# Soil Health in Texas

OMB No.0535-0264 Approval Expires: 4/30/2022 Project Code: 779 Survey ID: 1980 Version 48



United States Department of Agriculture



NATIONAL AGRICULTURAL STATISTICS SERVICE



USDA/NASS - Texas

Southern Plains Region PO Box 70 Austin, TX 78767-0070 Phone: 1-800-626-3142 Fax: 1-855-270-2725 E-mail: NASSRFOSPR@usda.gov

Please make corrections to name, address, and ZIP Code, if necessary.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB number is 0535-0264. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The information you provide will be used for statistical purposes only. Your responses will be kept confidential and any person who willfully discloses ANY identifiable information about you or your operation is subject to a jail term, a fine, or both. This survey is conducted in accordance with the Confidential Information Protection provisions of Title V, Subtitle A, Public Law 107-347 and other applicable Federal laws. For more information on how we protect your information please visit: <u>https://www.nass.usda.gov/confidentiality</u>. Response is voluntary.

### Why am I being asked to participate in this survey?

Neither soil scientists nor hydrologists have a quantitative field method for measuring or monitoring how soil structure is affected by management practices such as no-till and cover cropping. Additionally, hydrology models are built to respond to changes in soil texture rather than changes in soil structure; but structure, not texture, is management dependent and is the fundamental soil physical property that affects surface partitioning of water.

While non-profit organizations and businesses are pushing for the adoption of soil health practices, the available models that simulate soil processes and hydrology are ill-equipped to study the effects of these adoption practices. Our proposed work attempts to address both biophysical knowledge gaps by providing quantitative measures of changes in soil condition, at the mm-scale, and by using these measurements to inform watershed-scale models of soil processes so that stakeholders can better understand the on-farm and off-farm consequences of improved soil health on soil ecosystem services.

If you have specific questions regarding the content of this survey, please contact Richard Woodward, Professor, Dept. of Agricultural Economics, Texas A&M University, 979-845-5864, <u>r-woodward@tamu.edu</u>

Section 1: You and your operation				
Q1 How many years have you been farming?		years		
Q2 How old are you?		years		
	🗆 I will s	till be operating the farm.		
Q3 Five years from now, which of the following do you think will be most likely?	□ The fa or other r	arm will be operated by one or more relatives (children relative).		
	□ The fa	arm will be operated by non-related farmer.		
	🛛 The fa	arm will be converted into non-farm use.		
	🛛 Do not	t know		
	□ The fa or other r	□ The farm will be operated by one or more relatives (children or other relative).		
Q4 When you eventually stop farming, which of the following do you think will be most likely?	$\Box$ The farm will be operated by non-related farmer.			
	🛛 The fa	□ The farm will be converted into non-farm use.		
	Do not know			
Q5 Did/do your parents farm? (If No, skip to Q6)	□ Yes	□ No		
Q5a Are they still farming?	□ Yes	□ No, stopped farming □ No, deceased		
Q5b Do you currently work with them?	□ Yes	□ No		
Q5c Have you ever worked with them?	□ Yes	□ No		
Q6 Roughly, what share of your household income comes from farming?	□ 100%	□ 75% □ 50% □ 25% or less		
Q7 Roughly, what percent of your working time is dedicated to farming?	□ 100%	□ 75% □ 50% □ 25% or less		
Q8 Total acreage under management	Acres owne	ed Acres rented		
Q9 Total acreage under management A	Acres in rov	w crops Acres in pasture		

Q10 In 2018, how many acres did you plant in the following row crops?			
a. Corn		Acres	
b. Soybean		Acres	
c. Wheat		Acres	
d. Cotton		Acres	
e. Grain Sorghum		Acres	
f. Other		Acres	
Q11 In 2018, did you use strip-till on any of the row crops that you manage?	🗆 Yes 🗆 No	Acres	
Q12 Do you intend to increase or decrease your use of strip-till in the future?	Increase	Decrease	🗆 No Change
Q13 In 2018, did you use no-till on any of the row crops that you manage?	🗆 Yes 🗆 No	Acres	
Q14 Do you intend to increase or decrease your use of no-till in the future?	Increase	Decrease	🗆 No Change
Q15 To what extent do you rely on the consultant like an agronomist or entomologist to help you make farm management decisions?	Extensively Somewhat	Very Little No	one, I do not use a consultant

# Section 2: Details on Base Field

We would like you to give details on 1 row-crop field that you manage as one piece in terms of tillage, planting, and harver <b>If you <u>do not</u> use no-till or strip-till</b> , please choose a field we experimenting with alternative management practices. <b>If you <u>do</u> use no-till or strip-till</b> , please choose a field on what we advantageous.	ou manage. By "field," we mean an area that you esting. Please choose a field that you know well. ith which you would be comfortable nich you believe this practice is not particularly
Give this field a name so it will be easy to remember (for example, "Johnson")	
Q16 What county is this field located in?	County
Q17 How many acres is this field?	acres
Q18 How many years have you been managing this field?	□ 0 – 5 years □ 6 – 10 years □ 11 – 20 years □ 21 + years
Q19 Is this field owned or rented? If owned, skip to Q20	□ Rented □ Owned
Q19a If rented, is the contract cash or shares?	□ Cash □ Shares
Q19b If rented, how likely is it that you will be able to renew the lease for the next five years?	□ Very likely □ Likely □ Unlikely □ Unknown
Q20 All crop(s) planted in 2018	
Q21 Which tillage practice did you predominantly use on this field in 2018?	□ Conventional-till □ No-till □ Strip-till
Q22 Of the last 10 years, how many years have you used no-till or strip-till on this field?	years
Q23 Did you use cover crops on this field in 2018?	□ Yes □ No
Q24 Did you use manure on this field in 2018?	□ Yes □ No

Section 2: Details on Base Field (Contd.)	
Q25 What type of irrigation was in the field in 2018?	☐ Dryland ☐ Center Pivot or Linear ☐ Drip Tape ☐ Furrow
Q26 Were there terraces on the field in 2018?	□ Yes □ No
Q27 What is the general topography of the field?	<ul> <li>Nearly level (Less than 1%)</li> <li>Gently sloping (1-3%)</li> <li>Moderately sloping (3-5%)</li> <li>Strongly sloping (5-8%)</li> <li>Steep (8-12%)</li> </ul>
Q28 Which land type best describes this field?	<ul> <li>☐ Floodplain/bottomland</li> <li>☐ Hilly/upland</li> <li>☐ Neither</li> </ul>
Q29 Approximately what percentage of this field is prone to flood for more than a day? (0% to 100%)	%
Q30 To what extent do you feel that suburban housing near the field affects the choices you make on that field?	<ul> <li>No effect</li> <li>A slight effect</li> <li>A significant effect</li> </ul>
Q31 To what extent do you feel that complaints from non- farming residents near the field affect the choices you make on that field?	<ul> <li>□ No effect</li> <li>□ A slight effect</li> <li>□ A significant effect</li> </ul>

### Section 3 Soil health of your base field

Q32 The table below lists seven <u>changes</u> in soil health characteristics that some farmers desire. For each of these, indicate <u>how important this change is</u> to you for your **Base Field**.

	Very Important	Fairly Important	Important	Slightly Important	Not Important At All	Don't Know
a. Increasing water infiltration	1	2	3	4	5	
b. Increasing organic matter	1	2	3	4	5	
c. Decreasing runoff	1	2	3	4	5	
d. Decreasing erosion	1	2	3	4	5	
e. Decreasing bulk density	1	2	3	4	5	
f. Decreasing compaction	1	2	3	4	5	
g. Increasing drainage	1	2	3	4	5	

Q33 For each of the following indicators of soil health listed, do you believe that <u>using no-till or strip-till on</u> <u>your **Base** <u>Field</u> would increase or decrease the following soil characteristics?</u>

	Greatly Increase	Increase	Neither	Decrease	Greatly Decrease	Don't Know
a. Water infiltration	1	2	3	4	5	
b. Organic matter	1	2	3	4	5	
c. Runoff	1	2	3	4	(5)	
d. Erosion	1	2	3	4	(5)	
e. Bulk density	1	2	3	(4)	5	
f. Compaction	1	2	3	(4)	5	
g. Drainage	1	2	3	(4)	5	

### Section 4: Choices

In this section we ask 9 questions that are all quite similar. Together with responses from all the other respondents, your answers will help us understand how farmers feel about soil health, which will help policy makers develop appropriate policies.

Please answer all 9 questions by checking the box at the bottom of the column you choose.

Suppose you are looking to expand your operation by renting an additional field of land. There are two fields on the market. Both fields are **identical to your base field** except for:

- Water infiltration
- Organic matter
- Compaction
- Rental rate

For both fields, the cash rental agreement would be **valid for at least 5 years**. In each of the 9 choice tables, identify the field you would choose to rent.

Before beginning, **please indicate your estimate of the typical cash rental rate for a field like your** *base field*:

\_\_\_\_ (\$/Acre).

Refer to this as the "typical price"

Choice 1: Please identify the option you would choose.				
	Field A	Field B		
Water infiltration (infiltration into deeply wetted soil)	1 inch of standing water absorbs in 10 hours	1 inch of standing water absorbs in 3 hours		
Organic matter (%)	0.5%	2.5%	Neither A nor B	
Compaction	Restricts root growth substantially	Does not restrict root growth		
Cash rental rate (\$/acre per year)	\$5/acre cheaper than typical price	Typical price		
l choose				

Choice 2: Please identify the option you would choose.				
	Field A	Field B		
Water infiltration (infiltration into deeply wetted soil)	1 inch of standing water absorbs in 10 hours	1 inch of standing water absorbs in 5 hours		
Organic matter (%)	2.5%	0.5%	Neither A nor B	
Compaction	Restricts root growth partially	Does not restrict root growth		
Cash rental rate (\$/acre per year)	\$5/acre more expensive than typical price	\$5/acre less expensive than typical price		
l choose				

Choice 3: Please identify the option you would choose.				
	Field A	Field B		
Water infiltration (infiltration into deeply wetted soil)	1 inch of standing water absorbs in 3 hours	1 inch of standing water absorbs in 10 hours		
Organic matter (%)	1%	0.5%	Neither A nor B	
Compaction	Restricts root growth substantially	Restricts root growth substantially		
Cash rental rate (\$/acre per year)	\$5/acre more expensive than typical price	Typical price		
l choose				

Choice 4: Please identify the option you would choose.			
	Field A	Field B	
Water infiltration (infiltration into deeply wetted soil)	1 inch of standing water absorbs in 5 hours	1 inch of standing water absorbs in 10 hours	
Organic matter (%)	2.5%	1%	Neither A nor B
Compaction	Restricts root growth substantially	Does not restrict root growth	
Cash rental rate (\$/acre per year)	Typical price	\$5/acre more expensive than typical price	
l choose			

Choice 5: Please identify the option you would choose.			
	Field A	Field B	
Water infiltration (infiltration into deeply wetted soil)	1 inch of standing water absorbs in 3 hours	1 inch of standing water absorbs in 3 hours	
Organic matter (%)	0.5%	1%	Neither A nor B
Compaction	Restricts root growth partially	Restricts root growth substantially	
Cash rental rate (\$/acre per year)	Typical price	\$5/acre less expensive than typical price	
l choose			

Choice 6: Please identify the option you would choose.				
	Field A	Field B		
Water infiltration (infiltration into deeply wetted soil)	1 inch of standing water absorbs in 5 hours	1 inch of standing water absorbs in 5 hours		
Organic matter (%)	0.5%	1%	Neither A nor B	
Compaction	Does not restrict root growth	Restricts root growth partially		
Cash rental rate (\$/acre per year)	\$5/acre more expensive than typical price	Typical price		
l choose				

Choice 7: Please identify the option you would choose.								
	Field A	Field B						
Water infiltration (infiltration into deeply wetted soil)	1 inch of standing water absorbs in 10 hours	1 inch of standing water absorbs in 10 hours						
Organic matter (%)	1%	2.5%	Neither A nor B					
Compaction	Does not restrict root growth	Restricts root growth partially						
Cash rental rate (\$/acre per year)	Typical price	\$5/acre less expensive than typical price						
l choose								

Choice 8: Please identify the option you would choose.								
	Field A	Field B						
Water infiltration (infiltration into deeply wetted soil)	1 inch of standing water absorbs in 3 hours	1 inch of standing water absorbs in 3 hours						
Organic matter (%)	2.5%	0.5%	Neither A nor B					
Compaction	Does not restrict root growth	Restricts root growth partially						
Cash rental rate (\$/acre per year)	\$5/acre less expensive than typical price	\$5/acre more expensive than typical price						
I choose								

Choice 9: Please identify the option you would choose.								
	Field A	Field B						
Water infiltration (infiltration into deeply wetted soil)	1 inch of standing water absorbs in 5 hours	1 inch of standing water absorbs in 5 hours						
Organic matter (%)	1%	2.5%	Neither A nor B					
Compaction	Restricts root growth partially	Restricts root growth substantially						
Cash rental rate (\$/acre per year)	\$5/acre less expensive than typical price	\$5/acre more expensive than typical price						
l choose								

# Please consider your Base Field identified above when answering the questions.

Base Field Name\_\_\_\_\_

Section 5: Beliefs						
The following questio	ons measure y	our beliefs ab	out switching	from convent	tional to no-till	or strip-till
Switching to no-till or	strip-till on m	y Base Field w	ill be/was			
	It will never	Will be/Was	Will be/Was	Will be/Was	Will be/Was	Do not
	be better	better after	better in 6-9	better in 3-5	better	know
_		10 years	years	years	immediately	
a. Better for my	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	_
profits than	(1)	(2)	(3)	(4)	(5)	
conventional tillage.						
	It will never	Will be/Was	Will be/Was	Will be/Was	Will be/Was	Do not
	be better	better after	better in 6-9	better in 3-5	better	know
		10 years	years	years	immediately	
b. Better for my yield	$\sim$	$\sim$	$\sim$			
than conventional	(1)	(2)	(3)	(4)	(5)	
tillage						
	It will never	Will be/Was	Will be/Was	Will be/Was	Will be/Was	Do not
	be better	better after	better in 6-9	better in 3-5	better	KNOW
- Dattau in tanuar of		10 years	years	years	Immediately	
c. Better in terms of						
reducing my annual						
operating costs ( <b>not</b>	1	2	3	4	5	
Including equipment						
purchases) than						
conventional tillage						Donot
	it will never	will be/was	will be/was	will be/was	will be/was	Do not
	improve	after 10	A Quears	2 E voars	improved	KHOW
			0-9 years	3-3 years	Inineulately	
d An improvement on		years				
soil bealth more than			3		( <b>5</b> )	
	$\bigcirc$		3	•	9	
	It will never	Will he/W/as	Will he/W/as	Will he/Was	Will he/Was	Do not
	he more	more	more	more	more	know
	efficient	efficient	efficient in	efficient in	affordable	KIIOW
	emelent	after 10	6-9 years	3-5 years	immediately	
		Vears	o / years	o o yearo	minediatery	
e. More efficient than	~		~	~		_
conventional tillage.	(1)	(2)	(3)	(4)	(5)	

The following questions measure your attitudes about the use of no-till or strip-till. The use of no-till or strip-till on my Base Field will be/was									
	Very Good	Good	Neither Good nor Bad	Bad	Very Bad	Do not know			
a. No-till or strip- till would be/is good or bad for the soil in my Base Field.	1	٤	3	4	5				
	Big Advantage	Advantage	Neither Advantage Nor Disadvantage	Disadvantage	Big Disadvantage	Do not know			
b. No-till or strip- till would be/is an advantage or disadvantage for the soil in my Base Field.	1	2	3	4	(5)				
	Very Necessary	Necessary	Neither Necessary Nor	Unnecessary	Very Unnecessary	Do not know			
c. No-till or strip- till would be/is necessary or unnecessary for the soil in my Base Field.	1	2	Unnecessary 3	4	(5)				
	Very Pleasant	Pleasant	Neither Pleasant nor Unpleasant	Unpleasant	Very Unpleasant	Do not know			
d. Managing no- till or strip-till on my Base Field would be/was unpleasant or pleasant.	1	2	3	4	(5)				

Section 7: Expectations of Others Regarding the support for adoption of no-till or strip-till, please indicate your agreement or disagreement.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Do Not Know	Does Not Apply
a. People who are important to me would support/do support my use of no-till or strip-till.	1	2	3	4	5		
b. My neighbors think/thought using no- till or strip-till is/was a mistake.	1	2	3	4	(5)		
c. Some of my extended relatives would/did oppose/opposed my use of no-till or strip-till.	1	2	3	4	(5)		
d. My father would oppose/opposed my use of no-till or strip-till.	1	2	3	(4)	(5)		
e. My father would/did encourage my use of no- till or strip-till.	1	2	3	4	(5)		
f. I care that my neighbors think I'm a good steward of my land.	(1)	2	3	4	\$		

<b>Section 8: Duties and Obligations</b> Regarding the use of no-till or strip-till in general, please indicate your agreement or disagreement								
	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Do Not Know		
a. I feel it is my duty to protect the soil I work with.	1	2	3	<b>(4</b> )	(5)			
b. I believe it is my duty to protect soil for farming so that future farmers will be able to farm the land.	1	2	3	4	(5)			
c. I believe it is my duty to protect the soil I farm for my family.	1	(2)	3	(4)	(5)			
d. It is my duty to reduce erosion from the land I farm.	1	2	3	4	(5)			
f. It bothers me when I notice water running off the fields I farm.	1	(2)	3	(4)	(5)			
e. It is my duty to use no-till or strip-till	1	2	3	4	(5)			

### Section 9: Risk

Regarding the use or potential use of no-till or strip-till on your **Base Field**, please indicate your agreement or disagreement

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Do Not Know
a. Using no-till or strip-till increases the risk of low yields.	1	2	3	4	(5)	
b. There is risk in using no-till or strip-till because too much residue can delay planting in the spring.	1	2	3	4	(5)	
c. There is risk in using no-till or strip-till because it slows soil drying and warming.	1	2	3	4	(5)	
d. There is risk in using no-till or strip-till because residue increases crop diseases.	1	2	3	4	(5)	
e. No-till or strip-till is risky because my landlord may not want to renew my lease.	1	2	3	4	(5)	
f. If I use no-till or strip-till, I run the risk that other farmers may market themselves as better potential tenants to my landlord.	(1)	2	3	4	5	
g. No-till and strip-till are risky because developers may buy up my land for expanding suburban development therefore I would not have enough time to see the benefits.	1	2	3	4	(5)	
h. No-till and strip-till are risky because I would need to take on debt to adopt these practices.	1	2	3	4	(5)	

# Section 10: Freedoms or Constraints on Decisions

Regarding the use or potential use of no-till or strip-till please indicate your agreement or disagreement

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Do not know
a. Whether or not I use no-till or strip-till on my Base Field depends largely on me.	1	2	3	4	(5)	
b. I know everything I need to know to use no-till or strip-till on my Base Field if I want.	1	2	3	4	(5)	
c. I have the means/savings to adopt no-till or strip-till on my Base Field if I want.	1	2	3	4	(5)	
d. I can afford to increase my use of no-till or strip-till.	1	2	3	4	(5)	
e. To engage in no-till or strip- till, I would consult/consulted others first.	1	2	3	(4)	(5)	
f. I am able to use no-till or strip- till on my Base Field if I choose because I have people who can help me figure it out.	1	2	3	4	(5)	
g. On some of the fields I farm, I have little flexibility in the soil tillage practices I use because my leases are relatively short.	1	2	3	4	(5)	
h. My landlords have encouraged my use of no-till or strip-till.	1	2	3	(4)	(5)	
i. Some of my landlords have opposed my use of no-till or strip-till.	1	2	3	(4)	(5)	
j. My loan officer would be reluctant to approve a loan to purchase equipment needed to increase my use of no-till or strip-till.	1	2	3	4	(5)	

Section 11: Trust Regarding your trust in other farmers, please indicate your agreement or disagreement.							
	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Do Not Know	
a. I trust some farmers and consult with them when I have a question about a management problem.	1	2	3	4	(5)		

### Section 12: Trust; Agencies

The following questions ask about the various agencies that may be involved with soil management.

Please indicate how you feel the following agencies generally manage their role in helping soil practices.

	Very Well	Well	Neither Well nor Poorly	Poorly	Very Poorly	Do Not Know
a. US Department of Agriculture (USDA)	1	2	3	4	(5)	
b. Natural Resource Conservation Service (NRCS)	1	2	3	(4)	5	
c. Texas A&M AgriLife Extension State Specialists	1	2	3	(4)	5	
d. Texas A&M AgriLife Extension County Agents	1	2	3	(4)	(5)	
e. The crop consultant that I use.	1	2	3	4	(5)	

### Section 12: Trust, Contd.

I believe the following agencies *have the knowledge* to provide information for no-till or strip-till practices.

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Do Not Know
a. US Department of Agriculture (USDA)	1	2	3	4	(5)	
b. Natural Resource Conservation Service (NRCS)	1	2	3	4	(5)	
c. Texas A&M AgriLife Extension Sate Specialists	1	2	3	4	(5)	
d. Texas A&M AgriLife Extension County Agents	1	2	3	4	(5)	
e. The crop consultant that I use.	1	2	3	٩	5	•

# Section 12: Trust, Contd.

I believe the following agencies act in my best interest in providing information for soil management.

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Do Not Know
a. US Department of Agriculture (USDA)	1	2	3	(4)	(5)	
b. Natural Resource Conservation Service (NRCS)	1	2	3	(4)	(5)	
c. Texas A&M AgriLife Extension Sate Specialists	1	2	3	4	(5)	
d. Texas A&M AgriLife Extension County Agents	1	2	3	4	(5)	
e. The crop consultant that I use.	1	2	3	4	5	