

Why is the Green Revolution So Slow in Africa? An Empirical Investigation of the Market for (Fake) Seeds and Fertilizers in Uganda

Jakob Svensson

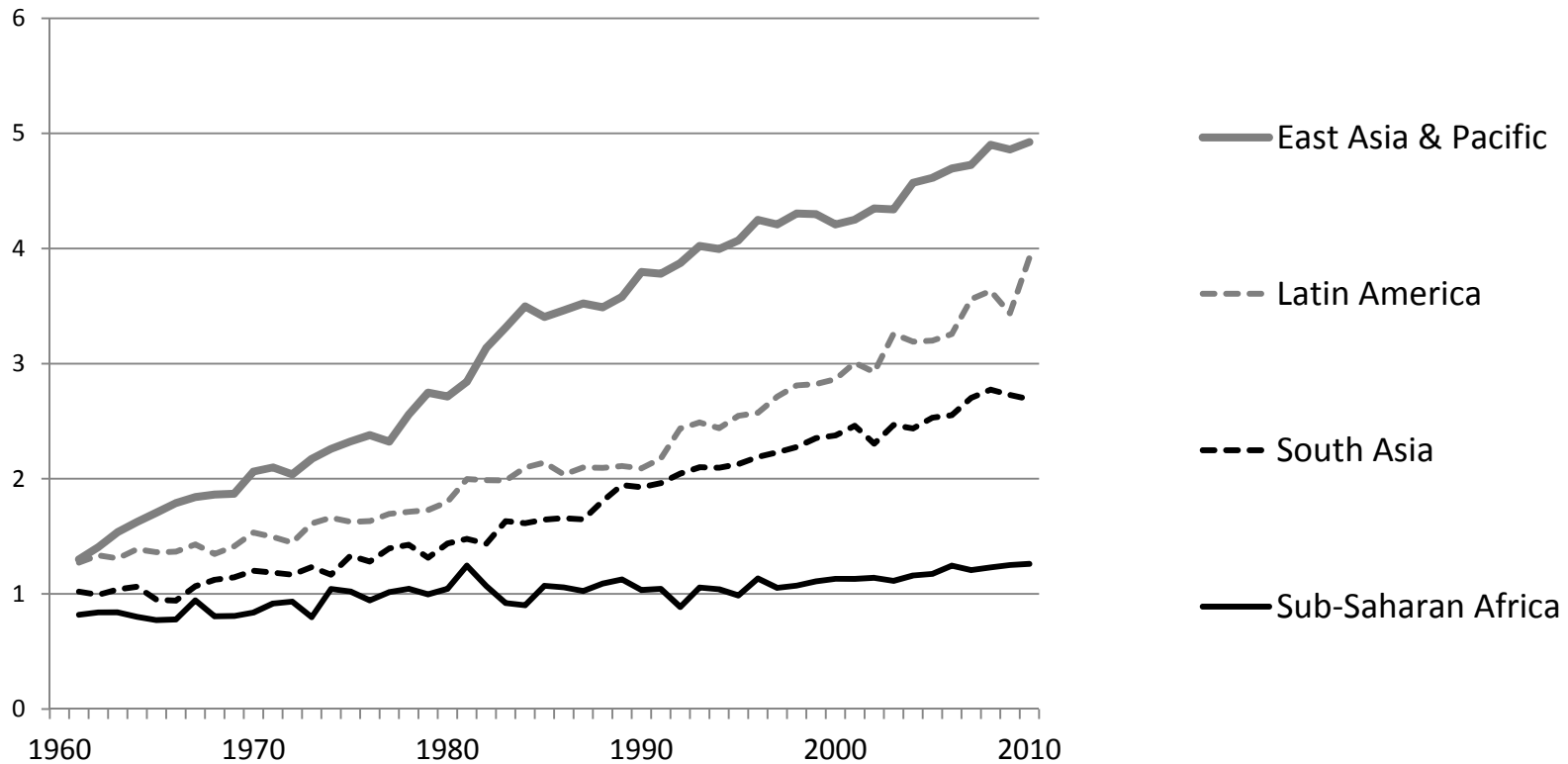
IIES, Stockholm University

2013

- Research program with some studies completed (antimalarial medicine in Uganda) and some that are ongoing
- Market for (Fake) Seeds and Fertilizers in Uganda
- Why?

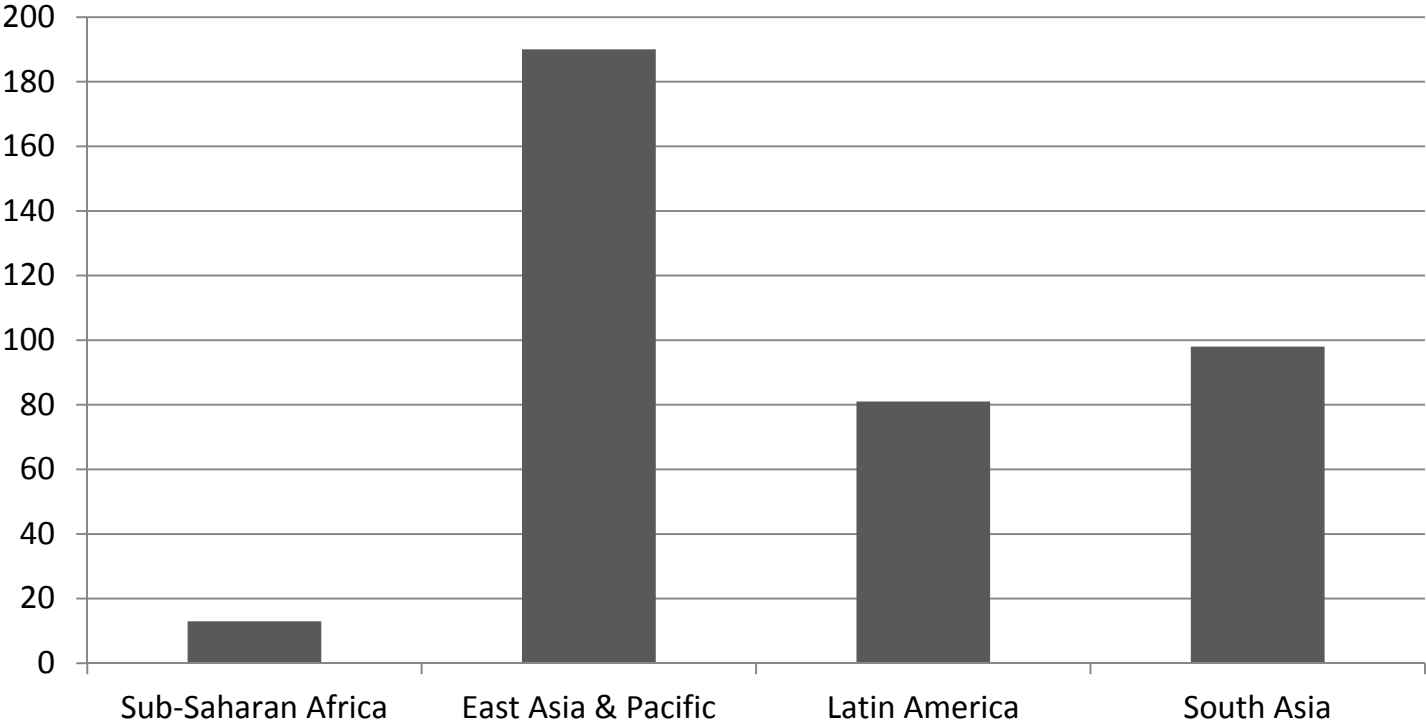
- Three out of every four poor people in developing countries live in rural areas, and most of them depend directly or indirectly on agriculture for their livelihoods.
- In most of Sub-Saharan Africa, agriculture and its associated industries are viewed as essential to growth and to reducing mass poverty and food insecurity.

Yield 1960-2010



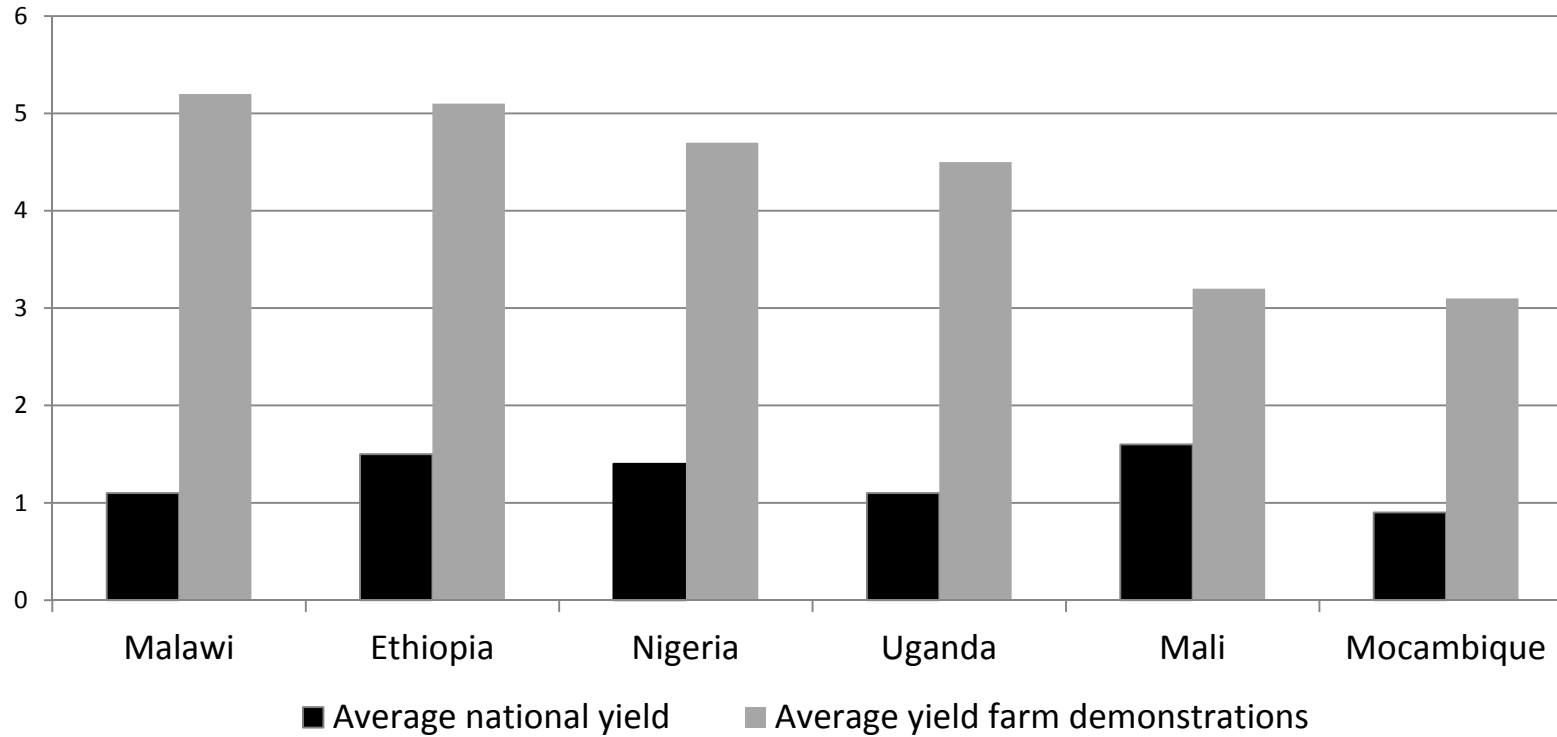
Note: Cereal yield (ton per hectare). Source: FAO

Fertilizer use



Note: Kg of nutrients per hectare of arable land. Source: FAO

Exploitable yield gap for maize in Africa



Note: OPV for all except Nigeria, which uses hybrids. Years 2001-2004. Source: Sasakawa Africa, personal communication

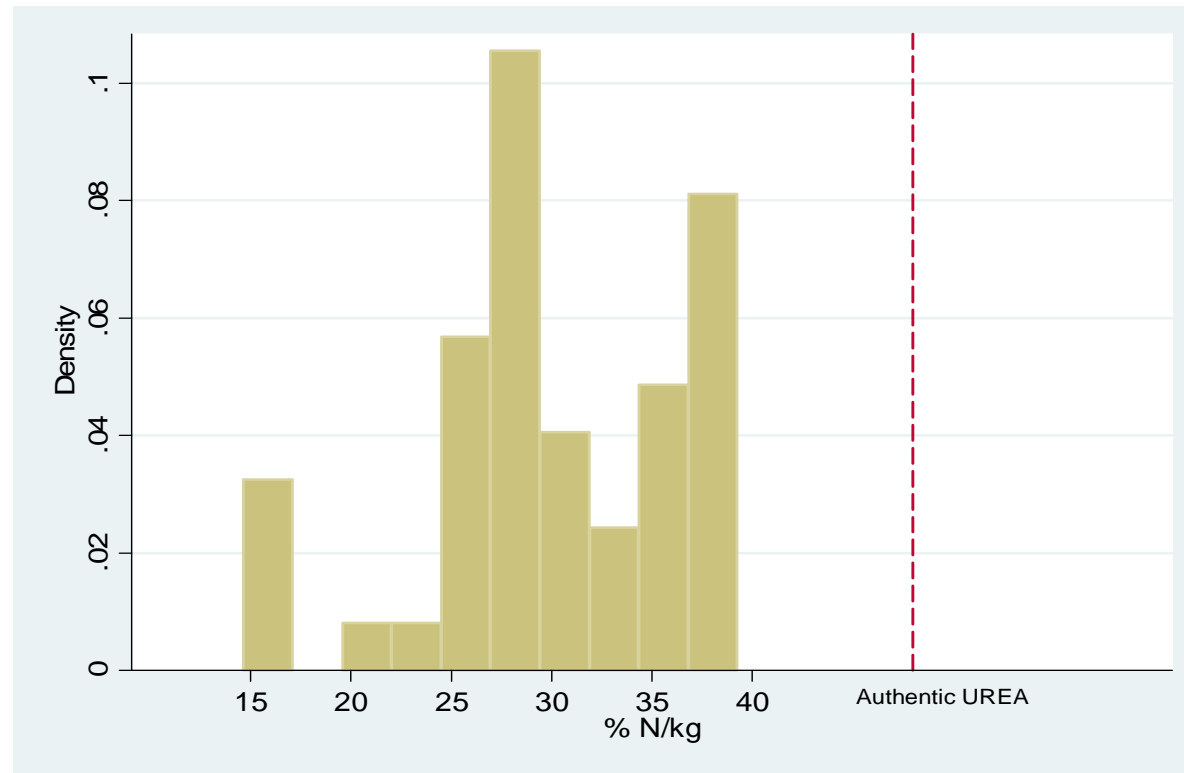
- A lot of research:
 - lack of appropriate knowledge
 - behavioral constraints
 - lack of credit
 - missing markets for output, risk and land.
- But evidence so far is rather mixed
- We focus on a complementary hypothesis - quality of the technology (agricultural inputs) available to most farmers

- At least since the seminal work of Akerlof (1970) economists have spent a lot of effort trying to understand markets with unobserved quality (“experience good”)
 - seeds and fertilizers are examples of such goods
- Akerlof (1970) noted that the problems associated with such goods – low quality and counterfeit – are particularly severe in developing countries
- As most farmers buy their inputs in local agro-shops, understanding how the market for these inputs work is important in order to understand technology adoption

Establish facts: Background

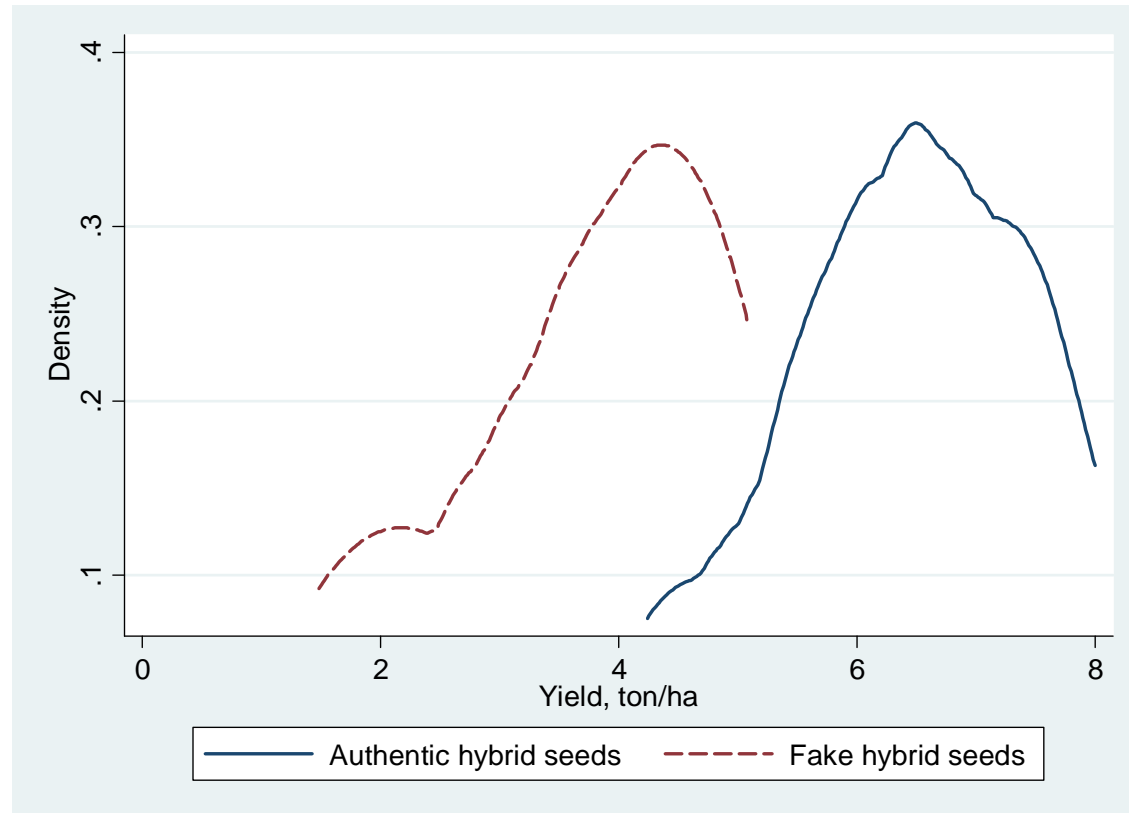
- News reports and anecdotal evidence suggest that the retail markets for hybrid seeds and fertilizers (and other agro-inputs) are plagued by poor quality inputs?
- But there is no systematic evidence.
- Is it true in general? Does it matter?
- Two pilot studies

Nutrient in fertilizers from market



Laboratory tests results (nitrogen content from 50 samples of UREA from retailers in Eastern Uganda).

Yield on authentic and fake seeds



Data from experimental test plots (HYV seeds from retailers in Eastern Uganda).

Establish facts: Two pilot studies

- Sent covert shoppers to buy HYV seeds and fertilizers from retailers in Eastern Uganda
- Record the price and test for quality
 - For fertilizers: test for the content of nitrogen in UREA in the lab (nitrogen based fertilizer)
 - For hybrid seeds: Grow seeds under ideal conditions and have agricultural scientists to assess whether the seed was authentic or not based on physical appearance

Establish facts: Full study

- Sent covert shoppers to buy HYV seeds and fertilizers from retailers in Eastern Uganda
- We record the price and test for quality
- For fertilizers:
 - randomly vary the script for purchase
 - test for nitrogen content for UREA (nitrogen based fertilizer)
 - compare yields for fertilizers with varying degree of dilution of N under "normal" conditions (soil with low nutritional content)
- For hybrid seeds:
 - Compare yields for authentic seeds with seeds sold under the same name in the market under "normal" conditions

The main hypothesis

- If markets for agro-inputs are plagued by counterfeit and substandard products, then fake products may act like a "tax":

⇒ adversely impact the real return to modern inputs.

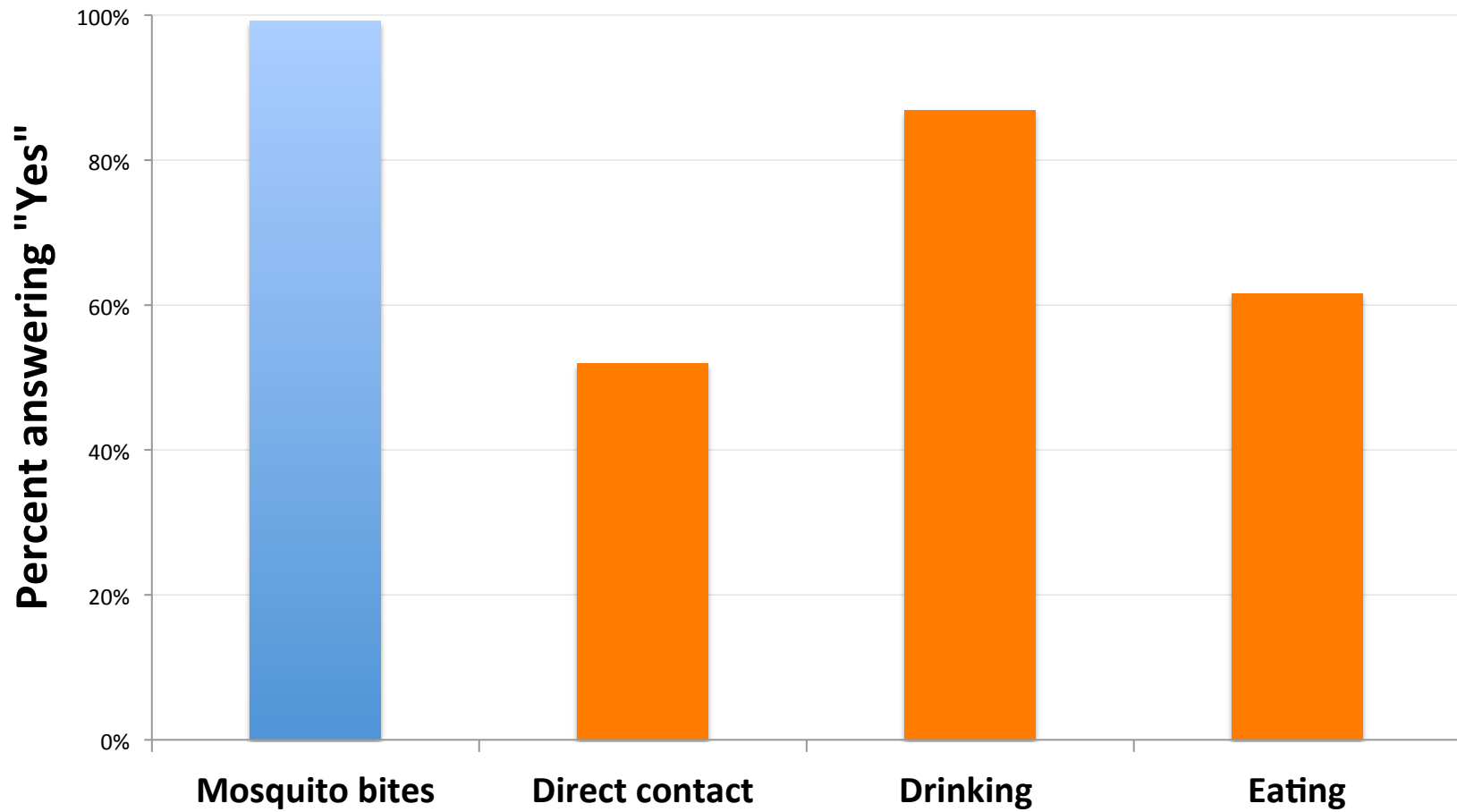
⇒ low level of adoption.

- If there are non-convexities in the production or profit function for fertilizers, the market of lemons problem can lead to poverty traps.

- Maybe poor quality inputs are disproportionately sold to poor and small-scale farmers.
 - Send covert shoppers with different "looks" and scripts
 - Buy from different outlets (rural retailers vs. urban wholesalers)
- Misconceptions

Beliefs about Malaria Transmission

Can the following cause malaria?



Misconceptions and antimalarial drug quality

- Fake ACT drugs are common
- Misconceptions common
- Consumers with misconceptions about how malaria is transmitted appear systematically more optimistic about quality.
- Appears like drugs shops sell more fake drugs in markets where misconceptions are more common.

What do farmers know and believe HYV seeds and fertilizers

- Survey of households in the vicinity of agro retail shops
 - Knowledge about fertilizers and HYV seeds
 - Misconceptions

Possible next steps

- Experimental approach to identify cost-effective interventions to address market of lemon problems

THANK YOU!