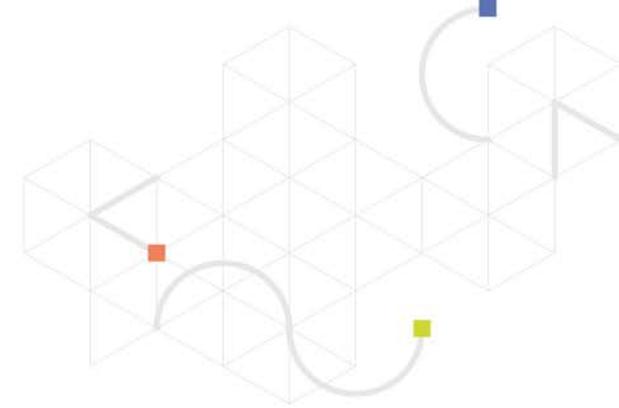


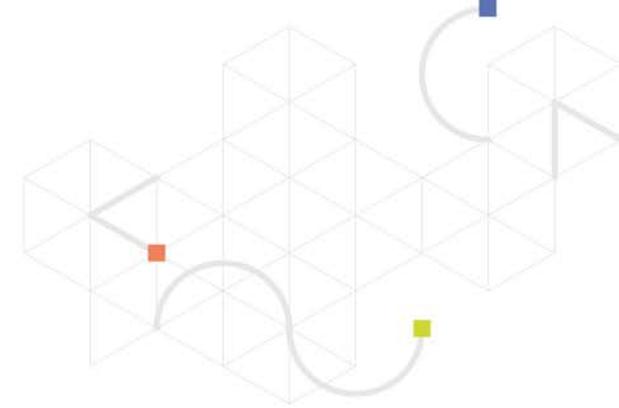
Project co-authors

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- Bo Wang, Camilla Brent, Jacqui Vandenbroek, Ellen Miech and Samuel Ryan – Department of Agriculture and Water Resources, Plant Import Operations Branch
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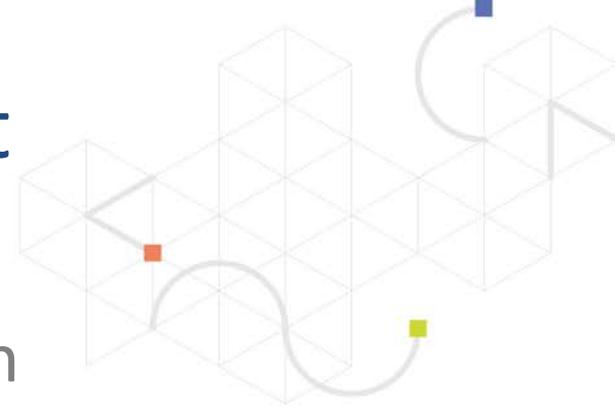
Outline

- **Project context**
 - Policy environment
 - Prior work – economic theory, laboratory experiments
- **Field trial**
 - Design
 - Evaluation strategy
- **Findings**
 - Implementation and participation
 - Assessment of behaviour change
 - Compliance-cost savings



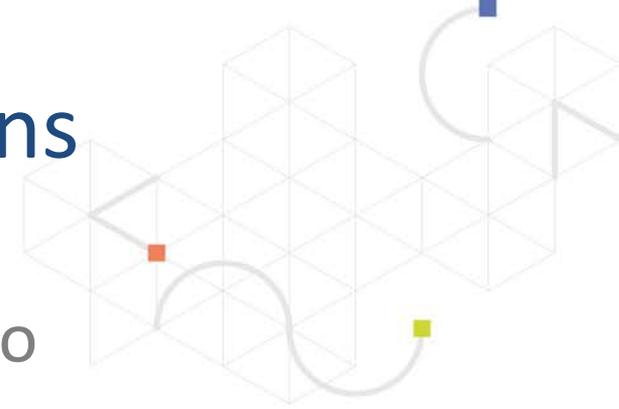
Biosecurity policy environment

- Department of Agriculture and Water Resources is responsible for the design and implementation of rules governing imports
 - The *Biosecurity Act 2015* allows greater flexibility in how biosecurity risks are managed
 - Balances the government's biosecurity objectives with the burden interventions place on businesses and the increased costs for Australian consumers



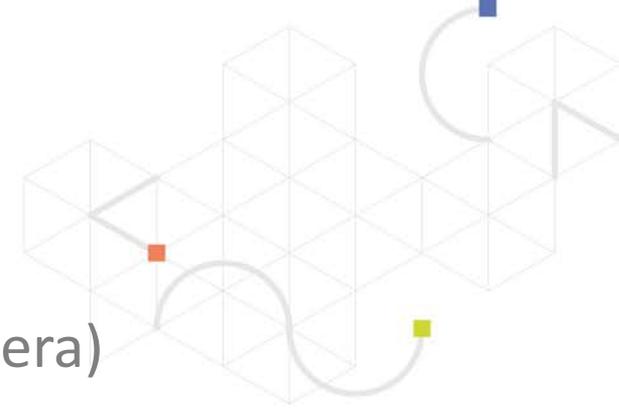
Designed biosecurity regulations

- *Incentive regulation* incorporates stakeholder behavioural responses into regulatory design
 - Rossiter and Hester (2017) analyses the importer-regulator interaction as an inspection game
- Complement game-theoretic foundations with suitable *behavioural economics* devices (Rossiter *et al.*, 2018)



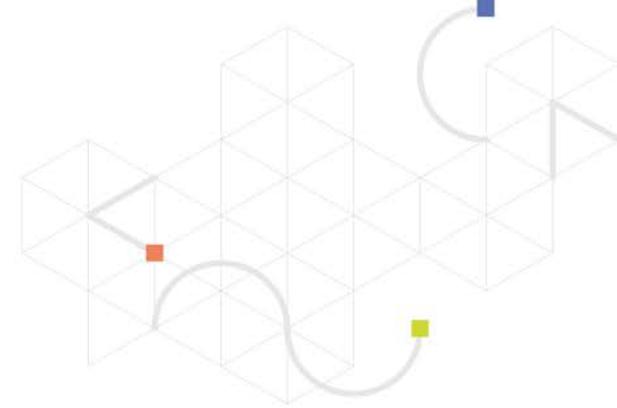
Field trial design

- Focus on two plant-product pathways
 - Vegetable seeds for sowing (selected genera)
 - Peat

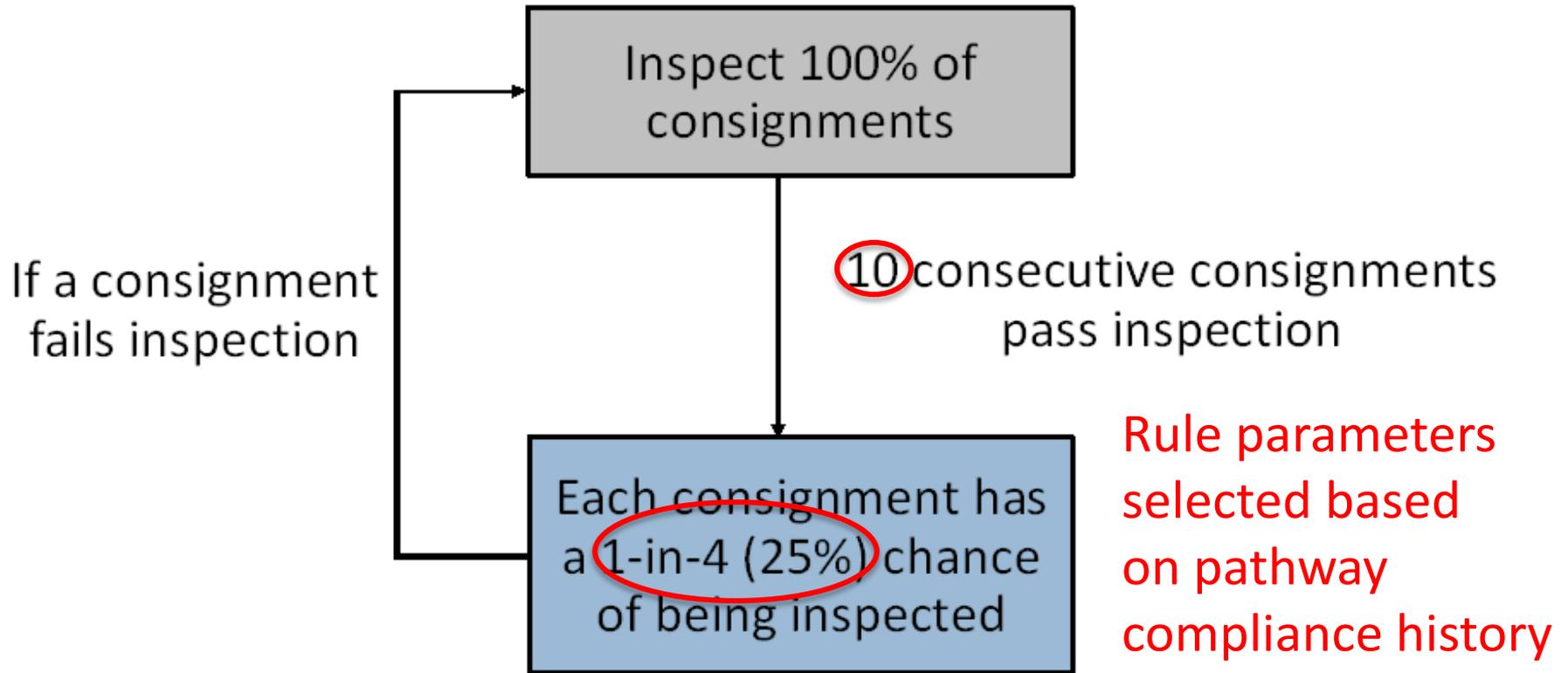
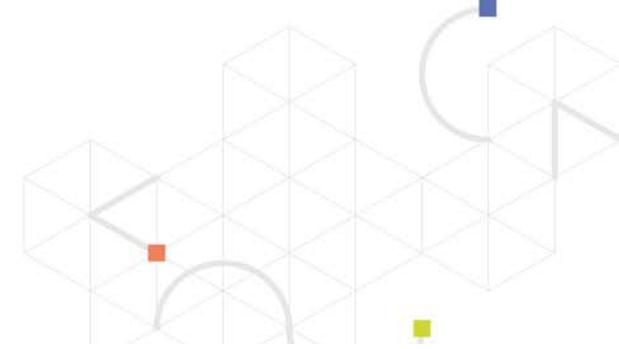


Field trial design

- Draw upon insights from previous theoretical and experimental research
 1. Use a simplified rule for determining eligibility for inspections (CSP-1), calibrated to pathway characteristics

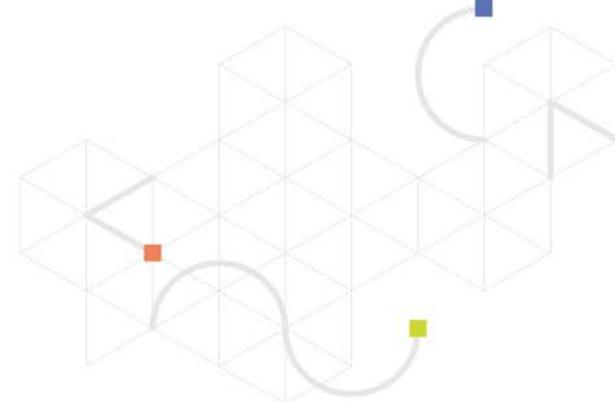


CSP-1 algorithm applied to each pathway individually

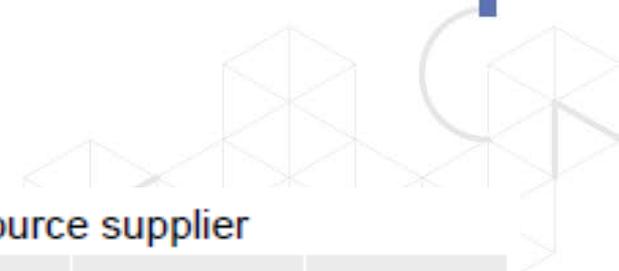


Field trial design

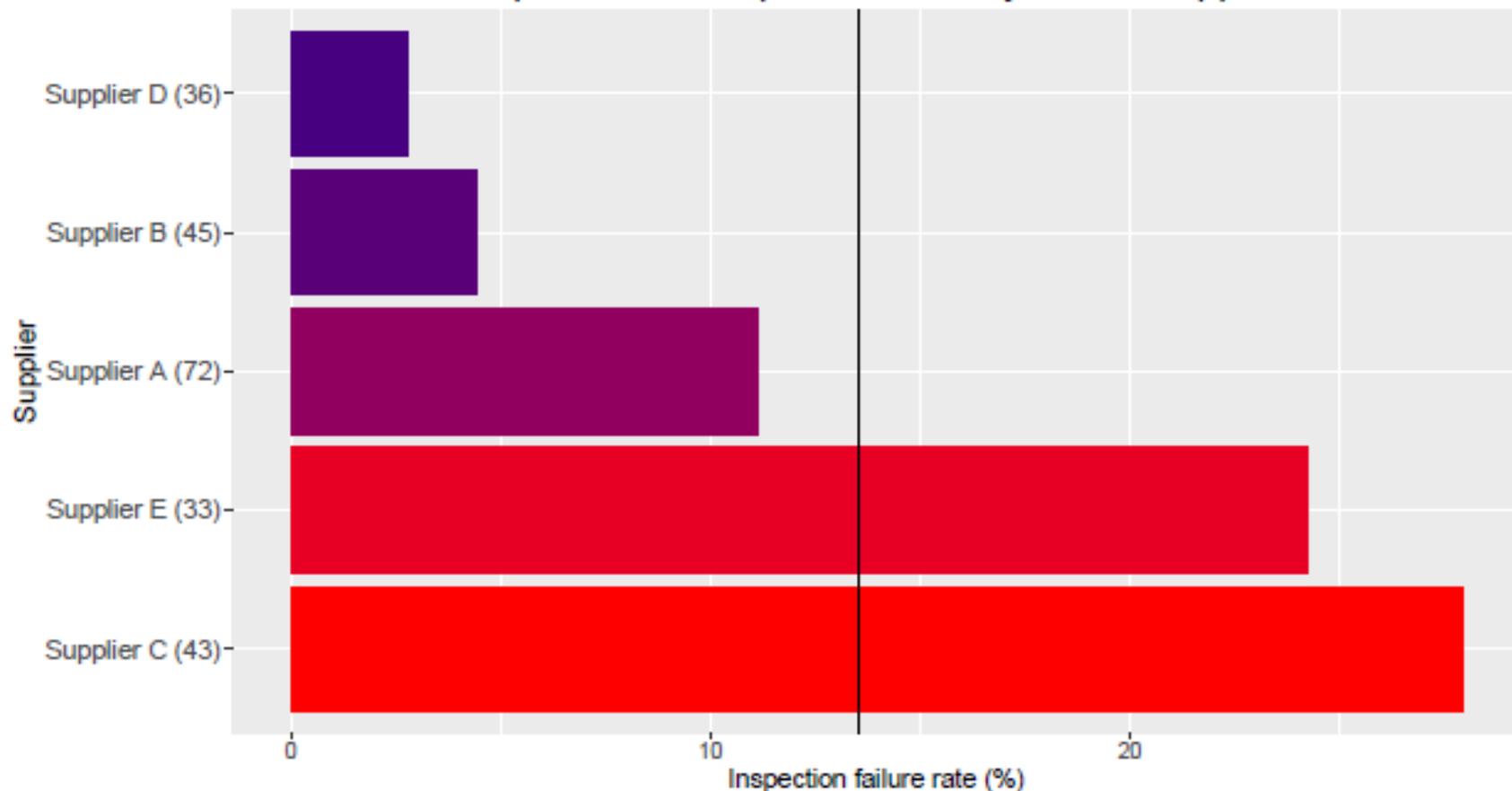
- Draw upon insights from previous theoretical and experimental research
 1. Use a simplified rule for determining eligibility for inspections (CSP-1), calibrated to pathway characteristics
 2. Offer a more complete description of the rules to stakeholders
 3. Apply an administrative code to separate eligible from ineligible shipments under the one tariff code
 4. Provide structured feedback reports to importers on their own consignments' inspection outcomes



Feedback reports



Inspection failure performance by source supplier



Feedback reports

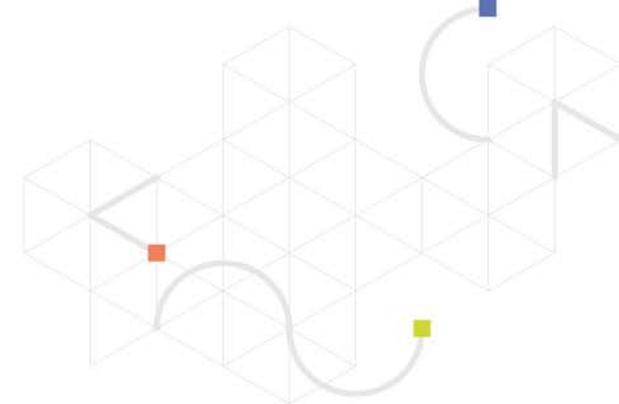
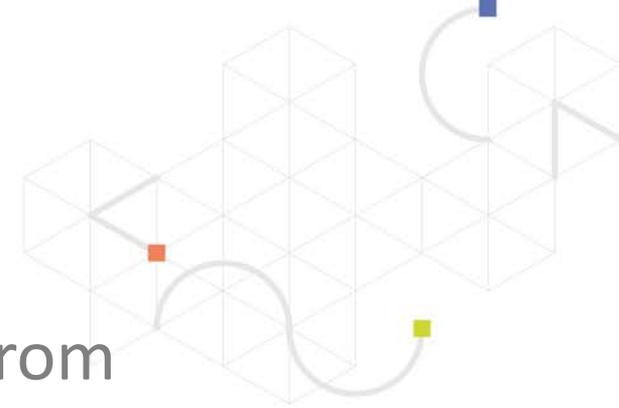


Table 1: Consignments with biosecurity risk material

AIMS Entry-Line Number	Goods Description	Supplier Name	Types of Risks Detected	Packaging Issue?	Organism/s: Specification to Genus (where available)
AIM1234567S – 1	Mixed Vegetable Seeds	Supplier C	Foreign Plant Material; Plant Disease	No	Liliopsida Cyperales Poaceae Triticum
AIM2345678S – 1	Carrot Seeds	Supplier E	Soil Contamination	Yes	Not available
AMI3451234S – 2	Cauliflower Seeds	Supplier A	Invertebrates (insects/arachnids); Fungi	No	Insecta Lepidoptera Pyralidae Plodia; Ascomycetes Pleosporales Pleosporaceae Alternaria
AMI3451234S – 4	Broccoli Seeds	Supplier A	Invertebrates (insects/arachnids); Fungi	No	Insecta Lepidoptera Pyralidae Plodia; Ascomycetes Pleosporales Pleosporaceae Alternaria

Evaluation strategy

- Mixed-methods approach
- (Largely) qualitative insights gleaned from stakeholder discussions
 - Two rounds of interviews with importers and customs brokers on each pathways
 - One-off interviews with document assessment and inspection field officers from DAWR
- Quantitative insights from analysing administrative data held by the department



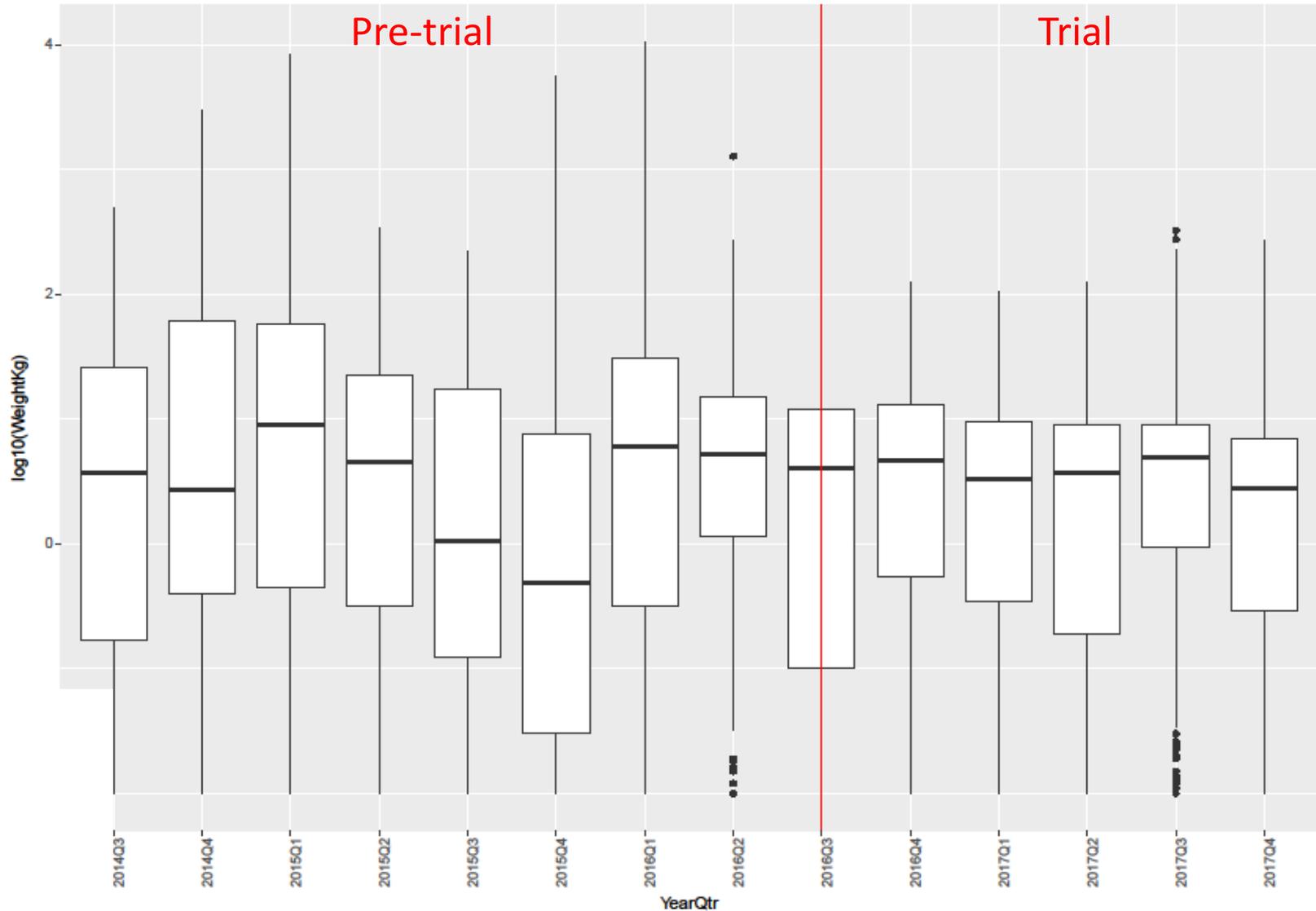
Implementation and participation

- Several issues arose in the complex operating environment
 - Pathway eligibility requirements changes during the trial
 - Biosecurity policy requirements reduced the incentive for importers of smaller seed shipments to participate
 - Challenges with internal department communication and IT system access
 - Stakeholders misunderstanding trial eligibility and mechanics
- Some stakeholders found the feedback reports helpful for their decision-making processes

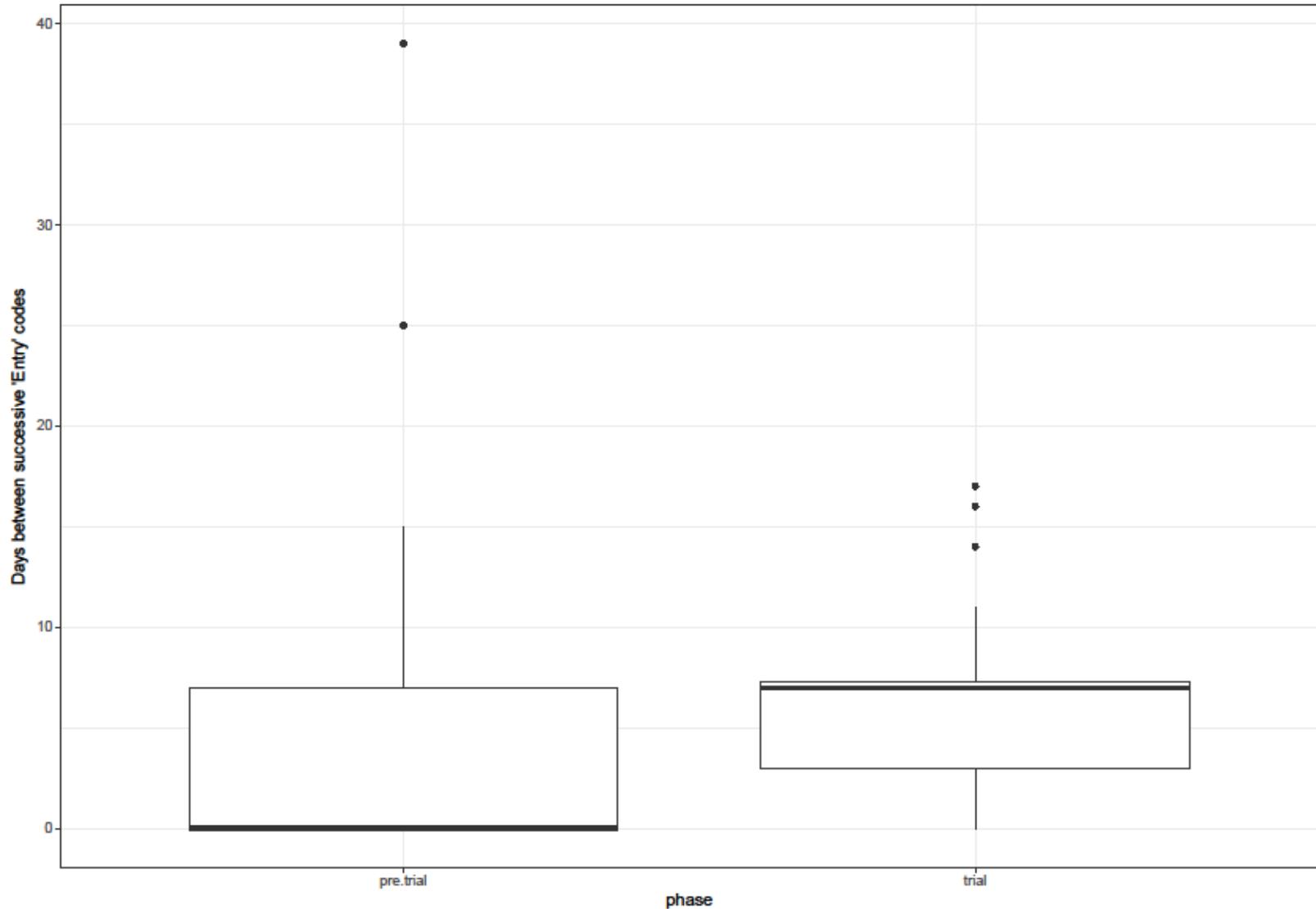
Behaviour change assessment

- Outcomes may manifest across several dimensions \Rightarrow use “footsteps of beneficial change” to gauge behavioural responses
 1. Changes to shipment size and/or frequency

Consignment weight distribution for an individual importer



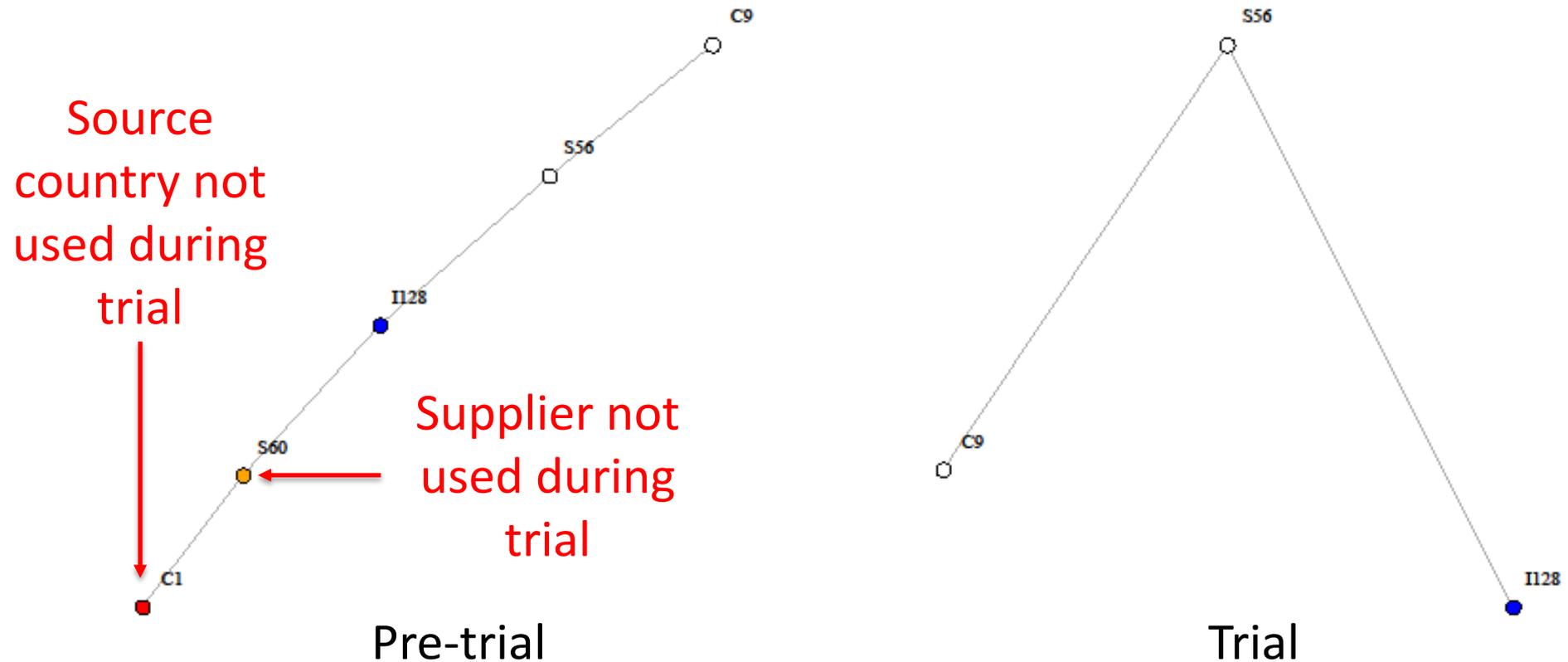
Consignment inter-arrival times for an individual importer



Behaviour change assessment

- Outcomes may manifest across several dimensions \Rightarrow use “footsteps of beneficial change” to gauge behavioural responses
 1. Changes to shipment size and/or frequency
 2. Switching suppliers and/or countries of origin

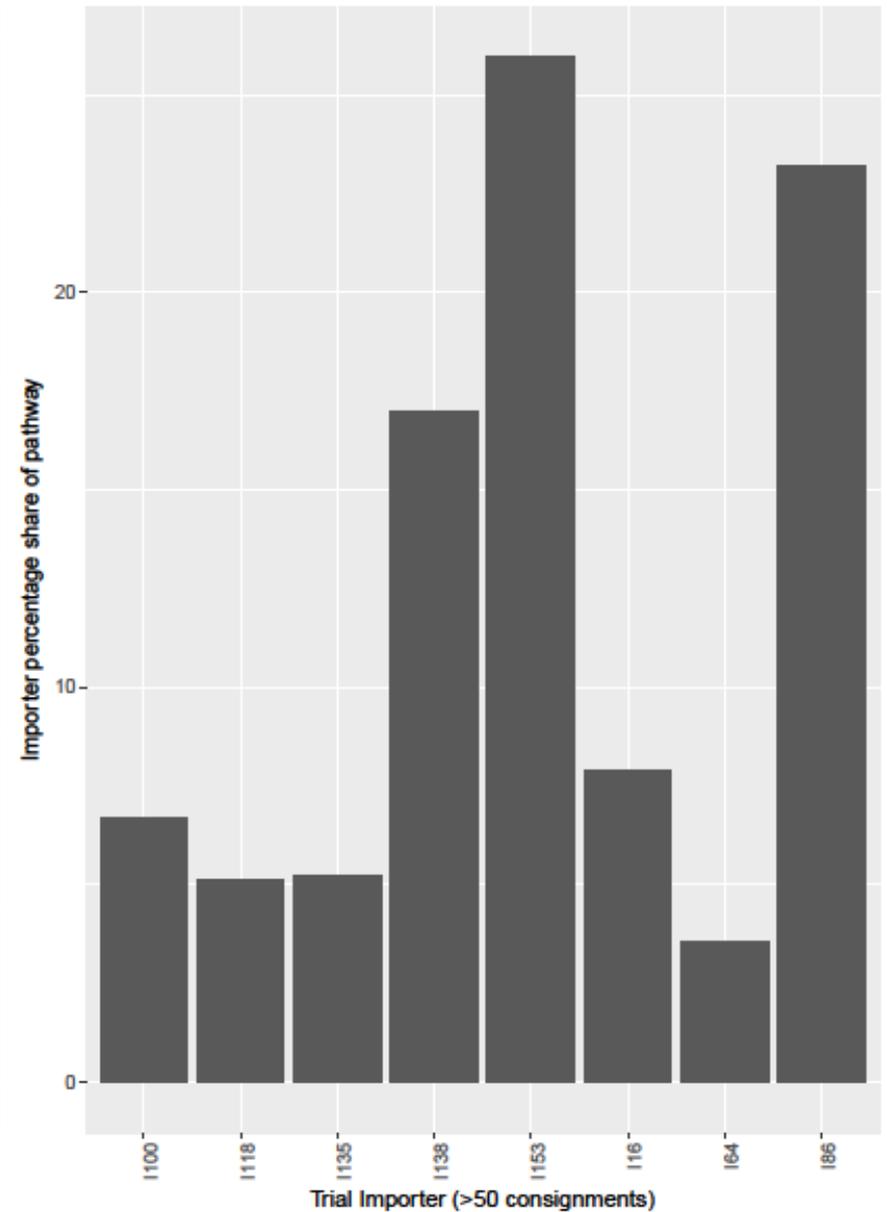
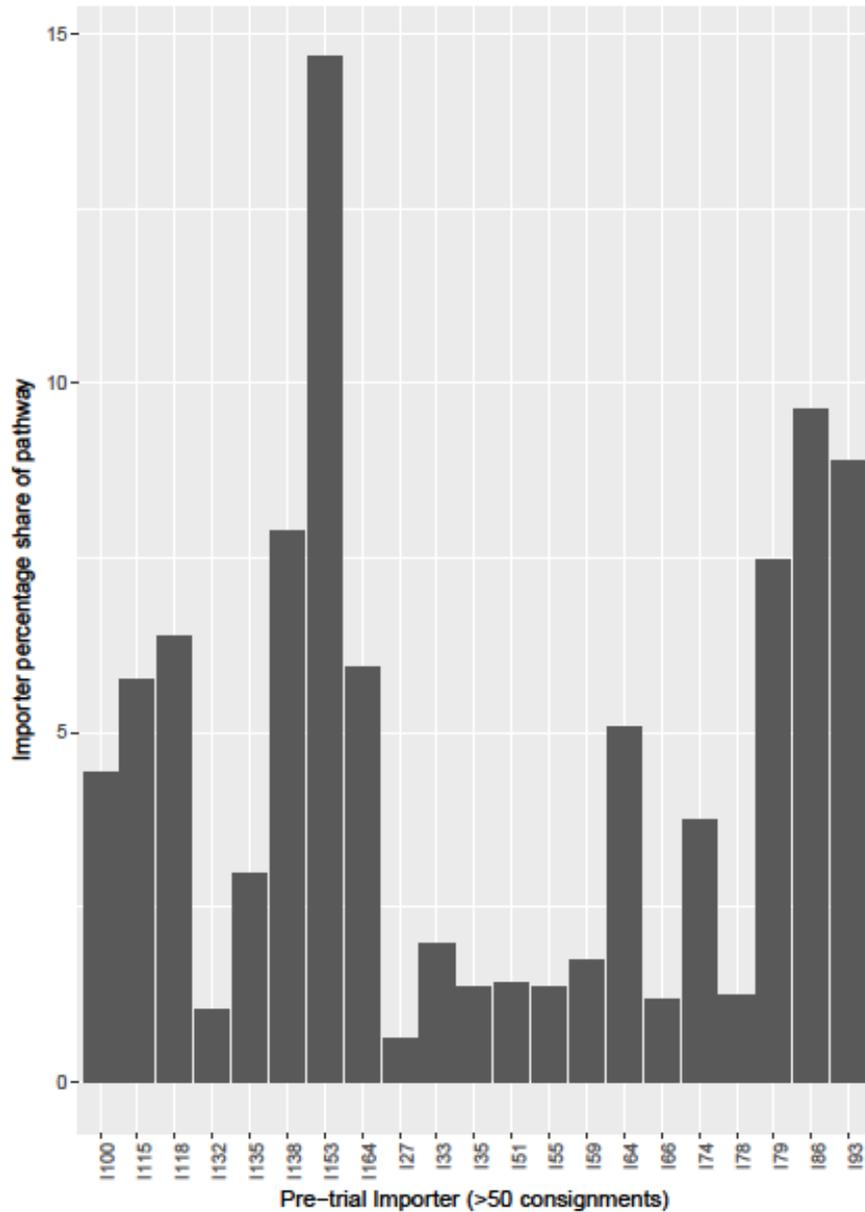
Supplier and source country network diagrams: an individual peat importer (I128)



Behaviour change assessment

- Outcomes may manifest across several dimensions \Rightarrow use “footsteps of beneficial change” to gauge behavioural responses
 1. Changes to shipment size and/or frequency
 2. Switching suppliers and/or countries of origin
 3. The number of inspections avoided in absolute terms and relative to the theoretical “best case”
 4. Changes to biosecurity risk mitigation procedures in the exporting country and/or in the transportation process
 5. Pathway-level evidence of changes in importer composition (favouring those with better track-records)

Vegetable seed pathway composition: importers



Estimated per-consignment compliance-cost savings: vegetable seeds

Cost component	Estimate (\$)
Direct inspection costs	100
Inspection attendance costs	80
Inspection booking opportunity costs	20
Cost of goods destroyed/being made unsaleable	50
Storage cost savings	0
Transport cost savings	150
Total (per consignment)	400

Key findings and opportunities for system improvements



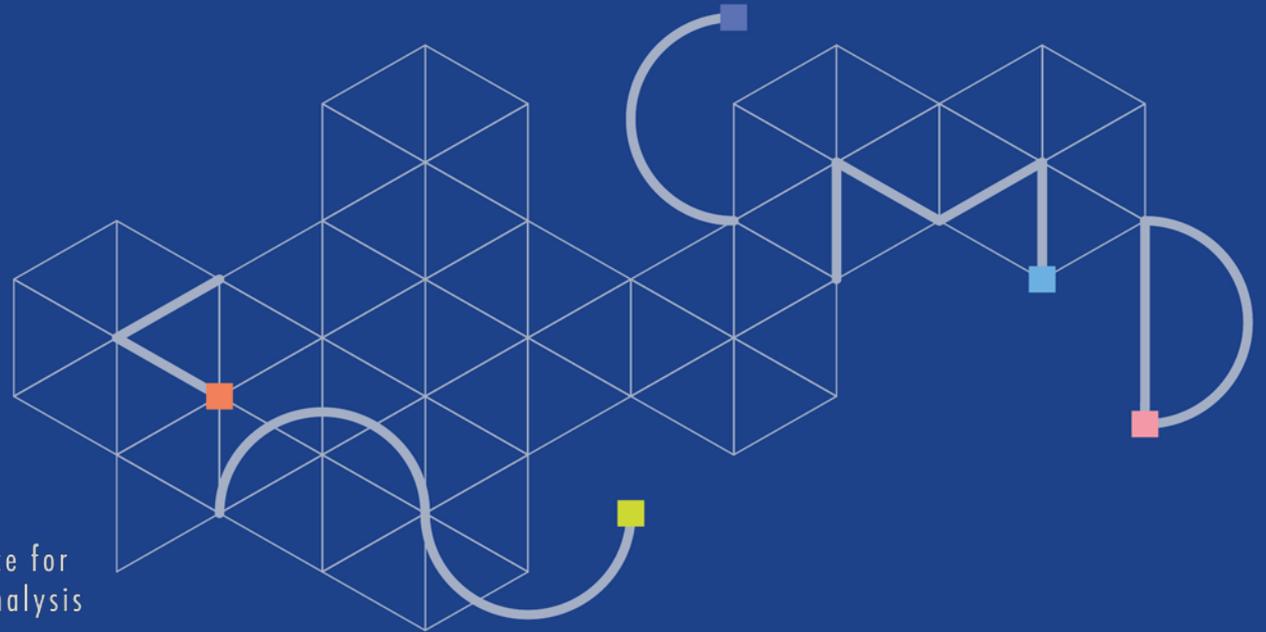
1. Develop pathway-specific understanding of factors that influence stakeholder behaviour.
2. Provide clearer guidance around what Australia's Appropriate Level of Protection means for designing assurance frameworks.
3. Reconfigure information management and operational systems to improve data capture and flexibility in rule design.

Thank you

Questions?

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