

# Exposure to women's groups and empowerment in agricultural households: Evidence from Nigeria and Uganda

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## Contents

	<b>Page</b>
Abstract.....	iii
I. Introduction .....	1
II. Theory of Change .....	5
III. Data .....	6
IV. Descriptive Statistics and Results .....	9
Descriptive statistics on women's groups .....	9
Descriptive Statistics on women's economic empowerment in agricultural households.....	12
Associations between exposures to women's groups and women's empowerment in agricultural household indicators.....	17
V. Conclusion.....	21
References .....	23
Appendix.....	26

## Abstract

African governments increasingly support large-scale women's groups interventions aiming to improve women's economic empowerment with support from multilateral donors and Foundations. Previous evidence indicates that women's savings, producer, and livelihoods groups can improve women's access to savings and credit, and human as well as social capital, but it is less clear if the findings of existing evidence are transferable to women's groups without a discernible focus on financial inclusion or livelihoods. This study uses nationally representative longitudinal data from Nigeria and a large longitudinal dataset from Uganda to examine the association between exposure to women's groups, asset ownership and decision-making power. The results suggest small yet positive associations between exposure to women's groups, asset ownership and decision-making power. However, most results do not remain statistically significant after controlling for individual-level fixed effects. The findings highlight the importance of triangulating results of experimental and quasi-experimental studies of specific women's group interventions with estimates from nationally representative data to understand the transferability of impact evaluation findings.

## I. Introduction

In sub-Saharan Africa, group-based interventions around agriculture, savings, and credit have become an increasingly important mechanism in efforts to improve women's economic empowerment and specifically their household-level decision-making power and economic outcomes, such as financial inclusion and asset ownership (Barooah et al., 2020; Brody et al., 2017; Desai et al., 2019; Gugerty et al., 2019; Odell & Gash, 2013). Recent investments, including by the World Bank and Bill & Melinda Gates Foundation, seek to improve women's economic empowerment by supporting African governments to fund "women's groups" defined as "groups of women who come together to take part in joint activities around a common purpose, such as savings, livelihoods, or health" (de Hoop et al., forthcoming). There are many types of women's groups, which differ by main objective or organizing purpose, membership criteria and activities; examples include savings and credit groups such as Village Savings and Loan Associations; health groups that engage in participatory learning and action; and farmer's groups such as producer cooperatives. Examples of large-scale government-supported women's group programs intending to improve economic outcomes of hundreds of thousands of beneficiaries include the Uganda Women's Entrepreneurship Programme (UWEP) and the Project for Financial Inclusion in Rural Areas (PROFIRA) in Uganda, and the Nigeria for Women Project (NFWP) in Nigeria (Desai et al., 2019; de Hoop et al., 2021). Evidence about the effectiveness of these investments is nascent, but growing though most literature refers to these group-based interventions as savings groups, producer groups, or livelihoods groups as opposed to women's groups (e.g. Blattman et al., 2016; Lecoutere, 2017; Lombardini et al, 2015; Karlan et al., 2017).

The existing evidence-base indicates that women's groups in sub-Saharan Africa, including savings groups, producer groups, or livelihoods groups are a potential avenue through which to improve women's access to savings, credit, and financial, human, and social capital, which in turn can improve women's decision-making power and various other aspects of economic empowerment. A systematic review by Barooah et al. (2020) found that women's livelihoods groups had positive effects on financial inclusion, but mixed evidence of positive effects on household expenditures, asset ownership, and income. A randomized controlled trial found that access to a CARE-supported savings group program implemented in Ghana, Malawi, and Uganda led to statistically significant improvements in women's decision-making power,

financial inclusion, and business outcomes (Karlan et al., 2017). A quasi-experimental study by Lecoutere (2017) finds that women's participation in agricultural cooperative activities such as group marketing and bargaining can strengthen their market power and improve economic well-being, women's empowerment and knowledge about and adoption of favorable agricultural practices. In Nigeria, evidence from previous studies also suggests that women's involvement in self-help groups, savings groups, cooperatives and farmers' associations can improve their access to productive resources, rural livelihoods and economic outcomes, though there are generally less experimental and quasi-experimental studies or in-depth qualitative studies on women's groups in Nigeria compared to Uganda (Omotesho et al., 2019; Badejo et al., 2017; Uyang et al., 2015).

While women's groups in sub-Saharan Africa take on a variety of roles (de Hoop et al., Forthcoming; Desai et al., 2018), the existing evidence on their effect focuses primarily on savings groups and livelihoods groups delivered by international NGOs (Blattman et al., 2016; Lecoutere, 2017; Lombardini et al., 2015; Karlan et al., 2017). Because of the varied implementation models, it is unclear if the findings of existing evidence on women's groups are transferable to women's groups without a discernible focus on financial inclusion or livelihoods, however. At the same time, recent evidence indicates that other group-based interventions, such as participatory learning and action groups, may contribute to consumption smoothing despite a lack of emphasis on economic objectives. For example, Malde & Vera-Hernandez (2020) found that a participatory community health intervention in rural Malawi enables households to compensate for crop losses, possibly because of informal risk sharing. This finding indicates that group-based interventions can deliver economic benefits by generating social capital, even in the absence of financial inclusion or livelihoods interventions.

This study contributes to the literature by using the nationally representative and longitudinal World Bank's Living Standards Measurement Study - Integrated Survey on Agriculture (LSMS-ISA) in Uganda – the Uganda National Panel Survey (UNPS) and in Nigeria - the General Household Survey (GHS), to examine the association between exposure to women's groups, asset ownership and decision-making power. While various studies in Uganda and Nigeria have examined the effects of savings groups and other women's groups with economic objectives on these outcomes using either randomized controlled trials or quasi-experimental studies (Blattman et al., 2016; Lecoutere, 2017; Lombardini et al., 2015; Karlan et al., 2017), none of those studies use a nationally representative sample, which could potentially limit external

validity and transferability (Deaton & Cartwright, 2018; White & Massett, 2018). In addition, only limited evidence exists on the ability of women's groups without discernible economic objectives to generate economic benefits, such as consumption smoothing. A synthesis on women's groups in Uganda by de Hoop et al. (Forthcoming) shows that while women's groups are an important strategy for improving economic outcomes and women's empowerment, large knowledge gaps remain, parts of which could be addressed by using nationally representative samples.

The current study aims to contribute descriptive evidence on the association between exposure to women's groups, asset ownership, and decision-making power of men and women in the household. We examine whether membership in women's groups is correlated with women's asset ownership and decision-making power in Uganda and Nigeria using longitudinal analyses based on nationally representative data from Nigeria and a large dataset from Uganda<sup>1</sup>. We do not aim to establish causal effects, however, lessons from these analyses of nationally representative data can provide some lessons on the potential transferability of previous impact evaluation findings to the effectiveness of women's groups with different implementation models. In addition, we provide descriptive evidence on the spatial patterns of women's groups, asset ownership, and household-level decision-making in Nigeria and Uganda.

The LSMS-ISA differentiates between different types of groups, but not the particular activities of women's groups. Both Uganda and Nigeria have a wide range of group activities at the community-level (de Hoop et al., Forthcoming; Desai et al., 2018). In Uganda, the community survey includes information on agricultural cooperatives, farmers' cooperatives, livestock associations, savings and credit cooperatives, business associations, women's groups, youth groups, cultural groups, sports groups, community police/watch groups, and disabled persons' associations. In Nigeria, the types of groups include village development committees, agricultural cooperatives, savings and credit cooperatives, business associations, women's groups, youth groups, political groups, cultural groups, health committees, school committees, parent-teacher associations, NGOs, community police/watch groups, and disabled person's associations.

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<sup>1</sup> It is unlikely that the data from Uganda are fully nationally representative because of the large number of missing observations.

In this study we focus our attention on women's groups, to examine whether women's groups that likely have varying objectives and implementation models are able to nonetheless influence women's asset ownership and decision-making power. In our analysis we control for exposure to financial and agricultural groups, which often include investments in social and financial capital through trainings, savings, and access to credit.

In this study, we specifically examined the following research questions:

1. What are the spatial patterns and characteristics of women's groups in Uganda and Nigeria?
2. What are the levels and geographic patterns of women's asset ownership and decision-making power in Uganda and Nigeria?
3. What is the association between community exposure to women's groups and individual-level asset ownership and decision-making power in Uganda and Nigeria?
4. How does the association between community exposure to women's groups, asset ownership and decision-making power differ between men and women?

We thus not only examined the association between exposure to women's groups and individual-level outcomes for women but also for men. In this way, we are able to examine whether women's groups are differentially associated with outcomes of men and women.

We find evidence for small but positive associations between exposure to women's groups, and women's household-level decision-making power and asset ownership in cross-sectional analyses, but most associations are no longer statistically significant in longitudinal analyses that control for individual-level fixed effects. After controlling for these individual-level fixed effects, we only find a small but statistically significant relationship between access to women's groups and the likelihood of women owning an asset in both countries, and in power over agricultural production (crop and livestock) decisions. This finding may indicate that women with higher decision-making power and asset ownership at the outset have higher exposure to women's groups, but there is only limited evidence that membership in women's groups results in further increases in asset ownership and decision-making power for these women. In addition, we found some evidence for a negative and statistically significant relationship between women's group exposure and men's asset ownership and decision-making power.

We discuss some data limitations that may explain our results. First, the association between women's group exposure, and women's asset ownership and decision-making power appear to

be smaller in large or nationally representative samples than the impacts found in smaller pilot studies. The small correlations may derive from measuring “exposure” rather than “membership”. Further, the influence of women’s groups is hard to compare to, for example, savings groups, when the primary activity or objective of a women’s group is not specified, leaving open a broad range of interpretations of activities and implementation models and the mechanisms through which these activities may influence women’s asset ownership and decision-making power. None of this implies that the results of previous experimental and quasi-experimental studies are not externally valid, or that we cannot learn from secondary data. They do suggest, however, that it is important to triangulate results whenever possible, to compare the results of experimental and quasi-experimental studies to estimates from nationally representative data to understand the transferability of impact evaluation findings.

## II. Theory of Change

The premise that women’s groups with specified economic objectives, such as financial groups, can improve women’s asset ownership and decision-making power operates through financial and social capital mechanisms (e.g. Desai et al., 2019; de Hoop et al., Forthcoming) First, access to opportunities for group savings can help women to make investments and increase their future consumption and asset ownership. Second, group support can enable women to improve access to social and other financial capital, which in turn can increase their asset ownership. Women’s exposure to group support and the accumulation of social and financial capital may also enable women to gain agency and increase their household-level decision-making power.

The described mechanisms will only result in improvements in women’s asset ownership and decision-making power when specific assumptions hold. These assumptions include community mobilizers organizing a sufficient number of women for groups, and facilitators having the availability, knowledge and education to guide group members. In addition, members should have time to meet and the resources to save regularly, which may depend on social norms that influence women’s participation in groups.

Other women’s groups with a variety of implementation models may generate economic benefits through different mechanisms. Specifically, they may stimulate informal risk sharing, which could generate economic benefits by mitigating the negative effects of idiosyncratic economic and non-economic shocks. In other words, women’s groups that do not focus on

savings or livelihoods may still generate economic benefits through the generation of social capital, including the creation of social networks, trust, and collective action.

### III. Data

To answer the research questions, we used the World Bank's Living Standards Measurement Study - Integrated Survey on Agriculture (LSMS-ISA) in Uganda – the Uganda National Panel Survey (UNPS) and in Nigeria - the General Household Survey (GHS). The LSMA-ISA is a nationally representative panel dataset that contains information on community, household, individual, and farm characteristics<sup>2</sup>. The agriculture module for households that undertake agricultural activities captures information on the characteristics of individual-level and household-level landholdings, decisions related to cropping and crop inputs and outputs, and the characteristics of livestock and farm assets. At the community level, the survey provides information on the presence of women's groups, business associations, savings groups, youth groups, and cultural groups<sup>3</sup>.

In Uganda, we use four waves of the LSMS-ISA between 2010/2011 and 2015/2016<sup>4</sup>, while in Nigeria, we use four waves of the LSMS-ISA between 2010/2011 and 2018/2019<sup>5</sup>. Both datasets take the form of a partially refreshed panel. The datasets track individual household members over the survey waves, making an individual-level panel analysis possible. We restrict our analysis to individuals who reside in agricultural households and are at least 18 years old. Overall, the sample for Uganda over four waves is comprised of 15,126 adults living in agricultural households, of which 7,905 are women. In Nigeria, the sample over four waves is comprised of 39,740 adults; 21,043 of whom are women.

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<sup>2</sup> The survey also includes information on education, health, labor force participation, income sources, access to financial services, assets, expenditures, and consumption, among other topics.

<sup>3</sup> Particular questions include: "Which of the following organizations exists in this community [Agricultural Coop, Farmers' Coop, Livestock Association, Savings & Credit Coop, Business Association, Women's Group, Youth Group, Cultural Group, Sports Group, Community Policy/Watch Group, Disabled Association, Other], How many [GROUPS] are there in this community? When did the [GROUP] begin? How often do members of the [GROUP] meet? How many female members does the [GROUP] have?"

<sup>4</sup> The exact survey years are wave 2 (2010/2011), wave 3 (2011/2012), wave 4 (2013/2014) and wave 5 (2015/2016).

<sup>5</sup> The exact survey years are wave 1 (2010/2011), wave 2 (2012/2013), wave 3 (2015/2016) and wave 4 (2018/2019).

We develop analytical models and selected control variables for these regression models examining associations between membership in groups to women's asset ownership and decision-making power. We examined these associations because of empirical evidence from previous studies related to savings and livelihoods groups and bargaining power in Uganda (Lecoutere, 2017; Lombardini, 2015), the impact of savings groups on women's empowerment, financial inclusion, and business outcomes in Uganda (Blattmann et al., 2016; Karlan et al., 2017) and the association between savings groups, cooperatives and farmers' associations, and women's access to productive resources, rural livelihoods and socio economic wellbeing in Nigeria (Omotesho et al., 2019; Badejo et al., 2017; Uyang et al., 2015).

We defined our outcome variables based on three aspects of women's economic empowerment: 1) asset ownership, 2) control over income, and 3) decision-making power in agriculture. Asset ownership includes land, large ruminants, small ruminants, poultry, farm equipment (but farm equipment only in Nigeria) and household goods, such as televisions, phones, and bicycles. Control over income includes income received from crops, livestock, business, wage and remittances. Finally, we examined decision-making power in agriculture with responses to decisions around crop inputs (such as seeds planted, fertilizer used, and land management), crop outputs (sales), and livestock (management and sales).

The UNPS and GHS survey data on women's groups are only available at the community level, hence we cannot discern which individuals and households participated in groups in Uganda and Nigeria. We therefore restrict the analysis in both countries to assessing the link between exposure to a women's group (rather than participation in a women's group) and women's empowerment in agricultural households. Finally, we note that in Uganda, the community-level data collection is characterized by missing observations for a non-negligible portion (35%) of the agricultural household sample<sup>6</sup> such that we cannot confidently consider the dataset nationally representative for Uganda. The sample for Nigeria is much more complete, however, and we consider it nationally representative for agricultural households because only 2% of the observations are missing.

In addition to providing a description of communities and indicators of economic empowerment to answer research questions 1 and 2 above, we estimate two econometric models to answer

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<sup>6</sup> That is 35% of all agricultural households.

research questions 3 and 4. The first is an Ordinary Least Squares (OLS) model as in equation (1):

$$Y_{it} = \alpha + \beta Woman_{it} + \theta Women'sgroup_{it} + \rho [Woman * Women'sgroup]_{it} + \varphi X_{it} + year_t + \varepsilon_{it} \quad (1)$$

Here  $Y_{it}$  is a proxy measure of empowerment in an agricultural household for individual  $i$  at time  $t$ ;  $Woman_{it}$  is a dummy variable that is 1 for individual women respondents;  $Women'sgroup_{it}$  indexes whether there is a women's group in the community;  $X_{it}$  is a vector of control variables that includes demographic characteristics, household characteristics and wealth, community characteristics and region/zone fixed effects; and  $year_t$  is the year fixed effect for each survey wave. Our key explanatory variable is the interaction term  $[Woman * Women's group]_{it}$  which interacts the gender of the individual with the presence of a women's group.  $\rho$  then captures the differential association of access to women's groups and women's outcomes proxying for women's economic empowerment. We additionally run equation (1) for women only, dropping the [Women and Woman \* Women's group variables]. In this regression  $\theta$  captures the association between proxy measures of women's economic empowerment in an agricultural household and exposure to a women's group; that is, the variation in women's individual empowerment in an agricultural household that is related to a women's group in the community.

We also estimate a panel model with the following structure:

$$Y_{it} = \alpha + \theta Women'sgroup_{it} + \rho [Woman * Women'sgroup]_{it} + \varphi X_{it} + year_t + \tau_i + \varepsilon_{it} \quad (2)$$

where in addition to the variables included in the OLS equation, we add  $\tau_i$  as individual fixed effects to control for individual-level characteristics that do not change over time (e.g., preferences that are commonly assumed fixed over a reasonable time frame motivation).  $\rho$  then captures the short-term differential association between proxies of women's economic empowerment and exposure to women's group. In a variation of this model, we also limited our analysis to only women.

To make the most of these data while acknowledging limitations, we undertake a descriptive analysis of the link between exposure to women's groups in communities and women's empowerment in agricultural households. Given that the Nigerian data at least are nationally representative, our analysis may provide fruitful information for policy makers and governments wanting to support women's groups with varied implementation models at a national level rather

than focusing on particular interventions, such as savings groups or livelihoods groups, that might be geographically or in other ways restricted.

## IV. Descriptive Statistics and Results

### Descriptive statistics on women's groups

In Uganda and Nigeria, different types of groups exist, including women's groups, and groups focused on agriculture, financial activities, religious pursuits, and business associations, all of which are avenues through which to deliver interventions (Desai et al., 2019). Over 60% of villages in Nigeria report the presence of a local women's group, while almost half of the villages in Uganda reported having a women's group, an agricultural group or a financial group<sup>7</sup>. Table 1 depicts the landscape for a selection of groups that may be related to women's economic empowerment in agricultural households.

**Table 1. The co-occurrence of groups across communities in Uganda and Nigeria, 2010 (shares)**

	Uganda	Nigeria
Village has a women's group	48%	61%
Village has an agricultural group	47%	28%
Village has a financial group	45%	33%
Village has a women's group and a financial group	23%	26%
Village has a women's group and an agricultural group	26%	20%
Village has a women's group and a financial and an agricultural group	14%	13%
<i>Village observations</i>	269	488

Figure 1 shows the geographical distribution of women's groups in Uganda and Nigeria. In Uganda, in 2010, 55% of 2,714 agricultural households had community-level information on women's groups. Among those, 45% were exposed to women's groups and 55% were not (Figure 1 (a)). Women's groups are found in communities spread across the country, with a

<sup>7</sup> As noted above, in Uganda, the community-level data collection is characterized by missing observations for a non-negligible portion of the sample. In waves 1-5 (2009/10 – 2015/16), community surveys were (intended to be) administered in the original 322 EAs from the 2005/06 survey. In 2010, 310 community surveys were at least partially done, of which 274 were administered a group module. The community-level survey reported on exposure to women's groups in 269 villages.

slightly greater concentration in districts north of Lake Victoria and in the south of the country. In 2010, fewer women's groups were reported in the northeastern districts of Uganda.

In Nigeria, exposure to women's groups is mostly concentrated in the southern zones of the country (Figure 1 (b)) in the states of Ebonyi, Enugu, Anambra, Imo, and Abia. The higher exposure in the South is possibly related to greater opportunities women in this region have to socialize outside the home, whereas conventional socio-cultural norms that impose restrictions on women are more prevalent in Nigeria's northern zones (Desai et al., 2018). Among 4,998 households in the sample in 2010, 98% had information on women's groups. Among those, 61% were exposed to women's groups. In total 61% of women aged 18 or above were exposed to a women's group in their community. This evidence is aligned with the finding of FAO and ECOWAS commission (2018) that a larger proportion of women in the southeast of Nigeria are members of agricultural groups.

**Figure 1. Households' exposure to women's groups in Uganda and Nigeria, 2010**

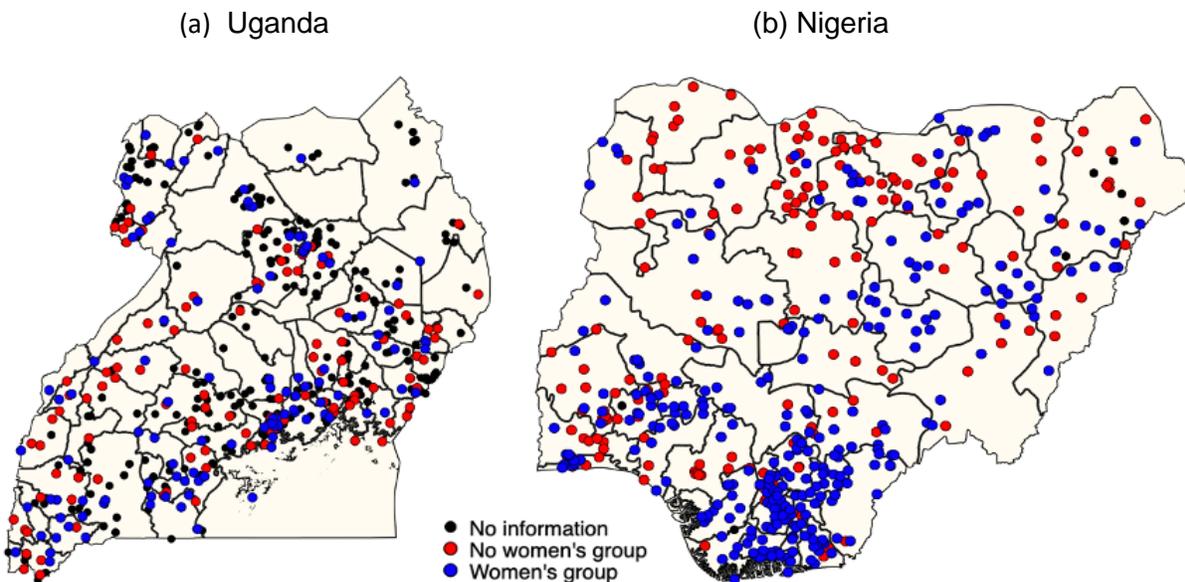


Table 2 depicts how exposure to women's groups in Nigeria and Uganda increased between 2010 and 2015. In 2010, 48% of the villages with information on women's groups reported having a women's group in Uganda, which increased to 54% by 2015.<sup>8</sup> In Nigeria, 61% of villages reported having a women's group in 2010, which increased to 70% of villages by 2018.

<sup>8</sup> In 2010, 1.8% of 274 villages did not have information on women's groups, in 2015

In Uganda, each village has on average one to two women's groups. In a subsample that only includes villages with at least one women's group, the average decreases from 2010 to 2015 from four women's groups to two women's groups per village. In Nigeria, each village has two to three women's groups, on average, in both 2010 and 2015. In the sub-sample of villages that report having at least one women's group, the average number of women's groups increased from three groups per village in 2010 to four groups per village in 2018.

We found some differences in the composition of women's groups between Nigeria and Uganda. In each village in Uganda, the largest women's groups have existed for at least five to eight years with 37 to 42 female members, on average. The largest Nigerian women's groups include almost twice as many members as in Uganda, with 67 to 80 members per women's group. Among enumeration areas that were retained between 2010 and 2015 (the first three waves of the survey), 23% of communities in Nigeria established a women's group, while in another 23% of communities, a women's group disappeared. In 43% of communities in Nigeria, women's groups persisted for the three consecutive waves of the panel survey, 20% of communities did not have a women's group in the three years of the panel, 14% had a women's group for one year of the panel and 23% had a women's group for two years of the panel. In Uganda, the data did not allow for linking communities between waves and a non-negligible portion of the data was missing. Thus, we did not include this analysis for Uganda.

**Table 2. Characteristics of women's groups in Uganda and Nigeria**

	Uganda		Nigeria	
	2010	2015	2010	2018
Village has a women's group	48%	54%	61%	70%
Average number of women's groups (all villages)	2.24	1.49	1.97	3.01
Average number of women's groups (among villages with at least one women's group)	4.67	2.79	3.24	4.27
Average years in existence (largest women's group in village) *	5.26	8.04	---	---
Average number of female members (largest women's group in village) *	42.46	37.44	80.57	67.70
Share of membership that is female (largest women's group in village) *	---	---	97%	97%
Average number of group meetings per year (largest women's group in village) *	21.73	25.85	21.93	22.23
<b><i>Among the enumeration areas that were retained in the first three (panel) waves of the survey</i></b>				
0 survey waves with a women's group	---	---	---	20%
1 survey wave with a women's group	---	---	---	14%
2 survey waves with a women's group	---	---	---	23%
3 survey waves with a women's group	---	---	---	43%
A women's group was established between 2010 and 2015	---	---	---	23%
A women's group disappeared between 2010 and 2015	---	---	---	23%

\* This variable is defined in villages with at least one women's group.

### Descriptive Statistics on women's economic empowerment in agricultural households

Evidence from Uganda and Nigeria indicates considerable regional differences in the household-level decision-making power of women in agricultural households. Figure 2 shows that women in agricultural households are more likely to make decisions on assets, income and agriculture in the northern regions of Uganda than women in the southern regions.

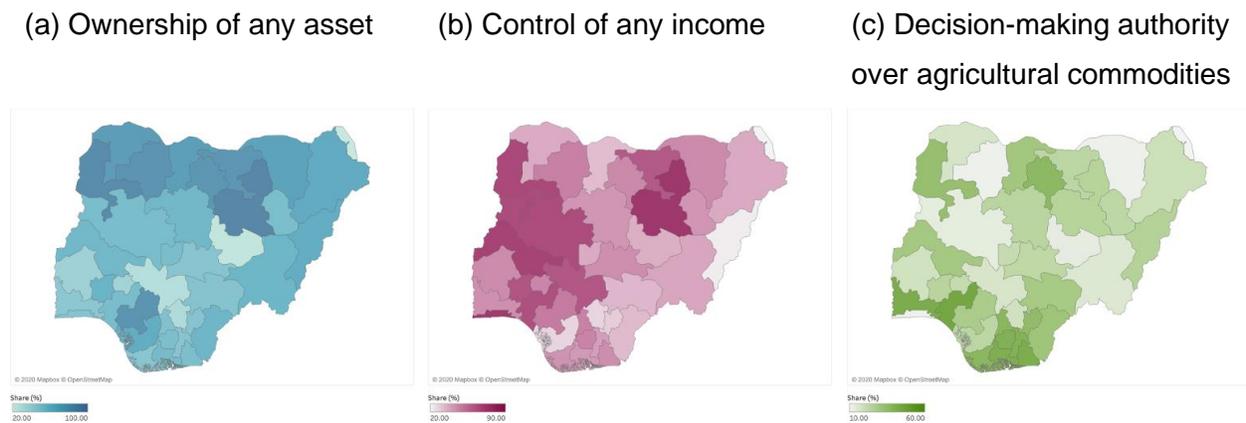
In general, agricultural decision-making authority is strongest among women living in the southern part of Nigeria, while women in agricultural households in the north-east and northwest of the country are more likely to make decisions over assets than women in the southern states in Nigeria. This result is mostly driven by women in the northern states owning household

assets, while women in the southern states of Nigeria are more likely to own land, farm equipment, ruminants or poultry. This finding is in line with Olomola (2013) who reported that women in southern Nigeria are more likely to own productive assets such as land than women in the north. Women in Bauchi state are more likely to have decision-making authority over assets and control over income than women in other states in Nigeria.

**Figure 2. Geographic patterns of indicators of empowerment among women in agricultural households in Uganda, 2010**



**Figure 3. Geographic patterns of indicators of empowerment among women in agricultural households in Nigeria, 2010**



Based on the longitudinal analysis, we find evidence for a positive trend in the percentage of women who have household-level decision-making power and own assets in Nigeria and Uganda; additionally, we find larger differences in asset ownership and decision-making power between men and women in Nigeria than in Uganda (Table 3 and Table 4). In Uganda, across all years, close to three quarters of women in agricultural households have decision-making

authority over income, are owners of assets, or make decisions in agriculture. In contrast, in Nigeria, 58% of women in agricultural households have control over income, 67% are asset owners, and 42% have decision-making power in agriculture. Previous evidence reported by Anderson et al (2017), Adegbite and Machethe (2020) and Adegbite et al. (2021) indicated that the majority of women in small-scale agriculture in Nigeria depend on male household heads to make agricultural and financial decisions. Women in both Uganda and Nigeria are less likely to be livestock owners or control income from livestock than from crops. This is especially true for large ruminants, whereas ownership of poultry and household goods is much more common among women. This supports the finding of the FAO and ECOWAS Commission (2018) that, men in Nigeria control the production of large ruminants, such as cattle, which attracts higher economic returns, while women are mainly involved in rearing small ruminants. However, Badejo et al. (2017) indicated that women's participation in livestock development programs through women's groups could provide a strong driving force for women's empowerment in livestock economic activities. Furthermore, almost half of the women in Uganda are owners of land, in stark contrast to the 8% of women in Nigeria who own a plot of land.

**Table 3. Indicators of empowerment among women (ages 18+) in agricultural households in Uganda**

	Mean Values				
	2010	2011	2013	2015	Total
1= Individual has control over crop income	53%	68%	62%	64%	62%
1= Individual has control over livestock income	11%	6%	6%	7%	8%
1= Individual has control over business income	20%	19%	22%	26%	22%
1= Individual has control over wage income	19%	11%	11%	9%	13%
1= Individual has control over remittances or assistance income	---	---	17%	16%	8%
1= Individual has control over crops, livestock, business, wage, or remittance income	66%	74%	71%	72%	71%
<b>Share of income categories in which this individual has control</b>	32%	33%	29%	30%	31%
1= Individual is listed as an owner of a plot	50%	51%	53%	49%	51%
1= Individual is listed as an owner of a large ruminant	19%	20%	16%	19%	19%
1= Individual is listed as an owner of a small ruminant	34%	35%	31%	31%	33%
1= Individual is listed as an owner of poultry	40%	35%	32%	31%	35%
1= Individual is listed as an owner of a household good	---	---	65%	66%	66%
1= Individual is an owner of land, livestock, or household good	63%	64%	71%	71%	67%
<b>Share of asset categories in which this individual has ownership</b>	55%	56%	62%	61%	59%
1= Individual decides over crop input	57%	70%	67%	67%	65%
1= Individual decides over crop output	53%	69%	62%	64%	62%
1= Individual decides over livestock	50%	56%	50%	52%	52%
1= Individual has decision power over crops or livestock <sup>9</sup>	70%	75%	72%	73%	73%
<b>Share of decision-making categories in which this individual has decision-making power</b>	58%	70%	67%	68%	66%
<i>Observations</i>	1,743	1,709	2,644	1,809	7905

<sup>9</sup> Decision-making power over crops and livestock is defined as individual's agency to make decisions around crop inputs (such as seeds planted, fertilizer used, and land management), crop outputs (sales), and livestock (management and sales).

**Table 3. Indicators of empowerment among women (ages 18+) in agricultural households in Nigeria**

	Mean Values				
	2010	2011	2013	2015	Total
1= Individual has control over crop income	6%	21%	19%	21%	17%
1= Individual has control over livestock income	22%	28%	27%	28%	26%
1= Individual has control over business income	36%	39%	35%	28%	35%
1= Individual has control over wage income	---	29%	7%	12%	16%
1= Individual has control over other income (non-farm)	---	3%	1%	2%	2%
1= Individual has control over crops, livestock, business, wage or other income	50%	62%	58%	61%	58%
<b>Share of income categories in which this individual has control</b>	36%	39%	34%	36%	36%
1= Individual is listed as an owner of a plot	4%	4%	8%	16%	8%
1= Individual is listed as an owner of a large ruminant	1%	2%	1%	1%	1%
1= Individual is listed as an owner of a small ruminant	18%	20%	17%	19%	19%
1= Individual is listed as an owner of poultry	21%	25%	18%	16%	20%
1= Individual is listed as an owner of farm equipment	8%	10%	10%	5%	8%
1= Individual is listed as an owner of a household good	48%	59%	52%	65%	56%
1= Individual is an owner of land, livestock, farm equipment, or a household good	61%	68%	61%	76%	67%
<b>Share of asset categories in which this individual has ownership</b>	30%	34%	28%	40%	33%
1= Individual decides over crop input	10%	15%	17%	22%	16%
1= Individual decides over crop output	6%	16%	16%	16%	14%
1= Individual decides over livestock	22%	39%	27%	28%	29%
1= Individual has decision power over crops or livestock	30%	50%	42%	47%	42%
<b>Share of decision-making categories in which this individual has decision-making power</b>	21%	31%	26%	30%	27%
<i>Observations</i>	5,046	5,030	4,952	6,015	21,043

## Associations between exposures to women's groups and women's empowerment in agricultural household indicators

Table 5 and Table 6 show results of our regression analysis of the association between exposure to women's groups and women's empowerment in agricultural households. The top panel displays results of an analysis of the women-only sample, i.e., all adult women in agricultural households. The values of the coefficients correspond to  $\theta$  in equations (1) and (2). The bottom panel shows the results that includes men and women in a combined sample. The values of the coefficients in this analysis correspond to  $\rho$ . Columns 1–6 display the results of the pooled OLS model, and columns 7–12 show the results of the individual fixed effects model.

In Uganda, we found some evidence that exposure to women's groups is associated with women's decision-making power and asset ownership in agricultural households, but the association is relatively small (top row, Table 5). The OLS regression shows that being exposed to a women's group in Uganda is associated with an increase of 2 percentage points in a women's ability to control income (column 3, top panel). In a regression model with men and women, group exposure is associated with a two-percentage point increase in asset ownership for women, and a 1 percentage point decrease in asset ownership for men (Table 5, column 1). Overall, women are 7 percentage points less likely to own assets than men. Women who are exposed to a women's group, however, only face a disadvantage in asset ownership of 4 percentage points relative to men. In particular, women exposed to groups are more likely to own small ruminants, poultry and household goods, and to control the income from crop outputs, as compared to men. However, statically significant correlations found in the pooled OLS analysis mostly are no longer statistically significant in the panel analysis that controls for individual-level fixed-effects. This is particularly true for the model that only includes women. In a regression model that includes men and women, we only find a statistically significant association in the interaction term between women's groups and women and asset ownership.

In Nigeria, we find a positive association between exposure to women's groups and decision-making over income and agriculture among women in agricultural households. Women exposed to a women's group are three percentage points more likely to make decisions related to income, and on more income categories, compared to women not exposed to groups (Table 6, columns 4 and 5). These same women are also four percentage points more likely to have authority over agricultural decisions. In a regression model with men and women, women exposed to women's groups are 6 percentage points more likely to make decisions related to

income (Table 6, column 3), and 7 percentage points more likely to have decision-making authority in agriculture compared to women not exposed to groups (Table 6, column 5). Compared to men, women are 14 percentage points less likely to control income, on average. Exposure to a group reduces the gap between men and women in control over income from 14 percentage points to 4 percentage points (Table 6, column 3). Including individual-level characteristics, such as gender, results in correlations that are statistically significant in the pooled OLS but no longer statistically significant after controlling for individual-level fixed effects. (Table 6, right panel). In the latter model, exposure to groups is still positively associated with the ownership of any asset, and women exposed to groups are still more likely to own any asset as compared to women without access to groups.

The findings suggest that exposure to women's groups is correlated with more decision-making power and higher asset ownership, but it remains unclear whether exposure to women's groups results in higher decision-making power or asset ownership for women. The lack of statistical significance after controlling for individual-level fixed effects, except for correlations with the ownership of any asset, suggests that women who begin with higher levels of decision-making power and asset ownership have a higher likelihood of women's group exposure in their community than women who begin with lower levels of decision-making power and asset ownership, but exposure to women's groups may have only limited subsequent effects on their levels of decision-making power and asset ownership.

**Table 2.** Association between exposure to women's groups and asset ownership, control over income, and decisions in agriculture in Uganda

	(1)	(2)	OLS		(5)	(6)	(7)	(8)	(9)	Panel		(12)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Owner of any asset	Share of asset categories with ownership	All Income	Share of income categories with control	Agriculture	Share of agricultural production categories with decision-authority	Owner of any asset	Share of asset categories with ownership	All Income	Share of income categories with control	Agriculture	Share of agricultural production categories with decision-authority
<b>WOMEN ONLY</b>												
1= Village reports that it has a women's group	0.01	0.01	0.02***	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	-0.00
	(0.373)	(0.266)	(0.005)	(0.715)	(0.573)	(0.272)	(0.200)	(0.634)	(0.278)	(0.661)	(0.336)	(0.549)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Region fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	7,905	7,905	7,905	7,905	7,905	7,905	4,694	4,694	4,694	4,694	4,694	4,694
<b>WOMEN AND MEN</b>												
1= Village reports that it has a women's group	-0.01*	-0.01	0.00	0.00	-0.01	-0.02***	-0.01	-0.01	0.01	0.02**	-0.01	-0.00
	(0.087)	(0.102)	(0.654)	(0.489)	(0.273)	(0.008)	(0.319)	(0.457)	(0.366)	(0.028)	(0.296)	(0.580)
1= Individual is female	-0.07***	-0.02**	-0.03**	0.01**	-0.03***	0.02**	--	--	--	--	--	--
	(0.000)	(0.019)	(0.033)	(0.028)	(0.007)	(0.011)						
Female*Women's group	0.03**	0.02**	0.02	-0.00	0.02	0.03***	0.02*	0.01	0.01	-0.01	0.02	0.00
	(0.031)	(0.033)	(0.178)	(0.604)	(0.161)	(0.002)	(0.096)	(0.279)	(0.715)	(0.238)	(0.130)	(0.808)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Region fixed effects	Y	Y	Y	Y	Y	Y	--	--	--	--	--	--
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	15,126	15,126	15,126	15,126	15,126	15,126	8,999	8,999	8,999	8,999	8,999	8,999

**Notes:** Robust p-values in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.

**Table 3.** Association between exposure to women's groups and asset ownership, control over income, and decisions in agriculture in Nigeria

	(1)	(2)	OLS			(6)	(7)	(8)	(9)	Panel			(12)
	Owner of any asset	Share of asset categories with ownership	All Income	Share of income categories with control	Agriculture	Share of agricultural production categories with decision-authority	Owner of any asset	Share of asset categories with ownership	All Income	Share of income categories with control	Agriculture	Share of agricultural production categories with decision-authority	
<b>WOMEN ONLY</b>													
1= Village reports that it has a women's group	0.01	0.00	0.03**	0.02**	0.04***	0.04***	0.03**	0.01	0.01	-0.00	0.00	0.02*	
	(0.254)	(0.561)	(0.037)	(0.031)	(0.001)	(0.000)	(0.023)	(0.181)	(0.641)	(0.702)	(0.827)	(0.067)	
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Region fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Obs.	21,043	21,043	21,043	21,043	21,043	21,043	7,601	7,601	7,601	7,601	7,601	7,601	
<b>WOMEN AND MEN</b>													
1= Village reports that it has a women's group	0.00	-0.02***	-0.04***	-0.06***	-0.05***	-0.07***	0.00	0.01	0.03***	0.02**	-0.01	-0.01	
	(0.781)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.943)	(0.406)	(0.009)	(0.044)	(0.173)	(0.344)	
1= Individual is female	-0.12***	-0.09***	-0.14***	-0.13***	-0.16***	-0.17***	--	--	--	--	--	--	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)							
Female*Group	-0.00	0.04***	0.10***	0.13***	0.12***	0.16***	0.03*	0.00	-0.02	-0.02	0.02	0.03**	
	(0.690)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.080)	(0.640)	(0.189)	(0.127)	(0.285)	(0.019)	
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Region fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Obs.	39,740	39,740	39,740	39,740	39,740	39,740	14,356	14,356	14,356	14,356	14,356	14,356	

Notes: Robust p-values in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## V. Conclusion

Women's groups have increasingly become an important strategy to bolster women's economic empowerment in sub-Saharan Africa. This study uses a nationally representative longitudinal dataset for Nigeria and a large longitudinal dataset for Uganda to examine the links between community-level exposure to women's groups and women's decision-making power and asset ownership in agricultural households. In this way we contribute to the literature on women's groups and economic empowerment in sub-Saharan Africa, which currently primarily focuses on the impact of women's savings groups, producer groups, and livelihoods groups using smaller sample experimental and quasi-experimental studies.

Evidence suggests that the number of women's groups in Nigeria has increased between 2010 and 2018, while Uganda experienced a decrease in the absolute number of women's groups. It is possible that policies aimed at strengthening women's groups are directing investments into existing groups to deliver interventions and further institutional evolution; in line with recent investments in large-scale women's groups with economic objectives in Nigeria and Uganda which largely focus on existing groups (Desai et al., 2019; de Hoop et al., 2021). In Nigeria in particular, almost half of the communities included in our analysis had a women's group present for three years or longer.

We find only small correlations between exposure to women's groups and women's empowerment in agricultural households, with most of those associations no longer being statistically significant after controlling for individual-level fixed effects. In Uganda in particular, we find very little evidence to suggest that the existence of a women's group in a community is associated with higher levels of control over income. However, we found some positive and statistically significant associations between exposure to women's groups and women's asset ownership, their share of asset categories, and their share of decision-making over agriculture production. In Nigeria, exposure to women's groups is positively associated with asset ownership, control over income and decision-making over agricultural production. In both countries, however, results, mostly disappear after controlling for individual-level fixed effects in a longitudinal analysis.

One potential reason for the limited evidence of statistically significant associations between access to women's groups and women's economic empowerment is that the full LSMS-ISA dataset was not designed to answer questions on women's group membership (though a non-representative sub-sample of LSMS-ISA households has been interviewed on group membership in a phone survey following COVID-19).<sup>10</sup> We can estimate whether an individual has been exposed to a women's group in their community but do not have information on individual participation in that group or strength of group functioning. Neither do we know exactly how women's groups were defined in the survey or what activities they engage in. This makes it challenging to interpret the correlational evidence. Future nationally representative surveys could include more details on women's group activities, in line with the recommendations by Desai et al. (2021) in their typology of women's groups. In addition, in Uganda, the community-level data collection was characterized by missing observations for a non-negligible portion of the sample. However, the findings suggest that the estimates of impact evaluations of savings groups or livelihoods groups are not necessarily transferable to women's groups with more diverse implementation models. This finding suggests the importance of conducting future experimental and quasi-experimental studies using more nationally representative samples and with more details on women's groups primary objectives and implementation models to examine the external validity of impact evaluations.

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<sup>10</sup> The phone-based LSMS-ISA survey data collected in Nigeria after the start of COVID-19 include more detailed questions on savings group membership that were analyzed as part of an evidence review on women's groups and COVID-19 in sub-Saharan Africa (Adegbite et al., 2021).

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## Appendix

**Table A1. Descriptive statistics for control variables (among women ages 18+ in agricultural households) in Uganda and Nigeria (pooled over survey years)**

	Uganda		Nigeria	
	Mean	Standard deviation	Mean	Standard deviation
Age in completed years	38.4	16.94	38.3	15.71
1= Household head	25%	0.43	9%	0.28
1= Spouse of household head	48%	0.50	66%	0.47
1= Child of household head	18%	0.38	17%	0.37
1= Individual is married (monogamously or polygamously)	59%	0.49	69%	0.46
1= Individual is separated or divorced	9%	0.29	2%	0.13
1= Individual is widowed	14%	0.35	12%	0.32
1= Individual has never attended school	22%	0.41	40%	0.49
1= Individual completed primary school	34%	0.47	41%	0.49
1= Individual completed secondary school	7%	0.25	20%	0.40
Number of members in HH	6.92	3.48	7.29	3.65
Household asset value, real 2010 values, IHST	15.2	2.25	11.2	1.62
Size of landholdings (acres)	3.59	13.99	1.02	4.30
1= Material for roof is straw or wood	30%	0.46	14%	0.35
1= Material for floor is earth or mud	74%	0.44	34%	0.47
1= Village reports that it contains a market for agricultural output	14%	0.35	65%	0.48
1= Village reports that it contains a bank or financial institution	2%	0.16	17%	0.38
1= Village reports that it contains a clinic or hospital	22%	0.41	71%	0.45
1= Village reports that it contains a trunk road or feeder road	58%	0.49	40%	0.49
1= Village reports that it has an agricultural group	51%	0.50	31%	0.46
1= Village reports that it has a financial group	52%	0.50	36%	0.48
1= Rural	86%	0.35	82%	0.39
Obs.	7905		21,043.	

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