POLICY BRIEF

Understanding Gender Differences on the Choices of a Portfolio of Climate-smart Agricultural Practices in Sub-Saharan Africa

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Context of the study

- Gender-based intra-household differences in resource ownership, management and control are important bargaining powers on the division of authority regarding agriculture-related decisions within the household.
- We consider a set of Climate Smart Agricultural (CSA) practices that can be categorized into three broad categories: yield-increasing, risk protection, and resource conservation strategy sets.

Key findings

- The gender-linked adoption of CSA practices is more likely to be made if plot management rights overlap with land ownership and control of economic rights from the land along gender lines.

- These distinctions in plot ownership, management and economic rights have important policy implications to enhance women's access to inputs, technologies and institutional services provided through better intra-household targets of extension and training, input access and related programmes.

- The findings provide important suggestions with respect to gender-differentiated impacts of policies to enhance resource entitlement and decision making thereby increasing adoption of a portfolio of CSA practices.

Introduction

Managing climatic risks and ensuring gender equality are critical to achieving sustainable development in Sub-Saharan Africa (SSA). In this regard, the uptake of a portfolio of farm level Climate-smart Agriculture (CSA) practices (such as cropping system diversification, soil and water conservation, reduced tillage, organic fertilizer, irrigation, etc.) becomes increasingly important to strengthen resilience and adaptive capacity of farm households. CSA practices comprise interventions that aim to sustainably increase productivity, build adaptive capacity and reduce green-house gas emissions through diverse sets of soil, water and crop husbandry practices. We consider a set of the CSA practices that can be categorized into three broad categories: yield-increasing, risk protection, and resource conservation strategy sets.

The issue of gender inequality in the adoption of CSA technologies, among others, has long been an important subject in most developing countries. Despite women's important roles in the farming systems, women farmers may not have the same influence as their men counterparts on farming decisions regarding changing agricultural practices. Gender differences in agricultural technology adoption may be observed for a number of reasons including women's lower initial endowments, bargaining power, access to financial resources, or institutional services. Differences in men's and women's responsibilities, priorities, and access to productive resources and institutional services at the community and household levels are crucial to describe the gender gap in agricultural investment.

A plethora of studies on adoption of farm technologies start with the household as the unit of analysis and consider the sex of the household head to represent gender. This

approach does not allow for the analysis of the relative position of men and women and also ignores the majority of women farmers in male-headed households who may also own the resources, knowledge and capacity and who can be responsible for making decisions on the farm plots they manage. Recent studies have shown that the relative bargaining powers of women and men within a household largely depend on their relative access to, control over, and utilization of resources. Yet, not much is known about the gender role played by intra-household resource ownership, management and control among members of the household, which are essential components in changing the pattern of gender-based adoption of portfolio of CSA practices.

In this study, using plot and household-level panel data from Ethiopia, Nigeria, Malawi, and Tanzania, we test:

- gender differences in adoption rates of multiple CSA practices and identify the nature of interrelationships (complementarity/ substitutability) among sets of yield-increasing, risk-protecting, and resource-conserving CSA practices.

- the effect of intra-household differences in resource ownership, management and control among household heads and spouses on the adoption of a portfolio of CSA practices on men and women plots.

Summary of research: Database

This study is based on the nationally-representative data drawn from the World Bank's Living Standard Measurement Survey (LSMS) from four eastern, western, and southern African countries: Ethiopia, Tanzania, Nigeria, and Malawi.

Agriculture in the study countries (Ethiopia, Tanzania, Malawi and Nigeria) is the mainstay of their economy. Women contribute 25 to 60% of the labour supplied into agriculture, but they control only about 30% of the agricultural incomes. Nevertheless, as in most SSA countries, the review of the country-specific literature reveals that gender differences in terms of economic participation and opportunities seem to be less noticeable in all these countries. For example, in composite indices of gender inequality from the years under investigation here – such as the 2021 World Economic Forum's Gender Gap Index– from a sample of 156 countries Tanzania, Ethiopia, Malawi and Nigeria rank 82, 97, 115, 130 respectively.

Gender and intra-household resource distribution

We identify the person within the household who is in charge of ownership (plot owner), management (plot manager) and output control (economic right) from every plot of the agricultural land. We use these different rights to land assets as indicators of bargaining power to examine how intra-household gender relations influence adoption of portfolio of CSA practices. We consider the bargaining variables for wife/female heads (referred to as women) and husband/male heads (referred to as men), given that the gender dynamics involving spousal pairs are most important to household decisions.

- Plot ownership rights are usually understood as the right to use or transfer the plot as the need arise. Understanding who has ownership rights becomes particularly relevant for accessing inputs and technologies where credit is available. In particular, women's ownership of lands and other assets may contribute to women's empowerment and bargaining power within households as well as communities and reduce their vulnerability to a variety of economic shocks.
- Plot management is an indicator of management rights that shows the decision on how to use the land, including when to start agricultural operation, which crops to plant, what inputs and agricultural technologies to apply.
- Output control is another domain of control that captures economic rights from the land by identifying who in the household controls the proceeds of the output.

In all countries, with both joint and individual ownerships, management and control of outputs within the household are observed with varying proportions. Gender differences of the different land rights are also varied across countries. The largest number of plots in Ethiopia (68%) and Malawi (80%) are managed jointly be men and women. Of the remaining plots in these countries– 24% and 8% of the plots in Ethiopia and 8% and 13% of the plots in Malawi– are solely managed by men and women, respectively. In Tanzania, joint management and sole management of plots are almost equal. Moreover, the number of plots managed solely by men and women are almost equal. However, in Nigeria, the largest number of plots (67%) is solely managed by men, joint management accounting only for 19% of the plots. These observations confirm the assertion that both sole and joint plot management rights of men and women are exercised on family farms in SSA.

In all countries, economic rights from the plots are likely to be shared between men and women. Furthermore, compared with the gender-based distribution of land ownership and plot management rights, output control rights are most likely

held jointly by men and women. With the exception of Nigeria, there is no a gender gap in output control between sole men and sole women plot possessions in other study countries. In Nigeria, the largest share of output is controlled solely by men. In all countries, we observed significant overlaps between land ownership and management of the plot along the gender lines.

Gendered patterns of CSA practices

Overall, adoptions of the different CSA practices are varying across the different countries, among men and women-managed plots and among solely and jointly-managed plots. We observed gender gaps on the adoption of different combinations of CSA practices. On average, non-adoption of CSA practices in the study countries comprised about 3 – 9% of the plots. Comparably, non-adoption is higher on men-managed plots than on women-managed plots in Malawi and Tanzania, where as non-adoption is higher on women-managed plots in Ethiopia and Nigeria. A further examination indicates that whereas 19 to 47% of farmers adopted a single CSA practice, more than 50% of the farmers adopted a combination of CSA practices. The gender gap on adoptions of combinations of CSA practices is also varied across countries. In Ethiopia and Nigeria, adoption of portfolio of CSA practices is higher on plots managed by men either in isolation or jointly with women compared with plots managed solely by women. However, in Malawi and Tanzania the adoption of a combination of CSA practices is higher on women-managed plots. Consistent with the evidence from previous studies in SSA, the result reveals that farmers in the study areas are often faced with a host of adaptation measures that may be adopted simultaneously, with complementary effects such as increasing yield, resource conservation, and risk protection. The result calls for a need to support and promote the package of agronomic and natural resource management practices as important elements of climate change adaptation strategies.

Intra-household factors influencing adoption of portfolio of CSA practices

We focus on the decision on adoption of multiple CSA practices by the head and spouse in the households. Given the fact that decisions about technology adoption usually involve contributions from the different household members individually or jointly, the empirical analysis focuses on the possible influence of gender roles and bargaining powers along the adoption pathways.

The results show that men plot managers in Nigeria are more likely to adopt portfolio of CSA. But in Ethiopia, women managers are less likely to increase the adoption rate of CSAs. This finding is consistent with the notion that within households, men and

women have varied accesses to the different types of CSAs where women are less likely to access multiple technologies than men. On the other hand, in Tanzania, adoptions of multiple CSAs are less likely on solely- managed plots (individually by men and by women), compared with jointly-managed plots. Although we recognized the well-established view that members of households do not share all the same preferences or pool all resources to improve overall welfare, in our setting in Tanzania, the head and the spouse do in fact share some degree of joint decision making over the adoption of multiple CSA practices. The result in turn implies that designing agricultural interventions in the settings of cooperation and joint interests among household members may increase the adoption of climate-sensitive adaptation options. Indeed, the agricultural extension system and policy advocacy should recognize the different preferences of household members and strengthening cooperation within the household.

With regard to the role of gender-differentiated plot ownership on the adoption rate of CSAs, we observed contrasting results in the study countries. We see that the adoption rate of CSAs in Ethiopia is positively associated on plots owned solely by women and men, but in Tanzania so is the case on jointly-owned plots. We also find that the adoption rate of CSAs is positively linked on women sole ownership of land in Malawi but on men sole ownership land in Nigeria. The results, while consistent with the results from the previous studies, they suggest that women's ownership of land may be a necessary condition both for the empowerment of females in developing countries and for enhanced household welfare.

Our data also allow us to differentiate the gender dimension of the control of output from the plot and its effect on adoption of CSA practices. It is important to keep in mind that the pattern of adoption behavior from the above results suggests that gender differences in adoption of CSAs is associated not only with gender differences in plot management rights but also on gender differences in plot ownership and economic control rights. This highlights our understanding of how changes in land tenure system are likely to affect with the plot management and output control rights to improve productivity of agricultural operations of the household.

The result indicates that in Ethiopia and Malawi, the probability of adopting portfolio of CSA strategy sets on women-managed farm plots is higher if the plot is owned solely by themselves or by their spouses. The evidence that within the household women are more likely to increase adoption rate on the plots they own and manage indicates their tenure security that enhances their bargaining power and choice to increase the adoption rate of CSA strategy sets. This result agrees with previous studies that confirm that with greater tenure security, women plot managers may feel secure to their usufruct rights, and thereby have more incentives to adopt strategies and reap the benefits from their investment.

The results that women plot managers increase adoption rate on men-owned plots in Nigeria and on jointly-owned plots in Tanzania are probably because within farm households' men and women may agree to grow crops and adopt the relevant technologies which end up under women's management decision perhaps due to intra-household specialization of tasks. This result may also imply the possible intra-household cooperation between spouses on the management and ownership of the household resources as well as the role of women over farming decisions to respond to the changing climate. The different results on the link between gender-based farm management and land ownership rights and their effects on adoption of multiple CSAs options may suggest that the development of well-targeted and socially-inclusive adaptation policies need to move beyond land ownership titling and consider other intra-household roles and responsibilities, such as plot management rights.

Similarly, we also find significant gender gaps on the adoption rate of CSAs due to the overlap between gender based plot management and control of economic rights over the plots. Across all countries, except in Malawi, the probability of adopting CSA practices on individually-managed plots (by men and women) is significantly positive if the output from the plot is also controlled solely by men and by women. In Malawi, however, on individually as well as jointly-managed plots, the adoption rate of portfolio of CSA practices is more likely if women have the right to control the output jointly with men. The result is consistent with the results from previous studies which state that if wives do expect to be able to control the outputs and gain higher bargaining powers, households are more likely to adopt technologies. Our result may suggest that beyond the right to management decisions, gender inclusive land rights also require a clear understanding of the economic rights from the plots among members of the household. The critical need for some African countries to recognize individual ownership rights and even to move beyond merely considering land titling and to aim at granting a range of land rights to women. This entails that there is need for institutionalizing gender in all levels of decision-making processes.

Policy recommendations

The findings of the study underline the importance of gender-linked intra-household differences in ownership, management, and control of resources and the role that these rights can individually and jointly play on the gender-linked adoption rates of a portfolio of CSA practices. The policy implications of the findings are important from the views of the implementation of agricultural development programmes:

1. Household members involved in farm decisions should benefit enabling conditions for technology adoption (such as extension advice, finance, credit, etc.).

2. Empowering women in terms providing the opportunity of the right to own and manage land and control economic rights from it as well as to get access to education and other financial resources.

3. The different results on the interface between gender-based farm management and ownership rights and their effects on adoption of multiple CSA options may suggest the need to move beyond a mere consideration of land ownership titling and strive to grant women other land rights, such as the management rights as well as the right to control outputs from the plot of land.

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Mission

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