Investment Decisions in Banana Research
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Fusarium Workshop on 20th August
How much money should be spent to address the threat of Foc TR4?

- Compared to other major diseases?
- As % of value of banana production?
- In response to potential losses?
Introduction

Would it make a difference on what it was spent?

- Quarantine strengthening in places where there is no Foc TR4?
- Containment where it currently is to keep it from escaping?
- Research to make efforts at quarantine, containment and recovery from Foc losses more effective?

- How to prioritize between Foc TR4 and other races?

Are there quantitative and transparent methods to help prioritize?
Quantitative methods for assessment

Cost benefit analysis (CBA): calculating and comparing benefits and costs of a (future) project. Costs and benefits expressed in monetary terms, adjusted for time they occur.
What data/information do we need?

**Costs**
- Research and extension costs by year
- Increase in production costs (at farm level)?
- Other negative “side-effects”?

**Benefits**
- Likelihood of research success → *factor to weigh benefits*
- How many years to achieve research output? → *onset of benefit stream*
- Benefits to producers (e.g. increase in yield (e.g. restoring pre-Foc yields) or price; yield loss avoided if Foc is contained → *counterfactual: widespread loss*)
- Benefits to consumers (e.g. through price reductions or quality changes; or by keeping preferred cultivars available → *counterfactual is replacement*)
- Other benefits (e.g. health, environment)
What data/information do we need? (cont.)

**Adoption**
- Current and future spread and losses of constraint → adoption domain
- How many potential users will adopt/benefit from technology
- Speed of uptake (when will benefits start and when will they max)
Example: RTB priority assessment for banana research

☐ Systematic assessment of key research options
  • Global online expert survey (N = 523) to identify constraints
  • Selection of key research options
  • Information for parameters from experts and statistics
  • Economic surplus model and CBA to quantify impact
  • Feedback loop with stakeholders (on-going)

☐ Research options with completed assessment:
  • Banana bunchy top virus (BBTV)
  • Banana bacterial wilt (BXW) – GMO and cultural practices
  • Conventional breeding for improved EAHB
  • Conventional breeding for improved Plantain
  • Cropping system intensification
Expert survey results: major yield constraints (by region)
Results of assessment: adoption ceiling and benefits

<table>
<thead>
<tr>
<th>Technology</th>
<th>Adoption ceiling</th>
<th>All Benefits</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Lower adoption</td>
<td>Higher adoption</td>
<td>Lower adoption</td>
<td>NPV [US$’000]</td>
<td>IRR</td>
<td>NPV [US$’000]</td>
<td>IRR</td>
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<tr>
<td>BBTV recovery</td>
<td>404</td>
<td>807</td>
<td>1,337,092</td>
<td>61%</td>
<td>2,734,922</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>BxW management: GM</td>
<td>436</td>
<td>872</td>
<td>103,608</td>
<td>36%</td>
<td>212,006</td>
<td>42%</td>
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</tr>
<tr>
<td>BxW management: cultural practises</td>
<td>643</td>
<td>1,287</td>
<td>1,981,603</td>
<td>72%</td>
<td>4,085,493</td>
<td>87%</td>
<td></td>
</tr>
<tr>
<td>Resistant EAHB - new</td>
<td>592</td>
<td>1,185</td>
<td>95,406</td>
<td>23%</td>
<td>208,147</td>
<td>27%</td>
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<tr>
<td>Resistant EAHB - release</td>
<td>397</td>
<td>795</td>
<td>298,804</td>
<td>49%</td>
<td>608,135</td>
<td>57%</td>
<td></td>
</tr>
<tr>
<td>Resistant Plantain - new</td>
<td>524</td>
<td>1,049</td>
<td>295,359</td>
<td>29%</td>
<td>618,668</td>
<td>34%</td>
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<tr>
<td>Resistant Plantain - release</td>
<td>449</td>
<td>898</td>
<td>1,110,961</td>
<td>64%</td>
<td>2,264,126</td>
<td>75%</td>
<td></td>
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<tr>
<td>Cropping system intensification</td>
<td>627</td>
<td>1,253</td>
<td>547,506</td>
<td>43%</td>
<td>1,127,387</td>
<td>54%</td>
<td></td>
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</tbody>
</table>

*Note:* Lower adoption scenario: analysis with 50% lower adoption ceiling.

*Net Present Values (NPV) calculated using a real interest rate of 10%.*
### Results: beneficiaries and poverty reduction

<table>
<thead>
<tr>
<th>Technology</th>
<th>Number of beneficiaries</th>
<th>Poverty reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower adoption</td>
<td>Higher adoption</td>
</tr>
<tr>
<td></td>
<td>Households ['000]</td>
<td>Persons ['000]</td>
</tr>
<tr>
<td>BBTV recovery</td>
<td>2,018</td>
<td>9,674</td>
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<td>BxW management: GM</td>
<td>2,173</td>
<td>10,745</td>
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<tr>
<td>BxW management: cultural practises</td>
<td>3,217</td>
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<tr>
<td>Resistant EAHB - new</td>
<td>934</td>
<td>4,326</td>
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<tr>
<td>Resistant EAHB - release</td>
<td>634</td>
<td>2,937</td>
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<tr>
<td>Resistant Plantain - new</td>
<td>1,979</td>
<td>8,820</td>
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<tr>
<td>Resistant Plantain - release</td>
<td>1,696</td>
<td>7,566</td>
</tr>
<tr>
<td>Cropping system intensification</td>
<td>1,397</td>
<td>6,428</td>
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</tbody>
</table>

**Note:** Lower adoption scenario: analysis with 50% lower adoption ceiling. Poverty reduction computed using on NPV (10% interest rate), national poverty incidence, share of agriculture on GDP (%), population, region specific elasticity (see Alene et al. 2009).
What is the objective of this session?

- Create awareness and interest about how research investment decisions can be improved with Foc as example
- Contribute to a consensus about the alternative research lines for addressing Foc
- Generate parameter data for Foc economic surplus modeling
- Build expert group to contribute further to parameter data
Thank you for your attention!