

Adopting Cover Crop Systems

Dollars, Sense and Other Considerations

Joel Gruver
School of Agriculture
Western Illinois University


Last year I shared a link to the proceedings for this conference on a farmer forum

Cover crops for clean water

W. L. Hargrove, Editor

The proceedings of an international conference
West Tennessee Experiment Station
April 9-11, 1991
Jackson, Tennessee

Published by the
Soil and Water Conservation Society

> 60 articles

~ 5 include socio-economic analysis

It concerns me that many of the questions we ask about cover crops today were asked 20 years ago, but not pursued aggressively. Was it due to a lack of funding, a lack of grower interest, or was it part of a great conspiracy of some sort?

Terry Taylor - Geff, IL

There are many reasons why cover crops are not more widely used.... some like competition for soil moisture may be unresolvable in drier climates without irrigation... other cover crop stumbling blocks are engineering problems, crop breeding problems or awareness/education problems that should be solvable.

The fundamental question that Terry was asking however, was not so much why aren't cover crops more widely used but rather **why haven't we made more progress in solving the solvable problems related to cover crops**.

What is innovation??

This type of innovation must be used on millions of acres to pay for R&D

VS

Home grown innovation

Some farmers are early adopters

adopt ≠ adapt

Some farmers are master adapters

Farmers that make cover crops work tend to be master adapters!

Cover crops require more management than broadly adapted off-the shelf technologies


Can you think of any ag technologies that substitute for management skill?


Roundup Ready
CORN 2
Roundup Ready
SOYBEANS
Roundup Ready
ALFALFA
Roundup Ready
CANOLA
Roundup Ready
COTTON


HERCULEX® XTRA
Insect Protection
HX


YieldGard®
Insect Protected Corn

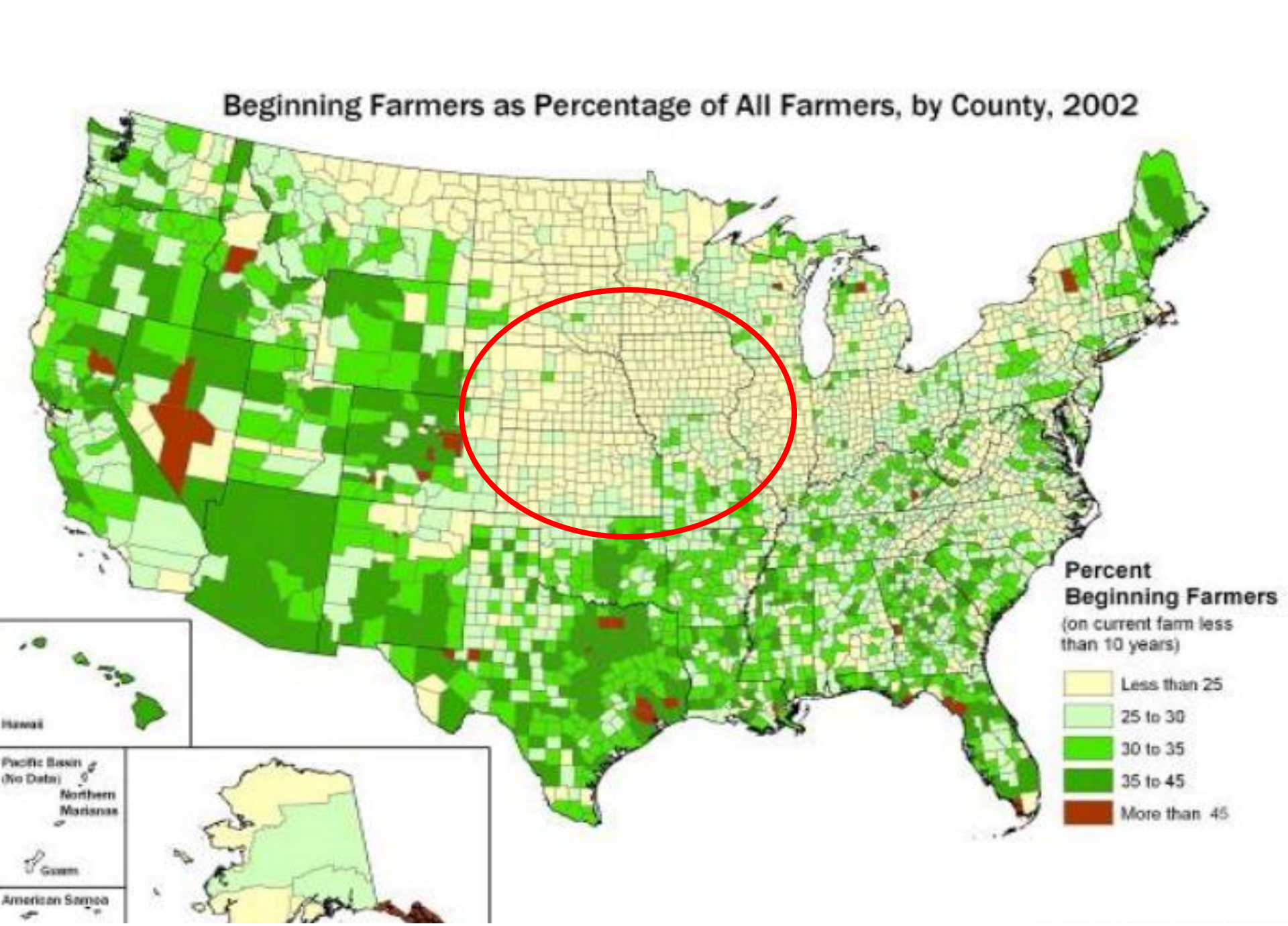
Major constraints on CC adoption in the past 20 years

*Mainstreaming of conservation tillage - soil cover with dead crop residues has come to be viewed as an adequate erosion control strategy by many farmers and conservationists

*Shifts in farm scale and enterprises (increased farm size and geographic spread, focus on just corn and soybeans, reduced #s of grazing animals) marginalized interest in cover crops

*Interest that was triggered by the energy crisis in the 70s, the Midwest farm crisis of the 80s and other developments during this era was dampened by the relatively low and stable crop and input prices in the 90s

*Farmers that survived the Farm Crisis dominate the decision making on Corn Belt farms today and avoid practices that they perceive to add risk


Beginning Farmers as Percentage of All Farmers, by County, 2002
Percent Beginning Farmers
(on current farm less than 10 years)
Less than 25
25 to 30
30 to 35
35 to 45
More than 45
Hawaii
Pacific Basin (No Data)
Northern Marianas
Guam
American Samoa

JOURNAL OF SOIL AND WATER CONSERVATION
The science and art of natural resource management for sustainability

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Are cover crops being used in the US corn belt?

J. W. Singer, S. M. Nusser, and C. J. Alf

ABSTRACT:

The benefits of using cover crops are well established, but adoption in agronomic farming systems is unknown. The objectives of this study were to quantify cover crop use and identify factors associated with their adoption. A mail survey was sent ... sota) to c... ners hav... the last ... ll of 200... the aver... in a farm operation was the most consistent and important factor related to the use of cover crops. Corn belt farmers believe that cover crops are most effective at reducing soil erosion (96%) and increasing soil organic matter (74%).

- Only 11% used cover crops within past 5 years.
- Only 8% planted cover crops on their farm in the fall of 2005. Only 4.8% in IA.
- 43% using conservation practices with cost sharing, 57% w/out.
- 56% said they would use cover crops with cost-sharing

just 5 years later

At the 2013 Ag Connect Expo & Summit (ACES) in Kansas City a survey conducted by Case IH, found that 85 percent of the 1,109 producer respondents were considering new cropping practices and technologies for this year's growing season…

and

COVER CROPS were the most frequently mentioned farming practice that will be tried for the first time in 2013 with 24 percent of respondents planning to plant them!

Some farmers have been using CC for > 20 years

Ralph "Junior" Upton, Springerton, IL

Ralph "Junior" Upton
Springerton, Illinois

New in 2005

Summary of Operation
1,800 acres of no-till corn, beans and wheat
Rye grass, cereal rye and hairy vetch cover crops

Problem Addressed
Difficult soil characteristics. Ralph "Junior" Upton farms poorly drained land characterized by an impenetrable layer, or "plow pan," six to eight inches deep that crop roots typically can't grow through.

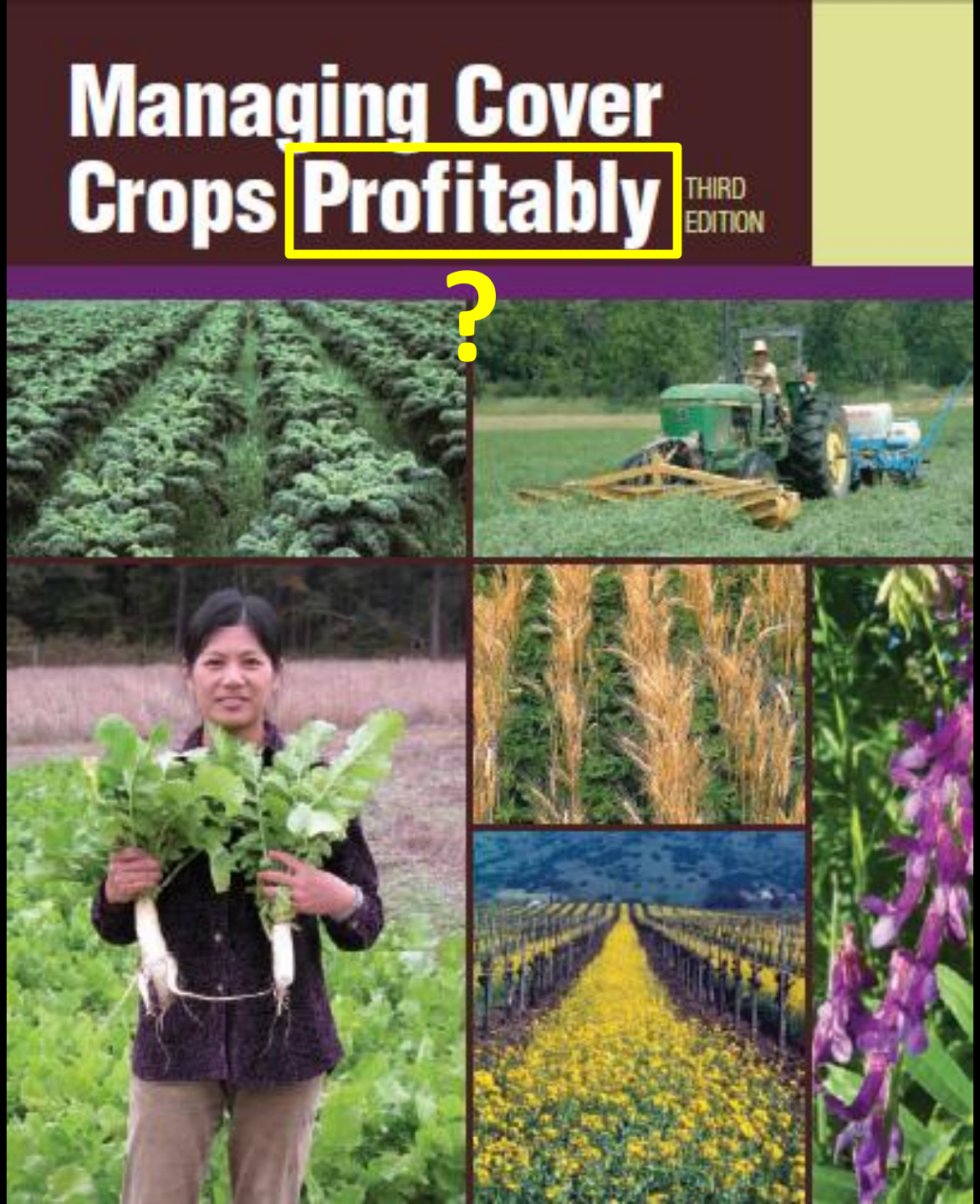
By adding cover crops and switching to no till, Junior Upton drastically improved his habitually compacted soil.
Photo by Dan Anderson.

You are reading the SARE book *The New American Farmer, 2nd Edition.*

Order this publication.

So what sparked the current cover crop revolution?

USDA initiatives have played a supporting role



but did not spark current interest

MANAGING COVER CROPS PROFITABLY

THIRD EDITION

No chapter on cover crop economics !

CC radishes are not new to Sugar Beet areas but over the past 5 years have captured the attention of Corn Belt farmers like no other CC to date

Welcome to AgTalk

11 threads, 78 posts, > 39,500 views in the last week

AgTalk Home

Search | New Threads | Forums | Skins | Control Panel

Welcome, jbgruver (Logoff).

AT+ Home | Wiki | Blogs | Classifieds | 411

Search results - Revise search

Results found in forum: Crop Talk

Thread	Replies	Views	Last post
Weed ID	16	5475	IHFarmerMN 6/4/2013 02:58
? questiin about corn	1	450	rocky grounder 6/4/2013 00:54
Prevent Plant Herbicide	5	2175	SDFarmboy 6/3/2013 18:24
PP cover crop	14	7875	nviney 6/1/2013 19:59
CC Pics and some water	6	4350	ehoff 6/1/2013 13:10
wheat harvest	3	2625	puff33m 6/1/2013 08:01
corn in cover crop update	11	7800	stormchased1 5/31/2013 19:04
Radish cover crop	4	2625	Andover 5/31/2013 16:34
Herbicides and cover crops	2	525	bigdirt 5/31/2013 07:31
Cover crops	10	3600	Iron Archer 5/30/2013 14:07
Oats and Radishes	6	2025	sgroff 5/30/2013 06:58

Threads with the word radish

The internet has played a key role in the CC revolution!!!

Midwest Cover Crops Council



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- About Us
  - History
  - Mission and vision
  - Supporters
  - MCCC meetings
- Cover Crop Resources
  - Cover crop species
  - Cover crop selector tools
  - Innovator profiles

WHAT ARE COVER CROPS?

Cover crops are plants seeded into agricultural fields, either within or outside of the regular growing season, with the primary purpose of improving or maintaining ecosystem quality.

The goal of the *Midwest Cover Crops Council* (MCCC) is to facilitate widespread adoption of cover crops throughout the Midwest, to improve ecological, economic, and social sustainability.

WHAT DO COVER CROPS DO FOR THE ENVIRONMENT?

- Enhance biodiversity
- Increase soil infiltration, leading to less flooding, leaching, and runoff
- Create wild life habitat
- Attract honey bees and beneficial insects

NEWS

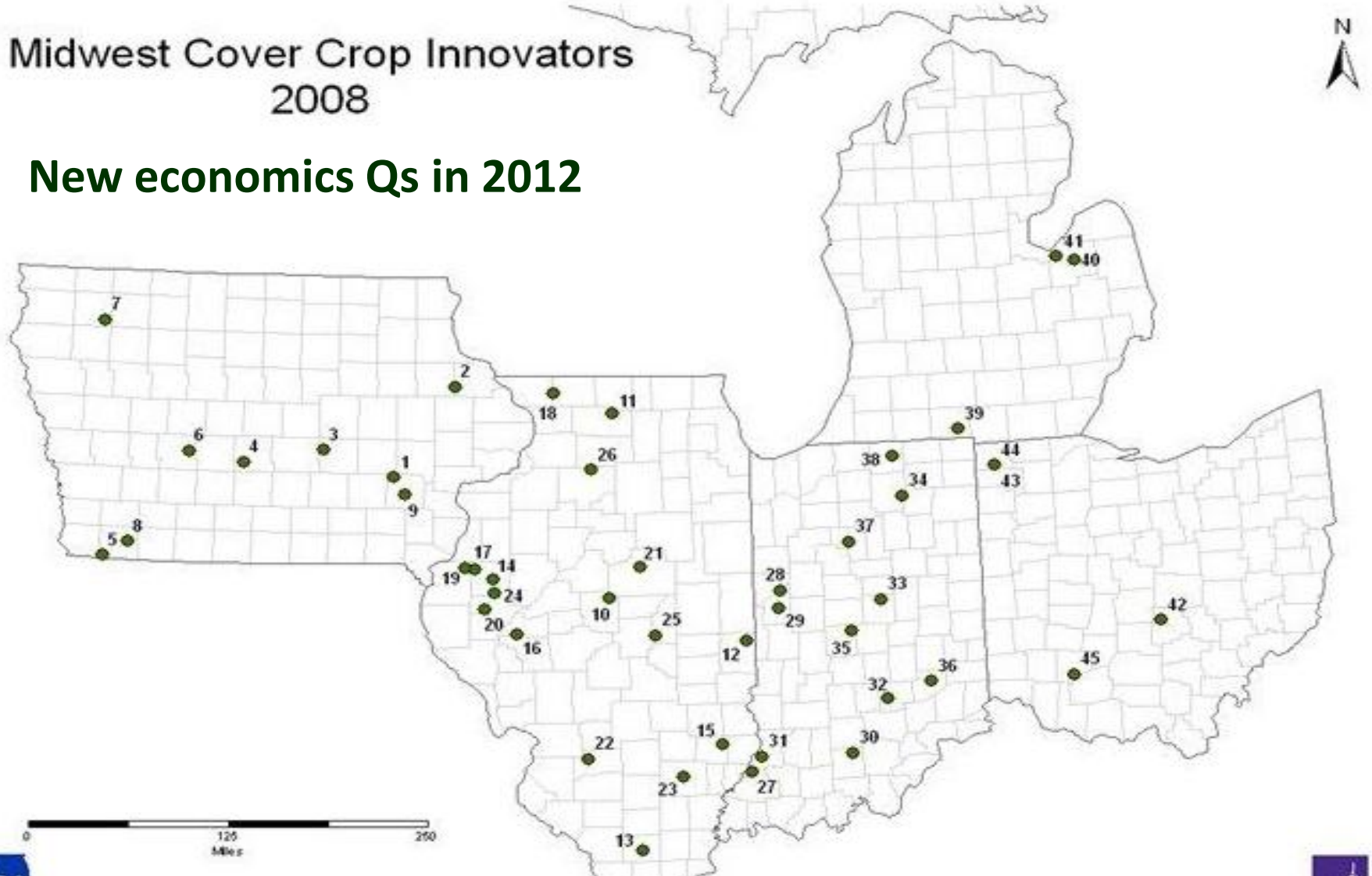
Webinar June 12th: Adopting cover crop systems: Dollars, sense and other considerations
Sponsored by USDA NRCS East National Technology Support Center

June 25th- Greensburg, IN
Using cover crops for weed and pest management

The MCCC field guide has received the Gold Award from the Association for Communication Excellence!

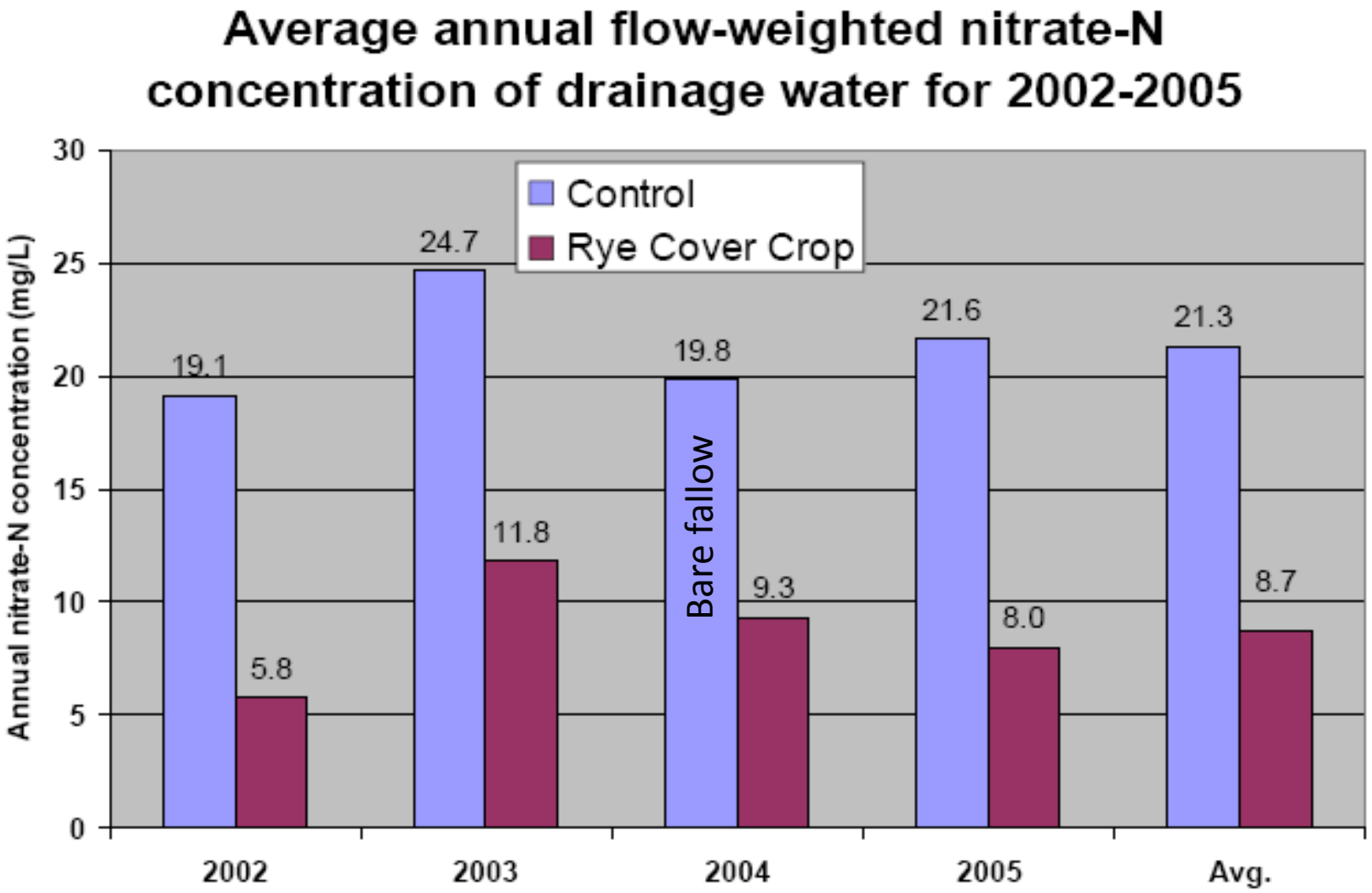
Association for Communication Excellence
In Agriculture, Natural Resources, and Life and Human Sciences

~ 160 profiles since 2008



The scientific basis for cover crops is strong!

but has been for decades



Kaspar et al. J. Environ. Qual. 36:1503-1511

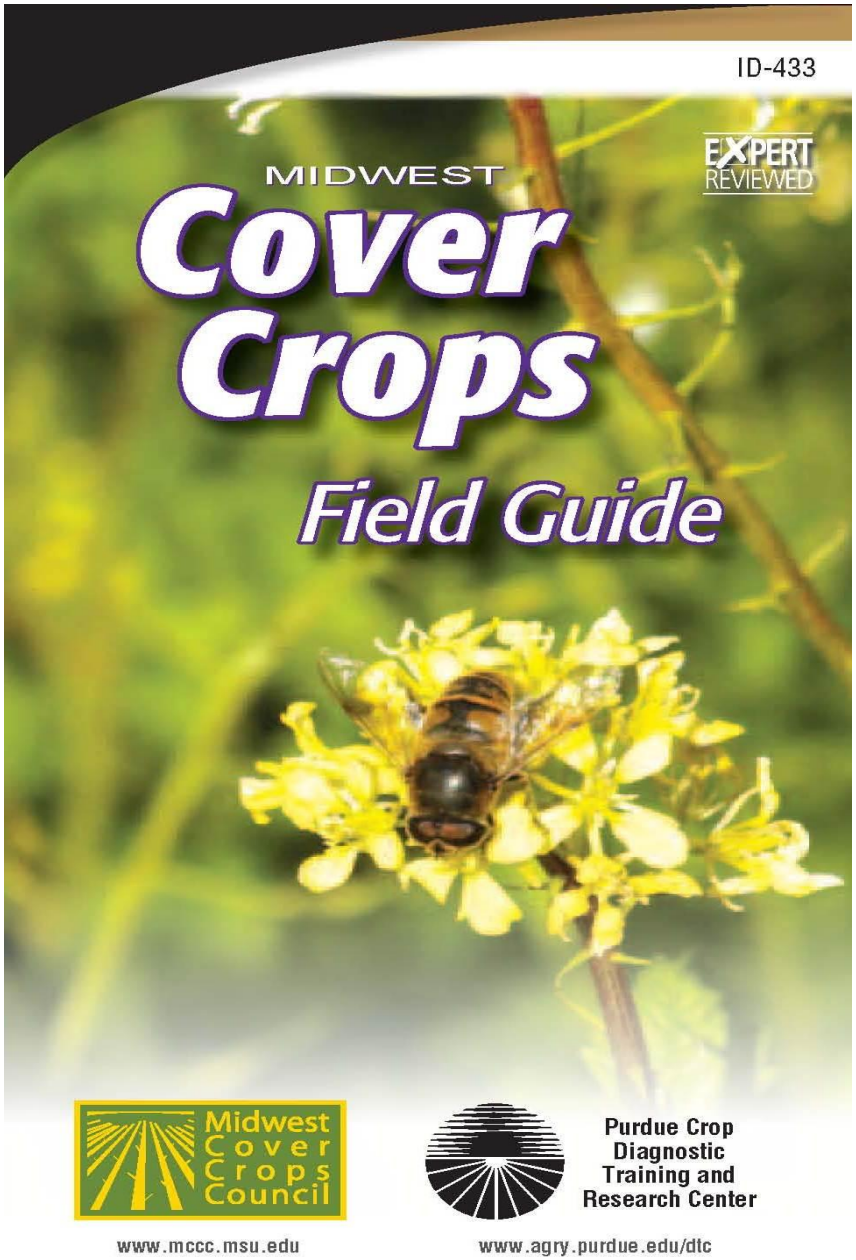
> 15,000 CCAs have received science-based info about CC

Crops & Soils

agronomy for practicing professionals

Volume 42 ■ Issue 6
November–December 2009

Focus Cover Crops



The *Midwest Cover Crops Field Guide* is now available from the Purdue Extension Education Store.

Individual copies cost $5 each. Boxes of 25 copies are $112.50--a 10 percent discount.

You can order copies of this 136-page guide now by clicking on the links above or by calling the Education store toll free: (888) EXT-INFO (398-4636, extension 46794).

EFFECTIVE COVER CROPPING IN THE MIDWEST **2011**

THESE VIDEOS WERE SHOT BY JOHN CRELLIN AT THE EFFECTIVE COVER CROPPING IN THE MIDWEST CONFERENCE, HELD DECEMBER 7-8, 2011 IN DECATUR, ILLINOIS. MORE INFORMATION AND PRESENTATIONS FROM THE CONFERENCE AVAILABLE AT SWCS.ORG/COVERCROPS

STEVE GROFF, CEDAR MEADOW FARM (PENNSYLVANIA)

STEVE GROFF, CEDAR MEADOW FARM (PENNSYLVANIA) (PART 2)

GABE BROWN, MAIN SPEAKER AT DINNER

KEN FERRIE, FARM JOURNAL FIELD AGRONOMIST, CLOSING SESSION -

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DAN DESUTTER, INDIANA, THREE-FARMER PANEL OF SUCCESSFUL

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SOIL AND WATER CONSERVATION SOCIETY

HARVESTING THE POTENTIAL

The Howard Buffett Foundation has provided an infusion of $ for conservation ag initiatives including CC conferences

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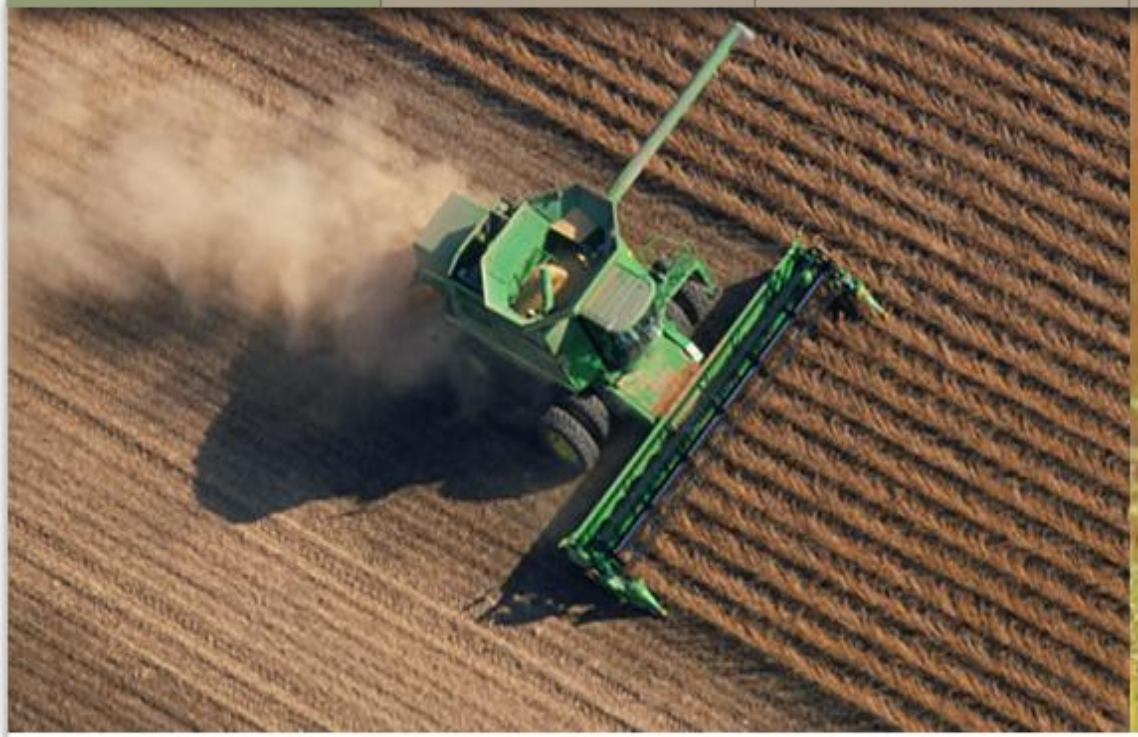
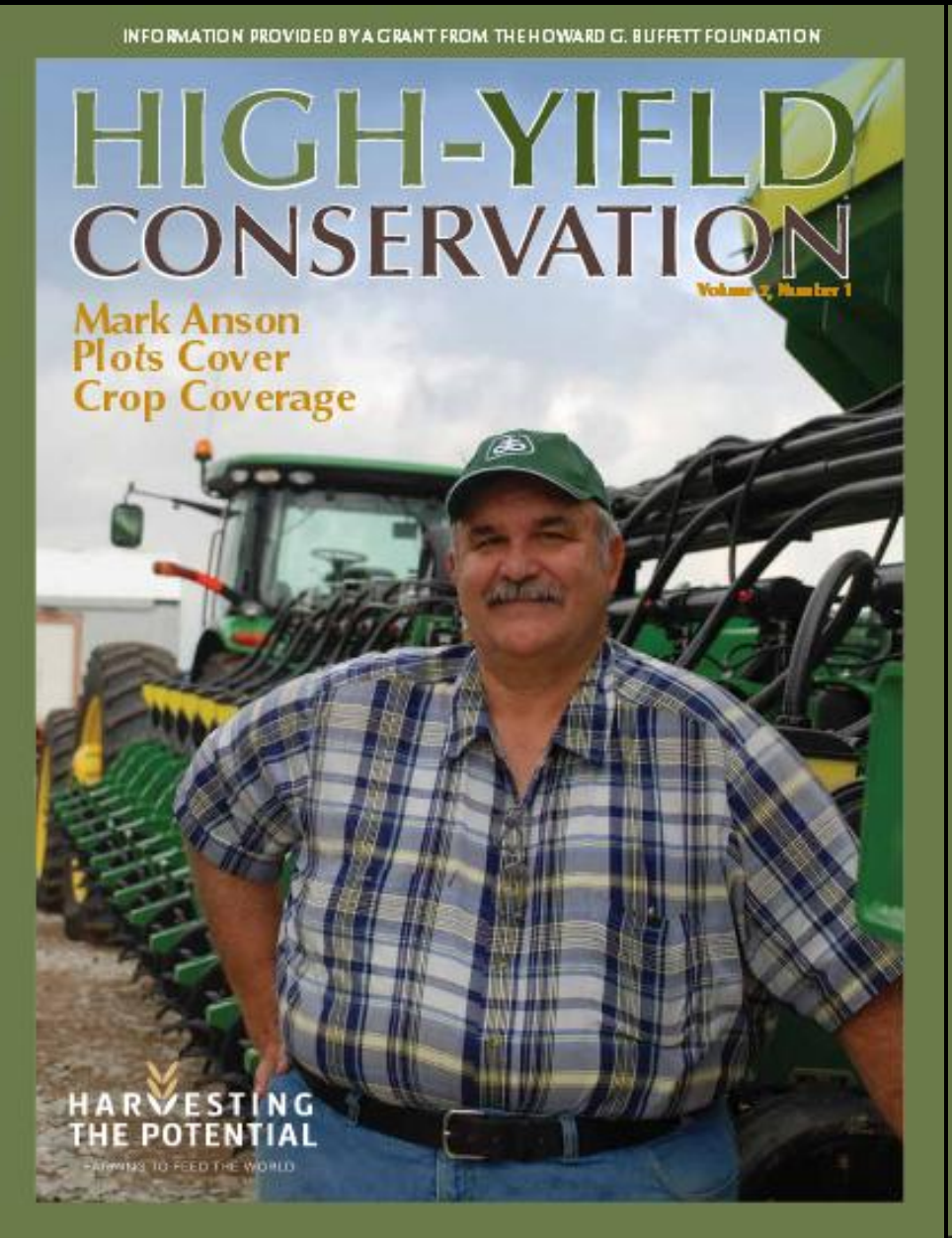
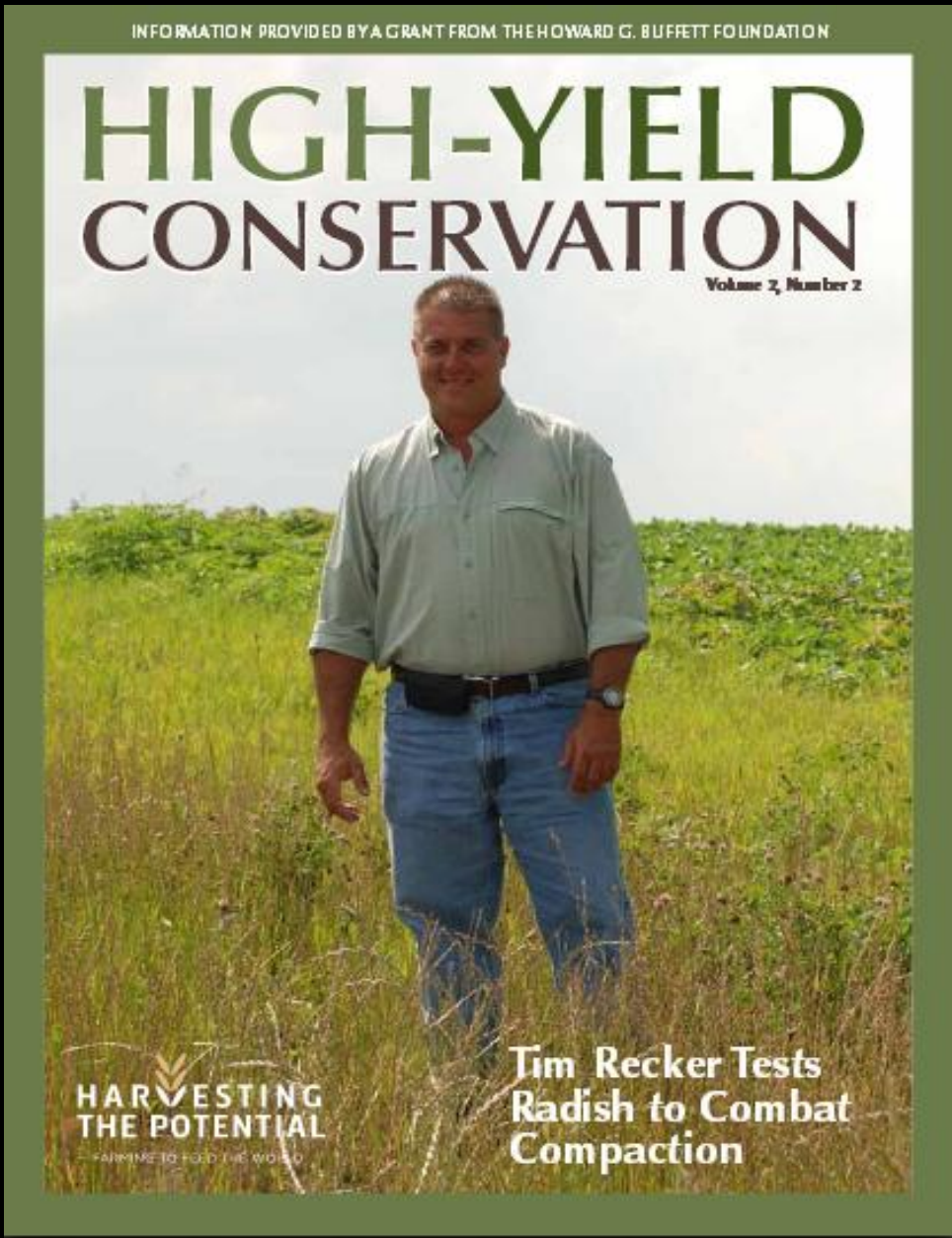


RAISING AWARENESS ON THE IMPORTANCE OF CONSERVATION AGRICULTURE

Almost 1 billion people worldwide do not get enough food to eat each day, and there are 50 million people in the United States who are food insecure. U.S. land for agriculture is shrinking as American farmers are faced with growing regulations. These issues are inextricably linked, yet have a mutual solution: conservation agriculture. More >

Profiles of cover crop integration within large scale agriculture





Meet Our Expert Team

Four experts will lend their expertise to High-Yield Conservation: Dan Towery, Mike Plumer, Steve Groff and Dwayne Beck.

Dan Towery founded Ag Conservation Solutions, a consulting firm, in 2005 in Lafayette, Ind. Prior to founding ACS, Towery worked for 25 years with USDA National Resource Conservation Service. He provides national expertise and knowledge in no-till, cover crops, soil quality, biotechnology, precision farming and conservation practices.

Mike Plumer retired this past year after 35 years as a national resources management educator with the University of Illinois Extension. Plumer specializes in soil conservation practices, conservation tillage and no-till systems, cover crops and water-quality issues.

Steve Groff is a family farmer and cover crops expert based near Holtwood, Pa. On Cedar Meadow Farm, his home farm, he pioneered what he calls the "permanent cover cropping system," which includes no-tillage, cover crops and effective cropping rotations as a way to increase profits, save soil and reduce pesticides.

Dwayne Beck is a manager of the Dakota Lakes Field Station and a professor at South Dakota State University. Beck's research focus is on developing management practices for efficient production while minimizing negative ecosystem impacts. He specializes in the use of diverse cropping patterns, low-disturbance no-till and the use of natural cycles to manage insects, weeds and diseases.

Extra 2011

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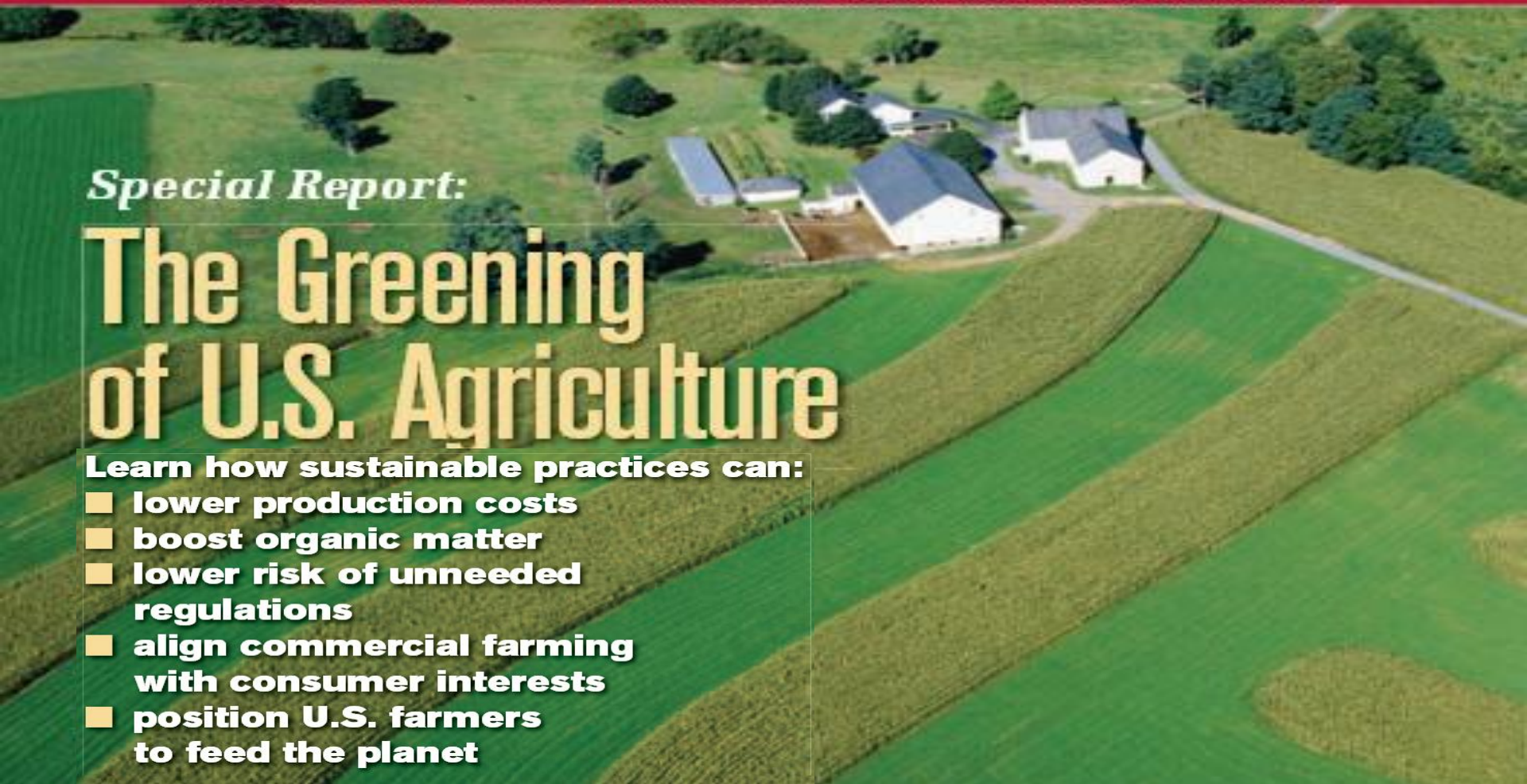


Special Report:

The Greening of U.S. Agriculture

Learn how sustainable practices can:

- **lower production costs**
- **boost organic matter**
- **lower risk of unneeded regulations**
- **align commercial farming with consumer interests**
- **position U.S. farmers to feed the planet**

Profit Profiles

By Paul Queck

Taking cover

Terry Metzger pioneered conservation tillage to save fuel, fertilizer and soil on his Iowa farm.

EXCLUSIVESURVEY

Green & Gold

IN THE RACE TO FEED A HUNGRY WORLD, DOING RIGHT BY THE ENVIRONMENT CAN ALSO BE GOOD FOR YOUR BOTTOM LINE

By Bryce Knorr

Farmers have long viewed themselves as the original environmentalists, living where they work, making a living off the land.

But in a growing world, where more and more people have fewer and fewer ties to agriculture, that connection is often lost. Farmers and the modern environmental movement typically mixed more like oil and water than peaches and cream.

But breakthrough research from *Farm Futures* suggests you can combine both profits and conservation. Our exclusive survey of more than 1,000 growers found those on the cutting edge of conservation were actually more profitable than other producers.

In short, it is possible to be both green *and* gold.

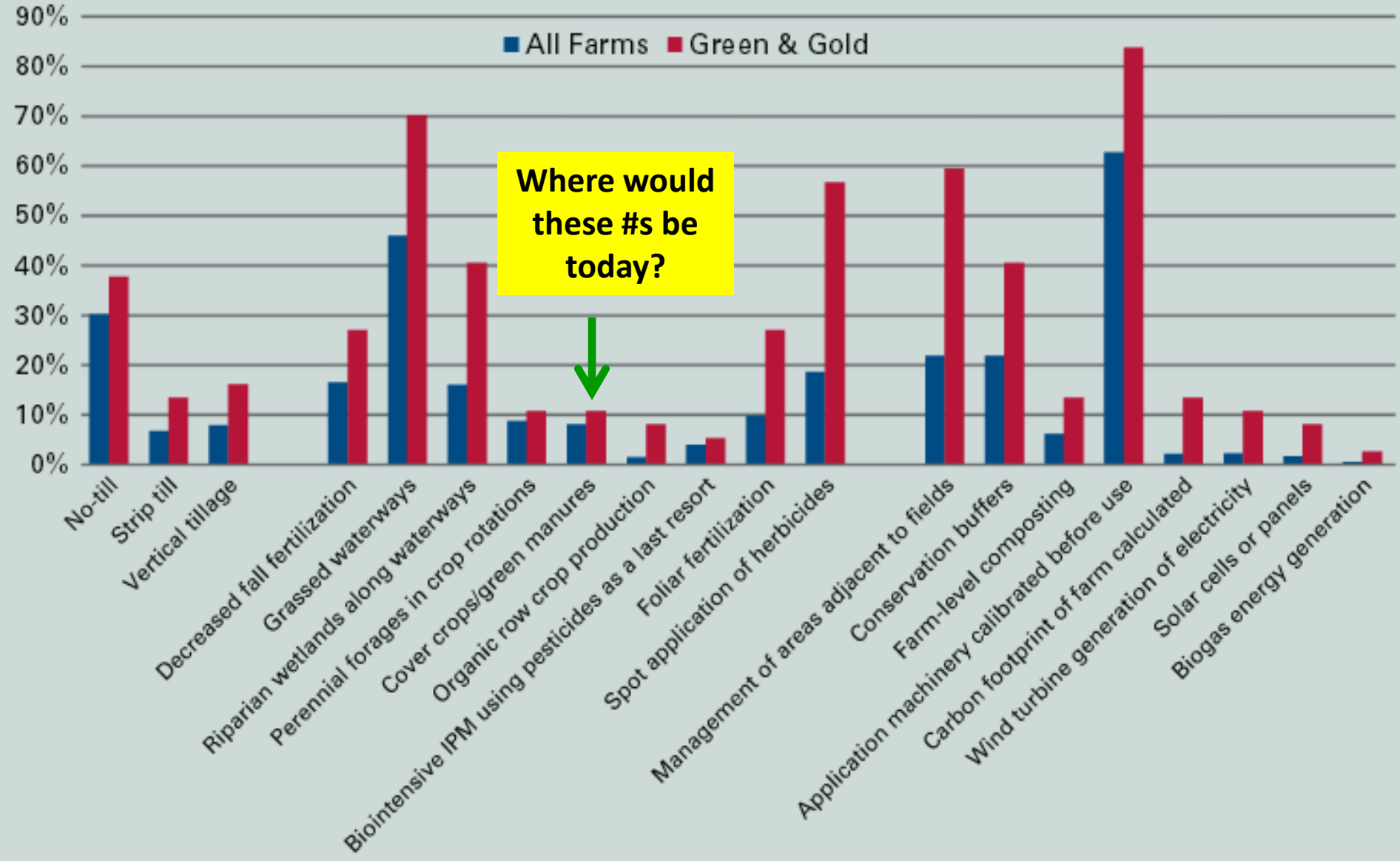
That finding is good news in a world where rising incomes and populations will require farmers to be ever more productive, growing more food on less land, using fewer resources, while conserving soil, water and air quality. Despite the tensions created by an often discordant debate about those goals, some farmers are making progress.

"You can have your cake and eat it, too," says Iowa farmer Terry Metzger.

A recent survey by Farm Futures magazine of more than 1,000 farmers found those on the cutting edge of conservation were actually more profitable than other farmers.

In short, it is possible to be both green and gold!

How farmers differ



USDA Task Force Clearing Up Cover Crop Rules

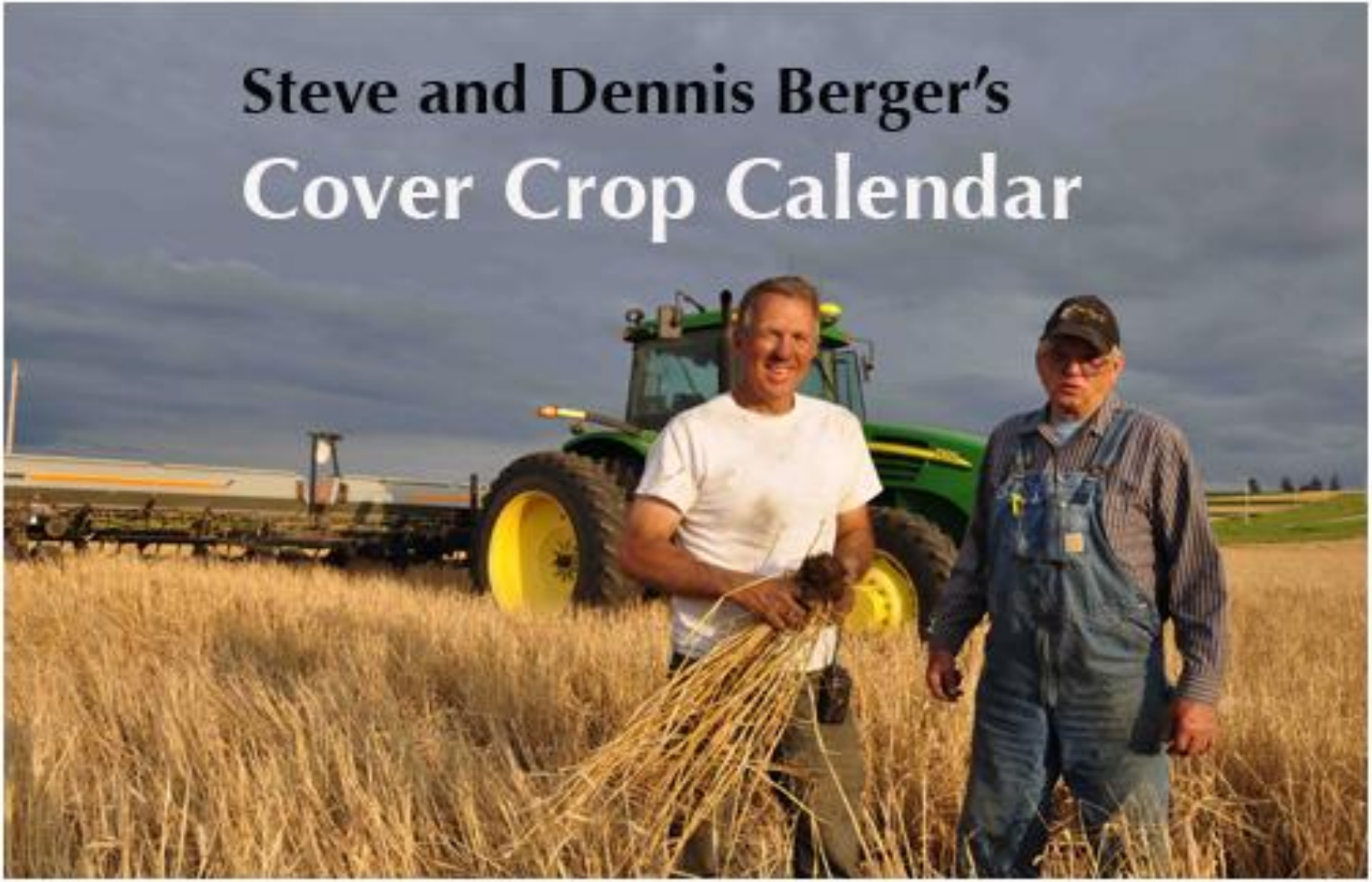
Harmonized policies pertaining to cover crops and federal crop insurance may be in place this fall in time for the 2014 growing season and could encourage more cover-crop adoption.

By John Dobberstein, Managing Editor

A special USDA task force plans to issue "harmonized" cover-crop rules later this year to eliminate conflicts around crop-insurance policies and potentially remove a significant barrier to cover-crop adoption.

The "Task Force To Harmonize Cover Crop Policies" was created earlier this year after the USDA acknowledged the Natural Resources Conservation Service, Risk Management Authority and Farm Service Agency all have conflicting directives about cover cropping.

Along with the lead agencies, the National Association of Conservation Districts, National Wildlife Foundation and the American Soybean Association are also players on this task force.



Steve Berger's Cover Crop Calendar

Play « »

FarmProgress
Agriculture's Information Leader™

> 40 photos taken throughout 2012
by Lynn Betts

Featured Article

Getting a Kick Out of Cover Crops

Keeping soil under cover offers perks for soil, water and nutrient conservation

June 21, 2012

Letter to the editor: These farm changes have reduced nitrates

Jun. 9, 2013 | 3 Comments

FILED UNDER

Opinion
Letters To The Editor

My farm has belonged to my family since 1881. We grow corn and soybeans near Eagle Grove. I believe that every responsible farmer can and should make decisions on their farm to help reduce nitrates in Iowa's waterways.

We have started using cereal rye as a cover crop. We also apply nitrogen in the late spring, instead of fall, which is closer to when the corn needs it. Finally, we installed a bioreactor to help further reduce nitrogen leaving the farm through subsurface tile drainage.

This spring, data showed that the nitrate concentrations in water flowing out of my tile were consistently more than 50% less than the water in Eagle Creek.

coming off of my farm, I see now that there are solutions to our water pollution problem that I can implement today while still growing corn and soybeans successfully.

— Tim Smith, Eagle Grove

Ryegrass Covercrop.com

VIDEOS

Annual Ryegrass as a cover crop and as a forage crop....

- more info

NEWS

Articles and news releases about annual ryegrass....

- more info

ANNUAL RYEGRASS MANAGEMENT GUIDE

View a 4-page brochure on annual ryegrass management, from planting to control....

- more info

BECK'S Corn After Cover Crop Study - 2012

Planted: April 10, 2012
Harvested: September 17, 2012
Population: 35,000 seeds/A.
Rows: Six 30" rows
Replications: Two (averaged)

Previous Crop: Cover Crop
Tillage: Fall Cover Crop / Spring Vertical Tillage
Herbicide: 8 oz. Verdict & 24 oz. Durango
Product Tested: BECK 4530HXR™*

RAINFALL	
April	3.64 in.
May	2.20 in.
June	0.90 in.
July	1.15 in.
August	5.10 in.
Total	12.99 in.

Purpose: In this study we are evaluating the advantages of cover crops and their ability to increase yield, soil tilth, scavenge and produce nitrogen, and shatter compaction. Corn was planted into 5 different cover crops that were planted in the fall of 2011. In addition, we also evaluated 3 different nitrogen programs to evaluate nitrogen scavenging and sequestration. These nitrogen rates consisted of 180 lbs. (100%N program), 135 lbs. (75% N program), and 90 lbs. (50% N program).

Treatment	Cover Crop Cost	Percent Moisture	Bushels† Per Acre	Bu./A. +/-	$ +/- N Reduction	Net^ Return	$ +/- Check
N-Vest® Soilbuilder Annual Ryegrass	$16.00						
100%		16.4	154.1			$772.59	+$94.92
75%		16.4	152.3	-1.8	+$19.53	$792.12	+$114.45
50%		16.4	148.6	-5.5	+$27.85	$800.44	+$122.77
AVERAGE			151.7				
Crimson Clover	$21.00						
100%		16.4	142.4			$698.56	+$20.89
75%		16.4	135.5	-6.9	-$10.56	$688.00	+$10.33
50%		16.4	119.1	-23.3	-$77.17	$621.39	-$56.28
AVERAGE			132.3				
GroundHog™ Brand Radish	$20.80						
100%		16.3	147.7			$730.03	+$52.36
75%		16.4	133.0	-14.7	-$56.58	$673.45	-$4.22
50%		16.3	118.5	-29.2	-$111.98	$618.05	-$59.62
AVERAGE			133.1				

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What's New for Dinner

BY FREDERICK KAUFMAN
August 24, 2010

FOOD, HEALTH & HOME | BUSINESS & POLITICS | FEATURE STORY

FALL 2010

COMMENTS (13) SHARE 0 Like 37

Even as the power of the American food movement swells, organic farms still make up less than 1 percent of this country's cropland**. The unignorable presence of that other 99 percent has forced many environmentalists to a singularly pragmatic conclusion**:

If there is going to be a significant attempt to slash the use of water, fossil fuels, fertilizers, herbicides, insecticides, and fungicides -- the resource-sucking carbon and chemical footprint that has come to define the modern agro-industrial complex -- the bulk of that effort will have to emerge from the operations of large-scale, conventional farms.


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NATIONAL WILDLIFE FEDERATION
Inspiring Americans to protect wildlife for our children's future
DONATE
TAKE ACTION
WHO WE ARE
WHAT WE DO
WHERE WE WORK
HOW TO HELP
NEWS & BLOGS
PHOTOS
WILDLIFE
Traditional mission of environmental organizations
ADOPT AN ANIMAL
Make a Symbolic Adoption to Help Wildlife
Help Wildlife
Safeguard America's Wildlife

Future Friendly Farming

Report highlights cost-effective strategies to protect wildlife habitat and save taxpayers, farmers and consumers money

10-05-2011 // Mékell Mikell

American farmers provide food, fuel and fiber for a growing nation. In the face of challenges including tight budgets, increasing threats to natural systems, climate change and extreme weather, farmers can implement strategies that assure yields and farm income while helping to address these challenges.

A new report from the National Wildlife Federation, *Future Friendly Farming: Seven Agricultural Practices to Sustain People and the Environment*, offers techniques that farmers and ranchers can use to increase profits, reduce greenhouse gas emissions, and protect soil, water and wildlife habitat.

Future Friendly Practice	Definition	Effect on Greenhouse Gases	Environmental Benefits	Wildlife Benefits	Landowner/ Farmer Benefits	Potential Trade-Offs or Problems
1 Cover Crops	Crops planted for the purpose of protecting and improving soil and nutrients rather than for harvest as a commodity, particularly during a period in which the land would have otherwise been barren	Sequesters carbon in plants and soil. In some regions, adding a cover crop to a conservation tillage system can nearly double the rate of carbon sequestration	Decreased soil erosion, improved nutrient retention, increased soil organic matter, improved water quality	Increased nesting areas for species such as ducks, high quality food sources for many grassland bird and game bird species	Increased profit through reduced fertilizer needs, improved soil fertility, and easier control of weeds	Requires extra time and knowledge to manage; and some new techniques for growing commodity crops
2 Conservation Tillage	A system in which 30% or more of the crop residue remains on soil after planting. No-till avoids tilling altogether	By disturbing the soil less, soil carbon storage is increased through enhanced soil sequestration, reduced CO_2 emissions from farm equipment	Reduced erosion, reduced water pollution	Increased bird nest density and nest success; increased bird use and aquatic biodiversity	Increased profits through reduced fuel, equipment, and labor costs	Potential increase in herbicide use; increased pest threats in repetitive single commodity production
3 Organic Agriculture	Uses crop rotation, compost, and biological pest control to maintain soil productivity and control pests without synthetic pesticides and fertilizers	Organic agriculture averages 60% less direct energy use compared to conventional production practices; organic soils have been found to sequester more carbon than conventional	Improved nutrient retention in soil, reduced soil erosion, reduced nutrient runoff	Increased biodiversity; eliminating the use of pesticides helps promote beneficial insects, birds, nearby aquatic organisms	Increased profit through premium prices and stronger long-term soil fertility through natural systems	Requires considerable knowledge, transition period can be difficult

CASE STUDY

Minnesota Corn and Soybean Farmer Grows Profits, as well as Water Quality and Climate Benefits

Source: Minnesota Department of Agriculture, Energy and Sustainable Agriculture Program, Mark Zumwinkle

Doug Keene, Fillmore County Resource Conservation Technician, examines a nicely growing winter rye cover crop before soybean harvest on Tom Boelter's farm.

PROFITABILITY

At a cost of just $38 per acre, the winter rye Tom planted provided $85 per acre worth of spring feed for his cattle, providing Tom a profit of $47 per acre from his cover crops.

Tom and his neighbors hired a pilot to apply rye seed to their fields. They planted 75 pounds of rye seed per acre, at a cost of $18 per acre. The helicopter and pilot's time cost $20 per acre, so total costs of seeding were about $38 per acre. The rye cover crop produced forage for 16 days of grazing for 25 pairs of cow/calves in the fall from October 25 through November 10.

In the spring he grazed 80 cows for 21 days from April 30 to May 20. **Tom saved about $5,600 in spring feed costs through grazing 66 acres of cover cropped fields, and yields of the following crops were maintained.**

Cover Crop Club Learning to Manage Practice Together

IA NRCS

CONSERVATION Showcase

by Laura Crowell, State Public Affairs Specialist

Trying something new and innovative is always easier when you can learn from someone else's experience. For a small group of innovative Pottawattamie County farmers experimenting with cover crops, that someone else is Pete Hobson.

Hobson, a 20-year no-till veteran, said he turned to cover crops as a tool to build more organic matter after test results showed his organic matter had plateaued. "Ideally I would like to increase organic matter one percent every 10 years. I went with rye grass because it will root much deeper than wheat or cereal rye and is a better organic matter builder," he said.

He aerial seeded his rye at the end of this August at a rate of 25 pounds per acre. "I was surprised with how little rain we had in September that it even germed," Hobson said.

Looking at a mat of green under his corn stalk residue he asked, " If we can do this well in a dry year, how well can we do in a normal year?"

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

COVER CROP

(Ac.)

CODE 340

DEFINITION

Crops including grasses, legumes, and forbs for seasonal cover and other conservation purposes.

PURPOSE

- Reduce erosion from wind and water.
- Increase soil organic matter content.
- Capture, recycle, or redistribute nutrients

turning yellow approximately growth stage R7-R8.

The species selected will be compatible with other components of the cropping system.

Cover crops will be terminated by harvest, grazing, frost, mowing, tillage, crimping, and/or herbicides in preparation for the following crop.

Herbicides used with cover crops will be compatible with the following crop.

Herbicides used for a main crop will be

Table 15. Historical EQIP data on practices affecting sheet and rill water erosion.

Practice Code and Name		Implemented Contracts** (excludes contract units not cost shared) Contracts	Units[A]–No.	Cost Share	Total Costs	Acres[B] Protected
329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	10,023	5,081,368	$156,569,693	$272,765,839	5,081,368
345	Residue and Tillage Management, Mulch Till	3,009	2,636,524	$45,308,322	$82,537,727	2,636,524
328	Conservation Crop Rotation	3,099	991,132	$44,000,197	$78,330,679	991,132
340	Cover Crop	4,250	1,311,286	$22,448,068	$38,904,427	1,311,286
412	Grassed Waterway	5,861	13,973	$20,346,154	$34,059,870	13,973
342	Critical Area Planting	12,717	104,135	$10,606,600	$17,947,879	104,135
327	Conservation Cover	1,258	26,812	$1,957,642	$3,236,896	26,812
344	Residue Management, Seasonal	166	1,226,248	$2,765,688	$5,016,995	1,226,248
635	Vegetated Treatment Area	557	357	$1,181,192	$1,772,342	357
330	Contour Farming	170	15,971	$244,533	$467,273	15,971
346	Residue and Tillage Management, Ridge Till	30	38,660	$155,137	$290,987	38,660
586	Stripcropping	119	16,919	$278,053	$460,024	16,919
393	Filter Strip	1,381	12,792	$1,684,301	$2,826,635	12,792
311	Alley Cropping	123	1,392	$84,861	$169,722	1,392
331	Contour Orchard and Other Fruit Area	102	1,280	$57,317	$112,797	1,280
450	Anionic Polyacrylamide	9	3,199	$9,095	$13,585	3,199
332	Contour Buffer Strips	26	2,186	$56,792	$101,460	2,186

Table A.4. Cropland Conservation Enhancements Selected in Preapproved Applications[a]

CC are not currently top ranking CSP enhancements

Enhancement Activity	Code	Frequency Selected		Percent of Total Cropland Activities Selected
		no. of applications	% of applications	
Recycle 100% of farm lubricants	ENR04	3,029	44.21%	13.88%
Use drift reducing nozzles, low pressures, lower boom height, and adjuvants to reduce pesticide drift.	AIR04	2,544	37.13%	11.66%
Plant tissue tests and analysis to improve nitrogen management	WQL04	1,389	20.27%	6.37%
GPS, targeted spray application (SmartSprayer) or other chemical application electronic control technology	AIR07	1,348	19.67%	6.18%
Harvest hay in a manner that allows wildlife to flush and escape	ANM10	1,055	15.40%	4.84%
Nitrogen stabilizers for air emissions control	AIR02	842	12.29%	3.86%
Resource-conserving crop rotation	CCR99	833	12.16%	3.82%
Split nitrogen applications, 50% after crop emergence	WQL07	789	11.51%	3.62%
Apply nutrients no more than 30 days prior to planned planting date	WQL05	695	10.14%	3.19%
High-level integrated pest management to reduce pesticide environmental risk	WQL13	627	9.15%	2.87%
Precision application technology to apply	WQL11	561	8.19%	2.57%

Use of cover crop mixes	SQL04	439	6.41%	2.01%
Continuous no till	SOE01	436	6.36%	2.00%
Use of deep-rooted crops to break up soil compaction	SQL05	409	5.97%	1.87%
Improve the plant diversity and structure of non-cropped areas for wildlife food and habitat	ANM08	369	5.39%	1.69%
Fuel use reduction for field operations	ENR01	357	5.21%	1.64%
Regional weather networks for irrigation scheduling	WQT04	325	4.74%	1.49%
Plant an annual grass-type cover crop that will scavenge residual nitrogen	WQL10	309	4.51%	1.42%
Establish pollinator habitat	PLT01	302	4.41%	1.38%
Controlled traffic system	SQL01	287	4.19%	1.32%
Locally grown and marketed farm products	ENR05	259	3.78%	1.19%
Continuous cover crops	SQL02	252	3.68%	1.15%
Irrigation pumping plant evaluation	WQT03	246	3.59%	1.13%
Injecting or incorporating manure	AIR01	242	3.53%	1.11%
Renovation of a windbreak or shelter belt for wildlife habitat	PLT06	213	3.11%	0.98%
Extend existing filter strips for water quality protection and wildlife habitat	ANM04	189	2.76%	0.87%
Apply split applications of nitrogen based on a pre-sidedress nitrogen test on cropland	WQL08	171	2.50%	0.78%
Use of non-chemical methods to kill cover crops	WQL17	165	2.41%	0.76%
Use of legume cover crops as a nitrogen source	WQL16	147	2.15%	0.67%

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Soil Quality Enhancement Activity – SQL05 – Use of Deep Rooted Crops to Break up Soil Compaction

Enhancement Description
This enhancement is for the use of deep rooted crops to break up compacted soils and improve soil quality. Deep rooted crops can be perennial plants like alfalfa or annual plants like forage radish.

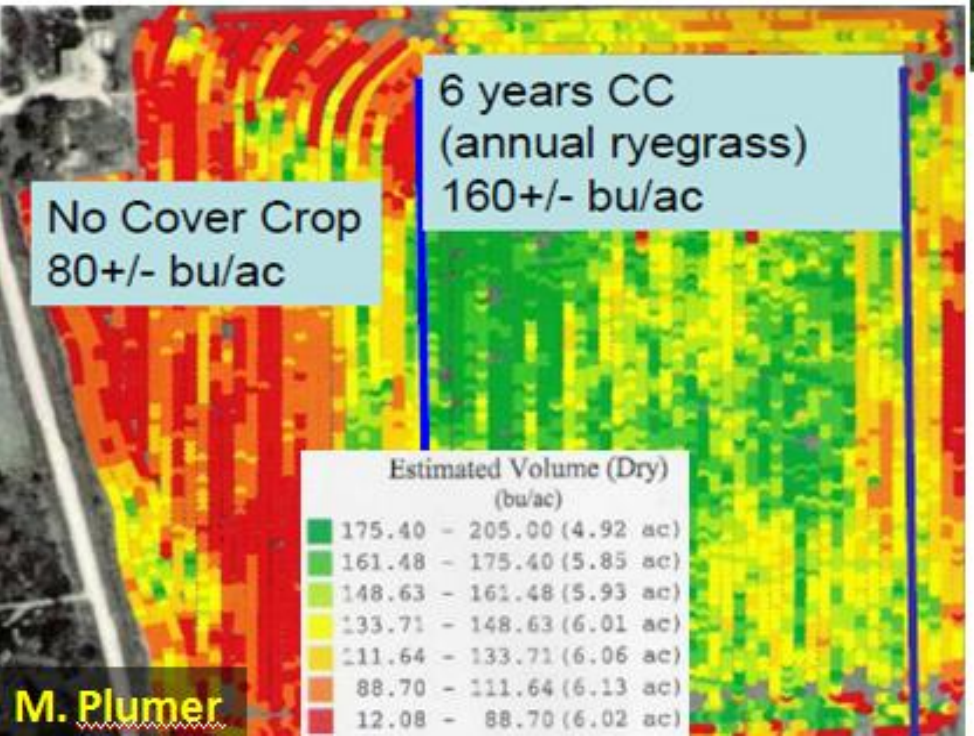
Land Use Applicability
Cropland

Benefits
Soils can have naturally occurring compacted layers (hard pans) or those that have been created through tillage or other farming activities. Deep rooted crops with large taproots can alleviate the effects of soil compaction by penetrating the compacted layer, creating pore space that allows air, water and crop roots to penetrate deeper in the soil profile. Eliminating soil compaction through the use of deep rooted crops increases infiltration, reduces surface runoff, improves soil tilth and overall soil quality. It also eliminates the need for sub-soiling with a plow, thus saving fuel, reducing erosion and enhancing water quality.

The value of cover crops is quantifiable

Impact of long-term cover cropping on corn yield in southern IL during a drought year

80bu x $6.30 = $540/ac



Bob Ridgley's 32-acre paddock of forage radishes, forage turnips, cereal rye and oats in Eastern MO will feed 120 head of cattle for about $64 per day for a couple weeks in the fall and about a month in the spring.

Cost accounting for cover crops

Direct costs

vs.

Indirect costs

vs.

Opportunity costs

DIRECT COSTS

Material costs

- seed
- inoculant
- herbicide
- fertilizer

Operational costs

- establishing
- terminating
- managing residues

Results of cover crop seed price survey

Vendor	Cereal rye	Annual ryegrass	Hairy vetch	Medium red clover
1 (WI)	0.188	0.52 (0.69)	1.60 (1.98)	1.22 (1.62)
2 (IL)				
3 (MN)				66 (1.84)
4 (NE)				65 (1.95)
5 (IL)				60)
6 (IL)				
7 (MO)				21
8 (IL)				75)
9 (IA)	(0.195)	(0.62)	(2.00)	2.00
10 (IN)	(0.239)	(0.75)	(2.20)	
11 (ILfarmer)*	0.125	0.48	1.05	

Prices were obtained through direct communication with vendors via phone or email during September 2010. Prices represent cheapest variety available (often VNS). Wholesale and retail prices were requested when available. Prices in parentheses are retail prices. All other prices are wholesale prices.

Performance over Price

- Buy CC seed on value not price

Vendor	Cereal rye	Annual ryegrass	Hairy vetch	Medium red clover
WI	0.188	0.52 (0.69)	1.60 (1.98)	1.22 (1.62)
IL1	0.147 (0.179)	0.47 (0.63)	1.42 (1.65)	
MN	0.153 (0.171)	0.50 (0.56)	1.70 (1.90)	1.66 (1.84)
NE1	0.157 (0.179)	0.55 (0.65)	2.10 (2.50)	1.65 (1.95)
IL2	(0.213)	(0.75)	(2.20)	(2.60)
IL3	0.188 (0.214)	(0.70)		
MO	0.197	0.46	1.47	1.21
IL4	(0.20)	(0.60)	(1.80)	(1.75)
IA	(0.195)	(0.62)	(2.00)	2.00
IN	(0.239)	(0.75)	(2.20)	
(IL farmer)	**0.125**	**0.48**	**1.05**	

Tillage Radish Growth Stages

1. Rapid Germination
2-3 days with proper soil temperature and moisture

2. Weed Suppression
Thick foliage shades out available space

3. Bio-Drilling Taproot
Tuber narrows at compaction point, sending out the taproot, boring down into the subsoil up to 30" in depth

4. Nutrient Silos
Enlarged tubers stockpile nutrients wicked up through the bio-drilling taproot

5. Winter-kill
Dies after 2-3 nights in the mid-teens, leaving a blanket of winter cover

6. Seedbed Ready
Residue has decayed, nutrients are available, and soil health and seeding conditions are enhanced

PLANTING TIPS

Precision Planter (4 lbs/acre): 15" rows using 60-cell small milo or sugar beet plates with 4" in-row spacing; Seed is selected for Precision Planting performance.

Drill Seeder (6 lbs/acre): 7.5" rows, using small grass box, use alfalfa setting as guide to set seeding rate. A large seed box can be used; setting is very low and somewhat difficult to establish. Plant a few rounds with a known amount of seed to determine correct seeding rate.

Broadcast / Aerial Seeding (8 lbs/acre): Strive for good soil and moisture contact; Corn seeding indicator is when 1" patches of sunlight on soil surface are seen or approximately 4 weeks prior to anticipated harvest time; Soybean seeding indicator is at leaf yellowing; Cotton seeding indicator is right before defoliation; Improve success rate by using drop tubes when seeding with a high clearance cover crop seeder.

Planting Depth: 1/4 to 1/2 inch deep. Can be planted 1" in light soils if necessary to reach moisture.

Nitrogen: To reach peak potential, needs 40-60 lbs of N, residual or applied.

SEEDING RATE

Planting: Plant 30-60 days prior to the first killing frost. Green growth starts in less than a week in normal conditions; winterkills when temps fall to the mid-teens for 2-3 nights.

Seeding Rate:

- **Drilling:** 6 lbs/acre
- **Broadcast / Aerial:** 8 lbs/acre
- **Precision:** 4 lbs/acre

Scan code for additional seeding information

How much is good technical support worth to you?

Green Cover Seed SmartMix Calculator

http://www.greencoverseed.com/

Use the yellow area to select your seed and your seeding rate per acre. Use the drop down boxes to select the species you want to include.			C:N Ratio (mature growth estimate) 24			N Fixing Potential (scale of 1-10) 4.5			Diversity Rating (scale of 1-10) 4.5		Frost Tolerance (scale of 1-10) 2.3	
		* Full Rate	lbs per acre	Season	% by weight	% by # seed	% by cost	Seeds/lb	Seeds per acre	Cost per pound	Cost 1K seed	Cost per acre
TOTALS			**18**						**250,000**			**$16.95**
Legumes					**72%**	**34%**	**78%**					**$13.25**
Cowpeas	Info	30-50	10	WS-B	56%	16%	38%	4,100	41,000	$0.65	$0.159	$6.50
Sunn Hemp	Info	14-20	3	WS-B	17%	18%	40%	15,000	45,000	$2.25	$0.150	$6.75
	Info											
	Info											
Grasses					**11%**	**56%**	**9%**					**$1.60**
Pearl Millet	Info	10-14	2	WS-G	11%	56%	9%	70,000	140,000	$0.80	$0.011	$1.60
	Info											
	Info											
Brassicas					**0%**	**0%**	**0%**					**$0.00**
	Info											
	Info											
	Info											
Other Broadleaves					**17%**	**10%**	**12%**					**$2.10**
Sunflower	Info	15-25	3	WS-B	17%	10%	12%	8,000	24,000	$0.70	$0.088	$2.10
	Info											

Add your own seed and seed cost in the section below. Totals will be reflected in grand totals at top but not in the Green Cover Seed cost total.

Green Cover SmartMix total: **$16.95**

Inoculant and mixing: $0.00

Per acre costs of cover crop planting operations based on custom rate surveys

Field operation	IA*	IL	IN*	MO*
Fertilizer buggy	4.15 (1.50-7.50)		4.72 (3.07-6.37)	4.97 (3-15) fert 6.02 (3.50-15) fert+seed
Harrowing	8.10 (4-12.50)			6.78 (3-12)
Cultipacking	6.55 (3-10)			8.50 (5-15)
Broadcast w/ ATV	10.35 (8-12)			7.44 (3-12.50)
Conv. grain drill	13 (7.50-20)	11.40	15.89 (13.63-18.15) s	13 (8-24) sg 14.09 (10-24) gc
No-Till grain drill	15.35 (12-25)	14.60	14.47 (10.80-18.14)	14.80 (10-24) s 14.25 (5-25) sg
Air seeder		16.40		

University of Illinois Machinery Cost Estimates

Table 1. Per Acre Field Operation Costs.

Operation	**Total**	= Tractor Overhead	+ Implement Overhead	+ Fuel & Lube	+ Labor
Tillage	------------------------------ $ per acre ------------------------------				
Combination tool	**9.50**	3.60	2.70	1.40	1.80
Coulter chisel plo[illegible]	[illegible]	[illegible]	[illegible]	1.50	2.10
Disk subsoiler	[illegible]	[illegible]	[illegible]	2.10	2.10
Field cultivator	[illegible]	[illegible]	[illegible]	0.70	1.00
Moldboard plow	[illegible]	[illegible]	[illegible]	3.00	4.10
Tandem disk	[illegible]	[illegible]	[illegible]	0.70	1.00
Planting and row-crop cultivation					
Conventional planter	**7.90**	2.00	3.80	0.70	1.40
No-till planter	**8.80**	2.60	4.00	0.80	1.40
Grain drill	**10.00**	2.30	4.80	0.90	2.00
No-till drill	**14.90**	3.70	8.10	1.10	2.00
Rotary hoe	**4.60**	0.90	2.90	0.30	0.50
Row-crop cultivator	**8.20**	3.00	2.90	0.80	1.50

"Adding 5 to 15 percent to estimated costs is appropriate for determining custom rates"

IA and IL Aerial Applicator Survey (May-June 2010)

Name	Location	Experience w/CC	Cost
Cady Aerial Spray	Rock Falls, IL	no exp., no customer interest	$8.00/a norm app $8.50/a cc
Benoit Aerial Spraying	Kankakee, IL	turnips and rye	$8.00/a norm app $10.00/a cc
Franks Flying Service	Morrison, IL	ryegrass and c. rye	$8.00/a norm app $10.00/a cc
Reeds Fly-on Farming	Mattoon, IL	yes, c. rye, small part of business	$8.00/a norm app $12.00/a cc
Killiam Flying Service	Carlinville, IL	rye, wheat on beans, rye on corn	$8.00/a norm app $10.00/ac or 10/lb
Curless Flying Service	Astoria, IL	ryegrass and turnips	$8-15.00/a all app.
Klein Flying Service	St. Francisville, IL	annual rye and turnips	~$12.50/a cc, $9.00/a liquid app
Agriflite Services	Wakarusa, IN	rye, wheat, ryegrass	ave $15.00/a for cc app.
Al's Aerial Spraying	Ovid, MI	rye and wheat	$10-15.00/a cc $10.00/a liquid


Attention to detail is required to achieve uniform aerial application of cover crops
?

Examples of total cover crop management programs ($/ac)

Costs	Program 1	Program 2	Program 3	Program 4
Seed	11.25	7.50	11.25	9.00
Seeding operation	4.15	15.00	10.00	10.00
Seed incorporation	6.50			
Herbicide	2.00	2.00		
Termination operation	6.50	6.50		
Total	30.40	31.00	21.25	19.00

Program 1
Seed: 90 lbs/ac cereal rye
Seeding operation: spread w/fertilizer buggy
Seed incorporation: rolling stalk chopper
Herbicide: 24 oz. glyphosate
Termination operation: 90' boom spray rig

Program 2
Seed: 60 lbs/ac cereal rye
Seed bed preparation: none
Seeding operation: no-till drill
Herbicide: 24 oz. glyphosate
Termination operation: 90' boom spray rig

Program 3
Seed: 90 lbs of cereal rye
Seed bed preparation: none
Seeding operation: aerial seeding
Herbicide: no added cost, burn-down standard
Termination operation: no added cost, burn-down standard

Program 4
Seed: 3 bushels of bin-run oats
Seed bed preparation: none
Seeding operation: aerial seeding
Herbicide: none – winter-kill
Termination operation: none – winter-kill

National Association of Farm Business Analysis Specialists

Achievement thru Better Records

Home

Real financial data for thousands of farmers across the Midwest

(* denotes retired member)

Alabama Illinois Iowa Kansas Kentucky Michigan Minnesota Missouri Nebraska North Dakota South Carolina Wisconsin

This is the kind of data we need to really understand CC economics

Alabama

State Coordinator, John L Adrian

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Lisec, Bob	PO Box 217 Headland, 36345	334-693-2010	rlisec@acesag.auburn.edu
Page, Robert	13112 Ala Hwy 68 Crossville, AL 35962	(256) 528-7133	rlp0005@aces.edu

SOME FARMS CONSISTENTLY HAVE HIGHER PROFITS THAN OTHER FARMS, #1 REASON IS LOWER COSTS!

Table 2. Number of Years in the High 1/3 Management Returns Group, Illinois FBFM, 1995 to 2000.

Year in the Top One-Third	Percent of Farms	Six-Year Average Management Return
0	26%	-$54
1	22%	-$3
2	16%	$18
3	14%	$33
4	11%	$54
5	6%	$64
6	5%	$94

Similar variation in cost effectiveness of CC is likely

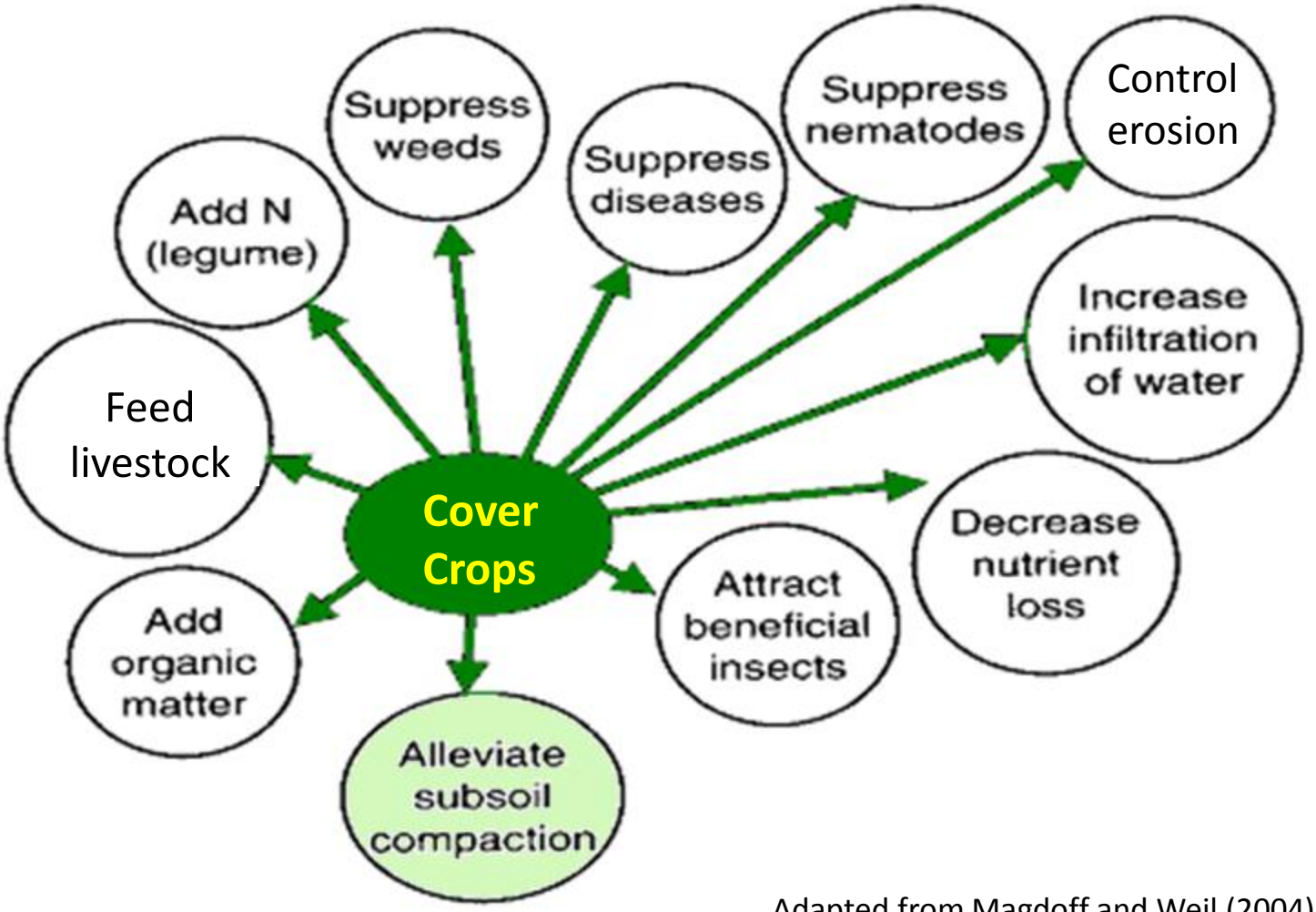
$148!

What are indirect costs?

-> costs associated with challenges created by the addition of cover crops to cropping systems.

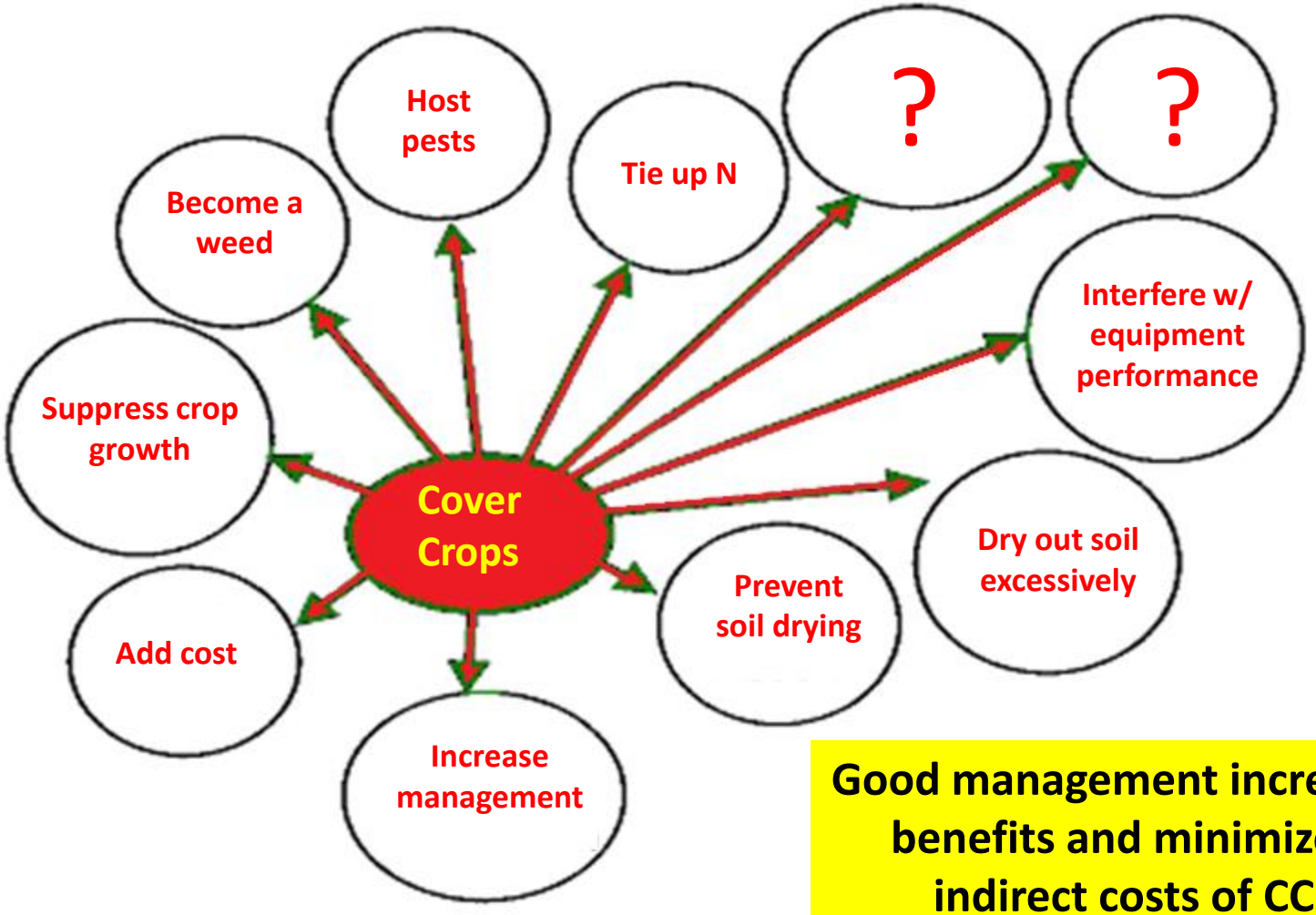
Examples include cover crop residues hindering establishment of succeeding cash crops due to slow soil warming or delayed organic N release and cover crops that become weeds.

CCs affect many agronomic factors simultaneously



Adapted from Magdoff and Weil (2004)

Not all effects are positive



Good management increases benefits and minimizes indirect costs of CC

Adapted from Magdoff and Weil (2004)


Soybeans preceded by spring planted radish in 2012

Good CC management starts with matching objectives with species

GRAZING = #1 way to make cover crops pay!

brassicas, clovers, small grains, a. ryegrass, sorghum-sudan

Nutrient scavenging/cycling

brassicas, small grains, annual ryegrass

Bio-drilling

brassicas, sugarbeet, sunflower,
sorghum-sudan sweet clover, alfalfa

N-fixation

clovers, vetches, lentil, winter pea, chickling vetch, sun hemp, cowpea, soybean

Bio-activation/fumigation

brassicas, sorghum-sudan, sun hemp, sesame

Weed suppression

brassicas, sorghum-sudan, cereal rye, buckwheat


Do you think that these cows are happy to have more than corn stalks for lunch today?

What are opportunity costs?

-> income foregone when less profitable crops are included in crop rotations (e.g., small grains) or cover crops are grown at times when cash crops could be in the field (e.g., cover crops following wheat vs. soybean double crop)

Who should pay for the costs of using cover crops?

Internal costs vs. External costs

aka

On-site costs vs. Off-site costs

aka

On-site benefits vs. Off-site benefits

The economics of off-site erosion

Karl L. Guntermann, Ming T. Lee and Earl R. Swanson - 1976

Erosion and sedimentation in agriculture has traditionally been thought to result in substantial costs to the producer implying that voluntary measures at soil conservation would be in the individual's and society's interest.

The research reported here indicates that off-site sediment damages are far greater than the on-site productivity effects of erosion and that there is considerable justification for stronger public policies in this area.

The development of the efficient production frontier reveals that conventional production techniques are quite inefficient compared to procedures that could be adopted.

There are no silver bullet solutions that sustainably balance environmental quality with productivity and profitability in agriculture!

A better strategy is . . .

silver buckshot!

Silver buckshot is a concept promoted by a collaboration of agencies and orgs called

GREEN LANDS BLUE WATERS

Winter cover crops

Perennial-based crop rotations

GREEN LANDS BLUE WATERS

Permanent pasture systems

Perennial bio-energy crops

Reductions in long-term costs!

Impact of the 2008 floods on IA soils

20 tons per acre average soil loss across 2,284,000 ac!

Conservation structures needing repair

12,157 Grassed Waterways

8,137 Terraces

3,375 Water and Sediment Control Basins

800 Grade Stabilization Structures

Fields with <u>combinations</u> of two or more conservation practices (e.g., no-till + cover crops) performed much better than fields with a single practice

Which compaction alleviation strategy is more cost effective?


What are these roots doing that is NOT accomplished by a steel shank?
Steve Carruther's farm in Ontario, Canada


This is not possible in a corn-soybean system!
Moving beyond cover crops as add-ons to new cropping systems
10/09/2010

Cover crops should not be viewed as the missing puzzle piece(s) in current cropping systems!


CC should be managed for short term
benefits AND long-term effects on
SOIL HEALTH

WIU Organic Research farm

Fall 2012

Student's home farm

Spring 2012

Some things are priceless :->