Is IPM Delivering on the Promise?

Economic Evidence from the United States and Abroad

Session Organizers: George W. Norton and Jeffrey Alwang, Virginia Tech; Scott Swinton, Michigan State; Jorge Fernandez-Cornejo, USDA/ERS
Purpose of the Session

• Summarize accumulated evidence of the economic impacts of IPM in the United States and abroad
  – Review results of past impact studies
  – Highlight the evolution of approaches to IPM impact assessment
  – Summarize economic benefits of IPM, value of environmental benefits, and cost effectiveness of alternative IPM diffusion methods.

• Session aimed at IPM scientists and coordinators, as well as practitioners of IPM impact assessment.
Audiences for IPM Impact assessment

- Farmers (for IPM adoption decisions)
- Scientists (for priority setting)
- Extension workers (for recommending)
- National and International Funding Agencies (for accountability, resource allocation, generating support for IPM)
Nature of IPM Impacts

• **Field and Farm-household Levels** – yield, costs, income, risk, human health and environment, nutrition

• **Watershed and Market levels** – production, prices, trade, income, human health and environment
Diversity of Impact Assessment Methods

• Budgeting
• Econometric analysis
• Economic surplus analysis
• Calculation of indices (poverty, environmental, nutritional)
• Math programming and simulation
Budgeting

- Partial budgets
- Enterprise budgets

Test for statistically significant differences
# Partial Budget

<table>
<thead>
<tr>
<th>Additions to Net Revenue</th>
<th>Reductions in Net Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Increased Returns:</strong></td>
<td><strong>Decreased Returns:</strong></td>
</tr>
<tr>
<td>1. __________ $______</td>
<td>1. __________ $______</td>
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<tr>
<td>2. __________ $______</td>
<td>2. __________ $______</td>
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<tr>
<td>3. __________ $______</td>
<td>3. __________ $______</td>
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<tr>
<td>Total $______ (A)</td>
<td>Total $______ (B)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decreased Costs:</th>
<th>Increased Costs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. __________ $______</td>
<td>1. __________ $______</td>
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<tr>
<td>2. __________ $______</td>
<td>2. __________ $______</td>
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<tr>
<td>3. __________ $______</td>
<td>3. __________ $______</td>
</tr>
<tr>
<td>Total $______ (C)</td>
<td>Total $______ (D)</td>
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</tbody>
</table>

A+C = $______ (E)          B+D = $______ (F)

**Change in Net Returns = E - F = $________**
## Enterprise Budget

<table>
<thead>
<tr>
<th></th>
<th>Units</th>
<th>Price or cost per unit</th>
<th>Quantity</th>
<th>Value or cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gross receipts</strong></td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
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<td></td>
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<tr>
<td><strong>Variable costs</strong></td>
<td>_____</td>
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<td></td>
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<tr>
<td><strong>Income above var. costs</strong></td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td><strong>Fixed costs</strong></td>
<td>_____</td>
<td>_____</td>
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<td></td>
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<tr>
<td><strong>Total costs</strong></td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td><strong>Income above all costs</strong></td>
<td>_____</td>
<td>_____</td>
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</tbody>
</table>
Econometric Analysis

- Regression analysis (of survey data) often required to assess factors influencing adoption (and projecting future adoption)
  - Often use probit or multinomial logit
  - Useful for assessing if participation in an IPM program affects adoption
  - Must be careful to assess how people are selected for the program
Economic surplus analysis

- Combines budget information, adoption information, secondary data on prices, quantities, and trade to estimate market level income effects and their distribution.

- Economic surplus benefits and program costs can be discounted over time in a benefit cost analysis.
Economic value of productivity gains from IPM adoption
Indices

- **Poverty** --
  \[ P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left[ \frac{z - y_i}{z} \right]^\alpha \]

- **Nutrition** – Estimation of changes in consumption and associated changes in calories, protein, etc.

- **Health and Environment** – assessing changes in pesticide quantity and risk and valuing those changes
  - EIQ
  - CV analysis
  - Experimental
Presentations

2. Economic Impacts of Farmer Field Schools, Evidence from Latin America: Ricardo A. Labarta and Scott M. Swinton, Michigan State
3. Cost-effectiveness of Alternative IPM Technology Transfer Methods: Jeffrey Alwang, Virginia Tech
4. Environmental Benefits of IPM: Evidence at home and abroad: George Norton