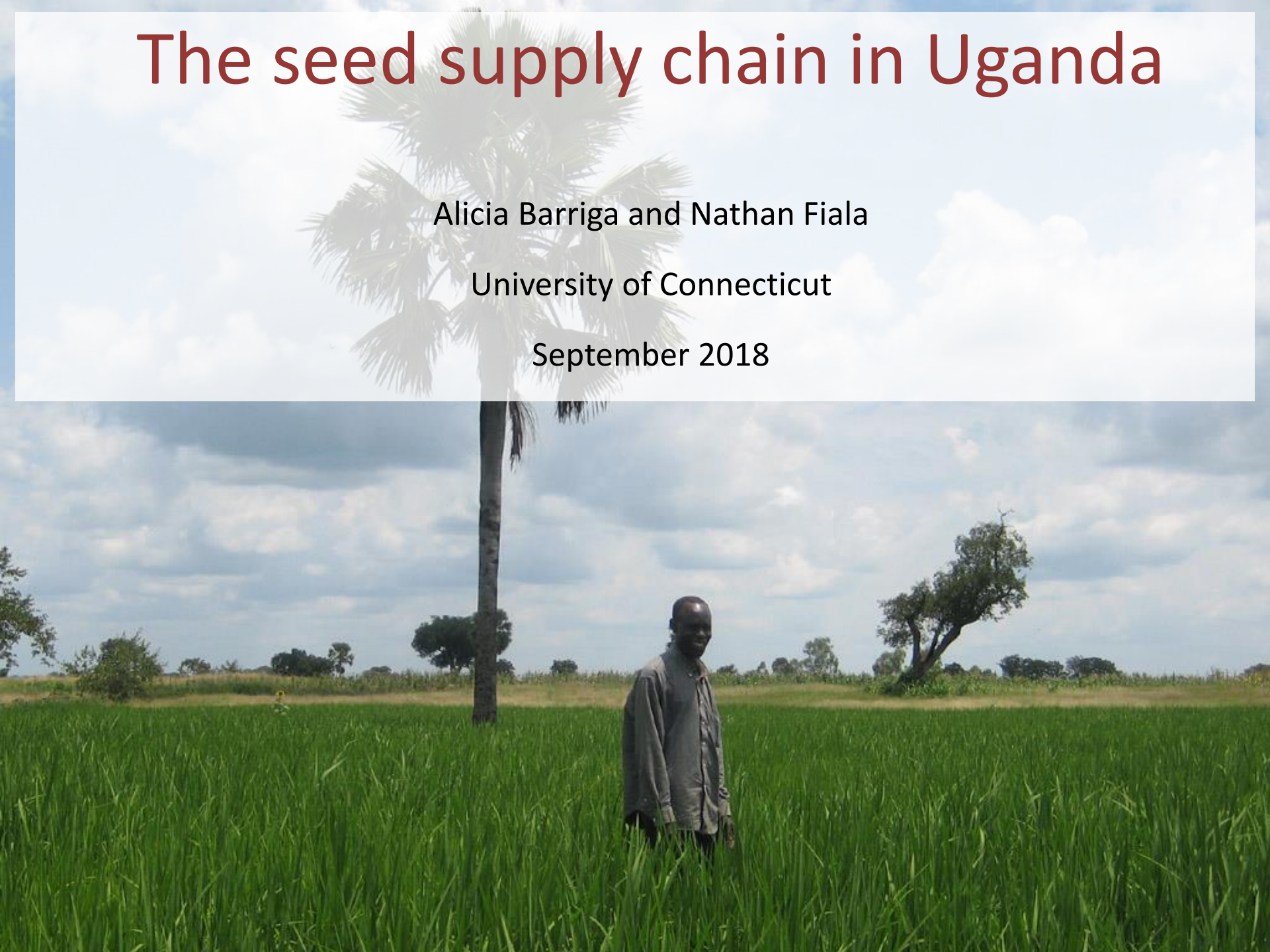


The seed supply chain in Uganda

Alicia Barriga and Nathan Fiala

University of Connecticut

September 2018



Are farmer inputs of low quality?

- Bold et al. (2017) found that a random bag of fertilizer has significantly missing nutrients
 - Under certain circumstances, can lead to negative returns for farmers
 - They found similar results for the quality of seeds
- But Ilukor et al. (2017) show that farmers have higher quality seeds than they expect
- No study has shown actual *adulteration*

This study : the supply chain in northern Uganda

- Are there quality issues, and are they from tampering or general degeneration along the supply chain?
 - At which point is quality worst?
 - Focus only on maize
 - Samples collected from points along the entire supply chain
- Focus on Arua, Lira, Kitgum, and Kampala
 - Based on the size of the district and oversight from government and NGOs
- Conducted a census of formal sector suppliers in these areas

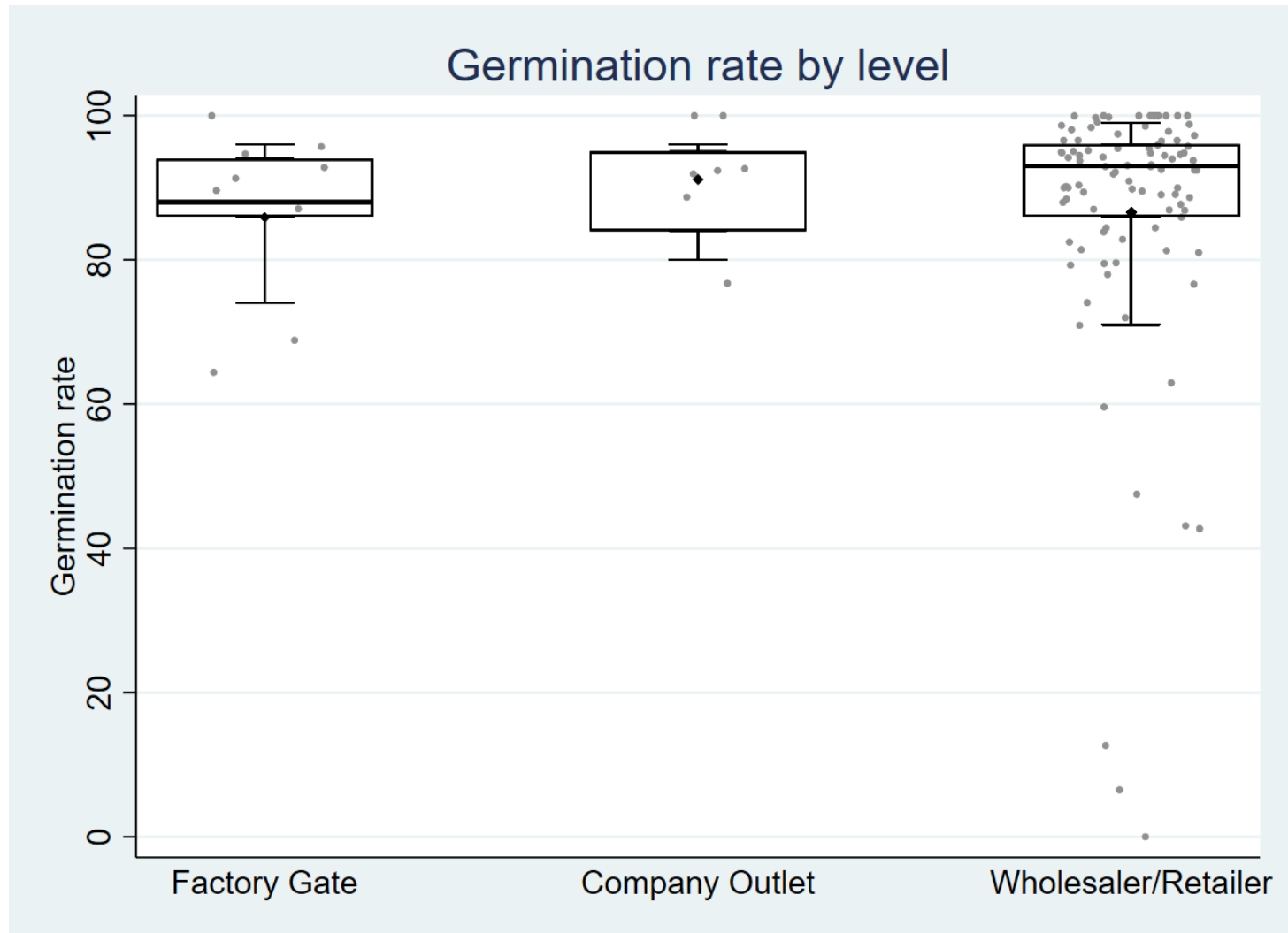
Measures of quality

- Testing conducted in Uganda to examine the physical purity and performance of the seeds
 - Moisture (influences seed quality and storage life of the seed)
 - Vigor (gives performance of seeds in storage; simulates early ideal conditions by germinating seeds in wet soils and incubating at certain temperatures)
 - Germination rates
 - Percentage of pure seeds and dead seeds
- DNA similarity testing in Australia
 - One way to examine whether or not seeds were adulterated
 - Can't say if pure, only if similar across seeds

Results from the full sample

	N	Mean	Std. Dev.	Min	Max
Moisture	112	12.92	0.71	11.3	16.3
Vigour test	112	71.47	21.80	0	97
% pure seeds	112	99.60	0.37	98.1	100
% inert	112	0.39	0.36	0	1.9
Germinate normal seeds	112	86.82	17.29	4	99
Germinate abnormal seedlings	112	2.85	2.70	0	19
% dead seeds	112	9.22	14.82	0	92
DNA distance	111	0.11	0.05	0.02	0.23

Results by supply chain



Summary of results

- High levels of genetic and physical purity of seeds in general
- We do not find that quality deteriorates systematically along the supply chain
 - Quality drops as soon as the seeds leave the breeders (?) and remains unchanged across the rest of downstream suppliers
 - But variance in outcomes goes up
- The prevalence of low seed quality is likely due to mishandling and/or poor storage immediately after the source
 - Not intentional counterfeiting or adulteration by lower level sellers

Possible policy responses

- Rather than certification, why not focus more on monitoring and storage?
 - Fund and strengthen existing monitoring mechanisms to target quality control interventions
 - National Seed Certification Services (NSCS) employs only 7 specialized personnel for inspecting seeds, compared to over 60 in Kenya
- Get development partners and the private sector to partnership with Government
 - Can strengthen Government's own monitoring system
- More funding towards NARO to create new, home-grown agricultural technologies for storage and transportation
 - Can also enhance breeder seed production capacity

Possible policy responses

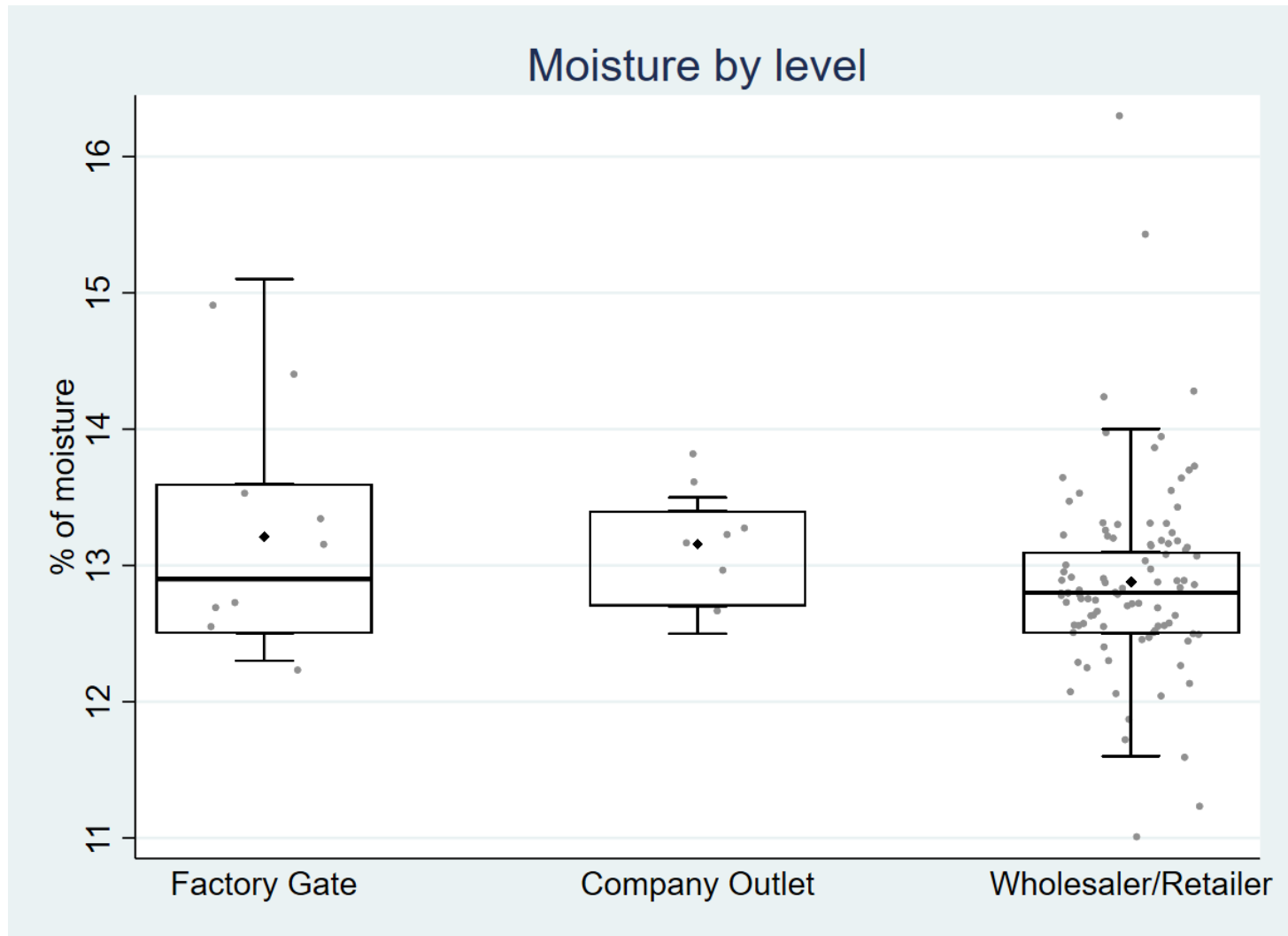
- Subsidize the use of improved inputs
 - Farmers can't always afford improved seeds and fertilizer
 - Or don't fully understand the value
- Expand extension services to farmers
 - And get them involved in the process of monitoring quality
 - Less than 8% of farmers report access to extension services
- Repeat and expand testing of supply chain of inputs
 - Can be used as a warning system for farmers

Proposed next steps

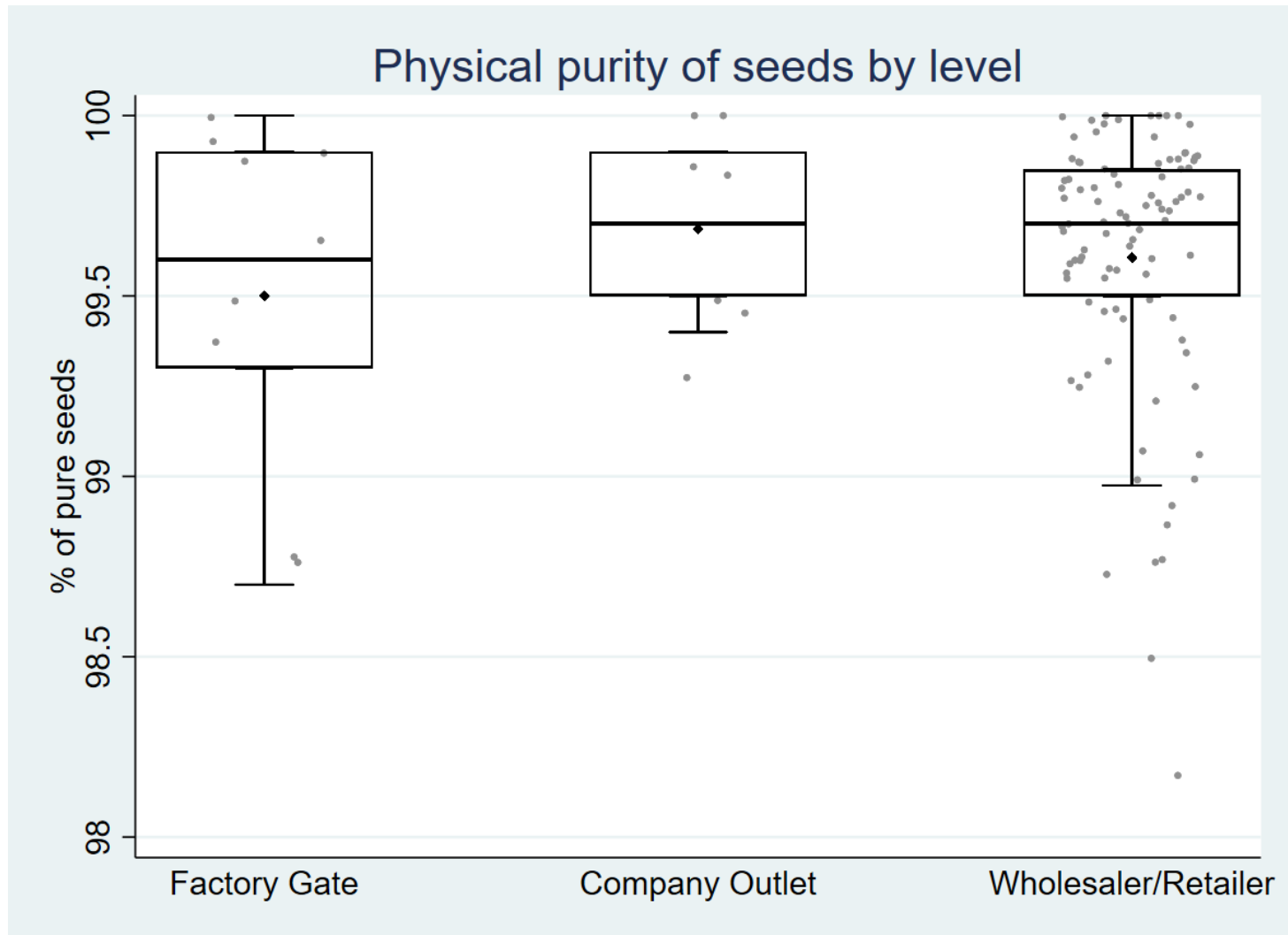
- Need to test explicitly for certified seed quality
- Larger sample size
 - More districts (20+)
 - Randomly sampled across the country
- At least 3 to 4 crop types
- Repeated each season to map out changes over time

Thank You

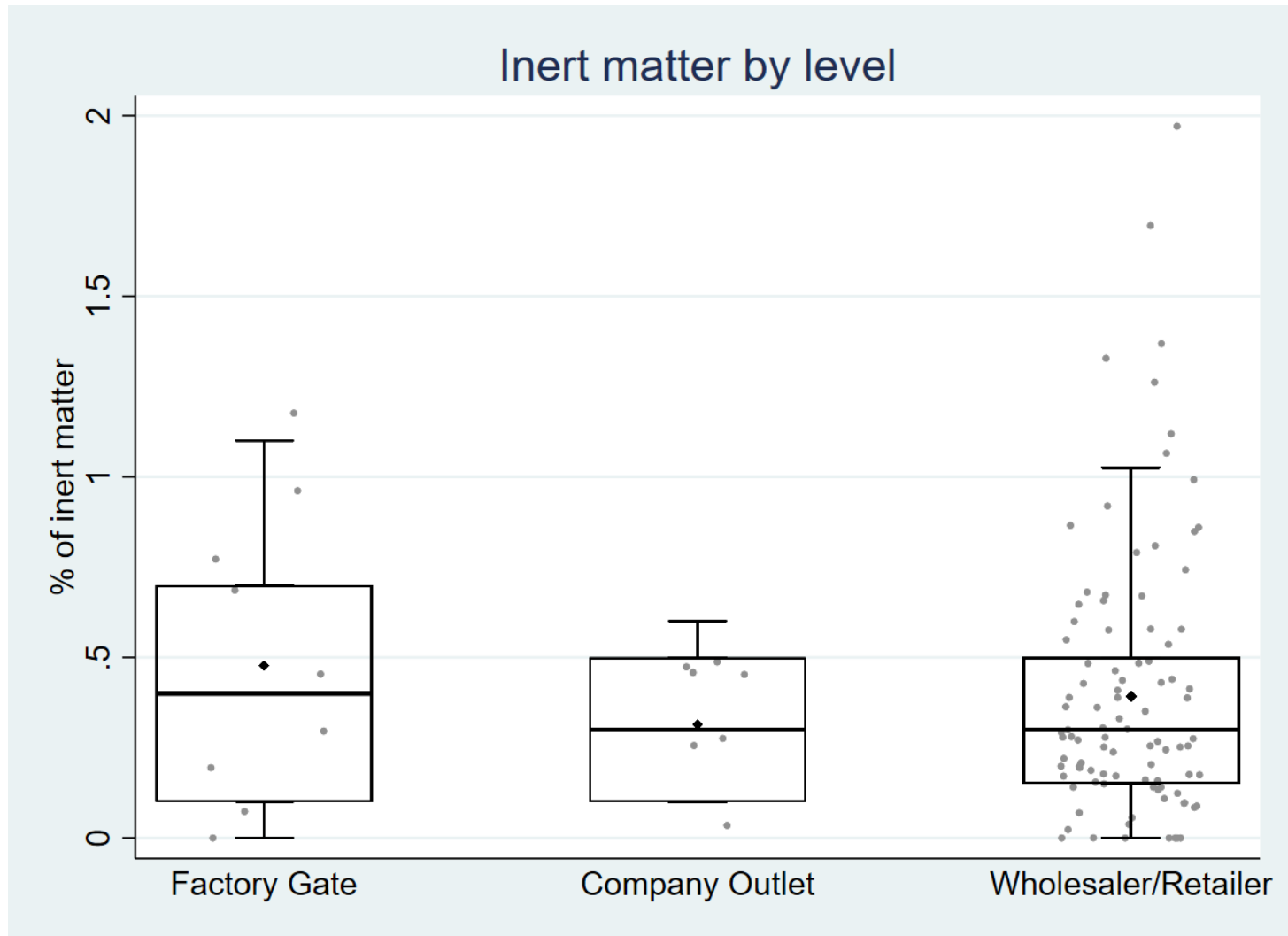
Results by supply chain



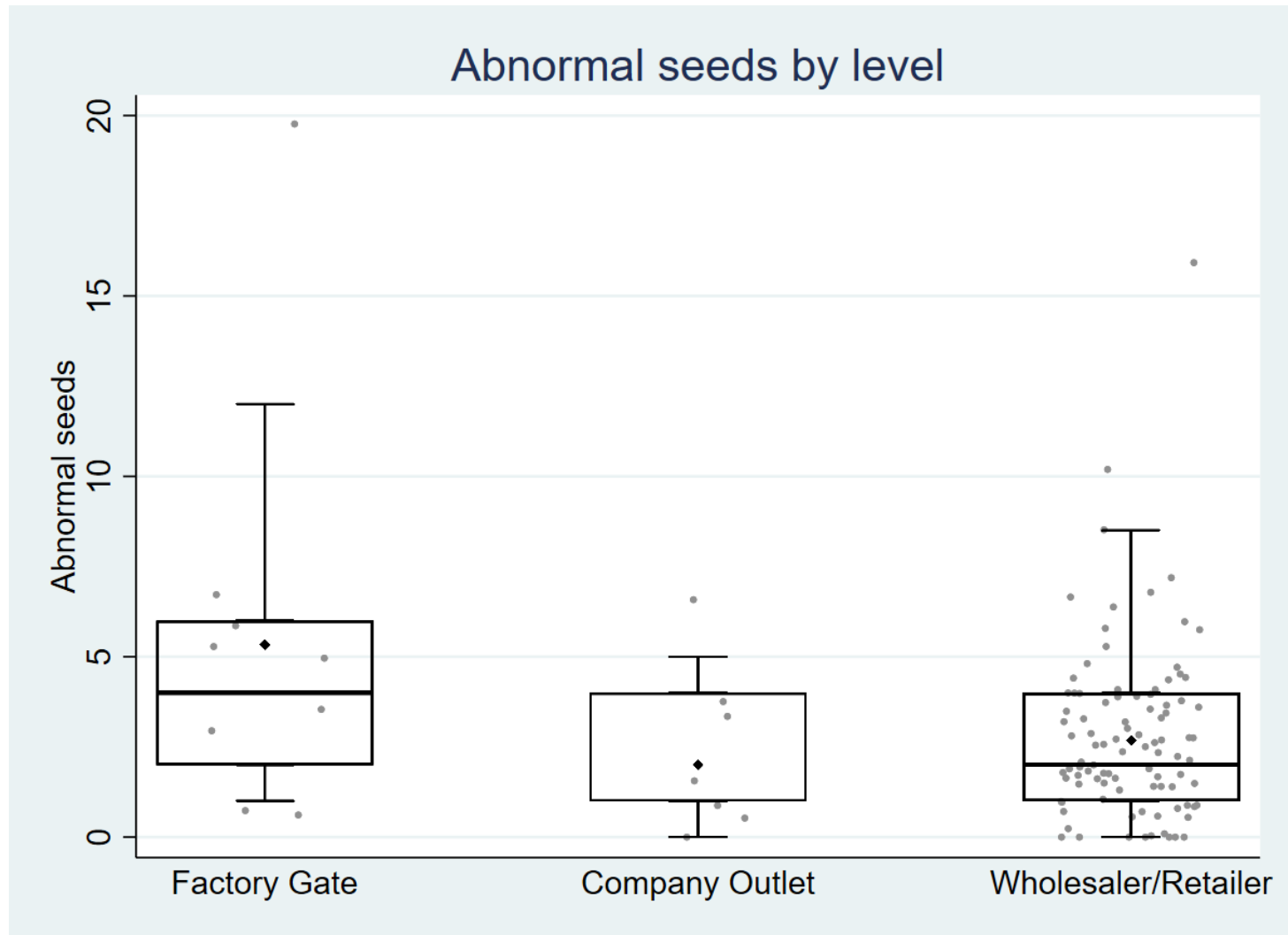
Results by supply chain



Results by supply chain



Results by supply chain



Results by supply chain

