2021 South Dakota Producer Resurvey Descriptive Results

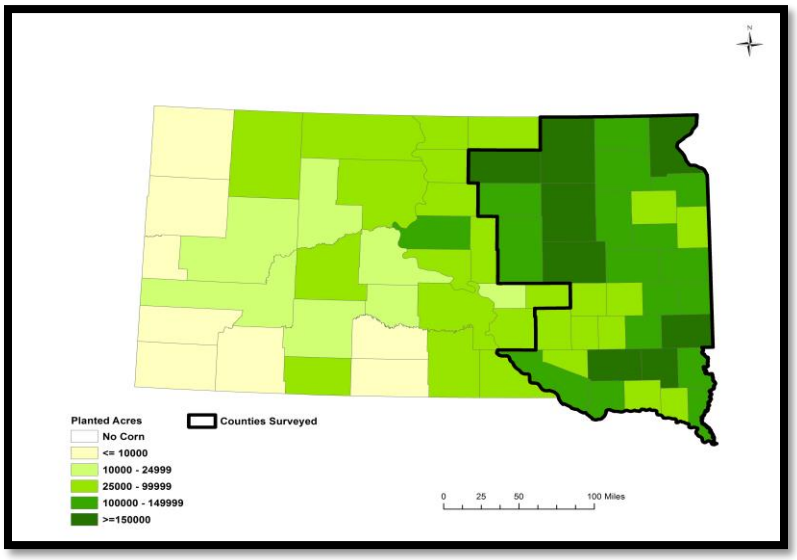
Prepared in June, 2021 by:

Dr. Tong Wang, South Dakota State University; Dr. Jessica Ulrich-Schad, Utah State University; M.S. student Stephen Cheye, South Dakota State University.

For questions or more information, please contact: Tong.wang@sdstate.edu

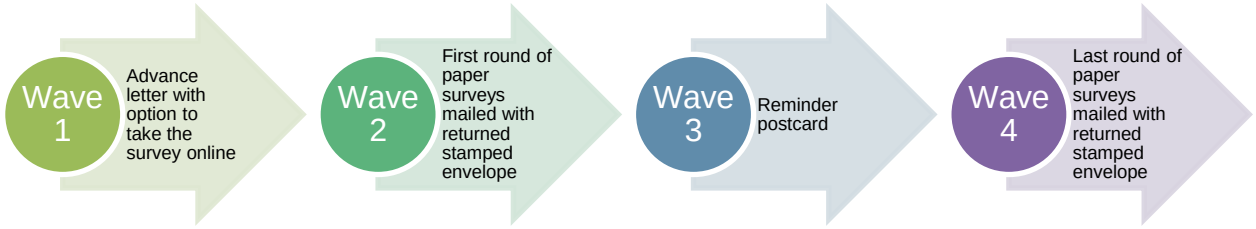
Methods

From January to March 2021, researchers from South Dakota State University (SDSU) and Utah State University (USU) conducted a resurvey of South Dakota of commodity crop producers in the eastern part of the state to study their attitudes and usage of soil and water conservation practices including cover crops, diversified crop rotations, conservation tillage, and integrated crop and livestock management. These same producers completed a similar survey in 2018 (see Wang et al. 2021a, b; Saak et al. 2021; Kolady et al. 2020; Avemegah et al. 2020).[1] In the 2018 surveys, farming operations in 34 South Dakota counties east of the Missouri River, where most of corn and soybean farming activities in the state are located, were targeted to take the questionnaire (see map below). Using a Freedom of Information Act Request (FOIA), we obtained a list of 10,000 farming operations that had participated in Farm Service Agency (FSA) programs in 2016 from the FSA and selected 3,000 operations using proportionate stratified-random sampling according to number of farming operations in the study counties.



[1] Wang, Tong, Hailong Jin, Yubing Fan, Oladipo Obembe, and Dapeng Li. 2021a. "Farmers' adoption and perceived benefits of diversified crop rotations in the margins of Corn Belt" *Journal of Environmental Management*, 293: 112903. https://doi.org/10.1016/j.jenvman.2021.112903
Wang, Tong, Zheng Xu, Deepthi Kolady, and Jessica D. Ulrich-Schad, and David E. Clay. 2021b. "Cover Crops Usage in South Dakota: Perceived Profitability and Future Adoption Decisions." *Journal of Agricultural and Resource Economics*. 46(2): 287-307. doi:10.22004/ag.econ.304768
Saak, Alexander E., Tong Wang, Zheng Xu, Deepthi Kolady, Jessica D. Ulrich-Schad, and David E. Clay. 2021. "Duration of Usage and Farmer Reported Benefits of Conservation Tillage." *Journal of Soil and Water Conservation* 71(1): 65-75.
Kolady, Deepthi, Weiwei Zhang, Tong Wang, and Jessica D. Ulrich-Schad. 2020. "Spatially mediated peer effects in the adoption of conservation agriculture practices." *Journal of Agricultural and Applied Economics*. DOI:10.1017/aae.2020.24.
Avemegah, Edem, Wei Gu, Abdelrahim Abulbasher, Kristen Koci, Ayorinde Ogunyiola, Joyce Eduful, Shuang Li, Kylie Barington, Tong Wang, Deepthi Kolady, Lora Perkins, A. Joshua Leffler, Péter Kovács, Jason D. Clark, David E. Clay, and Jessica D. Ulrich-Schad. 2020. "An Examination of Best Practices for Survey Research with Agricultural Producers." *Society and Natural Resources*. DOI: 10.1080/08941920.2020.1804651.

In accordance with a modified Tailored Design Method (Dillman et al. 2014)[2], the 3,000 operations in the sample were contacted up to four times (see Figure below). An advance letter was sent to those in the final sample informing them about the project and including a link to answer the questionnaire online. One-half of the 3,000 selected for participation were also randomly selected to receive a $2 bill with the advance letter to test if the incentive increased response rates (see Avemegah et al. 2020 for results). Those who did not respond in the first wave were then mailed the paper questionnaires and addressed and stamped return envelopes, followed by a reminder postcard two weeks later, and a second paper copy of the survey and envelopes two weeks after that (see waves below). Those operations who were not currently farming (e.g., rent out the land or no longer farming) were asked to notify us by returning a short form in the mail or online. The process used achieved a response rate of 30% after receiving 708 questionnaires back and removing bad addresses and non-farmers from the sample. All percentages shown are valid percentages (e.g., do not include the missing cases).



In 2021 we utilized the same methods to resurvey farmers who completed the 2018 survey. We used some of the same questions from the 2018 survey, but also developed new questions that recently emerged as interest points (e.g., response to the 2019 flooding, perceptions of carbon credits). By deleting some questions that were no longer of interest we reduced the overall length from 16 to 12 pages to encourage responses. To encourage responses, we also provided a $2 bill token pre-incentive and entered respondents in a drawing with a 1 in 10 chance of winning a $100 gift card. Of the 687 producers we attempted to resurvey (we were not able to resurvey all 708 because we did not have unique codes provided in the response from each), 94 were no longer farming or unreachable. Out of 593 eligible producers, 350 completed our survey, resulting in a 59.0% response rate. Below we outline the descriptive results to the 2021 follow-up survey.

[2] Don A. Dillman, Jolene D. Smyth, and Leah Melani Christian. 2014. *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method*, 4th Edition. Hoboken, NJ: Wiley.

Results

SECTION I: INFORMATION ON FARM AND FARMING DECISIONS

1. In 2020, in what county was most of the land that you operate, including rented land, located?

2. Please provide an estimated distance from your home to your largest tract of field:

	Mean	Range
Distance (Miles) (N=331)	9.8	0 - 600

3. Please list the total and rented acres of your operated land in the following categories as of 2020.

	ACRES OPERATED			ACRES RENTED		
	Mean	Range	N	Mean	Range	N
Cropland (Excluding CRP)	965.1	0 - 33033	346	435.7	0 - 9000	346
Pasture or rangeland	245.7	0 - 9000	346	118.0	0 - 7000	346
CRP land	27.6	0 - 650	346	6.0	0 - 300	344

4. Please list the yields for the following crops on your farm in a typical year.

CROPS	YIELD (BUSHELS/ACRE)				
	< 120 (1)	121 - 140 (2)	141 – 160 (3)	161 - 200 (4)	>200 (5)
Corn (N=329)	9.1%	11.3%	23.4%	47.4%	8.8%
Soybean (N=326)	6.4%	20.9%	42.6%	24.9%	5.2%

5. In 2020, about what percentage of your cropland had the following issues?

ISSUES	PERCENT OF ACRES ON CROPLAND					
	0% (1)	1-20% (2)	21-40% (3)	41-60% (4)	61-80% (5)	81-100% (6)
Highly erodible land (N=327)	43.1%	47.1%	4.9%	2.5%	1.8%	0.6%
Slow draining soil (N=336)	10.4%	49.1%	25.3%	8.6%	5.7%	0.9%
Saline or sodic conditions (N=325)	30.8%	63.1%	6.2%	0%	0%	0%

6. How concerned are you about the following issues of when making farm management decisions?

CONCERNS	DEGREE OF CONCERN			
	Not at all (1)	Slightly (2)	Moderately (3)	A lot (4)
Market volatility (N=347)	6.9%	13.8%	42.7%	36.6%
Soil health (N=346)	4.3%	14.5%	46.5%	34.7%
Insufficient rainfall (N=347)	3.8%	17.3%	40.4%	38.6%
Too much rainfall (N=347)	8.1%	28.5%	43.2%	20.2%

SECTION II: FARM MANAGEMENT PRACTICES

7. How many years have you been using the following practices? Please check the relevant box if you have not adopted or have dis-adopted these practices.

PRACTICES	CURRENT YEARS OF USAGE				Not adopted (5)	Dis-adopted (Please specify years of usage) (6)
	Less than 3 (1)	3-5 (2)	6-10 (3)	10+ (4)		
No tillage (N=330)	11.8%	6.7%	10.6%	28.5%	40.9%	1.5%
Reduced tillage (strip-till, mulch-till) (N=329)	6.7%	5.2%	14.9%	35.6%	36.8%	0.9%
Cover crops (N=328)	24.7%	15.2%	7.9%	7.9%	43.3%	0.9%
Diversified crop rotation (3 or more crops) (N=332)	6.9%	4.2%	6.9%	41.3%	37.7%	3.0%
Integrated crop and livestock management (N=330)	6.7%	5.2%	5.5%	36.7%	44.6%	1.5%

8. Please provide the percentage of your operated land under the following practices in 2020:

PRACTICES	PERCENT OF ACRES ADOPTED					
	0% (1)	1-20% (2)	21-40% (3)	41-60% (4)	61-80% (5)	81-100% (6)
No tillage (N=335)	42.7%	17.0%	7.8%	13.4%	5.7%	13.4%
Reduced tillage (strip-till, mulch-till) (N=333)	38.1%	13.8%	4.5%	17.1%	11.4%	15.0%
Cover crops (N=333)	50.8%	30.3%	9.9%	3.6%	2.1%	3.3%
Diversified crop rotation (3 or more crops) (N=335)	44.5%	11.3%	6.3%	5.7%	9.6%	22.7%
Integrated crop and livestock management (N=333)	47.5%	9.0%	7.8%	7.8%	7.8%	100.0%

9. Which of the following best describes your tillage practice in general? (Please check all that apply)

TILLAGE PRACTICE	Percentage of Usage (Average for those who use practice)
Continuous no-till (always use no-till) (N=47)	13.3%
Use no-till in some years, but use conventional tillage in other years (N=205)	57.9%
Use no-till for all crops (N=32)	9.0%
Use no-till only for corn (N=13)	3.7%
Use no-till only for soybeans (N=57)	16.1%

10. If some of your fields/crops are NOT under continuous no-till, which of the following are challenges you have faced using no-till? (Please check all that apply)

CHALLENGES	Percentage (Average for those who faced challenge)
Too much soil moisture (N=164)	31.8%
Delayed planting due to slow soil warming in spring (N=164)	31.8%
Reduced crop yields (N=69)	13.4%
Increased dependence on herbicide/fungicide (N=99)	19.2%
Other reasons (Please specify) (N=20)	3.9%

SECTION III: FARM MANAGEMENT DECISIONS AND PERCEPTIONS

11. Please rate the importance of the following factors on your soil conservation practice adoption decisions.

FACTORS	Not Important (1)	Slightly Important (2)	Somewhat Important (3)	Quite Important (4)	Very Important (5)
Improved soil health (N=336)	2.4%	2.1%	13.7%	40.5%	41.4%
Increased crop yields (N=337)	2.4%	1.2%	13.4%	38.0%	45.1%
Increased profitability (N=336)	2.7%	0.9%	8.6%	35.4%	52.4%
Financial subsidies (N=333)	19.5%	20.1%	27.9%	17.4%	15.0%
Technical support (N=331)	12.4%	21.2%	30.5%	24.2%	11.8%

12. A well-managed cropland can sequester about 1 ton of carbon per acre per year. Companies can purchase carbon credits to compensate for their greenhouse gas emissions. What is your perceived value of soil carbon on a per ton basis?

PERCEIVED VALUE OF CARBON PER TON	Percentage (Average for those who valued carbon/ton)
$0 (N=54)	17.3%
$1- $10 (N=41)	13.1%
$11 - $20 (N=57)	18.2%
$21- $30 (N=55)	17.6%
$31 - $50 (N=59)	18.9%
More than $50 (N=47)	15.0%

13. Indigo Carbon, Nori and Ecosystems Marketplace compensate farmers for carbon credits generated through increased soil carbon or reduced greenhouse gas emissions. At the following carbon credit values, would you consider adopting no-till and cover crops?

CARBON CREDIT	NO-TILL		
	Yes (1)	No (2)	Not sure (3)
$10/ton (N=312)	8.0%	49.4%	42.6%
$20/ton (N=303)	12.2%	39.9%	47.9%
$30/ton (N=308)	26.6%	24.7%	48.7%
$40/ton (N=302)	38.1%	14.9%	47.0%
$50/ton (N=306)	50.0%	8.2%	41.8%

14. Please rate the importance of the following methods for you when learning new farming practices.

SOURCES	Not Important (1)	Slightly Important (2)	Somewhat Important (3)	Quite Important (4)	Very Important (5)
Articles or fact sheets (N=334)	5.7%	7.8%	28.1%	39.2%	19.2%
Webinars or videos (N=329)	14.6%	20.1%	35.3%	23.1%	7.0%
Daylong workshops (N=330)	20.0%	27.3%	30.0%	17.3%	5.5%
Farm tours (N=332)	15.4%	20.8%	28.0%	25.3%	10.5%

15. Please check whether received any cost share to support the following conservation practices, and/or have been enrolled conservation programs, which support these conservation practices.

CONSERVATION PRACTICES					
	No Cost Share Received	CRP	CSP	EQIP	Other
No tillage/reduced tillage (N=333)	76.0%	11.1%	8.4%	3.9%	0.6%
Cover crops (N=321)	72.7%	4.8%	9.3%	7.2%	2.4%
Diversified crop rotation (3 or more crops) (N=312)	79.3%	2.4%	7.5%	3.9%	0.6%
Integrated crop and livestock system (N=317)	82.9%	1.8%	5.4%	4.5%	0.6%

16. On average, how do you rate your total production cost change after adopting the following practices? (If you haven't adopted the practice yet, please rate your perceived change).

CONSERVATION PRACTICES	TOTAL PRODUCTION COST				
	Reduced by >10% (1)	Reduced by 5%-10% (2)	Very little change (within 5%) (3)	Increased by 5%-10% (4)	Increased by >10% (5)
No tillage/reduced tillage (N=315)	21.6%	34.3%	31.4%	7.3%	5.4%
Cover crops (N=302)	9.9%	10.3%	45.0%	28.5%	6.3%
Diversified crop rotation (3 or more crops) (N=306)	9.2%	18.0%	48.7%	16.0%	8.2%
Integrated crop and livestock management (N=296)	13.9%	15.9%	54.1%	9.8%	6.4%

17. On average, how do you rate your cash crop yield change after adopting the following practices? (If you haven't adopted the practice yet, please rate your perceived change).

CONSERVATION PRACTICES	CASH CROP YIELD				
	Reduced by >10% (1)	Reduced by 5%-10% (2)	Very little change (within 5%) (3)	Increased by 5%-10% (4)	Increased by >10% (5)
No tillage/reduced tillage (N=319)	5.6%	13.2%	47.3%	23.2%	10.7%
Cover crops (N=302)	4.0%	6.6%	60.6%	25.2%	3.6%
Diversified crop rotation (3 or more crops) (N=313)	5.1%	3.2%	47.6%	35.8%	8.3%
Integrated crop and livestock management (N=301)	4.7%	4.3%	57.5%	26.9%	6.6%

18. On average, how do you rate your profits after adopting the following practices? (If you haven't adopted the practice yet, please rate your perceived change).

CONSERVATION PRACTICES	PROFITABILITY				
	Reduced by >10% (1)	Reduced by 5%-10% (2)	Very little change (within 5%) (3)	Increased by 5%-10% (4)	Increased by >10% (5)
No tillage/reduced tillage (N=317)	6.6%	6.6%	42.8%	33.0%	11.0%
Cover crops (N=302)	4.6%	10.2%	61.4%	20.1%	3.6%
Diversified crop rotation (3 or more crops) (N=310)	5.5%	6.4%	51.5%	29.6%	7.1%
Integrated crop and livestock management (N=298)	5.0%	2.3%	60.2%	24.1%	8.4%

19. How often do you use the following devices to facilitate your farm management decisions?

DEVICES	Never use (1)	Rarely use (2)	Use sometimes (3)	Moderately use (4)	Frequently use (5)
Smart phone (N=337)	22.3%	5.6%	18.4%	19.9%	33.8%
iPad or similar products (with apps) (N=333)	40.8%	9.0%	20.4%	14.7%	15.0%
Computer (desktop or laptop) (N=335)	18.2%	8.4%	27.5%	24.5%	21.5%

SECTION IV: INFLUENCE OF EXTREME WEATHER EVENTS

	Yes (1)	No (2)
20. Do you use online decision support tools that integrate weather/climate information? (N=341)	51.0%	49.0%

21. In the county you primarily operate in, please check the number of years in which a severe drought or severe wet conditions occurred between 2011-2020.

EXTREME WEATHER	YEARS OF EXTREME WEATHER EVENTS				
	None (1)	1 (2)	2 – 3 (3)	4-5 (4)	5 + (5)
Severe drought (N=332)	13.3%	41.3%	40.7%	4.8%	0%
Severe **wet** conditions (N=335)	2.1%	11.0%	63.0%	16.4%	7.5%

22. During the most recent drought, on the fields that you were able to harvest, how were the average yields affected compared to normal years?

YIELDS DURING MOST RECENT DROUGHT	PERCENT OF NORMAL YEAR YIELDS					
	Not Applicable (1)	0% (2)	1-40% (3)	41-60% (4)	61-80% (5)	81-100% (6)
No-till/reduced tillage fields (N=324)	31.8%	4.3%	28.4%	16.4%	10.5%	8.6%
Conventional tillage fields (N=321)	24.3%	4.7%	32.4%	21.5%	10.3%	6.9%

23. During the most recent flood, how many of your fields were affected to the extent that you could NOT plant?

PREVENTED PLANTING	PERCENT OF FIELDS NOT PLANTED					
	Not Applicable (1)	0% (2)	1-40% (3)	41-60% (4)	61-80% (5)	81-100% (6)
No-till/reduced tillage fields (N=326)	27.0%	9.2%	30.4%	13.8%	7.4%	12.3%
Conventional tillage fields (N=322)	22.1%	8.7%	33.2%	14.3%	8.7%	13.0%

24. For the fields that were affected by the most recent flood, what practice did you most often use during the affected year?

PRACTICES	Percentage
Left the field idle (N=151)	45.2%
Planted with a different cash crop (N=27)	8.1%
Planted with cover crops on my own (N=95)	28.4%
Planted with cover crops with government subsidies (N=19)	5.7%
None of the fields have been affected (N=42)	12.6%

25. For the conventional crop fields most frequently affected by drought and/or flood, please rate your likelihood of making the following changes in the next 5 years.

PRACTICES	Very Unlikely (1)	Unlikely (2)	Not Sure (3)	Likely (4)	Very Likely (5)
Use no-till/reduced tillage (N=318)	19.2%	13.2%	24.8%	29.9%	12.9%
Use cover crops (N=315)	14.6%	12.4%	32.7%	33.0%	7.3%
Diversify cropping (N=315)	13.4%	14.7%	34.4%	28.3%	9.2%
Integrate grazing (N=313)	32.6%	16.6%	21.4%	21.4%	8.0%
Convert from cropland to grassland (N=313)	48.6%	22.0%	19.8%	7.0%	2.6%

SECTION V: CHEMICAL USE ON CROP LAND

	Yes (1)	No (2)
26. Did you apply manure to the fields as a fertilizer for crop production in 2020? (N=340)	51.6%	48.4%

27. Please specify the amount of chemical nitrogen fertilizer that you use and desired for corn production.

TIME FRAME	N FERTILIZER AMOUNT (IBS. N/ACRE)						
	None (1)	1-40 (2)	41-80 (3)	81-120 (4)	121-160 (5)	161-200 (6)	200+ (7)
Current Year Usage (2020) (N=334)	10.8%	2.4%	8.7%	21.3%	32.9%	17.4%	6.6%
Desired Amount (N=326)	9.2%	2.2%	9.2%	26.1%	27.3%	18.1%	8.0%

28. How has your nitrogen use amount changed over the past 10 years? (N=333)

Reduced by more than 10% (1)	Reduced by 5%-10% (2)	Little change (within 5%) (3)	Increased by 5%-10% (4)	Increased by more than 10% (5)
4.8%	3.9%	48.1%	28.8%	14.4%

29. If your nitrogen use changed over time, please check all applicable reasons for such change.

REASONS	Percentage
Soil Nutrient Test Data (N=162)	26.1%
Cover Crops (N=40)	6.5%
Change in Yield Goals (N=163)	26.3%
Diversified Crop Rotation (N=49)	7.9%
Precision Nutrient Application (N=98)	15.8%
Continuous Cropping (N=34)	5.5%
Not applicable (N=74)	11.9%

30. If your nitrogen use changed over time, how do you rate your yield and profit change due to the change in your nitrogen use over the last 10 years?

	Reduced by > 10% (1)	Reduced by 5%-10% (2)	Little change (within 5%) (3)	Increased by 5%-10% (4)	Increased by >10% (5)
Yield (N=253)	1.2%	0.8%	20.6%	43.9%	33.6%
Profit (N=246)	1.2%	2.4%	26.0%	43.1%	27.2%

SECTION VI: YOUR VIEWS ON COMMUNITY AND ENVIRONMENT

31. The following questions are about how you feel about the land you farm. Please rate how much you agree or disagree with the following statements.

	Strongly disagree (1)	Somewhat disagree (2)	Somewhat agree (3)	Strongly agree (4)
When I think of home, I think of the land I farm (N=340)	2.1%	2.4%	29.4%	66.2%
I feel happiest when I am on the land I farm (N=339)	0.9%	3.2%	28.9%	67.0%
The land I farm is my favorite place to be (N=338)	1.5%	4.7%	31.7%	62.15
The land I farm is an important part of who I am (N=339)	1.8%	5.3%	25.7%	67.3%
My personal history is closely tied to the land I farm (N=340)	2.4%	6.8%	27.9%	62.9%
Even if I were no longer farming, the land I farm will always be a part of who I am (N=340)	2.7%	5.9%	28.5%	62.9%
It is important to me that the land I farm stay in my family (N=339)	2.1%	8.3%	21.8%	67.9%
The friendships I have developed through farming activities in the area where I farm are important to me (N=339)	0.6%	5.0%	41.6%	52.8%
Farmers in the area where I farm generally have beliefs and values similar to mine (N=340)	2.4%	15.6%	49.7%	32.4%
I have a trusted network of people I talk with about farming in the area where I farm (N=339)	0.9%	10.9%	45.4%	42.8%
There aren't many job opportunities available to me other than farming (N=338)	20.7%	35.8%	28.1%	15.4%
The land I farm is important to my economic well- being (N=339)	2.4%	6.2%	33.3%	58.1%
The characteristics of the land I farm (soil type, topography, etc.) are largely responsible for my success as a farmer (N=340)	2.4%	12.9%	49.4%	35.3%
If I could farm anywhere in the world, it would be the land I farm now (N=338)	5.0%	19.5%	39.6%	35.8%
Even though there might be better places to farm, I would rather farm in the area where I farm than anywhere else (N=339)	3.5%	12.7%	42.5%	41.3%
I would feel out of place farming anywhere else (N=339)	4.7%	25.7%	43.7%	26.0%

32. A sense of responsibility for one's own well-being and for the well-being of others can play an important role in peoples' decisions and actions. Rate how responsible you feel to the following groups of people for conserving the soil and water resources on the land you farm.

	Not at all responsible (1)	Slightly responsible (2)	Moderately responsible (3)	Very responsible (4)
Previous generations of my family (N=336)	6.0%	21.7%	35.4%	36.9%
Myself (N=333)	0.3%	5.4%	23.7%	70.6%
My neighbors (N=334)	5.1%	23.1%	41.3%	30.5%
People in the area where I farm (N=337)	3.6%	24.6%	40.7%	31.2%
People in my watershed (N=337)	4.5%	23.2%	38.9%	33.5%
Everyone on planet earth (N=337)	7.1%	34.4%	31.8%	26.7%
Future generations (N=337)	2.4%	13.1%	34.7%	49.9%

33. Soil and water conservation practices can have on-farm and off-farm benefits for the natural environment such as preventing erosion, reducing loss of nutrients into waterways, improving wildlife habitat, etc. In general, how beneficial do you feel the conservation practices on the land you farm are for the natural environment in the following places?

	Not beneficial (1)	Slightly beneficial (2)	Moderately beneficial (3)	Very Beneficial (4)
My farm (N=334)	0%	10.5%	39.8%	49.7%
The area where I farm (N=333)	0.3%	12.6%	45.4%	41.7%
My watershed (N=333)	0.6%	17.1%	43.2%	39.0%
My state (N=334)	1.2%	19.8%	44.3%	34.7%
The Midwest (N=332)	1.5%	22.0%	44.3%	32.2%
The country (N=334)	3.3%	23.7%	42.5%	30.5%
The planet earth (N=332)	5.4%	22.0%	42.5%	30.1%

SECTION VII: AGRICULTURAL DECISION SUPPORT SYSTEMS

34. Agricultural decision support systems (DSS) are software and hardware-based tools that gather and analyze farm-level environmental data and provide recommendations to producers about when and where to plant, spray, and harvest.

	Yes (1)	No (2)
Are you currently using a DSS for managing your farm? (N=337)	7.4%	92.6%

35. Select the type of decision support system (DSS) you use (you can select more than one choice):

TYPE OF DECISION SUPPORT SYSTEM	Percentage
Irrigation management (N=3)	6.7%
Matching climatic conditions to agricultural inputs (N=18)	40.0%
Purchase supplies and sell (N=23)	51.1%
Other (N=1)	2.2%

36. The following are problems some producers have experienced from their use of decision support systems (DSSs) and precision farming in general. Please rate your agreement or disagreement with the following statements. Please select one option on each line.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
The cost of purchasing and operating a decision support system is too high (N=322)	1.6%	4.7%	45.0%	31.7%	17.1%
The cost of maintaining decision support systems is too high (N=320)	1.3%	3.8%	45.6%	34.7%	14.7%
Interpreting and making decisions takes too much time (N=322)	0.9%	13.7%	54.4%	26.1%	5.0%
Decision support systems lack a user-friendly interface (N=319)	0.6%	7.8%	58.9%	25.1%	7.5%
I lack knowledge and skills to effectively interpret the agronomic recommendations (N=318)	4.7%	14.8%	40.9%	31.1%	8.5%
I am not sure I am using the data I collect as effectively as possible (N=319)	1.9%	4.1%	52.0%	35.4%	6.6%
I lack confidence in the agronomic recommendations made by decision support systems (N=320)	2.8%	13.8%	53.1%	23.4%	6.9%
I still need to ground truth the recommendations made by the decision support system (N=319)	0.3%	3.8%	43.3%	38.9%	13.8%
Decision support systems are only beneficial for big farms (N=319)	7.2%	21.0%	46.4%	18.2%	7.2%
There is not enough clarity and transparency about data collection terms and conditions (N=319)	1.6%	4.4%	61.1%	26.3%	6.6%
I am concerned about risks of data privacy related to decision support systems (N=317)	1.9%	9.8%	44.2%	27.2%	17.0%
I am concerned that corporations will use data for their benefit and not farmers' (N=320)	1.6%	7.2%	34.7%	32.2%	24.4%
I am concerned that data from decision support systems could be used for regulatory purposes (N=320)	1.3%	5.0%	38.1%	32.5%	23.1%

SECTION VIII: ABOUT YOU AND YOUR FARM

37. In what year were you born?

	Mean	Range	Frequency
Age (N=339)	58.8	23 - 91	339

	Male (1)	Female (2)
38. What is your gender? (N=341)	97.2%	2.6%

	High school or less (1)	4-year college degree (2)	Some college/technical school (3)	Advanced degree (Masters, etc.) (4)
39. What is the highest level of school you have completed? (N=339)	23.9%	43.7%	26.3%	6.2%

	Yes (1)	No (2)
40. Have you completed an agricultural major in college (e.g., agronomy, animal science, agricultural business)? (N=236)	30.5%	69.5%

	Less than 5 years (1)	5 – 10 years (2)	11 – 20 years (4)	21 – 30 years (5)	More than 30 years (6)
41.Approximately how many years have you been making farm management decisions? (N=291)	2.4%	11.7%	12.7%	16.2%	57.0%

	Yes (1)	No (2)
42. Do you consider farming as your primary operation in 2020? (N=290)	76.2%	23.8%

	Less than $50,000 (1)	From $50,000 up to $99,999 (2)	From $100,000 up to $249,999 (3)	From $250,000 up to $499,999 (4)	From $500,000 up to $999,999 (5)	$1 million or more (6)
43. Please indicate the level of your gross farm/ranch sales in a typical year (N=283)	17.7%	14.5%	24.5%	21.2%	12.7%	9.9%