

Focusing Now To Affect The Future



Survey reveals soil health awareness and interest is strong among South Dakota agricultural students and instructors, but additional educational resources are needed.



It is estimated that nationwide, soil health adoption rates are currently between 5-8 percent. Innovators and early adopters have shown an eagerness to implement these systems but moving soil health beyond these groups and into the mainstream of American agriculture will require a multi-pronged, multi-generational approach.

It will be necessary to devote more resources to educate, inspire and motivate the next generation of farmers and non-operator landowners, especially during their formative years and formal educational experiences.

Sample Student Summary Findings

Finding #1 Significant Student Interest In Soil Health and Soil Health-Related Topics



$\approx \frac{2}{3}$ of respondents (67%) indicated that they were **“interested”** or **“highly interested”** in the topic of “soil health and regenerative agriculture”

Finding #3 Direct Correlation Between Soil Health Education and Demonstrated Knowledge



The survey results clearly indicate a corollary relationship between students' previous **formal education** and exposure to **soil health principles**, and their understanding of associated **benefits and functions**.

Finding #5 Students Overwhelmingly Believe Consumers Will Have More Influence Over How Food Is Grown In The Future

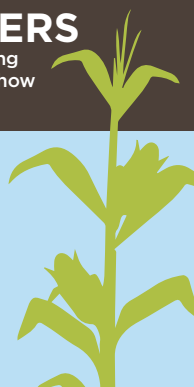


Students across all sub-groups realize that

CONSUMERS

will play an increasing role in determining how their food is grown.

An overwhelming **92% of respondents** indicated consumers will have **“somewhat more”** to **“significantly more”** influence within the next **10 YEARS**.



Sample Instructor Summary Findings

Finding #1 Instructors Have Received **MORE FORMAL EDUCATION** In The Taxonomic Aspects Of Soil Science And Are

More Confident

→ Teaching These Aspects ←



In terms of rating their previous formal educational exposure to soil science and soil health, the respondents indicated they had received slightly more formal education related to the taxonomic aspects of soil science than other aspects of soil science.

Finding #3 South Dakota's "Soil Health Bucket" Has Strong Use and Value Among Instructors

Several years ago, South Dakota developed and distributed a unique "Soil Health Bucket" educational package to specifically assist South Dakota FFA and/or 4-H instructors in their teaching of soil health principles to their students. The survey found that 74% of respondents received the bucket. Of those receiving the kit, 51% used some of the materials. Of those who used the materials,

92%

found them **HELPFUL** (42%)
or **VERY HELPFUL** (50%).

SURVEY RECOMMENDATIONS

#1

Continue Or Increase Soil Health Education Efforts Directed Towards All Agricultural Instructors.

#2

Ensure Future Soil Health Information And Educational Materials Focus On On-Farm Benefits.

(i.e. "improved soil function/fertility through managed grazing" and "soil water holding capacity and drought resiliency.")

#3

Continue To Work With Agricultural Education Groups, Institutions And Educators To Develop And Expand Soil Health Information And Curricula.

#4

Develop Age-Appropriate Videos, Interactive Media And Other Teaching Tools.

TO RECEIVE A COPY OF THE FULL
SURVEY REPORT PLEASE CONTACT:



South Dakota
Soil Health Coalition
(605) 280-4190
sdsoilhealth@gmail.com
www.sdsoilhealthcoalition.org

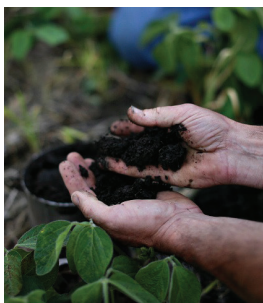
This material is based upon work supported by the Natural Resources Conservation Service, U.S. Department of Agriculture, under agreement NR186740XXXXG001.

Photo credit: USDA NRCS South Dakota, Joe Dickie, Mitch Kezar.

The USDA is an equal opportunity provider, employer, and lender.

Soil Health Knowledge, Interest, and Awareness Survey

South Dakota Agricultural Students, Instructors, and Advisors



 South Dakota
Soil Health Coalition



BACKGROUND

Annual cover crop surveys conducted by the Sustainable Agriculture Research and Education outreach program (SARE) and Natural Resources Conservation Service (NRCS) program participation reports, have indicated that soil health management system (soil health) adoption rates have slowly risen nationally. Individuals implementing these practices however, are largely considered innovators or early adopters and represent less than 10 percent of the total farming community. Many experts believe soil health adoption is reaching the “adoption curve chasm,” or point where the difficult transition between reaching early adopters and the majority, must be made. This stage will require new strategies and tactics to advance the soil health movement into the mainstream of farming.



Focusing Now To Affect The Future

Based on the information mentioned at left, it's estimated that nationwide, soil health adoption rates are currently between 5-8 percent. Innovators and early adopters have shown an eagerness to implement these systems but moving soil health beyond these groups and into the mainstream of American agriculture will require a multi-pronged, multi-generational approach. Special focus is needed on strategies and tactics that educate and inspire America's next generation of farmers BEFORE more “conventional farming methods” are accepted and utilized.

It will be necessary to devote more resources to educate, inspire and motivate the next generation of farmers and non-operator landowners, especially during their formative years and formal educational experience. This may serve to preempt the message of “conventional farming” which relies on practices such as tillage and synthetic inputs rather than regenerative agricultural practices like no-till, cover crops and diverse species rotations.

PURPOSE

Before effective strategies and tactics can be developed to effect change among this important audience, current levels of understanding, receptivity to potential messages and any potential communication barriers needed to be assessed. Consequently, the South Dakota Soil Health Coalition (SDSHC) along with communications consultants worked to develop, execute and analyze a poll of both students and instructors. The goal of this project was to more fully gauge soil health knowledge, interest and awareness and utilize this information to inform future outreach.

The consultants worked with J. Arbuckle, Ph.D. (Iowa State University Sociologist), Geri Eide (SD FFA Foundation), and Michele Nelson (FFA State Advisor SDSU) to develop the survey. The survey project was made possible through a grant provided by the USDA-Natural Resources Conservation Service.

THE SURVEY

During the summer of 2018, an outreach plan was developed to identify technical institutes and FFA instructors and advisors.

Subsequently, throughout the fall of 2018, more than 500 agricultural student respondents at South Dakota State University (SDSU), Lake Area Technical Institute (LATI), Mitchell Technical Institute (MTI), and middle and high school FFA students across South Dakota, completed the on-line survey. Of the 514 total responses, 245 (48%) are attending technical college, 196 (38%) are attending a four-year university, and 71 (12%) are FFA or 4H students attending middle or high school. Based on the size of the agricultural student-centric populations, the student survey results have a margin of error of +/-4 percent. With 43 instructor respondents participating, this portion of the online survey has an estimated margin of error of +/-12 percent.

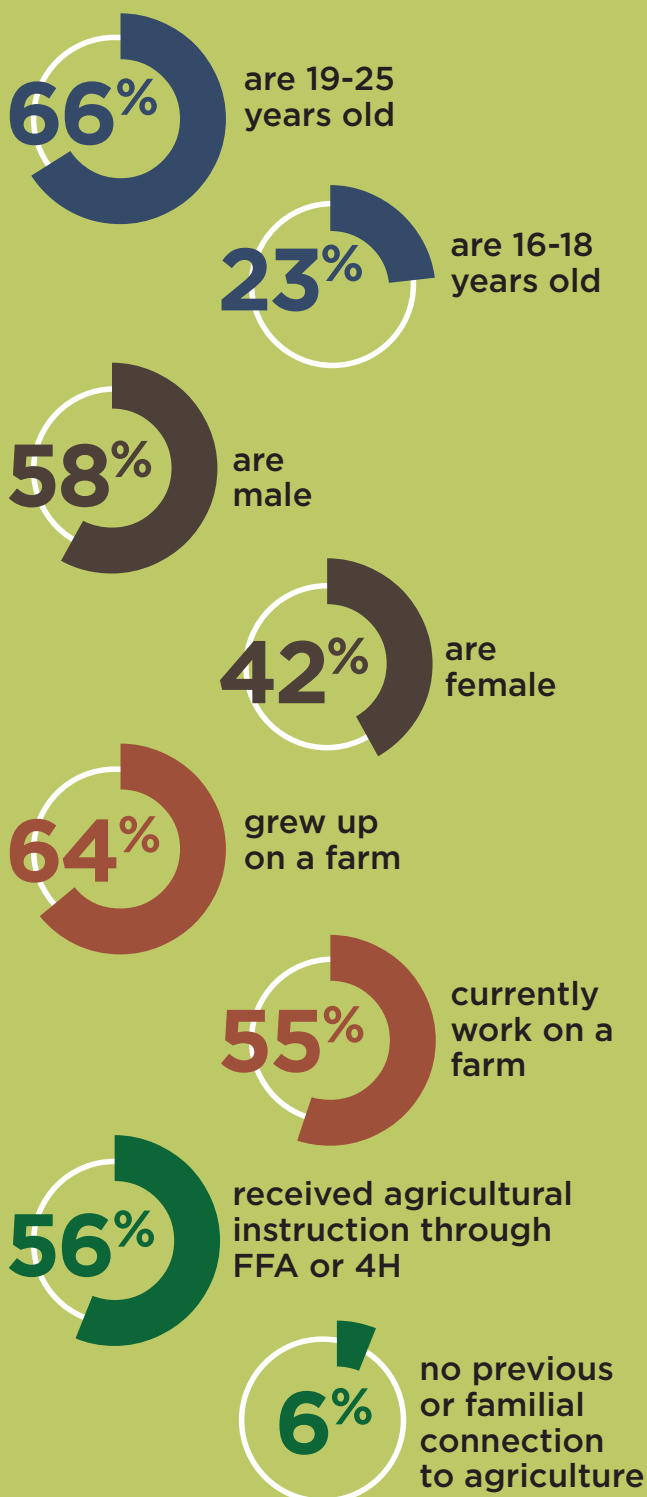
Student Respondent Profile

Of the **OVERALL**

student audience surveyed, demographic and experiential responses from the

South Dakota

students reveal the following:



THE TOP FIELDS OF CURRENT OR ANTICIPATED ACADEMIC PURSUIT INCLUDE THE FOLLOWING:

- Agricultural business management
- Agronomy
(including agricultural science)
- Animal husbandry
(including animal science)
- Crop production
(including precision agriculture)
- Agricultural engineering

SUB-GROUP DATA POINTS OF NOTE

Of the high school and middle school student sub-group:

- 33% plan to start their careers upon high school graduation
- 18% plan to work as a farm manager in the future
- 33% have not yet decided their career choice

Of the technical college student sub-group:

- 96% plan to start their careers upon graduation from technical college
- 54% plan to work as a farm manager
(22% in ag business/crop consulting)
- 75% are male, 25% female

Of the university student sub-group:

- 69% grew up on a farm
- 21% plan to work as a farm manager
(15% in ag business/crop consulting)
- 17% anticipate post-graduate degree
- 63% are female, 37% male

Student Summary Findings

The survey featured several soil health knowledge self-assessment questions as well as applied knowledge “indicator” questions to help assess overall awareness of key soil health principles. In addition, the survey questions sought to determine if students were more aware of and informed about any specific aspect of soil science over another (i.e. soil taxonomy verses soil biology) and what affect previous formal education or exposure had on their subsequent awareness, knowledge and/or interest in soil health-related topics.

Finding #1 Significant Student Interest In Soil Health and Soil Health-Related Topics

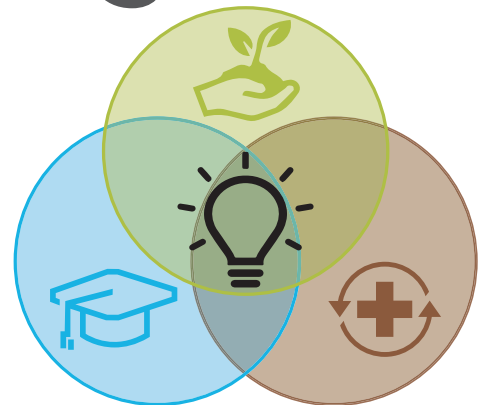


Those who responded as “interested” or “highly interested” in soil health-related benefits like “increasing the profitability, production potential and marketability of agricultural products” jumped to 76%. An equal percentage of respondents (76%) were “interested” or “highly interested” in “growing nutrient-rich foods for today’s consumer.”

Finding #2 Student Interest In Soil Health Benefits Is Strong.

The majority of students expressed positive interest (from “somewhat” to “very interested”) in all of the seven major benefits of soil health and regenerative agricultural principles listed in the survey. Two benefits were of particular interest, with 25% of student respondents indicating they were “very interested” in both “Improved soil function/fertility through managed grazing” and “Soil water holding capacity and drought resiliency.”

Finding #3 Direct Correlation Between Soil Health Education and Demonstrated Knowledge



One foundational principle of soil health management is understanding the negative impact soil tillage has on soil health, structure, biology and function. By a 64% to 34% margin, students who indicated they had had previous “high exposure” to formal education regarding soil health topics selected “strongly disagreed” or “disagreed” with the statement “Overtime, tillage or plowing allows rain to soak more easily into the ground.” This higher understanding of the adverse impact of tillage is a clear indicator that “high exposure” students retained key soil health education information.

Likewise, high soil health education exposure resulted in a greater expressed understanding of the role soil biology and soil health have on soil function, with 75% of those students expressing the understanding that more than 50% of soil function is enabled by biology and soil health. Only 51% of students who had no previous formal soil health education responded similarly. Of the “no exposure” group, 22% indicated they “did not know” the answer to the question.

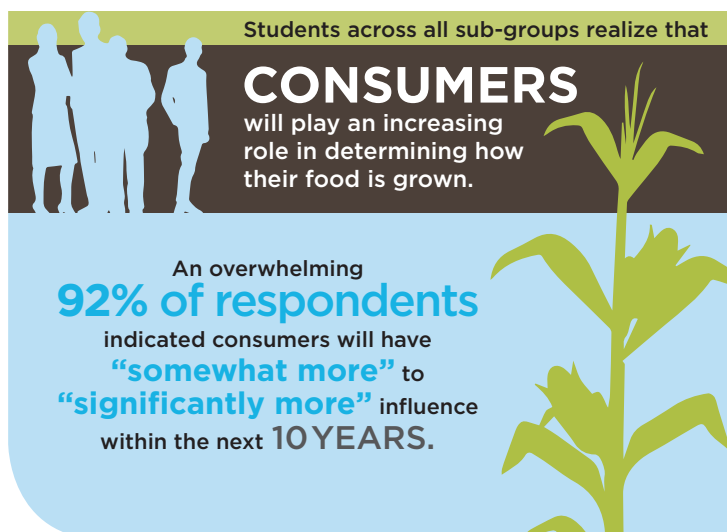
Finding #4 High Exposure To Soil Health Education Corresponds With High Interest In The Subject

While overall agricultural student interest in soil health and soil health-related topics is strong (as noted in “Finding #2”), it is especially robust among the sub-group of students who reported high soil health education exposure. In fact, the weighted mean average difference between the “high exposure” and “no exposure” groups across the seven benefit topics listed, averaged a full point on the 5-point Likert Scale.

Likewise, students in technical college and at the university level reported a significantly higher level of interest in topics related to soil health and regenerative agriculture compared to their middle and high school counterparts. In terms of expressed interest across the seven soil health/regenerative agricultural topics listed in the survey, half of the middle and high school students were “only slightly interested” or “completely uninterested,” whereas, on-average, two-thirds of college students were “somewhat interested,” “Interested” or “Very interested” in the same topics. This “interest gap” may be attributable to the maturation and selection of majors/professions among the college students compared to the middle and high school students, additional education exposure to the subject matter by college students, or a combination of both factors.



Finding #5 Students Overwhelmingly Believe Consumers Will Have More Influence Over How Food Is Grown In The Future



This widespread awareness is especially striking in the context of the soil health-related and regenerative agriculture movement, as more consumers (and food processing and retail outlets) recognize the associated environmental, climate, health and nutritional benefits.



Finding #6

Students Surveyed Who Attend “Technical College” Reported Higher Knowledge Levels Than Those Attending “College/University/Four Year Degree Programs”, In Factors That Affect Soil Function

When asked to indicate their current knowledge of factors which affect soil function more students attending “**Technical College**” reported being “somewhat” to “highly knowledgeable” than those attending “**College/University/Four Year Degree Program**”. This was the case for all factors listed which include: physical composition of soil, soil PH, soil chemistry, soil biology, and soil health.

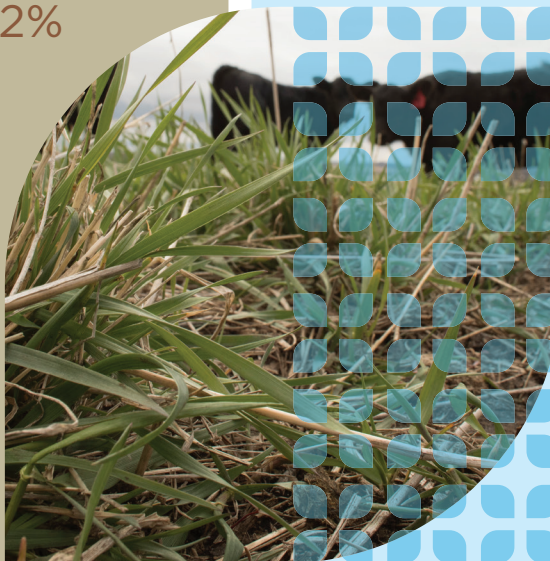
Physical Composition of Soil:
85.31% vs. 68.69%

Soil PH:
66.12% vs. 48.47%

Soil Chemistry:
60.42% vs. 46.46%

Soil Biology:
61.98% vs. 44.45%

Soil Health:
84.01% vs. 52.52%



Finding #7

Students Surveyed Who Attend “Technical College” Reported Higher Educational Exposure Than Those Attending “College/University/Four Year Degree Programs”, To Factors That Affect Soil Function

When asked to rate their educational exposure to factors which affect soil function, more students attending “**Technical College**” reported receiving “medium” to “high exposure” than those attending “**College/University/Four Year Degree Program**”.

Physical Composition of Soil:
91.43% vs. 63.63%

Soil PH:
80.41% vs. 43.94%

Soil Chemistry:
76.33% vs. 44.95%

Soil Biology:
80.40% vs. 45.46%

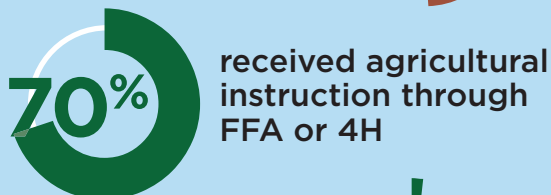
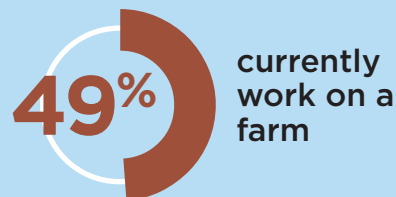
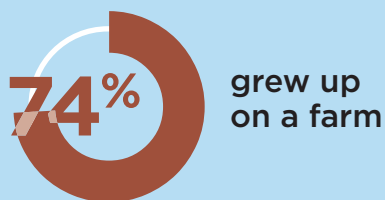
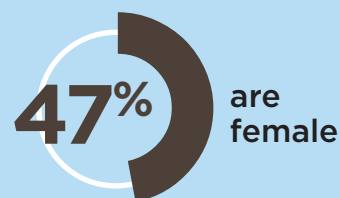
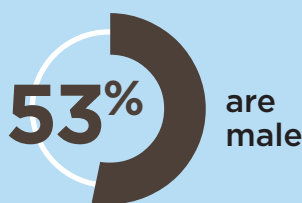
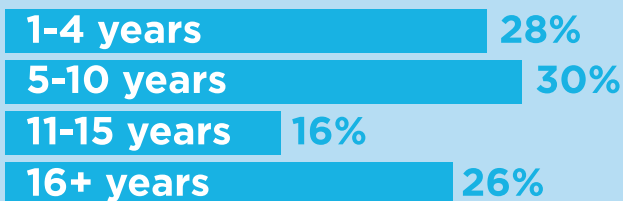
Soil Health:
89.35% vs. 48.48%

INSTRUCTOR RESPONDENT PROFILE

With 43 instructor respondents participating, this portion of the on-line survey has an estimated margin of error of +/-12 percent. Due to this limited respondent sample, the observations and recommendations that follow in the summary should be considered directional rather than predictive. Nonetheless, the survey results (especially when viewed in the context of the statistically significant student survey) provide some key insights into the awareness, interest and soil health-related educational tools required to assist this key group as they seek to educate subsequent generations about the basics and benefits of soil health and regenerative agriculture.

Of the **OVERALL** instructor audience surveyed, demographic and experiential responses reveal the following:

The range of teaching experience is fairly evenly distributed.



Instructor Summary Findings

Mirroring the student survey, the instructor poll featured a number of soil health knowledge self-assessment questions as well as applied knowledge “indicator” questions to help assess overall awareness of key soil health principles.

The instructor survey questions also attempted to determine if the respondents were more aware of and informed about any specific aspect of soil science over another (i.e. soil taxonomy verses soil biology) and to what extent previous formal education and exposure had on their subsequent awareness, knowledge, confidence and/or interest in teaching soil health-related topics.

Finding #1 Instructors Have Received **MORE FORMAL EDUCATION** In The Taxonomic Aspects Of Soil Science and Are

More Confident

→ Teaching These Aspects ←



In terms of rating their previous formal educational exposure to soil science and soil health, the respondents indicated they had received slightly more formal education related to the taxonomic aspects of soil science than other aspects of soil science.

Respondents indicated having received either “medium” or “high” exposure to the following topics, at the following levels.

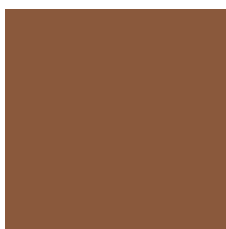
- **67% Physical composition of soil**
(sand, silt, clay)
- **51% Soil acidity** (pH)
- **58% Soil Chemistry** (NPK)
- **47% Soil biology**
- **44% Soil health**

Finding #2 Respondents Appear To Have Received Additional Professional Development Or Independent Learning Related To Soil Health

In general, formal educational experience translates directly to confidence in teaching the topic areas, with one noteworthy exception: soil health. Respondents indicated being “somewhat knowledgeable” or “highly knowledgeable” in the following areas at the following levels.

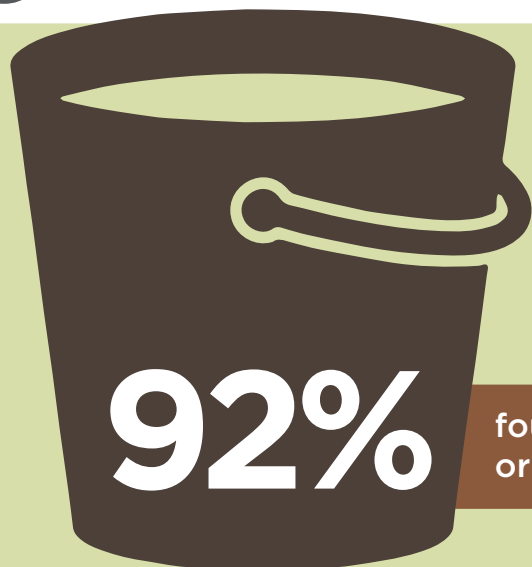
- **91% Physical composition of soil**
(sand, silt, clay)
- **49% Soil acidity** (pH)
- **64% Soil Chemistry** (NPK)
- **64% Soil biology**
- **74% Soil health**

While respondents indicated they had received the least amount of formal education in soil health and soil biology, the topic of soil health ranked second to “physical composition of soil” when it came to expressed knowledge about the topic, indicating some level of additional post-graduation professional development or independent learning on the topic by the respondents. This notable change may also be attributable, at least in part, to the availability of South Dakota’s Soil Health Bucket materials (see following section).



Finding #3

South Dakota's "Soil Health Bucket" Has Strong Use and Value Among Instructors



Several years ago, South Dakota developed and distributed a unique **"Soil Health Bucket"**

educational package to specifically assist South Dakota FFA and/or 4-H instructors in their teaching of soil health principles to their students.

The survey found that 74% of respondents received the bucket. Of those receiving the kit, 51% used some of the materials. Of those who used the materials,

found them **HELPFUL** (42%)
or **VERY HELPFUL** (50%).

Finding #4

Instructors Demonstrated Knowledge Of Key Soil Health Principles And Resulting Benefits Is High

Nine out of 10 respondents indicated that soil function and soil health can be "Highly affected" by agronomic practices like no-till, cover crops, managed grazing and crop rotations. When asked what percentage of soil function (water holding capacity, fertility, productive capacity, plant health, etc.) is enabled by soil biology and soil health," 95% responded correctly. Two-thirds of instructor respondents indicated (correctly) that soil structure and function can be improved in 10 years or fewer using no-till, cover crops, crop rotation and managed grazing.



Finding #5

Tillage And "The Stubborn Third"

Despite demonstrating general knowledge regarding the principles and benefits of soil health management systems, the role of tillage in production agriculture remains a stubborn holdout in the minds of many—including more than a third of the agricultural instructors surveyed. This "stubborn third" of respondents mirrors the erroneous perceptions of other audience groups previously surveyed on this topic (from farmers to consumers).



Finding #6 High Interest In Soil Health Teaching Tools



Age-appropriate videos — 60%
(weighted mean 1.49)

Interactive teaching aids — 60%
(weighted mean 1.51)

Website tools — 57%
(weighted mean 1.57)

Lesson Plans — 52%
(weighted mean 1.67)

Finding #8 Improving Soil Health Is Seen By Instructors As Highly Important To The Future Of American Agriculture

100%

of instructors surveyed responded that they believe improving soil health is either “Extremely important” or “Important” to the future of American Agriculture. 86.05% selecting “Extremely important” and 13.95% selecting “Important”.

Finding #7 Local Workshops With Meals/Materials During The Summer Are Most Preferred

When asked “If a soil health workshop for instructors was offered, how likely would attend,” the

TOP THREE WORKSHOP OFFERINGS WERE...



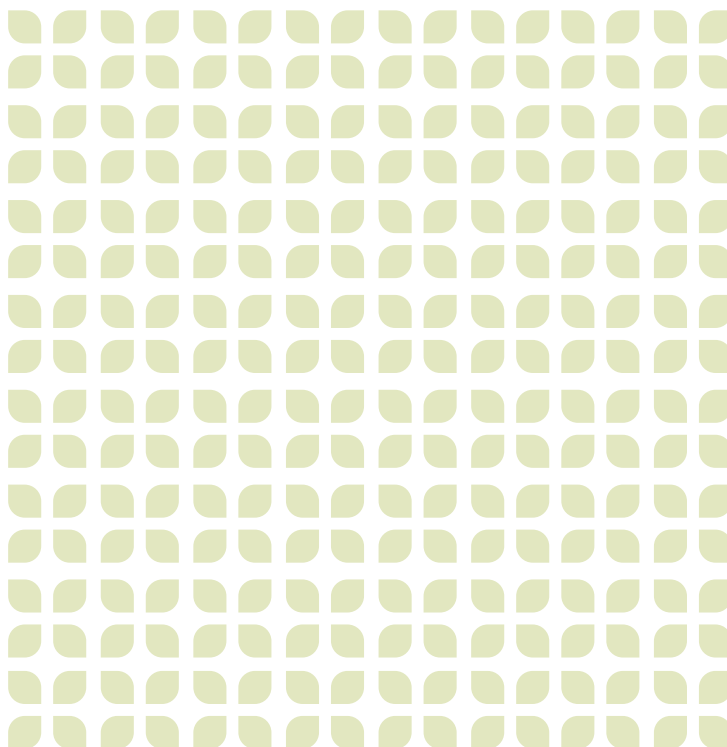
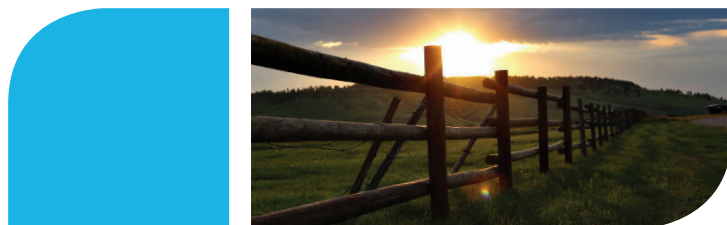
Within 1 hour commuting distance
(weighted mean 1.63)



Offering **means, teaching materials**
(weighted mean 1.77)



Offering **travel/meal stipend**
(weighted mean 2.00)



RECOMMENDATIONS BASED ON DATA

The following are several recommendations and supporting analytical observations offered to further assist those involved in the South Dakota soil health and regenerative agricultural movement in an effort to inform the planning and execution of future strategic and tactical marketing communications activities.

#1

Continue Or Increase Soil Health Education Efforts Directed Towards All Agricultural Instructors.

Given the resounding correlation between expressed knowledge formal soil health education, and awareness among the student respondents, investments in soil health educational activities from middle school through college have a measurable and lasting benefit. In addition, the same correlation between students expressing interest in soil health and soil health-related topics also appears to be directly influenced by previous soil health education exposure.

#2

Ensure Future Soil Health Information And Educational Materials Focus On On-Farm Benefits.

(i.e. “improved soil function/fertility through managed grazing” and “soil water holding capacity and drought resiliency.”)

Even among those students who had previous exposure to soil health education, there appears to be an opportunity to more effectively communicate the resulting benefits of soil health management systems to students. So while the scientific principles underpinning the agronomic and ecologic functions of soil health remain important, the resulting on-farm benefits associated with improving soil health should be more fully communicated.



RECOMMENDATIONS BASED ON DATA

PLEASE CONTACT THE
SD SOIL HEALTH COALITION FOR
ADDITIONAL INFORMATION



(605) 280-4190
sdsoilhealth@gmail.com
www.sdsoilhealthcoalition.org

*This material is based upon
work supported by the Natural
Resources Conservation
Service, U.S. Department of
Agriculture, under agreement
NR186740XXXXG001.*

*Photo credit: USDA NRCS South
Dakota, Joe Dickie, Mitch Kezar.*

*The USDA is an equal opportunity
provider, employer, and lender.*

#3

Continue To Work With Agricultural Education Groups, Institutions And Educators To Develop And Expand Soil Health Information And Curricula.

Students across all sub-groups, as well as their instructors, anticipate that consumers will play an increasing role in determining how their food is grown. As more consumers (and food processing and retail outlets) recognize the associated environmental, climate, health and nutritional benefits, there will be an increasing demand for future agriculturalists who understand how to effectively integrate soil health management principles into food production systems.

Educational institutions have the opportunity to meet the future needs of their students by preparing them for these jobs of the future by developing more regenerative agriculture and soil health-focused curricula.

#4

Develop Age-Appropriate Videos, Interactive Media And Other Teaching Tools.

Visual and interactive learning tools are preferred by South Dakota agricultural instructors. These instructors play a critical role in introducing the next generation of soil health and regenerative agriculturalists to key soil health principles.

Organizations working to promote soil health and regenerative agriculture should consider developing and/or distributing these learning tools to educators as a way of both educating and cultivating early interest in soil health and regenerative agriculture among the next generation. Given the identified “interest gap” (see “Finding #4 above) among younger students, investments in these types of learning tools could help close that gap and provide future farmers with a basic (and early) introduction to important soil health management principles.

