



Outline

- 1 | Introduction p.1
- 2 | An overview of studies on gender productivity differentials in SSA p.2
- 3 | Data p.5
- 4.1 | Approximation of production gains p.6
- 4.2 | Approximation of consumption and poverty gains p.7
- 5 | Potential gains from closing gender productivity differentials in SSA p.8
- 6 | Summary and conclusion p.10
- References p.11

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Gender equality in agriculture: What are really the benefits for sub-Saharan Africa?

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Abstract

Empowering women and ensuring gender equality have become a much-discussed subject among many political leaders, civil rights activists, and women's associations. In agriculture particularly, women face daunting constraints that significantly limit their potential and enmesh them into a gender productivity trap. The aim of this brief is to untangle the potential benefits African countries could get if they would strive for greater gender equality in their agricultural sector. Drawing on Mukasa and Salami (2016) who found that gender productivity gaps in Nigeria, Tanzania, and Uganda were respectively of 18.6, 27.4, and 30.6%, closing gender productivity differentials is estimated to yield production gains of 2.8% in Nigeria, 8.1% in Tanzania, and 10.3% in Uganda. These production gains would subsequently raise monthly consumption per adult equivalent by 2.9%, 1.4%, and 10.7% in Nigeria, Tanzania, and Uganda, respectively; and would help around 1.2%, 4.9%, and 13% households with female-managed lands climb out of poverty in Nigeria, Tanzania, and Uganda, respectively. Improving women's access to productive inputs (such as land, chemical fertilizer, improved seeds, and pesticides), reforming land discriminatory laws, and closing women's gaps in technology, agricultural finance, human capital, and extension services may help achieve gender equality in SSA's agriculture.

1 | Introduction

Women's contribution to economic development is hard to over-emphasize. In the agricultural sector of many developing countries, they represent the main driving force and spend considerable amount of time planting, weeding, ridging, and harvesting, while simultaneously doing their regular chores. However, irrespective of the sub-Saharan African (SSA) country under investigation, women are often found to be less productive than their male counterparts in the agricultural sector. Indeed, empirical

evidence suggests that women's deficits in agricultural productivity range from 4 to 50% across the world, but lie between 20 and 30% in the SSA region (FAO, 2011; Kilic et al, 2013).

The discriminating factors generally encompass land constraints (small land size, unequal land tenure systems and property rights), low application of modern inputs (such as chemical fertilizer, improved seeds, and pesticides), limited access to advisory

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and extension services, low stocks of human and physical capital and exclusion from credit and financial markets (Akresh, 2005; Goldstein and Udry, 2008; Alene et al, 2008; Peterman et al, 2011; Vargas Hill and Vigneri, 2011; Kilic et al, 2013; Croppenstedt et al, 2013; Aguilar et al, 2014; Backiny-Yetna and McGee, 2015; Ali et al, 2015).

Most SSA countries now recognize that the fight against gender bias in agriculture is crucial to sustaining economic growth and ensuring food security. This is particularly germane in countries where the vast majority of the populations earn their incomes from agriculture-based activities. According to recent statistics, agriculture accounts on average for 30% of the Gross Domestic Product in SSA countries, provides about 45% of earning sources, and employs over 65% of the total labor force (World Bank, 2015). If SSA countries could harness the full potential of their agricultural sector, then the impacts at household and national levels would be substantial.

While the extent of gender productivity gaps in SSA is well documented, a crucial ingredient is often missing from studies analyzing gender bias in agriculture: the assessment of potential benefits that would be expected if we were to decrease or outrightly eliminate gender inequality in agricultural productivity. For policy purposes, this is an important shortcoming. Indeed, it is particularly challenging to get policy makers committed to closing gender yield gaps if they are not convinced of the real benefits from allocating national resources to the fight against agricultural gender bias. It is not enough to simply enumerate the direct and/or indirect positive effects of gender equality in agriculture. Although a qualitative evaluation of these effects gives important insights, it is not particularly informative of the magnitude of potential benefits that countries would get.

Against this backdrop, the aim of this brief is to offer a first step towards a quantitative assessment of the expected benefits from gradually reducing or closing gender productivity differentials in SSA. This brief is a supplement of the authors' recent work (Mukasa and Salami, 2016) on the sources of gender productivity gaps in SSA countries in which we found that agricultural lands managed by female farmers were 18.6, 27.4, and 30.6 percent less productive than their male counterparts in Nigeria, Tanzania, and Uganda, respectively. Using the same sets of nationally representative data from the Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA), the present brief focuses on three types of benefits from gender equality in agriculture, namely production, consumption, and poverty gains. Production and consumption gains refer here to the relative percent increases in the production and consumption levels resulting from

enabling female managers to be as productive as male farmers. Poverty gains stand for the relative decline in the number of poor households achieved by closing or gradually eliminating gender productivity gaps in SSA.

The remaining of this brief is organized as follows. The next section gives an overview of recent studies on gender productivity differentials in SSA. Data sources are presented in section 3. Methodology for computing the expected benefits from gender productivity equality is discussed in section 4. Section 5 presents the results, and section 6 gives some concluding remarks.

2 | An overview of studies on gender productivity differentials in SSA

The literature linking gender differences and agricultural productivity can be decomposed into two main strands. The first strand focuses on the role of constraints faced by women at different stages of the production process to explain the observed differences in productivity levels. Since access to productive resources such as land, modern inputs, technology, or financial services is crucial in determining the level of agricultural productivity, then their limited access by women is likely to explain the productivity gap.

However, when authors simulate an equal access to land and other productive inputs, then the gender gap almost always disappears (World Bank, 2012; Kilic et al, 2013). For example, in their study of agricultural productivity in Burkina Faso, Udry et al (1995) compared around 4,700 agricultural plots and found that women's yields were 20 and 40 percent lower for vegetables and sorghum than men's but these large differences were essentially driven by women's lower use of productive inputs attributed to gender-based social norms. The same result patterns were revealed in Ethiopia by Tiruneh et al (2001) where the 35-percent productivity gap obtained was attributed to lower levels of input uses and limited access to extension services. In Zimbabwe, Horrell and Krishnan (2007) also explained the gender yield gaps by the lack of experience, fertilizer use, and access to extension services. Similar results and causal explanations are also found in studies of Saito et al (1994) for Burkina Faso, Kenya, Nigeria, and Zambia; Alene et al (2008) for Kenya; Oladeebo and Fajuyigbe (2007) for the Osun State in Nigeria; and Timothy and Adeoti (2006) for the Ondo and Ogun States in Nigeria.

A second strand of literature posits that market inefficiencies, particularly in the labor and credit sectors, affect more intensively the productivity of female-plot managers by

discouraging their participation to off-farm activities and reducing their inputs' access. Built on the gender wage gap literature, it shows that labor market imperfections create a wedge between the marginal product of labor and the prevailing market wage rate for the same type of work (Biswanger and Rosenzweig, 1986; Barrett, 1996; Barrett and al, 2008) and the magnitude of this wedge differs between male and female farmers. Using data from Malawi, Palacios-López and López (2015) show that the estimated 44-percent gender productivity differences between male- and female-headed plots was explained by 34 percent by labor market imperfections that spill over to the agricultural productivity.

The magnitude of gender productivity differentials and the relative importance of their drivers are dependent on the country, the representativeness of the sample, the choice of crops, the unit and methodology of analysis. To measure the extent of agricultural productivity differentials and untangle their potential sources, a common feature of the existing studies has been the reliance on the production/yield function estimates and

decomposition methods. Regarding the unit of analysis, the overwhelming majority of empirical studies have identified gender differences in yields (a common measure of agricultural productivity in the literature) by comparing male- and female-headed households. This choice may be explained by the practical impossibility from most existing data to unequivocally assign ownership and responsibility to one single person (Croppenstedt et al, 2013). However, the validity of the conclusions from this approach will eventually hinge upon its underlying assumptions (similar productive capacity across all household members, identical access to information, and negligible differences in quantity and quality of input uses) (Kilic et al, 2013; Oseni et al, 2013). The second possibility is to use instead information at the plot level and distinguish between plots managed or owned by men and women within the same household. This approach has the advantage of unveiling intra-household dynamics and capturing the extent of power sharing among household members. Table 1 summarizes the results of some studies on gender productivity differences conducted in SSA countries.

Table 1 Summary of some studies on gender productivity differences in SSA

Authors	Country studied	Period covered by the study	Sample	Percent of gender productivity gap	Main reasons of estimated gender gaps
Udry et al	Burkina Faso	1981-1985	4,655 cultivated plots	20% for vegetables; 40% for sorghum	Lower uses of productive inputs
Tiruneh et al	Ethiopia	1998	180 households	35%	Lower levels of input uses and limited access to extension services
Akresh	Burkina Faso	1990-1991	2406 households	Range from -32.5% to +50%.	Differences in farm sizes and vulnerability to rainfall shocks
Gilbert et al	Malawi	1998-99	1,385 sites	No significant difference	-
Peterman et al	Nigeria, Uganda	Nigeria: 2005; Uganda: 2003	Nigeria: 3,706 households; Uganda: 3,625 plots	Nigeria: 75%; Uganda: 28.6%	Differences in socio-economic characteristics (such as age, education, and household size), agricultural inputs, and crop choices
Vargas Hill and Vigneri	Ghana, Uganda	Ghana:2002; 2004; Uganda: 2003	Ghana: 428 cocoa farmers; Uganda: 300 coffee farmers	Ghana: 16.7% in 2002 and 14.6% in 2004; Uganda: 11.2%	Differences in access to assets and markets
Kilic et al	Malawi	2010-11	16,372 plots	25%	Differences in endowments (adult male labor inputs, child dependency ratio) and in inorganic fertilizer use
Aguilar et al	Ethiopia	2011-12	1,518 households	23.4%	Differences in land attributes, unequal access to resources and unequal returns to productive inputs
Backiny-Yetna and McGee	Niger	2011	4,814 plots	19%	Differences in accessing, using and supervising male farm labor; in quantity and quality of fertilizer use and in land ownership
Ali et al	Uganda	2009-2011	6,999 plots	17.5%	Differences in child dependency ratio, transport access, uptake of cash crops, improved seeds, and pesticides
Mukasa and Salami	Nigeria, Tanzania; Uganda	Nigeria: 2012-13; Tanzania: 2012-13; Uganda: 2011-12	Nigeria: 4,017 plots; Tanzania: 2,530 plots; Uganda: 2029 plots	Nigeria: 18.6%; Tanzania: 27.4%; Uganda: 30.6%	Endowment and structural disadvantages of women in land size and quality, and labor inputs

Source: Elaborated by the authors using the selected studies

While a gender wage gap has been consistently found in almost all studies using data from all regions, the reality is more nuanced when it comes to the agricultural sector. Indeed, though the overwhelming majority of studies showed that female farmers display significantly lower productivity levels than their male counterparts, others found no significant differences between the two groups (Gilbert et al, 2002) or even women being technologically more efficient than men (Akresh, 2005).

The general conclusion from the above studies is that female farmers might be at least as efficient as their male counterparts if the constraints they face in resource endowments and in accessing land, input, and agricultural finance could be addressed. The potential gains from closing or at least reducing the extent of the gender productivity gap could therefore be substantial, particularly in countries with larger shares of lands owned and/or managed by women. For instance, FAO estimates that if agricultural lands managed by women were to use equal quantities of inputs as in men-managed plots, then agricultural output in the developing countries would be raised, on average, by 2.5-4% and the number of undernourished people would decline by 12-17% (FAO, 2011).

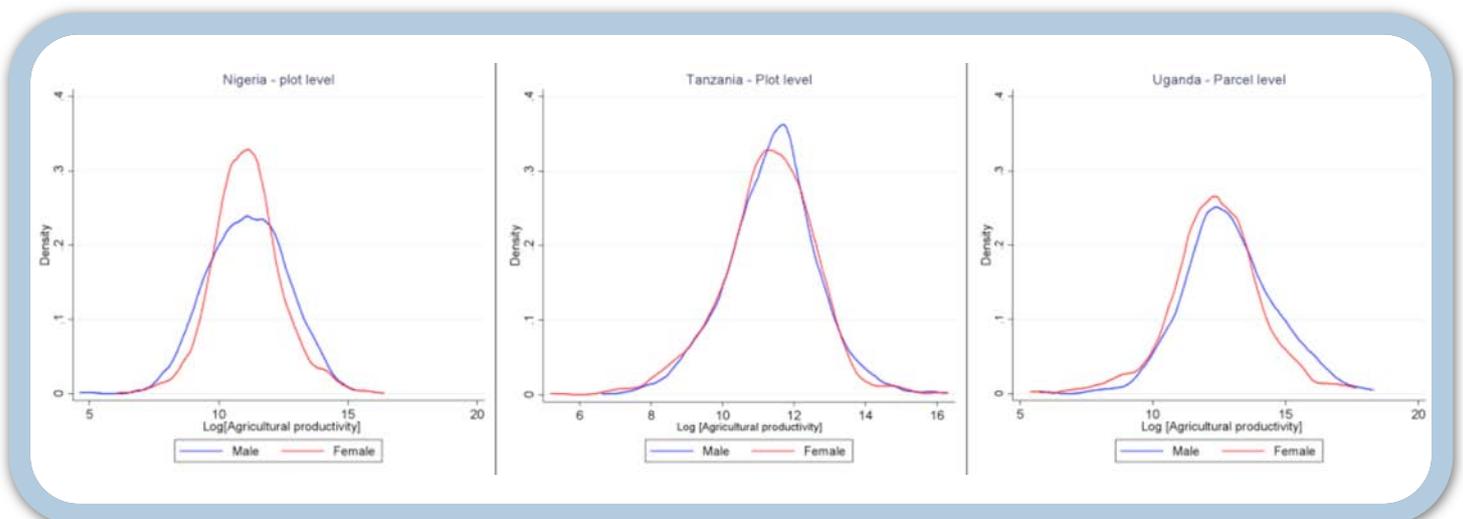
3 | Data

The data used in this brief come from the Living Standards Measurement Study – Integrated Surveys on Africa (LSMS-ISA) project, funded by the Bill and Melinda Gates Foundation and

implemented by each country's national statistics agency under the technical guidance of the World Bank. Of the six SSA countries with currently available LSMS-ISA data (Ethiopia, Malawi, Niger, Nigeria, Tanzania, and Uganda), we use data from Nigeria, Tanzania, and Uganda, given the paucity of updated evidence on gender gaps from these countries. The datasets are nationally representative and cover a set of demographic, health, economic, agricultural, and community topics². In each country, the analysis is performed at the land manager's level. For this brief, the final sample consists of 4,017 agricultural plots in Nigeria; 2,530 plots in Tanzania; and 1,160 parcels in Uganda representing 2,029 agricultural plots³.

Figure 1 plots the distributions of agricultural productivity (log of production values per acre) for male and female managers in the 3 countries using Kernel density estimates⁴. In Uganda, the productivity distribution of female-managed lands is predominately located at the left of the male distribution, which suggests that overall, female managers under-perform compared to their male counterparts. The differences are particularly high after the middle of the productivity distribution. In Tanzania, productivity distributions of male and female managers nearly overlap, except at the middle of the distribution where differences are high. Finally, in Nigeria, the distribution of the male managers is partly located at the left of that of female managers, for lower productivity levels, and partly at the right for higher productivity levels, with striking differences at the middle of the distribution.

Figure 1 Female and Male Managers' Productivity Distribution – Kernel density estimations



Source: Calculated by the authors based on the LSMS-ISA datasets of the respective countries.

² Details on key descriptive statistics of male and female managers can be found in Mukasa and Salami (2016).

³ We excluded from the initial samples observations with missing data on key variables, such land size, agricultural production, input uses, and lands jointly managed by both males and females.

⁴ Kernel density estimation is an exploratory data analysis technique using a non-parametric method to estimate the probability density function of a random variable (Fox, 1990; Li and Racine, 2006).

4. | Models of potential benefits of gender productivity equality

In a recent work, Mukasa and Salami (2016) found that yields on agricultural lands managed by Nigerian, Tanzanian, and Ugandan women are systematically lower than those managed by men, whether they considered an “average” farmer or they moved along the entire productivity distribution. Furthermore, they identified various factors explaining these gaps, ranging from differences in quantity and quality of land cultivated by farmers to differences in input uses and household characteristics. The question that immediately stands out is therefore “what if we could reduce or completely close all women’s endowment and structural disadvantages in agriculture? How large would be the production and welfare gains if we could achieve gender equality in agriculture?” The larger these potential gains, the more urgent the need to tackle gender inequality in agriculture.

However, it is not generally possible to get precise estimates of these potential gains. First, agricultural production is highly unpredictable and factors beyond farmers’ control (for example, climatic conditions, plant diseases, or pest infestation) may explain a significant part of production and yield levels. Second, male and female managers may develop completely different managerial and/or agricultural skills, unobservable to the researcher but likely to affect production and yield levels. Finally, the agronomic conditions under which male and female managers operate may be so different that there will remain a nonzero gender productivity gap even after allocating productive resources equally between male and female managers. These agronomic conditions may relate to factors such as differences in physiological crop attributes and local soil characteristics (such as soil nutrients, rate of water retention, and soil nitrogen content). Because of these factors and others, we can only approximate the expected gains from gradually reducing or eliminating female managers’ deficits in agricultural productivity.

The approximation exercise relies on the assumption that soil, farm, farmer, and household observable characteristics represent the main drivers of gender productivity differentials in SSA and although unobservable heterogeneity certainly plays a role, its influence is assumed negligible for simplicity purposes. To obtain reasonable approximates of these potential benefits of gender equality in agriculture, we will use the estimated yield gaps between female- and male-managed plots/parcels, the share of male-managed agricultural lands, and the areas under cultivation (Mukasa and Salami, 2015).

4.1 | Approximation of production gains

Production gains are understood here as the relative percent increases in the production levels when all observable constraints hindering female managers’ productivity are gradually suppressed, therefore enabling women to become as productive as men.

Let Y_m , Y_f and Y_T be respectively, current male, female and total gross values of yields in the sample. Let also Q_m, Q_f , and Q_T denote current male, female, and total gross values of outputs in the sample, respectively. Let finally g be the estimated gender productivity gap in the country, as obtained in Mukasa and Salami (2016); p , the proportion of plots/parcels managed by men; A_T , the total cultivated land in the country; and i (with $0 \leq i \leq 1$), the percent of the estimated gap that the government would like to reduce.

This means that the following relationships hold:

$$Q_T \equiv Y_T * A_T \quad (1)$$

$$Y_f = \frac{1}{[1 + (1 - i)g]} Y_m \quad (2)$$

$$Y_T = p * Y_m + (1 - p) * Y_f \quad (3)$$

Using (2) and (3), the relationship (1) can also be written as:

$$Q_T = \left[p + \frac{(1 - p)}{1 + (1 - i)g} \right] * (A_T * Y_m) \quad (4)$$

If in a country there is a perfect equality in both endowments and returns between female and male managers and that the impacts of unobserved differences between the two groups are negligible, then $g = 0$ and $Y_f = Y_m$, so that:

$$Q_T^n \equiv Y_m * A_T \quad (5)$$

where Q_T^n represents the new production level after closing the gender productivity gap. Hence, the difference between Q_T^n and Q_T gives the approximate production gains. Subtracting (4) from

(5) and then dividing the result by Q_T , we get the relative expected production gains for various targets of i :

$$\underbrace{\frac{(Q_T^n - Q_T)}{Q_T}}_{\text{production gains}} = \frac{1}{Q_T} \left[\frac{(1-p)(1-i)g}{1+(1-i)g} \right] * (A_T * Y_m) \quad (6)$$

Equation (6) states that the percent increase in the production levels due to gender equality in agriculture would be greater the larger the proportion of female-managed plots, $(1-p)$. Moreover, when comparing two countries, production gains will be more important in the country with larger gender productivity differentials, g , or a higher policy target, i , holding other things constant. Finally, the larger the level of production attained by male managers relative to their female counterparts, $(A_T * Y_m)$, the greater the expected benefits from closing gender productivity gaps. Hence, under the model assumptions, equation (6) shows that there might be considerable potential production benefits that could result from increasing women's access to agricultural lands and modern inputs, improving their managerial and agricultural skills, as well as their access to extension and advisory services.

4.2 | Approximation of consumption and poverty gains

It is also possible to approximate other potential gains from reducing/closing the gender productivity gaps. One of the most important of them is whether, beside gains in production, reducing the magnitude of gender gaps might also translate into welfare improvements of households where plots/parcels are female-managed. For the sake of simplicity, we only consider here two other benefits from gender equality in agriculture: consumption and poverty gains. There will be consumption gains if the level of monthly consumption per adult equivalent after reducing/closing gender gaps is higher than before. Similarly, there will be poverty gains if the number of households below the poverty line in households with female-managed plots/parcels decline after accounting for consumption gains due to gender equality in agriculture.

Let τ , with $0 \leq \tau \leq 1$, be the share of production normally allocated to home consumption and that the additional production from reducing/closing the gender gaps obtained in equation (6), i.e. $Q_T^n - Q_T$, be distributed equally across all

households in the sample with female managers. Let also C_T^n and C_T represent the consumption values after and before reducing/closing the gender productivity gap. This means that:

$$\underbrace{\frac{(C_T^n - C_T)}{C_T}}_{\text{consumption gains}} = \frac{\tau}{n(1-p)C_T} * (Q_T^n - Q_T) \quad (7)$$

$$= \frac{\tau(1-i)g}{n[1+(1-i)g]C_T} * (A_T * Y_m)$$

where n is the sample size.

The intuitions behind equation (7) are straightforward. Given the model assumptions, there is a positive correlation between the levels of production and consumption gains. When female-managed plots become as productive as males', then the additional production helps improve household's food security by increasing the quantity of food available for home consumption. This is particularly important in the context of the three countries under investigation (Nigeria, Tanzania, and Uganda) because consumption values were found to be systematically lower in households with female managers (Mukasa and Salami, 2016). Moreover, the larger the number of female managers within the economy, the smaller the potential consumption effect per household.

Finally, there will be poverty gains from reducing/closing the gender gaps if:

$$\#(C_T^n + C_N < \bar{w}) < \#(C_T + C_N < \bar{w}), \quad (8)$$

where C_N represents non-food consumption values. The left-hand side of (8) stands for the number of households with female-managed lands in which the total value of household consumption of food and non-food, $C_T^n + C_N$, is smaller than the poverty line \bar{w} . The right-hand side represents the number of poor households with female-managed lands before reducing/closing the gender productivity gap.

⁵ It is also conceivable that production gains from gender equality be allocated to other household non-food expenditures, such as education, health, or purchases of durables and/or non-durables. However, given data constraints, this possibility could not be investigated further.

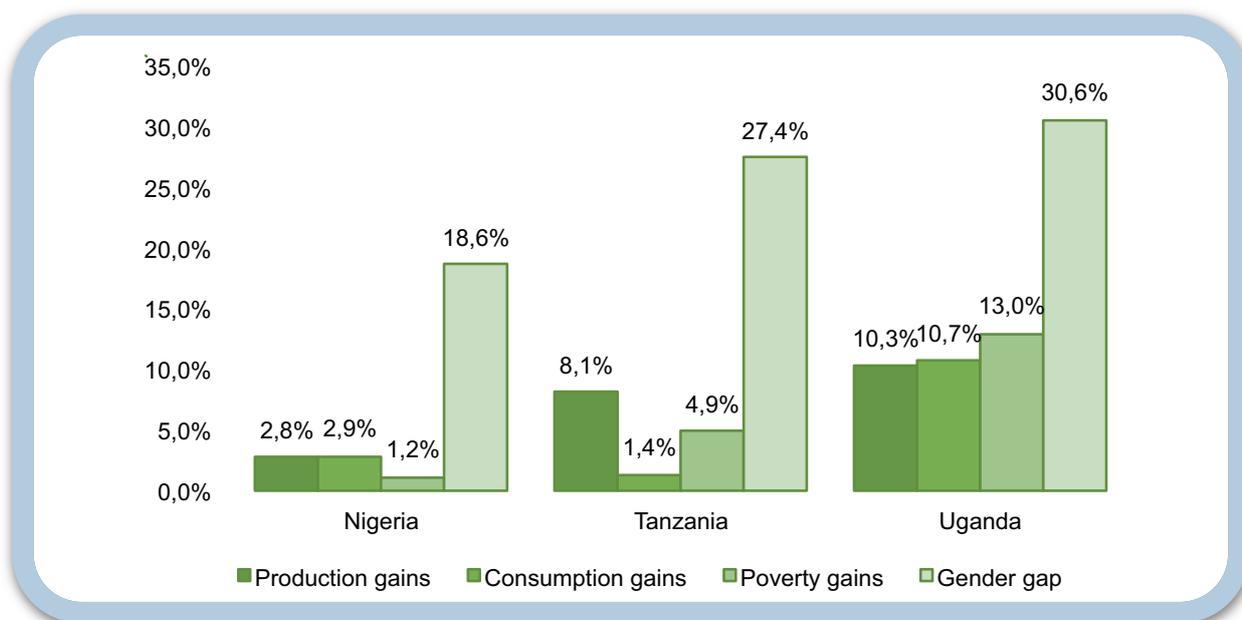
5 | Potential gains from closing gender productivity differentials in SSA

Using equation (6) and findings from Mukasa and Salami (2016), Figure 2 plots the approximate production, consumption and poverty gains that would be achieved if male and female managers had equal access to all productive factors and that the gender productivity differentials of 18.6% in Nigeria, 27.4% in Tanzania, and 30.6% in Uganda were completely eliminated.

As previously shown, the higher the current gender productivity differential, the larger the potential production gain from closing the gap. From Figure 2, the maximum production gains, expressed in percentage of the current

production levels, are respectively of 2.8% in Nigeria, 8.1% in Tanzania, and 10.3% in Uganda. Weighting these effects by the share of female managers from each country gives an average potential production gain of 6.6%. If these three countries are representative of yield gaps, input uses, and land allocation patterns between men and women in other SSA countries, then we could expect a global production increase of a relatively similar magnitude. These production gains are not negligible, knowing that SSA countries are lagging far behind other regions in terms of agricultural productivity. Thus, eliminating constraints, which prevent female managers from becoming as productive as males could be an important step towards improving agricultural productivity of SSA countries and ensuring its successful structural transformation.

Figure 2 Gender gaps and potential gains from gender equality in agriculture



Source: Authors, using the LSMS-ISA datasets of the respective countries and Mukasa and Salami (2015).

Regarding consumption gains, Figure 2 reveals that at the maximum, the monthly consumption per adult equivalent would increase by respectively 2.9%, 1.4%, and 10.7% in Nigeria, Tanzania, and Uganda, relative to their current levels. Gains of these magnitudes are substantial, particularly since current consumption levels in households with female-managed plots/parcels are already below those of males' (Mukasa and Salami, 2016). The larger consumption gains in Nigeria compared to Tanzania, despite having a lower production gain, comes from the smaller proportion of female-managed plots (17.1% against 34.9% in Tanzania),

which more than offset its disadvantage in terms of production gains.

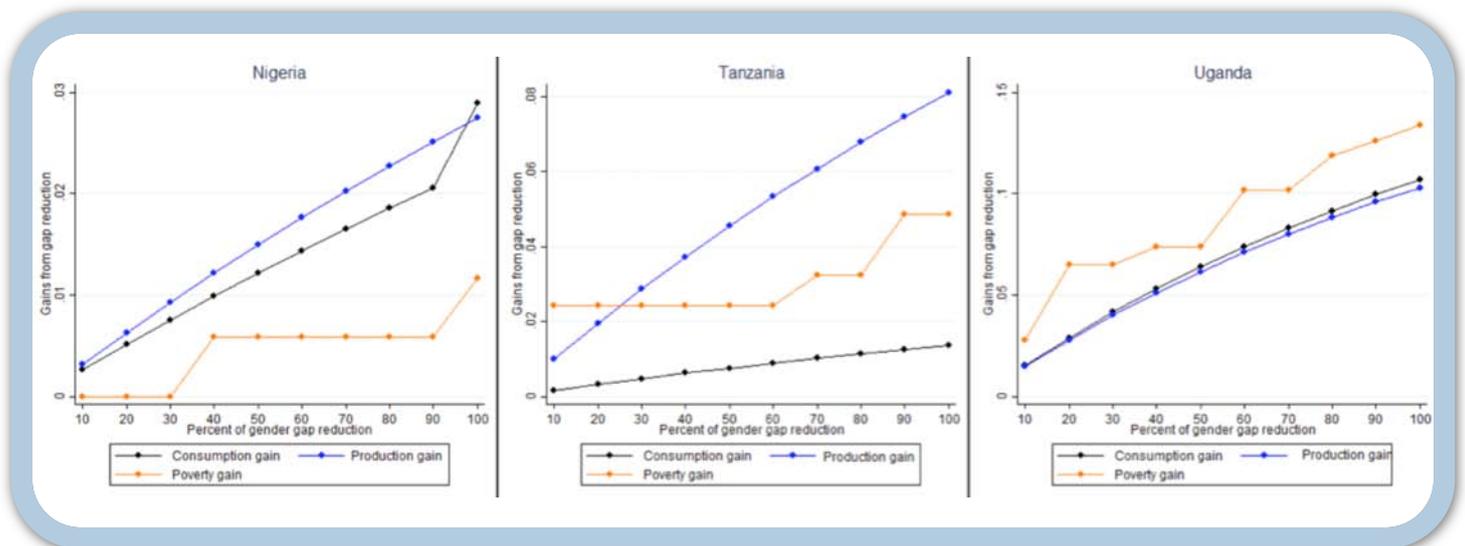
Finally, the figure also depicts the potential poverty gains from gender equality in agricultural production. In Nigeria, around 1.2% of current poor households with female-managed plots/parcels would be expected to climb out of poverty after closing gender productivity gaps. In absolute terms, this represents 2 out of the 171 households that are current below the poverty line in the sample of female managers. In Tanzania and Uganda, these potential poverty gains would reach

respectively 4.9 and 13%, representing 6 (out of 123) and 14 (out of 108) current poor households in those 2 countries. At national levels, this means that many poor individuals could see their welfare conditions significantly improve by reallocating productive resources between male and female managers⁶. Over time, these direct effects of gender equality in agriculture would induce other potential benefits. These indirect effects would include increases in female managers' bargaining power and improvements in their social status as their earnings increase, better child nutrition, health, and education attainment in households with female-managed plots (FAO, 2011).

However, given the extent of structural challenges faced by SSA countries, it is likely that the fight against gender productivity bias would be gradual and yield gaps would only be progressively reduced. Figure 3 give the approximate production, consumption and poverty gains from various levels of reduction of the current gender productivity differentials. Reducing the current yield gap by only 10% would induce very marginal effects since the approximate production gains in that case would be of the order of 0.3%

in Nigeria, 1% in Tanzania, and around 1.5% in Uganda. The gains are then increasing as we gradually reduce the current gaps with increasing rates. With a 10% gap reduction, no poverty gains would be expected in Nigeria insofar as consumption gains at that policy target are not sufficient enough to trigger any transition out of poverty. In Tanzania and Uganda, the poverty gains are already positive at that level but still very marginal in Tanzania with around 1% gain. Contrarily to production and consumption gains, poverty gains are not always increasing as we are reducing the gender gaps. Hence, in Nigeria, there are no poverty gains if less than 30% of the current gender productivity differentials are reduced and though they become positive afterwards, poverty gains do not improve between 40 and 90% of gender gap reduction, stagnating at around 0.6%. In Tanzania, they remain at 2.4% between 10 and 60% before starting an increasing trend. This implies that considerable efforts need to be undertaken to obtain tangible positive welfare improvements from reducing gender productivity bias. Governments tackling this gender bias will have set up ambitious programs if they want to lift a significant proportion of their countries' female managers out of poverty.

Figure 3 Potential gains from reducing/closing the gender productivity gaps



Source: Calculated by the authors based on the LSMS-ISA datasets of the respective countries.

⁶ Owing to data constraints, the exact numbers are impossible to compute. However, using currently available data on total labor force and the share of agricultural female farmers holding lands in the total labor force (FAO, 2015; World Bank, 2015) and taking advantage of sample information from LSMS-ISA surveys, we can get an idea of poverty gains at national levels. In the three countries, the number of households moving out of poverty after closing gender productivity gaps amounted approximately 2,500 in Nigeria, 1,700 in Tanzania, and 4,100 in Uganda.

6 | Summary and conclusion

Across Sub-Saharan Africa, female managers cultivate smaller land, have less access to inputs, advisory and extension services, display a lower rate of modern inputs application than their male counterparts, and suffer from discriminatory land laws. These constraints have led to important gender productivity differentials, evaluated at 18.6, 27.4, and 30.6%, respectively for Nigeria, Tanzania, and Uganda (Mukasa and Salami, 2016). Reallocating productive resources evenly between female and male managers may unlock the productivity potential of women inasmuch as many gender productivity studies have stressed that female managers might be as efficient as males when they had equal access to productive resources (Udry et al, 1995; World Bank, 2012; Kilic et al, 2013) .

This brief is aimed at approximating the potential benefits that SSA countries could gain by targeting gender productivity bias in their agricultural sector. It went beyond a qualitative assessment to investigate the extent of production, consumption, and poverty effects of gender equality in Africa's agriculture. Taking Nigeria, Tanzania, and Uganda as case studies, results suggest that closing gender productivity gaps would yield production gains of 2.8% in Nigeria, 8.1% in Tanzania, and 10.3% in Uganda. Furthermore, compared with their current levels, monthly consumption would also be expected to increase by 2.9%, 1.4%, and 10.7%, respectively for Nigeria, Tanzania, and Uganda. On the other hand, 1.2%, 4.9%, and 13% of current poor households with female managers might move out of poverty in Nigeria, Tanzania, and Uganda, respectively.

All these numbers convey the same message: current agricultural production levels in Africa could be significantly improved by just closing the gender productivity bias and important spillover effects in the short, medium, and long runs could be expected. Consumption and poverty gains,

approximated in the present brief, are only a fraction of these beneficial effects; other effects include improvements in the nutritional status of household members, social consideration, earnings, and children's education achievements.

To break the gender productivity trap female managers have been caught into for a long time now, sound reforms will need to be undertaken by policy makers. First, discriminatory laws or customs prevent many women in sub-Saharan Africa to acquire and/or hold land. In sub-Saharan Africa, the most dominant land tenure system is still customary or communal, which generally considers women as not worthy of acquiring or inheriting land property rights. Without access to land, one of the most important input factors for performing agricultural activities, women are thus confined to be laborers, lack sufficient power to either influence production decisions within the household or control the allocation of agricultural incomes. With secure land property rights, women would be able to participate into input use decisions, improve household's food security and enhance their agricultural productivity inasmuch as land tenure security can play as collateral and help farmers have better access to agriculture finance and purchase modern inputs. Hence, improvements in land tenure systems and fight against both unequal laws and constraints in accessing land are crucial if we target gender productivity inequality. Finally, as long as women will continue to suffer from endowment and structural disadvantages due to unequal access to extension and advisory services, agricultural financial instruments, public service delivery, and human and social capital deficits, reducing or closing gender productivity gaps will remain unattainable. Therefore, it is crucial to improve women's access to better-quality education in order to widen their opportunities, improve their participation to extension services to help them increase their adoption rates of new or modern agricultural inputs, and enhance their access to credit, finance, and insurance schemes to enable them finance and secure agricultural investments.

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