

Risk-taking, risk-sharing and underinvestment in agriculture in eastern Uganda – Policy lessons

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Key messages

Agricultural investment among smallholders may be encouraged through:

- Effectively framed index insurance, bundled with agricultural inputs and credit, especially when it is offered to risk-sharing groups
- Inventory credit at the community level
- Promoting fertiliser through small packs and leveraging modal behaviour

Motivation

We report here on the main policy lessons from our recent research on agricultural investment decisions in eastern Uganda; the research is summarised in the box on the next page. We find that risk avoidance can deter farmers from seizing highly lucrative investment opportunities, for example using fertiliser or growing cash crops such as onions, cabbages or tomatoes. Such investment requires a cash outlay larger than that required for conventional agriculture, i.e. the growing of maize intercropped with beans with a minimal reliance on purchased inputs. Typically, farmers only invest what they can afford to lose – the cash they don't need for their subsistence, which is often very little. A low-risk, low-productivity trap ensues that helps to explain why food insecurity remains endemic in the area.

Policy lessons

To tease out policy lessons, we consulted 117 stakeholders, 27 in the study area and 90 in Uganda's capital, Kampala. They are the government officials, opinion leaders among farmers, agricultural extensionists and senior representatives from development partners, civil society organisations, academia, research institutes, insurance companies and banks who have a keen interest in promoting agricultural investment in Uganda. Stakeholder consultation took place over three years, resulting in the following policy lessons.

Effectively framed index insurance, bundled with agricultural inputs and credit, can encourage investment, especially when it is offered to risk-sharing groups.

We find that risk aversion affects fertiliser uptake and that traditional farmers – unlike those who grow cash crops – avoid attractive investment opportunities when these carry a risk of failure, even when that risk is as small as 5%. We interpret this as evidence of a 'safety first' principle: the

failure of an investment may spell disaster if it means that income falls below the subsistence threshold and the asset buffer is not enough to absorb negative income shocks.

This suggests that insurance may encourage investment if it covers the risk of not meeting subsistence needs. Traditional crop insurance is not a realistic option on a micro scale: for the insurance company it is too costly to monitor a smallholder farmer's diligence and to screen out farmers who are overly prone to risk-taking. An attractive alternative is index insurance, in which indemnity payments are based on the value of an index correlated with crop losses. Such an index could measure precipitation, temperatures or the average yield in an area, among others. A particularly attractive index is evapotranspiration, which measures the water that crops actually use. The Meteosat satellites in orbit since 1978 can measure this cheaply with a 3 km resolution for the entire continent of Africa.

Uptake of index insurance by smallholder farmers is often disappointing. However, evidence from India, Kenya and Rwanda suggests that farmers will buy it when offered as part of a package that also contains credit and inputs. Compared to the informal risk sharing that farmers practise, formal insurance will lead to more investment. We find that farmers reduce risk-taking in informal arrangements, since this would burden others with potentially adverse consequences. Such considerations cannot arise with formally provided index insurance.

Some risk will remain, however good the index, which is known as basis risk. A good part of this basis risk tends to be individual-specific, which means farmers may share it. Studies for Ethiopia and India provide empirical support for the idea that index insurance is more attractive when it is offered to risk-sharing groups.

Our research finds strong evidence for inertia in the uptake of innovations such as index insurance, due to how decisions are framed. An insurance decision is a move from a situation in which risk-taking is naturally expected to one of comparative

safety: we find that the status quo exerts a powerful pull in such decisions. A farmer might reason, ‘we’ve managed these risks so far; we’ll manage in the future’.

This pull can be reduced in various ways. One is to frame insurance as an ultra-efficient way of saving. Farmers are familiar with saving, which they do as best they can to absorb negative income shocks (the lack of savings instruments is a major hindrance here). To build a sufficiently large buffer against the worst shocks, they need to save for many years. By contrast, taking out an insurance contract makes that ‘buffer’ available instantly. The resulting change in farmers’ mind-sets would be from ‘this is risk we can manage’ to ‘this is a better way of managing our risks’.

Research approach

How can prudent risk-taking agricultural investment be encouraged? To answer this question, we investigated the risk-taking and risk-sharing habits of farmers in our study area. We studied these *in isolation* from the myriad other factors that determine investment behaviour. For that purpose, we devised economic experiments, conducted in lab-like conditions. Subjects were endowed with the equivalent of about two days’ wages, on which they could earn a large return by investing some or all of their endowment in a risky asset. Through varying the experimental conditions, we obtained many nuanced insights into how farmers take and share risk.

The 1,803 farmers in our study form a representative sample for Sironko District and Lower Bulambuli (together the former Sironko District). We also collected detailed information on their agricultural investment decisions, their livelihoods and assets, and their multi-faceted economic relations with other village members with whom they share risk, exchange information and labour, and mutual assistance of all sorts. Combining experimental and survey data, we built up a rich picture of the determinants and deterrents in deciding to take advantage of profitable but risky investment opportunities.

Promoting inventory credit at the community level may encourage agricultural investment

An attractive way of increasing farm profitability and thereby agricultural investment is the warehouse receipt system (WRS). Farmers deposit their commodity – of standardised quality – in a licensed warehouse, for which they get a receipt. The receipt is the basis for credit at a financial institution. In this way, the farmer does not need to sell the produce at a time when prices are low, to meet cash needs, but can afford to wait until the prices have risen. The WRS is an institution with a very long history. It has been pivotal in some countries’ agricultural development and has the potential to enable farmers to fetch a higher price for their produce through inter-temporal arbitrage and a quality premium.

The WRS was introduced in Uganda by law in 2006. The Uganda Commodity Exchange (UCE) is responsible for licensing and monitoring its performance. However, as in other sub-Saharan countries, Ugandan smallholders typically do not benefit from the WRS. They face obstacles including the minimum-deposit requirement, transport costs, lack of trust in the system and a limited number of financial institutions that accept the receipts as collateral for loans.

To enable smallholder participation in the WRS, farmer organisations (FOs) could aggregate and deposit a commodity on behalf of individual farmers. There are large challenges to overcome with this: some concern the distrust, dishonesty and costs of association that plague fledgling cooperatives; others concern disagreements among members as to when to sell the produce.

We find that diverging risk attitudes are a powerful source of conflict among those engaged in joint ventures. This sheds some light on why disagreements arise in FOs that try to benefit jointly from WRS participation. The decision whether to sell at any particular point in time is risky – do we accept the current certain price or do we hold out for an uncertain price rise? More risk-averse farmers will want to sell sooner, leading to conflict with the less risk-averse. An attractive alternative to the WRS, or perhaps a step towards

it, is the 'warrantage' system, currently operating in some African countries. This inventory credit system works on very similar principles to the WRS. A farmer deposits produce in a community warehouse jointly managed by an FO and a financial institution. Crucially, the deposited produce remains the individual farmer's property, obviating conflict over when to sell arising from differences in risk aversion. The farmer can typically borrow up to 80% of the value of the deposited commodity and can thus afford to postpone selling. A randomised controlled trial in Kenya found that farmers' profits benefit from warrantage as a result of selling when prices are higher.

Promote fertiliser through small packs and leveraging modal behaviour

In Uganda, as elsewhere in sub-Saharan Africa, the use of inorganic fertiliser is extremely low, greatly inhibiting the Green Revolution. Key reasons for this include high prices, patchy information about correct usage, fertilisers sold far from farmers' lands, erroneous beliefs about the effects of fertilisers on the soil, and legitimate fears about adulteration, which is widespread.

To these must be added risk preferences, in two ways. First, as noted, typical semi-subsistence farmers invest what they can afford to lose, what they don't need for their basic needs; and fertiliser use is correlated with risk aversion. That said, almost everybody invested something in our experiments. When asked why, farmers replied: 'it's like in farming – you invest a little at first, and then if it works, you invest a bit more next time.' Selling fertiliser in packs of 1, 2, 5 and 10 kg rather than the customary 50 kg accords with this cautious approach to investing and has been successfully adopted in Uganda by AT-Uganda

and USAID's Feed the Future. This may set farmers on a path towards higher productivity, as gradually growing surpluses over subsistence will lead to rising levels of investment over time.

Second, risk preferences are not set in stone. We find that communicating information about modal behaviour in parallel sessions prompts farmers to adjust their investment behaviour instantaneously, on average by about 50% towards the (perceived) social norm. This suggests that the fertiliser promotion projects of Sasakawa 2000, Feed the Future and AT-Uganda, which use demonstration plots and information campaigns, achieve part of their success (inadvertently) through modifying risk preferences. This can be exploited more directly by targeting a number of geographically strategically located villages first, concentrating resources there, then communicating their adoption rates to neighbouring villages, gradually spreading outwards.

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