Exploring differences in agricultural productivity among women and men on small-scale farms in Senegal: Contributions of agricultural innovations

October 2021 By Aboubacry KANE and MOUHAMADOU M. AIDARA

KEY MESSAGES

- On small-scale farms in Senegal men are more likely than women to adopt agricultural innovations such as improved seed, fertilizer, agrochemicals, or machinery.
- However farm plots managed by women are, on average, more productive than those managed by men for many crops and across regions in the country.
- The fact that women cultivate smaller plots, as well as specialize in certain high-yielding crops including rainfed rice, explains much of this difference in land productivity.
- Multivariate models based on the Kitagawa-Oaxaca-Blinder approach suggest that if endowments of women's plots – especially size of farmed areas – were adjusted to the same level as those of men's plots, men's productivity would be higher, in part due to greater use of agricultural technologies.
- If women and men had the same level of adoption of certified seed and chemical fertilizers (NPK, Urea, Phosphate), then women's productivity would further increase by between 0.4% and 0.5%.
- Study findings suggest a need for further studies using gender disaggregated data to fully unleash the agricultural production potential of both women and men in rural Senegalese farm communities.

BACKGROUND

In 2014, Senegal embarked on the "road to emergence" through the adoption of the Emerging Senegal Plan (ESP), the first axis of which aims at the structural transformation of the economy. This transformation seeks to realize the development of the agriculture, fisheries and agri-food sectors, in particular, by developing competitive integrated sectors with high added value and intensifying production by increasing productivity. Aware that these development objectives of the PES cannot be achieved without eliminating gender disparities, the Government of Senegal has adopted a national Gender Equity and Equality Strategy (SNEEG), one of the objectives of which is to create an institutional and socio-economic environment conducive to gender equality. Despite this political will, gender disparities persist in the agricultural sector where productivity remains a major issue. Basically, agricultural policies, from the Loi d'Orientation Agro-Sylvo--Pastorale (LOASP) to the Stratégie Nationale de Sécurité Alimentaire et de Résilience (SNSAR), to the Programme d'Accélération de la Cadence de l'Agriculture Sénégalaise (PRACAS) the Lettre de Politique Sectorielle de Développement de l'Agriculture (LPSDA) and the Programme National d'Investissement Agricole pour la Sécurité Alimentaire et la Nutrition (PNIASAN) [1], all aim to achieve food and nutrition security and reduce poverty, but few policies have integrated gender into their goals and objectives (FAO, 2018). In 2015, 80.7% of plots were farmed by men compared to 19.3% by women in 2015 (EAA, 2020).

Yet reducing gender inequalities in Africa can

significantly improve agricultural production and reduce poverty (FAO, 2011).

As part of the INITIATIVE 50X2030 programme, a global strategy to improve agricultural and rural statistics, whose data are intended to inform policy design and implementation, this research examined the contributions of agricultural innovations to gender gaps in agricultural productivity in Senegal. More specifically, the paper draws on data from the 2018 Annual Agricultural Survey (AAS) conducted under the FAO Integrated Agricultural Survey (AGRI Survey) in order to:

- Measure the contribution of agricultural innovations to productivity (value of production / hectare) on plots managed by women and men;
- Identify factors associated with production and productivity in Senegal by gender; and
- Explore components of observed gender gaps in agricultural productivity in Senegal, drawing on the Kitagawa-Oaxaca-Blinder approach.

STUDY METHODS

Using data from the 2018 Annual Agricultural Survey (AAS) conducted under the FAO Integrated Agricultural Survey (AGRI Survey) program, we adopt the Kitagawa-Oaxaca-Blinder decomposition method to examine differences in agricultural productivity between women and men. The method consists of estimating a yield function that models the value of output per hectare as a function of a set of factors associated with output (and with land area), including an indicator of the gender of the plot manager. The logic of this approach is to identify how each variable or set of variables relates to any observed gender differences in productivity.

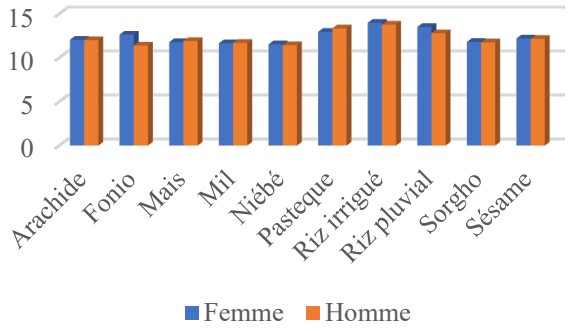
The final sample includes 10181 plots, 1606 managed by women and 8575 by men. Variables included in the statistical model include characteristics of the plot manager (age, education, training, marital status), farm management characteristics including the adoption of modern agricultural innovations (e.g., use of certified seed, chemical fertilizers, and motorized equipment), other physical characteristics of the plot (plot size, biotic and abiotic constraints reported, presence of irrigation or erosion control), and finally a set of other inputs used on the plot (e.g., manure, compost, locally-sourced seeds, and equipment).

SUMMARY FINDINGS

Findings suggest that on average plots managed by women have *higher* agricultural productivity (measured by the logarithm of the value of output per ha) than plots managed by men (Figure 1).

85.3% of the overall productivity gap is explained by endowment effects: characteristics of plot managers, plot characteristics and unequal access to resources:

Figure 1: Mean crop productivity log(FCFA/ha) by gender of plot manager and primary crop



- Cultivating a smaller total area of land is the main factor associated with higher productivity on plots managed by women. The average size of plots managed by women is 0.7 ha, while plots managed by men average 1.4 ha.
- Another factor that accentuates the productivity gap in favor of plots managed by women is the cultivation of rainfed rice, which is a high-yielding self-sufficiency crop generally produced by women on small plots, particularly in the Ziguinchor and Sédhiou regions.
- In other crops, the productivity gap between women and men is smaller (though for most crops productivity is higher on plots managed by women).

Plots managed by men are more likely to incorporate agricultural innovations than those managed by women:

- Male plot managers are more likely to employ certified seeds, chemical fertilizers and motorized equipment during the harvesting phase.
- If women and men had the same level of adoption of these innovations, then women's productivity would increase by an average of 0.4%.

In addition to agricultural technologies, several demographic characteristics are associated with productivity.

- Compared to plots managed by married men, plots managed by married women are less productive, perhaps reflecting married women being more involved in household work.

- Women plot managers tend to have less formal education (literacy, training) than men.
- Plots managed by women are more likely to experience phytosanitary problems, perhaps reflecting less use of pesticides/fungicides.

POLICY OPTIONS

This study shows that there is an underutilization of women's productive capacities and that if this gap is solved it could unleash their productivity potential. The results of this study suggest at least three instruments policy makers might consider that could further stimulate agricultural productivity growth and reduce the disparity in access to endowments among women and men engaged in agriculture in Senegal:

1. Facilitate access to land for women to enable them to cultivate large areas.
   a. Improve land tenure systems and legislation to unlock women's productivity potential.
   b. Support equitable land management by integrating gender into agricultural sectoral policies and sensitizing religious and customary leaders to improve women's access to land.
2. Ensure the availability of innovations and increase women's ability to bear the cost of innovations.
   a. Finance agricultural innovations for women.
   b. Provide support and flexibility in repaying credits for trying innovations.
3. Encourage diversification of women's income.
   a. Promote the sale of certified seed during marketing campaigns.
   b. Increase fertilizer distribution points by encouraging competition.
4. Address barriers to adoption of motorized equipment among women.

Contributions of the Study

This study seeks to fill information gaps in the drivers of agricultural productivity, and to provide policy levers to increase food production, enhance equity, and improve decision making within the framework of the National Agricultural Investment Program for Food Security and Nutrition (PNIASAN).

- Findings provide an evidence base to inform policy to address gendered disparities in technology adoption and productivity.
- This research further links to ongoing gender mainstreaming policies and the challenges of PNIASAN which aims to improve the productivity of strategic and promising sectors in Senegal.

Table 1. Summary Policy Implications

Policy instruments	Benefits	Disadvantages
1. Facilitating access to land for women	- Unlocking the productivity potential of women - Less expensive than other instruments - Fairness instrument	- No disadvantages
2. Ensure the availability of innovations and increase women's ability to bear the cost of innovations.	- Modernize agricultural work tools. - Increase agricultural yields with innovative techniques and practices. - Increase women's income.	- Costly - Its implementation requires a great deal of financial and technical effort at several levels.
3. Subsidize motorized equipment for women	- Reduction of costs incurred in production.	- Costly

References

FAO and ECOWAS Commission (2018). National Gender Profile of the Agriculture and Rural Development Sectors - Senegal. Gender Country Assessment Series, Dakar. 108 pp.
FAO (2011). The State of Food and Agriculture. Women in Agriculture: Closing the Gender Gap to Support Development. Rome 2011. http://www.fao.org/docrep/013/i2050e/i2050e.pdf.

This note summarizes the results of a study conducted under the 50x2030 Initiative. This research was financially supported by the 50x2030 Initiative through the International Fund for Agricultural Development (IFAD). To learn more about the scientific research methods and findings, read the full document.