Cover Crop Trends in the U.S.

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UNIVERSITY OF MISSOURI
AND NORTH CENTRAL SARE
Presentation Outline

- Why is cover crop adoption increasing so rapidly?
- What’s happening with cover crops for yield and other adoption considerations
- New equipment for cover crops
- Funding assistance to experiment with cover crops
- Policy changes – recommendations from National Working Group on Cover Crops and Soil Health
Sunlight being harvested

October 30, 2013, Steve Groff farm, southeastern PA
The Soil Food Web

First trophic level: Photosynthesizers
Second trophic level: Decomposers, Mutualists, Pathogens, Parasites, Root-feeders
Third trophic level: Shredders, Predators, Grazers
Fourth trophic level: Higher level predators
Fifth and higher trophic levels: Higher level predators
When there is no cover

November 22, 2012, Decatur, IL
Cover Crops *(examples)*

- Fall planted
  - Cereal (winter) rye
  - Oats
  - Tillage radishes
  - Annual ryegrass
  - Hairy vetch

- Spring planted
  - Spring triticale
  - Oats
  - Austrian peas
  - Dwarf rapeseed
  - Clovers

- Summer planted
  - Sorghum sudan grass
  - Foxtail millet
  - Buckwheat

Crimson clover in a Missouri field.
Cover crops can be a key part of today’s conservation efforts.

Strip trials of cover crops, late October, farm of Steve Groff, Lancaster, PA.
SARE/CTIC Cover Crop Survey

- For the 2012-13 survey, 759 producers who use cover crops completed the survey, and those farmers surveyed planted over 218,000 acres of cover crops in 2012
  - Survey was done both online and through paper copies at Midwest farmer meetings

- For the 2013-14 survey, 1924 farmers completed the survey, split between 75% who had used cover crops and 25% who had not
  - This past year it was an online survey with wide national distribution
2014 User Respondent Distribution by Postal Code

Legend:
- US Lakes
- U.S. States
- Cover Crop Users:
  - 1
  - 2
  - 3
  - 4
  - 5

Date: 7/30/2014
Time: 1:53:40 PM
Cover crop cost share

How Financial Assistance is Used

- Yes - I initially received cost-share but now I largely self-fund (63%)
- Yes, I have only planted cover crops using financial assistance (14%)
- Yes, I have periodically received and used financial assistance (15%)
- No - I have not received financial assistance to plant cover crops (8%)

Preliminary data from 2013-14 SARE/CTIC cover crop survey
Why are farmers planting cover crops?

Desired Cover Crop Benefits

- Increases soil organic matter: 73.9%
- Reduces soil erosion: 51.2%
- Reduces soil compaction: 36.2%
- Controls weeds: 28.1%
- Provides a nitrogen source: 22.8%
- Provides nitrogen scavenging: 17.0%
- Increases yields in following cash crop: 15.8%
- Economic return: 12.0%
- Fibrous rooting system: 10.0%
- Deep tap roots: 9.5%
- Decreases cost of producing the following cash crop: 4.6%
- Attracts pollinators to my farm: 4.1%
- Winter kills easily: 4.0%
- Other: 3.2%
- Winter hardiness / survival: 1.8%
- Reduces diseases: 1.6%
- Controls insects: 1.5%

Preliminary data from 2013-14 SARE/CTIC cover crop survey
Cover Crops Role of Ag Retailers

- Helping assess and understand soil changes resulting from cover crop use
- Helping to adjust nutrient management plans to account for cover crop nutrient...
- Providing cover crop termination advice and services
- Providing cover crop seeding services
- Advising farmers on what cover crop seed to purchase
- Encouraging farmers to plant cover crops

Preliminary data from 2013-14 SARE/CTIC cover crop survey
First Year Farmers Planted a Cover Crop

Preliminary data from 2013-14 SARE/CTIC cover crop survey
Total acres of cover crops planted by surveyed farmers

Preliminary data from 2013-14 SARE/CTIC cover crop survey
### 2012 USDA Census of Agriculture

<table>
<thead>
<tr>
<th>State</th>
<th>Acres of cover crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington</td>
<td>178,401</td>
</tr>
<tr>
<td>Idaho</td>
<td>103,467</td>
</tr>
<tr>
<td>Oregon</td>
<td>92,796</td>
</tr>
<tr>
<td>Montana</td>
<td>128,183</td>
</tr>
</tbody>
</table>
Cover Crop Species Used by % of Respondents

- Winter Cereal Grains: 69%
- Legumes: 51%
- Brassicas: 51%
- Annual Grasses: 50%
- Multi-species Mix: 31%
- Two-species Mix: 25%
- Summer Annual Broadleaf: 19%
- Other: 6%

Preliminary data from 2013-14 SARE/CTIC cover crop survey
Cover Crop Use in the West

- Other: 7.9%
- Summer Annual Broadleaf: 26.2%
- Multi-Species Mix (3 or more): 35.7%
- Two-Species mix: 20.6%
- Brassicas: 34.1%
- Legumes: 58.7%
- Annual Grasses: 31.0%
- Winter Cereal Grains: 55.6%

n=126
Biggest Cover Crop Challenges

Biggest Cover Crop Challenges (% of Respondents)

- Establishment: 46%
- Time / labor requirements and increased: 44%
- Species selection: 43%
- Cover crop seed costs: 33%
- Planting / management costs: 27%
- Cover crop sometimes uses too much soil moisture: 23%
- Cover crop seed availability: 18%
- Cover crop becomes a weed the following year: 15%
- No measurable economic returns: 11%
- Increased insect potential: 8%
- Increases overall production risk: 7%
- Yield reduction in the following crop: 5%
- Nitrogen immobilization: 5%
- Increased disease potential: 3%
COVER CROP IMPACT ON CORN AND SOYBEAN YIELDS IN THE DROUGHT YEAR OF 2012
Impact of Cover Crops on Corn and Soybean 2012 Yields*

*Yields are for 2012 on farms where farmers had side by side fields with similar management and varieties, other than using cover crops or not.

Based on 234 Respondents

- All respondents
  - Corn with covers: 126.2
  - Corn without covers: 115.1

Based on 196 Respondents

- All respondents
  - Soybeans with covers: 47.1
  - Soybeans without covers: 42.2
Drought States Commodity Crop Yields as Impacted by Cover Crops in 2012

- Broke the data down to look at yield impact in seven of the states hit hardest by drought (specifically NE, KS, SD, MO, IA, IL, and IN)

<table>
<thead>
<tr>
<th>Group of respondents</th>
<th>Corn</th>
<th>Soybeans</th>
</tr>
</thead>
<tbody>
<tr>
<td>All respondents with side-by-side field comparisons</td>
<td>9.6% Yield Increase</td>
<td>11.6% Yield Increase</td>
</tr>
<tr>
<td>Drought states (7 states)</td>
<td>11.0% Yield Increase</td>
<td>14.3% Yield Increase</td>
</tr>
</tbody>
</table>
How can cover crops help in a drought?

- **Benefits that may occur from cover crop in first year**
  - Deep rooting cover crops lead to deeper rooting cash crops
  - Residue blanket reduces evaporation
  - Possible changes in mycorrhizae and overall soil biology

- **Long term benefits**
  - Increased organic matter
    - Better rainfall infiltration
    - Better retention of moisture in the soil profile
  - Better soil health
  - Less restrictions to root growth
  - Use of cover crops is often accompanied by other changes, like the move to no-till (each tillage pass causes the loss of soil moisture)
COVER CROP IMPACT ON CORN AND SOYBEAN YIELDS IN 2013
Impacts of Cover Crops on Corn and Soybean Yields in 2013

- **Corn with Covers**: 164.9
- **Corn without Covers**: 159.9
- **Soybeans with Covers**: 49.4
- **Soybeans without Covers**: 47.2

Based on 570 Respondents

Based on 529 Respondents

Preliminary data from 2013-14 SARE/CTIC cover crop survey
Primary Method of Seeding Cover Crops in 2013

- Drilling: 46%
- Broadcast Seeding with Light Incorporation: 24%
- Aerial Seeding: 14%
- Broadcast Seeding with Seeds left on the Surface: 12%
- Precision Seeding with Corn or Soybean Planter: 3%
- Seeding with Liquid Manure: 1%

Preliminary data from 2013-14 SARE/CTIC cover crop survey
Median Cover Crop Seeding Costs

Preliminary data from 2013-14 SARE/CTIC cover crop survey
Primary Cover Crop Termination Methods Used in 2013

- Herbicide: 45%
- Tillage: 20%
- Mowing: 10%
- I prefer to plant cover crops that winter-kill: 19%
- Other: 5%
- Roller - crimping: 1%

Preliminary data from 2013-14 SARE/CTIC cover crop survey
What’s up with cover crop seeding method?
High clearance cover crop broadcast seeder
60 foot wide roller crimper for terminating cover crops (this is hairy vetch in Illinois)
Planting beans into standing cereal rye

Photo credit – Dave Robinson
Soybeans emerging in killed cereal rye

Photo credit: Dave Robinson
Grazing of Cover Crops

Beef cattle grazing cover crops, farm of Steve Groff, Lancaster, PA
Western SARE

Grants and Education advancing innovations in sustainable agriculture
Farmer/Rancher

- Led by agricultural producers with support and guidance from technical advisors

- Up to $15k for 1 farm or $25k for 3+ farms collaborating
Professional + Producer

- Agricultural professional leads project with producers, acting as advisor and on-site trial host.

- Maximum grant $50K
Cover Crop Termination Zones

Zone 1 - Terminate cover crop 35 days or earlier before planting
Zone 2 - Terminate cover crop 15 days or earlier before planting
Zone 3 - Terminate cover crop at or before planting
Zone 4 - Terminate cover crop at or within 5 days after planting, but before crop emergence
Policy Changes with Cover Crops

National Working Group on Cover Crops and Soil Health
- Pacific Northwest represented by Gary Farrell

- Crop insurance and connection to crop yield
- Data on where cover crops are being used
- Incentive payments
- New cover crop cultivars
- More investigation into connection with soil health

Great opportunity for cover crops going forward – probably on track for 20 million acres of covers by 2020
What cover crop farmers would tell their neighbor

- It is a systems approach based on a return to the way nature is intended to work and therefore can be extremely successful.
- If you expect to be able to farm your land in 50 years, or have your child or grandchild farm it, then you need to use cover crops.
- There is a wide array of cover crops that can improve every rotation and soil with a little bit of planning.
- Keeping the soil covered year-round provides food for the life in the soil, which in turn provides nutrients for your crops.
- We must take better care of the soil we depend on.
Thanks! Visit www.sare.org/covercrops