



EXAMINING THE GENDER DIGITAL DIVIDE A Case Study from Rural Nigeria

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Rural Nigeria, with its diverse cultural and socio-economic landscapes, presents unique challenges when it comes to digital inclusion. Traditional gender roles, limited educational opportunities, inadequate infrastructure, and sociocultural norms often combine to create barriers that disproportionately affect women's access to digital technologies. As a result, women in rural areas face significant challenges in acquiring digital skills, accessing online information and services, and participating in digital platforms, thus perpetuating the gender gap and further marginalizing women from the benefits of the digital revolution.

This policy note summarizes research designed to highlight the barriers female farmers in Nigeria face in accessing technology and information so that stakeholders can work together to ensure that Nigeria's rural women are equipped with the necessary tools and resources to thrive in the digital age and contribute meaningfully to their communities.

The Relationship between Household Cell-Phone Ownership and Agricultural Outcomes

Survey findings indicate a steady rise in household-level cell-phone ownership in Nigeria, from 54

METHODOLOGY

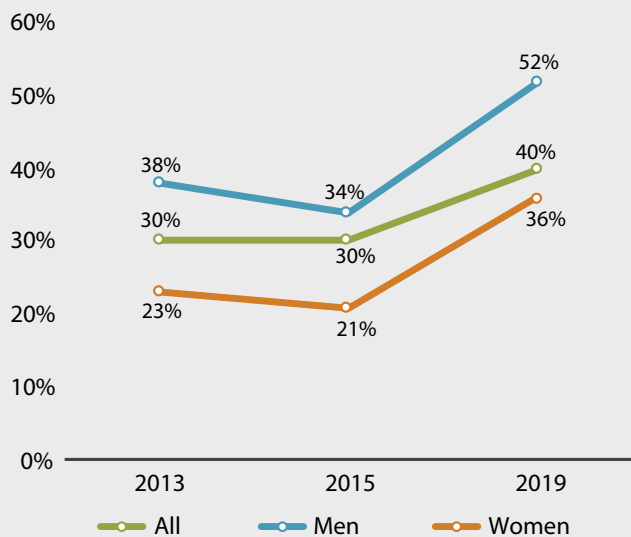
The analysis reported in this policy note is based on data from three rounds of the General Household Survey Panel (GHS-Panel) in 2013, 2015, and 2019, implemented in collaboration with the World Bank Living Standards Measurement Study (LSMS) team as part of the Integrated Surveys on Agriculture (ISA) program. The GHS-Panel is a nationally representative survey of approximately 5,000 households, which are also representative of the six geopolitical zones in Nigeria. GHS-Panel households were visited twice: first after the planting season (post-planting) between July and September, and second after the harvest season (postharvest) between January and February. Note that the analysis reported focuses on individual cell-phone use and household-level cell-phone ownership as proxies for digital connectivity and use of information and communications technologies (ICT).

percent in 2013 to 62 percent in 2015, with only a further 1 percent increase by 2019. Only 40 percent of all respondents reported using cell phones in 2019: 52 percent were male and 36 percent were female, confirming the gender gap in digital access in rural Nigeria (Figure 1). In rural areas where access to infrastructure and services is limited, the very

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FIGURE 1. Incidence of cell-phone use in rural Nigeria by gender, 2013, 2015, and 2019



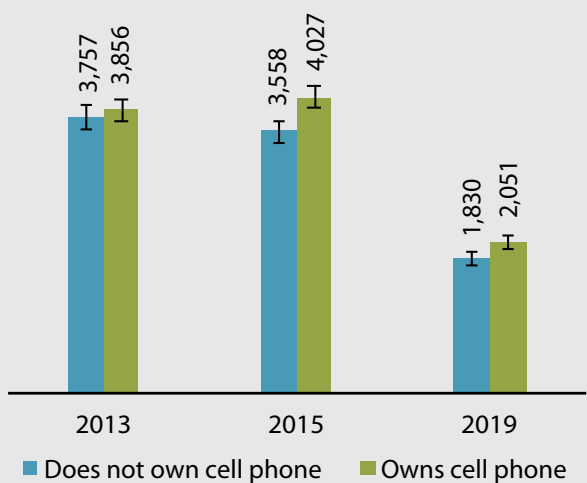
Source: Calculated by authors based on the Nigerian General Household Survey, 2013, 2015, and 2019.

slow growth in ownership and use of cell phones very likely limits people’s access to communication channels and information, thereby also limiting their opportunities for economic advancement.

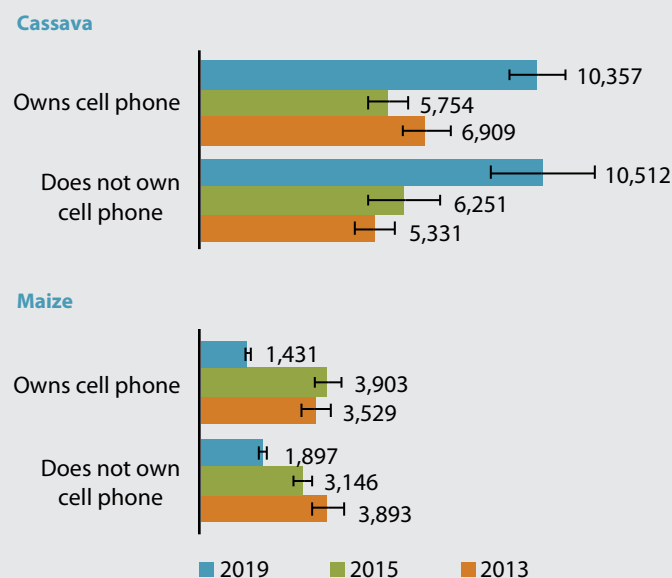
Although the value of production per hectare fell dramatically between 2013 and 2019, households that reported owning cell phones attained higher values compared with households that did not (Figure 2a). Better access to market information regarding prices, demand trends, and market opportunities; higher exposure to agricultural extension services; and farmer-to-farmer knowledge-sharing are some crucial ways that owning and using cell phones may have benefited farmers in their efforts to augment the value of their production. In contrast, survey findings do not suggest significant differences in the yields of Nigeria’s key crops, such as cassava and maize,

FIGURE 2. Agricultural outcomes by household cell-phone ownership (2013, 2015, and 2019)

a. Value of crop production per hectare (PPP\$/ha)



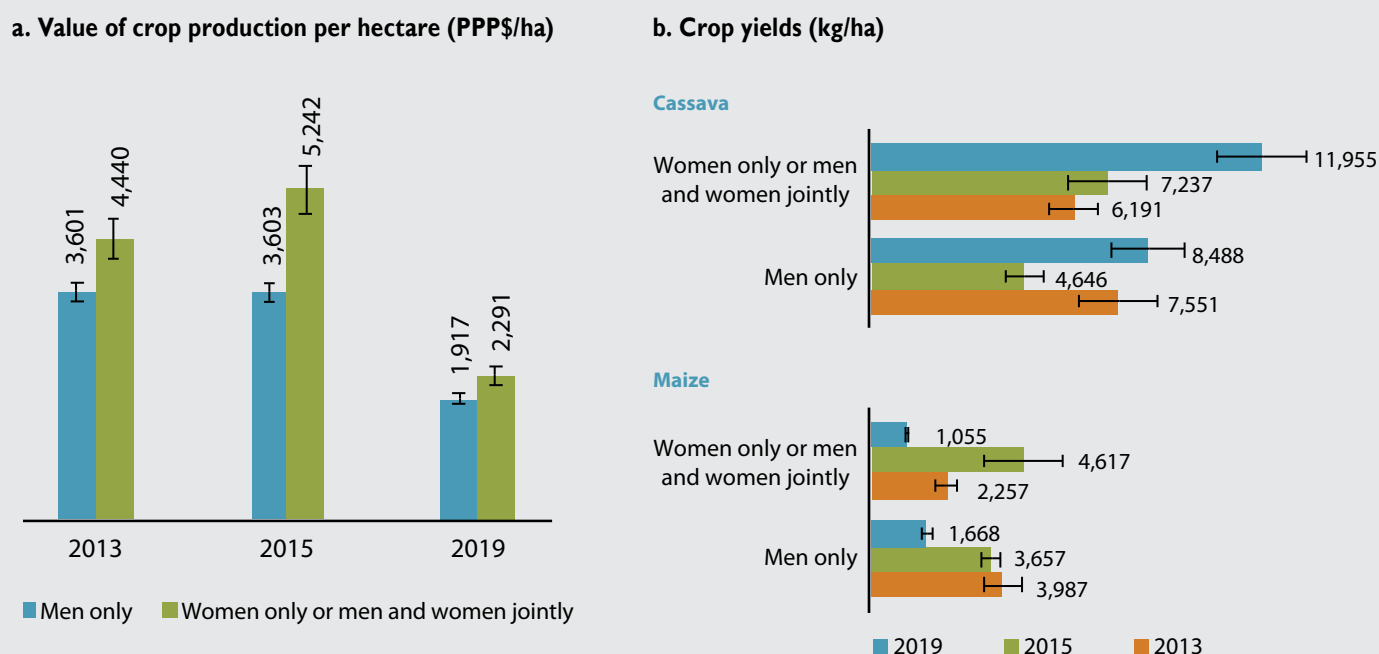
b. Crop yields (kg/ha)



Source: Calculated by authors based on the Nigerian General Household Survey, 2013, 2015, and 2019.

Notes: The length of the error bars represents the range of values within which the true value is likely to fall; kg = kilogram; ha = hectare; PPP = purchasing power parity conversion factors, which take the purchasing power of the local currency into account in reference to the U.S. dollar.

FIGURE 3. Agricultural outcomes by plot decisionmaker, 2013, 2015, and 2019



Source: Calculated by authors based on the Nigerian General Household Survey, 2013, 2015, and 2019.

Notes: The length of the error bars represents the range of values within which the true value is likely to fall; kg = kilogram; ha = hectare; PPP = purchasing power parity conversion factors, which take the purchasing power of the local currency into account in reference to the U.S. dollar.

between households that owned cell phones and those that did not (Figure 2b). This suggests that farmers who owned cell phones likely benefited from increased market access and comparatively higher production values rather than from higher crop yields.

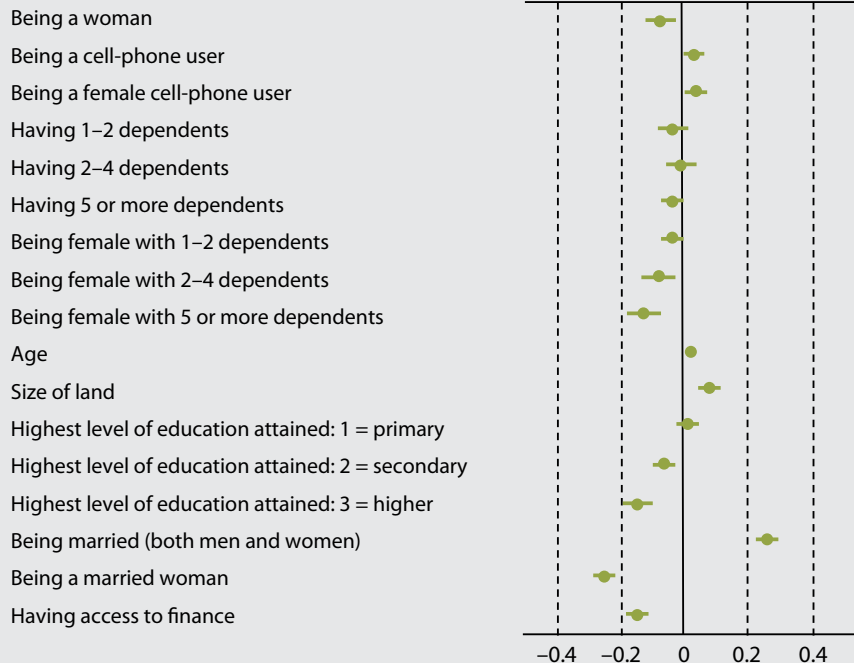
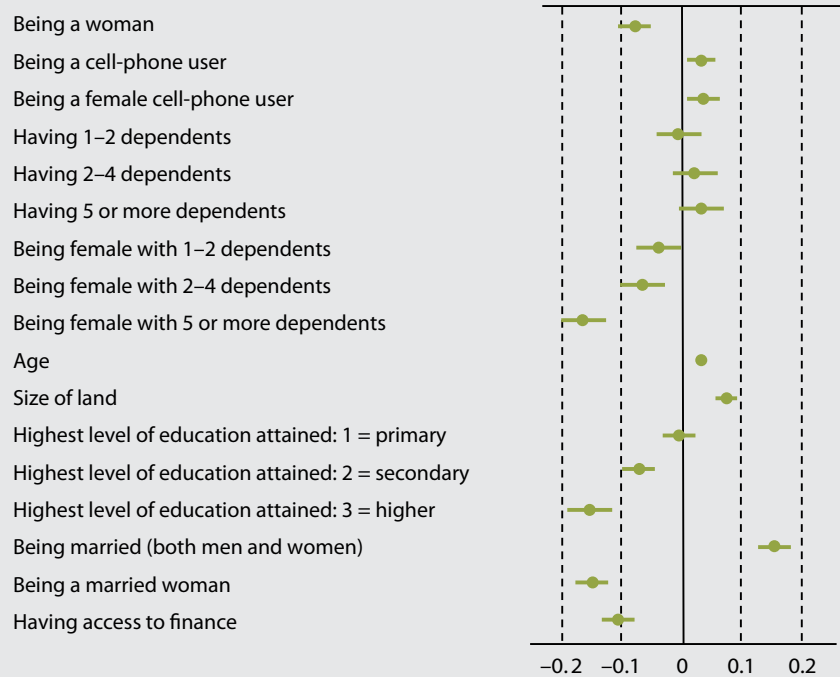
The results also suggest gendered differences in the value of crop production per hectare, which was found to be higher across time for plots managed either by women only or by men and women jointly compared with plots managed solely by men (Figure 3a). Although cassava yields from plots managed solely by men were higher in 2013, over time higher yields were generated from plots managed by women only or by men and women jointly. Results are less clear for maize.

The Relationship between Cell-Phone Ownership and the Decision to Engage in Agriculture

The study also examined the key determinants of farmers' decisions to engage in agriculture (whether on their own or another's farm) and at what level of intensity under two different thresholds of labor participation: (1) for at least one hour in the week prior to the interview, which is the international standard definition of employment, and (2) for at least 20 hours per week, which excludes under-employment (defined as working at least one hour but fewer than 20 hours per week).

Results suggest that Nigeria's rural women were less likely to be employed in agriculture than were the country's rural men (Figure 4). The study also

FIGURE 4. Key determinants of engagement in agriculture

a. Minimum of one hour's work per week**b. Minimum of 20 hours' work per week**

found that both married women and women with a greater number of dependents were less likely to enter the agricultural labor market based on cultural norms that determine gender roles in rural societies. As a result, caregiving at home is prioritized for women, and men's income levels are generally higher than women's. Furthermore, cell-phone use, particularly by women, was found to be associated with a higher likelihood of engagement in agriculture, providing evidence of the crucial role technology plays in securing employment opportunities—especially in rural areas.

At both levels of intensity, results indicate that higher levels of education were associated with reduced likelihood of engagement in agriculture, reflecting respondents' decision to engage in nonagricultural labor, which in general offers higher income levels. Interestingly, higher access to finance was found to be inversely correlated with the decision to engage in agriculture, suggesting a preference for self-employment or entrepreneurship in sectors outside agriculture, where available financial products support this choice.

Cell-phone use was associated with an increased likelihood of working longer hours in agriculture, regardless of whether or not under-employed individuals were included (Figure 5). Importantly, this finding held true for women, indicating

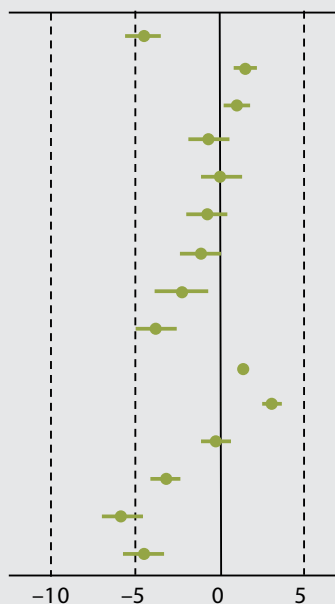
Source: Calculated by authors based on the Nigerian General Household Survey, 2013, 2015, and 2019.

Note: Engagement in agriculture includes farmers working on their own or others' farms. Results presented in this figure are based on a double-hurdle model to identify the key variables contributing, first, to the decision to work in agriculture, and second, to the amount of the time invested in that work.

FIGURE 5. Key determinants of the intensity of engagement in agriculture

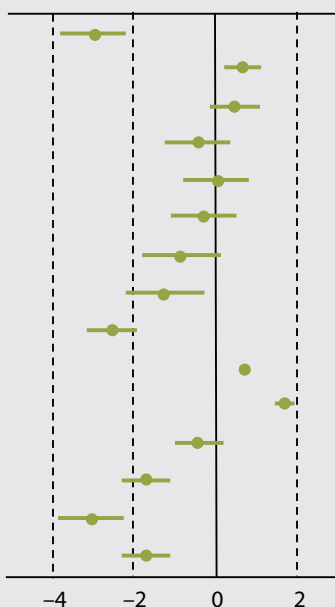
a. Minimum of one hour's work per week

- Being a woman
- Being a cell-phone user
- Being a female cell-phone user
- Having 1–2 dependents
- Having 2–4 dependents
- Having 5 or more dependents
- Being female with 1–2 dependents
- Being female with 2–4 dependents
- Being female with 5 or more dependents
- Age
- Size of land
- Highest level of education attained: 1 = primary
- Highest level of education attained: 2 = secondary
- Highest level of education attained: 3 = higher
- Having access to finance



b. Minimum of 20 hours' work per week

- Being a woman
- Being a cell-phone user
- Being a female cell-phone user
- Having 1–2 dependents
- Having 2–4 dependents
- Having 5 or more dependents
- Being female with 1–2 dependents
- Being female with 2–4 dependents
- Being female with 5 or more dependents
- Age
- Size of land
- Highest level of education attained: 1 = primary
- Highest level of education attained: 2 = secondary
- Highest level of education attained: 3 = higher
- Having access to finance



that their engagement in agriculture could be supported by introducing cell phones and providing training in their use.

Concluding Remarks

The study's findings provide empirical evidence of the crucial role technology plays in advancing agricultural practices and outcomes. Results indicate that women with access to cell phones are more likely not only to engage in agriculture, but also to work longer hours than women who reported not using cell phones. Given that, as of 2019, a little more than one-third of rural Nigerian women reported using cell phones, ample opportunity exists to utilize this technology to bridge information gaps, enhance market linkages, and promote sustainable farming practices, all of which would support gender equality, rural livelihoods, and the transformation of the country's agricultural sector.

Addressing the gendered digital divide in rural Nigeria requires a multifaceted approach combining policy interventions, infrastructure development, capacity building, and community engagement. Efforts must focus not only on improving physical connectivity, but also on addressing the underlying social, cultural, and economic barriers that hinder women's engagement with digital technologies. Promoting access to digital technology, along with the skills and literacy required to use it, represents a significant opportunity for Nigeria to foster

Source: Calculated by authors based on the Nigerian General Household Survey, 2013, 2015, and 2019.

Note: Engagement in agriculture includes farmers working on their own or others' farms. Results presented in this figure are based on a double-hurdle model to identify the key variables contributing, first, to the decision to work in agriculture, and second, to the amount of the time invested in that work.

an enabling environment that values gender equality, to promote inclusive and sustainable development, and—importantly—to unlock the considerable untapped potential of its female rural population.

Further Reading

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