



Utah Producers and Soil Health: Statewide Survey Results

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Introduction

Soil health is defined by the U.S. Department of Agriculture (USDA) as “the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans” (Natural Resources Conservation Service [NRCS], n.d.). While soil health is important for crop production, it is also increasingly recognized as important for societal and ecosystem services (Lehmann et al., 2020).

Recent research examined motivations for Utah ranchers and farmers to participate in a soil health trial and the challenges they face in implementing soil health conservation practices on their land (Petrzelka et al., 2024). This research finds that these producers understand the importance of soil health to the environment and their operation’s productivity. They also desire more information about soil health practices relevant to their region, the Intermountain West (IMW), given that much of the research focuses on the U.S. Midwest. Utah producers are well aware that their land is unique and that soil health practices used in other parts of the country do not always work, nor are they necessarily a good idea on their farm or ranch. Yet, they are motivated to attempt soil health practices for their benefit so that others can learn from them (Petrzelka et al., 2024).

Highlights

- Producers who responded to the statewide survey agreed strongly on the importance of soil health.
- The low level of government assistance needed or seen as a priority by survey respondents is a positive sign for more widespread adoption of soil health practices.
- Producers need more detailed information on how to implement soil health practices for more to use them.
- Few producers are using various biological and physical soil health tests, and much opportunity exists for increasing use and interpreting these tests for Utah growing conditions.
- Producers do not widely use soil health information sources.

Utah Producer Survey

These results and the lack of peer-reviewed research on soil health in the IMW highlight the need for more soil health data collection in Utah. To address this need and gain soil health perspectives and actions from a larger and more representative sample of Utah farmers and ranchers, a mail and online survey of Utah producers was conducted in 2024, focused on those who indicated they produced crops in 2023. The survey was developed by a team of Utah State University (USU) social scientists, agronomists, and environmental consultants who are part of the [Utah Soil Health Network On-Farm Soil Health Demonstration Project](#). A total of 517 Utah producers took the survey, a 19% response rate.¹

In this report, we provide an overview of the survey results, with a specific focus on producers' views on soil health, indicators used for soil health, factors that influence soil health adoption, and information sources used for soil health. We begin by briefly presenting survey participants' demographics and operation characteristics to provide context for the soil health discussion that follows.

Personal and Business Characteristics of Utah Producers

Age and Education

- Respondents' average age was 66, with a range from 23 to 98 years old.
- The majority (94%) identified as men and had varying levels of education, with 28% having some college, 25% holding a bachelor's degree, and 15% having a graduate/professional degree.

Occupation Scope and Income

- Of the producers, 60% have been making farm/ranch management decisions for more than 30 years, with 18% making these decisions between 21–30 years, indicating most producers have been involved in farming/ranching for a lengthy period.
- Fifty-one percent consider farming their primary occupation, with 32% indicating annual net farm income before taxes was less than \$25,000, followed closely by 30% indicating annual net farm income before taxes as \$25,000–\$74,999.

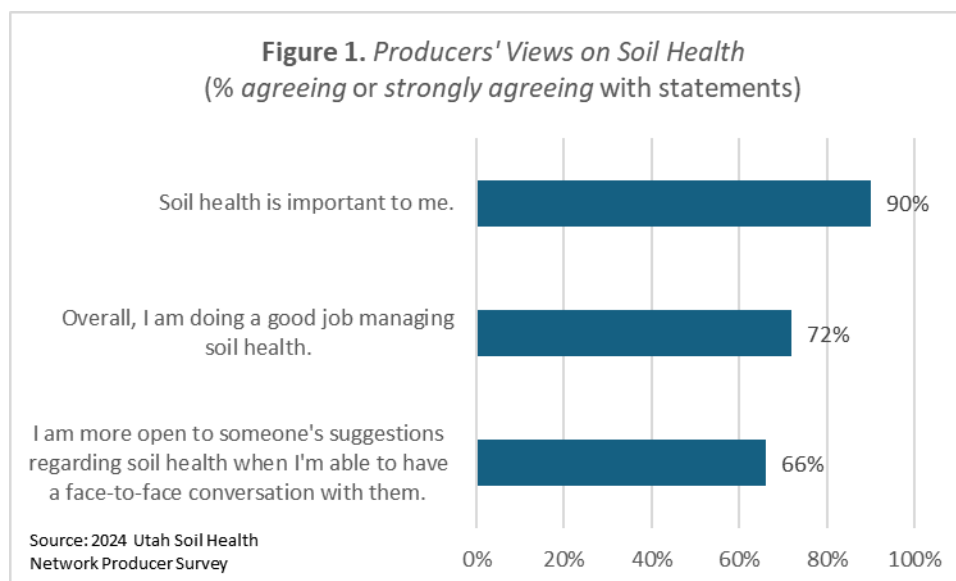
Operation

- The average number of acres operated (rented and owned) was 929 acres (median = 200, range 0.5 to 45,000).
- Sixty-six percent indicated their 2023 operation was a mix of crop and livestock.
- The top three crops participants grew in 2023 included: alfalfa (82%), other hay (55%), and small grains (30%).

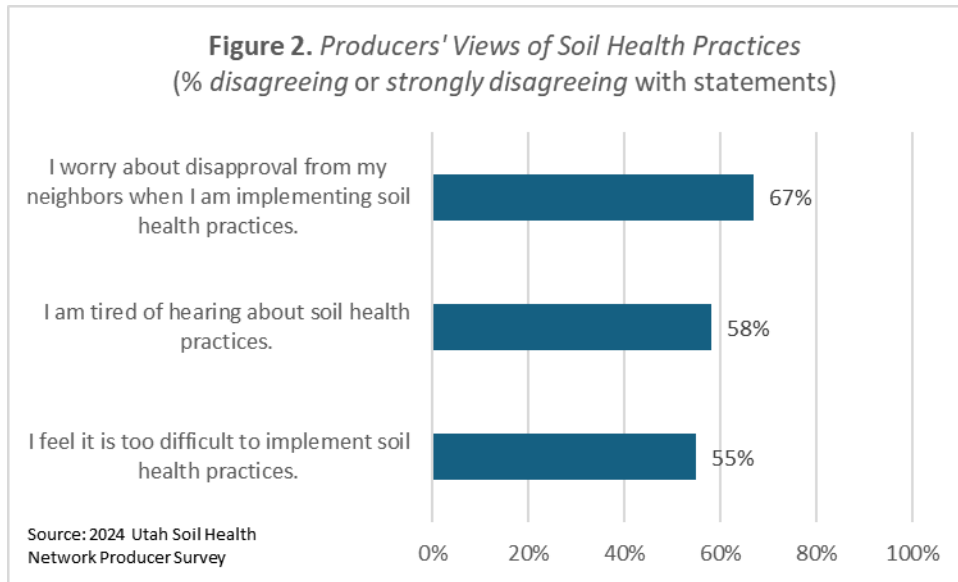
With this backdrop, we turn to examining producers' views regarding soil health and soil health management practices.

Views on Soil Health

We asked producers about soil health and soil health management attitudes. As seen in Figure 1, 90% of the producers *agreed or strongly agreed* that “soil health is important” to them, and 72% believe they are doing “a good job managing soil health.” For those open to soil health discussions, face-to-face conversations are the preferred communication method, with 66% agreeing they are more open to suggestions regarding soil health when the conversation is conducted in this format.

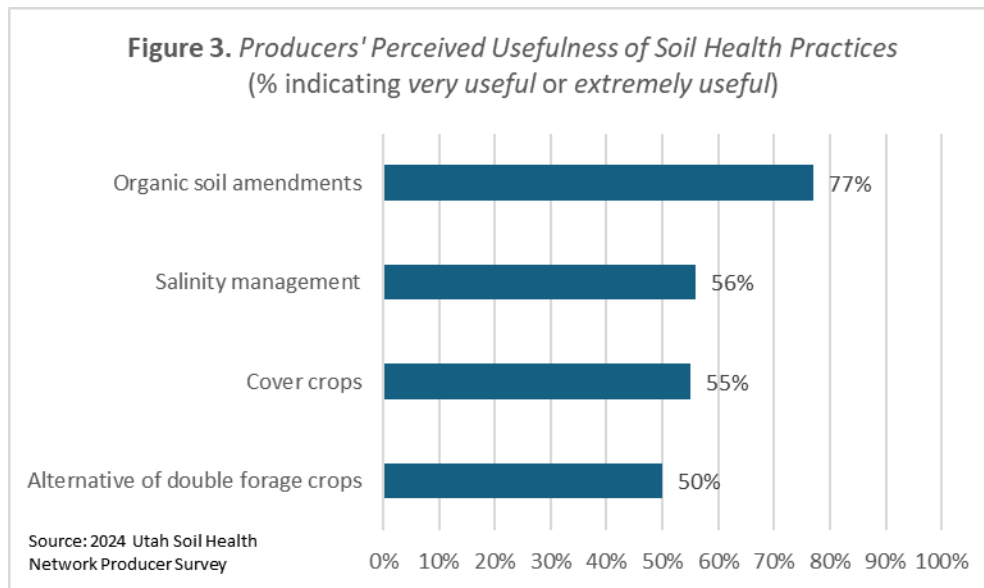


Various statements received high levels of disagreement. As Figure 2 indicates, 67% of the producers either *disagreed* or *strongly disagreed* that they “worry about disapproval from neighbors when implementing soil health practices,” 58% *disagreed* that they “are tired of hearing about soil health practices,” and 55% *disagreed* that it was “too difficult to implement soil health practices.” Overall, these findings show that a slight majority of Utah producers are not concerned about neighbors’ disapproval of implementing soil health practices, are very open to discussing soil health, and have confidence in implementing soil health practices.



Soil Health Practices

Producers were asked to rate the usefulness of various practices for improving soil health (whether they were using the practice or not). From a list of 10 practices, at least 50% of the producers indicated that they believe four of the practices are *very useful* or *extremely useful*. These practices included organic soil amendments (i.e., manure, compost, biosolids, biochar), found to be most useful (77%), with salinity management, cover crops, and alternative or double forage crops found to be useful by 56%, 55% and 50% of the producers, respectively (Figure 3).



Also significant to note is that when asked about the usefulness of various practices for improving soil health, at least 20% of the producers surveyed indicated they *did not know* about the usefulness of four of the practices listed, including biological soil amendments (33%), crop diversification (22%), chemical soil amendments (21%), and soil or water pH management (20%).

Producers were then asked what soil health practices they used on their land in 2023 (Table 1). From a list of 10 practices, the only practice with at least 50% of producers using it was organic soil amendments (65%), followed by alternative or double forage crops (43%), and chemical soil amendments (42%). Those practices with the highest number of producers **not** using them were those practices producers indicated they do not know the usefulness of—including biological soil amendments (84%), soil or water pH management (71%), diversified crop rotation (71%), and crop diversification (70%).

Table 1. *Soil Health Practices Used in 2023*

Practice	Percentage
Organic soil amendments	65%
Alternative or double forage crops	43%
Chemical soil amendments	42%
Conservation tillage	41%
Cover crops	40%
Salinity management	32%
Crop diversification	30%
Diversified crop rotation	29%
Soil or water pH management	29%
Biological soil amendments	16%

Survey participants were also asked about soil health practices they were likely to use in the future. Table 2 contains the percentages for each practice that was indicated as *likely* or *extremely likely* to be used. Again, organic soil amendments were the only practice that over half of the participants were planning to use (69%), followed by cover crops (50%), and alternative or double forage crops (49%). And again, the same pattern emerges for those practices less likely to be used (in particular, biological soil amendments).

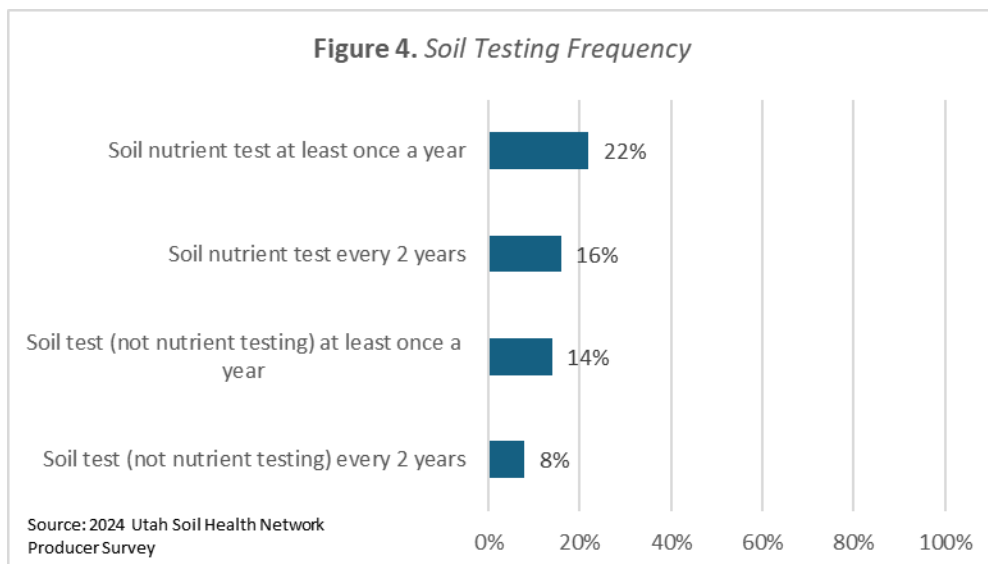
Table 2. *Practices Likely to Use in Future*

Practice	Percentage
Organic soil amendments	69%
Cover crops	50%
Alternative or double forage crops	49%
Conservation tillage	45%
Chemical soil amendments	42%
Salinity management	35%
Diversified crop rotation	33%
Crop diversification	33%
Soil or water pH management	33%
Biological soil amendments	18%

Indicators of Soil Health Used by Producers

Producers were asked a series of questions about indicators of soil health used on their farm or ranch. When asked about the frequency of soil nutrient testing, the results show that 38% conduct soil nutrient testing at least every 2 years (Figure 4), and 22% indicated they conduct additional soil testing (not nutrient testing) at least every 2 years. Thirty-nine percent indicated they do *not* routinely conduct soil nutrient testing, with 58% indicating they do *not* conduct soil health

testing that is not nutrient testing. These low levels of soil testing use signify large opportunities for more regular soil testing to monitor soil fertility and health on Utah farms and ranches.



Producers were also asked about indicators of soil health they currently use in their operation (Table 3). From a list of 22 possible indicators, the top four indicators (those with 50% or more of the producers using) were crop yield and the three soil chemical tests representing the major macronutrients (nitrogen, phosphorus, and potassium) that are commonly applied to crops. Few biological indicators were used more than 10%, and the most common was nitrogen mineralization at 12%. The most used physical indicator of soil health was soil texture (37%), followed by available water holding capacity (22%). Only 1% of producers used the two most common soil health packages in the U.S. (Haney Test for Soil Health and Cornell Comprehensive Assessment of Soil Health [CASH]), and 6% used other soil health packages. These results indicate that few producers are using various biological and physical soil health tests, and much opportunity exists to increase the use and interpretation of these tests for Utah growing conditions.

Table 3. Indicators of Soil Health

Category	Test	Percentage
Crop	Crop yield	68%
Soil - chemical	Nitrogen	68%
	Phosphorous	68%
	Potassium	56%
	Soil pH	37%
	Micronutrients	21%
	Organic carbon	14%
Soil - biological	Nitrogen mineralization	12%
Soil - physical	Soil texture	37%
	Available water holding capacity	22%
	Penetration resistance	15%
	Infiltration rate	11%
Soil - chemical, physical, and biological	Other tests*	10% or less

*Erosion rating, base saturation, cation exchange capacity (CEC), other soil health test packages, aggregate stability, carbon mineralization, electrical conductivity, bulk density, Haney test, and CASH.

Factors Influencing Soil Health Practice Adoption

Producers were asked to rate the importance of various factors to their soil health practice adoption decisions (Table 4). Three factors were rated very important by over 50% of the producers, including increased profitability (79%), increased crop yields (77%), and improved soil health (66%), showing both financial and environmental factors are important to many producers. Only 23% indicated that financial assistance from government programs was a very important factor for adopting soil health practices, indicating that money from the government is not the only motivator and that other motivators (some financial and some not) are also important to consider.

Table 4. *Important Factors in Soil Health Practice Adoption*

Factor	Percentage indicating <i>very important</i>
Increased profitability	79%
Increased crop yields	77%
Improved soil health	66%
Technical support	33%
Financial assistance from government programs	23%

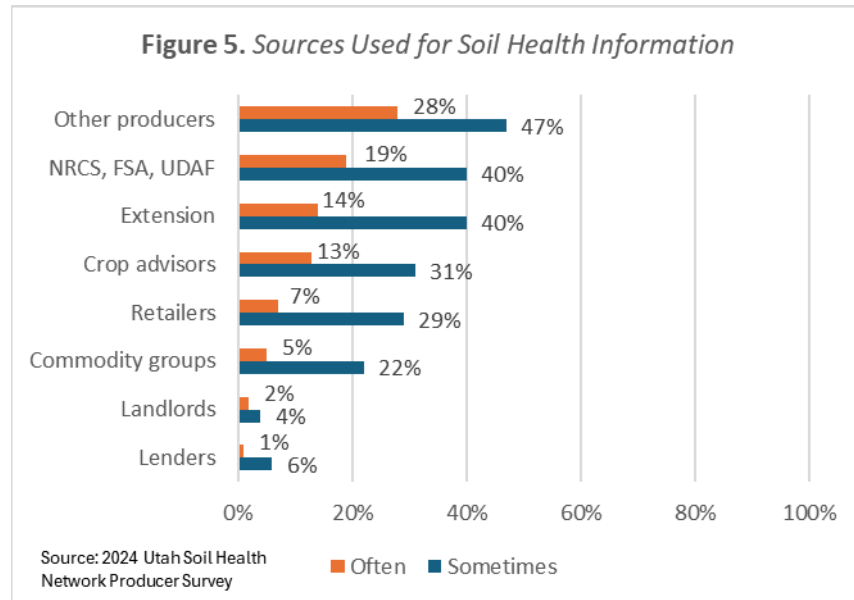
Producers were also asked to what degree various factors influence their soil health management choices. Table 5 contains in bold the top three responses (more if tied) across the categories *not at all*, *somewhat*, and *a lot*. The responses correspond with the adoption factors above, where cost and yields are a large factor in the producer's soil health management choices.

Table 5. *Influences on Soil Health Management Choices*

Influence	Percentage		
	<i>Not at all</i>	<i>Somewhat</i>	<i>A lot</i>
Cost	7%	44%	49%
Lack of equipment	18%	44%	38%
Expected decrease in productivity or yields	26%	44%	31%
Difficulty in managing	23%	59%	18%
Expected increase in operation complexity	14%	59%	27%
Already invested in current techniques	16%	58%	26%
Lack of knowledge	14%	58%	28%
Lack of farm input supplies	25%	58%	17%
Lack of interest	51%	41%	8%
Do not think it will improve anything	34%	47%	19%
Farm size	32%	50%	19%
Lack of time	22%	52%	26%
Lack of labor	20%	52%	28%
Farm size	32%	50%	19%
Lack of available technologies	22%	57%	20%
Mixed messaging from various sources	31%	54%	15%
Lack of information pertaining to soil health in Utah	25%	52%	23%

Soil Health Information Sources

Finally, producers were asked what information sources they used to gain soil health information (Figure 5). Other producers are the primary source of soil health information for those producers surveyed (28% *often*; 47% *sometimes*), followed by government entities (NRCS, Farm Service Agency [FSA], Utah Department of Agriculture and Food [UDAF]) with 19% indicating *often* and 40% *sometimes*, and university Extension (14% *often*; 40% *sometimes*). The survey results also show that no information source is used “often” by at least 50% of the producers. These findings compare somewhat with producers actively working on soil health in Utah, who state they rely primarily on USU and USU Extension, YouTube, and the NRCS, with the use of all three sources at low levels (Petrzelka et al., 2024).



Summary

The survey results provide encouraging findings for soil health work in the IMW and illuminate areas for outreach and conservation agencies to focus on. There are high levels of agreement among the producers on the importance of soil health, and the low level of government assistance needed or seen as a priority is a positive for encouraging the adopting soil health practices.

While understanding the importance of soil health is evident with these producers, it appears more detailed aspects of how to implement soil health are needed, given the low levels of involvement in various soil health practices. When asked about the usefulness of various practices, at least 20% of the producers surveyed indicated they do not know about the usefulness of four practices, including biological soil amendments (33%), crop diversification (22%), chemical soil amendments (21%), and soil or water pH management (20%).

In addition to the low use of some soil health-promoting practices, there was



also little regular soil health testing, which indicates a need for greater monitoring. Low use may be due to increased soil analysis costs compared to routine soil nutrient testing. Financial and technical support and additional research on how soil health properties relate to soil health management practices may help increase the use of these tests.

The lack of knowledge about the usefulness of various soil health practices and soil testing may be the first area of focus for those doing outreach with producers on soil health. But this, too, is a challenge, for no soil health information source is used “often” by at least 50% of the producers. Thus, the challenge is for natural resource outreach agencies to both make themselves visible as a valuable source of soil health information and ensure they have the resources to provide this information to interested producers.

For more information on the demonstration project mentioned, please visit the [Utah Soil Health Network On-Farm Soil Health Demonstration Project](#). For those interested in obtaining more information on soil health on their land, please contact Matt Yost, Ph.D., matt.yost@usu.edu or Jessica Schad, Ph.D., jessica.schad@usu.edu.

Endnotes

¹ For the full survey report, including detailed methodology and findings, see the [Utah Soil Health Network Producer Survey](#) descriptive report (Barkat et al., 2024, July).

² The terms participants and producers are used interchangeably here.

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