The Economics of Contract Quality

Part 2: Defining an Index Insurance Quality Standard

Michael R. Carter

University of California, Davis, University of Cape Town, NBER &
BASIS Assets & Market Access Innovation Lab

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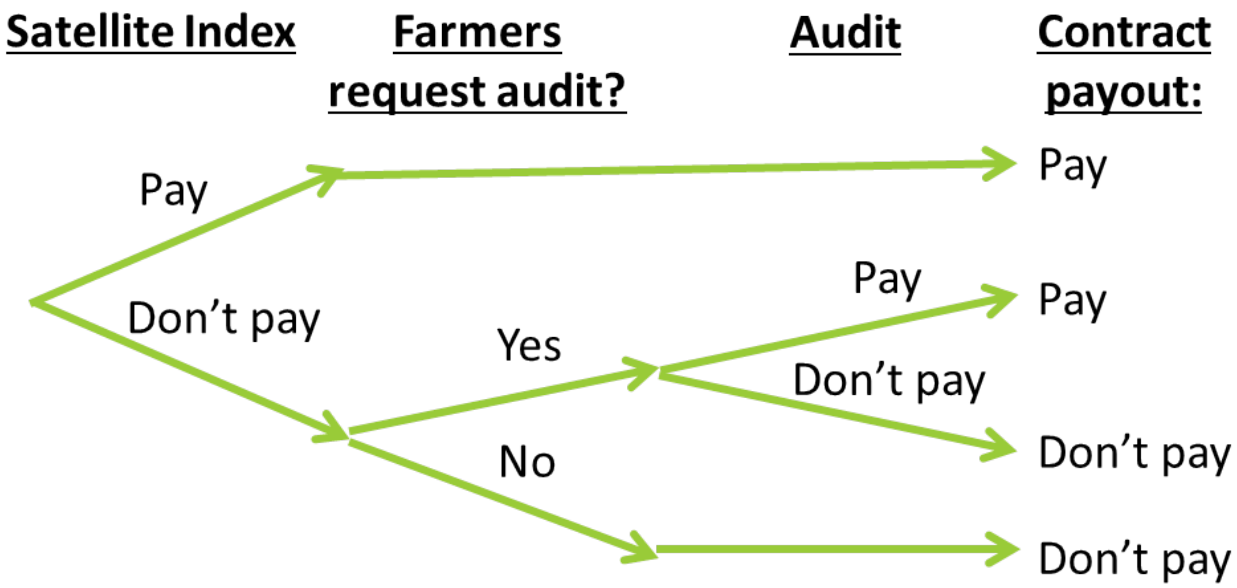
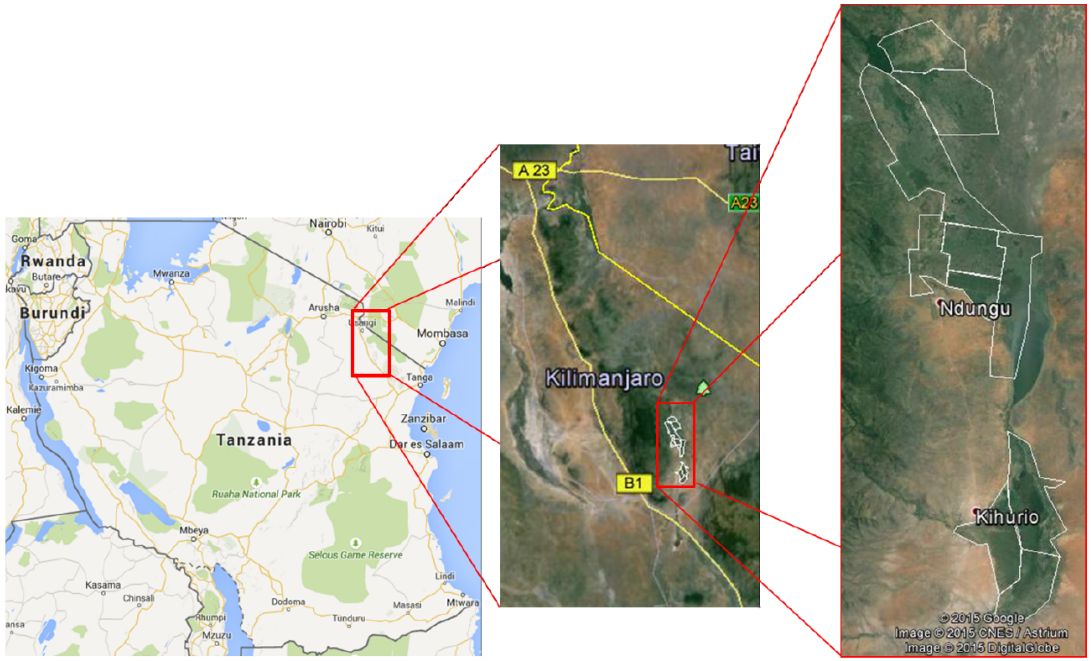
Designing and Certifying a Real World Contract

- The primary index is based on (inexpensive) satellite data
- If the satellite index does not pay out, an audit, in the form of a crop-cutting exercise, can be invoked at farmers' request
- The result of the audit will determine payouts
- Incentive compatible penalties to prevent unnecessary audits

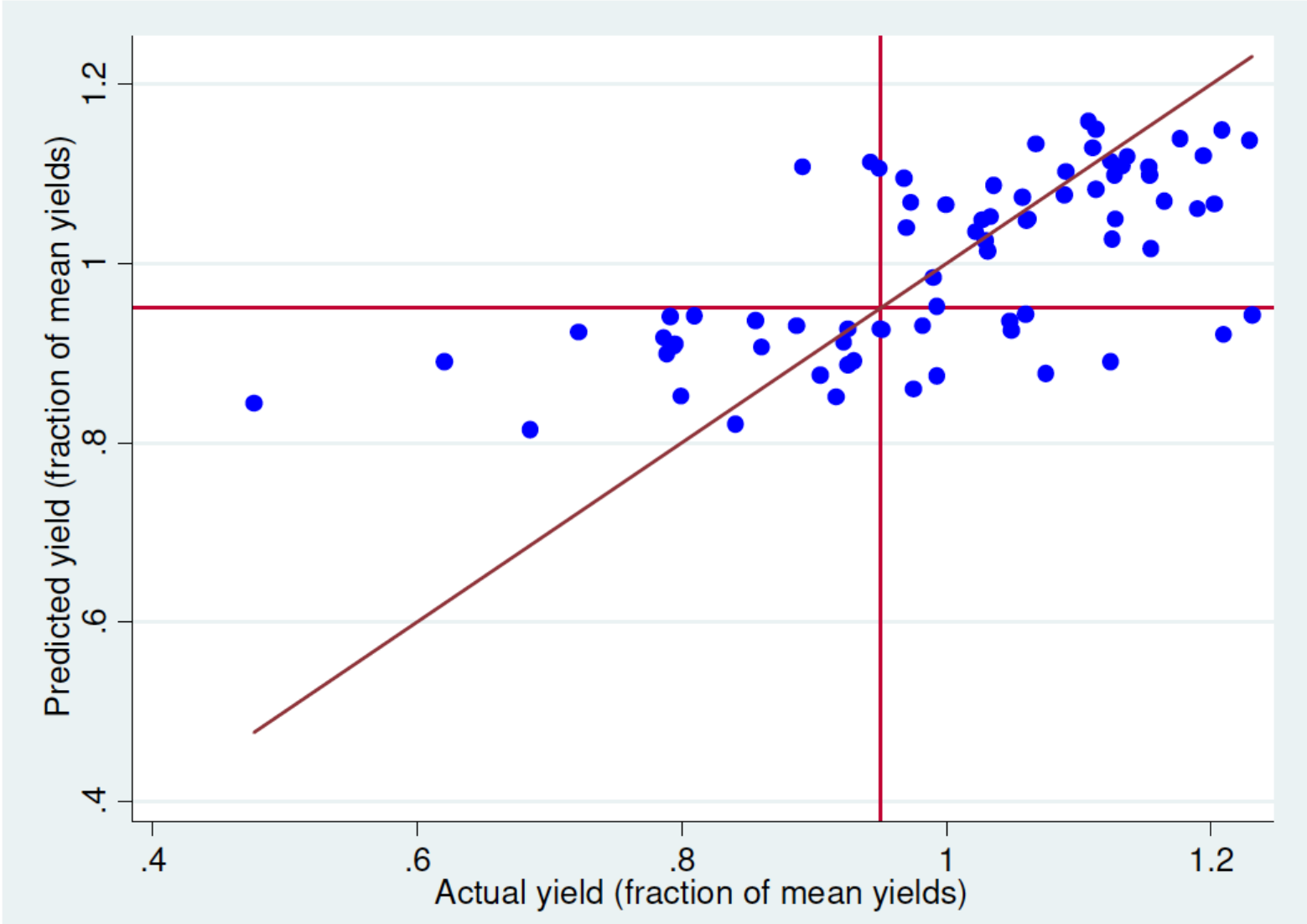


The data

- Collected up to 10 years of plot-level recall yield data for 400 rice farmers in our study area in Northeastern Tanzania
- Used publicly available satellite data from NASA



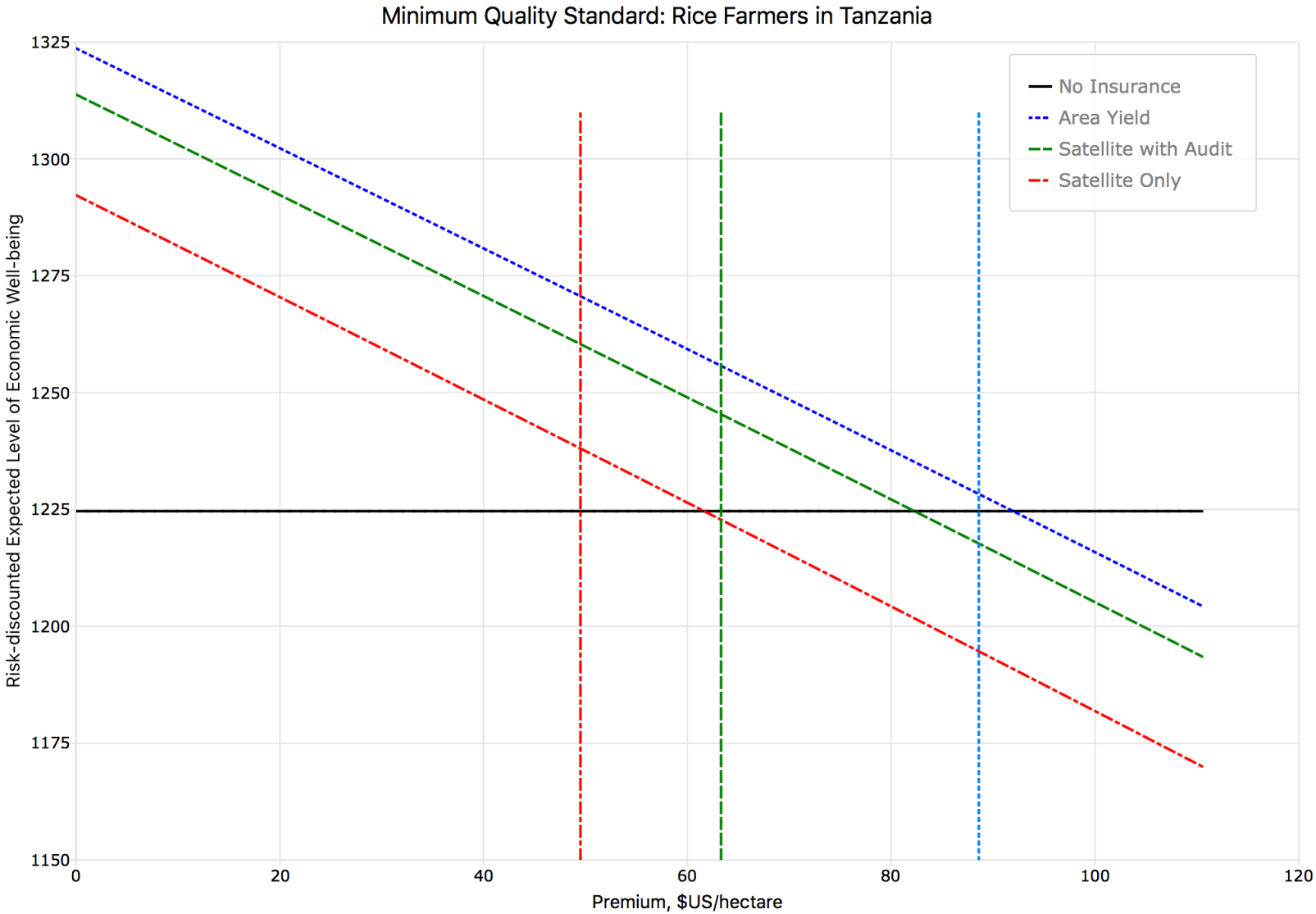
Modeling yields as a function of the satellite data



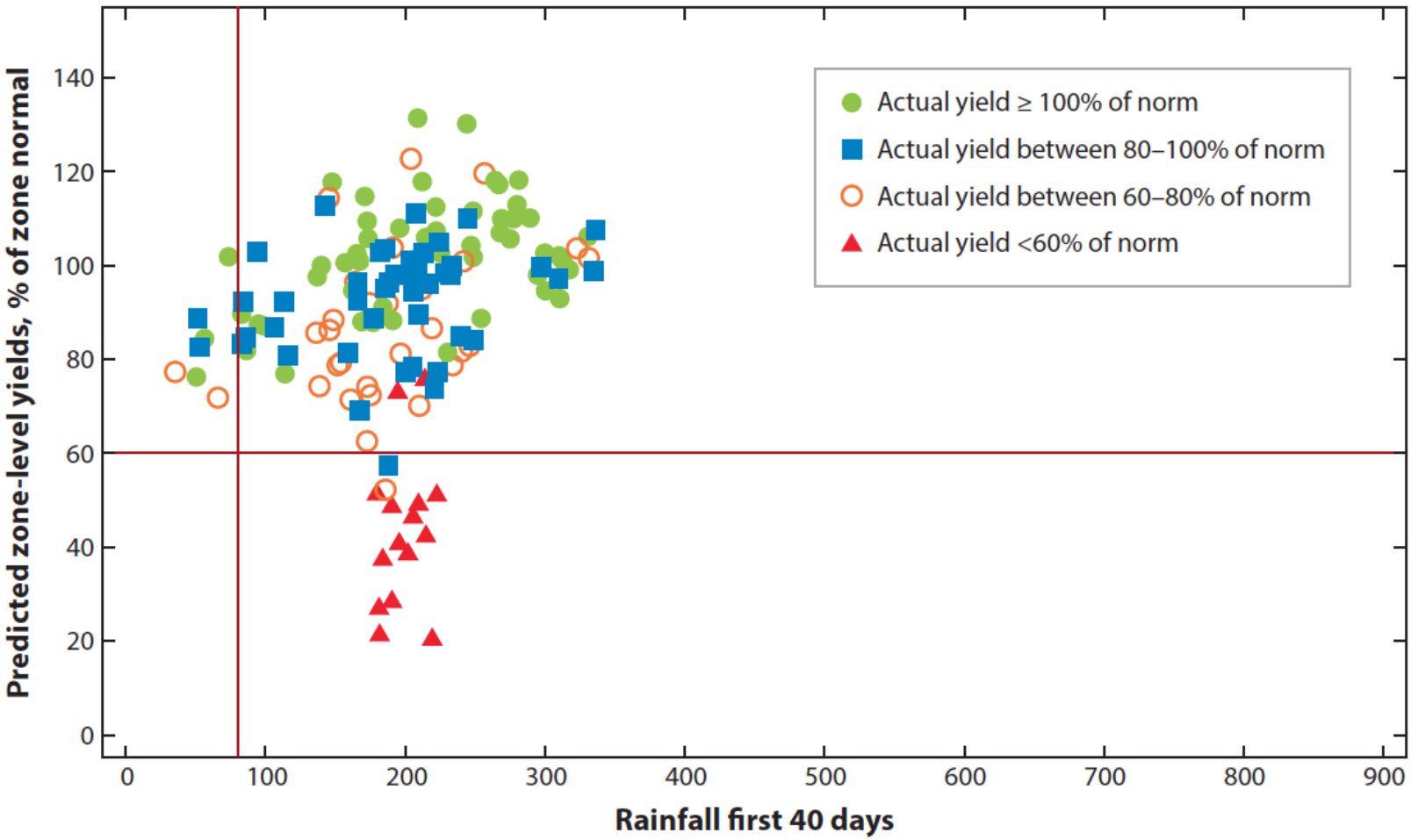
Designing the insurance contracts

- Consider 3 different contracts:
  1. **Area-yield contract:** Compensates farmers with an amount equal to actual area yield shortfalls below the zone mean
  2. **Satellite-based contract:** Compensates farmers for predicted zone-level yield shortfalls
  3. **Satellite-based conditional audit contract:** Pays according to the satellite-based contract, unless farmers request an audit. If farmers request an audit and actual losses are greater than a certain percentage (δ) of predicted losses, the contract will pay based on the result of the audit. The optimal audit trigger (δ) depends on the audit cost (γ)

Applying MQS to Contract Alternatives



Another Example Piloted in Tanzania & Mozambique for Maize

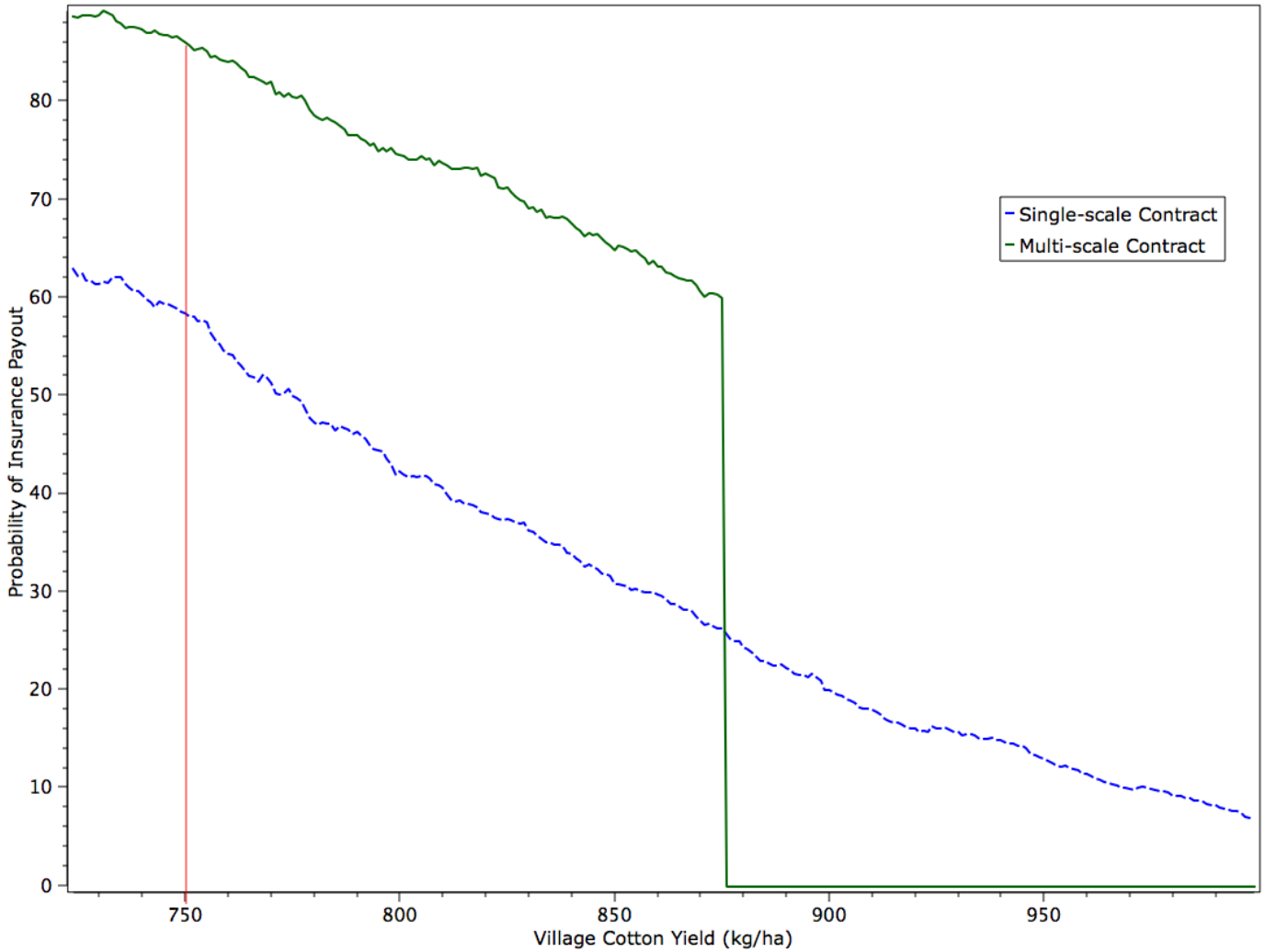


- Spillovers to Kenya crop insurance program

Downscaling with Type-2 Audit

- Area yield contracts can in principle offer strong insurance value (compared to weather-based insurance)
- But over what geographic should yields be calculated?
  - A too small area (e.g., the individual farmer's field in the extreme) creates a moral hazard problem
  - A too large area (e.g,, average yields for a county or even a group of villages) lessens the quality of the insurance
- So might two triggers be better than one?
  - Primary trigger set a small area (e.g., village)
  - A higher level "audit" trigger can control moral hazard
- Let's compare single trigger contract set at the 10 village level versus a 2-trigger contract set at the level of single village with audit of 2 randomly selected neighboring villages
- Both contracts carry same price!

Uncompensated Losses under Alternative Contracts in Mali



Summary of Steps to Design for Quality

- Scale down insurance zones to smallest level possible given technology & moral hazard problems (including reliance on double trigger contracts as with cotton contracts)
- Use ground-truthing & technology to eliminate design failure
- Consider fail-safe audit to definitively eliminate design failure
- Beware that in some environments index insurance may never work because intrinsic idiosyncratic risk is too high

In Conclusion

- Problems of risk & resilience more powerful than ever
- Time to neither praise nor bury index insurance
- Big data technological frontier is exciting, but we need more attention to the designing contracts for quality to take advantage of these new technological possibilities
- A "Do No Harm" MQS seems reasonable from the perspective of the different stakeholders
- As we will discuss, governments & the private sector can support the development and certification of quality standards