



Locus of control and technology adoption in Africa: Evidence from Ethiopia

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Key messages

- Farmers who believe that life events (such as their yield) can be influenced by their own individual actions are more likely to adopt agricultural technologies.
- Policies aiming to improve rural households' non-cognitive skills can boost agricultural investment in new technologies.
- Combining policy interventions that address both external and internal constraints can help improve the agricultural investment decisions of poor households, e.g. by providing (un)conditional cash transfers and specific skill trainings.

Agricultural adoption rates remain low in sub-Saharan Africa

Despite substantial government investment to promote modern agricultural technologies - to improve yields and food security - the adoption rates of these technologies remain low in many African countries.

Many studies suggest low agricultural adoption rates in sub-Saharan Africa are due to "external constraints" such as limited access to credit, transaction costs, and market imperfections. These studies tend to be based on the theory that farmers are "poor but rational" and will therefore choose the optimal level and mix of agricultural technologies. However, the low adoption rate of profitable agricultural technologies suggests this may not be the case.

Recent behavioral and psychological studies argue that poor households in developing countries also suffer from "internal constraints" such as self-control/temptation problems and poor (financial) planning. These internal constraints are expected to be more significant among rural farmers who have limited consumer education.

Adopting new technologies involves higher short-term costs as well as some uncertainty while the new technologies take effect. As such, farmers'

individual beliefs about how future outcomes can be influenced by their actions can affect technology adoption decisions.

For example, farmers who believe that life events (such as their yield) can be influenced by individual actions – farmers who have an "internal locus of control" – are more likely to invest in new agricultural technologies than farmers who believe that life events are out of their control ("external locus of control").

While the Government of Ethiopia continues to invest substantial resources in facilitating the adoption and diffusion of agricultural technologies, use of chemical fertilizers and improved seeds remains low. As such, Ethiopia provides an interesting context in which to investigate the behavioral and psychological influences on farmers' technology adoption decisions.

By investigating the influence of the "locus of control" on farmers' decision making, this study aims to uncover some behavioral and psychological explanations for the existing low adoption rates of profitable agricultural technologies in sub-Saharan Africa.

Data and methodology

This study uses two datasets, each covering the period from 2011 to 2013. The first is from a survey evaluating Ethiopia's Agricultural Growth Program and covers 7,500 farm households over two rounds (2011 and 2013). This dataset includes detailed information on household characteristics and access to and use of agricultural inputs; it also includes self-reported information on farmers' locus of control. The second dataset is from a randomized control trial evaluating the demand for weather-index crop insurance in Ethiopia and covers 2,300 rural households across 110 villages. This dataset includes rich information on demographic and socioeconomic characteristics for 2011 (baseline), 2012 (midline) and 2013 (endline).

This study analyzes the two datasets to investigate the impact of locus of control on farmers' actual technology adoption (chemical fertilizers, improved seeds, and irrigation) and their hypothetical demand for new agricultural technology. A contextualized list of ten questions allowed the research team to measure the degree of farmers' perceived control over their life events. Alternative econometric approaches were then employed to analyze the farmers' locus of control.

Key findings

The analysis indicates that **locus of control significantly predicts farmers' technology adoption decisions**, including chemical fertilizers, improved seeds, and irrigation.

Specifically, the results show that **individuals with an internal locus of control** – i.e. believe that life events (such as their yield) can be influenced by individual actions – or a greater degree of it, **are more likely to adopt agricultural technologies**. Those with an external locus of control – i.e. believe that life events are out of their control – or a greater degree of external locus of control, are less likely to adopt one or more of these agricultural technologies.

These results imply that locus of control may influence (or at least explain) agricultural investments. As such, the results suggest that improving farmers' psychological capital could boost agricultural investment and therefore play a crucial role in reducing poverty. Conversely, low levels of psychological capital or non-cognitive skills may perpetuate poverty by discouraging agricultural investments.

Other factors that are shown to influence increased technology adoption include:

- Households headed by literate farmers,
- Larger family sizes,
- Households with better socioeconomic standing (measured by livestock, land ownership and self-reported wealth status),
- Greater access to information, education, credit, and markets.

Additionally, crop choices also significantly explain farmers' likelihood of adopting agricultural technologies, particularly chemical fertilizers and improved seeds.



Picture: Colleen Wainwright/DFID

Implications for policy

The results of this study suggest that **policies aiming to improve rural households' non-cognitive skills can boost agricultural investment in new technologies.**

Combining the results associated with the impact of farmers' locus of control and those of external constraints (e.g. access to credit) highlights the **need for more integrated policies to improve agricultural investments as no single intervention may alleviate all types of poverty trap.** This is particularly the case for rural households suffering from external frictions *and* internal constraints.

Consequently, **combining policy interventions that address both external and internal constraints can help improve the agricultural investment decisions of poor households** and produce higher returns than if the policies were to be applied independently. Examples of combining policy interventions could mean relaxing credit constraints or providing (un)conditional cash transfers, while also providing specific skill trainings.



Picture: ILRI/Stevie Mann

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