Approaches to Encourage Adoption of Best Management Practices: Soft Technologies in Use Today

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Harnessing marketplace power to improve health, environment and economics

Agriculture

Communities

Seventh International IPM Symposium, March 2012
BMP Adoption: What Soft Technologies Available to Increase?

Adoption dilemma:
• Proven BMPs exist; adoption lags below potential.

Science of behavior change
• Adoption continuum - innovators to late adopters. (Rogers 1983)
• Adoption process - awareness, persuasion, decision, implementation, confirmation.

• 80 – 20 Rule, 20% of practitioners responsible for 80% of problems.

• Not bad actors, “inappropriate behaviors”. Address rationale for current behavior to achieve change. (Nowak et al. 2006)

Table 2. Frequency of weed resistance BMP adoption (percent of respondents).

<table>
<thead>
<tr>
<th>BMP</th>
<th>Often or always</th>
<th>Sometimes</th>
<th>Rarely or never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scout before</td>
<td>83%</td>
<td>11%</td>
<td>5%</td>
</tr>
<tr>
<td>Scout after</td>
<td>81%</td>
<td>15%</td>
<td>4%</td>
</tr>
<tr>
<td>Clean field</td>
<td>75%</td>
<td>13%</td>
<td>12%</td>
</tr>
<tr>
<td>Control early</td>
<td>80%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Control escapes</td>
<td>79%</td>
<td>15%</td>
<td>6%</td>
</tr>
<tr>
<td>Clean equipment</td>
<td>25%</td>
<td>20%</td>
<td>54%</td>
</tr>
<tr>
<td>New seed</td>
<td>94%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Different modes</td>
<td>39%</td>
<td>33%</td>
<td>28%</td>
</tr>
<tr>
<td>Supplemental tillage</td>
<td>21%</td>
<td>26%</td>
<td>53%</td>
</tr>
<tr>
<td>Use label rate</td>
<td>93%</td>
<td>4%</td>
<td>1%</td>
</tr>
</tbody>
</table>

From Frisvold et al. 2010
BMP CHALLENGE: Try BMPs Risk Free

- Farmer and crop advisor complete one-page application to try a BMP on a field.

- Crop advisor makes recommendations, carefully places check strip following written protocol, oversees practice and harvest, sends results to Agflex.

- Single check strip using farmer’s traditional practice: Yield in adjacent rows is highly correlated, > 90% when selected at random.

- Agflex makes cash payment to farmer if any net income loss due to BMP.

- Partnership with American Farmland Trust. Funding from USDA NRCS Conservation Innovation Grants, PA Dept. of Environmental Protection, Chesapeake Bay Foundation, others.

- Contact: Rebecca Ressl, 608 232-1425 rebecca.ressl@bmpchallenge.org

www.bmpchallenge.org
Results

• **53% were applying ≥ 25 pounds of N/acre above university recommendations** before the BMP CHALLENGE.

• **87% adopt.** Past participants indicate they use the nutrient BMP or a modified version on an average of 60% of their acreage.

Current programs: corn for grain, silage; sweet corn.

  • Controlled-release N fertilizer for sweet corn
  • Manure incorporation and fertilizer injection
  • GreenSeeker chlorophyll sensor variable rate
  • Split fertilizer applications
  • Nitrification inhibitors
NRCS & IPM Working Group: Grower Incentives for IPM
http://nrcs.ipm.msu.edu/

Natural Resources Conservation Service (NRCS), formerly Soil Conservation Service. Works with private landowners to protect/enhance soil, water, air, plants, animals, humans.

History: Less than 2% of EQIP to IPM nationally.

Our goal: Increase grower awareness and access to NRCS conservation programs for IPM.

Over 140 members from NRCS, Extension, crop advisors and others. Funding from USDA Regional IPM Centers.

% of total FA:
- 2008: 0.4%
- 2009: 1.1%
- 2010: 1.6%
- 2011: 1.7%

Millions of Dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
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<tbody>
<tr>
<td>$</td>
<td>$3.00</td>
<td>$7.50</td>
<td>$4.50</td>
<td>$1.50</td>
</tr>
<tr>
<td></td>
<td>$4.50</td>
<td>$9.00</td>
<td>$10.50</td>
<td>$13.50</td>
</tr>
</tbody>
</table>
2012: New NRCS IPM Option for Herbicide-Resistant Weeds

- **Financial and technical assistance**

- **Key planning considerations:**
  
  A. Monitor weed species and their stage of development
  B. Compare monitoring results with established weed thresholds and weed resistance management objectives
  C. Manage the weed population with crop canopy shading
  D. Manage the weed population with mulching
  E. Suppress weeds at appropriate stages (i.e., seedling stage, before flowering, before maturity) to minimize weed seed production
  
  **F. Use herbicides with different sites of action in mixtures, sequences and/or rotation.**
  
  G. Utilize mechanical suppression techniques (note that soil disturbing techniques cannot increase erosion beyond tolerable levels so hand weeding may be necessary)
  
  H. Increase the use of Conservation Crop Rotation, Cover Crop, and Residue and Tillage Management conservation practices to prevent early-term resistant weeds
  
  I. The plan must address the operator’s objectives
  
  J. The plan must meet NRCS quality criteria for soil, water, air, plants and animals
  
  K. The plan must comply with federal, state, tribal, and local laws, regulations and permit requirements
Challenge: Lack of Private Sector “Technical Service Providers”

- NRCS qualifies TSPs.
- Requires topic knowledge, NRCS program training.
- > 12,000 Certified Crop Advisors eligible, < 1500 participate.
- Historical barriers:
  - low payment rates,
  - cumbersome approval process.
- 2012:
  - New, one-day TSP qualification process.
  - Arkansas, >100 TSPs qualified to complete IPM, Herbicide Resistant Weed Conservation Activity Plan
  - $1627.50 available for ≤100 acres; $2730.00 for >100 acres.

Contact: Tim Pilkowski, USDA NRCS, 202-720-5917, tim.pilkowski@wdc.usda.gov, or visit http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp
Opportunity: Private Sector Business Plan

Ag retailers make 45% of pesticide applications primary influencer of input decisions in commodity crops.

Partnership for Ag Resource Management
• Engage ag retailers to solve P challenge in W. Lake Erie.
• Listening sessions, training, client recruitment, SWAT modeling, business plan development, i.e., how many acres of which products/services do we need where to solve this problem?
• IPM Institute, American Farmland Trust, National Center for Water Quality Research at Heidelberg University, Sandusky River Watershed Coalition, eleven ag retail locations including The Anderson’s, Bascom Elevator, Central Ohio Farmers Coop, Crop Production Services, Heritage Coop Mid-Wood, S & D Applications and Sunrise Coop.
• $$: Great Lakes Protection Fund, OH NRCS
• PartnershipFARM.org

See also: Illinois “Keep it for the Crop 2025”
• 4Rs for nutrients: Right Source, Right Rate, Right Time, Right Place
<table>
<thead>
<tr>
<th>na7</th>
<th><strong>Weed control</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>55 The farm manager or crop advisor can identify major weeds in the field.</td>
</tr>
<tr>
<td>**</td>
<td>56 The farm manager or crop advisor understands the life cycle of major weeds in the field.</td>
</tr>
<tr>
<td>**</td>
<td>57 The farm manager or crop advisor is aware of emerging weed problems in the region.</td>
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<tr>
<td>***</td>
<td>58 Historical records of problem weed areas on the farm are maintained.</td>
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<tr>
<td>*</td>
<td>59 Herbicides are used according to label directions for rate, timing and soil type.</td>
</tr>
<tr>
<td>*</td>
<td>60 Specific variety and herbicide combinations that result in crop phytotoxicity are not used.</td>
</tr>
<tr>
<td>***</td>
<td>61 Weeds that are difficult to control in the current crop are partially controlled in rotation crops.</td>
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<tr>
<td>*</td>
<td>62 Mechanical equipment is cleaned when moved from fields with perennial weed problems.</td>
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<td>*</td>
<td>63 Pre-plant herbicide use decisions are based on historical weed information.</td>
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<tr>
<td>**</td>
<td>64 Post-planting herbicide use decisions are based on weed seedling scouting and threshold levels or history.</td>
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<td>**</td>
<td>65 Herbicides are selected to avoid injury to rotation crops.</td>
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<tr>
<td>***</td>
<td>66 Herbicides are selected according to reduced risk (i.e. risk is based on location variables - aquatic, avian, handlers, surrounding environment).</td>
</tr>
<tr>
<td>***</td>
<td>67 Herbicides are selected to reduce development of resistance.</td>
</tr>
</tbody>
</table>

*For the 'practice group' below, check (x) the highest level attained and all lower levels. Example: a YES on #69 also earns a YES on #68.

| 68 | Herbicide use is reduced on at least 25% of the acres using methods of banded/spot sprays, mechanical tillage, or other non-chemical methods. |
| 69 | Herbicides use is reduced on at least 75% of the acres using methods of banded/spot sprays, mechanical tillage, or other non-chemical methods. |
| 70 | Weed seed sources on field edges are controlled through mechanical methods. |
2011-2012 Results

www.nationalpotatocouncil.org/NPC/survey.cfm