Economic Data Needed for Prioritization

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Good Practices

- Understand
  - Markets - economic networks – trade issues
  - Biological processes, consumer behavior
  - Decision maker’s needs

- Identify
  - Risks
  - Options
  - Gaps
  - Issues on the periphery
Factors Affecting Prioritization

- Biology of the pest and hosts
- Potential detection/infestation/control scenarios
- Range of mitigation efforts – costs – effectiveness
- Market reactions
  - Producers – regional differences
  - Trading partners
  - Competitors
- Time horizon
- Analytical and data limits

Valuing an Event (aka Criteria 5)

Event sequence
Criteria 1, 2, and 3

Public & private mitigation efforts
Criteria 6

Trade & consumer responses

Initial conditions/value

Crop losses

Crop value

Production response

Expected value of event

Shock value
Criteria 4

Updated own market impacts

Counts/returns

Impacts on other crops

Other economic impacts

Event value

$\text{Event value} = \text{Production response} \times P(E|C1-4, 6)$
Influence of Market Response

- Capacity of a system to cushion itself
  - Market reallocations - adapt behavior
  - Increase set of alternatives
- Ability to place events in perspective
  - Influence consequences
  - Judgment among alternative choices
- Cost of monitoring/managing
  - Detection
  - Crop rotations, scouting practices

Portraying Events

- Mapping impacts
  - Magnitudes and options
  - Sequence and probabilities of outcomes
  - Comparisons to historical experience
- Distilling imperfect or uncertain information into quantities and prices
- Expert opinion
Aggregating Effects [w/o demand shift]

Aggregating Effects [demand effects]
Isolating Losses

Crop Losses

Control Expenses

Efficiency Frontier

Isocost Level 1 > Isocost Level 2

H

CLn

CLm

CLl

E_n

E_m

E_l

Cc

M

L

Effects Over Time

Crop Production

Pre-event

Post-event with control

Post-event no control

Qc

Qw

Qn

I_0

I_1

Input
What Else Should be Included?

Potential Economic Impacts
Over What Period?
Path Dependent

Direct Costs

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Prevention Costs</th>
<th>Mitigation Costs</th>
<th>Trade Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop P x Q</td>
<td>+ / -</td>
<td>P x Q +</td>
<td>P x Q + / -</td>
<td>P x Q + / -</td>
</tr>
<tr>
<td>Other Crops</td>
<td>+ / -</td>
<td>?</td>
<td>?</td>
<td>?</td>
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</tbody>
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Analysis of a Plant Disease

Other industries affected by the disease
downstream example

Differential effects on the value of production by region
**Limits to Assessments**

- Increasing detail increases trade-offs
  - Models
  - Data
- Historical experiences for comparison
- Defer to expert opinion

- Imperfect translations- quantities and prices
- False precision mistaken for accuracy

**Prioritization - Economic Data Needs?**

- Data currently available
  - Value of production
  - Value of exports
- Market reactions
  - Effects of and on substitutes or complements
  - Markets with the pest
- Additional considerations?
  - Value-added impacts
  - Interdependencies