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Economics of Soil Amendments: Cover Crops

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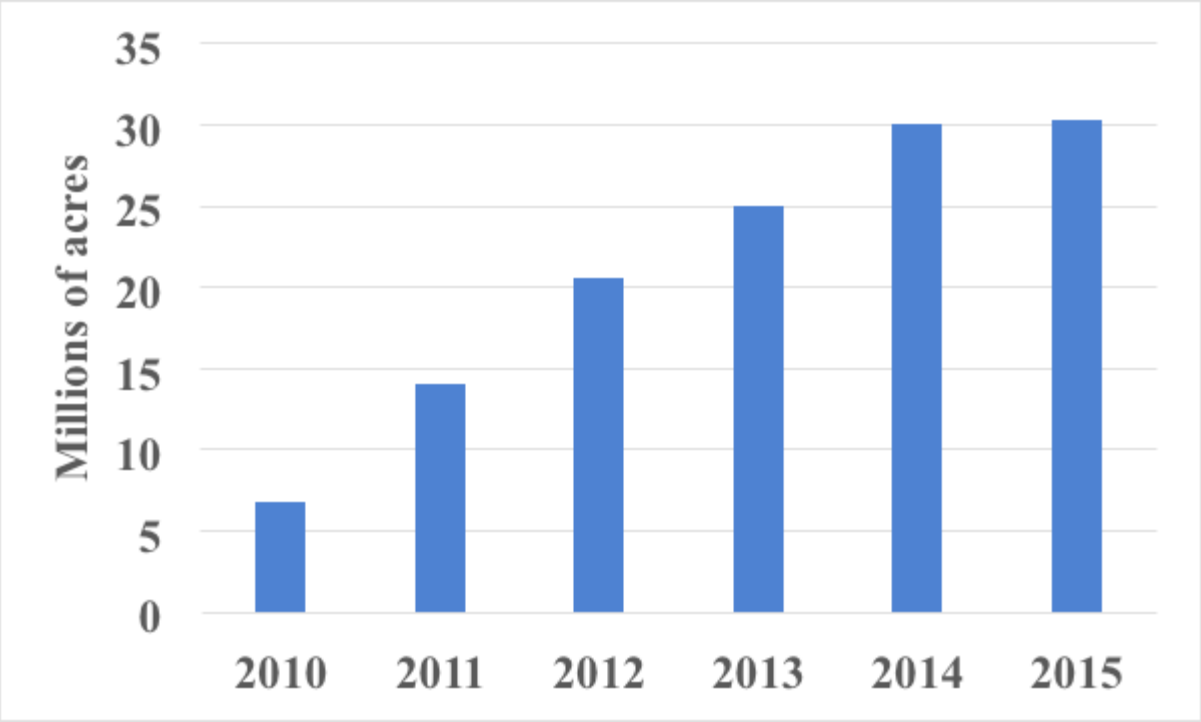
AGRICULTURE AND
NATURAL RESOURCE
ECONOMICS PROGRAM

Conservation Stewardship Program (CSP)

Acres enrolled in the Conservation Stewardship Program (CSP) with at least one soil health practice for enhancement, 2010-2015

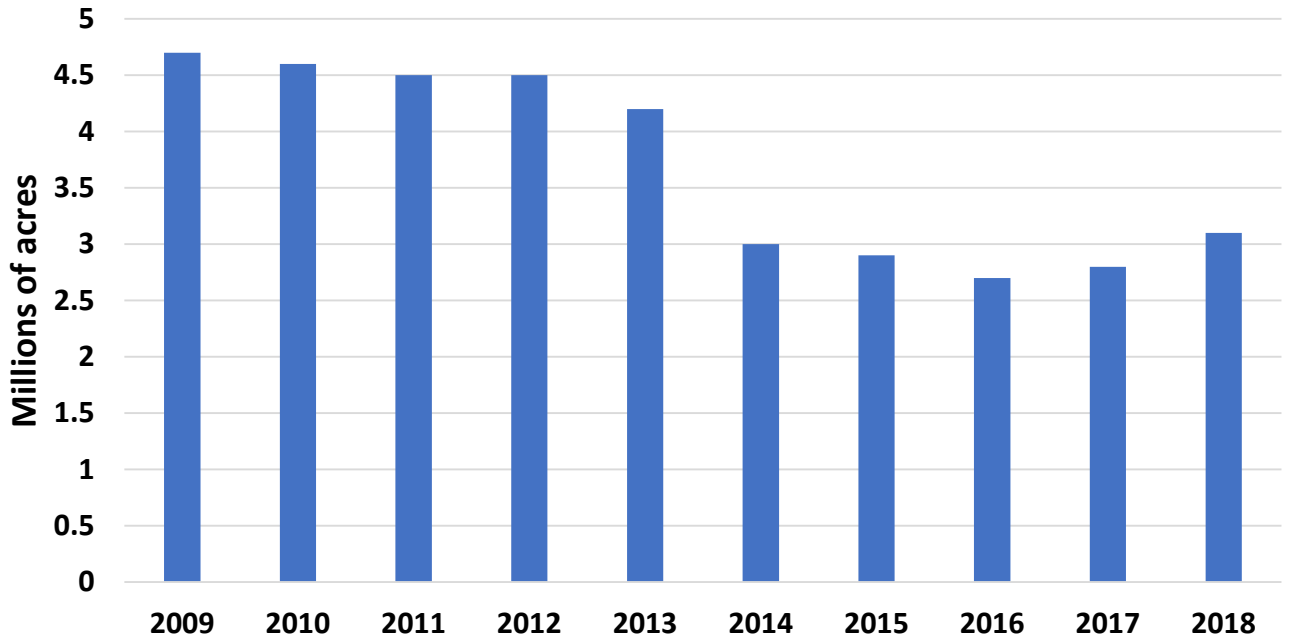


Source: Bowman and Lynch (2019)

Soil health practices: cover crops, no-till, and pasture and rangeland management or restoration

Environmental Quality Incentives Program (EQIP)

Acres enrolled in the Environmental Quality Incentives Program (EQIP) with at least one soil quality practice, 2009-2018

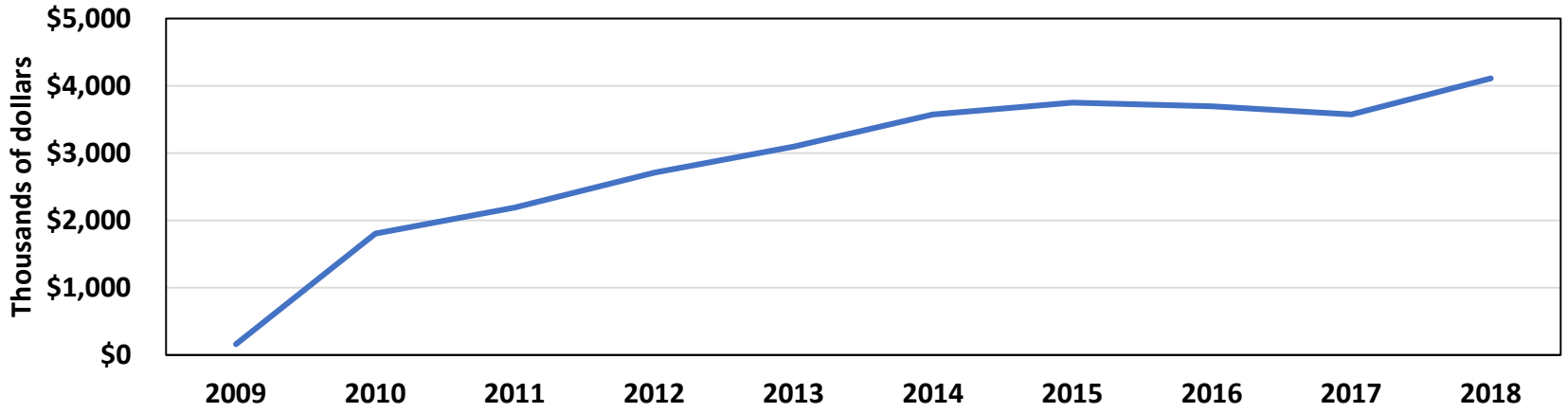


Source: Data Source: USDA-NRCS, National Planning and Agreements Database, October 2018.

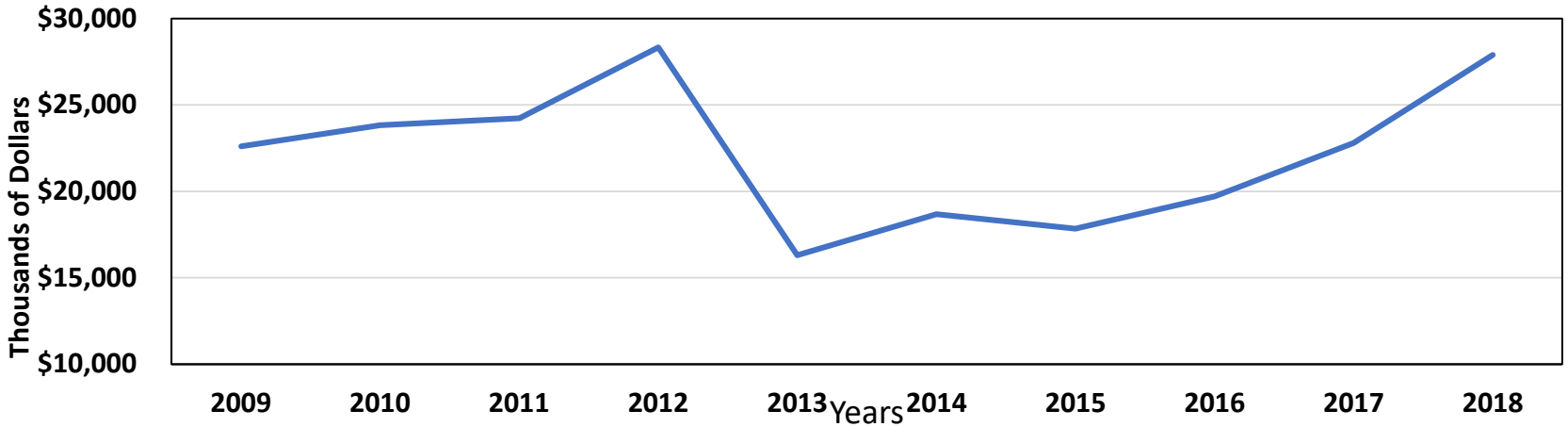
In 2018, acres with soil quality practices went down by 31%, relative to 2009-2013 average values.

Conservation spending in Florida has increased in recent years

Total CSP Obligations by Fiscal Year, Florida



Total EQIP Obligations by Fiscal Year, Florida

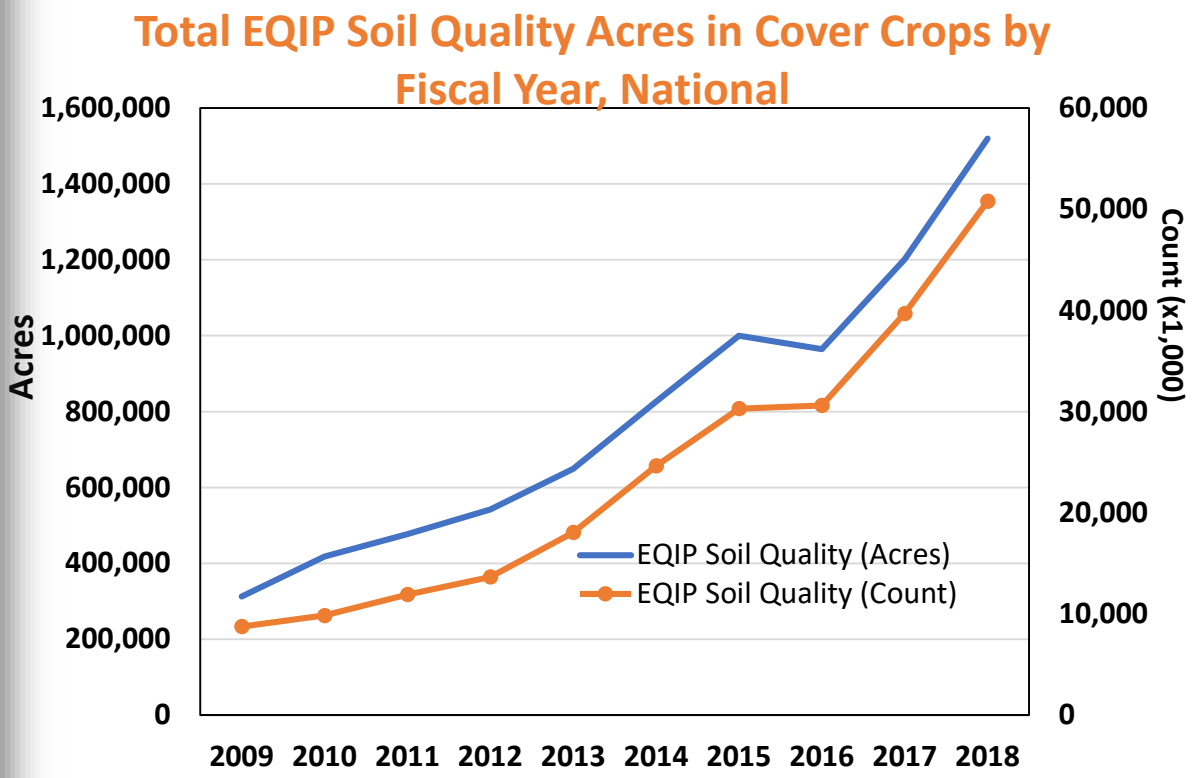


Soil health has both private and public benefits

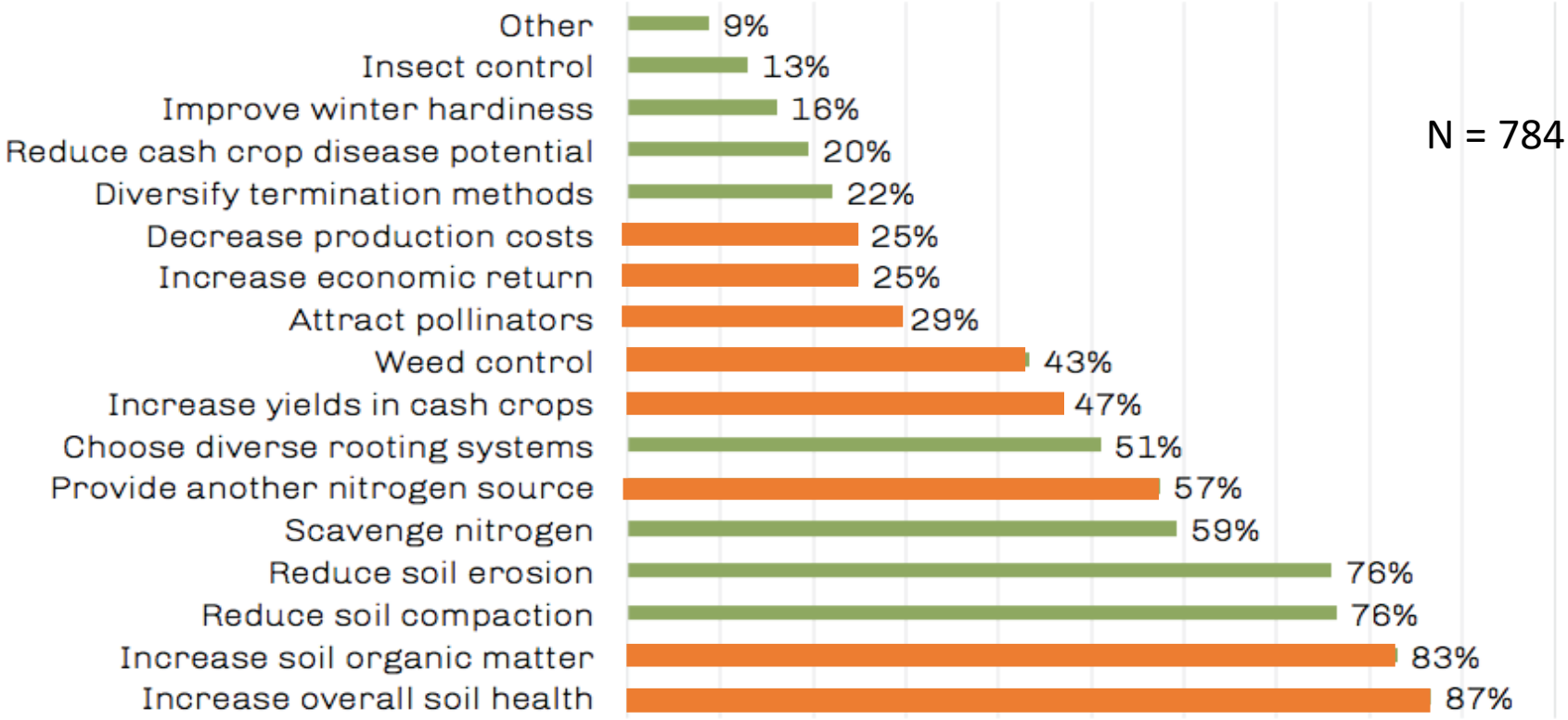
	Ecological/Environmental	Agronomic
Private/ Farm	• Local biodiversity, natural beauty, etc. • Flood control • Erosion control	• Increased yields • Pest control • Reduced fertilizer use/cost • Drought mitigation • Irrigation reductions
Public/ External	• Carbon sequestration • Cleaner water • Flood control • Erosion control	• Lower risk of pest outbreaks • Lower risk of disease outbreaks • Fewer unwanted nitrates from runoff

Source: Stevens (2019)

EQIP Cover Crop Acres



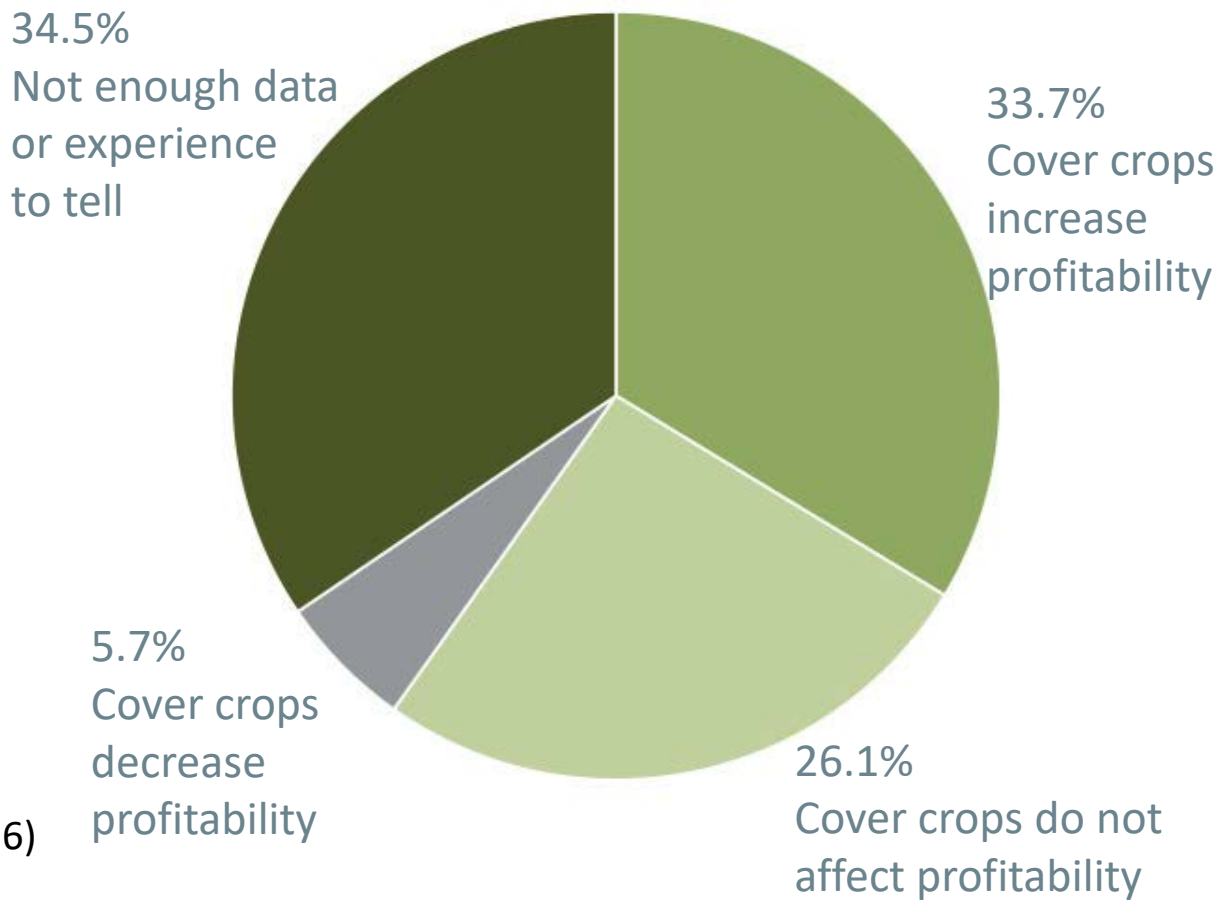
Motivation for using cover crops



N = 784

Source: CTIC (2016)

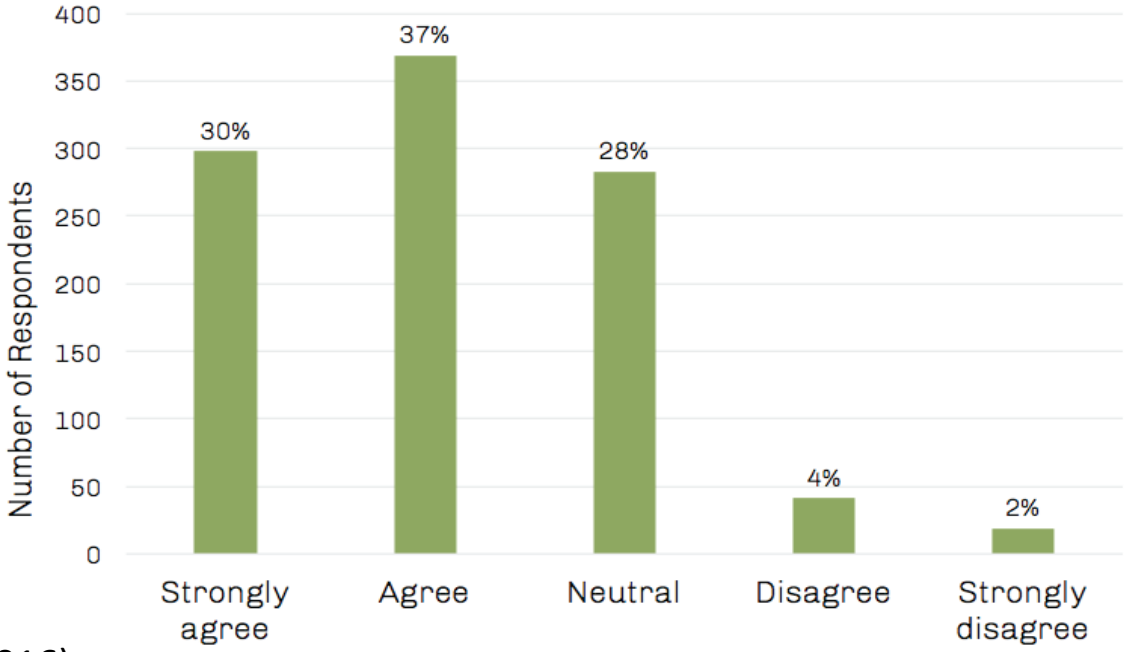
Cover crops' impact on profit



Source: CTIC (2016)

N = 1,022

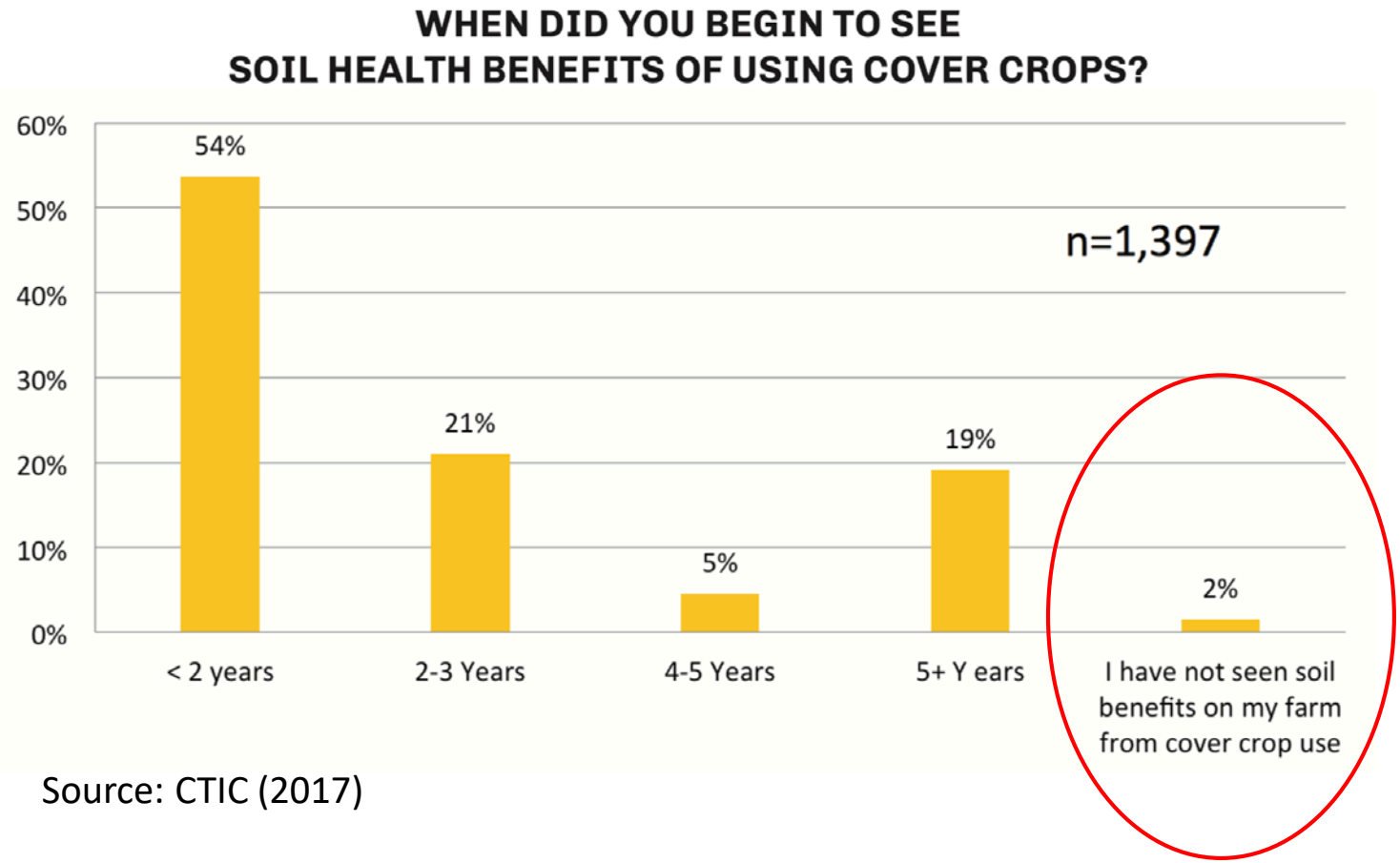
Using cover crops can reduce yield variability during extreme weather events



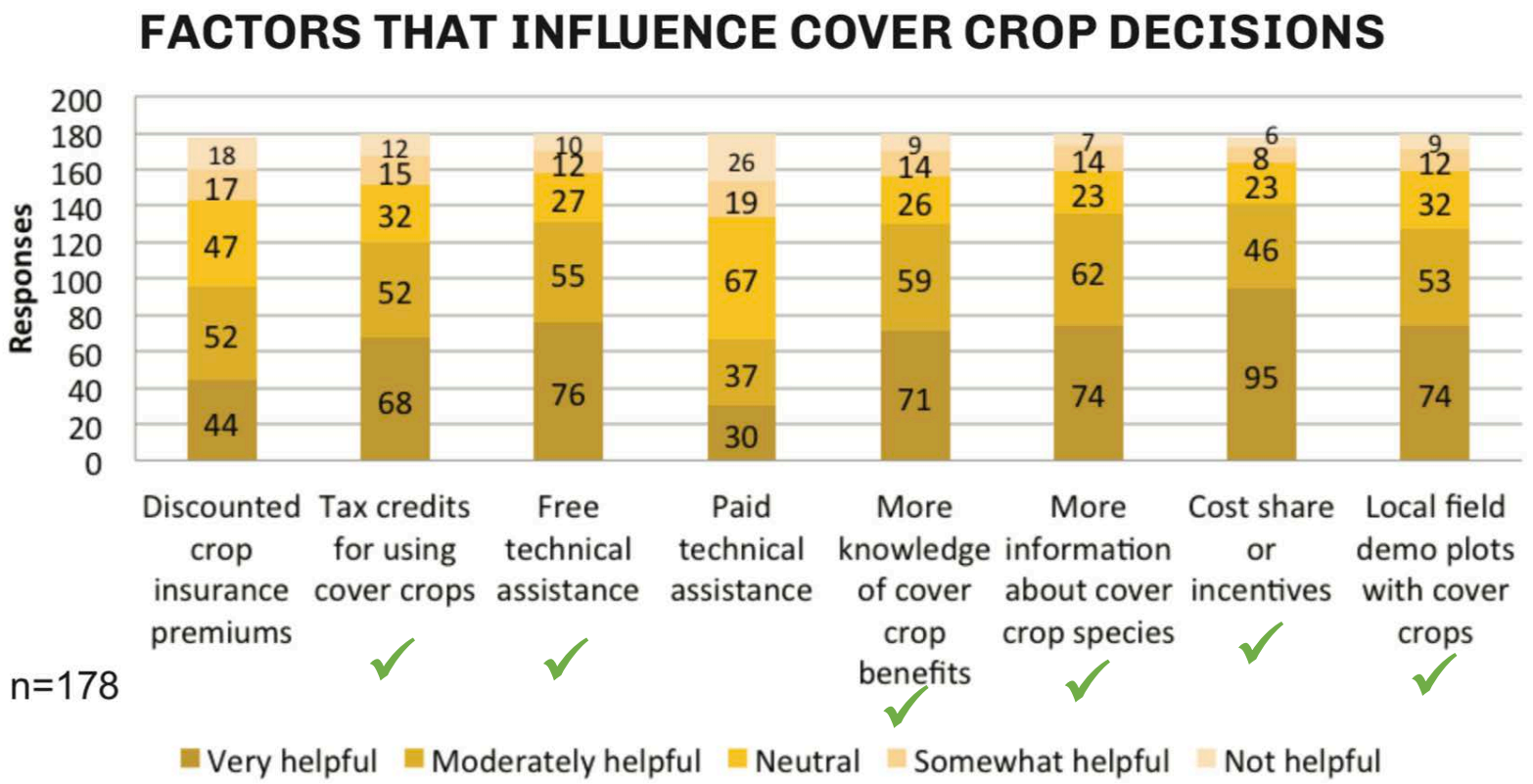
Source: CTIC (2016)

N = 1, 010

Soil health improvements



Source: CTIC (2017)



✓ **Factors found to be very helpful at influencing cover crop decisions (40-53%)**

Source: CTIC (2017)

Typical cover crop costs

ITEM	COST PER ACRE
Cover crop seed	$10 - $50
Seeding the cover crops	$5 - $18
Termination	$0 - $10
Subtotal range	**$15 - $78**
Median cost from survey	**$37**

Source: SARE-CTIC (2019); www.sare.org/cover-crop-economics

Corn and soybeans yield benefits

Percent increase in yield for corm and soybeans following cover crops versus comparably managed fields with no cover crops

CROP YEAR	CORN	SOYBEANS
2012	9.6%	11.6%
2013	3.1%	4.3%
2014	2.1%	4.2%
2015	1.9%	2.8%
2016	1.3%	3.8%

Source: SARE-CTIC (2019); www.sare.org/cover-crop-economics

Estimated input savings on soybean fields after using cover crops

BUDGET ITEM	YEARS OF COVER CROPPING		
	One ($/ac)	Three ($/ac)	Five ($/ac)
Fertilizer	$0	$6.30	$8.40
Weed control	$0 - $15	$10 - $25	$10 - $25
Erosion repair	$2 - $4	$2 - $4	$2 - $4
Subtotal	**$2 - $19**	**$18.30 - $35.30**	**$20.40 - $37.40**

Source: SARE-CTIC (2019); www.sare.org/cover-crop-economics

Estimated net returns on soybean fields after using cover crops

BUDGET ITEM	YEARS OF COVER CROPPING		
	One ($/ac)	Three ($/ac)	Five ($/ac)
Saving on inputs (the low end of the subtotal from the returns)	$2	$18.30	$20.40
Income from extra yield in normal weather year	$11.45	$19.12	$26.78
Cost of seed and seedling	$37	$37	$37
Net return	**-$23.55**	**$0.42**	**$10.18**

Source: SARE-CTIC (2019); www.sare.org/cover-crop-economics

Estimated input savings on corn fields after using cover crops

BUDGET ITEM	YEARS OF COVER CROPPING		
	One ($/ac)	Three ($/ac)	Five ($/ac)
Fertilizer	$0	$14.10	$21.90
Weed control	$0 - $15	$10 - $25	$10 - $25
Erosion repair	$2 - $4	$2 - $4	$2 - $4
Subtotal	**$2 - $19**	**$26.10 - $43.10**	**$33.90-$50.90**

Source: SARE-CTIC (2019); www.sare.org/cover-crop-economics

Estimated net returns on corn fields after using cover crops

BUDGET ITEM	YEARS OF COVER CROPPING		
	One ($/ac)	Three ($/ac)	Five ($/ac)
Saving on inputs (the low end of the subtotal from the returns)	$2	$26.10	$33.90
Income from extra yield in normal weather year	$3.64	$12.32	$21
Cost of seed and seedling	$37	$37	$37
Net return	**-$31.36**	**$1.42**	**$17.90**

Source: SARE-CTIC (2019); www.sare.org/cover-crop-economics

Situations that may boost cover crop impacts:

- ✓ Herbicide-resistant weeds
- ✓ Grazing income
- ✓ Use with other practices (e.g., no-till)
- ✓ Irrigation reductions
- ✓ Reduced fertilizer use
- ✓ Payments received

Barriers to cover crop adoption

- Cost of seed and planting
- Managing the cover crops:
  - increased labor, fear the cover crop will become a weed, cover crop selection, attracting non-beneficial insects
- Limited time to establish cover crop
- Steep learning curve
- The lack of measurable economic returns following implementation
- Aesthetics

Summary

We know little about the adoption of soil health practices (including cover crops) in Florida.

What we do know seems to be consistent across the country:

- Increased spending indicates there are significant Federal and state efforts to increase acres with soil health practices
- Cover crops are an important part of the soil health story
- Cover crops may help mitigate against extreme weather (e.g., drought)
- Startup costs are high, but returns may be seen within a few years
- There are several ways to boost returns from cover crops

THANK YOU FOR YOUR ATTENTION

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Questions?

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