the findings and discusses the implications of the results for gender-equality programming and survey design.

2. Measuring gender attitudes in agriculture

2.1. Gender attitudes in agriculture

Several large-scale efforts measure gender attitudes, but they focus on topics other than agriculture, such as reproductive health, domestic chores and family roles, sexual relationships, leadership, education, and employment. Measures of gender attitudes are included in the World Values Survey (WVS), for example, which collects data from more than 80 countries, with about 1,000 respondents per country across multiple years. Other surveys or survey modules designed to measure gender attitudes include the Gender Equality Attitudes Study (GEAS) (UNWomen 2020), the Gender Roles Attitude Scale (GRAS) (García-Cueto et al. 2015), and the Gender-Equitable Men (GEM) scale (Pulerwitz and Barker 2007).

Measures that address agriculture tend to focus on gender roles in their attitude statements. Cole et al. (2020) integrated a gender-attitudes scale in their Women's Empowerment in Fisheries Index (WEFI) tool (largely based on the WEAI), which was administered to assess the impact of using a gender-transformative approach in a postharvest fish loss reduction intervention in Zambia. The gender-attitudes scale comprised eight statements that reflected current gender roles in the floodplain fishery (e.g., "Women should not get involved in fishing fulltime[;] this is a man's responsibility" and "Men should primarily be the ones who control the earnings obtained from the sale of fish"). Their findings suggest that using a gender-transformative approach led to significant changes in gender-equality attitudes (and

women's empowerment outcomes) compared to using an accommodative approach. Bhati et al. (2023) developed and validated a scale in India to assess farm families' attitudes about certain agricultural topics (e.g., "Men have more farm experience") and nonagricultural topics (e.g., "It is shameful when men engage in domestic work").

In another study from India, Tanusha and Goyal (2018) developed and validated a scale to assess the attitudes of young rural women toward their participation in agriculture. The final scale comprised 19 statements, of which 12 were negatively framed (e.g., "Females can't be [an] entrepreneur in farming") and 7 were positively framed (e.g., "Many policies are women oriented so young females can take [up] agriculture as [a] profession"). Karami and Mansoorabadi (2007) compared the attitudes of women and men rice growers toward environmental sustainability in rural Iran, where they found that women farmers had more positive attitudes about environmental sustainability. Other studies have also looked at gender attitudes or focused specifically on measuring gender norms (descriptive and/or injunctive)—rather than just attitudes—in agriculture and the agrifood system (see; Hillenbrand & Miruka 2019; Lopez et al. 2022; Quisumbing et al. 2021; Seymour et al. 2023). However, none of these studies systematically analyzed the effect of framing on the measures of attitudes or norms.

2.2. Selected gender attitudes and frames for our study

The gender-attitude statements for our study focus on four themes aimed to inform actions of development projects seeking to improve agronomic outcomes (Table 1). Inevitably, these themes (and subthemes) are interlinked. The first theme focuses on women's access to agricultural information providers, whether by interacting with agricultural extension agents, attending agricultural trainings, or using information and communication technologies (ICTs). These are the typical modes of disseminating agronomic innovations. In many African contexts, women are considered "farmers' wives," not farmers, and thus are not targeted for services, information, and inputs, regardless of their actual contributions to farm production and marketing (Farnworth and Colverson 2015; Manfre et al. 2013; Ragasa 2012). Moreover, men tend to dominate the ranks of extension agents in many African countries, which can pose challenges for women farmers in contexts where interactions between men and women outside marital or familial relationships are strongly discouraged (Hidrobo et al. 2024).

Digital tools are considered powerful and affordable options to deliver agronomic advice at scale (Aker 2011; Fabregas et al. 2019; Spielman et al. 2021). By removing the need for in-person interactions and enabling farmers to receive advice at convenient times and locations, digital tools can eliminate key barriers to women's access to extension services (Fu and Akter 2016). However, gender-inequality attitudes may discriminate against women owning mobile technology or using digital tools (Voss et al. 2021). We therefore ask about attitudes toward women using ICTs more generally, rather than about accessing agronomic information through ICTs, given that the latter is relatively uncommon among households in the study regions.

The second theme concerns attitudes about women's roles in agricultural production. Gender norms and images of who is or should be primarily engaged in farming often limit women's access to and use of timely information and extension services (Farnworth and Colverson 2015; Manfre et al. 2013; Ragasa 2012). Viewing women as helpers often leads extension service providers to target male household heads, who are seen as the primary farmer in the household. Many policymakers, program decision-makers, and rural extension service providers implicitly or explicitly characterize their target groups according to features such as "head of household" or as "cash crop" versus "food crop" farmer, with women seen as food crop producers. These classifications can unwittingly marginalize women by overlooking their diverse roles in agriculture and by creating gendered power imbalances and uneven development outcomes in agrifood

systems (FAO 2023). We therefore aim to capture attitudes about women as farmers through three statements. At the extensive margin, we ask whether women should be encouraged to farm. At the intensive margin, we ask whether increasing productivity on women's plots is considered as important as increasing productivity on men's plots, and whether it is acceptable for women to be the primary cultivators.

Table 1. Gender-attitude statements used in the study, under an equality or inequality frame

Theme	Subtheme	Statements under equality/positive frame	Statements under inequality/negative frame
Agricultural information	Extension agents	1. It is okay for women to interact with male extension agents.	1. Women should not interact with male extension agents.
	Training	2. It is okay for women to participate in agricultural extension trainings or activities.	2. Women should not participate in agricultural extension trainings or activities.
	Digital	3. It is okay for women to use information and communication technology (e.g., mobile phones, internet, Facebook, apps).	3. Women should not use information and communication technology (e.g., mobile phones, internet, Facebook, apps).
Farming	Woman farmer	4. Women should be encouraged and supported as farmers.	4. Women should not be encouraged and supported as farmers.
	Prioritizing plot performance[a]	5. It is equally important to improve productivity on women's plots as it is on men's plots.	5. It is more important to improve productivity on men's plots as compared to women's plots.
	Primary farmer[a]	6. It is okay for women to be primarily the ones who cultivate crops.[b]	6. Men should primarily be the ones who cultivate crops.
Off-farm employment	Marketing role	7. It is okay for women to engage in agricultural marketing activities/trade at the market.	7. Women should not engage in agricultural marketing activities/trade at the market.
	Nonfarm business	8. Women should be encouraged to be owners and managers of nonfarm businesses.	8. Women should not be encouraged to be owners and managers of nonfarm businesses.
Household responsibilities	Primary income earner[a]	9. It is okay for women to be the primary income earners for their families.[b]	9. Men should be the primary income earners for their families.
	Husband's role in care	10. Husbands should help wives with household chores, like cooking and taking care of children.	10. Husbands don't need to help wives with household chores, like cooking and taking care of children.

Source: Authors.

Note: [a] These statements use the word "primary" and signal that attitudes about and acceptance of gender-equality opportunities are in the vanguard. [b] Given the baseline of low participation and limited agency of women in crop cultivation and income-generating activities, along with the reported bias against women as primary farmers or cultivators and income earners, the wording of these statements supports reduced bias and greater gender equality in opportunities to lead and drive economic activities.

The third theme focuses on women as economic agents off the farm, through engaging in crop marketing or as nonfarm entrepreneurs. Participation in marketing agricultural produce is often associated with more decision-making power over the use of income from crop production (FAO 2023). The person who sells crops has cash in hand, and even if they do not retain control over the cash, they still know how much income was earned from the sale of the produce. Moreover, selling the produce in local or more distant markets, away from the point of production, requires lifting mobility restrictions (Mc Peak and Doss 2006). Understanding attitudes toward women's entrepreneurship more generally offers additional insights into whether community members are supportive of women earning income outside of crop production.

The final theme touches on attitudes in support of a male breadwinner model. Norms that position men as breadwinners and women as responsible for domestic chores and care work are still reported in many contexts (Elias et al. 2024; Ragasa et al. 2023; Rietveld et al. 2023). Domestic responsibilities may limit women's time to engage in agricultural production (Pierotti et al. 2022), while beliefs that men should be the household's primary income earner can reinforce the tendency to target men for extension services. Addressing this attitude requires not only openness to women as economic agents (as noted earlier in attitudes toward women as farmers or entrepreneurs) but also acceptance of women as the primary income earners in their households.

This study also sets out to determine whether framing these statements differently—such as in terms of equality versus inequality, or positive versus negative wording—elicits different responses and lowers or heightens the magnitude of the normative perspective. Tanusha and Goyal (2018) framed some statements as positive versus negative or as using equality (no bias) versus inequality (with bias) language. For example, statements such as "I will take up farming, as it is my family occupation" (positive); "Only people of the lower stratum of society will take up farming" (negative); "Females can't be entrepreneurs in farming" (negative); "Agriculture is dominated by males, and females don't have a say in it" (negative), "To ensure food security [requires …] attracting youth toward agriculture" (positive); and "If youth come to farming, it would be made more scientific and innovative" (positive) reflect a mix of positive framing (mirroring no bias) and negative framing (mirroring bias). If respondents tend to agree with the statements offered, the framing might affect study results. In the gender-inequality frame, the respondent's tendency to agree with the gender-biased statements would then inflate the measured support for gender inequality. In contrast, in the gender-equality frame, the tendency to agree with the statements reduces the measured support for inequality and increases support for gender equality. In this study, we aim to test whether the way the statement is framed influences the attitude scores.

3. Data and Methods

3.1. Study sites

We focused on study sites in four sub-Saharan African countries: DRC, Ethiopia, Nigeria, and Rwanda (Annex Figure 1).[1] Although each project was uniquely designed to fit the respective socioeconomic and agronomic conditions of the intervention site, the projects shared a common focus on incorporating digital support tools to improve and deliver tailored agronomic recommendations to farmers. These four countries have different gender contexts: Rwanda ranks highest on key gender equality indices, DRC and Nigeria have some of the lowest gender inequality indicators in Africa and the world, and Ethiopia falls in the middle, with more diversity within the country (Table 2).

[1] These study sites were selected because they fall within the operational areas of ongoing or forthcoming agricultural interventions under the CGIAR Sustainable Farming Science Program.

Table 2. Gender (in)equality indicators

Indicator	DRC	Ethiopia	Nigeria	Rwanda
Gender Social Norms Index (GSNI) (2017–2022)[a]				
Share of people with no bias		1.23	0.42	0.85
Share of people with at most one bias		26.25	6.86	10.61
Share of people with at least one bias		98.77	99.58	99.15
Share of people with at least two biases		73.75	93.14	89.39
Share of people biased in the economic dimension		61.73	79.92	65.68
Gender Development Index (GDI) (2022)[b]	0.89	0.92	0.89	0.92
Gender Inequality Index (GII) (2022)[c]	0.61	0.49	0.68	0.40
Country ranking (1 for the most equality)	152	125	165	98
Global Gender Gap Index (2024)[d]	0.61	0.71	0.65	0.76
Country ranking (1 for the most equality)	140	79	125	39
Economic participation and opportunity	0.67	0.59	0.73	0.67
Educational attainment	0.68	0.87	0.84	0.96
Health and survival	0.98	0.97	0.97	0.97
Political empowerment	0.11	0.41	0.07	0.42
Social Institutions and Gender Index (SIGI) (2023)[e]	46.9	30.8	43.9	19.0
Discrimination in the family	52.5	40.6	61.6	35.4
Restricted physical integrity	32.3	23.8	28.5	17.3
Access to productive and financial assets	64.9	39.9	35.4	15.1
Restricted civil liberties	34.5	17.1	46.9	5.8
Human Development Index (2022)				
Women	0.45	0.47	0.52	0.52
Men	0.51	0.51	0.58	0.57
Life expectancy at birth (2022)				
Women	62.1	68.9	54.0	69.2
Men	57.5	62.6	53.3	64.8
Mean years of schooling (2022)				
Women	5.8	1.7	6.6	4.5
Men	8.8	3.2	8.7	5.4
Estimated gross national income per capita (2022)				
Women	917	1,762	4,110	1,662
Men	1,246	2,970	5,386	3,000
Share of seats in parliament (% held by women) (2022)	14.8	38.9	4.5	54.7
Labor force participation rate (% ages 15 and older) (2022)				
Women	60.0	57.6	77.0	54.8
Men	66.4	79.2	85.7	66.2

Source: Various official global data.

Note: DRC = Democratic Republic of the Congo. [a] The GSNI covers four key dimensions: political, educational, economic, and physical integrity. [b] GDI is the ratio of the female to male Human Development Index. The higher the index, the better the outcomes for women. [c] A low GII value indicates a higher degree of gender parity. [d] Under the Global Gender Gap Index, a value of 1 indicates full gender parity. [e] A value of 0 indicates no discrimination; a value of 100 indicates absolute discrimination.

3.2. Sampling and survey data collection

Between March and September 2023, we interviewed 8,051 women and men respondents from farming households in study sites across DRC, Ethiopia, Nigeria and Rwanda (Table 3). The study population reflects the expected intervention area and potential beneficiary households of ongoing or forthcoming agronomic bundled interventions of the CGIAR Sustainable Farming Science Program. The target households were rural households growing at least one of the crops prioritized by the intervention teams for developing and scaling the agronomic innovations.

Table 3. Characteristics of sample respondents (percentage of respondents)

Variable	DRC	Ethiopia	Nigeria	Rwanda
Regions/states	South Kivu	Amhara, Oromia, SNNPR	Kaduna, Kano, Nasarawa	Northern, Eastern, Southern, and Western Province
Focal crops	Coffee	Sorghum, teff, wheat	Cassava, maize, rice	Beans, cassava, maize, potato, rice, wheat
Survey period	August and September 2023	March 2023	June and July 2023	August and September 2023
Socioeconomic characteristics of respondents (in % of respondents)				
Gender (Female)	51	47	45	50
Youth[a]	20	18	17	17
Age (in years)	50	41	40	43
Household head	47	56	56	50
Literate	63	61	86	84
Farming is main occupation	79	74	89	93
Highest education level completed				
No school	40	41	17	24
Primary school	33	35	30	65
Secondary school	23	14	31	10
Postsecondary education	3	3	15	1
Adult education	0	8	8	1
# respondents	*938*	*1,587*	*1,952*	*3,574*

Source: Authors.

Note: DRC = Democratic Republic of the Congo; SNNPR = Southern Nations, Nationalities, and Peoples' Region.

[a] The age range for youth is defined according to each country's national youth policy. In DRC, youth are defined as individuals ages 15–35 years. In Ethiopia and Nigeria, youth are defined as individuals ages 15–29 years. In Rwanda, youth are defined as individuals ages 16–30 years.

In DRC, coffee-producing households were selected in two districts of South Kivu, in eastern DRC and bordering Rwanda (Annex Figure 2; Kintche et al. 2024). In Ethiopia, five *woredas* across three regional states were selected (Annex Figure 3), with between 144 and 301 households growing sorghum, teff, or wheat interviewed in each *woreda* (Lambrecht et al. 2023a). In Nigeria, households growing cassava, maize, or rice were selected in the northern part of the country, specifically in the north-central and northwest zones (Annex Figure 4; Lambrecht et al. 2023b; Kreye et al. 2025). A total of nine local government areas (LGAs) were selected for the study. In each LGA, 10 villages were randomly selected from a list of all villages in the LGA. Within each village, 12 households were interviewed. In Rwanda, the study covered all rural regions in the country (Annex Figure 5; Ma et al. 2024). Interviews in Rwanda were conducted with households growing beans, cassava, maize, potato, rice, or wheat in eight districts. In each district, between 12 and 28 villages were sampled for conducting interviews (proportional to population size), and between 12 and 15 households were randomly selected in each village.

The questionnaires included a household-level questionnaire that any knowledgeable household member could answer and an individual-level questionnaire that was to be administered in private to the main agricultural decision-makers in the household (one adult male and one adult female). Alongside questions related to decision-making and resource ownership, the individual-level questionnaire included statements to measure attitudes toward gender (in)equality. Enumerators read 10 statements to respondents that corresponded to the four themes, with the response options based on a 5-point Likert scale ("strongly agree," "agree," "neutral," "disagree," and "strongly disagree"). The statements were framed either as supporting

gender equality or as endorsing gender inequality (Table 1). The corresponding responses indicate the individual respondents' attitudes about, support for, and/or endorsement of gender (in)equality.

The survey questionnaire was programmed in computer-assisted personal interviewing (CAPI), whereby the specific frame (equality or inequality) was randomly assigned to a respondent using an algorithm in the CAPI program. The statements were administered in a prespecified order (as in Table 1). As a result, we had an equal number of respondents per country who were presented with statements using the equality frame and the inequality frame. Because of a CAPI coding error, however, three statements in the surveys in DRC and Ethiopia were always framed in the equality frame. This was corrected in the surveys in Nigeria and Rwanda.

Likert scale data are susceptible to biases, including the (1) central tendency bias (in which respondents avoid extreme response options); (2) order bias, either as primacy bias (the tendency for respondents to pick one of the first options presented to them) or recency bias (the tendency to pick a statement at the end of a list (the last option they remember); and (3) acquiescence bias (in which respondents tend to agree with statements) (McClendon 1991; Reitmann et al. 2020). We expect that these sources of biases were limited among our respondents. While we provided a "neutral" option, only few responses that are "neutral". Moreover, we would be especially concerned about acquiescence bias if respondents consistently or strongly agreed to all statements. However, our data does not support such response behavior, and instead reveals that respondents adjust their respondents to the respective statement (see Table 5 on the different magnitudes of agreements by statement and by framing). As hypothesized, the variation in men's attitudes across all focus countries is more likely driven by framing effects.

3.3. Analytical methods

Our analyses rely on descriptive statistics and regression analyses and focus on respondents' (dis)agreement with gender-attitude statements. For each statement, we created a variable that indicates support for gender equality. Hence, when statements were administered using a gender-equality framing, "strong agreement" or "agreement" were coded as attitudes supportive of gender equality. When, instead, statements were administered according to the gender-inequality frame, "strong disagreement" or "disagreement" were coded as attitudes supportive of gender equality. These binary indicators are the main outcome variables of interest in our analyses. In addition, we constructed indicators of support for gender equality for a group of statements as the share of all respective statements that the respondent supports in favor of gender equality.

To understand the impact of framing on gender-attitude outcome indicators, we conducted regression analyses. Respondents were randomly assigned to the equality or inequality frame, thus avoiding concerns over endogeneity with our outcome variables. Our main regression models are estimated as probit or fractional probit models, as follows:

$$Equality\ tendency_i = \beta_0 + \beta_1 Frame_i + \beta X_i + \epsilon_i \quad (1)$$

$Equality\ tendency_i$ is a dummy variable indicating whether the respondent supports gender equality related to a specific statement, or it is the percentage of gender-equality statements supported by respondent i. $Frame_i$ is 1 if inequality framing statements were presented to respondent i and 0 otherwise; and X_i contains control variables for respondent i. Standard errors are clustered at the lowest administrative division level.

A priori, our hypothesis was that β_1 would be negative—that is, we expected that when presented with inequality framing statements, respondents would be less likely to support the gender-equality statements. Marginal effects of fractional probit models are reported, indicating the percentage-point difference in support for gender-equality statements by respondents presented with equality frames compared to those presented with inequality frames.

Furthermore, to examine heterogeneous framing effects across different groups, interaction terms are included in the regression models. The regression model is estimated as follows:

$$Equality\ tendency_i = \beta_0 + \beta_1 Frame_i + \beta_2 Group_i + \beta_3 Frame_i \times Group_i + \beta X_i + \epsilon_i \quad (2)$$

where $Group_i$ is a dummy denoting the group of interest to which respondent i belongs. Groups estimated in the analysis included gender and age group and literacy level. β_3 represents the difference in framing effects between women and men, youth and non-youth, and literate and illiterate respondents.

4. Results

4.1. Gender attitudes

Women and men respondents across all countries expressed attitudes conducive to gender equality on more than half of the statements (Table 4). Respondents in DRC showed the lowest levels of support for gender equality, with comparatively low levels of support across all individual statements relative to the outcomes from the other three countries. Rwandan respondents showed the highest support for gender equality, with more than a third of men and women respondents in Rwanda supporting all gender-equality attitude statements (38 percent and 36 percent, respectively). This percentage was lower in Ethiopia and Nigeria, where only 18 to 24 percent of men and women respondents supported all gender equality attitude statements. In Ethiopia and Rwanda, men's and women's responses did not differ significantly, whereas women in Nigeria were more likely than men to agree with the gender-equality statements or to have no bias. Across all four countries, youth and non-youth responses did not differ significantly (Annex Figures 6–7).

Most women and men across the four study sites supported gender equality in interactions with and access to extension agents, participation in trainings, and access to digital tools (Table 4), and were supportive of women as farmers, as entrepreneurs, and in marketing and trading. A sizeable share of respondents, however, still voiced disagreement with women's interactions with male extension agents, women's participation in training, and women's use of ICTs. In DRC, 21 to 25 percent of respondents did not support women's interaction with male extension agents, participation in training, and use of ICTs. Moreover, in Nigeria and DRC, a sizeable share of respondents did not agree with women performing marketing activities outside their own community. Most women and men across the four study sites also had attitudes that support gender equality in terms of the husband's role in domestic chores and care work, except among respondents in DRC, where only 36 percent of male respondents and 38 percent of female respondents agreed that husbands should help their wives with household chores and care work.

Statements signaling gender-equal opportunities as being in the vanguard of farming and other economic activities garnered the lowest support across all four countries. These statements pertained to women as primary farmers, women's crop performance as a priority, and women as primary income earners. About half of the respondents agreed with the following statements: "It is equally important to improve productivity on women's plots as it is on men's plots"; "It is ok for women to be primarily the ones who

Table 4: Respondents' agreement with gender-equality attitude statements, by gender

Statement	DRC		Ethiopia		Nigeria		Rwanda	
	Men	Women	Men	Women	Men	Women	Men	Women
Share of statements in support of gender equality	0.58	0.60	0.76	0.77	0.73	0.78***	0.85	0.84
Share of respondents with all attitudes in favor of equality	0.04	0.04	0.18	0.20	0.20	0.24	0.38	0.36
It is okay for women to interact with male extension agents.	0.75	0.75	0.88	0.89	0.83	0.87**	0.94	0.93
It is okay for women to participate in agricultural extension trainings or activities.	0.79	0.79	0.92	0.91	0.86	0.90**	0.95	0.95
It is okay for women to use ICT	0.78	0.76	0.87	0.85	0.78	0.88***	0.94	0.94
Women should be encouraged and supported as farmers.	nd [a]	nd	0.91	0.92	0.87	0.91**	0.95	0.94
It is equally important to improve productivity on women's plots as it is on men's plots.	0.52	0.51	0.54	0.55	0.73	0.77*	0.57	0.56
It is okay for women to be primarily the ones who cultivate crops.	0.42	0.44	0.41	0.44	0.51	0.56*	0.69	0.68
It is okay for women to engage in agricultural marketing activities/trade at the market.	0.69	0.76*	0.90	0.91	0.80	0.86**	0.93	0.92
Women should be encouraged to be owners and managers of nonfarm businesses.	nd	nd	0.86	0.86	0.86	0.89*	0.93	0.92
It is okay for women to be the primary income earners for their families.	0.37	0.40	0.44	0.50*	0.33	0.37	0.64	0.66
Husbands should help wives with household chores, like cooking and taking care of children.	0.36	0.38	0.90	0.89	0.72	0.80***	0.91	0.88**
# observations	*458*	*480*	*842*	*745*	*1,078*	*874*	*1,778*	*1,796*

Source: Authors.

Note: Significant differences between responses of male and female respondents are shown as * $p < 0.05$; ** $p < 0.01$; and *** $p < 0.001$. [a] nd = no data collected.

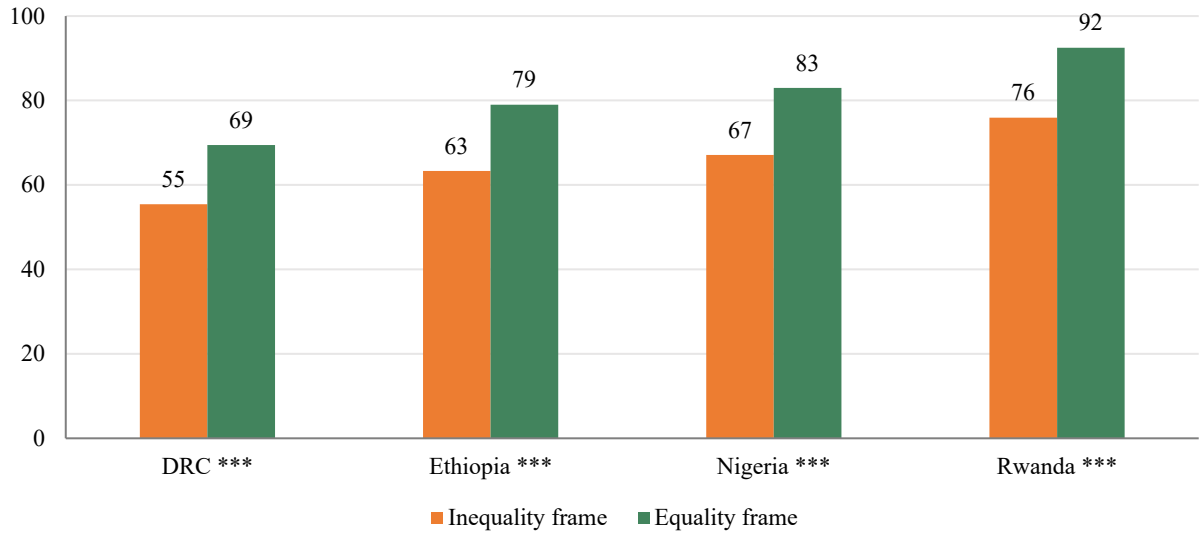
cultivate crops"; and "It is ok for women to be the primary income earners for their families." However, the findings reveal a persistent reluctance to fully recognize the equal importance of women's crop performance compared to men's, or to embrace women as primary farmers and breadwinners. Respondents opposing women taking primary roles as farmers or income earners, however, may also do so from the perspective that men would be avoiding their responsibility to provide food and income for their families—an outcome generally viewed as undesirable to women as well. These statements also received a much larger proportion of neutral responses compared to others (Annex Table 1).

4.2. The effect of framing

Across all study sites and most gender-attitude statements, more respondents agreed rather than disagreed with statements in the equality frame (one side of the same coin) and disagreed rather than agreed with similar statements in the inequality frame (other side of the same coin) (Figure 1 and Table 5). A greater proportion of respondents supported gender equality when the equality frame was used, and a greater proportion of respondents supported gender inequality (i.e., a lower proportion of respondents supported gender equality) when the inequality frame was used. This framing effect appears similar between women and men respondents.

However, the framing effect was more pronounced for statements pertaining to women as primary farmers, women's crop performance as a priority, and women as primary income earners (Table 5). The most extreme example was found among Rwandan respondents regarding equal priority for women's crop performance: 93 percent of respondents agreed with "It is equally important to improve productivity on women's plots as it is on men's plots," but only 19 percent disagreed with "It is more important to improve productivity on men's plots as compared to women's plots." In Ethiopia, 74 percent of respondents agreed with this same statement in the equality frame, whereas only 34 percent of respondents disagreed with the statement in the inequality frame (Table 5).

Figure 1. Average percentage of gender equality statements supported by respondents, by country and frame



Source: Authors.
Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 5: Respondents' agreement with gender-attitude statements, by frame

		DRC		Ethiopia		Nigeria		Rwanda	
Theme	**Subtheme**[a]	**Eq**	**Ineq**	**Eq**	**Ineq**	**Eq**	**Ineq**	**Eq**	**Ineq**
Share of statements in support of gender equality[b]		0.69	0.55***	0.79	0.63***	0.83	0.67***	0.93	0.76***
Agricultural information	Extension agents	0.85	0.65***	0.90	0.86**	0.93	0.77***	0.95	0.92***
	Training	0.87	0.71***	0.93	0.90**	0.95	0.80***	0.97	0.93***
	Digital	0.84	0.70***	0.84	0.87	0.88	0.76***	0.95	0.93**
Farming	Woman farmer	nd [/d]	nd	0.92	nd	0.96	0.81***	0.97	0.92***
	Prioritizing performance[c]	0.62	0.41***	0.74	0.34***	0.91	0.58***	0.93	0.19***
	Primary farmer[c]	0.47	0.39*	0.58	0.26***	0.56	0.50**	0.85	0.52***
Off-farm employment	Marketing role	0.82	0.64***	0.93	0.88***	0.88	0.77***	0.94	0.91***
	Nonfarm business	nd	nd	0.86	nd	0.95	0.80***	0.92	0.92
Household responsibilities	Primary income earner[c]	0.40	0.38	0.61	0.32***	0.41	0.27***	0.84	0.46***
	Husband's role in care	0.39	nd	0.90	nd	0.85	0.64***	0.92	0.88**
# observations		*468*	*472*	*814*	*773*	*993*	*959*	*1,797*	*1,777*

Source: Authors.

Note: Eq = equality frame; Ineq = inequality frame. Significant differences between responses to statements in the equality versus inequality frame are shown as * $p < 0.05$; ** $p < 0.01$; and *** $p < 0.001$. [a] See exact statements in equality versus inequality frames in Table 1. [b] In DRC and Ethiopia, only the seven correctly framed statements were reported. [c] These statements signal bias or acceptance of gender-equality opportunities in leading or driving roles in farming or other economic activities. [d] nd = no data collected.

Table 6: Regression results of framing on attitudes supporting gender equality, by statement theme and different model specifications

Model specification		All statements	Statements signaling women's equal opportunities to prioritize and lead: With	Statements signaling women's equal opportunities to prioritize and lead: Without	Statement grouping by theme: Information	Statement grouping by theme: Farming	Statement grouping by theme: Off-farm employment	Statement grouping by theme: Household responsibilities
No interaction	Inequality frame (1= yes)	−0.16***	-0.32***	-0.07***	-0.07***	-0.28***	-0.07**	-0.19***
		(0.02)	(0.05)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with gender (1= female)	Inequality frame	−0.15***	−0.31***	−0.07***	−0.07***	−0.28***	−0.07**	−0.19***
		(0.02)	(0.04)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)
	Gender	0.01	0.03*	0.00	0.00	0.02	0.01	0.03
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
	Inequality # Gender	−0.01	−0.01	0.00	0.00	−0.01	−0.01	−0.01
		(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with youth (1 = youth)	Inequality frame	−0.15***	−0.32***	−0.07***	−0.06***	−0.28***	−0.06***	−0.20***
		(0.02)	(0.05)	(0.02)	(0.02)	(0.04)	(0.02)	(0.04)
	Youth	0.02	0.00	0.02	0.02	0.01	0.03*	0.01
		(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
	Inequality # Youth	−0.02	0.01	−0.03	−0.04*	−0.00	−0.02	0.01
		(0.02)	(0.02)	(0.01)	(0.01)	(0.03)	(0.02)	(0.02)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with literacy (1 = literate)	Inequality frame	−0.12***	−0.27***	−0.05*	−0.04*	−0.24***	−0.07***	−0.19***
		(0.02)	(0.05)	(0.02)	(0.02)	(0.05)	(0.01)	(0.05)
	Literate	0.03*	0.00	0.02	0.03	0.01	0.02	−0.02
		(0.01)	(0.03)	(0.02)	(0.03)	(0.04)	(0.02)	(0.03)
	Inequality # Literate	−0.04**	−0.06	−0.03	−0.04*	−0.06*	−0.00	−0.01
		(0.01)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations		*8,034*	*8,034*	*8,034*	*8,034*	*8,034*	*8,034*	*8,034*

Source: Authors.

Note: Results of fractional regression models. Controls include respondent's age, marital status, education level, whether the respondent's primary occupation is farming, and country dummies. Standard errors are clustered at the first administration level and shown in parentheses. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

The framing effect was confirmed and quantified in regression models (Table 6, Annex Tables 2–3). The inequality frame decreased the likelihood that respondents disagreed with the inequality statements by 16 percentage points. The framing effect did not vary by gender or age group, literacy, or education level. It did, however, vary across statements: The inequality frame decreased the likelihood of support for gender equality in access to agricultural information and digital access by 7 percentage points, women's role in farming by 28 percentage points, off-farm employment by 7 percentage points, and household responsibilities by 19 percentage points (Table 6). The largest framing effects appeared in response to statements signaling prioritization between women and men, or acceptance of statements that support women's equal opportunities to lead or drive farming or other economic activities. Under the inequality frame, respondents were 32 percentage points less likely to disagree with the inequality statements prioritizing men's crop performance and designating men as the primary farmers and income earners. The nonsignificance of the interaction terms showed that the framing effect does not vary by gender and age group.

The effect of framing was relatively large compared to the effect of other socioeconomic characteristics commonly associated with gender equality or inequality attitudes, such as gender, age, or literacy level. Except for Nigeria, there were no statistically significant differences between women and men respondents on attitudes in support of gender equality overall (Table 4 and Annex Tables 2–4). Across study sites, youth and non-youth had similar gender attitudes, except with respect to ICT use. This pattern seems heterogeneous across countries, though youth in Nigeria had more gender-equal attitudes than youth in Ethiopia. The magnitude of these effects, however, was small (1–2 percentage points). Overall, literacy and education level did not have a significant effect on gender-(in)equal attitudes, though in Ethiopia and Nigeria, individuals with a secondary education and higher were more likely to support gender equality than those without formal schooling.

4.3. Collective attitudes

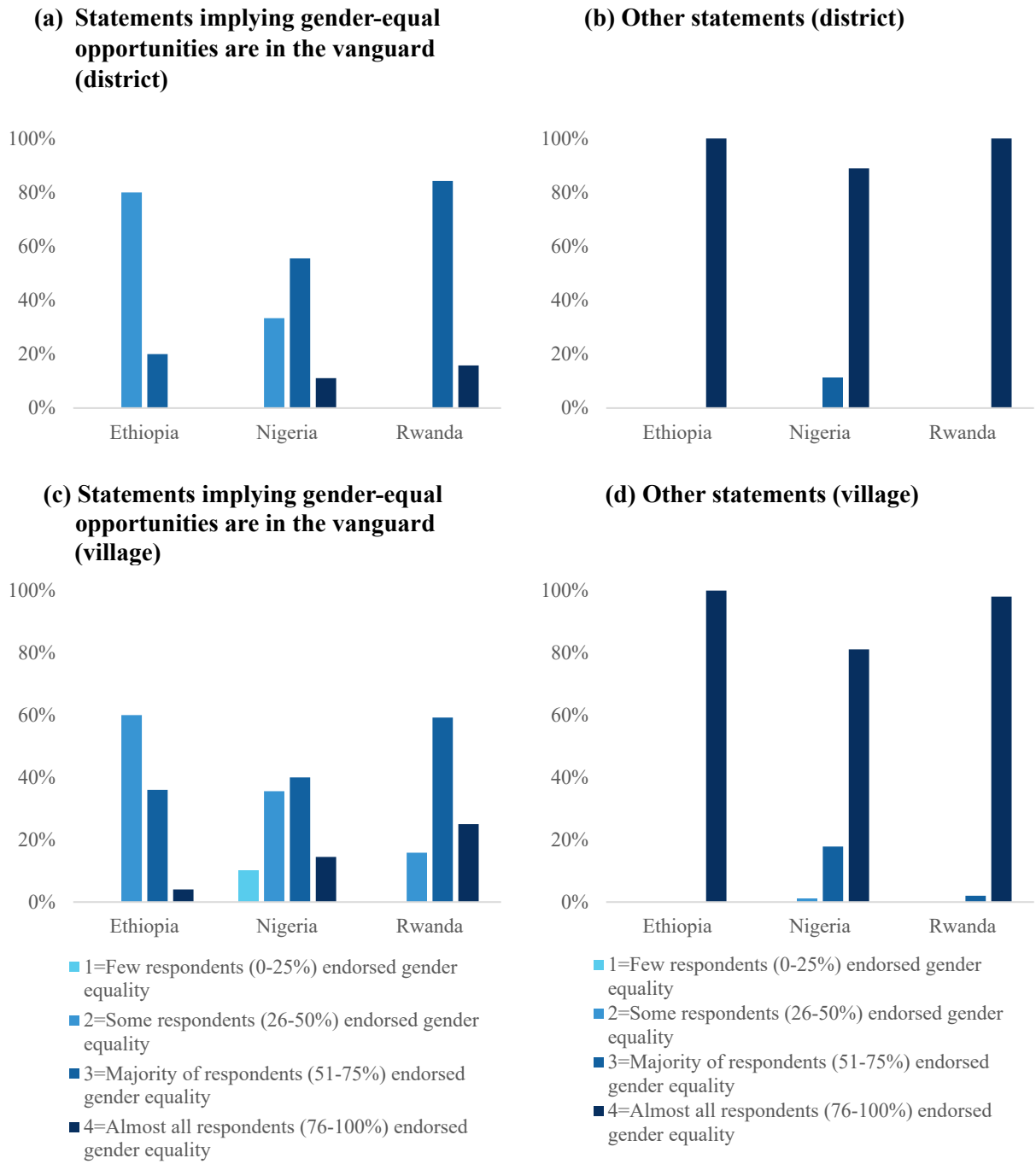
Patterns shown at the country level may mask significant heterogeneity in gender attitudes within each study site. If restrictive attitudes were found to be concentrated in some villages or locations, gender awareness campaigns and/or the use of transformative approaches can be targeted to those locations. If restrictive attitudes were found to be more widespread—that is, seen in all villages but pertaining to a limited number of people within these communities—then individual and digital-based approaches may be more cost-effective. Therefore, we also examined the heterogeneity of attitudes across locations within the study sites, looking at the level of kebeles (in Ethiopia), districts or sectors[2] (in Rwanda), or LGA in Nigeria. Given the limited geographical coverage of the sample in the DRC, we do not include it in this analysis.

Gender attitudes were relatively homogeneous across different kebeles in Ethiopia or across districts in Rwanda but varied widely across LGAs in Nigeria (Annex Table 5). For example, support for women's digital access ranged from 66 percent of respondents in one LGA to 98 percent in another. Regarding equal prioritization of women's crop performance, 54 percent of respondents in one LGA supported this statement, and 91 percent in another LGA did so. The shares of respondents supporting the statement that women can be primary farmers ranged from 30 percent in one LGA to 77 percent in another. Of the belief that women can be primary income earners, shares ranged from 8 percent to 49 percent. Two LGAs in Nigeria had the most respondents expressing strong support for almost all gender-equality statements (i.e., they had the lowest bias), except in the cases of women as primary farmers and primary income earners,

[2] A sector is an administrative subdivision in Rwanda, at a lower level than the district but at a higher level than the villages. In total, there are 416 across four provinces in Rwanda.

which garnered the fewest respondents supporting these statements (indicating the highest bias). In Nigeria, the same LGA exhibited the highest or lowest bias depending on the statement or theme.

Figure 5. Percentage of districts/villages and their concentration of attitudes endorsing gender-equality statements



Source: Authors. Note: Taller bars mean more concentration (less diversity) of gender attitudes across districts or villages; while shorter bars and greater spread of color shades of the bars mean more diversity (less concentration) across districts and villages.

Next, we focused on the two distinct groups of statements: (1) those implying ranking or prioritization and signaling gender-equal opportunities for leading economic activities (i.e., statements with [(a)] in Table 1) (Figure 5a and 5c); and (2) all other statements (Figure 5b and 5d). The former (Figure 5a and 5c) were shown earlier to expose greater variation in gender attitudes across villages than the latter (Figure 5b and 5d). At the district level, sample districts were similar in concentration of endorsement or support for gender equality in Ethiopia and Rwanda, but more diversity existed across districts (LGAs) in Nigeria (Figure 5). At the village level, our results confirmed this diversity. Especially in Nigeria, some villages had low levels of support for gender equality (Figure 5). This was particularly apparent per statement at the village level (Annex Figures 4 and 8). In Nigeria, gender awareness campaigns and use of transformative approaches can be targeted to those LGAs and villages with a high concentration of support for gender inequality or where restrictive attitudes were found to be more heightened.

4.4. Gender attitudes and other indicators of empowerment and gender (in)equality

We assessed the correlation between our measure of gender attitudes and an indicator for women's empowerment in agriculture, based on an adaptation of the widely used abbreviated Women's Empowerment in Agriculture Index (A-WEAI) (Malapit et al. 2017). When these measures are perfectly correlated, collecting indicators of gender attitudes and empowerment offers little benefit. However, some level of correlation is expected, given that both relate to gender equality and inequality in the agricultural sector.

We found that gender attitudes were highly correlated with access to finance, group membership, voice in productive or household production decisions, and the overall empowerment score (Table 8). The results relate to the potential influence of gender attitudes on the associated care responsibilities and time constraints that limit women's productive work. Acceptance of women's entrepreneurship may be related to control over income and other resources, with the correlation more apparent for women than for men. These results suggest the need to collect data on both gender attitudes and empowerment, as they may not serve as proxies or mirrors for each other. Data on empowerment may capture dimensions that do not reflect men's and women's underlying beliefs and attitudes.

Table 8. Correlation coefficient between empowerment dimensions and percentage of gender-equality statements supported by women respondents

Respondents	Input in productive decisions	Ownership of assets	Access to and decisions on credit	Control over the use of income	Group membership	Work balance	Empowerment score	Empowered (=1)
All women respondents	0.072***	−0.024	0.096***	0.054**	0.184***	−0.022	0.112**	0.098*
Ethiopia	0.094*	−0.051	0.025	0.062	0.132***	−0.022	0.112**	0.098*
Nigeria	0.026	n/a	0.029	0.062	0.065	n/a	n/a	n/a
Rwanda	−0.024	−0.018	0.1033***	−0.018	0.202***	n/a	n/a	n/a

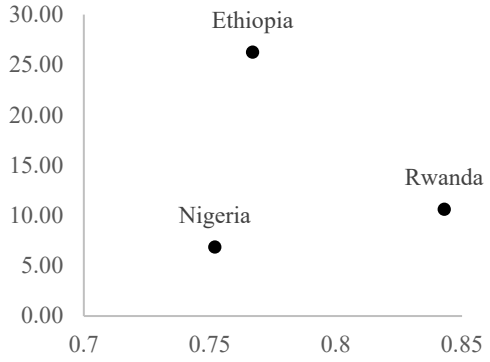
Source: Authors.

Note: The empowerment dimensions are based on the abbreviated Women's Empowerment in Agriculture Index (A-WEAI) (Malapit et al. 2017). Because of data availability issues, some indices were not available for certain countries. Ownership of assets is missing for Nigeria, while work balance, empowerment score, and empowerment status are missing for Nigeria and Rwanda. * $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$.

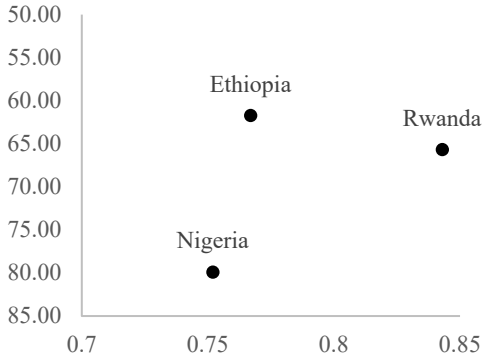
Further, we looked at the correlation between gender attitudes in agriculture and national data on gender (in)equality (Figure 6). Different measures of gender (in)equality at the national level showed a mostly consistent story, although the magnitude and ranking of the country varied depending on the dimension or indicator. Rwanda had the highest scores and ranking on many dimensions of gender (in)equality, Ethiopia had high scores for some indicators, and DRC and Nigeria had the lowest scores in most indicators of gender (in)equality. Our gender-attitude measures aligned with some national measures of gender (in)equality but diverged from others, which suggests that gender attitudes may contribute to dimensions and insights that can be tracked over time. Such measurement and tracking can provide useful insights on which attitudes persist and can help inform the design of gender-transformative approaches.

Figure 6. Comparison between measures of gender attitudes in agriculture and national gender indicators

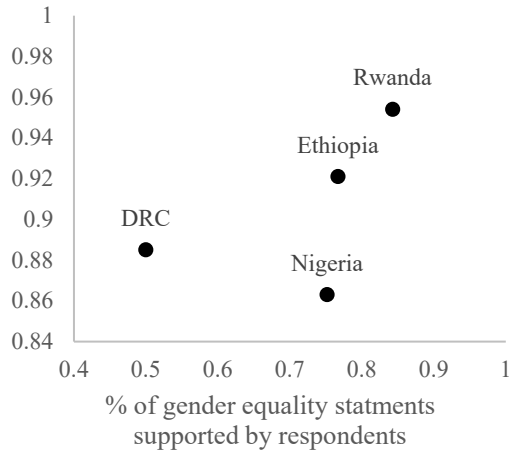
(a) Gender Social Norms Index (GSNI), share of people with one bias at most



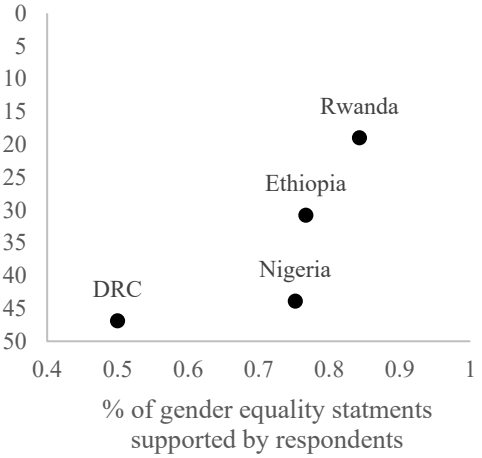
(b) Gender Social Norms Index (GSNI), share of people biased in the economic dimension

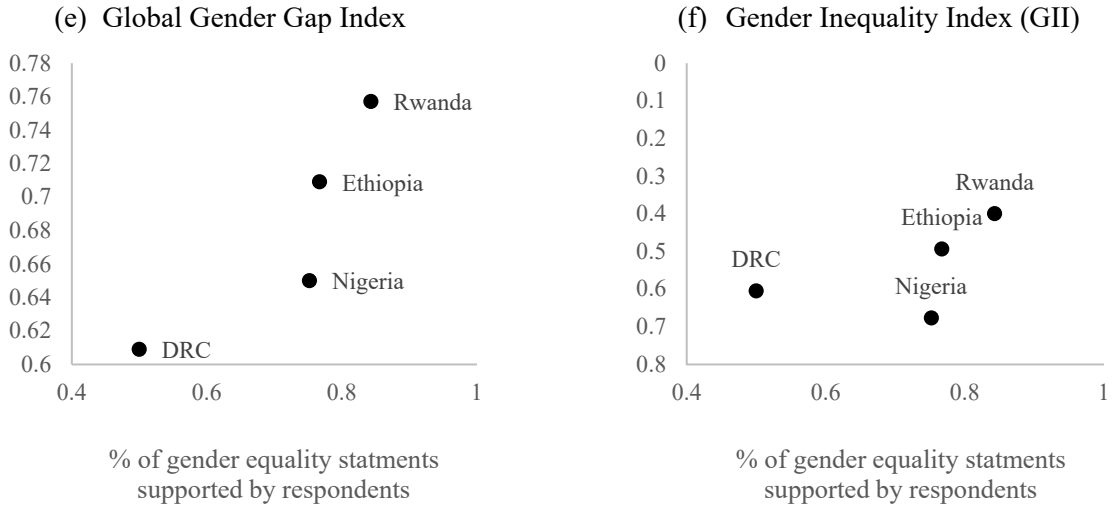


(c) Gender Development Index (GDI)



(d) Social Institutions and Gender Index (SIGI)





Source: Various global datasets in the y-axis and survey datasets in the x-axis.
Note: All indicators in the y-axis were converted into equality measures for easier interpretation.

5. Discussion and Concluding Remarks

Discriminatory gender attitudes can act as critical internal and external constraints to women's participation in agricultural activities. These attitudes may limit women's ability to benefit from agricultural policies and projects and hinder the empowerment those initiatives are intended to support. Where such discriminatory attitudes exist, gender-transformative approaches are necessary to achieve better agricultural development outcomes (FAO 2023).

This study was designed to contribute new insights on statement construction and the measurement of gender attitudes in agriculture, with a particular focus on attitudes relevant to interventions aimed at improving agronomic outcomes through digital support tools. Using data from 8,051 smallholder farmers in four countries in sub-Saharan Africa, we document both differences and commonalities in gender attitudes across different contexts. The survey instrument tested two framing approaches for measuring gender attitudes—equality/positive and inequality/negative—to inform statement construction in surveys as well as gender messaging in programming. We implemented these new formulations in farming communities and crop areas not investigated in previous studies, with an emphasis on attitudes rather than norms (e.g., see the work on norms by Seymour et al. 2023).

We found that attitudes supporting gender inequality persist, but their magnitude and spread vary by location and by statement or theme. On average, women and men across all countries supported more than half of the gender-equality statements, with support highest in Rwanda. Surprisingly, there were few significant differences of any real magnitude between men and women, youth and non-youth, or literate and non-literate respondents. A sizeable share of respondents (23 percent in DRC and 17 percent in Nigeria) did not support women's use of ICT. Statements capturing gender-equal opportunities to lead or drive farming or other economic activities received significantly lower levels of support from both women and men compared to other statements. Similar findings were reported by UN Women (2020) from in their pilot study of gender-equality attitudes conducted in 2018 across 10 countries (Colombia, India, Japan, Kenya, Nigeria, the Philippines, Sweden, Turkey, United Arab Emirates, and the United States).

We also found that framing matters, with respondents exposed to positive/equality framing supporting 16 percent more of the gender-equality statements. This effect did not differ between men and women, youth and non-youth, or literate and non-literate respondents. However, the framing effect was much larger in

attitudes toward gender-equal opportunities for leading or driving farming and other economic activities (for example, gender attitudes prioritizing the performance of women's plots relative to men's, or recognizing women as priority farmers or main income earners, compared with more restrictive attitudes).

These observations may, in part, be explained by acquiescence—the tendency, when in doubt, to consent to or agree with a statement posed by an enumerator (see McClendon 1991; Reitmann et al. 2020). However, variation in responses across different statements and themes suggest that acquiescence bias was negligible in our study; instead, our data showed a strong framing effect (how the statements were presented asked). The framing effect, particularly through gender-inclusive language, can influence behavior and even mitigate stereotype threats for women (Moyano et al. 2023). Linguistic framing of gender differences has been shown to influence perceptions of gendered power and the endorsement of gender stereotypes (Bruckmüller et al. 2012). Framing that emphasizes positive social impact increases positive evaluations of female-led ventures by increasing perceptions of warmth (Lee & Huang 2018). These studies illustrate that subtle framing choices affect survey responses, highlighting the need for a more careful survey design.

Our study underscores the importance of piloting or experimenting with different ways of phrasing questions or statements to capture attitudes. Depending on the objective of the question or hypothesis being tested, certain framing or questions may be more effective. While we do not promote a particular frame as better, researchers must be mindful that framing can produce substantial differences, especially when attitudes are measured either as outcomes in themselves or as mechanisms for achieving higher-level outcomes. Randomizing by frame may therefore be worthwhile: (1) to test and measure differences in a given context; (2) to analyze the factors driving those differences; and (3) to obtain a fuller and more nuanced measure of attitudes by combining, averaging, or adjusting estimates across frames, depending on the study context.

At aggregate levels, patterns of gender attitudes were similar across communities and districts in Ethiopia and Rwanda but more diverse in Nigeria. Gender attitudes are significantly correlated with empowerment indicators, though not perfectly aligned. Our measures of gender attitudes are consistent with some national measures of gender in(equality) but diverge from others.

Measuring attitudes can provide useful insights into which norms persist, how widespread they are, and how they can inform the design of gender-transformative approaches. We recommend developing gender-attitude scales that include both restrictive attitudes (what men or women should and should not do) and priority attitudes (whether men or women should or should not receive priority). Moreover, framing should be standardized across respondents and settings to ensure valid cross-respondent and cross-country comparisons.

Future research could explore the value of using an intersectionality frame when developing gender-attitude statements, to better reflect the diversity within gender and other social groups. One shortcoming in our study is that all gender-attitude statements focused broadly on women (and in some cases, men) and were not designed to reflect likely intersectional differences in smallholder farm households and communities. For instance, people may find it more acceptable for older married women to interact with male extension agents, use ICT, or engage in agricultural marketing activities than for their unmarried adult daughters still living at home. Similarly, it may be viewed as less acceptable for older men to help their wives with household chores compared to younger men who recently married and live in smaller households with few or no household members to assist. Other future research directions include exploring the extent to which individual attitudes deviate from prevailing norms and what factors explain such discrepancies. Likewise, a deeper understanding of how and why individual (or spousal) attitudes are linked to empowerment would help inform the design of gender-transformative interventions.

From a gender messaging and programming perspective, targeted gender-awareness campaigns and transformative approaches may be especially effective in areas with a greater concentration of restrictive gender attitudes. Mass communication, digital-based approaches, or other cost-effective methods could be used to reach more individuals in communities where gender attitudes are more homogeneous. Moreover, our results suggest that using positive pitch or messaging is more effective than negative messaging in gender awareness campaigns. For example, highlighting role models or showcasing examples and illustrations of joint decision-making, farming, and income-generating activities may foster more favorable changes in attitudes than emphasizing gender inequality and its associated costs and disadvantages. The effectiveness of such positive approaches is a promising area for future research and should be tested more formally through new experimental designs.

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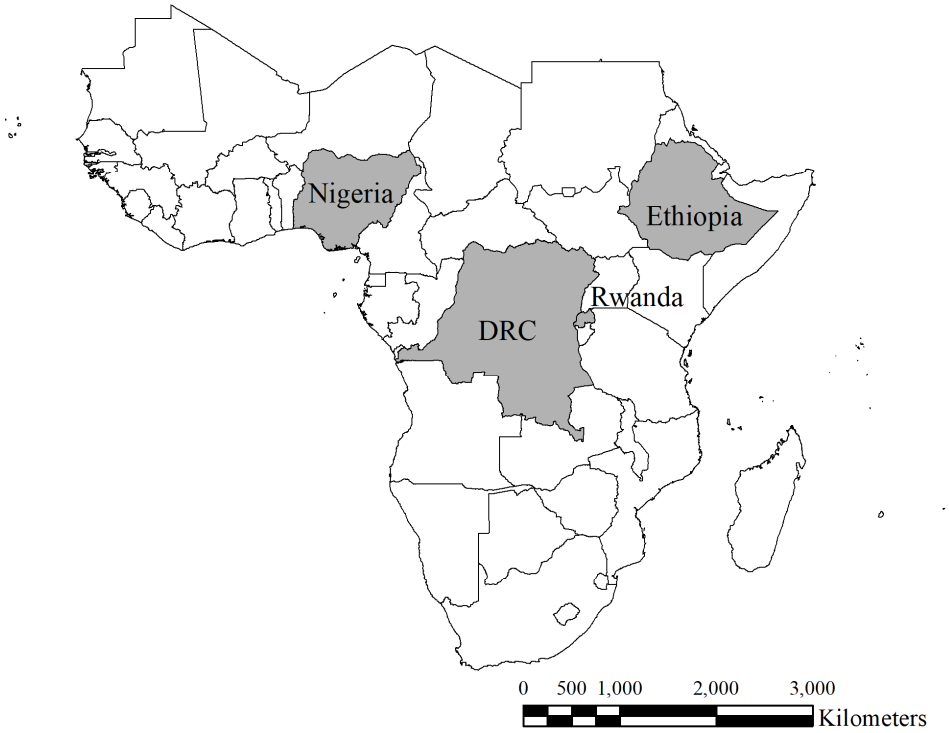
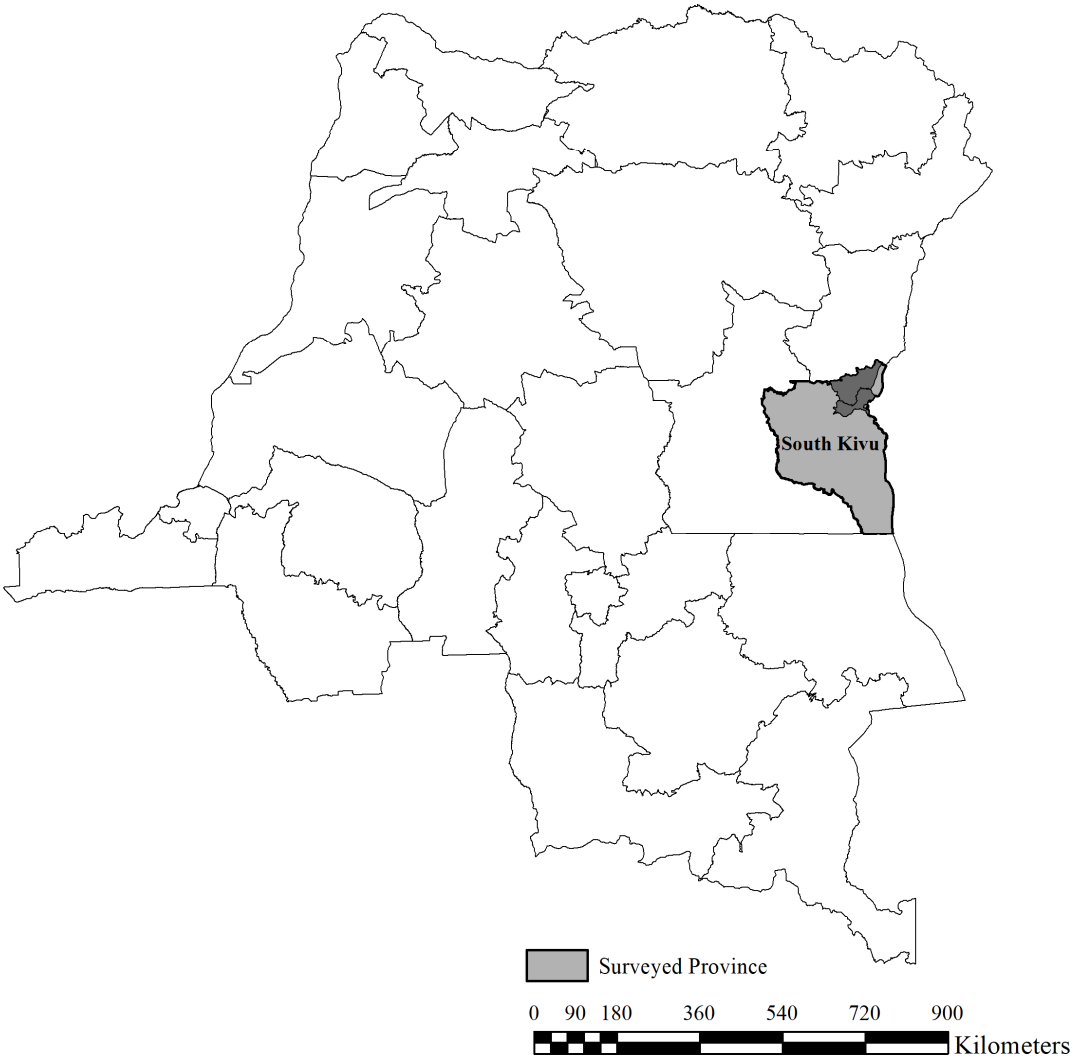
Annex

Annex Figure 1. Map of study sites



Source: Authors.

Annex Figure 2. Map of study sites in DRC



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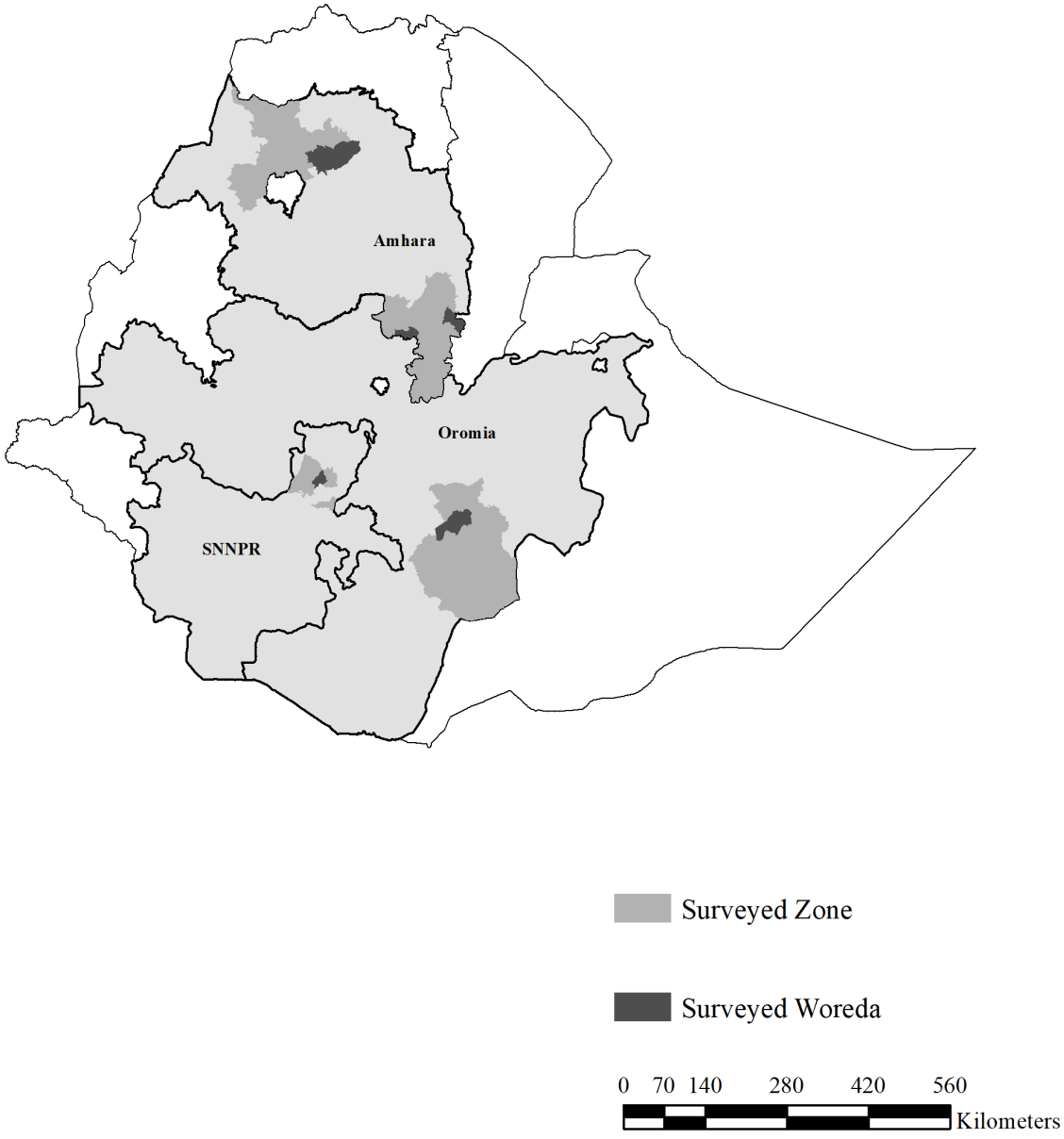
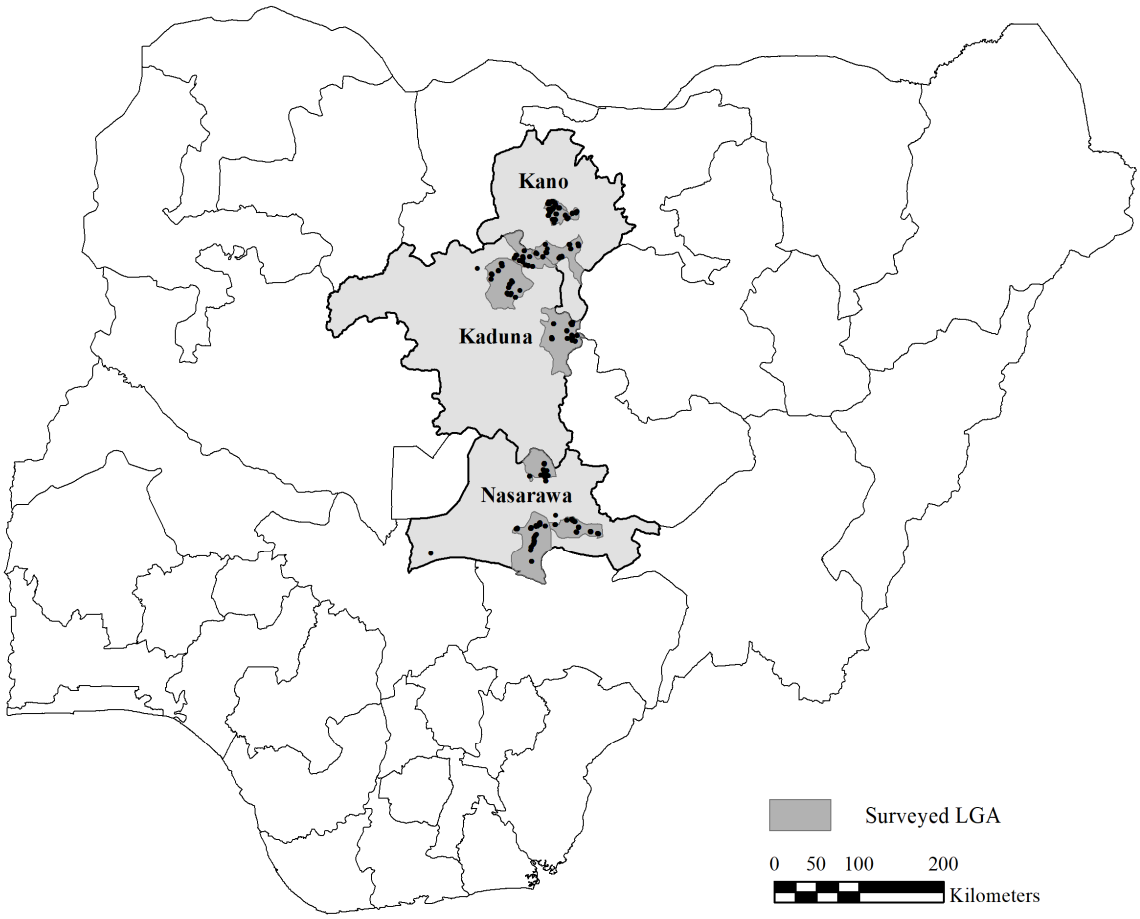
Annex Figure 3. Map of study sites in Ethiopia



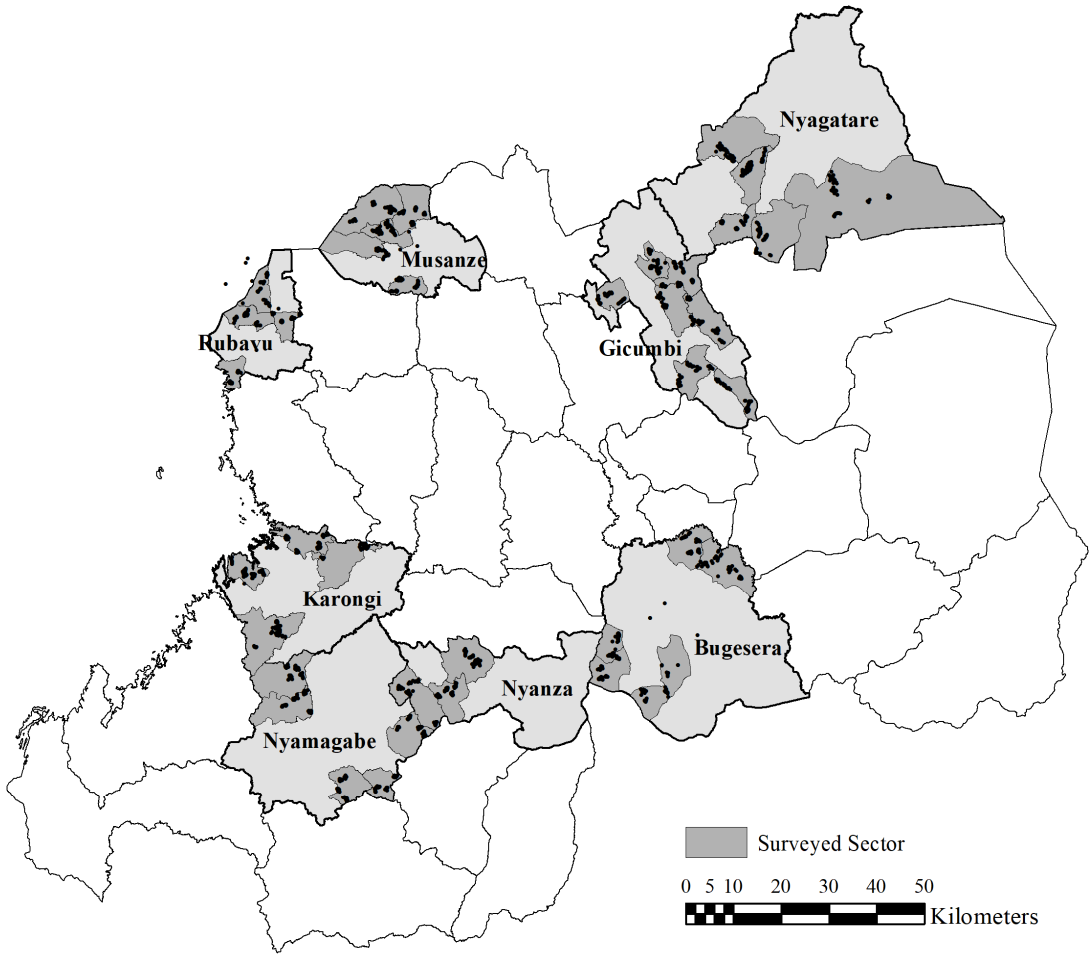
Source: Authors.
Note: Data were collected in three regional states of Ethiopia: Amhara (North Shewa and Central Gondar), Oromia (Bale), and the Southern Nations, Nationalities and Peoples' Region, or SNNPR (Hadiya).

Annex Figure 4. Map of study sites in Nigeria



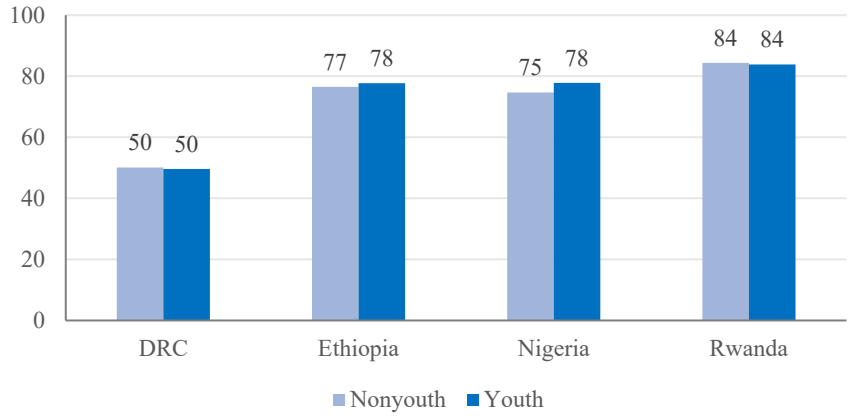
Source: Authors.
Note: Data were collected in three different states and nine local government areas (LGAs) in Nigeria: Kano (Bunkure, Kura, Tudun Wada), Kaduna (Ikara, Lere, Soba), and Nasarawa (Akwanga, Doma, Obi).

Annex Figure 5. Map of study sites in Rwanda



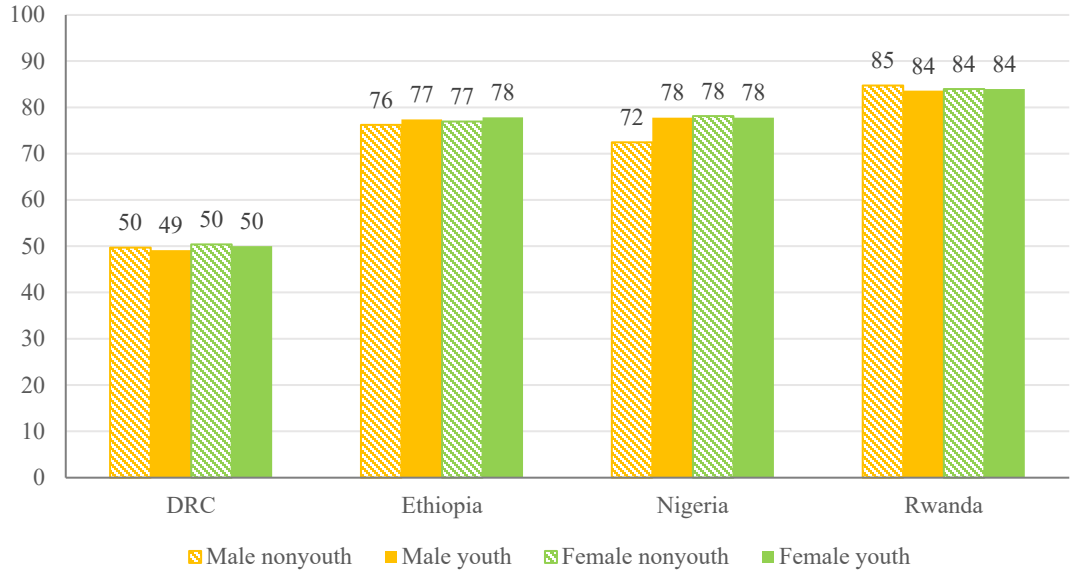
Source: Authors.
Note: Data were collected in four provinces and eight districts in Rwanda: Eastern Province (Bugesera, Gicumbi), Northern Province (Karongi, Musanze), Southern Province (Nyagatare, Nyamagabe), and Western Province (Nyanza, Rubavu).

Annex Figure 6. Average share of respondents supporting gender-equal attitudes



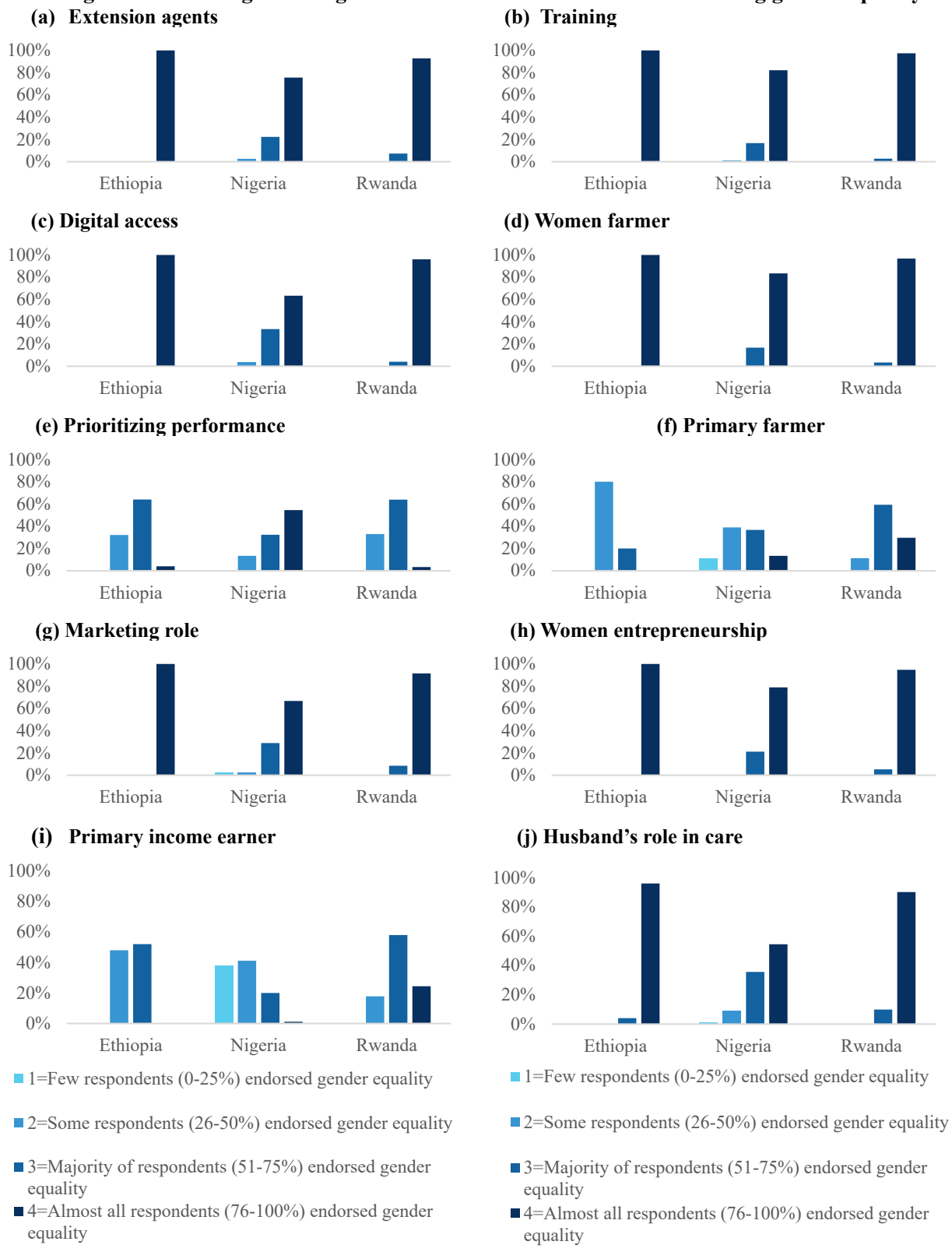
Source: Authors.

Annex Figure 7. Average share of respondents supporting gender-equal attitudes, by country, gender, and age group



Source: Authors.

Annex Figure 8. Percentage of villages and concentration of attitudes endorsing gender equality



Source: Authors.

Annex Table 1. Detailed Likert-scale responses, by statement, frame, and study setting (%)

(a) DRC

Statement	Eq					Ineq				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Extension agents	16	70	3	3	9	5	26	4	28	37
Training	16	71	3	3	7	4	22	3	35	36
Digital	15	69	6	4	7	5	19	5	36	35
Woman farmer	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Prioritizing performance	8	54	10	8	20	9	40	10	18	23
Primary farmer	6	40	12	17	25	13	35	13	18	21
Marketing role	12	70	5	6	7	6	22	8	36	28
Nonfarm business	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Primary income earner	5	35	13	22	25	13	37	13	16	22
Husband's role in care	26	13	8	47	6	n/a	n/a	n/a	n/a	n/a
# observations	*468*					*472*				

(b) Ethiopia

Statement	Eq					Ineq				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Extension agents	27	63	2	6	2	3	10	1	56	30
Training	33	61	2	3	1	2	7	1	58	32
Digital	22	63	7	7	1	2	8	3	57	30
Woman farmer	35	57	2	5	0	n/a	n/a	n/a	n/a	n/a
Prioritizing performance	22	52	6	19	2	13	45	7	29	5
Primary farmer	9	49	8	31	3	16	54	3	23	3
Marketing role	25	69	1	5	0	3	8	1	61	27
Nonfarm business	25	60	6	7	1	n/a	n/a	n/a	n/a	n/a
Primary income earner	12	49	10	26	3	15	48	6	28	3
Husband's role in care	37	53	3	5	2	n/a	n/a	n/a	n/a	n/a
# observations	*814*					*773*				

(c) Nigeria

Statement	Eq					Ineq				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Extension agents	24	68	1	4	2	8	13	2	55	21
Training	27	69	1	3	1	6	12	2	58	22
Digital	26	63	4	6	2	5	14	4	50	26
Woman farmer	38	58	1	2	1	6	10	2	58	23
Prioritizing performance	28	64	4	3	1	9	26	7	39	19
Primary farmer	15	41	17	23	4	12	25	12	42	8
Marketing role	26	62	3	7	2	6	14	2	60	17
Nonfarm business	26	68	2	2	1	6	11	3	57	22
Primary income earner	15	26	11	32	15	25	41	8	22	5
Husband's role in care	27	59	7	5	2	8	18	10	45	20
# observations	*993*					*959*				

(d) Rwanda

Statement	Eq					Ineq				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Extension agents	35	60	3	1	1	1	4	3	47	45
Training	37	60	2	1	0	1	4	2	47	46
Digital	36	60	3	1	0	1	3	3	43	50
Woman farmer	43	54	2	1	0	2	4	2	49	44
Prioritizing performance	31	62	4	2	0	20	57	4	13	6
Primary farmer	27	57	5	8	3	10	27	11	36	16
Marketing role	38	56	4	2	1	2	4	2	53	38
Nonfarm business	39	54	3	4	0	2	4	2	54	39
Primary income earner	30	54	5	8	4	13	30	11	32	14
Husband's role in care	33	58	4	3	2	2	6	3	54	34
# observations	*1,797*					*1,777*				

Source: Authors.

Annex Table 2. Regression results of framing on attitudes supporting gender equality, by statement and different model specifications

Model specification		Extension agents	Training	Digital	Woman farmer	Prioritizing performance	Primary farmer	Marketing role	Nonfarm business	Primary income earner	Husband's role in care
No interaction	Inequality frame (1 = yes)	−0.08***	−0.08***	−0.05*	−0.09***	-0.43***	-0.22***	-0.07***	-0.05	-0.26***	-0.09*
		(0.02)	(0.02)	(0.02)	(0.02)	(0.04)	(0.04)	(0.02)	(0.03)	(0.04)	(0.04)
	Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with gender (1 = female)	Inequality frame	−0.09***	−0.09***	−0.04	−0.08**	−0.42***	−0.22***	−0.07**	−0.05	−0.25***	−0.10*
		(0.02)	(0.02)	(0.02)	(0.03)	(0.04)	(0.04)	(0.02)	(0.03)	(0.04)	(0.04)
	Gender	−0.00	−0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.05**	−0.00
		(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)	(0.03)
	Inequality # gender	0.01	0.01	−0.01	−0.02	−0.02	0.00	−0.01	−0.01	−0.02	0.01
		(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
	Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with youth (1= youth)	Inequality frame	−0.08***	−0.08***	−0.04	−0.08***	−0.44***	−0.22***	−0.07***	−0.05	−0.26***	−0.09*
		(0.02)	(0.02)	(0.02)	(0.02)	(0.04)	(0.05)	(0.02)	(0.03)	(0.04)	(0.04)
	Youth	0.04**	0.00	0.01	0.01	0.01	−0.00	0.03*	0.01	0.00	0.04
		(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.01)	(0.02)	(0.02)	(0.02)
	Inequality # youth	−0.05*	−0.02	−0.04	−0.02	0.01	−0.00	−0.02	−0.02	0.01	0.01
		(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.04)	(0.02)	(0.02)	(0.03)	(0.02)
	Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with literacy (1= literate)	Inequality frame	−0.06***	−0.05***	−0.01	−0.09***	−0.32***	−0.20**	−0.07***	−0.05	−0.24***	−0.07
		(0.02)	(0.01)	(0.02)	(0.03)	(0.05)	(0.07)	(0.01)	(0.03)	(0.05)	(0.04)
	Literate	0.03*	0.04**	0.03*	−0.01	0.09***	−0.00	0.00	−0.01	0.01	−0.01
		(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.04)	(0.01)	(0.01)	(0.02)	(0.02)
	Inequality # literate	−0.03	−0.05*	−0.04*	0.00	−0.15***	−0.03	0.00	−0.00	−0.02	−0.02
		(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.06)	(0.02)	(0.03)	(0.03)	(0.04)
	Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations		*8,034*	*8,034*	*8,034*	*8,034*	*8,034*	*8,034*	*8,034*	*5,518*	*5,518*	*5,518*

Source: Authors.

Note: Results of probit regression models. Controls include respondent's age, marital status, education level, whether the respondent's primary occupation is farming, and country dummies. Standard errors are clustered at the first administration level and shown in parentheses. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Annex Table 3. Regression results of framing on attitudes supporting gender equality, by country, statement theme, and different model specifications

(a) DRC

Model specification		All statements	Statements signaling prioritization	Statements not signaling prioritization	Information	Farming	Off-farm employment	Household responsibilities
No interaction	Inequality frame (1 = yes)	−0.14***	−0.10***	−0.17***	−0.16***	−0.14***	−0.18***	−0.02
		(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with gender (1 = female)	Inequality frame	−0.14***	−0.10**	−0.16***	−0.15***	−0.15***	−0.17***	−0.02
		(0.03)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.05)
	Gender	0.01	−0.00	0.02	0.01	−0.01	0.06	0.01
		(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.05)	(0.05)
	Inequality # gender	−0.00	0.01	−0.02	−0.02	0.02	−0.02	−0.01
		(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.06)	(0.06)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with youth (1 = youth)	Inequality frame	−0.11***	−0.07**	−0.14***	−0.14***	−0.11***	−0.16***	−0.00
		(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)
	Youth	0.09*	0.10	0.08	0.09	0.14*	0.06	0.04
		(0.04)	(0.06)	(0.05)	(0.06)	(0.06)	(0.07)	(0.07)
	Inequality # youth	−0.14**	−0.14*	−0.13*	−0.13*	−0.16*	−0.14	−0.11
		(0.04)	(0.06)	(0.05)	(0.06)	(0.07)	(0.08)	(0.08)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with literacy (1 = literate)	Inequality frame	−0.10***	−0.08	−0.11**	−0.10**	−0.09*	−0.14**	−0.05
		(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.05)	(0.05)
	Literate	0.05	0.11	0.12*	0.12	0.13	0.12	0.08
		(0.03)	(0.08)	(0.06)	(0.06)	(0.08)	(0.09)	(0.10)
	Inequality # literate	−0.07	−0.04	−0.09*	−0.11*	−0.08	−0.06	0.04
		(0.04)	(0.05)	(0.04)	(0.05)	(0.06)	(0.06)	(0.07)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations		*937*	*937*	*937*	*937*	*937*	*937*	*937*

(b) Ethiopia

Model specification		All statements	Statements signaling prioritization	Statements not signaling prioritization	Information	Farming	Off-farm employment	Household responsibilities
No interaction	Inequality frame (1 = yes)	−0.14***	−0.31***	−0.03	−0.02	−0.33***	−0.05***	−0.28***
		(0.01)	(0.01)	(0.03)	(0.03)	(0.03)	(0.02)	(0.04)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with gender (1 = female)	Inequality frame	−0.15***	−0.31***	−0.05	−0.04	−0.32***	−0.07***	−0.28***
		(0.02)	(0.02)	(0.03)	(0.04)	(0.05)	(0.02)	(0.04)
	Gender	0.02	0.03	−0.05*	−0.06	0.00	−0.03	0.10**
		(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)
	Inequality # gender	−0.01	−0.00	0.05***	0.05**	−0.01	0.04	0.01
		(0.02)	(0.03)	(0.01)	(0.02)	(0.04)	(0.03)	(0.02)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with youth (1 = youth)	Inequality frame	−0.14***	−0.33***	−0.03	−0.02	−0.34***	−0.06***	−0.30***
		(0.01)	(0.01)	(0.03)	(0.04)	(0.02)	(0.01)	(0.04)
	Youth	−0.03**	−0.06***	0.00	−0.00	−0.05	0.01	−0.07**
		(0.01)	(0.02)	(0.03)	(0.04)	(0.04)	(0.01)	(0.03)
	Inequality # youth	0.04***	0.09***	0.01	0.01	0.07*	0.03	0.12***
		(0.01)	(0.02)	(0.03)	(0.04)	(0.04)	(0.02)	(0.02)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with literacy (1 = literate)	Inequality frame	−0.12***	−0.30***	−0.01	−0.00	−0.30***	−0.04***	−0.29***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
	Literate	0.02	−0.04	−0.01	−0.01	−0.05	−0.00	−0.01
		(0.03)	(0.05)	(0.05)	(0.05)	(0.07)	(0.05)	(0.02)
	Inequality # literate	−0.02	−0.02	−0.03	−0.03	−0.04	−0.02	0.01
		(0.03)	(0.03)	(0.05)	(0.06)	(0.06)	(0.02)	(0.03)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations		*1,579*	*1,579*	*1,579*	*1,579*	*1,579*	*1,579*	*1,579*

(c) Nigeria

Model specification		All statements	Statements signaling prioritization	Statements not signaling prioritization	Information	Farming	Off-farm employment	Household responsibilities
No interaction	Inequality frame (1 = yes)	−0.16*	−0.18**	−0.15**	−0.15**	−0.18**	−0.13	−0.18*
		(0.06)	(0.07)	(0.06)	(0.05)	(0.06)	(0.07)	(0.09)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with gender (1 = female)	Inequality frame	−0.15*	−0.18*	−0.14*	−0.13*	−0.18*	−0.11	−0.17*
		(0.07)	(0.07)	(0.07)	(0.05)	(0.07)	(0.08)	(0.07)
	Gender	0.06**	0.04**	0.09**	0.09**	0.05	0.07	0.06**
		(0.02)	(0.01)	(0.03)	(0.03)	(0.03)	(0.05)	(0.02)

	Inequality # gender	−0.02	−0.01	−0.04	−0.03	−0.01	−0.04	−0.01
		(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with youth (1 = youth)	Inequality frame	−0.15*	−0.18**	−0.14*	−0.13***	−0.18**	−0.11	−0.18*
		(0.06)	(0.07)	(0.06)	(0.04)	(0.06)	(0.07)	(0.08)
	Youth	0.04*	0.01	0.07***	0.06***	0.01	0.08**	0.04**
		(0.02)	(0.03)	(0.01)	(0.01)	(0.02)	(0.03)	(0.02)
	Inequality # youth	−0.04	0.02	−0.07**	−0.09**	−0.01	−0.08***	0.02
		(0.02)	(0.01)	(0.02)	(0.03)	(0.01)	(0.01)	(0.02)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with literacy (1 = literate)	Inequality frame	−0.10*	−0.06	−0.13***	−0.11***	−0.08	−0.12*	−0.11
		(0.05)	(0.10)	(0.03)	(0.01)	(0.08)	(0.04)	(0.09)
	Literate	0.01	−0.03	−0.03	−0.00	−0.01	0.01	−0.12*
		(0.01)	(0.03)	(0.08)	(0.07)	(0.02)	(0.05)	(0.06)
	Inequality # literate	−0.06	−0.14	−0.03	−0.04	−0.11	−0.01	−0.08
		(0.05)	(0.11)	(0.04)	(0.04)	(0.07)	(0.03)	(0.09)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations		*1,944*	*1,944*	*1,944*	*1,944*	*1,944*	*1,944*	*1,944*

(d) Rwanda

Model specification		**All statements**	**Statements signaling prioritization**	**Statements not signaling prioritization**	**Information**	**Farming**	**Off-farm employment**	**Household responsibilities**
No interaction	Inequality frame (1 = yes)	−0.17***	−0.42***	−0.03*	−0.03	−0.35***	−0.02	−0.21***
		(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with gender (1 = female)	Inequality frame	−0.16***	−0.42***	−0.02	−0.03	−0.35***	−0.01	−0.20***
		(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)
	Gender	0.00	0.02	−0.00	0.00	0.00	0.00	0.00
		(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
	Inequality # gender	−0.01	−0.01	−0.01	−0.01	−0.00	−0.02	−0.01
		(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with youth (1 = youth)	Inequality frame	−0.17***	−0.42***	−0.03*	−0.03*	−0.35***	−0.02	−0.20***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
	Youth	−0.00	−0.00	0.00	−0.01	−0.01	−0.00	0.02
		(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Inequality # youth	−0.00	−0.01	0.00	−0.00	0.00	0.01	−0.00
		(0.00)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)

	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction with literacy (1 = literate)	Inequality frame	−0.18***	−0.45***	−0.03	−0.02	−0.36***	−0.03	−0.23***
		(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
	Literate	−0.01	−0.04	0.01	0.02	−0.03	0.01	−0.02
		(0.02)	(0.02)	(0.03)	(0.04)	(0.03)	(0.03)	(0.01)
	Inequality # literate	0.01	0.03	0.00	−0.01	0.02	0.02	0.03
		(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
	Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations		*3,574*	*3,574*	*3,574*	*3,574*	*3,574*	*3,574*	*3,574*

Source: Authors.

Note: Results of fractional regression models. Controls include respondent's age, marital status, education level, whether the respondent's primary occupation is farming, and country dummies. Standard errors are clustered at the first administration level and shown in parentheses. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Annex Table 4. Regression results of factors explaining attitude in support of gender equality (percentage of gender equality statements that respondents agree with)

Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)
Gender (Female = 1)	0.01				0.01		0.02
	(0.01)				(0.01)		(0.01)
Age group		0.00					
(Youth = 1)		(0.01)					
Literate (=1)				–0.00	–0.00		
				(0.01)	(0.01)		
Education level (Base = no schooling)							
Primary school						–0.00	0.01
						(0.00)	(0.01)
Secondary school						0.01	0.02
and up						(0.01)	(0.01)
Age group × gender (Base = female youth)							
Male non-youth			–0.01				
			(0.01)				
Male youth			–0.01				
			(0.01)				
Female non-youth			–0.00				
			(0.01)				
Literate × gender					0.00		
					(0.01)		
Education level × gender							
Primary school ×							–0.02*
gender							(0.01)
Secondary school							–0.00
and up × gender							(0.01)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	8,034	8,034	8,034	8,044	8,044	8,034	8,034

Source: Authors.

Note: Controls include respondent's age, gender, marital status, education level, whether the respondent's primary occupation is farming, and country dummies, except when these factors are the variable of interest in the model. Standard errors in parentheses. Standard errors were clustered at the first administration level.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Annex Table 5. Support toward gender equality statements, by local government area (LGA) in Nigeria and statement (%)

LGA	# of respondents	All statements	Extension agents	Training	Digital	Woman farmer	Prioritizing performance	Primary farmer	*Marketing role*	*Primary income earner*	*Entrepreneur*	*Care*
A	243	69	71	72	74	75	75	63	73	42	70	70
B	236	70	88	89	89	89	54	34	86	29	85	56
C	241	72	75	84	74	86	72	54	68	49	83	71
D	240	72	81	83	66	83	74	63	63	44	86	79
E	246	75	85	88	90	90	71	50	90	38	90	59
F	240	76	86	92	77	93	78	46	95	13	96	85
G	248	76	86	88	73	88	78	62	74	40	90	84
H	240	79	96	98	98	99	80	30	99	8	95	83
I	242	88	95	96	95	96	91	77	93	47	94	92
Nigeria	**2,176**	**75**	**85**	**88**	**82**	**89**	**75**	**53**	**83**	**34**	**87**	**75**

Source: Authors.

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