

Shaping Soil Watershed Stewardship Through Combined Producer and Influencer Education: A Pilot Program

Abstract

Changes in land use from grassland to row crop agriculture may contribute to environmental degradation. Outreach efforts on this topic have largely targeted producers, but interactions with "influencers" may affect producers' conservation decisions. Consequently, we conducted a pilot implementation of a 1-day workshop for both producers and influencers on soil health and its impact on watersheds. We measured producers' knowledge gains and all participants' satisfaction with the workshop content and instruction. We also collected information from all participants regarding their past, present, and potential future use of or recommendations for using conservation practices. Our results may be useful for improving future workshop offerings and other initiatives intended to connect producers and influencers in learning.

Keywords: [soil health](#), [land conversion](#), [watersheds](#), [conservation](#), [andragogy](#)

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Introduction

The Western Corn Belt of the United States has experienced rapid rates of land conversion from grassland–wetland complexes to corn and soy row crop production. Between 2006 and 2011, annual land conversion rates in Iowa, Minnesota, Nebraska, North Dakota, and South Dakota varied between 1.0% and 5.4%, comparable to rainforest deforestation rates in Brazil, Indonesia, and Malaysia (Wright & Wimberly, 2013). Recent estimates show that 24% of land east of the Missouri River in South Dakota has no tillage history (Bauman, Carlson, & Butler, 2016) and that conversion is expected to continue into the future (Turner et al., 2017).

Conversion from grassland to row crop agriculture contributes to increased soil erosion (Lal, 2004; Pimentel, 2006), decreases in soil water infiltration rates (Bharati, Lee, Isenhardt, & Schultz, 2002; Gerla, 2007), and reduced water quality in wetlands, lakes, streams, and rivers due to sedimentation and nutrient runoff (Verhoeven, Arheimer, Yin, & Hefting, 2006). Loss of soils and nutrients from

answer.)

- a) increase
- b) decrease
- c) stay the same
- d) I don't know.

6) Which of the following definitions best describes the term "soil externality"? (Select the single best answer.)

- a) impacts of soil organic matter and soil site stability due to switching land uses
- b) impacts of soil loss and/or change in soil properties due to a management system
- c) impacts of soil loss and/or change in soil properties felt by others due to a particular management system
- d) impacts of soil conservation practices to enhance soil organic matter and stability

7) What is the "glue" that holds soil together?

- a) glucose
- b) glomalin
- c) ghrelin
- d) glyoxalin
- e) I don't know.

8) Which of the following are keys to achieving soil health? (Select **ALL** that apply.)

- a) Minimizing soil disturbance
- b) Providing soil armor (cover)
- c) Always having live roots growing in the soil
- d) Using diverse plants, rotations and (where possible) animals
- e) Using only the manufacturer's recommended amount of fertilizers or pesticides

9) Which of the following best describes the definition of a "land steward"? (Select the single best answer.)

- a) Someone who's land is pristine, showing no signs of flaws or poor management.
- b) Someone entrusted with something with the understanding that it will be returned in the same or better condition than when it was given.
- c) Someone whom others in the community aspire to be like in terms of land productivity.
- d) Someone who follows all land management recommendations to the letter.

e) Not sure.

10) Using cover crops to manage or reduce soil loss can _____ a producer's risk of his/her land becoming infested with weeds or animal pests. (Select the single best answer.)

a) increase

b) decrease

c) neither increase nor decrease

d) Not sure.

Thank you for your participation in this quiz!

Appendix B

Voluntary Producer Postworkshop Survey Administered to Producers Who Participated in a Soil Health Workshop

Dear Workshop Participant:

Thank you very much for participating in today's workshop! We request your feedback on your experience in order to help us improve future workshops like this one. Please complete the short survey below before you depart today. We realize that your time is valuable and have attempted to keep the requested information as brief and concise as possible. It will take approximately 5-10 minutes of your time. Your participation in this project is voluntary. You may elect to withdraw from this survey at any time without consequence.

There are no known risks or direct benefits to you for participating in this survey. Your responses are strictly confidential. When the data and analysis are presented, you will not be linked to the data by your name, title, or any other identifying item. Please do not put your name on this survey form so that we can ensure that the data are anonymous. When you are finished, please return the completed survey in the enclosed envelope.

Your consent is implied by the return of the completed questionnaire. Please keep this letter for your information. If you have any questions, now or later, you may contact us at the number below. Thank you very much for your time and assistance. If you have any questions regarding your rights as a research participant in this study, you may contact the SDSU Research Compliance Coordinator at 605-688-6975, SDSU.IRB@sdstate.edu.

Sincerely,
Melissa Wuellner
Roger Gates
Ben Turner
Hector Menendez

This project has been approved by the SDSU Institutional Review Board, Approval No.: IRB-1606004-EXM.

1) What conservation practices have you implemented on your property in the past? (Select all that apply.)

- Cover crops
- Enrollment of land in Conservation Reserve Program
- Grass waterways
- Integration of livestock and crops
- Minimum or conservation tillage
- No-till

Other Please describe: _____

I have yet to implement any of the above conservation practices on my property.
(If selected, please skip to Question #3)

2) Which of the conservation practices identified in Question #1 are currently functional on your operation? (Select all that apply.)

Cover crops

Enrollment of land in Conservation Reserve Program

Grass waterways

Integration of livestock and crops

Minimum or conservation tillage

No-till

Other Please describe: _____

3) Are you considering implementing any new conservation practices within the next year?

Yes

No **(If selected, please skip to Question #5.)**

Not sure **(If selected, please skip to Question #5.)**

4) Which of the conservation practices are you considering implementing within the next year? (Select all that apply.)

Cover crops

Enrolling land in Conservation Reserve Program

Grass waterways

Integration of livestock and crops

Minimum or conservation tillage

No-till

Other Please describe: _____

5) Are you considering implementing any new conservation practices within the next three years?

Yes

No **(If selected, please skip to Question #7.)**

Not sure **(If selected, please skip to Question #7.)**

6) Which of the conservation practices are you considering implementing within the next three years? (Select all that apply.)

Cover crops

Enrollment of acres in the Conservation Reserve Program

Grass waterways

Integration of livestock and crops

- Minimum or conservation tillage
- No-till
- Other Please describe: _____

7) Rate your level of agreement with each of the following aspects of the workshop's content by circling one number for each statement.

(5 = Strongly agree; 4 = Slightly agree; 3 = Neutral; 2 = Slightly disagree; 1 = Strongly disagree; 0 = Not applicable/ Don't know.)

The content of the workshop was appropriate.	5	4	3	2	1	0
I learned more about soil health in the course of this workshop.	5	4	3	2	1	0
I learned more about how to better achieve soil health in the course of this workshop.	5	4	3	2	1	0
Classroom activities were appropriate for the topic.	5	4	3	2	1	0
Field activities were appropriate for this topic.	5	4	3	2	1	0
I would recommend this workshop to a colleague in the future.	5	4	3	2	1	0
I would attend an additional or advanced workshop related to this topic in the future.	5	4	3	2	1	0

**If you rated "slightly disagree" or "strongly disagree" on any of the statements listed above, please provide additional explanation of your ratings below:

8) Rate your level of agreement with each of the following aspects of the workshop's presenter(s) by circling one number for each statement.

(5 = Strongly agree; 4 = Slightly agree; 3 = Neutral; 2 = Slightly disagree; 1 = Strongly disagree; 0 = Not applicable/ Don't know.)

The presenter(s) explained content clearly and concisely.	5	4	3	2	1	0
The presenter(s) answered participant questions effectively.	5	4	3	2	1	0
The presenter(s) stimulated additional learning about the workshop topic that was not covered during the event.	5	4	3	2	1	0
I would attend another workshop by this/these presenter(s) in the future.	5	4	3	2	1	0
I would recommend this/these presenter(s) to others in my community.	5	4	3	2	1	0

****If you rated "slightly disagree" or "strongly disagree" on any of the statements listed above, please provide additional explanation of your ratings below:**

9) Please briefly share with us why you decided to attend this workshop today?

10) Where did you hear about this workshop? (Select all that apply.)

iGrow Website

Newspaper

Online newsletter

Radio

Other Please describe: _____

11) OPTIONAL: Approximately how many acres is your operation? _____ acres

Appendix C

Voluntary Soil Health Principles Pre- and Postworkshop Quiz Administered to Influencers Who Participated in a Soil Health Workshop

Dear Workshop Participant:

Thank you very much for participating in today's workshop! We request your feedback on your experience in order to help us improve future workshops like this one. Please complete the short survey below before you depart today. We realize that your time is valuable and have attempted to keep the requested information as brief and concise as possible. It will take approximately 5-10 minutes of your time. Your participation in this project is voluntary. You may elect to withdraw from this survey at any time without consequence.

There are no known risks or direct benefits to you for participating in this survey. Your responses are strictly confidential. When the data and analysis are presented, you will not be linked to the data by your name, title, or any other identifying item. Please do not put your name on this survey form so that we can ensure that the data are anonymous. When you are finished, please return the completed survey in the enclosed envelope.

Your consent is implied by the return of the completed questionnaire. Please keep this letter for your information. If you have any questions, now or later, you may contact us at the number below. Thank you very much for your time and assistance. If you have any questions regarding your rights as a research participant in this study, you may contact the SDSU Research Compliance Coordinator at 605-688-6975, SDSU.IRB@sdstate.edu.

Sincerely,

Melissa Wuellner

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This project has been approved by the SDSU Institutional Review Board, Approval No.: IRB-1606004-EXM.

1) Which conservation practices have you recommended to your clients in the past year? (Select all that apply.)

- Cover crops
- Enrollment of land in Conservation Reserve Program
- Grass waterways
- Integration of livestock and crops
- Minimum or conservation tillage

- No-till
- Other Please describe: _____
- I have yet to implement any of the above conservation practices on my property.

2) Which conservation practices will you recommend to your clients in the next year?
(Select all that apply.)

- Cover crops
- Enrollment of land in Conservation Reserve Program
- Grass waterways
- Integration of livestock and crops
- Minimum or conservation tillage
- No-till
- Other Please describe: _____
- Not sure.
- I have no plans to recommend any specific conservation practices to my clients in the next year.

3) Do you also farm or ranch on your personal property?

- Yes
- No **(If selected, please proceed to Question #10.)**

4) What conservation practices have you implemented on your property in the past? (Select all that apply.)

- Cover crops
- Enrollment of land in Conservation Reserve Program
- Grass waterways
- Integration of livestock and crops
- Minimum or conservation tillage
- No-till
- Other Please describe: _____
- I have yet to implement any of the above conservation practices on my property.
(If selected, please skip to Question #10)

5) Which of the conservation practices identified in Question #4 are currently functional on your operation? (Select all that apply.)

- Cover crops
- Enrollment of land in Conservation Reserve Program
- Grass waterways
- Integration of livestock and crops
- Minimum or conservation tillage
- No-till

Other Please describe: _____

6) Are you considering implementing any new conservation practices within the next year?

- Yes
- No **(If selected, please skip to Question #8.)**
- Not sure **(If selected, please skip to Question #8.)**

7) Which of the following conservation practices are you considering implementing within the next year?
(Select all that apply.)

- Cover crops
- Enrolling land in Conservation Reserve Program
- Grass waterways
- Integration of livestock and crops
- Minimum or conservation tillage
- No-till
- Other Please describe: _____

8) Are you considering implementing any new conservation practices within the next three years?

- Yes
- No **(If selected, please skip to Question #10.)**
- Not sure **(If selected, please skip to Question #10.)**

9) Which of the conservation practices are you considering implementing within the next three years?
(Select all that apply.)

- Cover crops
- Enrollment of acres in the Conservation Reserve Program
- Grass waterways
- Integration of livestock and crops
- Minimum or conservation tillage
- No-till
- Other Please describe: _____

10) Rate your level of agreement with each of the following aspects of the workshop's content by circling one number for each statement.

(5 = Strongly agree; 4 = Slightly agree; 3 = Neutral; 2 = Slightly disagree; 1 = Strongly disagree; 0 = Not applicable/ Don't know.)

The content of the workshop was appropriate.	5	4	3	2	1	0
I learned more about soil health in the course of this workshop.	5	4	3	2	1	0
I learned more about how to better achieve soil health in	5	4	3	2	1	0

the course of this workshop.

Classroom activities were appropriate for the topic. 5 4 3 2 1 0

Field activities were appropriate for this topic. 5 4 3 2 1 0

I would recommend this workshop to a colleague in the future. 5 4 3 2 1 0

I would attend an additional or advanced workshop related to this topic in the future. 5 4 3 2 1 0

**If you rated "slightly disagree" or "strongly disagree" on any of the statements listed above, please provide additional explanation of your ratings below:

11) Rate your level of agreement with each of the following aspects of the workshop's presenter(s) by circling one number for each statement.

(5 = Strongly agree; 4 = Slightly agree; 3 = Neutral; 2 = Slightly disagree; 1 = Strongly disagree; 0 = Not applicable/ Don't know.)

The presenter(s) explained content clearly and concisely. 5 4 3 2 1 0

The presenter(s) answered participant questions effectively. 5 4 3 2 1 0

The presenter(s) stimulated additional learning about the workshop topic that was not covered during the event. 5 4 3 2 1 0

I would attend another workshop by this/these presenter(s) in the future. 5 4 3 2 1 0

I would recommend this/these presenter(s) to others in my community. 5 4 3 2 1 0

**If you rated "slightly disagree" or "strongly disagree" on any of the statements listed above, please provide additional explanation of your ratings below:

12) Please briefly share with us why you decided to attend this workshop today?

13) Where did you hear about this workshop? (Select all that apply.)

- iGrow Website
- Newspaper
- Online newsletter
- Radio
- Other Please describe: _____

14) OPTIONAL: If you also farm or ranch, approximately how many acres is your operation?
_____ acres

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