

### Mali Food Security Policy Research Program

#### Gender, Generation, and Fertilizer Use

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#### Socio-economic challenges

In the Sudanian Savanna of Mali, as elsewhere in the West African Sahel, dryland cereals are grown on plots managed collectively and individually by household members of the farm family enterprise (EAF). The EAF is generally composed of families that span multiple generations and multiple households. The head (usually an elder patriarch) is responsible for the management of the EAF and, more specifically, for organizing land and labor to meet staple food needs for all its members.

Major changes are underway in Mali that influence the current and potential role of women and younger generations within the EAF. On one hand, the rural population is aging and, on the other hand, an increasing number of young job seekers are migrating to urban areas. Greater inclusion of younger generations and women in agricultural activities could permit them to better address these socio-economic challenges. In addition to curbing rural migration from rural areas, better inclusion could make farming activities more attractive to younger generations and, consequently, ensure continuity in growing crops to feed future Malian generations. It is therefore important for young men and women to have access to all the resources needed to successfully grow crops, including access to fertilizer.

#### Key Findings

1. Fertilizer use rates (% and kg/ha) are higher on maize plots than on sorghum plots.
2. Fertilizers are more often applied on collective (%) than on individual plots.
3. Fertilizer use rates (kg/ha) are lower on plots managed by youth.
4. The fertilizer subsidy program favors maize production and consequently men as they grow maize more often than women do.
5. Access to both markets and farmer associations promotes fertilizer use.

#### Key role of inputs

In Mali, yields of dryland cereals, with the exception of maize, have stagnated. This is partly attributed to the limited use of fertilizer.



The average use of nitrogen (N total nutrients) is about 14 kg per ha in Mali, which is high compared to the average of 3 kg for the West African region as a whole but low compared to the average of 27 kg for Southern Africa (Thériault et al., 2015). Raising fertilizer use rates is a priority in order to raise productivity and improve food security. To promote fertilizer use, the Malian Government has established a fertilizer subsidy program. 100% of EAF hectares planted to maize and one third of plots planted to sorghum are eligible for subsidized fertilizers.

### Differences in fertilizer use

In a recent study by Smale et al. (2016), differences in fertilizer use on sorghum and maize plots are tested by: 1) plot management type (collective, individual); 2) gender of plot manager - man or woman; and 3) and plot manager status in the family (relationship to head). Fertilizer use by the EAF members was tested utilizing data collected in 2015 from more than 600 family farm enterprises in 58 villages of the Sudanian Savanna of Mali.

### Gender and status of plot manager

Analysis of descriptive statistics suggests that the use of fertilizer on plots managed collectively than on those managed individually. In fact, 58% of collective plots are fertilized compared to 46% of individual plots. This difference is mainly explained by the crop grown. Maize plots receive much higher rates of fertilizer per hectare (~177 kg/ha) than sorghum plots (~28 kg/ha). This reflects that maize responds more intensively to fertilizer than sorghum and that 100% of area planted to maize are eligible to subsidies as opposed to one third of that planted to sorghum.

higher rates per hectare than collective sorghum plots when other factors are considered. This difference is partly due to the higher use rates found on individual women's sorghum plots given that they usually serve as « food reserves » to ensure households' food security. Furthermore, small individual plots managed by women are most often planted to sorghum intercropped with other plants like groundnuts and cowpeas.

The results of the multivariate econometric analysis show that the decision to fertilize and the intensity of use are lower for individual maize plots managed by male household members other than the head of the family farm enterprise. These results partly reflect the generation dimension. As a matter of fact, plot managers under 25 years of age and the sons of the EAF's elder patriarch have lower fertilizer use rates on their individual maize and sorghum plots respectively (Figure 1). Conversely, older women and wives of the head apply more fertilizer on their sorghum plots than other plot managers. We also note that maize production is dominated by men. None of the women in our sample manage maize plots.

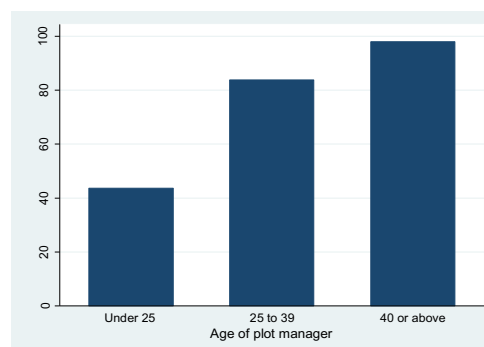


Figure 1. Fertilizer use rate (kg/ha) by age group

We use a multivariate econometric analysis allowing to control for several factors that influence the decision to fertilize (%) and the intensity of use (kg/ha) and, thus, to test the effects of plot management, gender, and generation on fertilizer use. Results show that individual sorghum plots are more likely to receive fertilizers and at

## Access to market and farmer cooperatives

One of the factors influencing the decision to fertilize and the intensity of use is the presence of a weekly market fair. In villages that host weekly market fairs, maize and sorghum plot managers use more fertilizer on either crop. This result is important as it indicates opportunities to supply and commercialize maize as well as sorghum.

The share of plot managers in the village who are members of farmer cooperatives strongly affects average intensity of use, especially on maize plots. Although there are many types of farmer organization, farmer cooperatives play a major role in the supply of fertilizer. They serve as the conduits for extension advice, credit, and fertilizer subsidies. These farmer cooperatives mostly focus on cotton production. Given the strong interaction between cotton and maize in the region, the presence of farmer cooperatives has a positive impact on maize plots.

## Policy implications

In light of these results, agricultural extension programs need to be inclusive of all members of the family farm enterprise while respecting social norms that dictate decision-making and cohesion within production units. The current subsidy policy has been developed in a way to

promote more fertilizer use on both maize and sorghum plots and favor men over women. A way to improve inclusion of young men and women in agriculture would be to factor in their needs when estimating fertilizer amounts.

Access to villages, especially through the development of weekly market fairs, positively contributes to the intensification of sorghum and maize production while creating opportunity for both crops to become more commercialized crops. Access to markets therefore remains a key factor for the development of agriculture. Multiplying fertilizer distribution centers would make them more accessible to more farmers, including young men and women.

Smale, M., Kergna, A., Thériault, V., Assima, A. and Keita, N. 2016. Gender, generation and agricultural intensification: A case of two cereals in the Sudanian Savanna of Mali. Feed the Future Innovation Lab for Food Security Policy, Working Paper 26.

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