Presentation from the USDA Agricultural Outlook Forum 2017

United States Department of Agriculture
93rd Annual Agricultural Outlook Forum
"A New Horizon: The Future of Agriculture"

February 23-24, 2017
Arlington, Virginia

United States Department of Agriculture

Soil Health at NRCS

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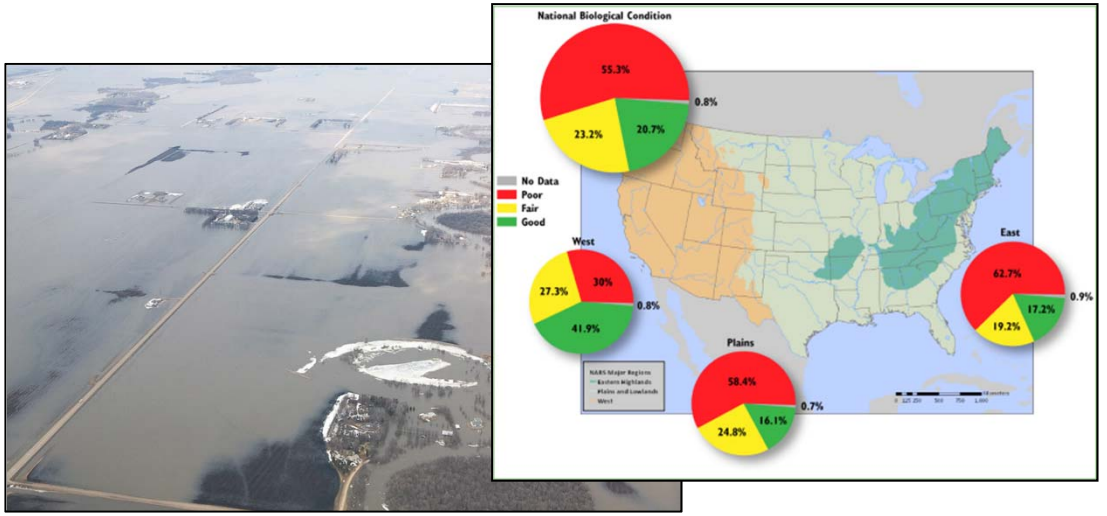
Secretary's Ag Outlook Forum
Feb 23, 2017

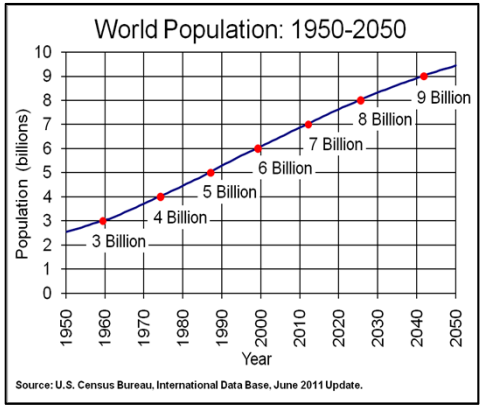
National Challenges

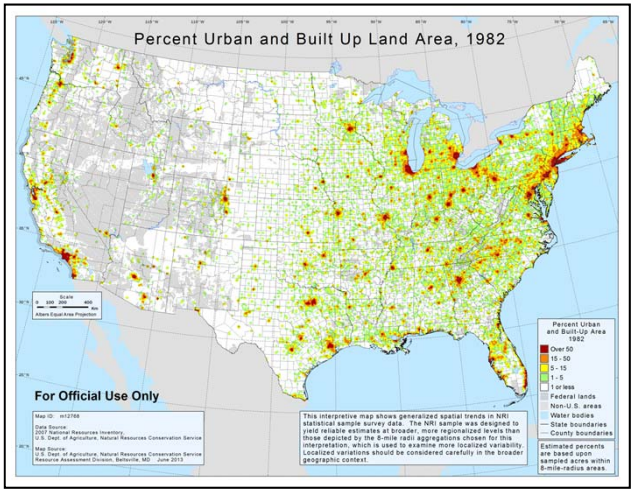
Population growth

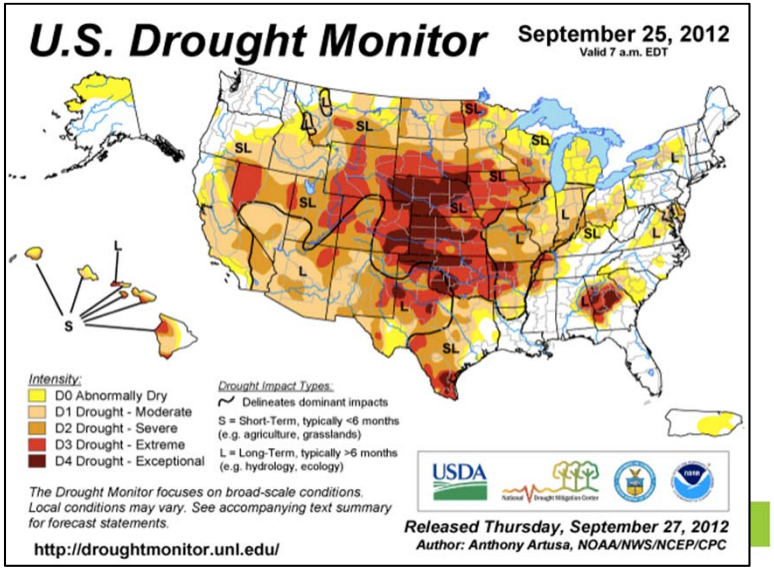
Risk from Extreme Weather

Water quality and quantity









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Return on our Nation's Soil Health Investment

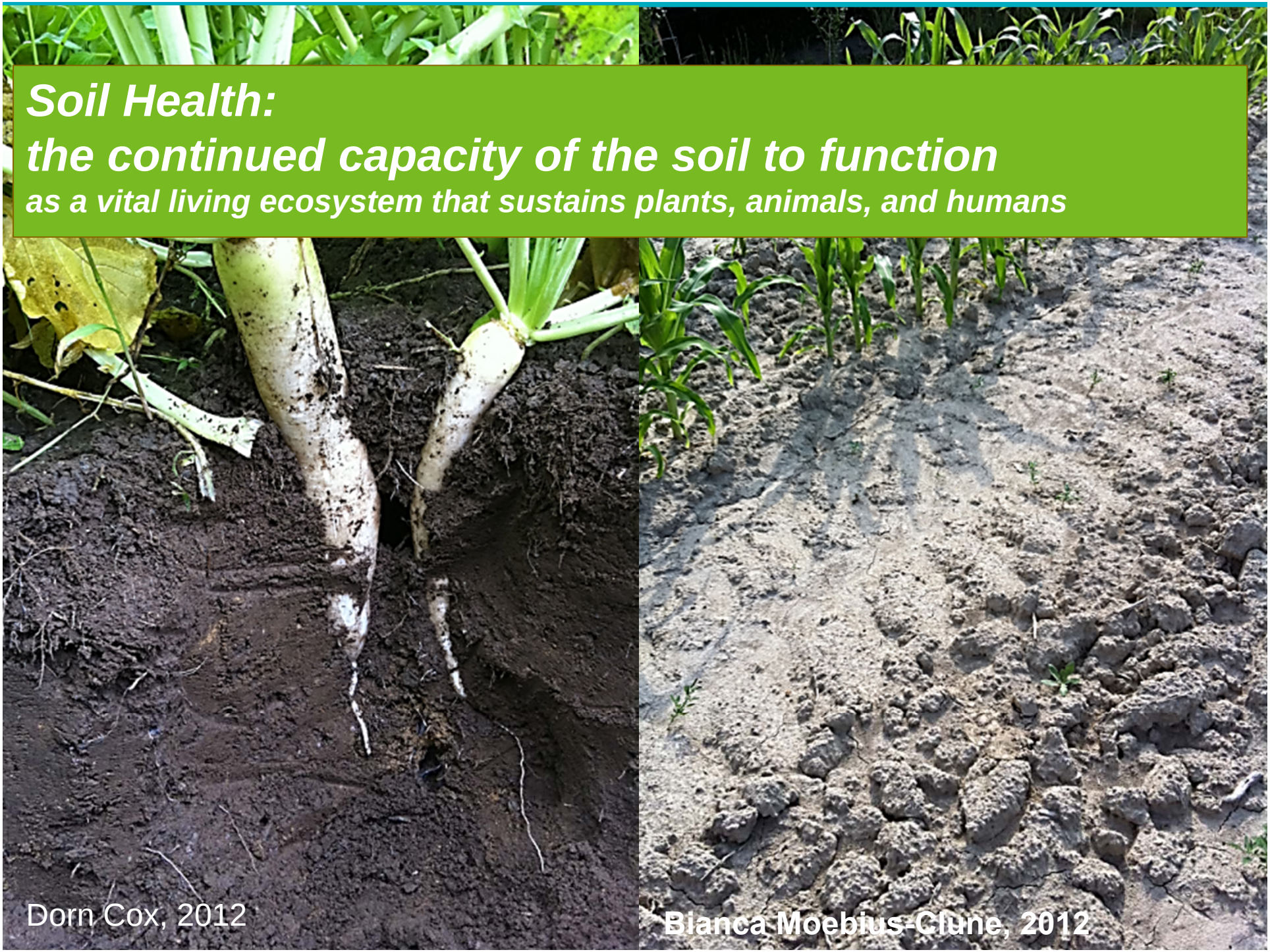
Changing the Face of Agriculture and How We Feed our Nation

BENEFITS

- Water infiltration
- Less runoff, erosion, flooding
- Water storage and availability
- Soil organic matter
- Energy savings
- Nutrient cycling & pest suppression
- Resilience
- Biodiversity, groundwater, clean water and air …
- Long-term economic viability
- Sustained reliable productivity – to feed 9 billion

Photos: NRCS and Dorn Cox, 2012

Soil Health:
the continued capacity of the soil to function
as a vital living ecosystem that sustains plants, animals, and humans

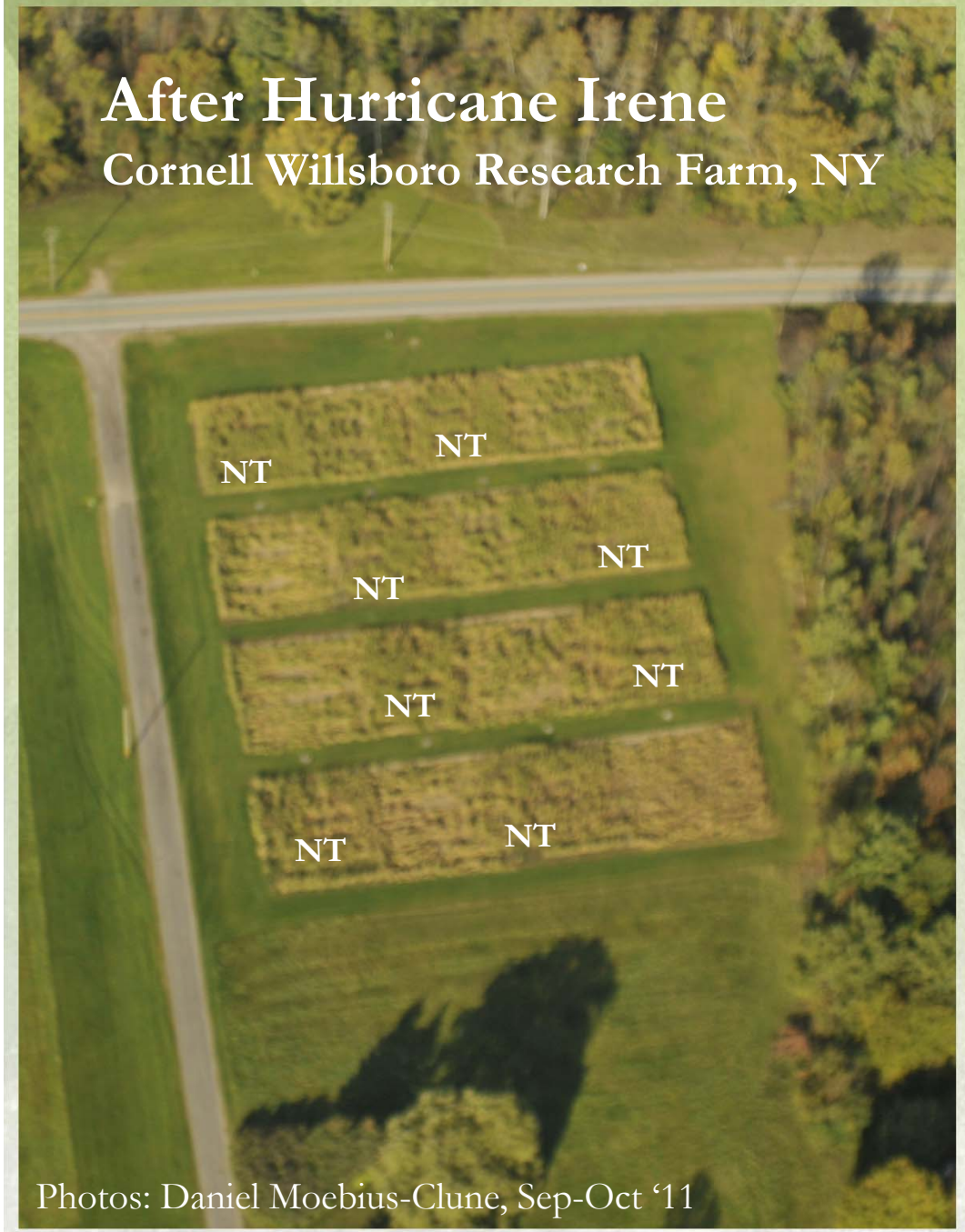


Infiltration - Brookings County, SD

unlock the SECRETS IN THE SOIL

2011: Resilience to extreme weather

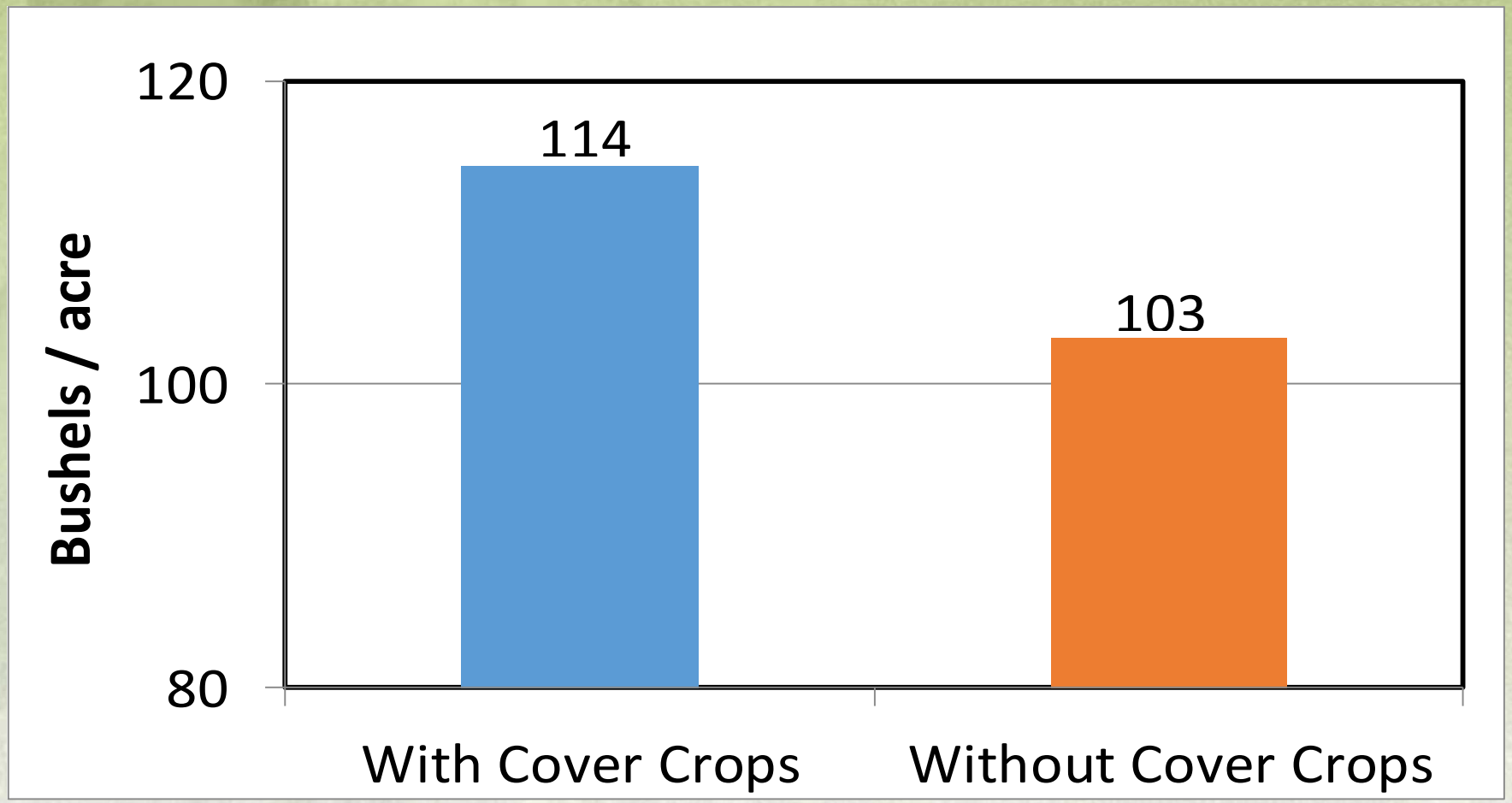
unlock the SECRETS IN THE SOIL




No Cover
With Cover Crop

USDA-SARE, CTIC Survey 2013

2012 Corn Yield, Drought States



Conventional Potato System

Soil Improving Potato System

Honeycutt et al., 2007; Maine ARS

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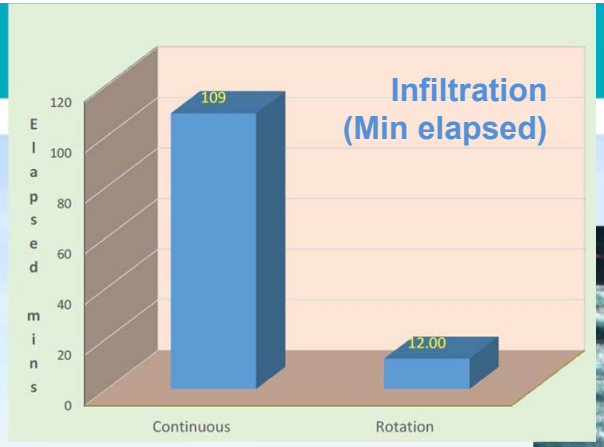

Heavy, continuous season-long grazing

Moderate, rotationally grazed

Image courtesy of Stan Boltz, NRCS-SHD

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Goal: WIN-WIN Regenerative Soil Health Management Systems Become the Common Place on America's Working Lands

Better crop yields & quality; lower cost, risk, environmental impact

Field conditions more resilient and consistent

More SOC, nutrients, and top soil built

AWHC increases

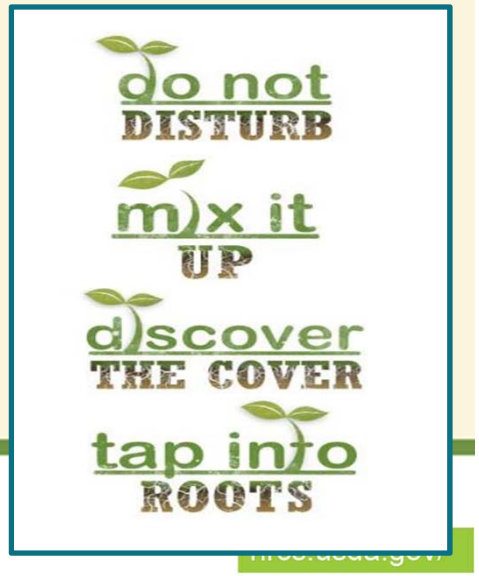
SOC increases, rooting reduces compaction

Reduced tillage, more rooting, higher diversity, surface cover

Aggregates rebuilt

Infiltration increases, wind and water erosion decrease

Less energy, inputs and tillage needed, more water stored, better rooting, more nutrient access, greater soil organism diversity, less disease



Modified by Moebius-Clune and Cox from *Building Soils for Better Crops*

Soil Health Management Systems for Resilient & Productive Soils

Provide diverse C sources and biochemicals

- Stimulate microbial diversity and abundance, services
- Break disease cycles
- Increase SOM, aggregation, and nutrient cycling
- Enhance plant growth
- Increase predator & pollinator populations

Protect microbial habitat

- Maintain SOM & aggregates
- Increase water storage/access
- Reduce erosion & runoff risk
- Buffer temperature
- Reduce evaporation

Image courtesy of Barry Fisher, NRCS-SHD

Soil Health at NRCS

- Agency born in Dust Bowl
- Boots on the ground working with producers to implement conservation
- Agency uniquely positioned to assist producers in adopting soil health management systems (SHMS)
- NRCS Soil Health Campaign:
  - Fundamental Shift: reducing erosion to building a healthy agroeco*system. Practices to Systems*
  - Raised awareness, expanded adoption
  - Growing customer demand for system adapted soil health management support
  - Encountering knowledge gaps
  - Predicted demand: catalyzed SHD

Geographically specific management challenges

For example:

- **KS:** Is there enough water for a cover crop?
- **VT:** Is there enough growing season for cover crop establishment?
- **FL:** Will enough residue remain to suppress weeds?
- **NY:** Will residue keep the soil too wet or cold in the spring?
- **CA:** how to economically justify a cover crop, when a high value vegetable crop could grow instead?
- **WY:** What management effort is economically worth while when climate variability controls soil functioning?

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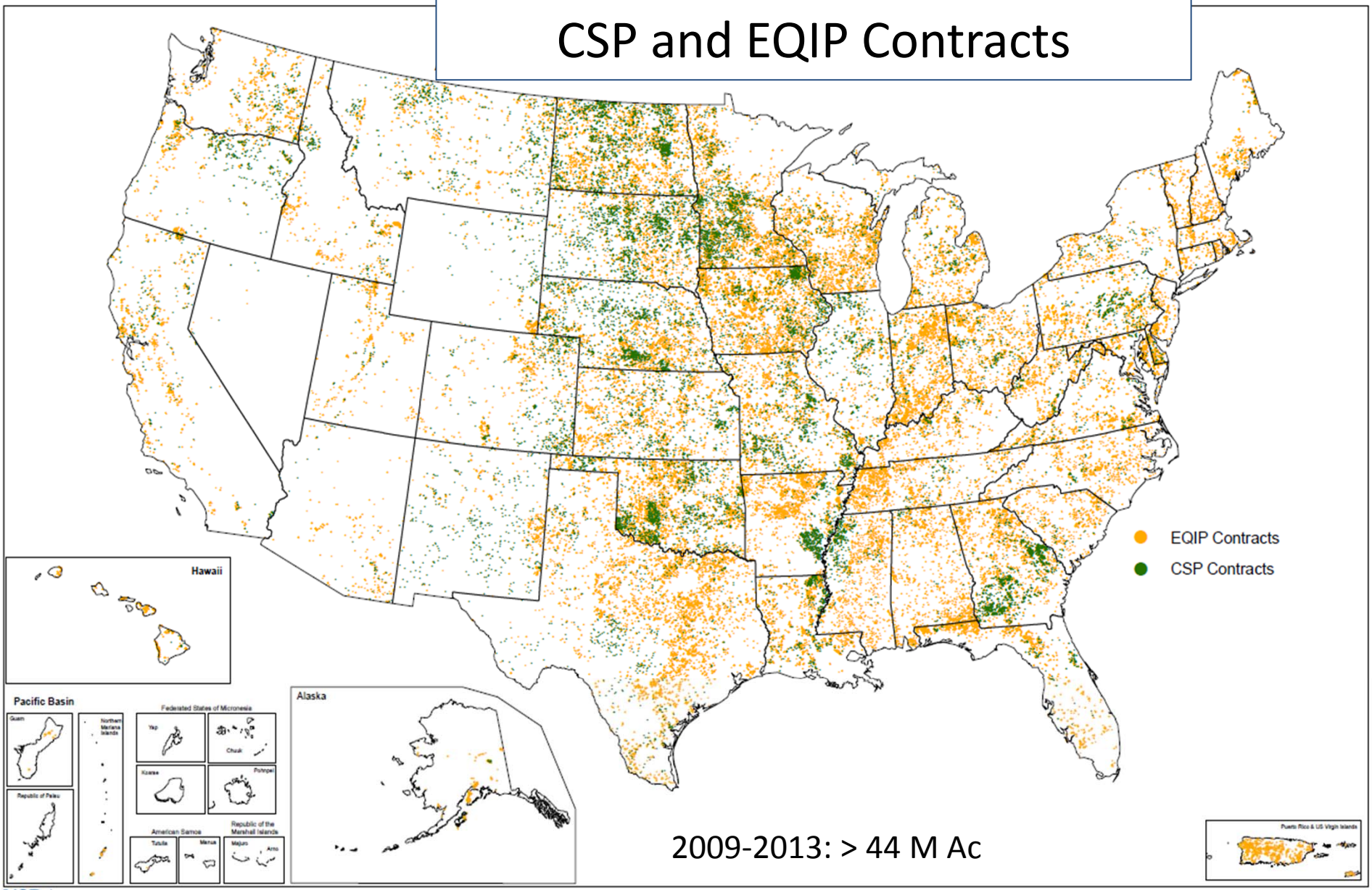
Soil Health Related Practices in CSP and EQIP Contracts



2009-2013: > 44 M Ac

USDA Natural Resources Conservation Service
SPA-REAPD
Washington, D.C.

September 2014

USDA United States Department of Agriculture

Regional Conservation Partnership Program (RCPP) Projects to Improve Soil Health Management Systems Adoption

- Adoption of SHMS: promoting, demonstrating, guiding, and cost sharing
- Projects nation wide in production systems ranging from high tunnels to commodity and row crops, to vegetables, to mixed operations to pasture, range, and forest lands
- 2015-2017 funded > 20 such projects, > $35M

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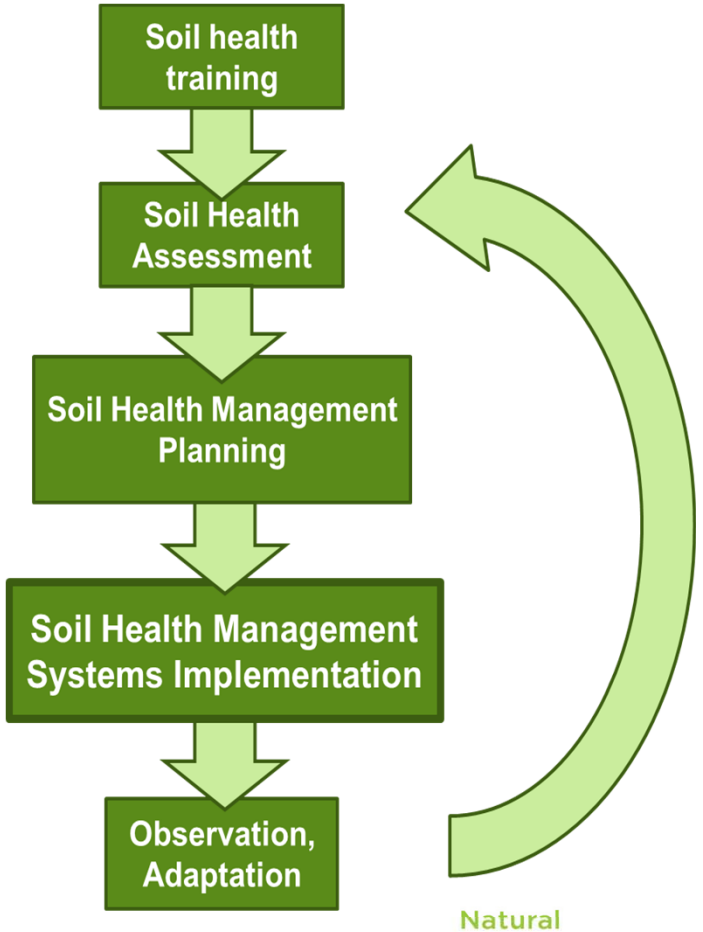
Soil Health Division

Assess needs ● Build partnerships

Develop and carry out strategies

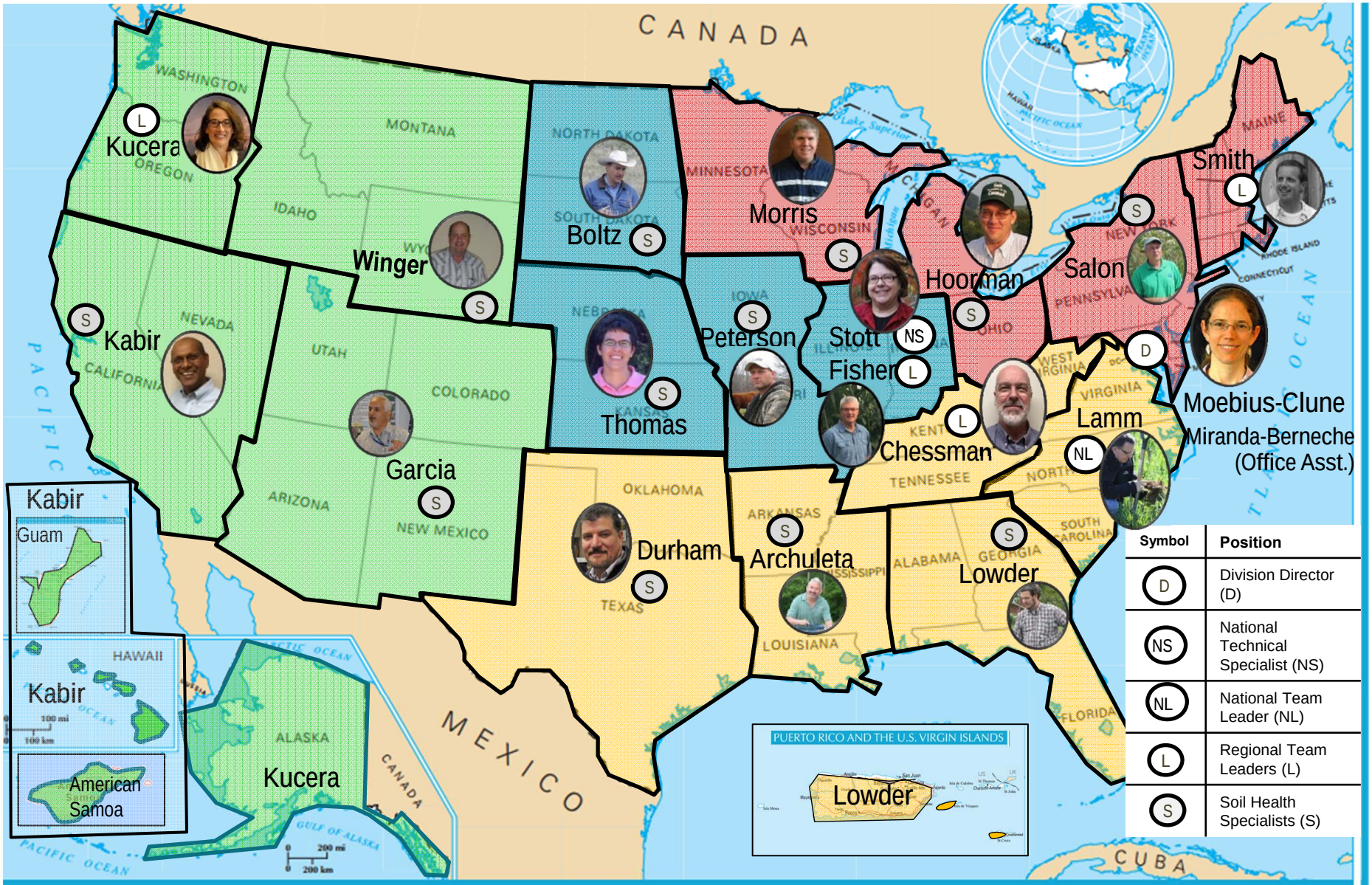
- **Training** to build NRCS staff and partner technical capacity
- **Coordination** - national and regional agency and partners, to meet expanding soil health demand
- **Bridge** to external partners for soil health science and technology acquisition and expanded adoption
- **Further integration** of soil health into standards, agency policy, tools, programs
- **Soil health testing standardization**, interpretation guidance, tools for conservation planning
- **Compiling SHMS innovation** and broadly leveraging localized



Natural Resources Conservation Service

nrcs.usda.gov/

National USDA-NRCS Soil Health Division



Symbol	Position
D	Division Director (D)
NS	National Technical Specialist (NS)
NL	National Team Leader (NL)
L	Regional Team Leaders (L)
S	Soil Health Specialists (S)

Contacts: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/contact/conservation/st/#soil

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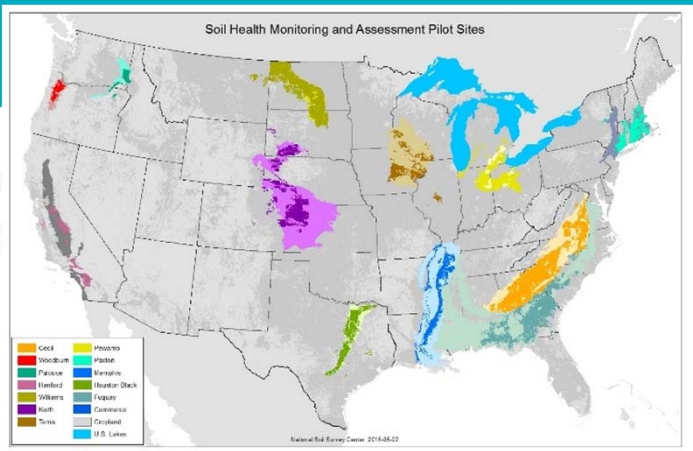
Strengthening the Science of Soil Health



Leveraging agency wide technical capacity and infrastructure, as well as partner resources to assess, monitor, and enhance Soil Health

Components:

1. *Evaluate existing literature on indicators and their interpretation, soil health management systems implementation*
2. *Leverage existing projects*
3. *Build and populate NRCS soils database with soil health data*
4. *Develop soil health management decision tools and citizen science portal*
5. *Monitor soil health on representative benchmark soils and evaluate management impact*

Natural Resources Conservation Service

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Soil Health Research Needs

1. **Soil Health Indicator soil-climate-adjusted interpretation**
2. **Indicators for further processes (pest suppression, nutrient dynamics, growth promotion, other biological processes)**
3. **Rates of change as affected by which SHMS (cropped and grazed)**
4. **Soil Health potential – what is achievable?**
5. **Relationship of soil health status to:**
   a. Yield, yield variability and risk, crop quality, and production system economics
   b. Environmental outcomes, ecosystem services
6. **Soil Health Management Systems (SHMS) impact on nutrient dynamics**
7. **Targeted system appropriate recommendations**
   a. Location- and cropping system-appropriate
   b. Economically viable
   c. Effective for improving soil health/soil functioning
   d. For example – for cover crops: optimal species/varieties for cropping system, mixes, seeding rates and seeding methods, management methods by cropping system/climate/soil

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Thank you! Questions?

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