Inputs and extension services: Evidence from Uganda

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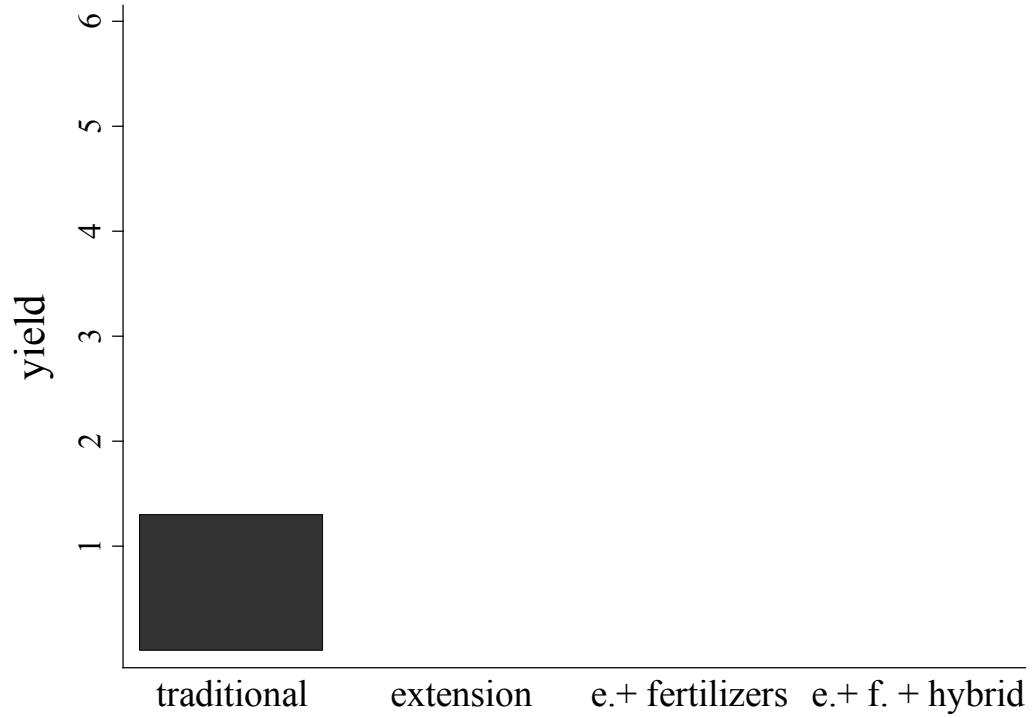
What do we know?

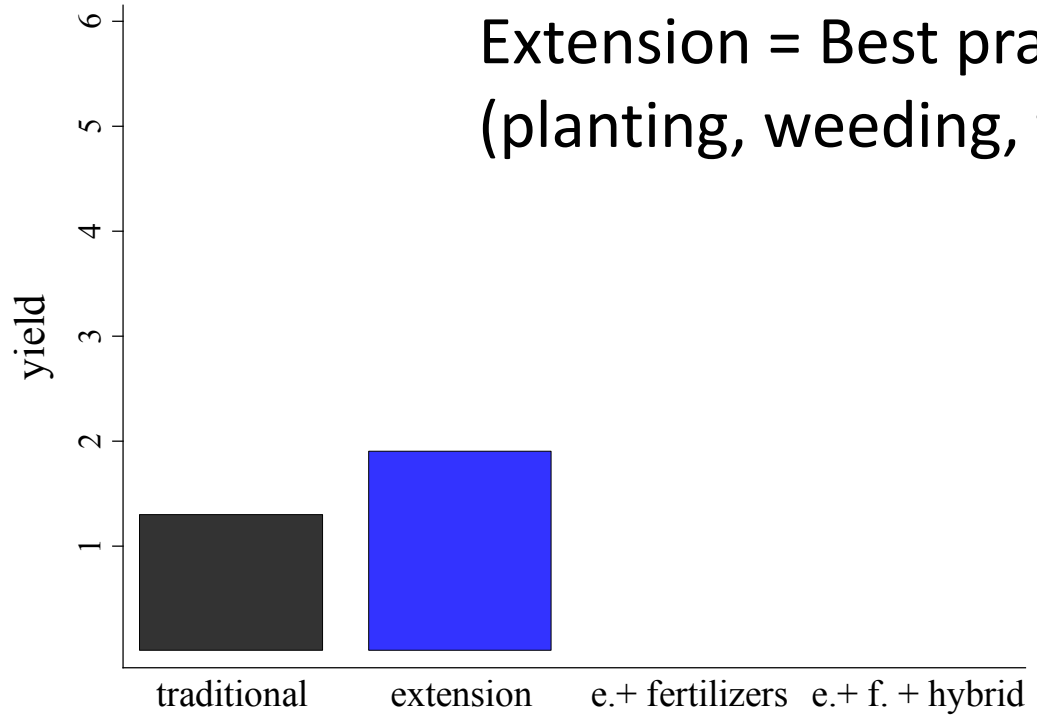
What do we know?

- Bold, Kaizzi, Svensson, and Yanagizawa-Drott (2017)
  - Experimental agricultural trials at five of the National Agricultural Research Laboratories' research stations
  - Household survey data from farmers residing nearby these research stations
  - Data on quality of inputs (fertilizer and hybrid)
- Bold, Ghisolfi, Nsonzi, and Svensson (ongoing)
  - Experimental study on linking farmers to an effective supply chain (output access, extension service, input provision)

What do we know? Maize yield return

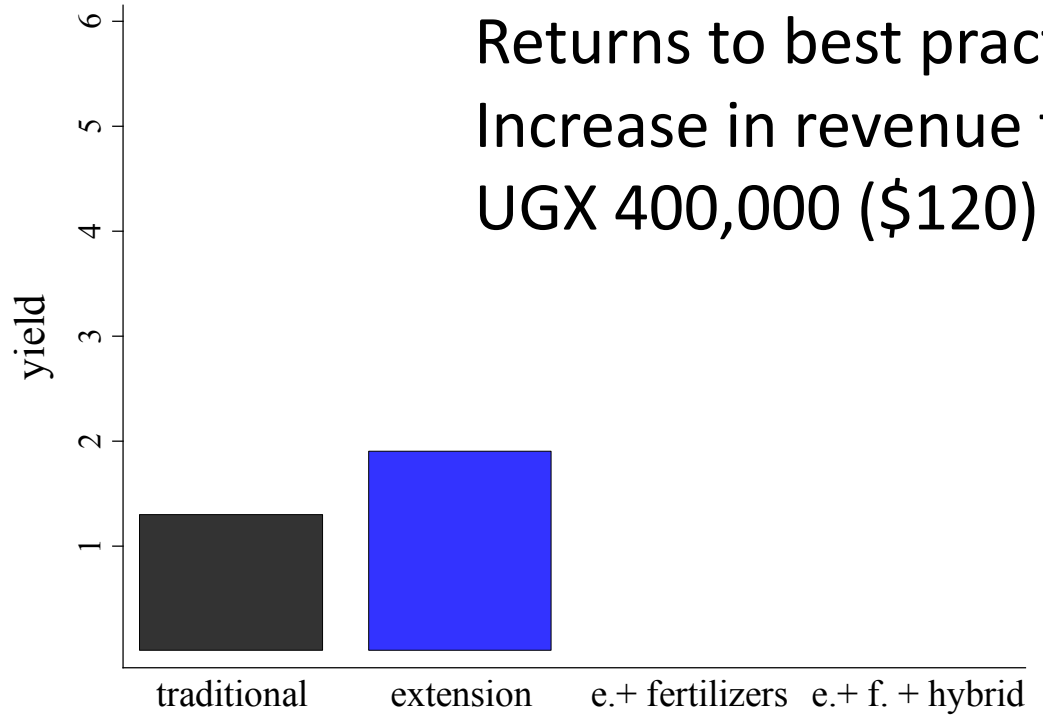


Yield return to adoption: Extension service



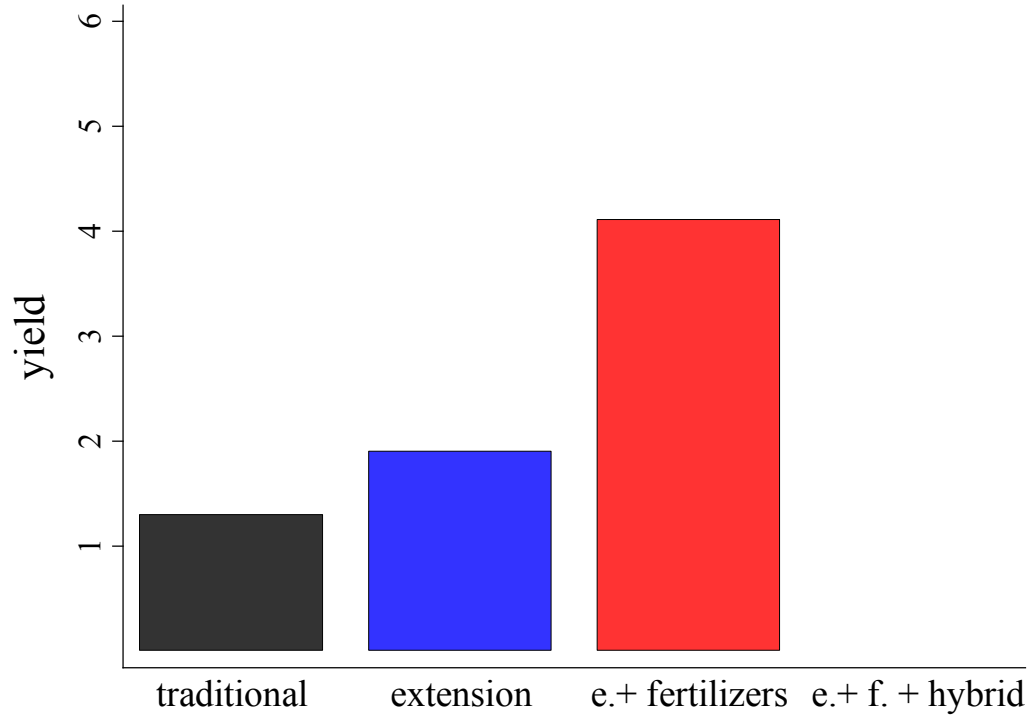
Extension = Best practice crop management (planting, weeding, thinning, harvesting, etc)

Yield return to adoption: Extension service

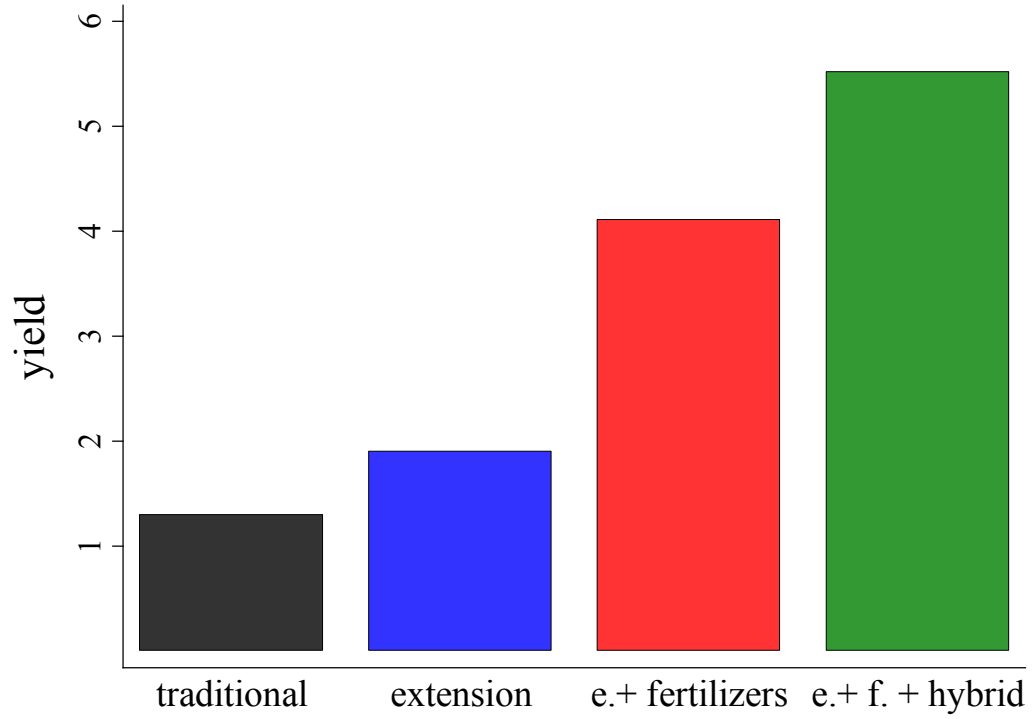


Returns to best practice crop management:
Increase in revenue for 1 ha of land =
UGX 400,000 ($120) per season

Yield return to adoption: Extension + fertilizer

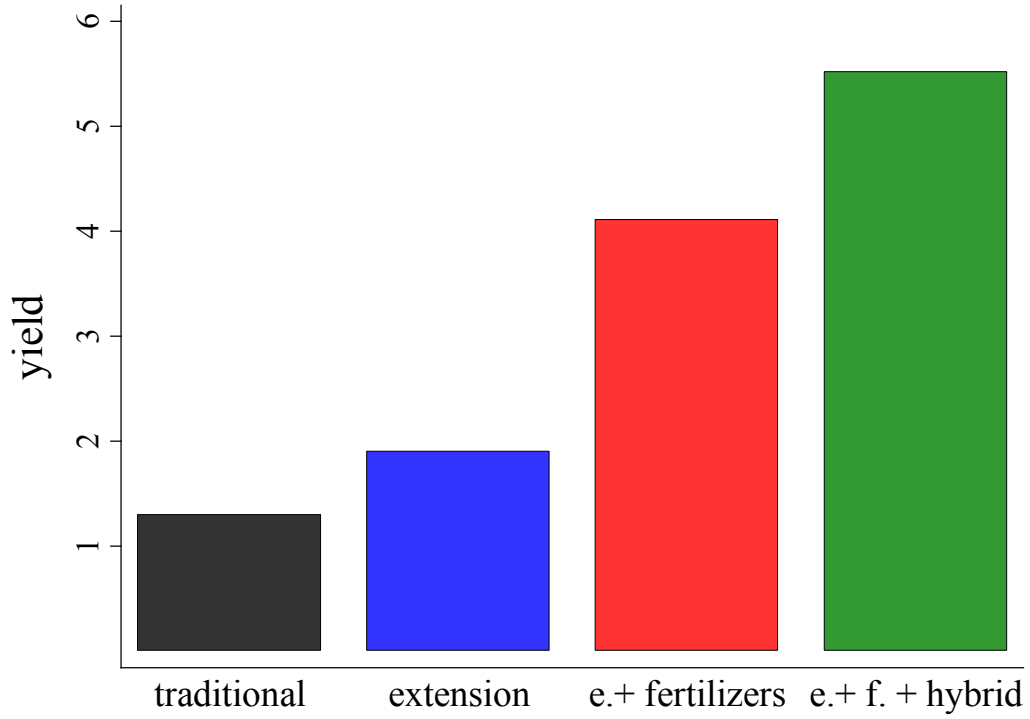


Yield return to adoption: Ext + Fert. + Hybrid



Yield return to adoption: Ext + Fert. + Hybrid

Profit: Estimate a rate of return to adoption of fertilizer and hybid seeds, *conditional on know-how*, of over 80%

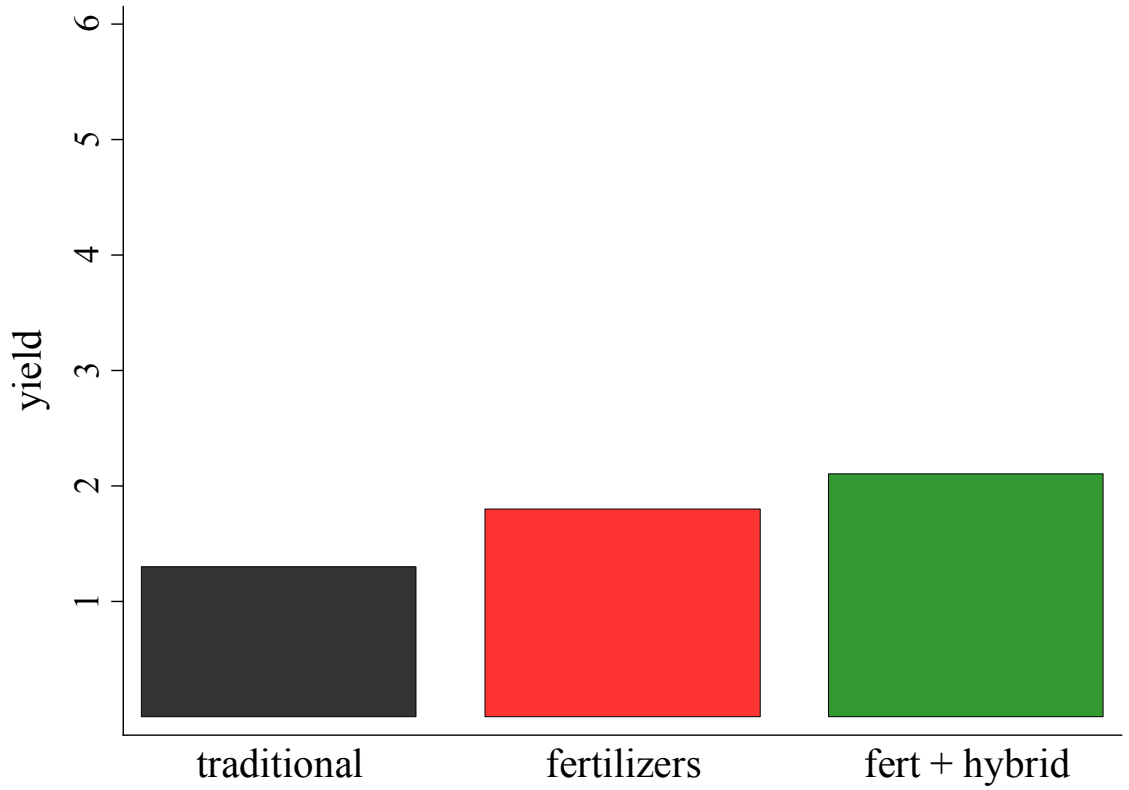


Adoption rates in SSA

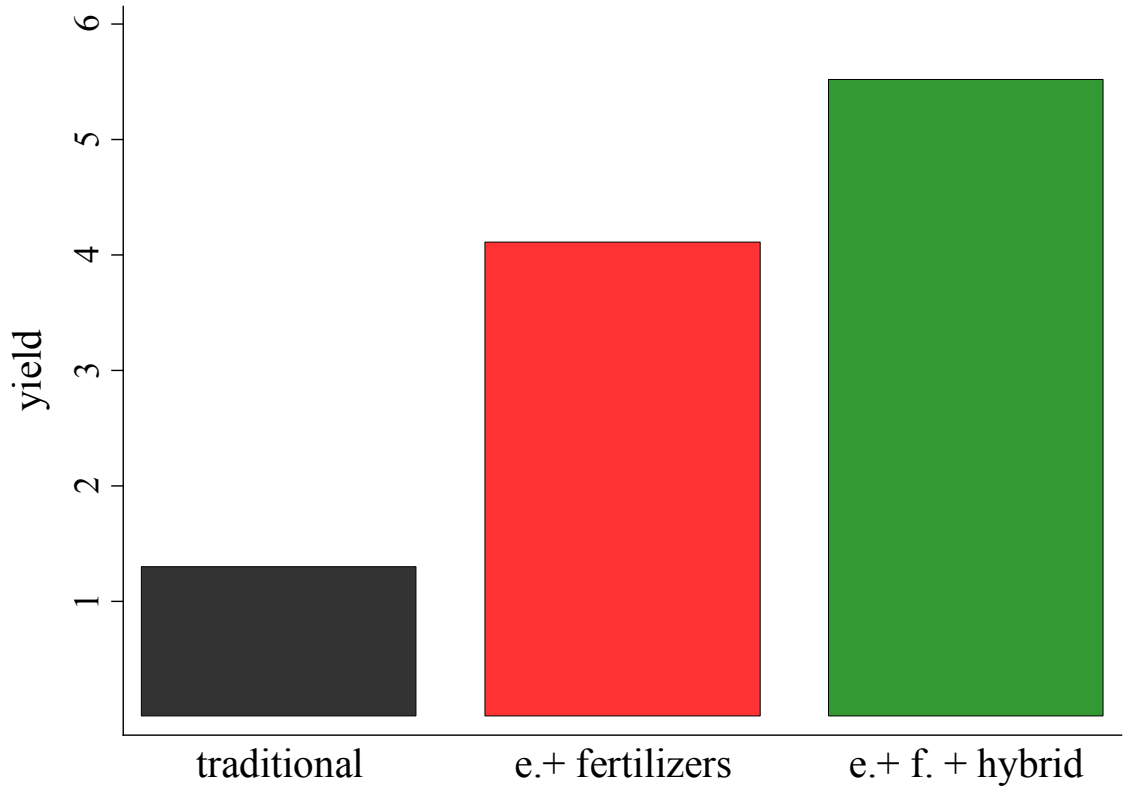
	(1) % of cultivating maize growing households using fertilizer	(2) % of cultivating maize growing households using any improved seeds
Burkina Faso	61.1 (3,768)	27.8 (3,768)
Ethiopia	66.9 (1,826)	34.4 (1,826)
Malawi	80.7 (1,970)	48.7 (1,970)
Mali	65.0 (946)	34.3 (946)
Tanzania	18.8 (2,066)	45.7 (2,066)
Uganda	**9.0** **(1,362)**	**26.9** **(1,362)**

Observed and potential yield

Household survey data



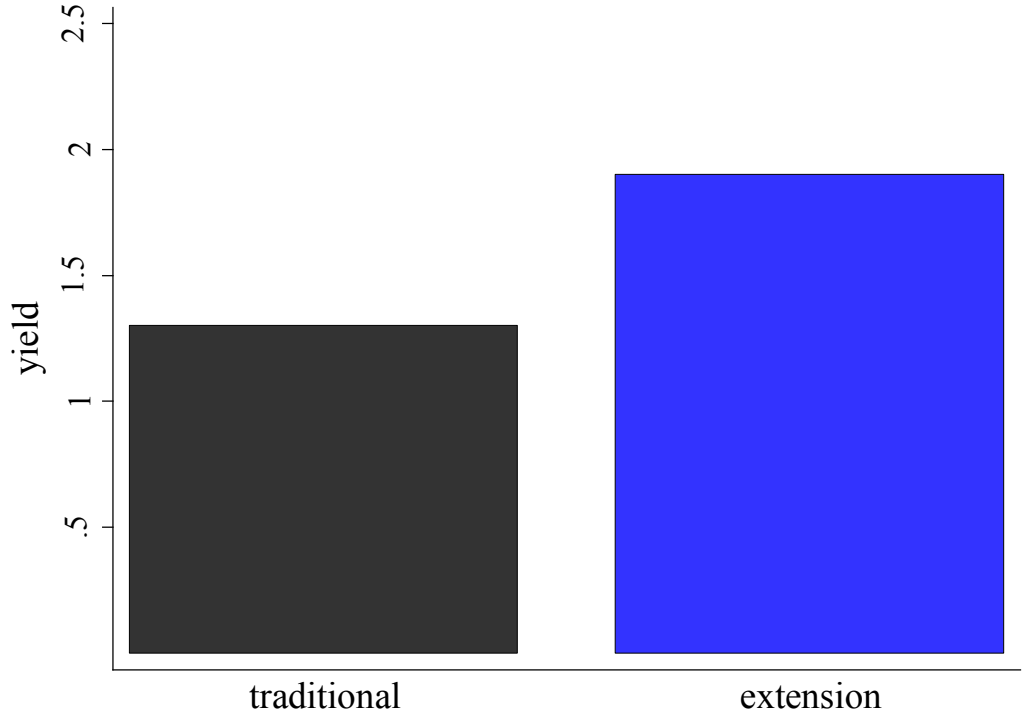
Experimental data



What explains the gap between observed and experimental data?

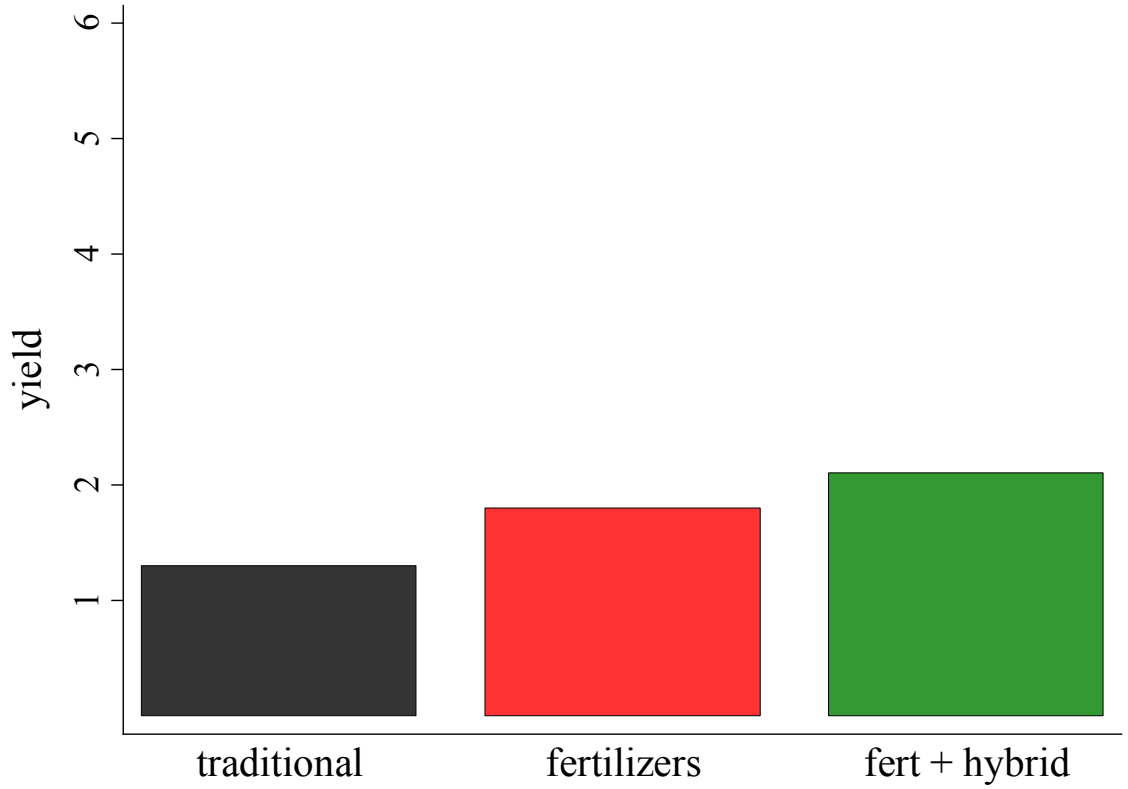
What explains the low adoption rates?

What explains the gap: Low know-how

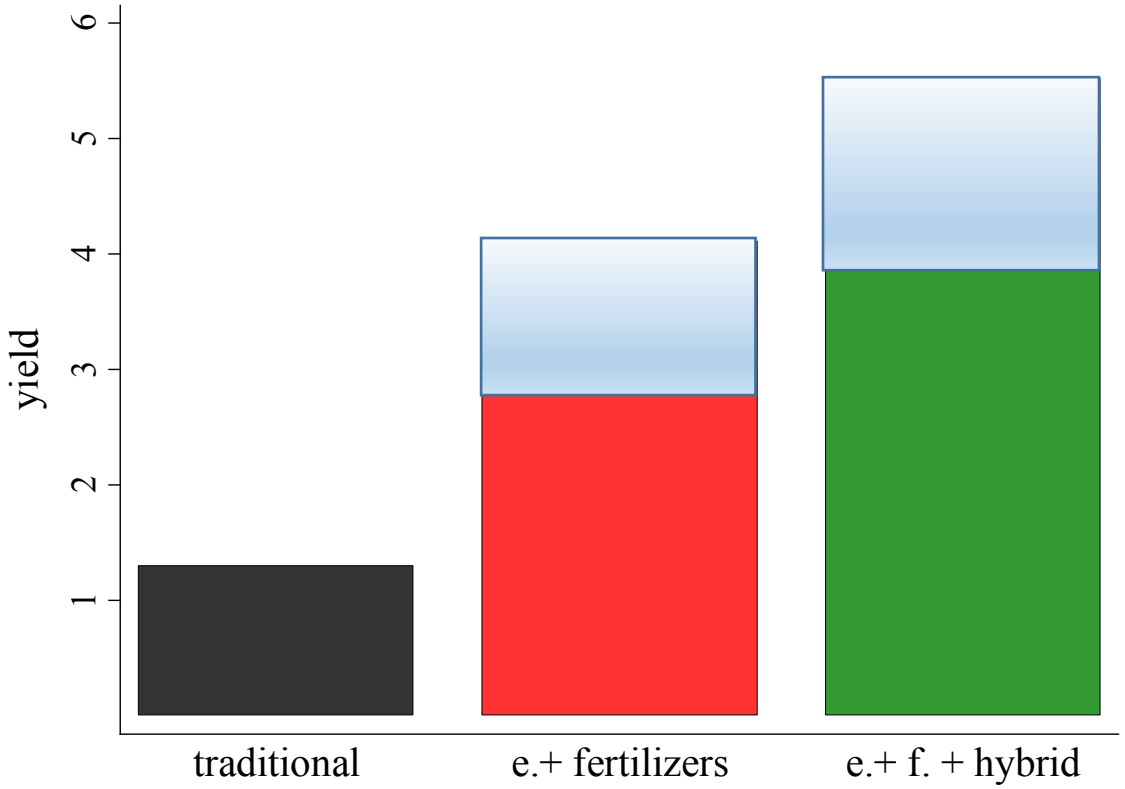


Observed and potential yield with low know-how

Household survey data



Experimental data



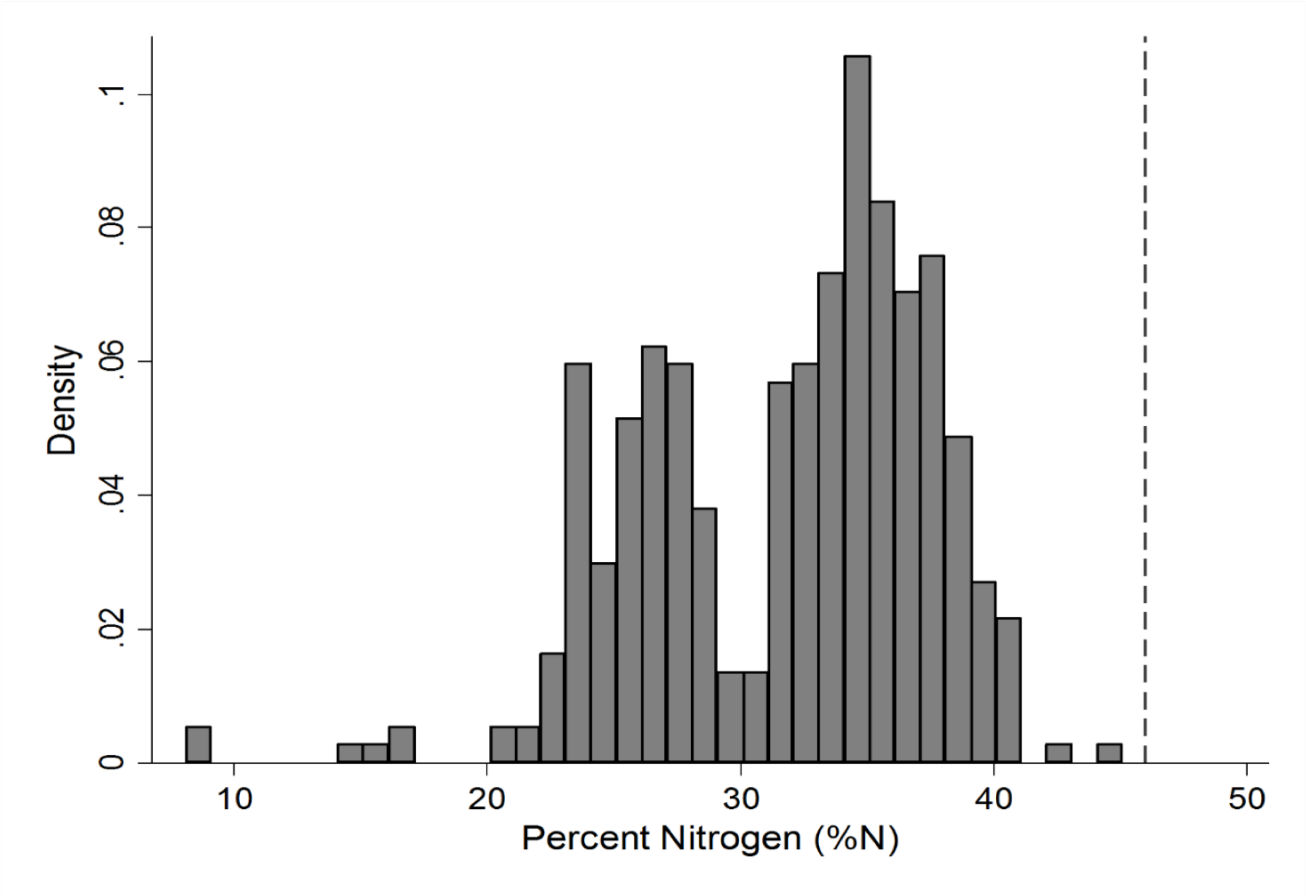
What explains the gap: High cost?

- Input costs higher in Uganda than many other SSA countries (Kenya and Tanzania) because of higher transport costs due to longer distances and border-related constraints
- Inputs subsidized in many countries
- High costs can help explain low adoption rates but NOT low yields for those that use modern inputs

What explains the gap: Quality of inputs

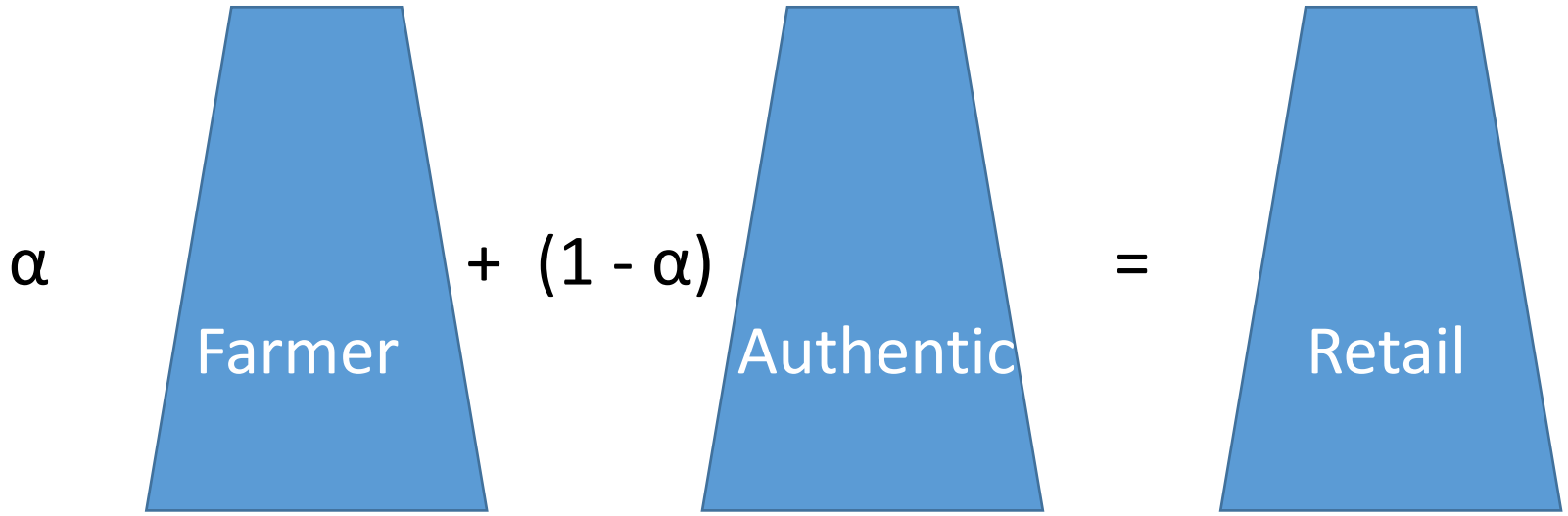
- Bought and tested—in lab and in field—fertilizers and hybrid seeds purchased in local markets (retail markets) across Uganda
- Evidence of significant quality problem

Quality of UREA fertilizer in local markets



Measuring dilution of retail seeds

- To assess the quality of retail hybrid seed, we focus on their yield response
- Find α?



Quality of hybrid seeds in local markets

What explains the gap: Quality of inputs

- Low quality inputs could be due to a multitude of factors
  - Adulteration
  - Poor storage
  - Inappropriate handling procedures

- Quality deterioration could manifest at different points in the supply chain.

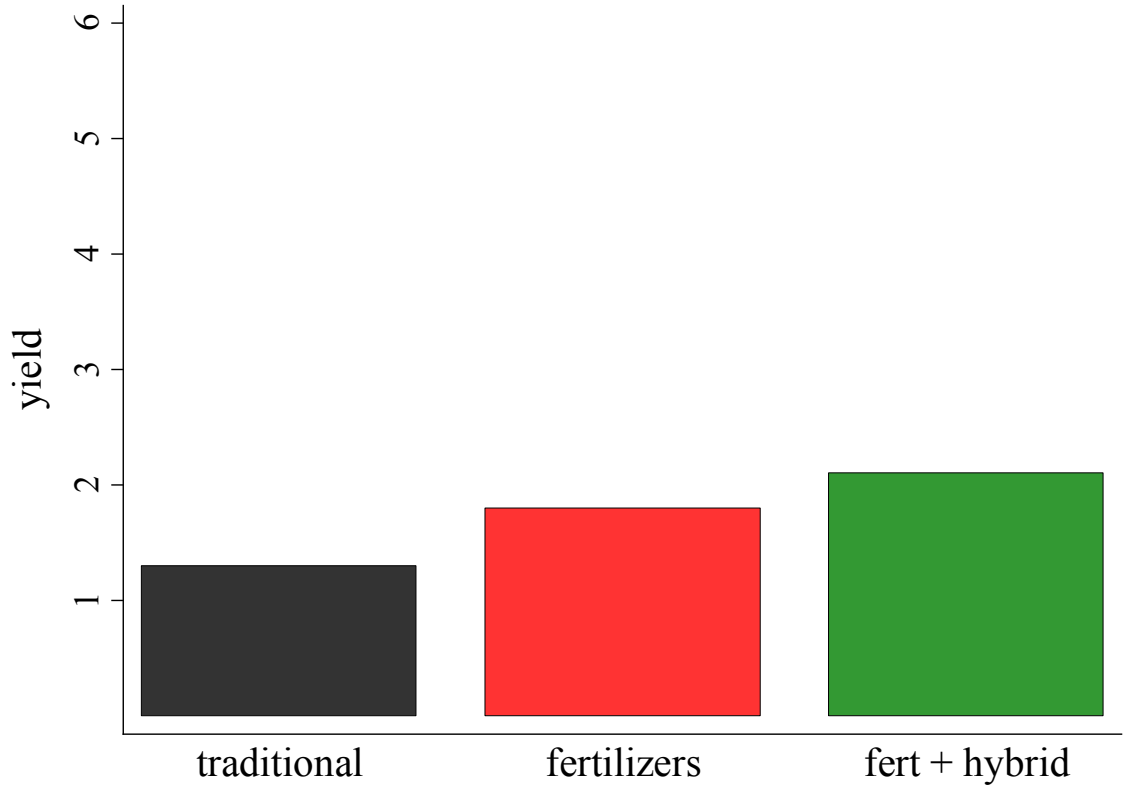
What explains the gap: Quality of inputs

- Low input quality can help explain low adoption rates AND low yields for those that use modern inputs

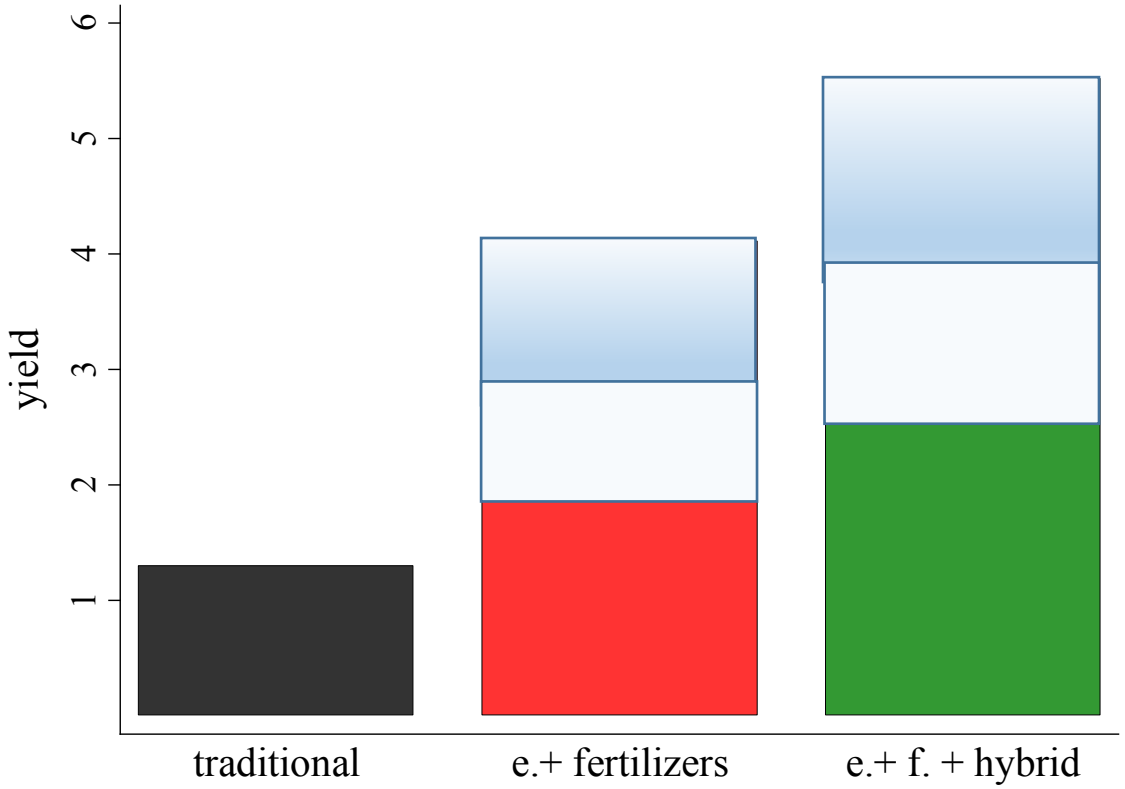
	Rate of return
Authentic inputs	83.6%
Input quality in local markets	6.5%

Observed and potential yield with low know-how, and low input quality

Household survey data



Experimental data



Policy

Policy: Input subsidy

- Input subsidy policies: While lower prices on inputs is likely to increase adoption and yields, **poor input quality** in retail markets and **low know-how** significantly lower impact of such an approach taken in isolation
- Any policy with a high chance of yielding large improvements in yield and income needs to address these constraints
- If farmers would follow best-practice crop management and could obtain high quality inputs at current prices, adoption is profitable without input subsidies

Policy: Know-how and extension service

- Identifying best practice crop management (planting, weeding, thinning, harvesting, etc.) is easy
- Delivering it effectively is difficult
- Existing public system not effective (Okoboi, 2013)
  i. Insufficient demonstrations;
  ii. Little knowledge of how to use inputs effectively;
  iii. High absenteeism
  iv. Advice and inputs delivered at the wrong time of season
  v. Encourage the use of wrong or low quality inputs
- Overall, extension workers work under weak performance incentives and with insufficient knowledge

Policy: Know-how and extension service

- Two core components:

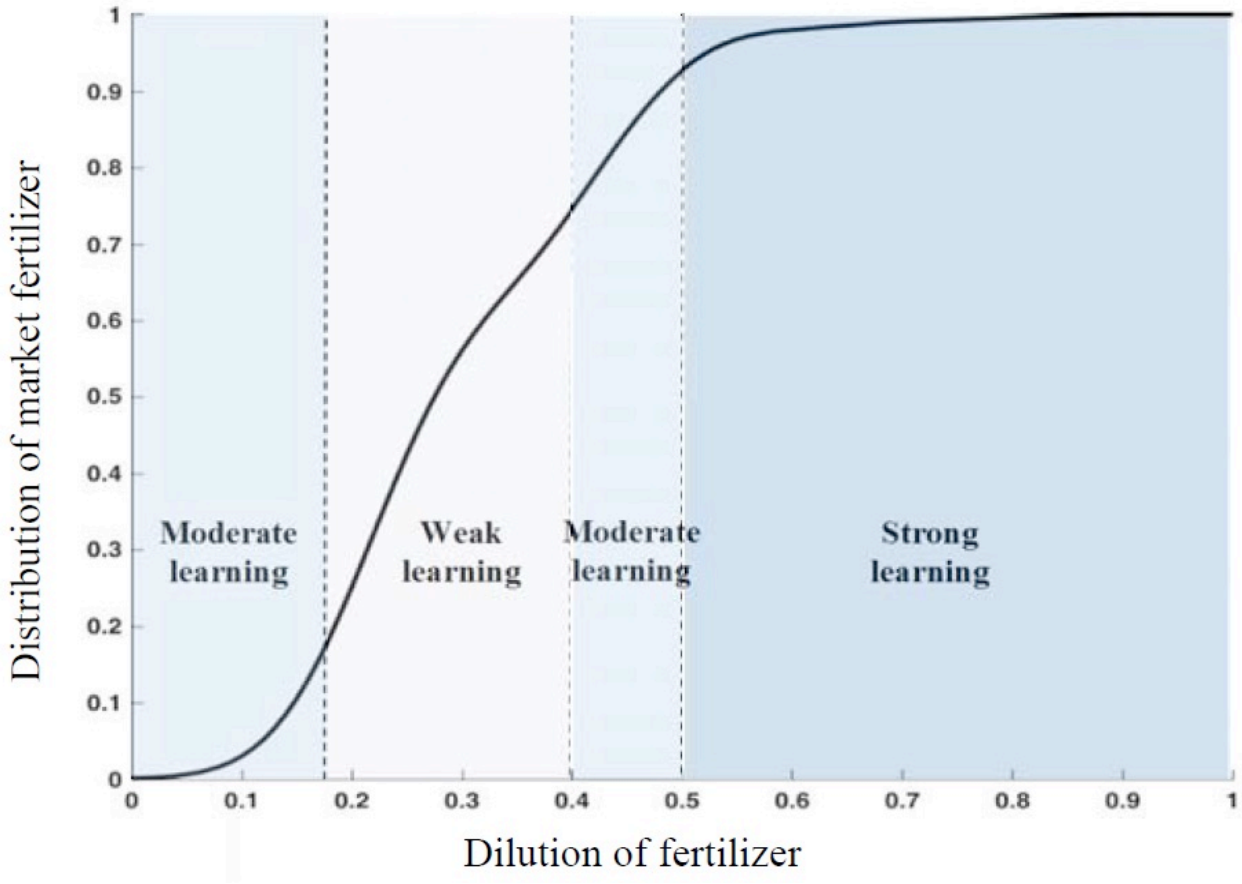
1. Ensuring that EWs have sufficient and up-to-date crop specific knowledge
2. Incentivize EWs

- Incorporate EWs, or trained farmers, into the supply chain, for example through private-public arrangements

Policy: Increasing the quality of inputs

- Monitor and enforce existing regulations
- Incentives to provide high quality inputs
- Improve farmers' ability to infer quality

Improve farmers' ability to infer quality



Increased know-how not only impact yield and profitability, but could also make it easier for farmers to infer quality

Incentives to provide high quality inputs

- The incentives to build up and maintain a high quality reputation in weakly regulated and unmonitored markets may not be strong enough for the small and informal drug stores that currently dominate the market
- Policies to facilitate the entry of a larger firm, or a market chain, that can tap into consumers' ability to learn about and pay for quality may be an option to improve quality
- Linking the seller of the technology (inputs) with the buyer of the output

Wrap up: The need for an holistic approach

- Other constraints
  - Cash and credit constraints
  - Output market constraints (famers lacking infrastructure for storage, drying etc)

- In designing policy:
  - Understanding of how the supply chain is working, starting at the farmer level, is key
  - Private-public partnerships have a large potential

Thank you!