Explaining Gender Differentials in Agricultural Production in Nigeria
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Summary
Nigeria presents a unique case study on differences in agricultural productivity between men and women. This study, which captures a comprehensive picture of agriculture across the nation, shows that female farmers produce 16 percent less per hectare than their male counterparts, when plot size, farmer characteristics, and inputs are taken into account. This nationwide (excluding the west) gender gap is driven by the North East and Central regions, where female farmers are 28 percent less productive than male farmers. In these two regions, women farm on smaller plots and have lower levels of key inputs, notably fertilizer and labor, a pattern that is well documented in many other African contexts. Extending access to fertilizer, hired labor, and cash crops to women in the North would likely have a positive overall impact on Nigerian agricultural growth. The South, however, does not fit this established pattern. When controlling for key characteristics and factors of production, no gender gap in productivity is observed, though female farmers would benefit from additional herbicide and female labor. These strikingly different patterns in these two regions of the same country provide ample space for further study.

INTRODUCTION
Comprising half of the population, women represent the largest marginalized group in Sub-Saharan Africa. Differences in land tenure, access to inputs, skills, and time use all decrease female productivity, creating a gender gap in production and earnings.

These patterns seem to hold at a national level in Nigeria, where women earn 60 cents for every dollar a man earns (WDR 2012). Despite their significant role in agricultural production, women in Nigeria have relatively limited access to agricultural land and less access inputs and extension services compared with men (Phillip et al 2009). Nigerian men are five times more likely than women to own land and there are clear geographical differences in land ownership, with lower ownership by women and higher gender gaps in land ownership in the North compared to the South (British Council, 2012). These constraints can limit women’s productivity in the sector.

COUNTRY CONTEXT & DATA
These gender-specific challenges are highly relevant in Nigeria, where agriculture remains the predominant economic activity for many households, employing about 60 percent of the working population and contributing roughly 40 percent to GDP (Nigeria National Bureau of Statistics). Nigerian agriculture is characterized by small-scale, subsistence farming with little commercialization. Agriculture is more common in the North with over 80 percent of households engaged in the sector compared with about 50 percent of households in the South. Although men dominate the sector in Nigeria, a large share of women also participate across the agriculture value chain and are active in production, processing, and sales.

This study, the second in a series of two, uses the first dataset to capture a comprehensive picture of agriculture across the nation of Nigeria. It is representative at the national, zonal and rural/urban levels and includes all six geopolitical zones in Nigeria, three of which are in the North (North East, North West and North Central) and three of which are in the South (South East, South West and South South). These data are from the General Household Survey-Panel (GHS-Panel) conducted in 2010/11 by the Nigeria National Bureau of Statistics (NBS) in collaboration with the World Bank Living Standard Measurement Study (LSMS) team. The analysis focuses on 2,431 households farming 4,240 plots with GPS plot measurement over 100 square meters. It includes information on the manager of each specific plot farmed, rather than defaulting to the household head as the manager, as is common. Overall, 15 percent of plot managers in the data are female.
Because of the paucity of female-managed plots in the North West and South West, this analysis excludes the West of the country. In addition, the analysis shows key distinctions between patterns in the North and South of the country, so the results are presented separately for these regions. Productivity is measured as the monetary (Naira) value of all crops grown on the plot under the manager’s purview.¹

**NOT YOUR MOTHER'S FARM**

In Nigeria, male and female farmers operate under dramatically different conditions, though the pattern varies by region. In the North (North Central and North East), female-managed plots are, on average, 41 percent smaller than male-managed plots. In addition, male managers are more likely than female plot managers to use inputs such as fertilizer, herbicide and pesticide on their plots. Female plot managers use more female household labor per hectare, though there is no significant difference in the amount of male household labor per hectare used. They also use more male labor hired from outside the house.

There are no significant differences in access to extension services in the North. Surprisingly, female plot managers are more likely to grow cash crops² than male managed plots with 20 percent of plots managed by females growing at least one cash crop compared to 14 percent of male managed plots.

In the South (South Central and South East), some key distinctions emerge. Unlike in the sample in the North, no significant differences are observed in land size or per hectare use of non-labor inputs when comparing male and female-managed plots. Female-managed plots in the South have significantly fewer days of male family labor, hired male labor, and hired female labor. Unlike in the North, male managers in the South have more access to extension services than their female peers.

**A GENDER GAP EMERGES**

When accounting for these differences, including plot size, farmer characteristics, and use of inputs, women in Nigeria produce 16 percent less than men per hectare.

In the North, a much larger gender gap is observed, as female farmers produce 28 percent less than their male peers. As other studies from Africa have observed, productivity declines with land size (Carletto et al., 2011). For this reason, women’s plots, which are much smaller than men’s on average, look more efficient than men’s larger plots. However, once size is taken is controlled for, male plot managers are revealed to be significantly more productive.

In the South, where men and women’s plot sizes are no different, no gender gap in productivity exists. Interestingly, the patterns of differences between male and female farmers in these two regions of the same country are markedly different, and the national gender gap appears to be driven entirely by productivity differences in the North (excluding the West).

**UNDERSTANDING THE GAP: ENDOWMENTS & RETURNS**

To get a better understanding of this gender gap, the results of an Oaxaca decomposition are examined, which makes it...
possible to delve deeper into how the different factors contribute to the gender gap. This technique is often used to explain gender wage differentials, and applying it to agricultural productivity is a novel approach that has only been tried once before in literature on Africa. This decomposition can be understood as being composed of two portions: endowments (the portion of the gap that is due to differences in levels of observed variables, such as labor, land, and education) and returns (the unexplained portion of the gap which shows the return to each factor of production).

**NORTHERN NIGERIA**

In the North, both portions of the gap are significant, though the gender disparities are driven more by the unexplained factors than by the observed characteristics. Men tend to live in households with a larger household adult labor pool, have higher incidence of fertilizer use, and have more days of hired labor than female managers, all of which widen the gender gap. The factor that contributes most to the endowment effect, though, is women’s smaller plot sizes, which masks the gender difference by reducing the gap.

The returns to factors of productivity are lower for women in the North and seem to drive the gender difference in this region. Female farmers tend to be older, and these older women face a particular disadvantage, a finding which may benefit from further research. Monocropping, growing cash crops, engaging in off-farm employment, and using purchased seeds all work to narrow the gap.

**SOUTHERN NIGERIA**

In the South, unlike in the North, only the aggregated endowment effect is significant. The amount of herbicide and female hired labor both serve to widen the gap, while farm size and the number of adult females in the household contributes negatively to the endowment effect, thereby reducing the gap.

In the unexplained disaggregated results, it is found that age contributes to the gender gap. Further examination suggests this may be capturing a widow effect, as most of the female managers in the South are widowed and the widows are more likely to be older. Men also benefit more from female family labor and the ratio of children to adults in the household.

**POLICY CONCLUSIONS**

In Northern Nigeria, female farmers produce yields that are significantly lower than that of their male counterparts. This gender gap in productivity is primarily driven by the disproportionate disadvantage faced by older female farmers, as well as lower levels of key inputs, notably fertilizer and labor, a pattern that is well-documented in many other African contexts. Extending access to fertilizer, hired labor, and cash crops to women in the North would likely have a positive overall impact on Nigerian agricultural growth.

The South, however, does not fit this established pattern. When controlling for key characteristics and factors of production, no gender gap in productivity is observed. However, women in this region would benefit from additional herbicide and female labor. Further research that investigates this unique context and explores the mechanisms that drive the differences in inputs and returns is pending.

This brief is based on data collected by the Nigeria National Bureau of Statistics as part of the Living Standards Measurement Study - Integrated Surveys on Agriculture (LSMS-ISA) project. The full dataset is available for download at www.worldbank.org/lsms-isa.