UCDAVIS
COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

Conservation Agriculture Systems INNOVATION CENTER

UCDAVIS
DEPARTMENT OF PLANT SCIENCES



2021 California Processing Tomato Production

Friday, January 22, 9:00-11:30 AM

A Virtual Workshop via Zoom

Sponsored by the University of California Cooperative Extension (UCCE)

21 Years and counting: What we've learned from different oil management systems in Five Points!

10:38 – 10:58 AM

January 22, 2021

Jeff Mitchell



Register today to join us for this UC Cooperative Extension virtual workshop!

California Processing Tomato Production

Plan for today's discussion

- Suggest some economic evidence for why this topic is important
- Share some observations about what might be possible at one place
- Point out the value of our learning together

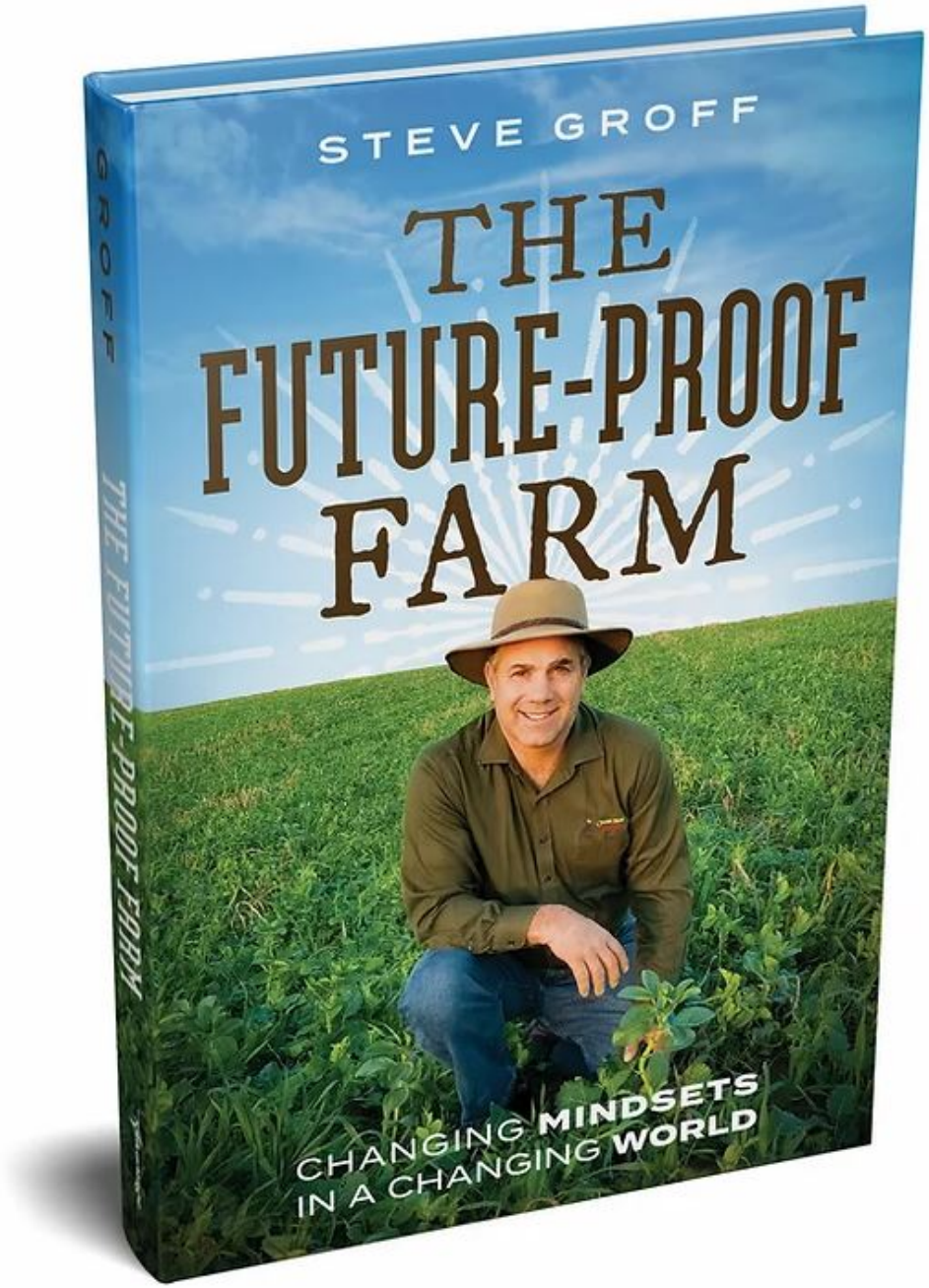


https://www.whitehouse.gov/blog/2015/10/27/acting-climate-through-sustainable-agriculture-white-house-champions-change









Farmers are becoming more aware than ever how to adopt the regenerative practices that the market is demanding.

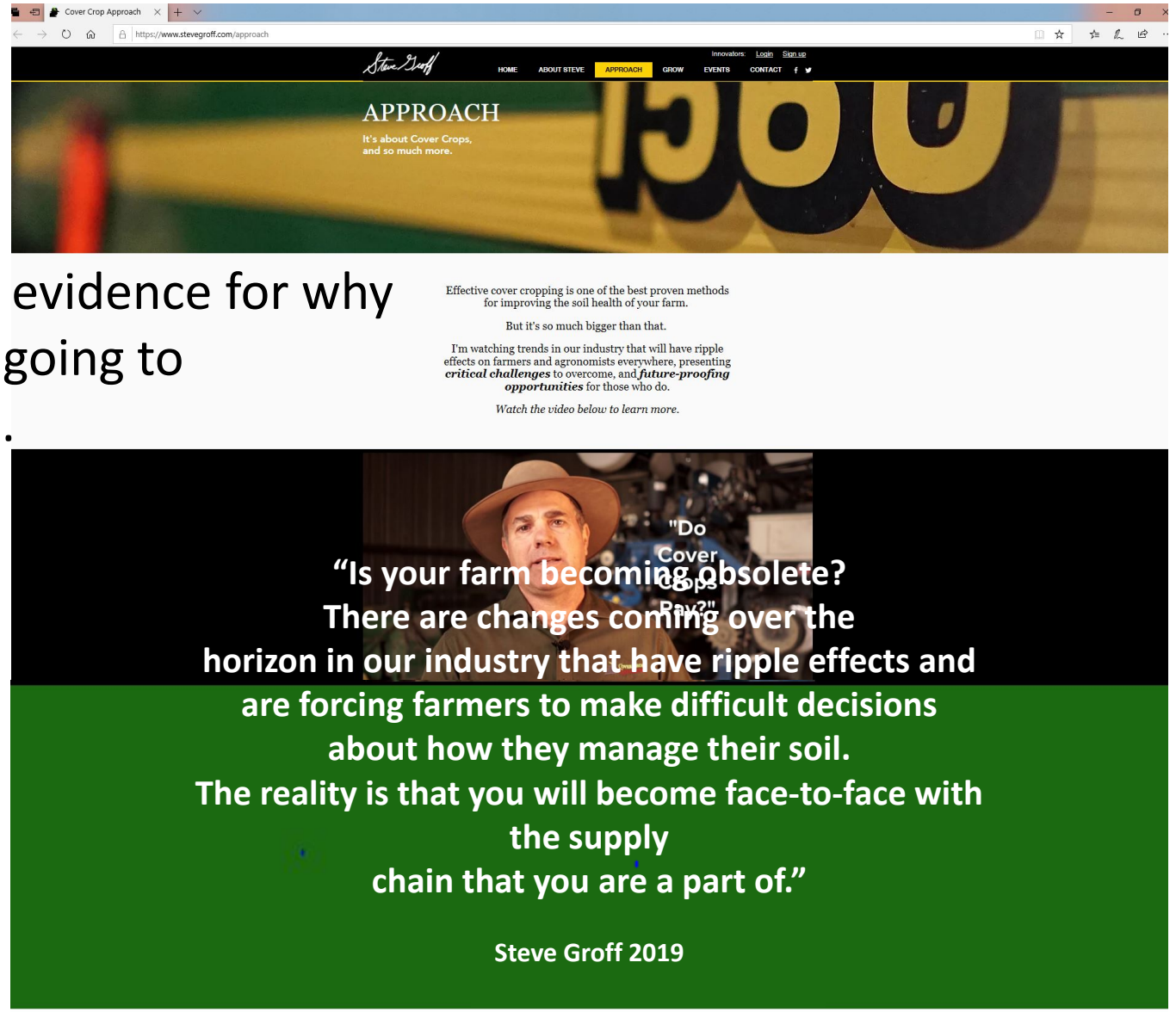
Consumers are more interested than ever to know how their food was grown and to support environmentally-aware sources.

From roadside stands to global conglomerates, the entire food industry is driving a dramatic shift in operations for the headwaters of the supply chain: farms.

As a research-based farmer, international consultant, speaker and author, Steve Groff has been eyeing the trends in the industry and has transformed his own farming practices to meet the new demand.

His personal story is a stark wake-up call, fanning the flames of effective regenerative ag for farmers and

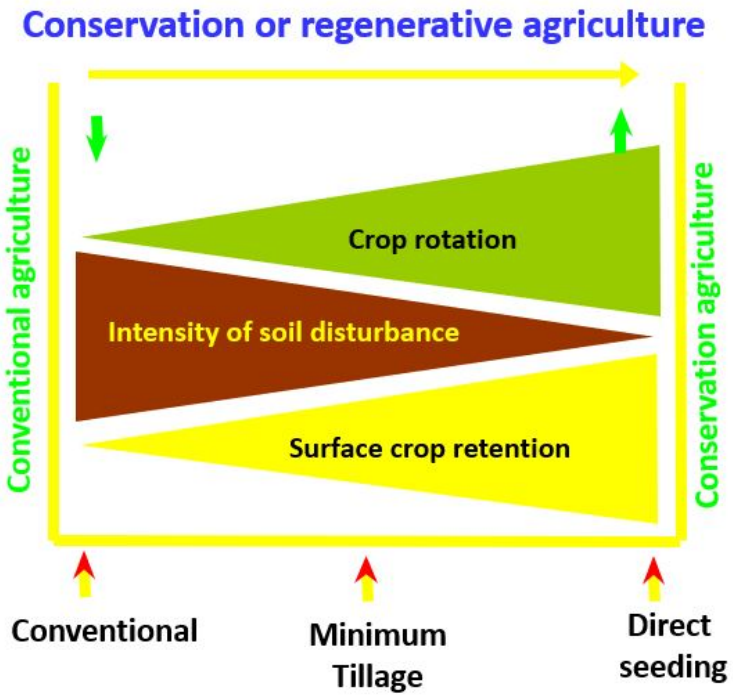
Let’s start with the economic evidence for why and how things are going to be changing.



https://www.stevegroff.com/approach



“If you want to sell your food to us, you’ll meet our specifications.”



Managing for soil health …

- Minimizing soil disturbance
- Maximizing the diversity of plants in rotation / cover crops
- Keeping living roots in the soil as much as possible, and
- Keeping the soil covered with plants and plant residues at all times

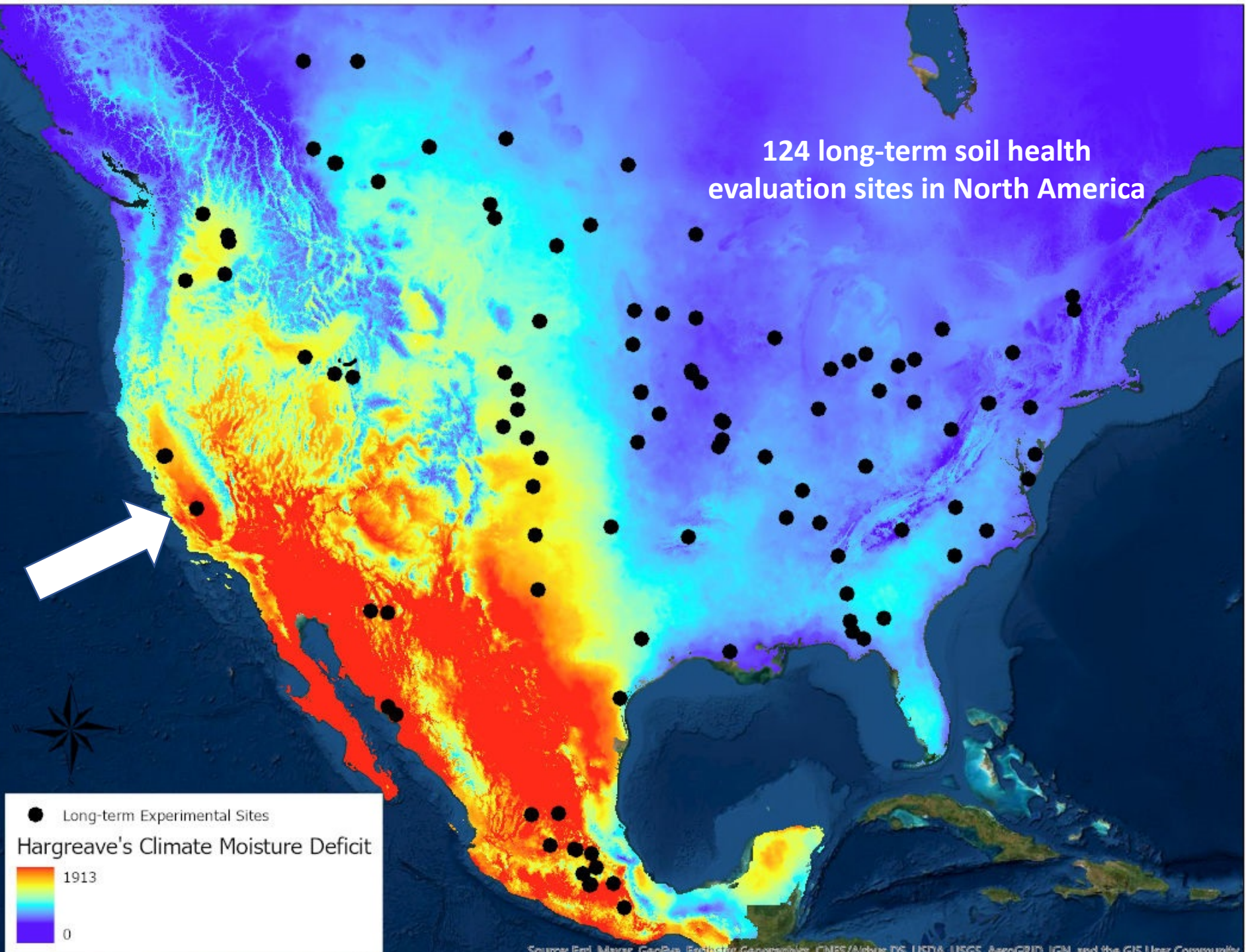
Unlock the Secrets in the Soil

http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/

Mother Nature…

- harvests the maximum amount of sunlight
- leaks very few nutrients including CO_2
- has diversity
- does not export nutrients
- makes maximum use of water and nutrients by having highly developed porosity and VAM webs
- does not do tillage

Summary of comments made by Dr. Dwayne Beck, SDSU,
at 2014 Winter Conference of No-till on the Plains, Salina, KS



Based on methodology described by Wang et al. (2016; https://doi.org/10.1371/journal.pone.0156720)

Retrieved from: http://tinyurl.com/ClimateNA

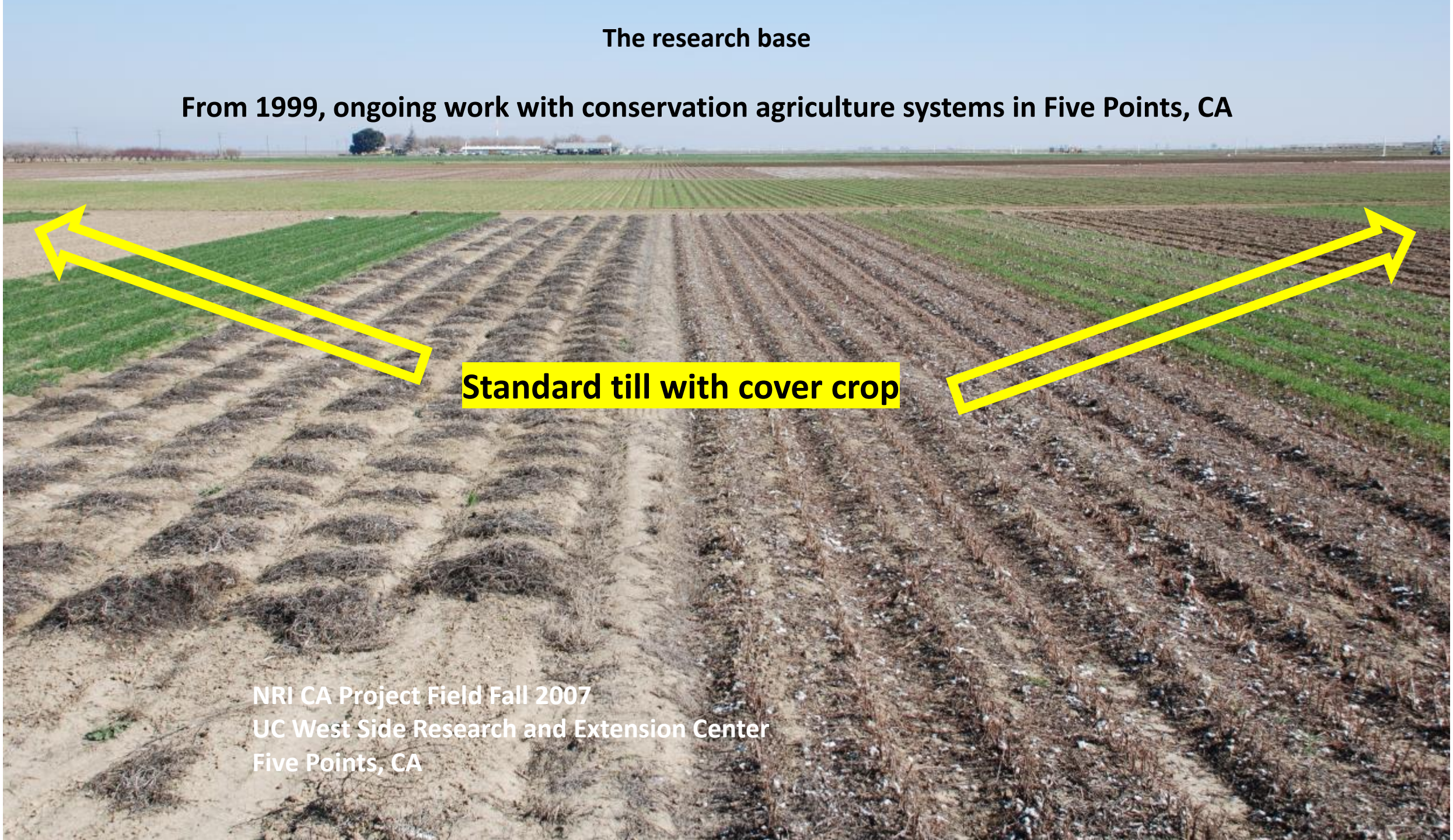
The research base

From 1999, ongoing work with conservation agriculture systems in Five Points, CA



The research base

From 1999, ongoing work with conservation agriculture systems in Five Points, CA



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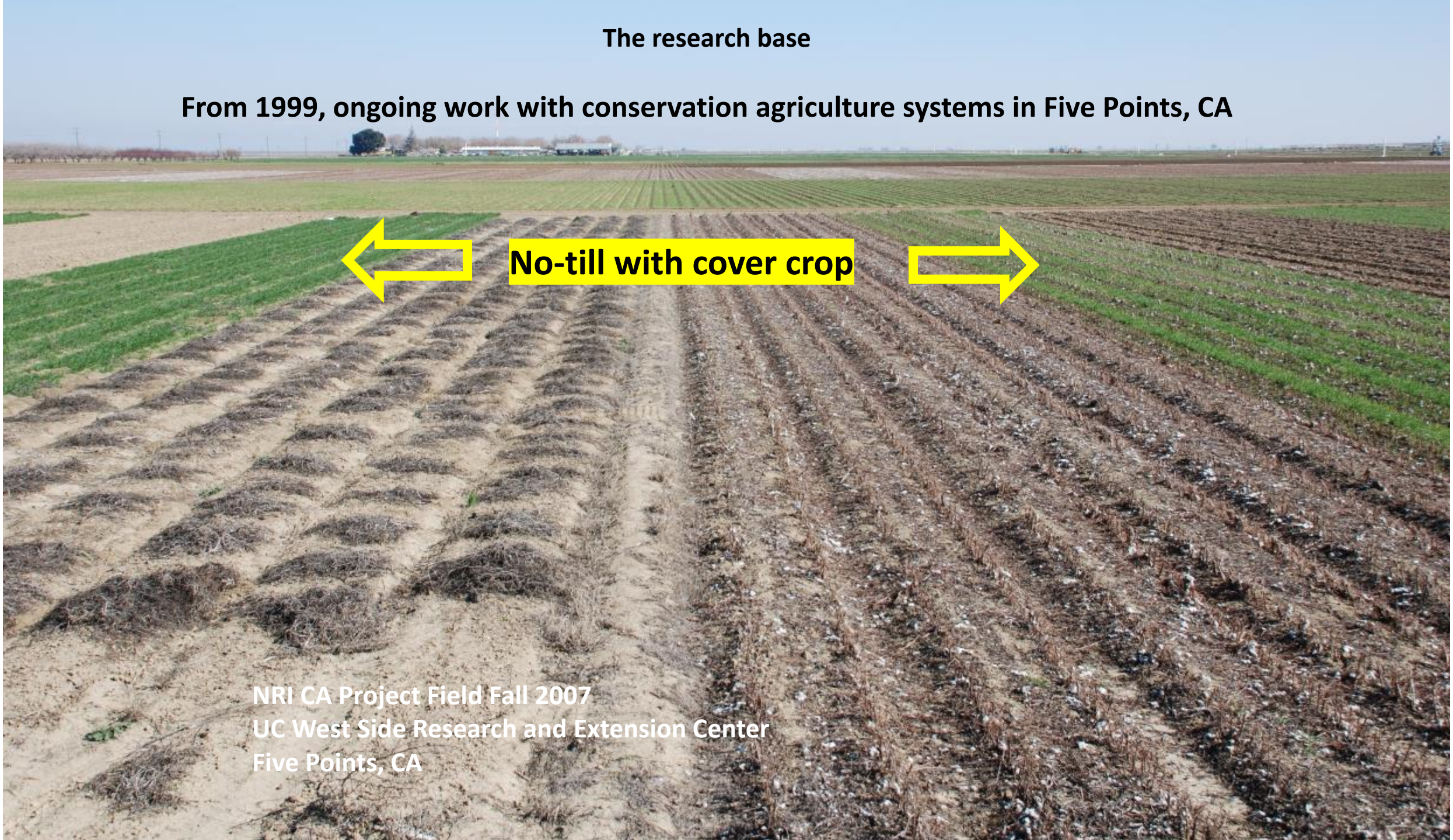




Rainfed winter cover crop being seeded into cotton and tomato residue Five Points, CA 2007

These systems LOOK different!



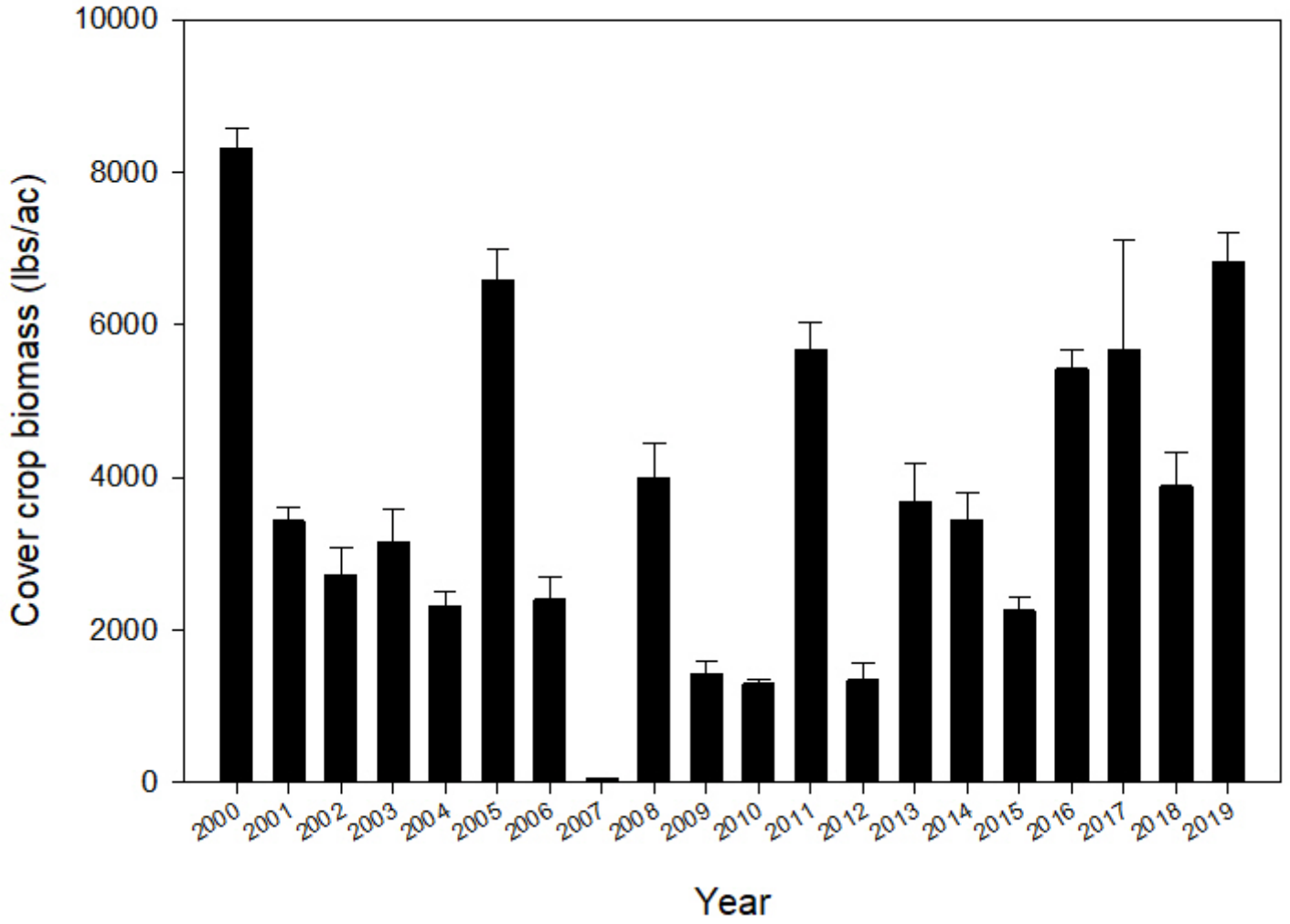
Winter, rainfed triticale, rye and pea cover crop no-till
seeded into cotton and tomato residues
Five Points, CA 2008

No-till tomato transplanting into cotton and cover crop residue
Five Points, CA
2007



Cover crop biomass in long-term study in Five Points, CA 2000 – 2019

32 tons of organic matter

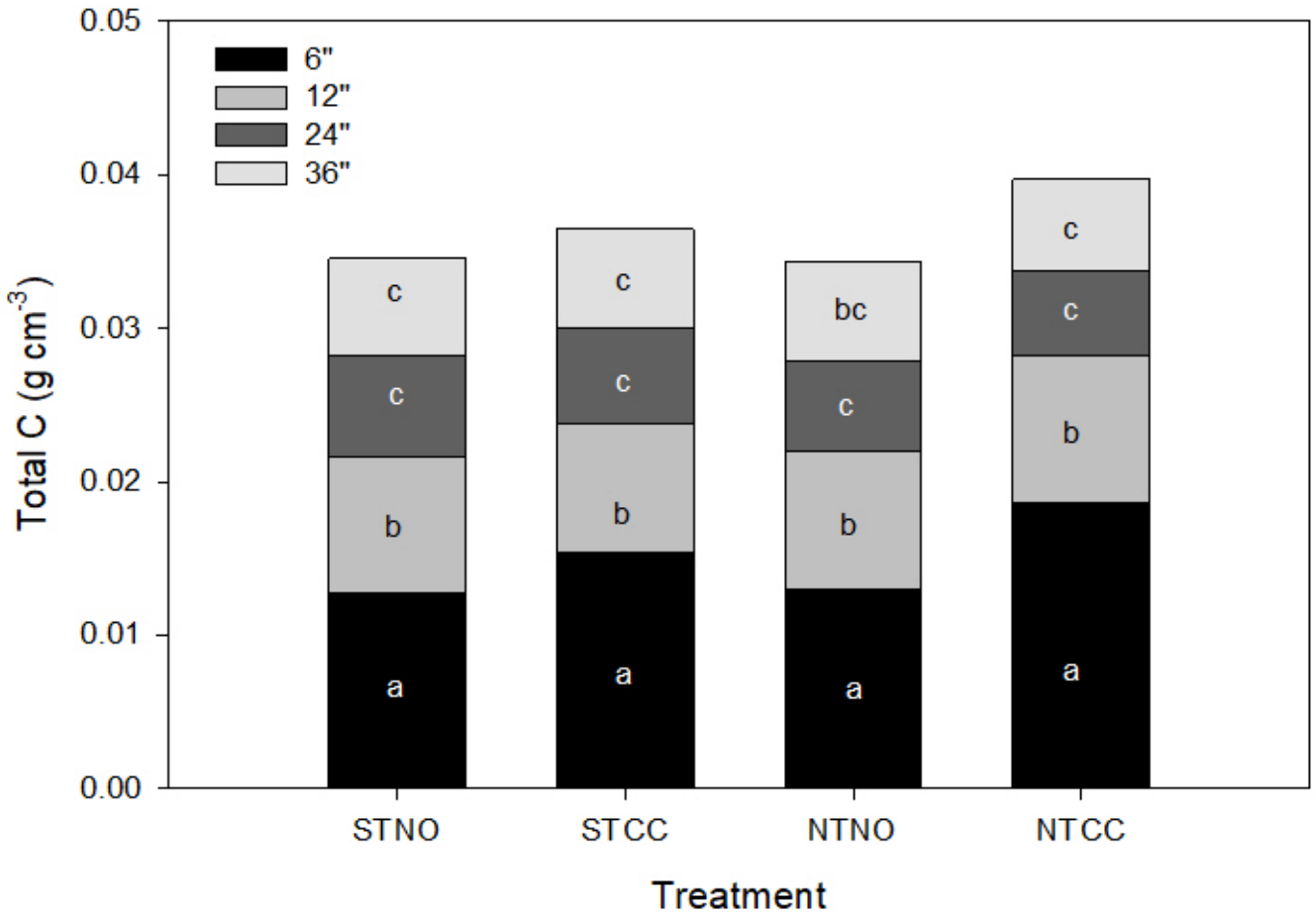


15 tons of carbon

Time taken for 1”, 2”, 3”, and 4”
of water to infiltrate
into the soil



ntcc	no-till with cover crop	stcc	standard till with cover crop
ntno	no-till without cover crop	stno	standard till without cover crop


0.05
0.04
0.03
0.02
0.01
0.00
Total C (g cm-3)
6"
12"
24"
36"
c
c
b
a
c
c
b
a
bc
c
b
a
c
c
b
a
STNO
STCC
NTNO
NTCC
Treatment

Agricultural Management and Soil Carbon Storage in Surface vs. Deep Layers

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Soil C sequestration research has historically focused on the top 0 to 30 cm of the soil profile, ignoring deeper portions that might also respond to management. In this study we sampled soils along a 10-treatment management intensity gradient to a 1-m depth to test the hypothesis that C gains in surface soils are offset by losses lower in the profile. Treatments included four annual cropping systems in a corn (*Zea mays*)–soybean (*Glycine max*)– wheat (*Triticum aestivum*) rotation, perennial alfalfa (*Medicago sativa*) and poplar (*Populus* x *euramericana*) and four unmanaged successional systems. The annual grain systems included conventionally tilled, no-tillage, reduced-input, and organic systems. Unmanaged treatments included a 12-yr-old early successional community, two 50-yr-old mid-successional communities, and a mature forest never cleared for agriculture. All treatments were replicated three to six times and all cropping systems were 12 yr post-establishment when sampled. Surface soil C concentrations and total C pools were significantly greater under no-till, organic, early successional, never-tilled mid-successional, and deciduous forest systems than in the conventionally managed cropping system ($p \leq 0.05$, n = 3–6 replicate sites). We found no consistent differences in soil C at depth, despite intensive sampling (30–60 deep soil cores per treatment). Carbon concentrations in the B/Bt and Bt2/C horizons were lower and two and three times more variable, respectively, than in surface soils. We found no evidence for C gains in the surface soils of no-till and other treatments to be either offset or magnified by carbon change at depth.

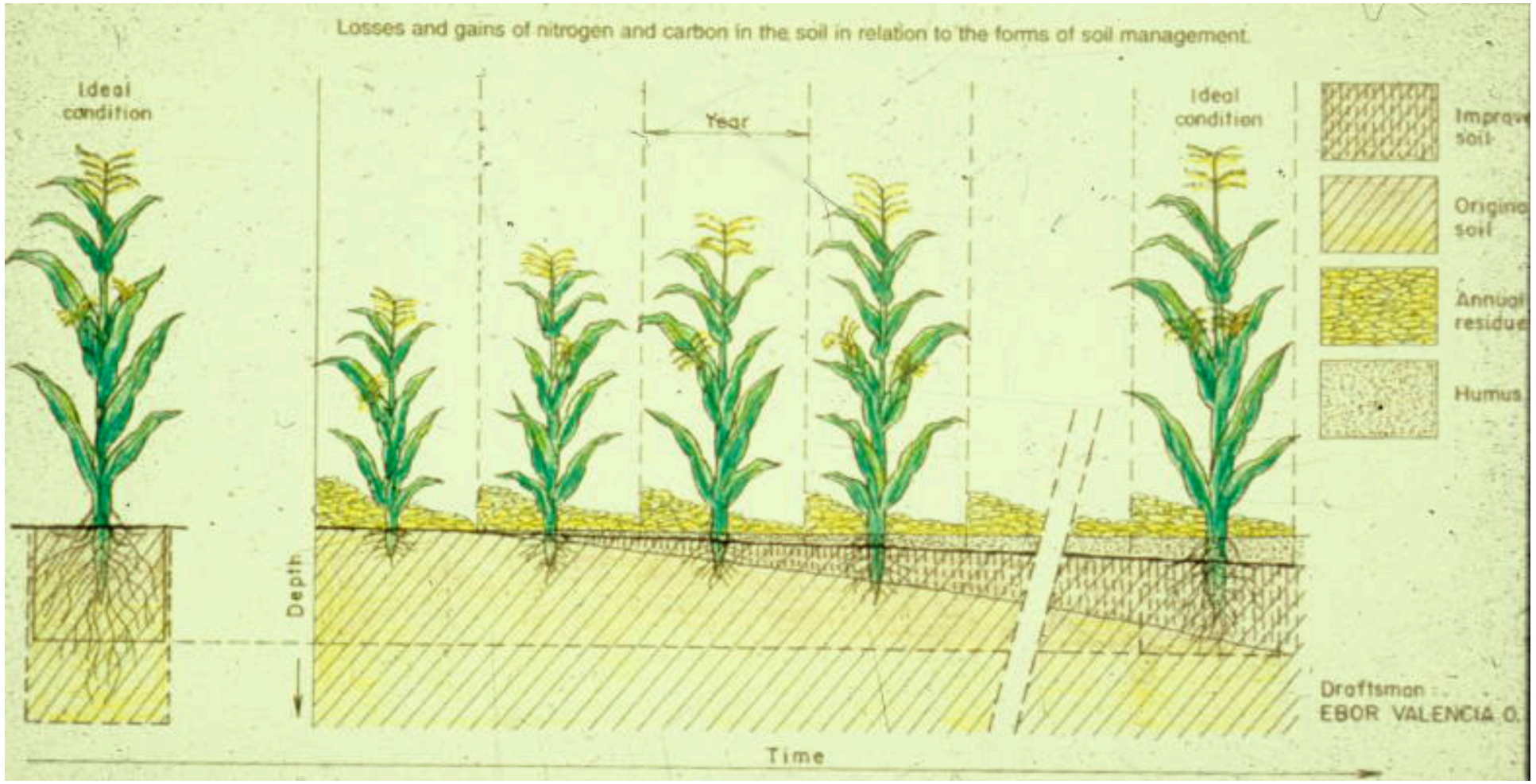
Abbreviations: CV, coefficient of variation; KBS, W.K. Kellogg Biological Station.

Soils hold approximately 75% of the C stored on land and about twice that stored in the atmosphere, and thus plays a large role in the global C cycle (Swift, 2001). Carbon is sequestered in soil when organic matter accumulates faster than it is respired as CO_2 by soil heterotrophs. Soil C storage helps to stabilize atmo-

0.0 (0.6)	ab
1.6 (0.9)	ac
−0.4 (0.8)	a
1.4 (0.8)	ac
3.5 (1.5)	bc
2.0 (0.8)	bc
1.7 (0.3)	c
−0.6 (1.3)	a
2.7 (0.7)	c
1.2 (1.5)	ac

vested. is never tilled.
different ($p \leq 0.05$).

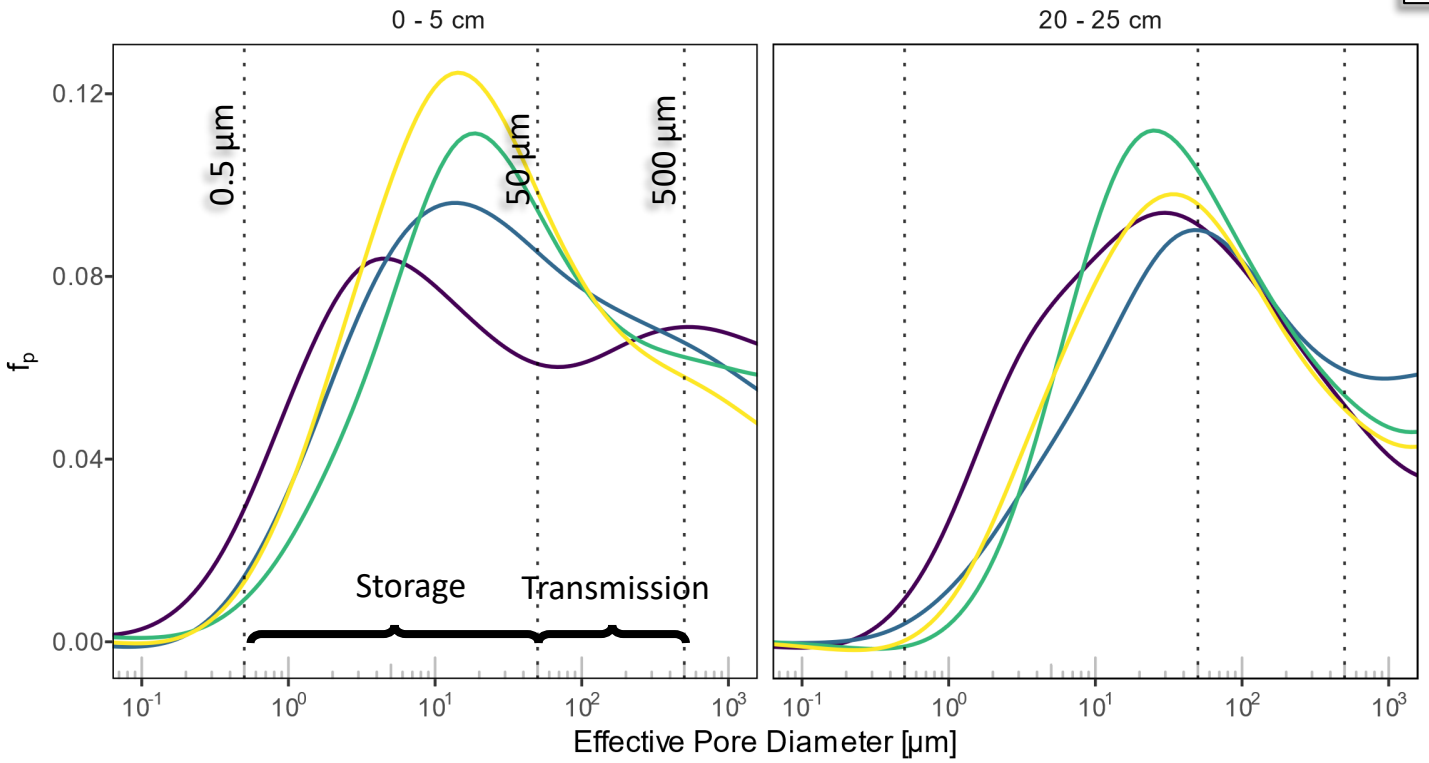
It seems reasonable to assume that the soil C pool in the conventional till treatment is at equilibrium, that is, that it has already lost all of the C it is likely to lose while row-cropped, and is maintaining its current C levels, since this system has been tilled for over a hundred years. If this is the case, then the C differences between the conventional system and the no-till and organic systems represent absolute sequestration rates of at least 33 and 50 g C m^{-2} yr^{-1} in the A/Ap horizon over the 12 yr since these systems were established. If, on the other hand, the conventional system is still slowly losing C (Senthilkumar, 2009a) then differences between these systems represent net sequestration. In this case, C in the no-till and organic systems would also be losing C more slowly than in the conventional system. In either case, no-till and organic management in these soils would still represent effective CO_2 mitigation strategies.



Stubble Over the Soil
Carlos Crovetto

Pore size distribution

RT-CC Reduced Till – Cover Crop
RT-NO Reduced Till – **No** Cover Crop
ST-CC Standard Till – Cover Crop
ST-NO Standard Till – **No** Cover Crop

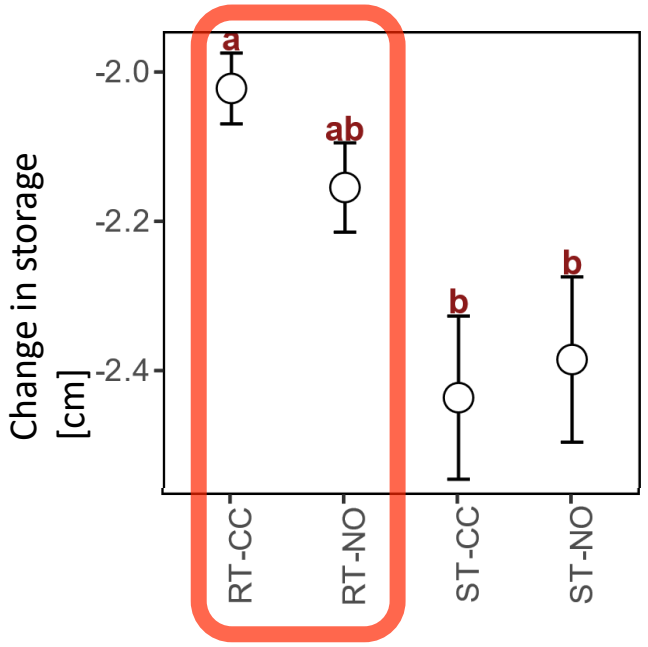


This is one of the first times we've shared this information!

Araya et al.,
Manuscript in preparation

Storage change following irrigation

- Reduced tillage plots with cover crop show higher water storage
- Not apparent from static measures
  - field capacity ($\theta(300\ cm)$)
  - Plant available water content ($\theta(300\ cm) - \theta(15{,}000\ cm)$



Araya et al.,
Manuscript in preparation

RESEARCH ARTICLE

No-tillage and high-residue practices reduce soil water evaporation

by Jeffrey P. Mitchell, Purnendu N. Singh, Wesley W. Wallender, Daniel S. Munk, Jon F. Wroble, William R. Horwath, Philip Hogan, Robert Roy *and* Blaine R. Hanson

Reducing tillage and maintaining crop residues on the soil surface could improve the water use efficiency of California crop production. In two field studies comparing no-tillage with standard tillage operations (following wheat silage harvest and before corn seeding), we estimated that 0.89 and 0.97 inches more water was retained in the no-tillage soil than in the tilled soil. In three field studies on residue coverage, we recorded that about 0.56, 0.58 and 0.42 inches more water was retained in residue-covered soil than in bare soil following 6 to 7 days of overhead sprinkler irrigation. Assuming a seasonal crop evapotranspiration demand of 30 inches, coupling no-tillage with practices preserving high residues could reduce summer soil evaporative losses by about 4 inches (13%). However, practical factors, including the need for different equipment and management approaches, will need to be considered before adopting these practices.



Jeffrey P. Mitchell

Conservation tillage allows growers to plant directly into fields that contain residue from prior crops. *Above*, tomatoes are transplanted into cover crop residues (triticale, rye and pea) in Five Points.

Improving water use efficiency is an increasingly important goal as California agriculture confronts water shortages. Changing tillage and crop residue practices could help.

Crop residues are an inevitable feature of agriculture. Because no harvest removes all material from the field, the remaining plant matter, or residue, accumulates and is typically returned to the soil through a series of mixing and incorporating operations involving considerable tractor horsepower (Upadhyaya et al. 2001), an array of tillage implements (Mitchell et al. 2009) and cost (Hutmacher et al. 2003; Valencia et al. 2002).

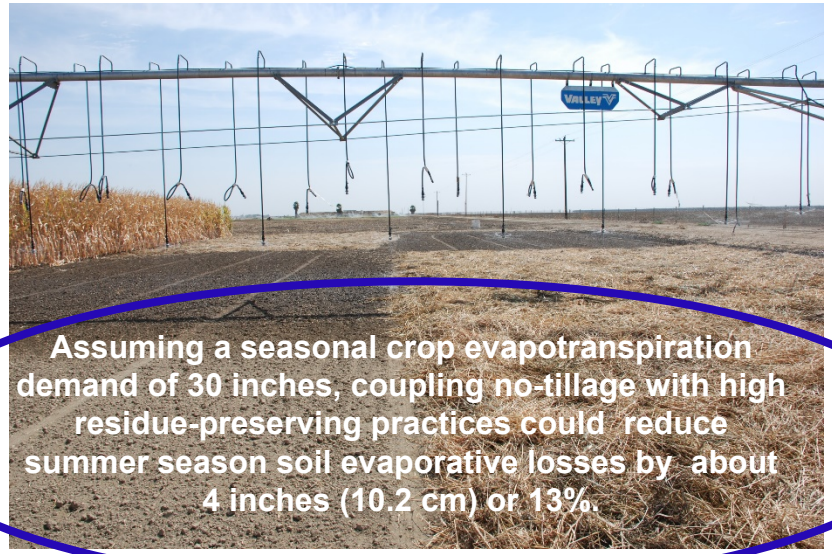
Managing residues to essentially make them disappear is the norm in California. Concerns about crop pathogens are exacerbated when organic materials accumulate on the soil surface (Jackson et al. 2002), and farmers believe that they need "clean" planting beds to make the seeding and establishment of subsequent crops easier and efficient. Residue management practices in California are also influenced by tradition; until recently, they had not changed significantly for 70 years (Mitchell et al. 2009).

In regions of the world where no-tillage systems are common — such as Brazil, Argentina, Paraguay, Canada, Western Australia, the Dakotas and Nebraska — generating and preserving residues are an indispensable part of management and major, even primary, goals of sustainable production (Crovetto 1996, 2006). Value is derived from residues in several ways: they reduce erosion (Shelton, Jasa et al. 2000; Skidmore 1986), provide carbon and nitrogen to soil organisms (Crovetto 2006) and reduce soil water evaporation (Klocke et al. 2009; van Donk et al. 2010), along with other advantages and drawbacks (see box, page 56).

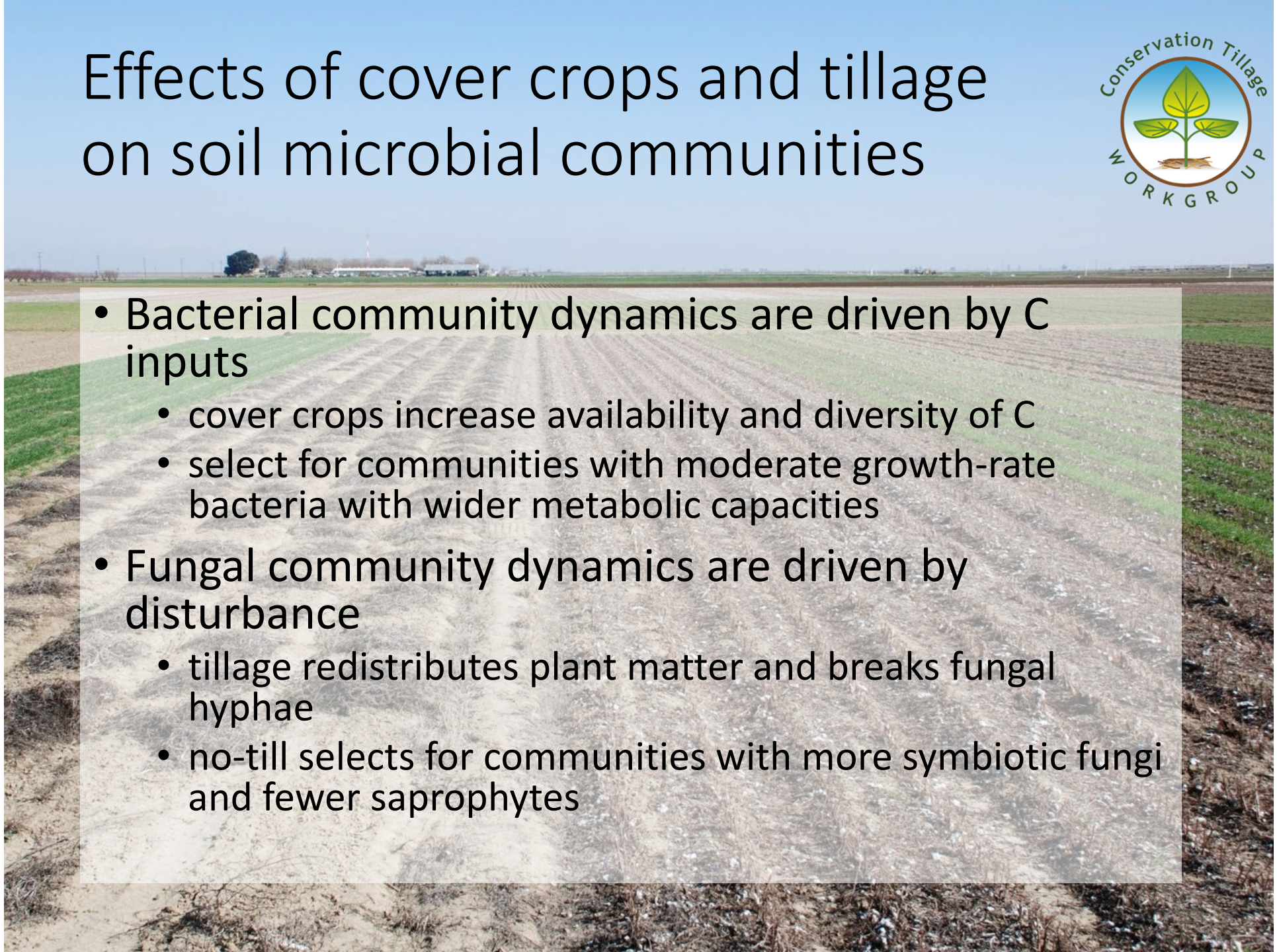
Residue amounts vary widely in cropping systems (Mitchell et al. 1999; Unger and Parker 1976). While the weight of the residues may be important, most often the percentage of soil cover or the thickness of residues is used in assessing or distinguishing their benefits (Shelton, Smith et al. 2000; USDA NRCS 2008). From research back in the Dust Bowl era, soil scientists developed relationships between the amount and architecture of residues, including crop stubble, and the reductions in soil loss due to wind (Skidmore 1986) and water (Shelton, Jasa et al. 2000). Over time, 30% or more residue cover was associated with significant reductions in soil loss, and this level of cover became an important management goal in areas where soil loss was a problem, such as the Great Plains, Pacific Northwest and southeastern United States (Hill 1996). Eventually, 30% cover became the target linked to the definition of conservation tillage and also to the residue management technical practice standard that the U.S. Department of Agriculture's Natural

Online: http://californiaagriculture.ucanr.edu/landingpage.cfm?article=ca.v066n02p55&fulltext=yes
DOI: 10.3733/ca.v066n02p55





Effects of cover crops and tillage on soil microbial communities

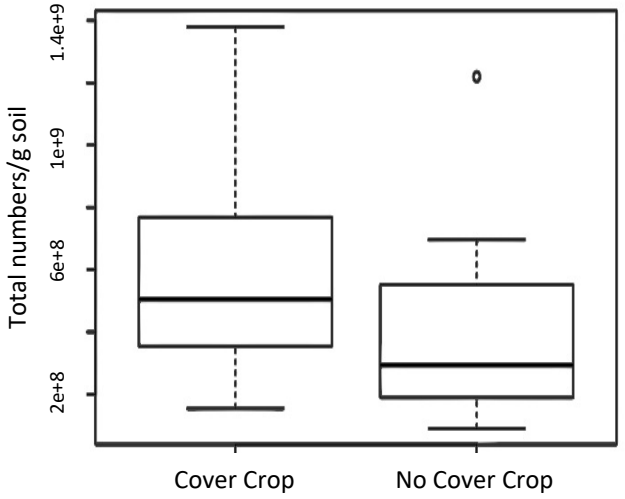


- Bacterial community dynamics are driven by C inputs
  - cover crops increase availability and diversity of C
  - select for communities with moderate growth-rate bacteria with wider metabolic capacities
- Fungal community dynamics are driven by disturbance
  - tillage redistributes plant matter and breaks fungal hyphae
  - no-till selects for communities with more symbiotic fungi and fewer saprophytes

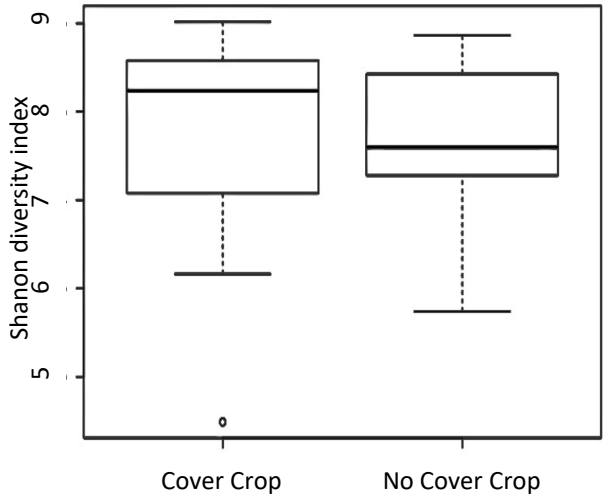
Bacteria respond strongly to Cover Crops

- Cover cropping leads to:
  - higher bacterial biomass
  - higher diversity
  - organisms with larger genomes and therefore greater metabolic capacities.

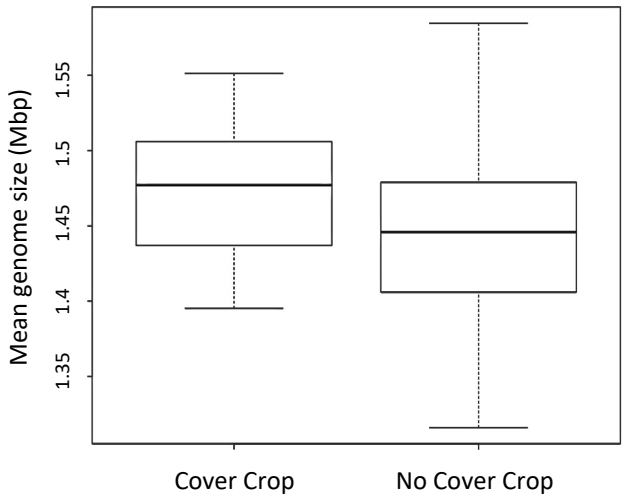
Total numbers



Species diversity



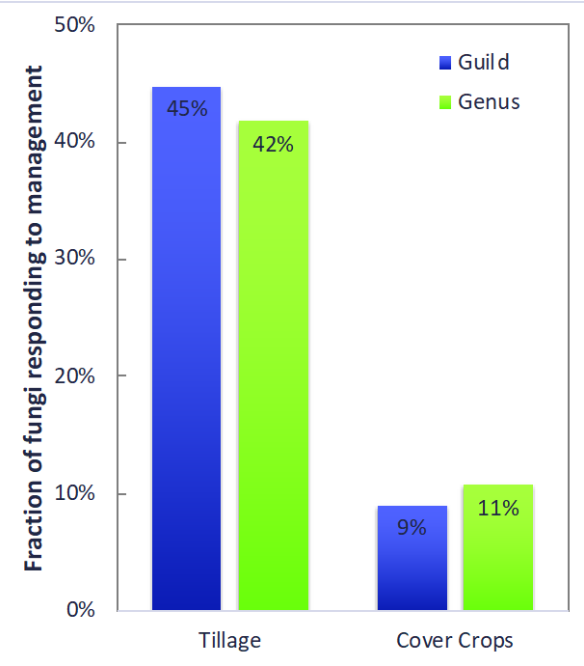
Metabolic capacity

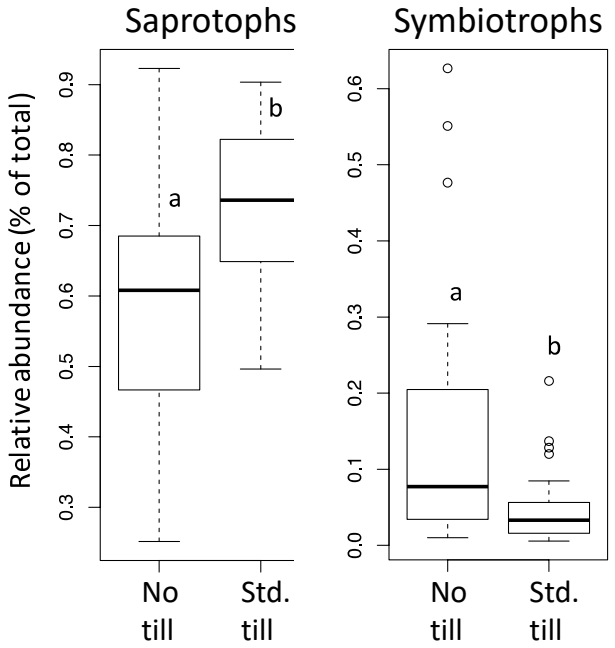


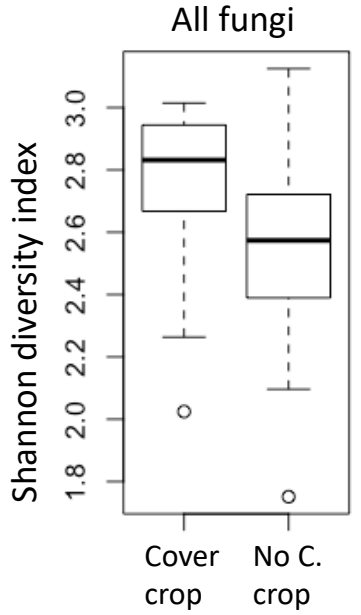
Schmidt R, Gravuer K, Bossange A, Mitchell J, Scow K. Plos One. 2018;13: e0192953

Fungi respond strongly to Tillage

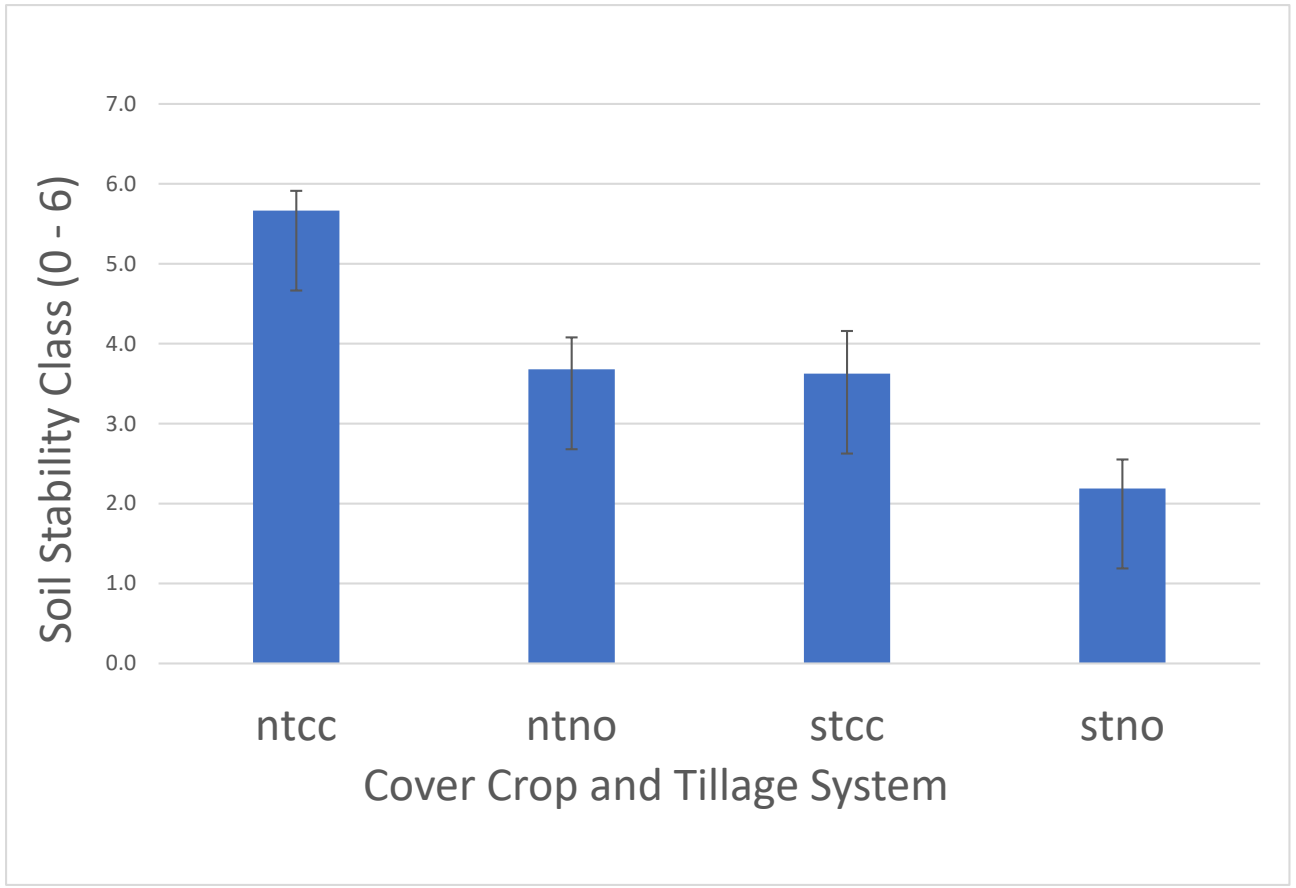
- Assignment to functional guilds corresponds well with phylogeny
- No-till leads to functional changes but not change in diversity
  - Higher nunbers of mutually beneficial fungi (Symbiotrophs)
  - Lower numbers of fungi that break down organic matter (Saprotrophs)
  - No change in pathogenic fungi (Pathotrophs)
- Cover crops lead to increased diversity but not functional changes





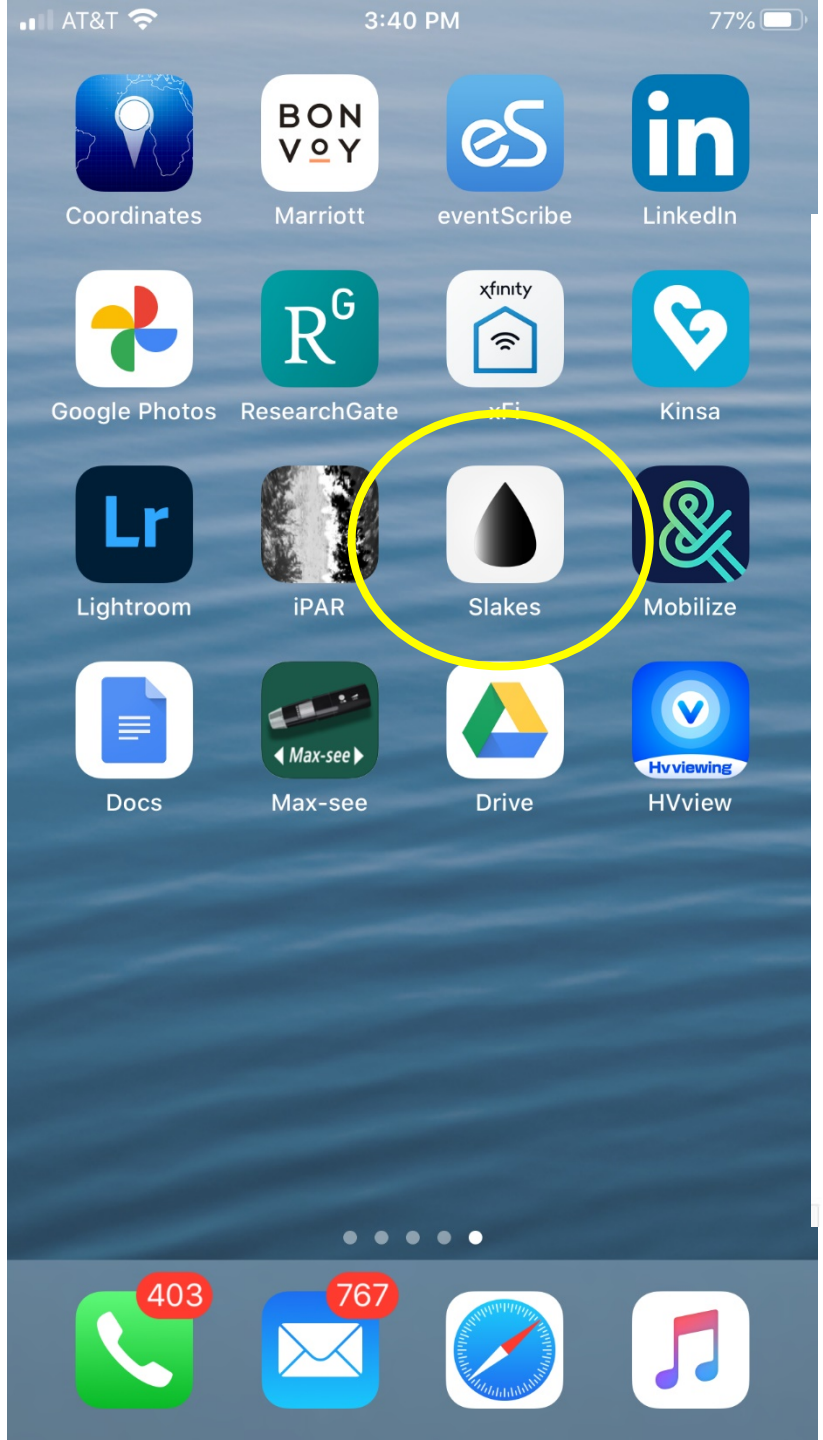


Schmidt R, Mitchell J, Scow K. Soil Biol Biochem. 2019;129: 99-109



A higher stability class number indicates greater soil aggregate stability.

ntcc	no-till with cover crop	stcc	standard till with cover crop
ntno	no-till without cover crop	stno	standard till without cover crop





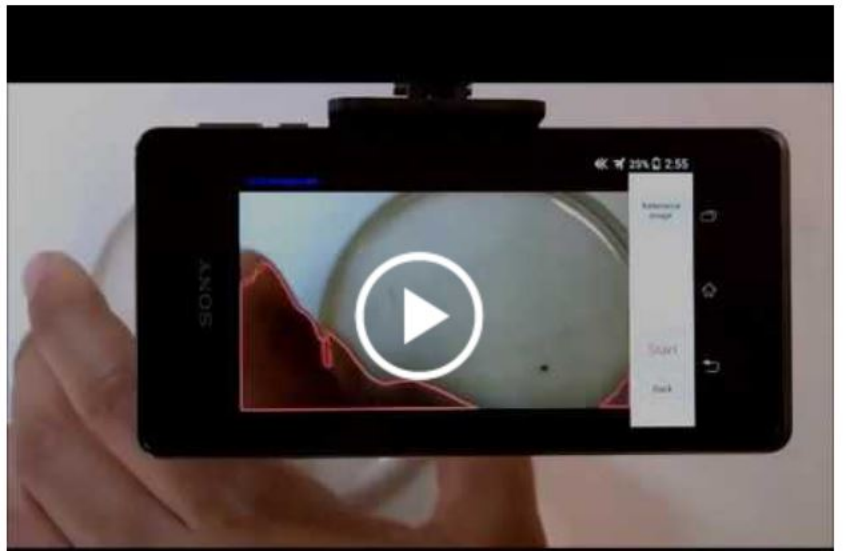
Slakes: Soil aggregate stability

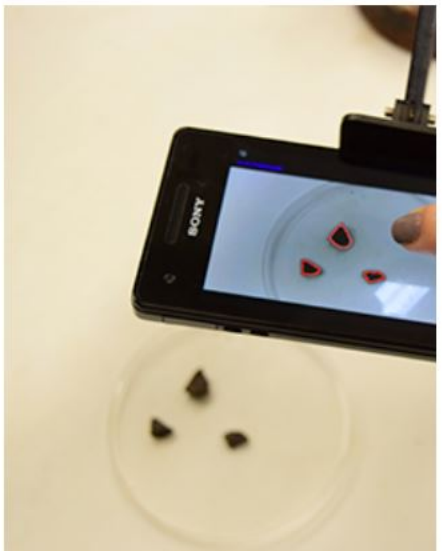
Dr Mario Tools

Everyone

This app is compatible with your device.

Installed





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journal homepage: www.elsevier.com/locate/still

Soil slaking assessment using image recognition

Mario Fajardo*, Alex. B. McBratney, Damien J. Field, Budiman Minasny

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Image recognition
Soil disaggregation dynamics

ABSTRACT

We have developed a new methodology for the assessment of soil slaking under fast wetting conditions. We applied an image recognition algorithm to a set of digital images of soil aggregates immersed in water taken at regular time intervals. The kinetics of the slaking process was captured by measuring the projected aggregate's area change over time. The methodology was tested in a dataset covering a great part of the agro-ecological variability of New South Wales (NSW), Australia. An empirical model which captures the rapid and slow slaking process was fitted to the data and three new slaking coefficients (*a*, *b* and *c*) were obtained and related to selected soil properties and land-use. The coefficient *a*, equivalent to the maximum slaking potential of the samples, was linearly related to exchangeable sodium, pH, clay percentage, calcium/magnesium and total carbon/nitrogen, and non-linearly related to total carbon. The coefficients *b* and *c*, equivalent with the initial slaking and the rate of change respectively, were found to be linearly related to nitrogen and total carbon. The coefficient *a*, was significantly lower in the natural sites reflecting a higher aggregate stability in those soils. The methodology is fast, inexpensive and simple; furthermore, it provides a new perspective in soil aggregate stability experiments, since it considers the slaking dynamics during the entire disaggregation process.

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1. Introduction

An aggregate is a group of primary particles that cohere to each other and their stability is a function of the binding forces between them that withstand after an applied disruptive event (Kemper and Rosenau, 1986). As reviewed by many authors e.g., (Tisdall and Oades, 1982; Kemper and Rosenau, 1986; Field et al., 1997; Amézketa, 1999; Diaz-Zorita et al., 2002; Bronick and Lal, 2005), aggregate stability is an important soil physical property which influences a wide range of biological and chemical processes in natural and agricultural environments. The stability of aggregates in water is an essential property for maintaining soil productivity by helping in minimizing soil erosion, environmental pollution and further degradation.

Notwithstanding its importance, many soil studies do not consider the analysis of this physical property, due to the time needed for the analysis, the instrumentation specificity used in each observation and the lack of accessible (in terms of cost and/or availability) private services to outsource its evaluation.

There are many methods that can be used for measuring soil stability in water, namely a) end-over-end shaking methods (Middleton, 1930; Quirk, 1950), b) wet sieving techniques (Yoder, 1936; Perfect et al., 1992), c) raindrop impact or rainfall simulation techniques (Young, 1984), d) immersion methods (Loveday and Pyle, 1973; Field et al., 1997) and e) ultrasonic dispersion (Edwards and Bremner, 1967).

Among these previously mentioned, the usually preferred method to measure and present the results of aggregate stability in water, is in the form of a Mean Weight Diameter (MWD) after wet sieving of soil aggregates (Van Bavel, 1950; Youker and McGuinness, 1957; Henin et al., 1958; Kemper and Rosenau, 1986; Le Bissonnais, 1996). This method is simple and intuitive, the basic idea behind it is that resultant bigger aggregates after sieving are related with greater stability (Nimmo and Perkins, 2002), however it requires specialized equipment e.g., wet sieving apparatus, and the time required in the analysis is a limiting factor in processing a large dataset, due to the need of post-processing i.e., oven-drying and weighting of resultant soil fractions.

On the other hand, a more practical and faster approach developed specifically for in-field assessment of sodicity problems, is the immersion method presented by Field et al. (1997) called ASWAT (Aggregate Stability in Water). This method uses a qualitative scale, or ASWAT scores, to rank the degree of slaking/dispersion of a sample, with 0 equivalent to non-disruption and 16 to full dispersion.

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SOIL PHYSICS & HYDROLOGY

Soil Science Society of America Journal

Evaluation of SLAKES, a smartphone application for quantifying aggregate stability, in high-clay soils

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Abstract

The measurement of aggregate stability is widely used for establishing quantified soil condition ratings. These ratings can inform managers and scientists on effective soil management practices and identify regions where poor soil conditions are jeopardizing the environment and soil productivity. However, many current methods for quantifying soil conditions are complicated and time-consuming, and require specialized equipment, especially the measure of aggregate stability. SLAKES is a smartphone application created by the University of Sydney, Australia, that quantifies aggregate stability through a simple experiment. The experiment requires three pea-sized soil peds, a petri dish of water, and a smartphone running the SLAKES application. The application takes 10 min to produce an on-screen measurement of aggregate stability and a downloadable text file of the ped dissolution over time. SLAKES, along with the Cornell Wet Aggregate Stability Test, was used on seven conventional tillage, seven no-till, and eight perennial grass fields to determine whether the application showed sensitivity to different management practices. All 22 sites were on Vertisols (Typic Haplusterts). The SLAKES results showed higher significant separation of means ($p < .0001$) between each management type than the Cornell method, which was only able to differentiate between conventional tillage and perennial grass management at a lower significance ($p = .06$). SLAKES proved to be a legitimate method for quantifying aggregate stability based on slaking. With this simplified aggregate stability measurement method, rating and quantifying soil health is viable for anyone with a portable electronic device and is much less tedious than traditional lab-based methods.

1 | INTRODUCTION

Quantified ratings of soil health are important for both scientists and land managers because they can inform soil management decisions and identify threats to both soil productivity and the surrounding environment. A quantified rating of soil health can be established by measuring different aspects of the soil's biological, chemical, and physical properties. One of the most often cited measurements of soil physical health is aggregate stability (Stewart et al., 2018). Aggregate stability affects how a soil responds to disturbances, such as heavy rainfall events. For example, erosion and crusting of soils are caused, in large part, by disaggregation (Le Bissonnais, 1996).

Abbreviations: CT, conventional tillage; CWAST, Cornell Wet Aggregate Stability Test; HSD, honest significant difference; NT, no-till; PG, perennial grass; SI, slaking index; SI-380, slaking index at 380 seconds; SI-480, slaking index at 480 seconds; SI-600, slaking index at 600 seconds.

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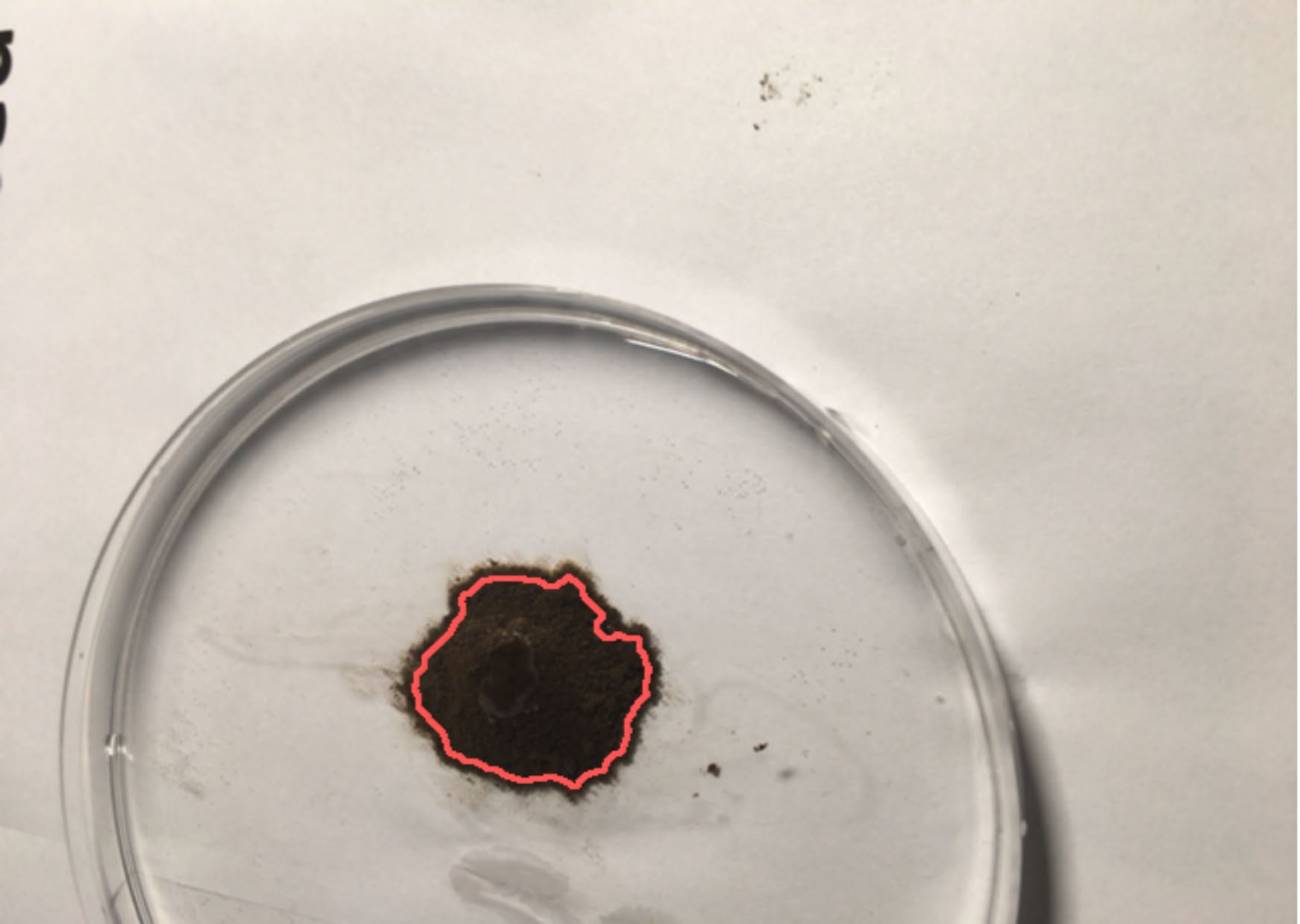


Reference Image

9 Minutes left

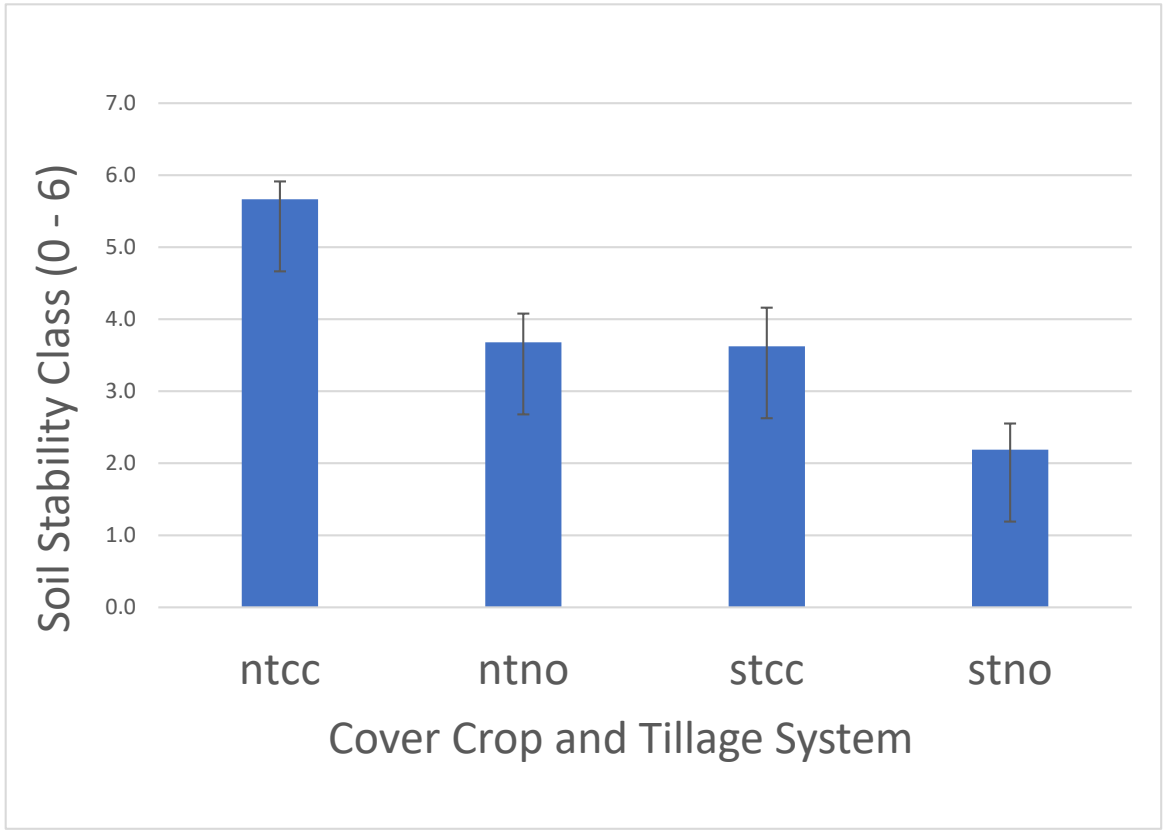
Start

Back

SLAKES

3-Jun-20

	average	stderr
ntcc	0.56	0.21
ntno	2.57	0.41
stcc	1.44	0.26
stno	3.30	0.30



A higher stability class number indicates greater soil aggregate stability

ntcc	no-till with cover crop	stcc	standard till with cover crop
ntno	no-till without cover crop	stno	standard till without cover crop

RESEARCH ARTICLE

No-tillage and high-residue practices reduce soil water evaporation

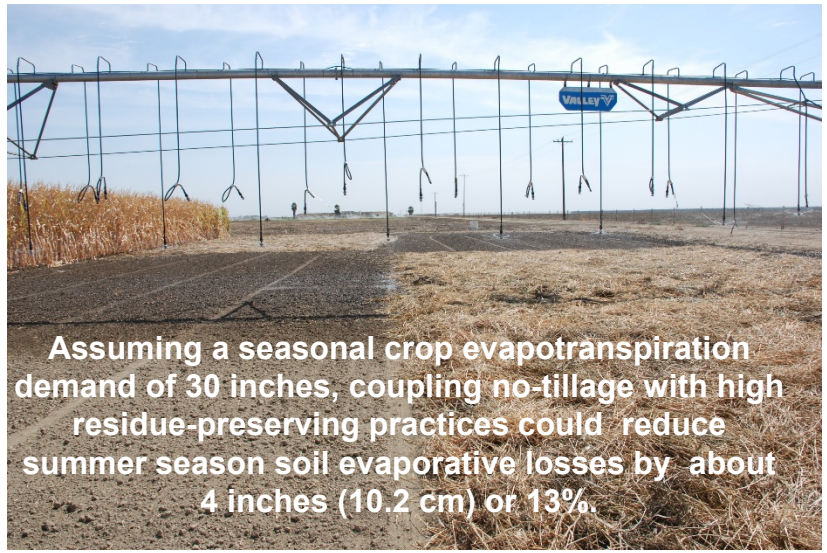
by Jeffrey P. Mitchell, Purnendu N. Singh, Wesley W. Wallender, Daniel S. Munk, Jon F. Wroble, William R. Horwath, Philip Hogan, Robert Roy *and* Blaine R. Hanson

Reducing tillage and maintaining crop residues on the soil surface could improve the water use efficiency of California crop production. In two field studies comparing no-tillage with standard tillage operations (following wheat silage harvest and before corn seeding), we estimated that 0.89 and 0.97 inches more water was retained in the no-tillage soil than in the tilled soil. In three field studies on residue coverage, we recorded that about 0.56, 0.58 and 0.42 inches more water was retained in residue-covered soil than in bare soil following 6 to 7 days of overhead sprinkler irrigation. Assuming a seasonal crop evapotranspiration demand of 30 inches, coupling no-tillage with practices preserving high residues could reduce summer soil evaporative losses by about 4 inches (13%). However, practical factors, including the need for different equipment and management approaches, will need to be considered before adopting these practices.





Conservation tillage allows growers to plant directly into fields that contain residue from prior crops. *Above,* tomatoes are transplanted into cover crop residues (triticale, rye and pea) in Five Points.



Improving water use efficiency is an increasingly important goal as California agriculture confronts water shortages. Changing tillage and crop residue practices could help.

Crop residues are an inevitable feature of agriculture. Because no harvest removes all material from the field, the remaining plant matter, or residue, accumulates and is typically returned to the soil through a series of mixing and incorporating operations involving considerable tractor horsepower (Upadhyaya et al. 2001), an array of tillage implements (Mitchell et al. 2009) and cost (Hutmacher et al. 2003; Valencia et al. 2002).

Managing residues to essentially make them disappear is the norm in California. Concerns about crop pathogens are exacerbated when organic materials accumulate on the soil surface (Jackson et al. 2002), and farmers believe that they need "clean" planting beds to make the seeding and establishment of subsequent crops easier and efficient. Residue management practices in California are also influenced by tradition; until recently, they had not changed significantly for 70 years (Mitchell et al. 2009).

In regions of the world where no-tillage systems are common — such as Brazil, Argentina, Paraguay, Canada, Western Australia, the Dakotas and Nebraska — generating and preserving residues are an indispensable part of management and major, even primary, goals of sustainable production (Crovetto 1996, 2006). Value is derived from residues in several ways: they reduce erosion (Shelton, Jasa et al. 2000; Skidmore 1986), provide carbon and nitrogen to soil organisms (Crovetto 2006) and reduce soil water evaporation (Klocke et al. 2009; van Donk et al. 2010), along with other advantages and drawbacks (see box, page 56).

Residue amounts vary widely in cropping systems (Mitchell et al. 1999; Unger and Parker 1976). While the weight of the residues may be important, most often the percentage of soil cover or the thickness of residues is used in assessing or distinguishing their benefits (Shelton, Smith et al. 2000; USDA NRCS 2008). From research back in the Dust Bowl era, soil scientists developed relationships between the amount and architecture of residues, including crop stubble, and the reductions in soil loss due to wind (Skidmore 1986) and water (Shelton, Jasa et al. 2000). Over time, 30% or more residue cover was associated with significant reductions in soil loss, and this level of cover became an important management goal in areas where soil loss was a problem, such as the Great Plains, Pacific Northwest and southeastern United States (Hill 1996). Eventually, 30% cover became the target linked to the definition of conservation tillage and also to the residue management technical practice standard that the U.S. Department of Agriculture's Natural

Online: http://californiaagriculture.ucanr.edu/landingpage.cfm?article=ca.v066n02p55&fulltext=yes
DOI: 10.3733/ca.v066n02p55

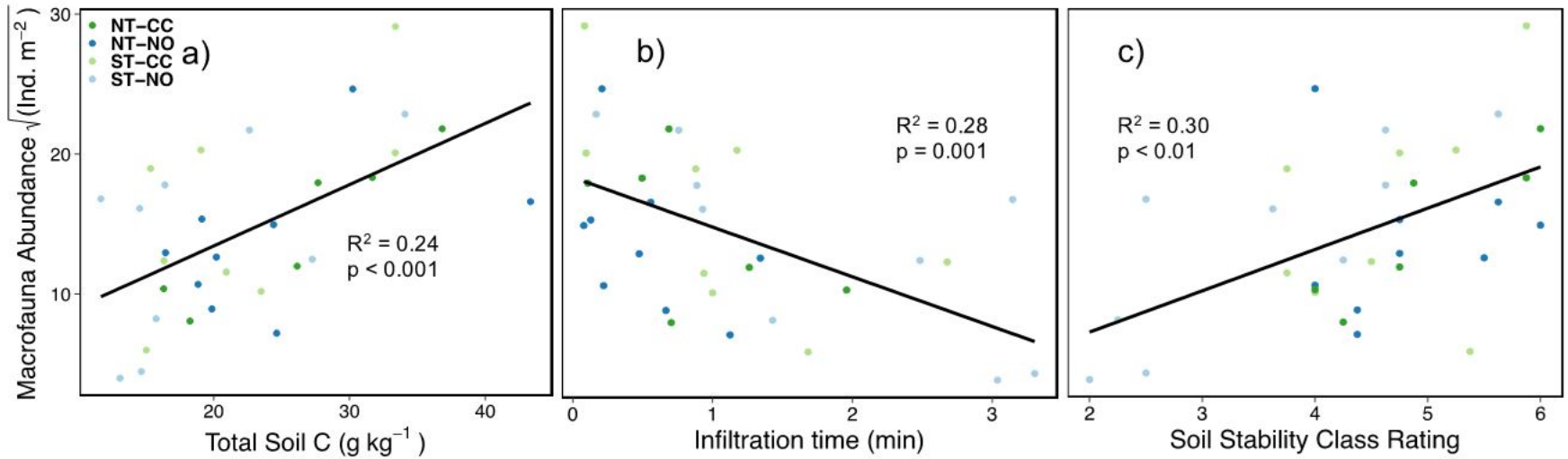


Figure 2. Relationships between total soil macrofauna abundance and soil health parameters within a 16-year irrigated, field trial near Five Points, California, USA. Regression lines are calculated based on square root transformed macrofauna abundance data and a) surface soil organic carbon (SOC) 0-6cm; b) time for 400mL of water to infiltrate a single ring infiltrometer; c) Soil Stability Class. Macrofauna sample points are plot averages based on two years of data and are colored based on treatment (n= 32). NT, no-till; ST, standard tillage; CC, winter cover crop; NO, no cover crop.

Title: Winter cover crops and no-tillage promote soil macrofauna communities in irrigated, Mediterranean cropland in California

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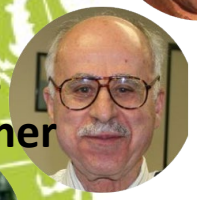

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Pioneers in Reduced Disturbance Vegetable Production

Conservation Agriculture Systems
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‘Take the hardest crop you have and show that it will work.’

Rick Bieber
Trail City, SD

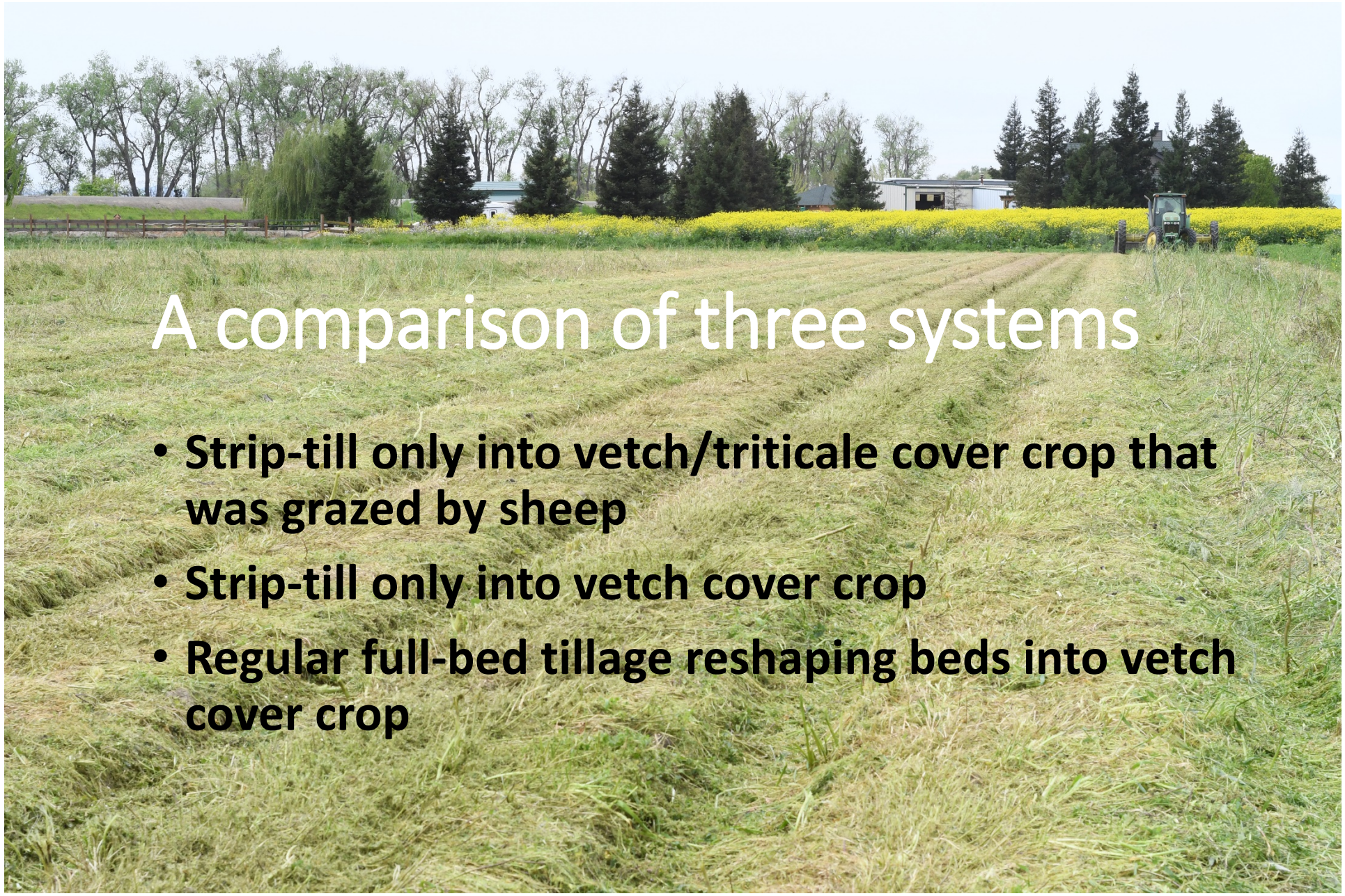


Locations of organic farm and field station demonstration sites that are part of the 2018 CIG Project related to reduced disturbance organic vegetable production systems






Scott and Brian Park
Park Farming
Meridian, CA



A comparison of three systems

- **Strip-till only into vetch/triticale cover crop that was grazed by sheep**
- **Strip-till only into vetch cover crop**
- **Regular full-bed tillage reshaping beds into vetch cover crop**



Phil Foster
Pinnacle Organically Grown
Hollister, CA




Trying to achieve year-round cover and
maximized cover cropping


The strip-till systems that are being implemented here are completely new for this farm and the region and have never been undertaken at this scale before.





Sampling was done as follows:

- 4 samples per field at 0-6, 6-12, 12-24, and 24-36 inch depths
- Each sample was composited from 4 subsamples
- Samples were mixed thoroughly and then separated for PLFA (wet) and other determinations (dry)







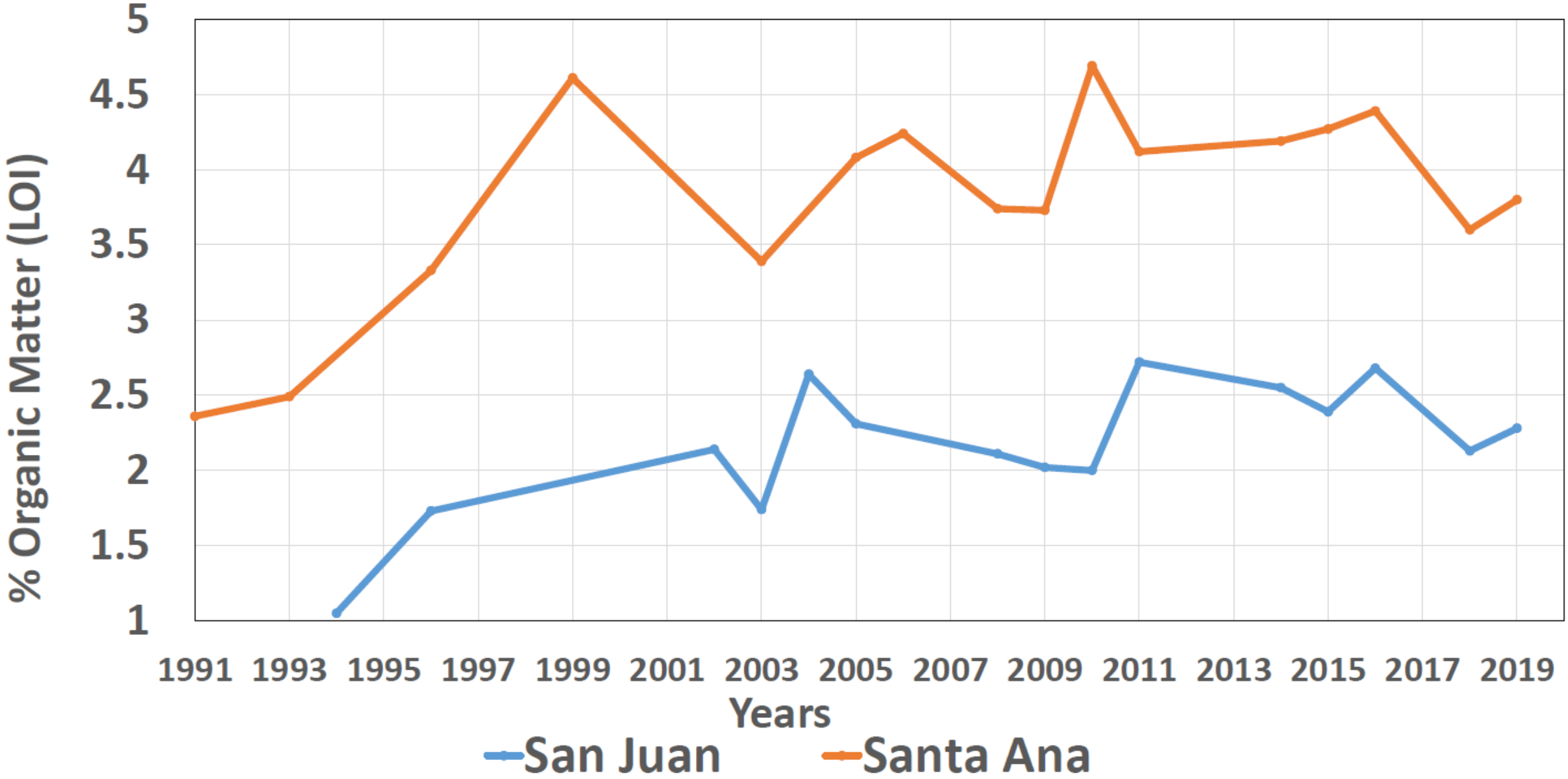
Soil %C - Park Organics - Nueva		
Depth	NRCS	CIG
0-6	0.87	1.46
6-12	0.87	0.99
12-24	0.64	0.71
24-36	0.41	0.77

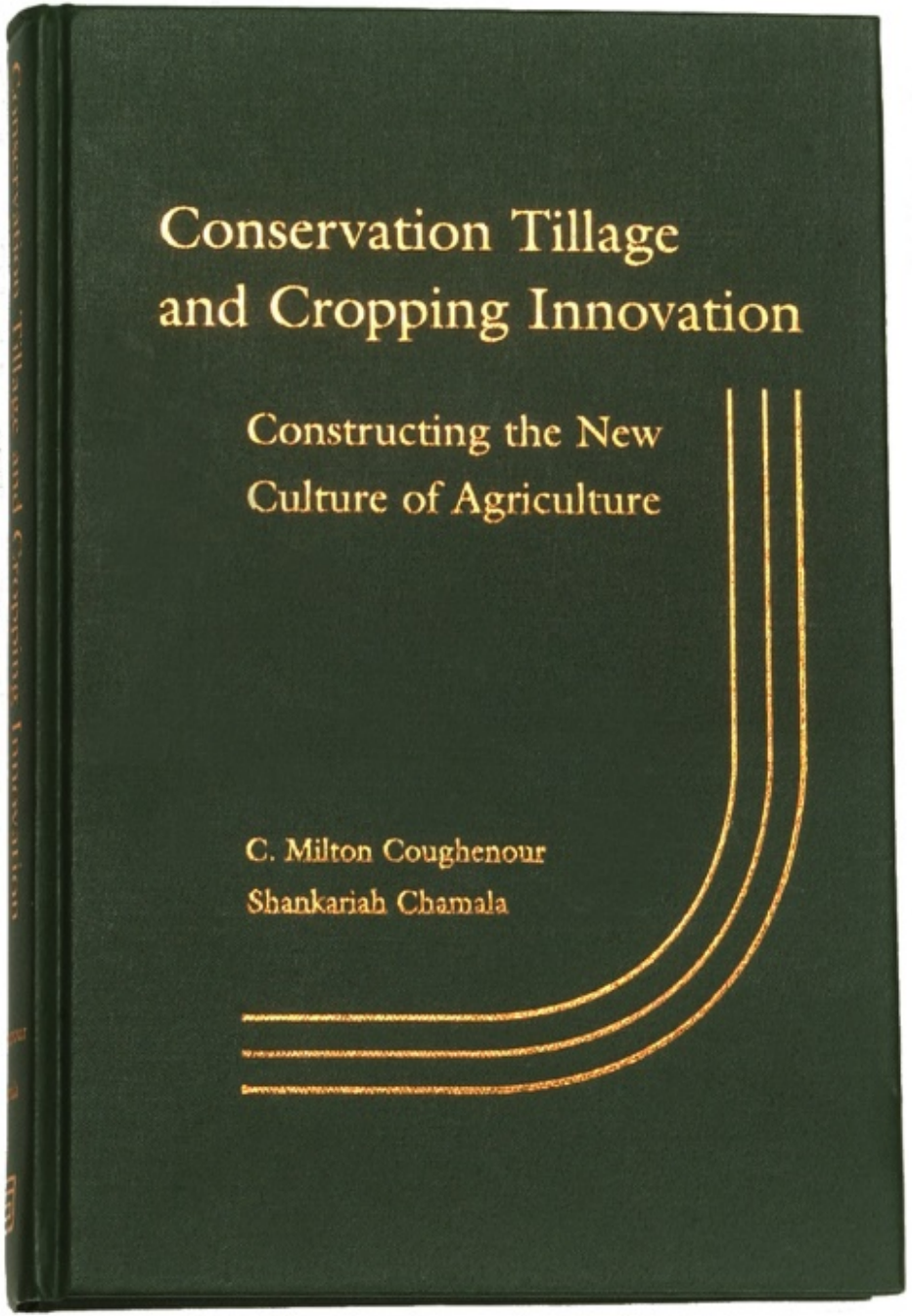
Soil %C - Full Belly - Yolo		
Depth	NRCS	CIG
0-6	1.34	2.78
6-12	1.04	1.77
12-24	1	0.97
24-36	0.68	0.71

Soil %C - Tom Willey - Visalia		
Depth	NRCS	CIG
0-6	1.45	1.32
6-12	0.49	1.17
12-24	0.49	0.77
24-36	0.12	0.50

Soil %C - Pinnacle Farms - Reiff, Sorrento, Clear Lake					
Depth	Reiff	Sorrento	Clear Lake	Average	Foster
0-6	0.87	0.63	1.74	1.08	2.37
6-12	0.87	0.63	1.74	1.08	2.33
12-24	0.87	0.52	1.26	0.89	1.91
24-36	0.14	0.39	0.29	0.27	1.57

Soil Organic Matter Change 1991-2019 PFR





- development of systems

- local networks

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About Local projects Log in Sign up

This new web app supports locally driven, participatory projects that are learning to monitor and manage *wholes* such as watershed function, soil health, and local economics.

From surveillance . . .

compliance and certification monitoring

one-way information pipelines

expert predictions and models

academic research and publication

to participatory community science

shared intelligence on fundamental processes

participatory evidence, learning, interpretation

flexible, adaptable, portable data formats that support feedback and dialogue

permission and flexibility to ask new and different questions

If your primary focus is surveillance or the factors listed under it, there are better tools out there than this one. However, if your project is wanting or needing to shift toward more participatory feedback and



2021 California Processing Tomato Production

Friday, January 22, 9:00-11:30 AM

A Virtual Workshop via Zoom

Sponsored by the University of California Cooperative Extension (UCCE)

10:58 **Compost Panel:** Composted Municipal Waste Amendments and Tomato Production

Introduction—Jeff Mitchell, CE Specialist, KARE, UC ANR

11:02 **The 2nd-Year Study at Russell Ranch, UC Davis**—Xia Zhu Barker, Researcher, LAWR, UC Davis

11:10 **A 3-Year Study in Merced County**—Scott Stoddard, Advisor, UCCE Merced County

11:17 **The 1st Year of a Study in Stanislaus County**—Zheng Wang, Advisor, UCCE Stanislaus County

11:24 **Panel Discussion**

Other sources of information:

The Conservation Agriculture Systems Innovation Center

http://casi.ucanr.edu/

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Thank you.

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