

Adoption of Improved Seeds and Land Allocation, Evidence from DRC.

EXECUTIVE SUMMARY

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Abstract

There is a resurgent interest in agricultural input subsidies as instruments to promote adoption of yield increasing technologies in developing countries. But what is the impact of such technologies on agricultural expansion in Africa, where land is insecure and considered relatively abundant? Using unique experimental data from the Equateur province in DRC, we study the implications of such interventions for households agricultural decisions related to land use. We show that high subsidy levels lead to high adoption of improved seeds, especially when the transport constraint is relieved, but also lead to more land conversions in the forest and in the savanna.

Key words: agricultural policies, technology adoption, input subsidies, land use change, Sub-Saharan Africa, Democratic Republic of Congo

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Approximately 75% of the population in sub-Saharan Africa remains dependent on agriculture for its livelihoods. Increasing productivity for smallholder farmers is therefore one of the highest development priorities, and a cornerstone in the fight against poverty and hunger. It is generally believed that there exist profitable technologies ¹ that farmers are not adopting due to market imperfections and/or behavioral constraints (see for example [Duflo et al. \(2009\)](#); [Conley and Udry \(2010\)](#) or *World development report 2008 agriculture and development* (2007) and [Jack \(2013\)](#) for reviews). As an example, by 2000, adoption of modern varieties of maize was estimated to be 17 percent of total area harvested in sub-Saharan Africa compared to 90 percent in East and South East Asia and the Pacific ([Gollin et al., 2005](#)). Understanding the role of the different constraints to the adoption of yield increasing technologies, broadly defined to include adoption of agricultural practices, crop varieties, inputs and associated products, is therefore key to inform policy design

To inform this debate, we will focus on input subsidies for improved seeds, one specific policy to increase adoption that has received a lot of attention in recent years. Those policies can lift the credit constraints, an important possible deterrents to technology adoption. The economic rationale is the following : if farmers are facing liquidity constraints and the credit market is deficient, input subsidies can help farmers get access to good quality seeds. And if the technology is an experience good, farmers who receive seeds for free or at a subsidized price may be more willing to pay for it in the future once they have experienced the benefits ([Dupas, 2014](#)). We use data we collected for a field experiment in the North West of the Democratic Republic of Congo.

In 92 selected villages, households were randomly chosen to receive vouchers to buy improved seeds at a reduced price for five of the main staple crops, namely maize, rice, groundnut, soya, and cassava. We first randomly selected villages where vouchers would be distributed before the planting season, and distributed vouchers to randomly selected men or women in the households with price reductions of 30, 60, 90 or 100%. The proportion of households in a village receiving a voucher varied randomly between 20, 45 and 70%. Households had 3 months to redeem their vouchers from local agrimultipliers, at prices fixed by the Ministry of Agriculture. Part of the villages were randomly selected to have a delivery of seeds directly in the village, where they could redeem their voucher directly a few days after the voucher distribution. Improved seeds were also available outside the experiment but in limited quantities and in a limited number of places, and traditional non improved seeds were still available on the market. We then conducted two household surveys, the first after the season following the lotteries, and the second one year later. This experimental design allows us to estimate the effect of the subsidies on adoption, and on land use decisions.

We first test whether subsidies increase adoption in the short run. We find large effects of subsidies on adoption just after the intervention, and one year later. We then examine the impact on the choice of plots cultivated. Overall, our results suggest that the subsidy had an effect both on the intensive and on the extensive margin, and in particular for households that received vouchers but no truck delivery. In the season following the voucher distribution, treated households did not change the number of plots cultivated, but were more likely to cultivate on plots they converted from forest to agriculture. One year later the number of plots cultivated decreased but the share of converted plots increased due to both the increase in the number of converted plots and the decrease in the number of plots taken into use after

¹technologies can be in the form of new crops, techniques, or agricultural practices and crop choice

following.

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