

# Sample Size Isn't Everything

How Uncertainty About Heterogeneity Impacts Learning  
About New Technologies

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# Motivation

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## Social Learning Is Oddly Influential

Peers have limited experience

Authorities test recommendations extensively

Yet, both induce adoption at equal rates:

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- Takahashi, Mano, and Otsuka (2019)

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Implies social learning is more influential *per data point*

# What's the mechanism?

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- Why?
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- **How can authorities improve?**

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$$\text{Total Uncertainty} = \text{Context Uncertainty} + \text{Sampling Error}$$

## Preview of Results

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# Related Literature

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- **Decision makers as statisticians**
  - Steiner and Stewart (2008), Olea et al. (2021), Salant and Cherry (2020), etc...
- **Social learning theory**
  - Sethi and Yildiz (2016), Dasaratha et al (2022), Bala and Goyal (1998), etc...

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- **Information provision experiments**
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- **Role of heterogeneity in agriculture**
  - Giné et al. (2018), Suri (2011), Munshi (2004), etc...
- **Agricultural extension design**
  - Dar et al. (2020), Kondylis et al. (2020), Cole and Fernando (2021), etc...

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- **Decentralization of public goods**
  - Oates (1972) and Oates (1993)

# Theory

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# Experimental Design

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- Participants must decide how intensively to adopt a hypothetical technology
- Pay based on crop yield from decision

## High vs Low Context Uncertainty

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Vary context uncertainty by varying % of gray tiles

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(a) Low Context Uncertainty Round

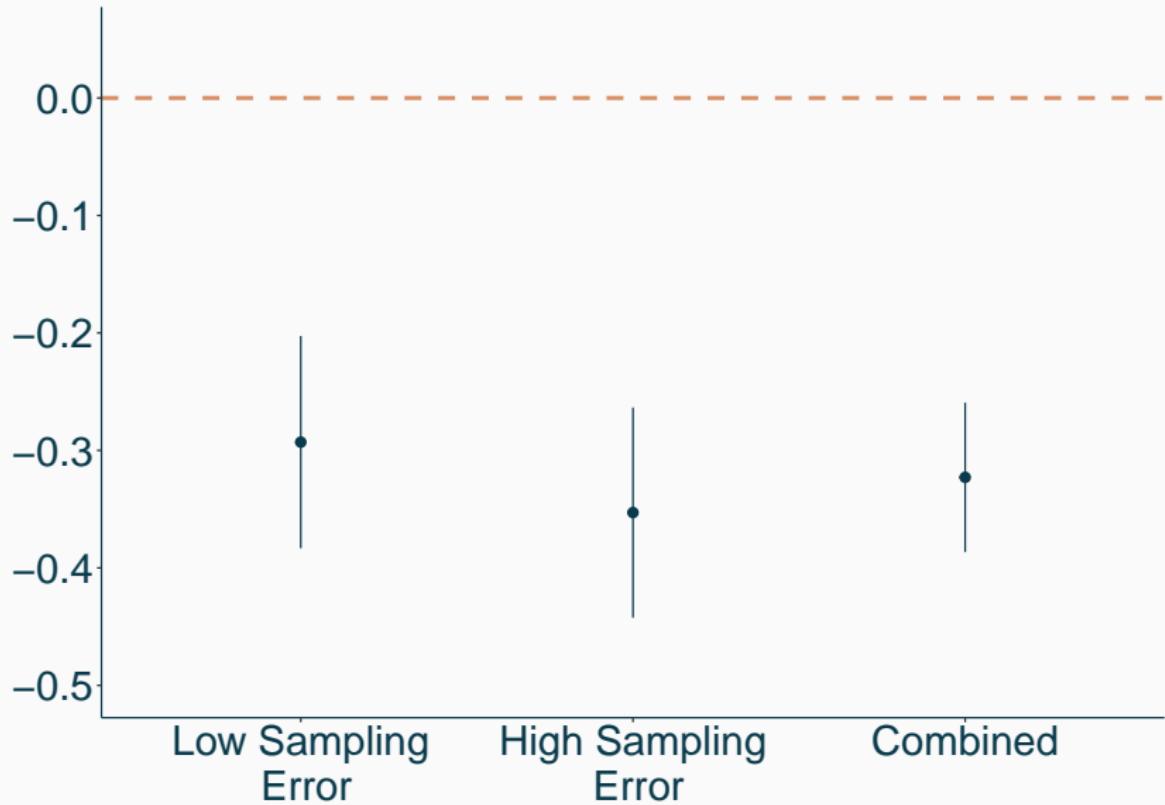


(b) High Context Uncertainty Round

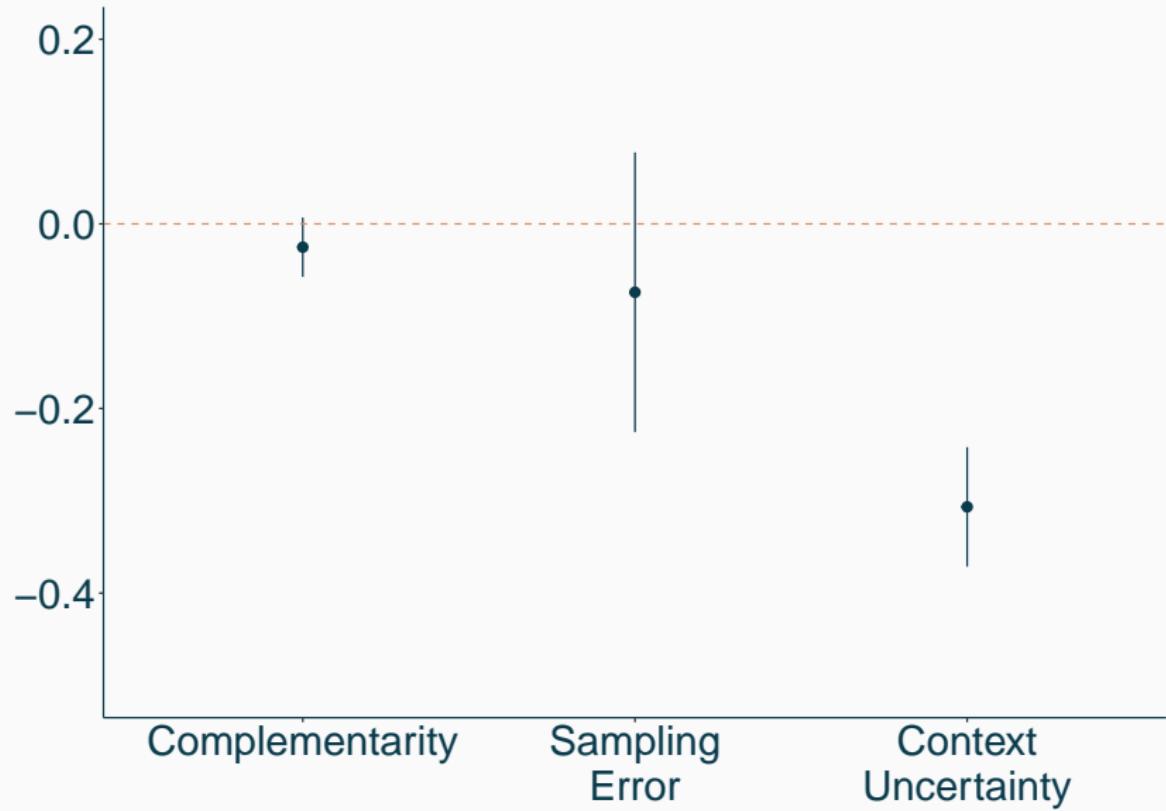
## Results

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# Farmers Prefer More Context



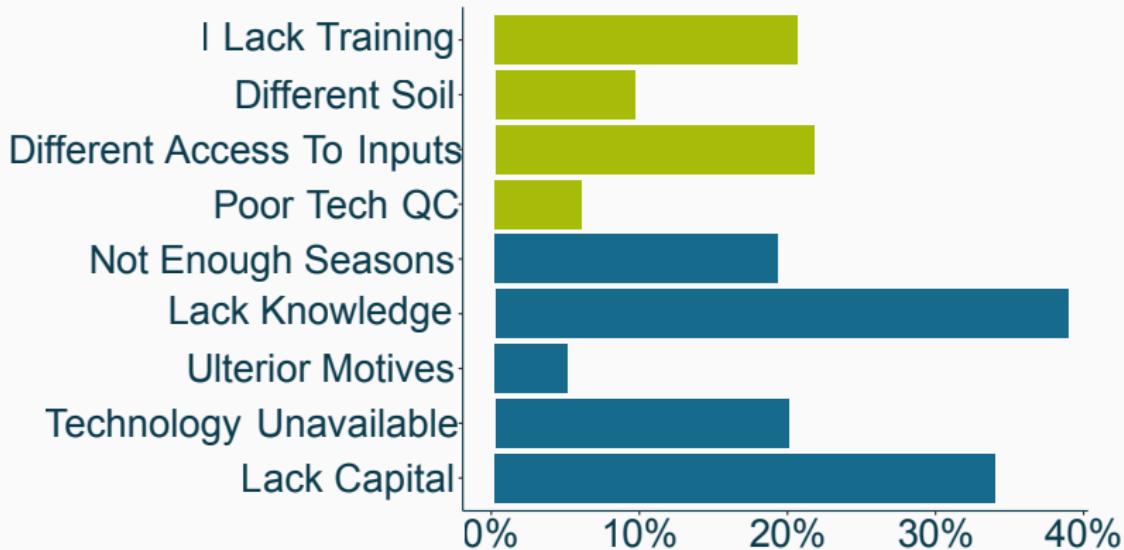
## Uncertainties May Be Complementary



## External Validity

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# Farmers Worry About Heterogeneity



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## Conclusion

- **Total Uncertainty = Context Uncertainty + Sampling Error**
- Social learning may not be special
- Information campaigns should disaggregate returns
- Distributed, local experimentation could increase influence
- Insurance with low basis-risk, when tied to experimentation, can have high positive externalities
- Future work looks into how much full personalization (i.e. ML) is needed