
Clear Creek Watershed Social Assessment: Landowner Survey

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Prepared for

East Central Iowa Council of Governments
Clear Creek Watershed Coalition

Project funded by

East Central Iowa Council of Governments as part of the Iowa
Watershed Approach for Urban and Rural Resilience, made
possible through a federal grant from the U.S. Department of
Housing & Urban Development



March 12, 2018



We are grateful for the contributions of the many respondents who provided their time and insights. This report would not have been possible without their assistance. For further information, contact:

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Executive Summary

The Clear Creek Watershed Social Assessment was funded by the East Central Iowa Council of Governments as part of the Iowa Watershed Approach for Urban and Rural Resilience through a grant from the U.S. Department of Housing & Urban Development. The primary goal of the Clear Creek Watershed Community Assessment was to better understand general attitudes and awareness about water quality in the Clear Creek Watershed (Iowa & Johnson counties, IA). The Clear Creek Watershed Coalition will integrate the results from the Community Assessment into an Education & Outreach Plan that will seek to build support for watershed improvement projects and best management practices.

The results presented in this report represent one aspect of the two-part Clear Creek Watershed Social Assessment and complement the information gathered in the survey of urban Johnson County residents. This summary provides the key findings from the survey of landowners and farmers in the watershed on topics related to decision-making, management and conservation practices, conservation and land stewardship attitudes, trust in the sources of conservation information, livestock ownership and manure application practices, and views on water quality and experiences with flooding.

A self-administered mail-back survey design was used to gather information from landowners in Iowa (sample $n = 508$) and Johnson Counties (sample $n = 524$). We received 272 completed questionnaires from eligible individuals who own agricultural land and/or farm in Iowa County ($n = 118$), Johnson County ($n = 141$), or both counties ($n = 13$), resulting in an overall adjusted response rate of 39%. Slightly over one-half of respondents (52%) farmed or owned land in Johnson County, 43% of respondents indicated they farmed or owned land in Iowa County, and a small portion of respondents (5%) indicated owning or farming land in both counties.

- **Land ownership:** Just under half of the respondents reported that they owned land but did not farm (46%). The most common situations for those who farmed were farming a combination of land they owned and land that is rented (21%) and farming their own land (19%). Only a small percentage indicated that they rented all of the land that they farmed (8%). When they retire from farming, landowners and farmers reported that they would most likely sell the land to a family member to farm (24%), have the land custom farmed (17%), or pass it on to a family member through a trust or inheritance (11%).
- **Farming Practices:** Landowners most frequently reported that an all no-till corn/bean rotation (37%) was used on the acres they rent to farmers, followed by a corn/corn/bean rotation that uses minimum tillage for the corn and no-till for the beans (24%) and hay (17%). Similar proportions of owner-operators reported using a no-till corn/bean rotation (36%) and corn/corn/bean (minimum-till corn, no-till beans; 25%), but a greater proportion used their acres for hay (34%). Tenant farmers were the most likely group to have used a no-till method with corn and beans, with over half (51%) reportedly having used this type of crop rotation.
- **Decision-making:** Approximately six out of 10 respondents (61%) identified themselves as the primary decision-makers of a farming operation, with half of those having been the primary decision-makers for 25 years or more. Across all farming situations, whether the acres were rented or owned, the operators of the land, not the owners, were identified most often as

making decisions about all aspects of the land, from crop rotation to soil and water conservation practices.

- **Land use management practices:** The most common land use management practices that landowners and farmers used were reduced tillage (69%), no-tilling one crop in the rotation (64%), and contouring (56%). In contrast, cover crops and long-term no-till were the practices used least. Although cover crops were one of the least used management practices, a majority of respondents (75%) showed interest in continuing or trying it in the future. Cover crops and contouring were perceived by the most individuals as having limitations to their adoption and expansion. Only 25% of respondents reported no limiting factors for cover crops and 41% indicated the same for contouring. For these two practices, time was considered a main obstacle along with expenses and lack of information and training. Although cover crops and long-term no-till were the land use management practices used least, they were seen as the most effective in improving water quality (61% and 57%, respectively).
- **Nitrogen and phosphorous management practices:** The nitrogen and phosphorus management practices used most often by farmers and landowners were soil tests (72%) and avoiding fall application of manure or nitrogen fertilizer (54%). In contrast, nitrogen stabilizers or inhibitors, variable rate application technology, and split rate/time nitrogen application were the practices used less frequently by farmers and landowners (41%, 46%, and 48%, respectively). Interest in continuing or trying nitrogen and phosphorous practices was high, ranging from 58% for split rate/time nitrogen application to 82% for conducting soil tests on a regular basis. However, expense of implementation was noted as a limiting factor by over one-quarter of respondents for most of the nitrogen and phosphorous management practices. Time was the primary limiting factor reported for farmers changing nutrient application practices such as avoiding fall manure or nitrogen fertilizer application (21%) and using split rate/time nitrogen application (27%). Regularly conducting soil tests for pH, phosphorous, nitrogen, and potassium was seen as the most effective practice for improving water quality while avoiding application of manure or nitrogen fertilizer in the fall was viewed as the least effective.
- **Soil and water conservation practices:** The soil and water conservation practice with which farmers had the most personal experience was buffers (60%). This practice also had the highest reported interest from farmers and landowners with regard to continuation or adoption (70%). Wetland construction, saturated buffers, and bioreactors were reportedly used by the fewest number of farmers and landowners (18%, 10%, and 2%, respectively), and had the lowest percentages of respondents indicating interest in adopting or continuing to use (39%, 34%, and 23%, respectively). However, this may indicate untapped opportunities for implementation of these practices given that levels of interest are higher than reported use. Expense was seen as the most limiting factor for all soil and water conservation practices, with over one-half of respondents noting expense as a factor for all but two practices. For those two practices, buffers (43%) and saturated buffers (47%), the majority of landowners did not view expense as a limiting factor. A lack of training was also seen as a limiting factor by one-quarter of respondents for implementing saturated buffers (26%) and by about one-third of respondents for installing bioreactors (34%). A majority of farmers and landowners believed all the soil and water conservation management practices to be moderately or very effective at improving water

quality in their area. However, saturated buffers, wetland construction, and bioreactors were viewed as less effective than were the other practices.

- **Conservation and land stewardship attitudes:** When asked about soil health and water quality, a vast majority of respondents agreed or strongly agreed that they apply soil and water conservation practices regardless of commodity payments (85%), they know what steps to take to improve soil health on (83%) and reduce nutrient loss (83%) from the land they own or farm. Seven in 10 respondents agreed or strongly agreed that they are concerned about the erosion from the fields they own or farm (78%) or the fields owned or farmed by their neighbors (72%). This concern did not necessarily translate to perceived ability to make change, as only 54% of respondents agreed or strongly agreed that there are actions they can take to improve the water quality in the creeks near where they farm.
- **Trust in the sources of conservation information:** The public and governmental groups with the most reported trust from respondents about conservation issues included Iowa State University Extension and the Iowa or Johnson County Soil and Water Conservation District, which were trusted moderately or a great deal by more than two-thirds of respondents (75% and 70%, respectively). By contrast, the public or government entities with the least trust from respondents as conservation information sources were city or county government staff and their county's public health office (38% and 27%, respectively). With regard to non-governmental sources of conservation information, farmers and landowners in the Clear Creek Watershed were most trusting of their family members and neighbors or friends who farm (74% and 69%, respectively). In contrast, 39% of respondents indicated that they did not trust local media (e.g., newspaper, television, radio) at all as a source of conservation information.
- **Livestock and manure application:** Three of 10 respondents (31%) owned livestock at the time of the survey. The most common type of livestock owned was cattle, with two-thirds of livestock owners (66%) reportedly having them. A plurality of respondents indicated a 50% cost-share program would be a reasonable financial incentive for improving pasture management with practices such as rotational grazing or improving watering systems. Three of 10 farmers and landowners (31%) indicated manure was applied to the fields they farm or own. The most common form of manure applied to fields was solid manure (91%), followed by semi-solid and liquid manure (23% and 20%, respectively). Across all types of manure used, the majority of farmers applied manure in both the spring and fall. The most important factors for determining where to spread manure were crop nutrient needs (91%), soil test results (85%), own judgement based on experience (81%), and proximity to the manure source (76%). Conversely, the least important factors selected by respondents were recommendations from a variety of groups including the Natural Resources Conservation Service, family who farm, consultants, neighbors who farm, and equipment manufacturers, with pluralities of respondents indicating that these sources were not at all important.
- **Views on water quality:** In regards to waterway quality, lakes were seen as having the best quality when compared to creeks and rivers, with 53% of respondents indicating that the quality of the water in their lakes was good or excellent. In contrast, rivers were considered the body of water with the worst water quality. Overall, only 41% of respondents rated their quality of

water in rivers as good or excellent and 15% stated that it was poor. When asked how they would prefer to get information about local efforts to improve water quality, most respondents preferred to be contacted through the mail (74%). The next preferred mediums for receiving information were newspaper (28%), email (24%), Internet (21%), and radio broadcasts (21%).

- ***Flooding experiences:*** When asked about their experiences with flooding in the past, one out of five (20%) farmers reported that the ground they farm was prone to flooding. Fourteen percent of respondents indicated the property they own or farm has been affected by flooding from Clear, Buffalo, Deer, or Rhine Creeks. Although most of the respondents indicated that their crops did not suffer from high or standing water in the past 10 years (77%), slightly less than one-quarter (23%) reported having had those experiences.

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Background & Methods

The goal of the Clear Creek Watershed Community Assessment was to understand general attitudes and awareness about water quality in the Clear Creek Watershed (Iowa & Johnson counties, IA). This assessment is part of a broader Comprehensive Watershed Management Plan process that is currently underway in the Clear Creek Watershed with funding from the State of Iowa and support from the seven jurisdictions and the Soil & Water Conservation Districts in Iowa and Johnson counties that comprise the Clear Creek Watershed Coalition (CCWC).

The results presented in this report represent one aspect of the two-part Clear Creek Watershed Social Assessment and complement the information gathered in the survey of urban Johnson County residents. The CCWC will integrate the results from the Community Assessment into an Education & Outreach Plan that will be aimed at building support for watershed improvement projects and best management practices.

The survey of agricultural landowners and operators in Iowa and Johnson Counties assessed baseline data regarding conservation practices, perceptions of water quality, personal sources of information, and current farming practices. Participants were recruited from lists provided by the Iowa and Johnson County Soil and Water Conservation Districts of rural landowners who own land in Iowa and Johnson County within the boundaries of the Clear Creek Watershed. A mail-back survey data collection method was used to gather information from these landowners in Iowa (sample $n = 508$) and Johnson Counties (sample $n = 524$).

Participants received up to four separate mailings:

- 1) An advance letter from the Iowa or Johnson County Soil and Water Conservation District (sent August 3, 2017);
- 2) An initial mailing containing a prepaid incentive (\$2), a paper questionnaire, and a prepaid return envelope (sent August 8, 2017 to Johnson County and August 11 to Iowa County landowners);
- 3) A reminder/thank you postcard (sent August 21); and
- 4) A final mailing with a paper questionnaire and prepaid return envelope sent on August 25 to those who had not yet responded.

A total of 143 individuals were removed from the sample after they were determined to be ineligible for the study based on their report that they did not own or farm any agricultural land in Iowa or Johnson Counties at the time of the survey. We received 272 completed questionnaires from eligible individuals who own agricultural land and/or farm in Iowa County ($n = 118$), Johnson County ($n = 141$), or both counties ($n = 13$), resulting in an overall adjusted response rate of 39.1% (RR3, AAPOR Standard Definitions, 2016¹).

Throughout this report, percentages in tables and figures are rounded to the nearest whole number, therefore percentage totals will range from 99% to 101%.

¹ American Association for Public Opinion Research (2016). *Standard definitions: final dispositions of case codes and outcome rates for surveys (9th ed.)*. Author: Ann Arbor, MI.

Results

Respondent Characteristics

As shown in Table 1, the majority of respondents were male (72%) and over one-quarter were female (28%). The mean age of respondents was 65 years old ($SD = 14.0$), with ages ranging from 21 to 97. Slightly over one-half of respondents had some college education (58%) and approximately one-third reported high school was their highest level of education completed (33%). The majority of respondents indicated that they lived on a farm (57%) or in a rural setting, but not on a farm (20%).

Table 1. Respondent characteristics.

	n*	%
Sex	244	
Male		72
Female		28
Education	240	
Some high school or less		2
High school diploma/GED		33
Vocational or technical diploma/certificate		7
Some college but no Bachelor’s Degree		21
B.A., B.S., or equivalent		22
Graduate degree, Master’s, Ph.D., M.D., etc.		15
Residence	241	
On a farm		57
In a rural setting, not on a farm		20
In a rural subdivision outside of city limits		5
In a small town of less than 5,000 people		10
In a larger town of 5,000 to less than 25,000 people		2
In a city of 25,000 or more people		6

*The number of responses for different variables may vary due to item nonresponse.

As indicated in Figure 1, 43% of respondents indicated they farmed or owned land in Iowa County, 52% farmed or owned land in Johnson County, and a small portion of respondents (5%) indicated owning or farming land in both counties.

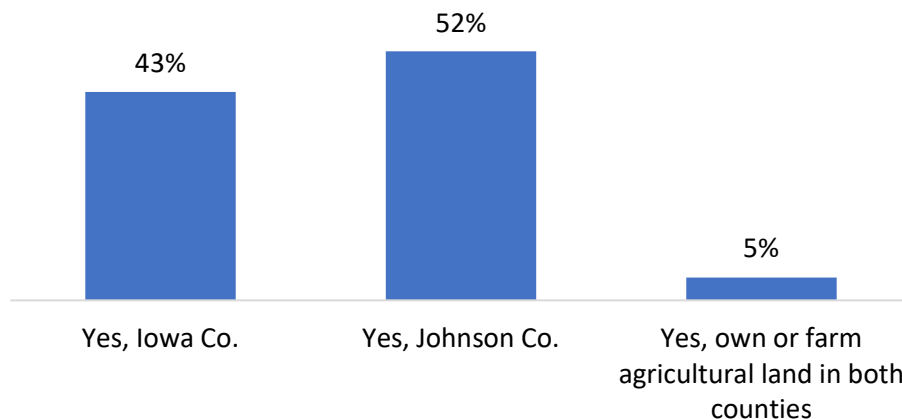


Figure 1. Responses by county.

A little over one-quarter of respondents (29%) identified farming as their main household income during the past five years (Figure 2). Most respondents (54%) indicated that farming constituted 1% to 50% of their overall income and approximately one of five respondents (18%) indicated that they had not received any income from farming during this timeframe. Respondents were asked to report their agricultural income earned within the last year considering all sources of agricultural income, including government payments and farm rent received. Twelve percent of respondents did not earn any agricultural income. Approximately four of 10 respondents (39%) indicated having made \$1 to \$24,000 from agriculture, while slightly over one-quarter (28%) reported gross value between \$25,000 and \$99,999, and one-fifth of respondents (21%) had agriculture-related earnings of \$100,000 or more.

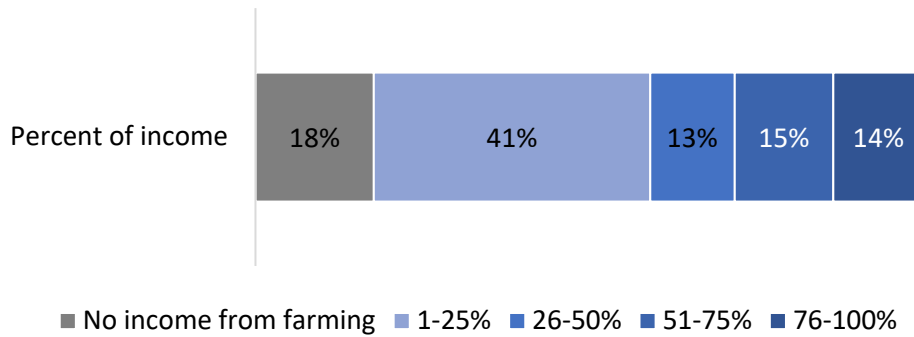


Figure 2. Percentage of income from farming over the last five years.

Over one-half of respondents (54%) were not employed off-the-farm at the time of the survey (Figure 3). Those who work off the farm (46%) are more likely to hold full-time employment than part-time employment.

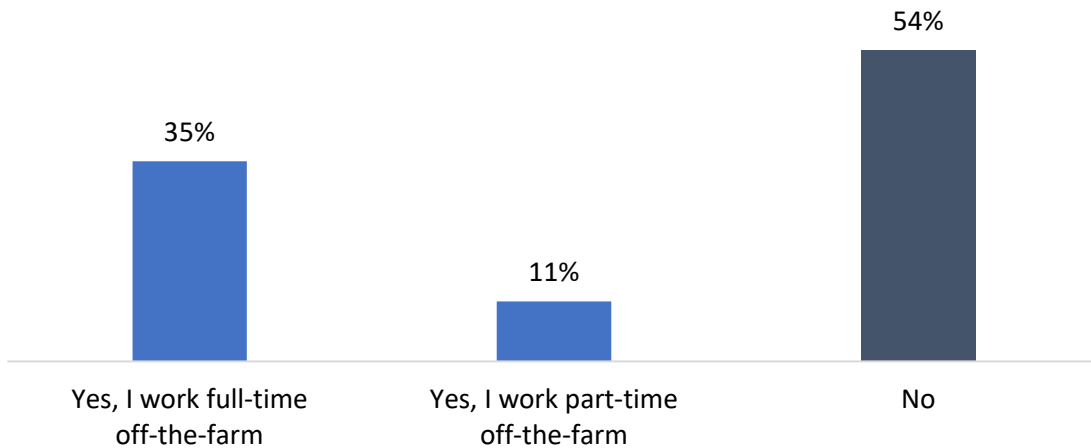


Figure 3. Employment off-the-farm.

Land Ownership

As shown in Figure 4, landowners were most often the sole owners of their land (53%). When they identified themselves as co-owners, the most common partners were spouses (32%) and siblings (8%).

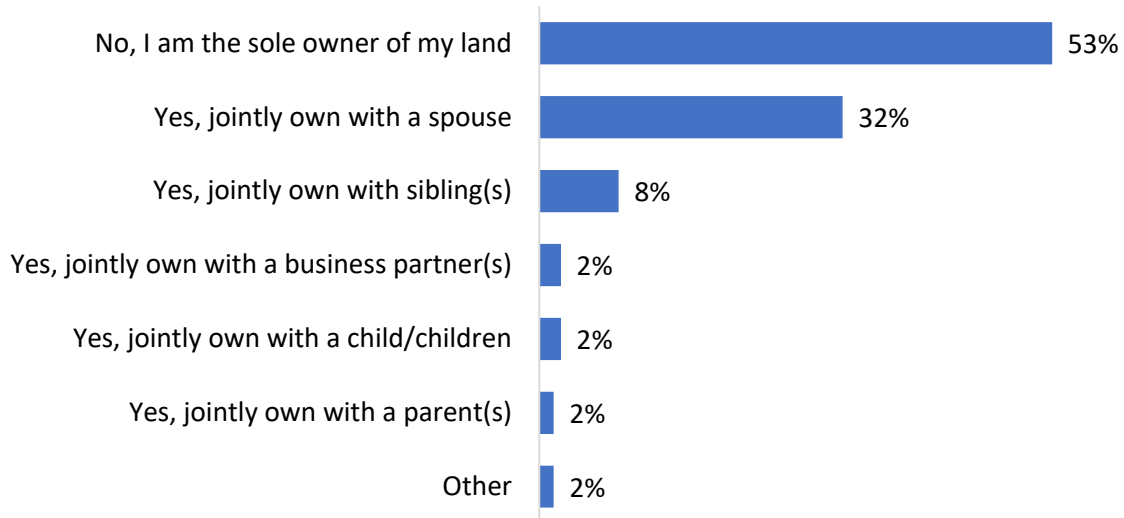


Figure 4. Landownership shareholder(s).

Just under half of the respondents reported that they own land but do not farm (46%; Figure 5). The most common situations for those who farmed were farming a combination of land they owned and land that is rented (21%) and farming their own land (19%). Only a small percentage indicated that they rented all of the land that they farmed (8%). When asked how long they planned to continue farming, one-half (50%) of those who farmed indicated 10 years or less.

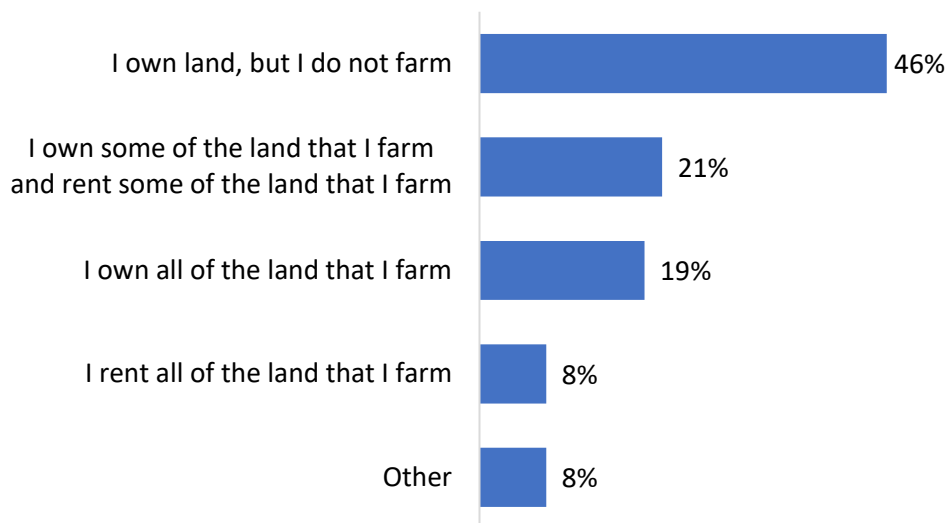


Figure 5. Farming situation.

Landowners were asked what they would do with their land when they retire. The most frequent responses included selling the land to a family member to farm (24%), having the land custom-farmed (17%), and willing the land to a family member (11%; Figure 6). Smaller percentages of respondents indicated that they would rent the land to a family member (6%) or non-family member (6%), sell the land to someone outside of the family to farm (6%), or that the land will be enrolled in a set aside program (6%) such as the Conservation Reserve Program (CRP). However, a number of farmers were uncertain about their plans for their land after retirement with almost one of five landowners being unsure about how they would transition their land (18%).

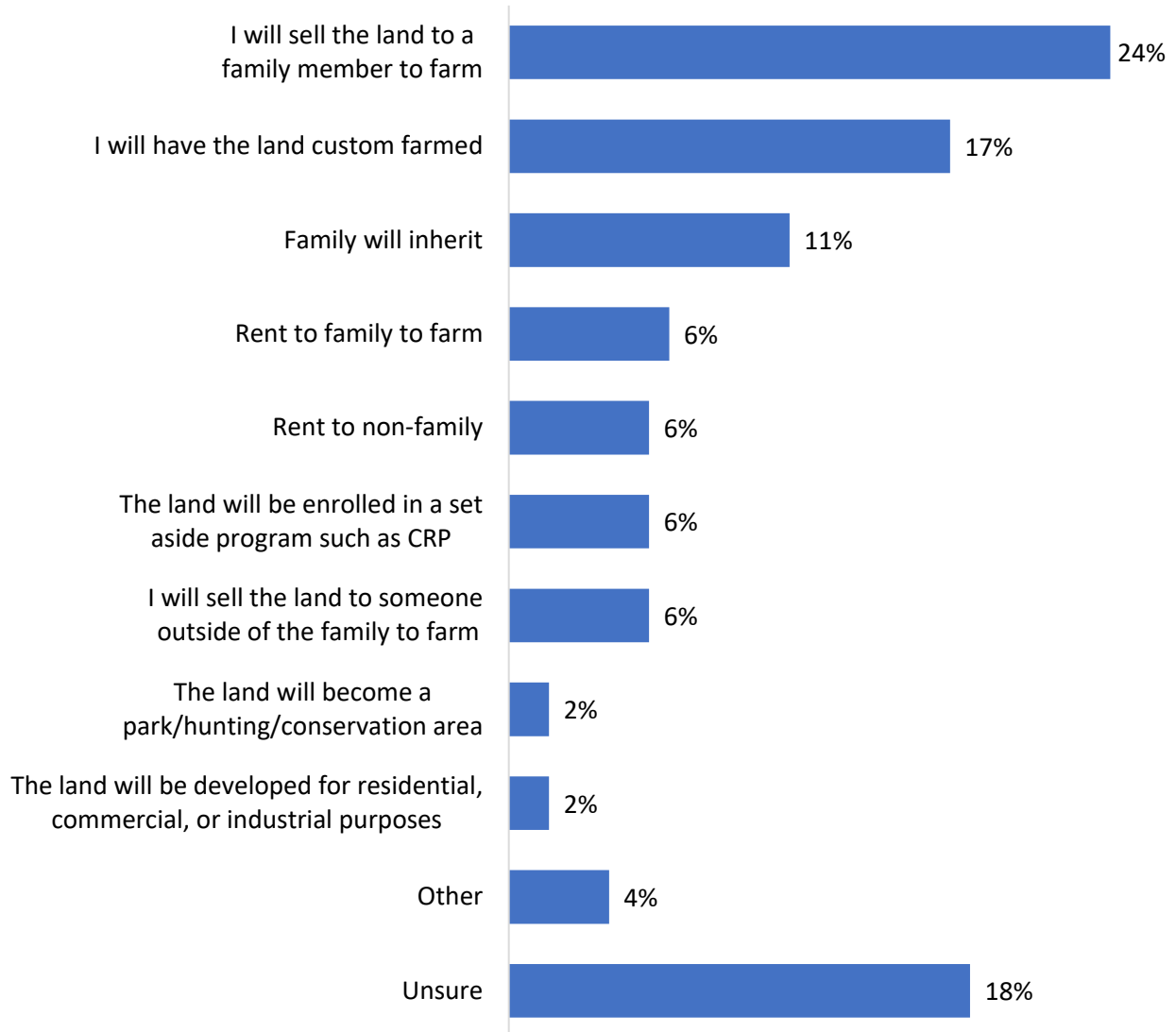


Figure 6. Plans for land management after retirement.

Farming practices

Respondents were asked to indicate whether they farmed any land that they owned, farmed land they rented from others, or whether they rented land to others who farmed. Over 40% (43%) of respondents were lessors, meaning they owned land that they rented to others to farm. The number of acres that were rented out to farmers ranged from three to 2,000 acres, with a median of 98 acres. The most common rotation practice reported by lessors regarding the land they rent to farmers was a corn/bean (all no-till) rotation (37%; Figure 7). Nearly one-quarter (24%) of owners reported the acres they rented to farmers were in a corn/corn/bean (minimum-till corn, no-till bean) rotation. The next most common rotations that owners indicated their renters used were hay (17%) and a corn/bean rotation, using all conventional tillage (16%).

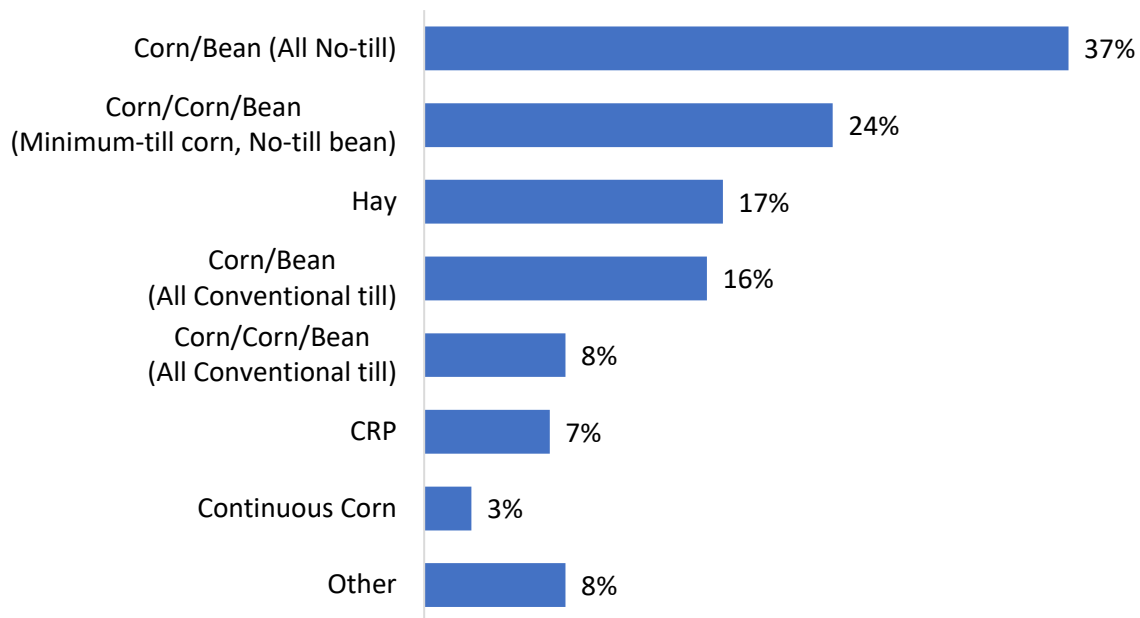


Figure 7. Crop rotation on owned acres rented to farmers.

Just under half (46%) of respondents indicated they farmed land that they own. The reported number of owned and self-farmed acres ranged from two acres to 1,850 acres, with a median of 140 acres. The most frequently reported types of crop rotations used on land that was farmed by an owner/operator included corn/bean (all no-till) (36%), hay (34%), and corn/corn/bean (minimum-till corn, no-till beans; 25%; Figure 8). Farmers in Iowa and Johnson Counties reported different degrees of no-till practices on acres they own and operate, with 43% of Iowa County farmers indicating they use a corn/corn/bean (minimum-till corn, no-till bean) practice compared to 12% of Johnson County farmers. Nearly half (48%) of Johnson County farmers indicated they use a corn/bean (all no-till) rotation compared to one-fifth (21%) of Iowa County farmers who said the same.

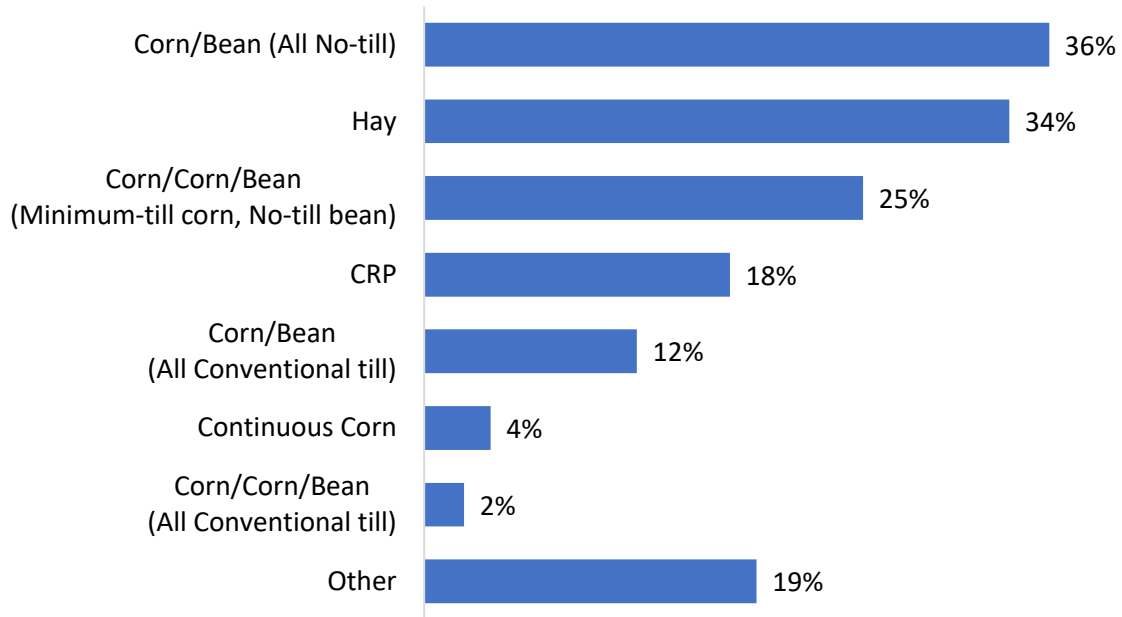


Figure 8. Crop rotation on owner operated acres.

Approximately one-quarter (24%), of respondents indicated they rented land from someone to farm, with the number of rented acres farmed ranging from eight to 8,000 acres, with a median of 195 acres. Over half of these tenant farmers reported using a corn/bean (all no-till) rotation (Figure 9). The next most common crop rotations reported for rented acres were corn/corn/bean (minimum-till corn, no-till bean; 24%) and hay (21%).

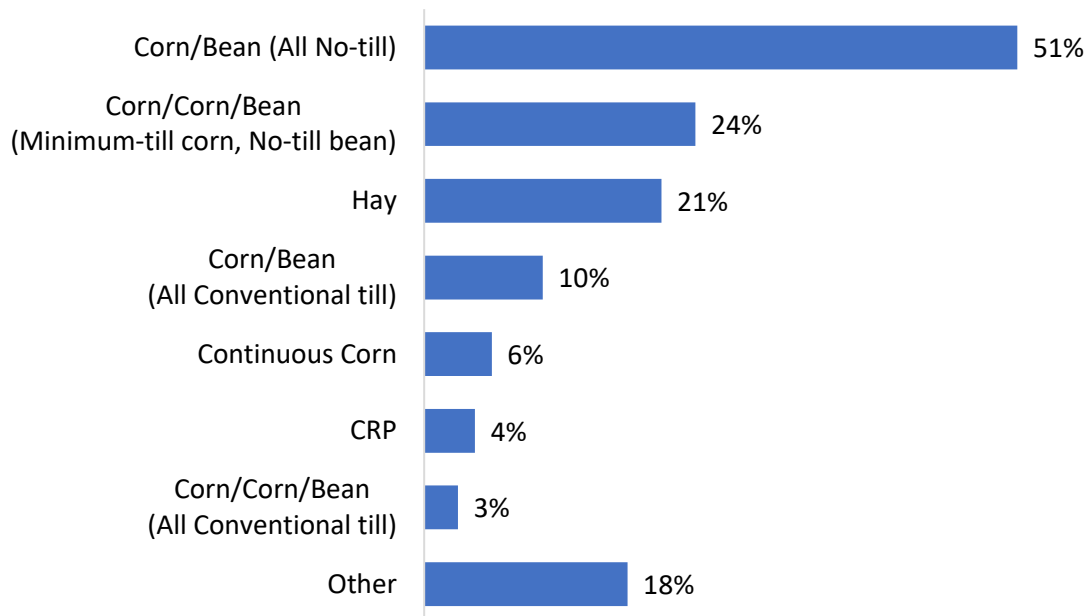


Figure 9. Crop rotation on acres rented by farmers.

Overall, one-third (33%) of respondents indicated they owned or farmed some ground that contained acres enrolled in the Conservation Reserve Program (Figure 10). The number of acres that were enrolled by farmers in 2017 averaged 51 acres, but ranged from one acre to 350 acres. Farmers noted that they planned to put 10 acres, on average, back into production in the next two years.

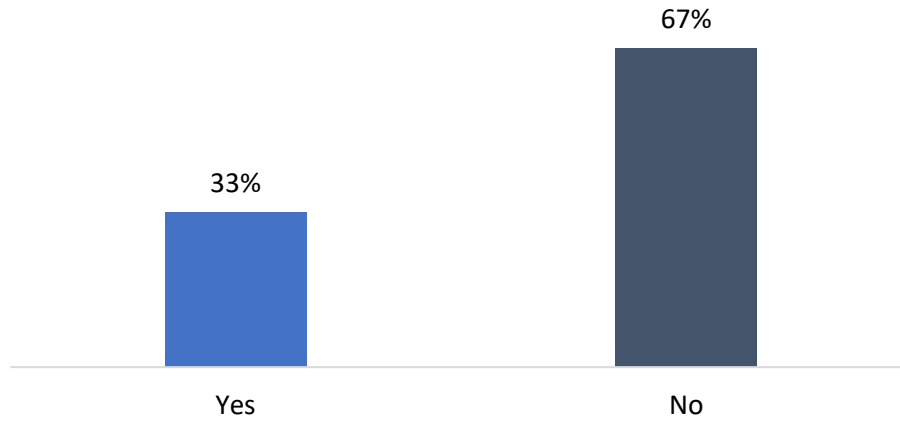


Figure 10. Respondents who own or farm land with acres in CRP.

Respondents were also asked to indicate whether any of the land they farmed was considered to be Highly Erodible Land (HEL). Over 70% of owner-operators (78%) and tenants (73%) indicated that they farmed HEL land; four of 10 lessors farmed HEL acres (Figure 12).

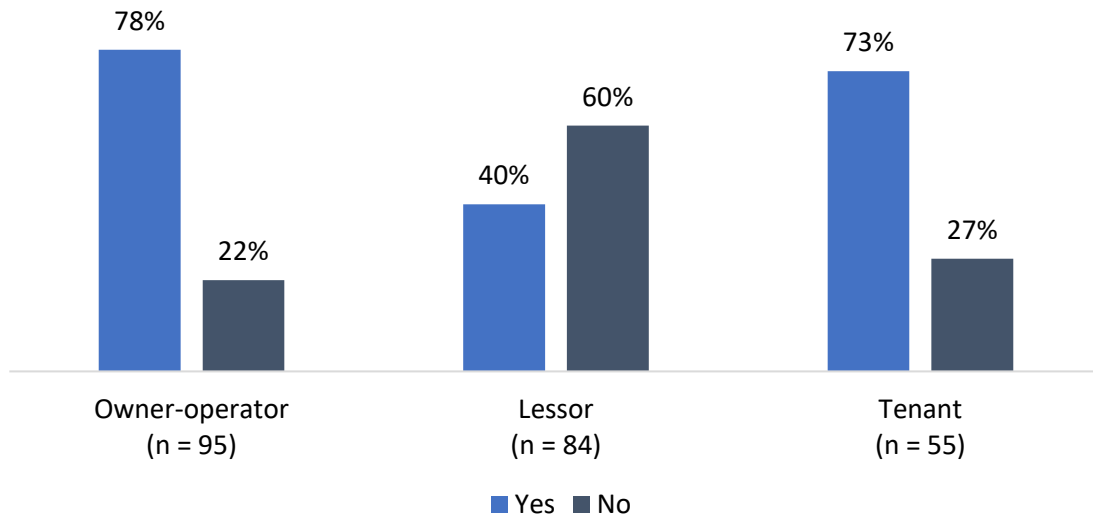


Figure 11. Farm Highly Erodible Land (HEL).

Tenant farmers were the most likely group to purchase crop insurance, with nine of 10 (90%) having reported they purchased crop insurance at the time of the survey. Two-thirds of owner-operators (68%)

reported purchasing crop insurance and less than 20% of lessors, those owners who rent acres to farmers, reported purchasing crop insurance (Figure 11).

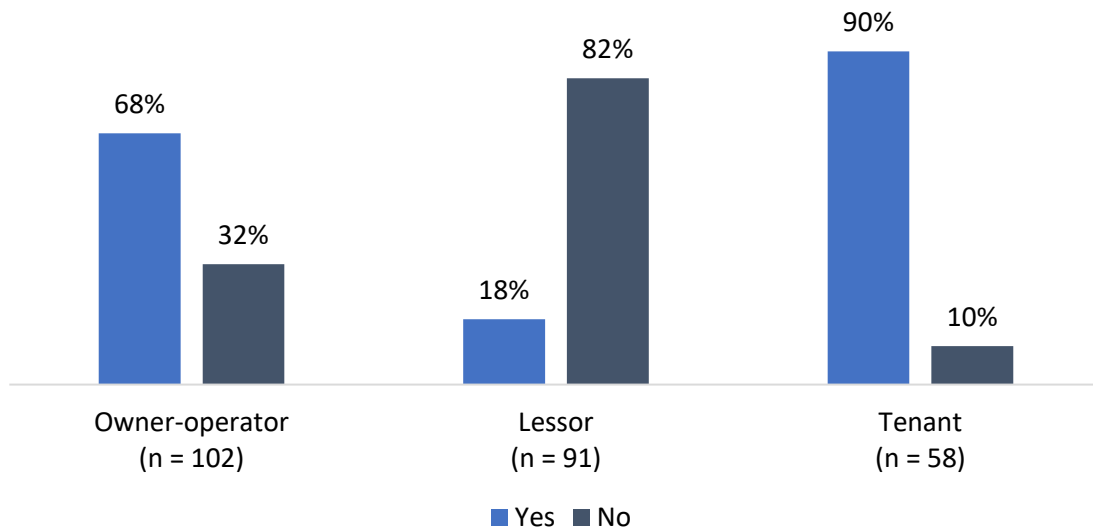


Figure 12. Purchase crop insurance.

Decision-making

In order to understand decision-making on farmland, farmers and landowners were asked to identify the primary decision maker on the farm and which parties made decisions about various aspects of the land including crop rotation, land use management practices, nitrogen and phosphorous management practices, and soil and water conservation practices.

Approximately six of 10 respondents (61%) identified themselves as the primary decision-makers of a farming operation (Figure 13), with half of those having been the primary decision-makers for 25 years or more.

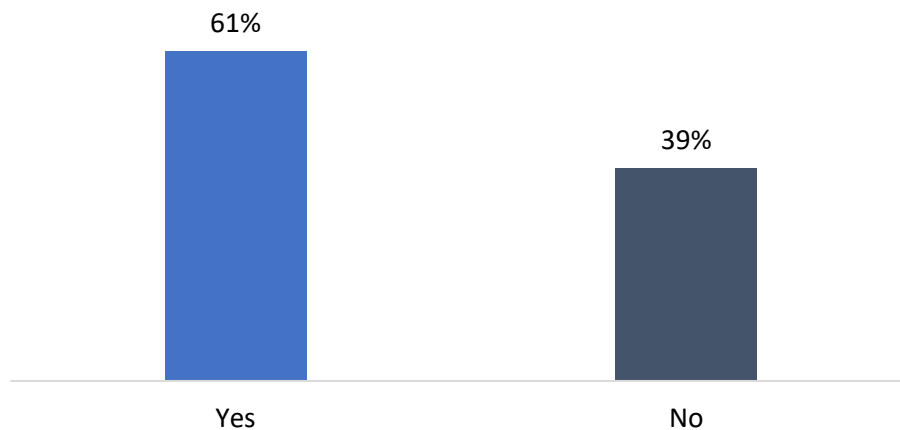


Figure 13. Respondent is current primary decision maker.

On land that was farmed by owner-operators, decisions regarding crop rotation as well as decisions about practices involving land use management, nitrogen and phosphorous management, and soil and water conservation were made primarily by the owner-operator (Figure 14). Approximately one-fifth of owner-operators made decisions about practices and crop rotation jointly with a farm manager. To a much lesser degree these decisions were made solely by a farm manager.

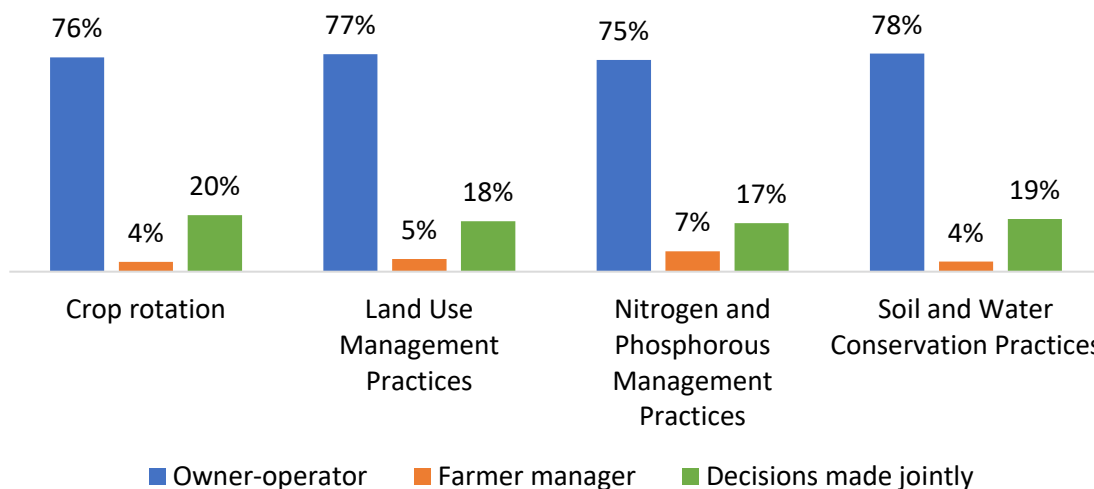


Figure 14. Decision-making on owner-operated farmland.

Lessors, those respondents who own land but rent it to someone else to farm, indicated that tenants most often made decisions regarding nitrogen and phosphorous management practices (78%) and crop rotation (70%; Figure 15). Landowners played a larger role in decisions about land use management (29%) and soil and water conservation practices (37%) on the land they leased out, with many making those decisions jointly with their farmer. Small percentages of owners identified themselves as the sole decision-maker regarding land use management practices (6%) and soil and water conservation practices (9%).

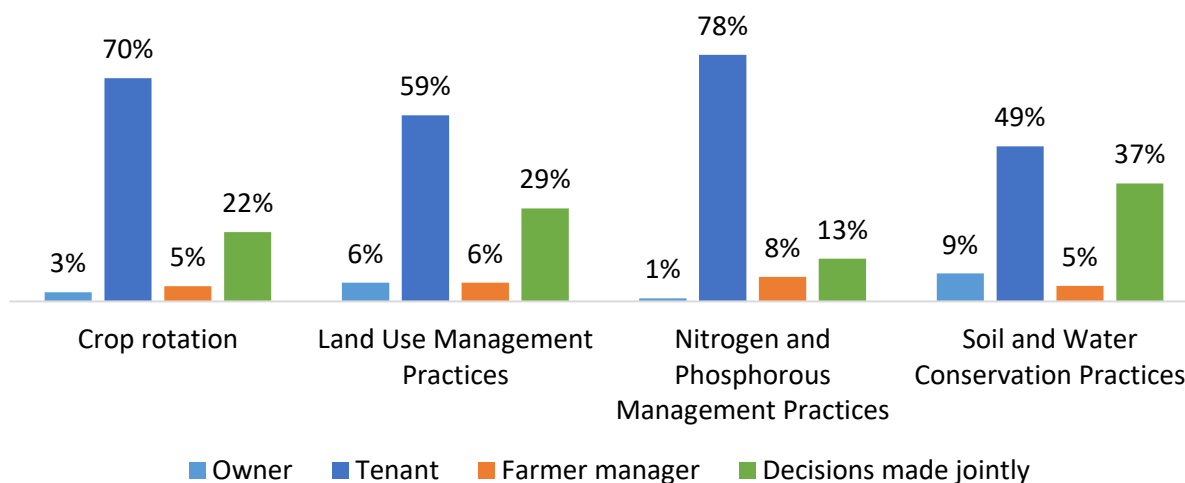


Figure 15. Decision-making on farmland that owners rent to farmers.

Tenant farmers responsible for making the decisions regarding crop rotation (85%), land use management practices (82%), and nitrogen and phosphorous management practices (85%) on the acres they rented. These tenants were also mostly responsible for decisions about soil and water conservation practices (67%); however, landowners were more involved in these decisions, with some owners making these decisions themselves (9%), but more often making decisions about these practices jointly with their operators (24%; Figure 16).

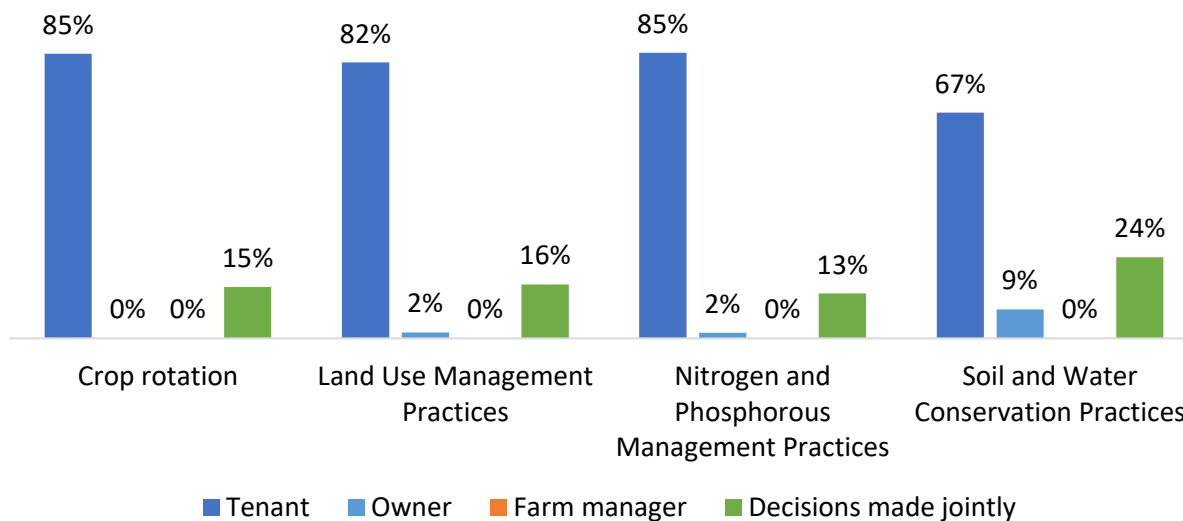


Figure 16. Decision-making on farmland tenants rent from landowners.

Across all farming situations, whether the acres were rented or owned, the operators of the land, not the owners, were identified most often as making decisions about all aspects of the land, from crop rotation to soil and water conservation practices.

Land use management practices

Farmers and landowners were asked about their experience with a variety of conservation-related land use management practices including tillage methods, cover crops and contouring. They were also asked about their interest in trying or continuing to use these practices, any barriers to their implementation, and the perceived efficacy of each practice. The most common land use management practices that landowners and farmers used were reduced tillage (69%), no-tilling one crop in the rotation (64%), and contouring (56%; Figure 17). In contrast, cover crops and long-term no-till were the practices least used. Almost half of the respondents (49%) indicated that they have not tried cover crops and four of 10 (40%) reported the same for long-term no-till. Although cover crops were one of the least used management practices, three of four respondents (75%) showed interest in continuing or trying it in the future. Reduced tillage and no-tilling one crop in the rotation received similar interest (76% and 75%, respectively).

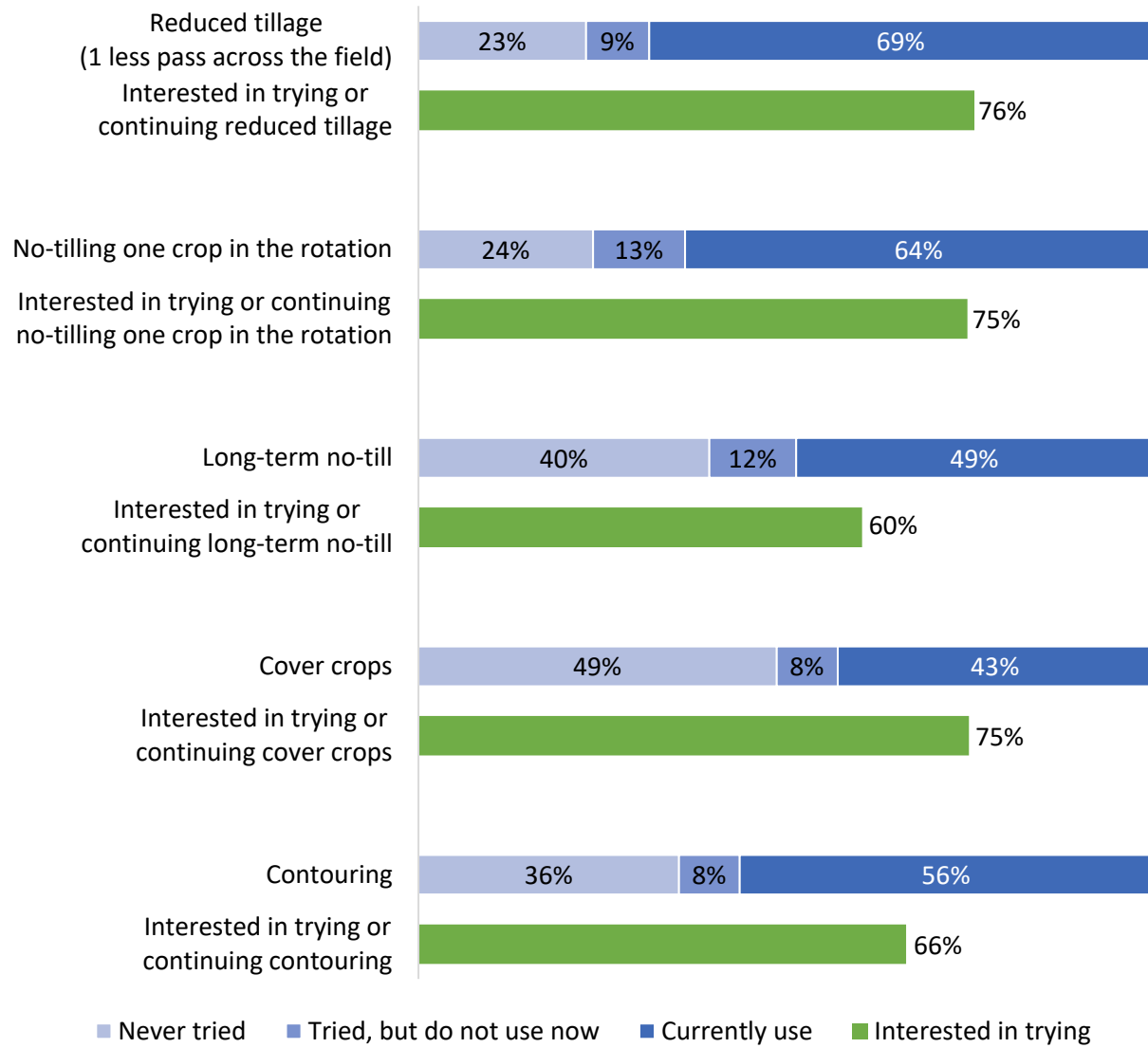


Figure 17. Experience with and interest in using land use management practices.

No-tilling one crop and reduced tillage were not only the most common practices used by landowners and farmers, but also those perceived as having the fewest factors limiting their adoption or extension (Figure 18). In both cases, over 60% of the respondents (69% and 63%, respectively) indicated that there were no limiting factors. The main barriers to the use of reduced tillage and no-tilling one crop were expenses (13% and 11%, respectively) and lack of information and training (12% and 13%, respectively). Despite its limited adoption, long-term no-till was also seen as having no factors limiting its use by over half of respondents (56%). Those who reported barriers to its adoption identified expenses (16%) and lack of information and training (18%) as the main obstacles. Cover crops and contouring were the practices perceived as having the most factors limiting their adoption and expansion. Only 25% of respondents reported no limiting factors for cover crops and slightly over forty percent (41%) indicated

the same for contouring. For these two practices, time was considered a main obstacle along with expenses and lack of information and training.

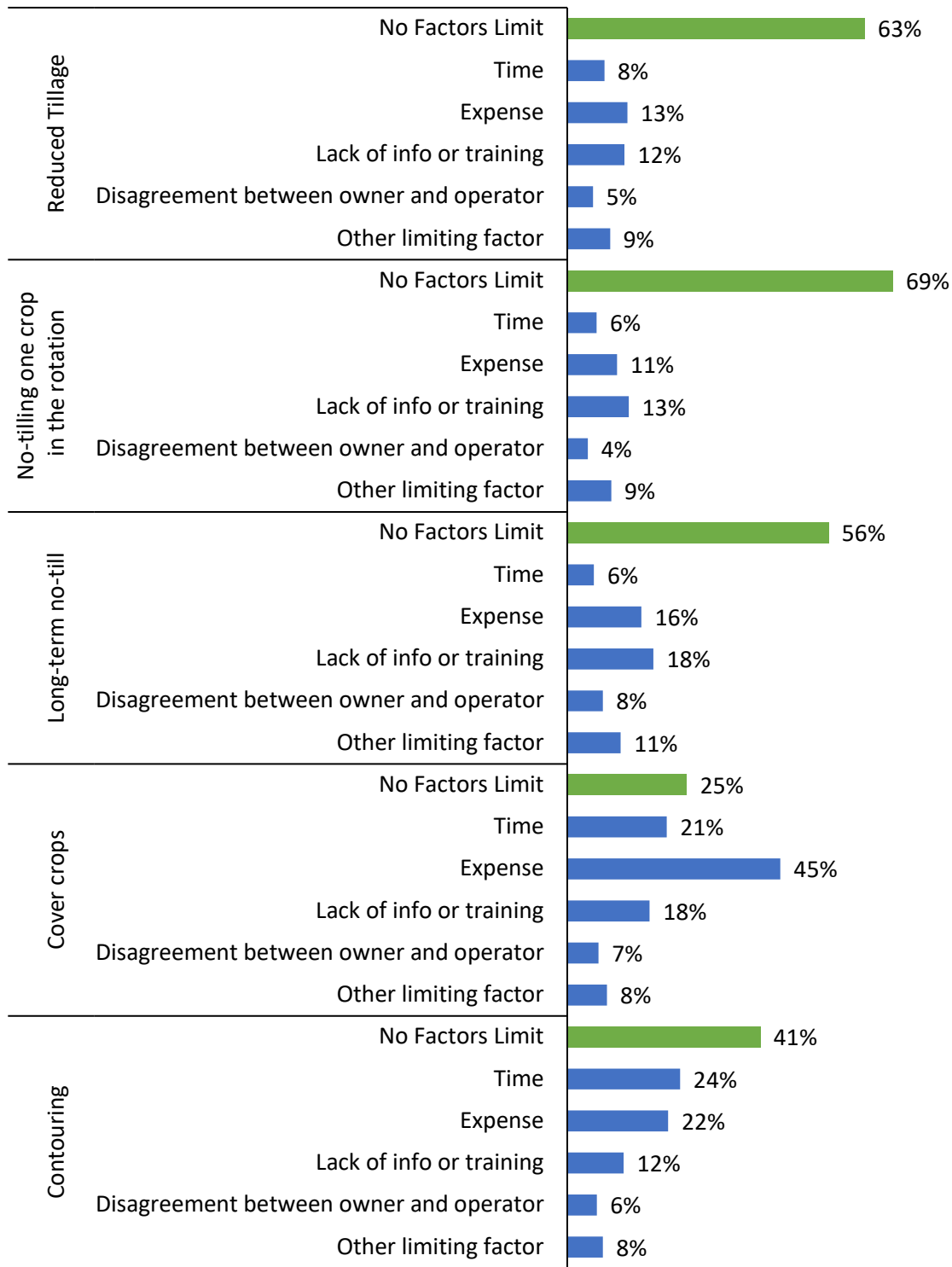


Figure 18. Factors limiting the adoption or extension of land use management practices

Although cover crops and long-term no-till were the land use management practices least used, they were seen as the most effective, with 61% and 57% of respondents, respectively, indicating that they are very effective in improving water quality in their drainage area or watershed (Figure 19). Nearly one-half of respondents (49%) believed contouring and no-tilling one crop in the rotation to be very effective land use management practices for improving water quality. All land use management practices were viewed as being moderately or very effective by the majority of respondents.

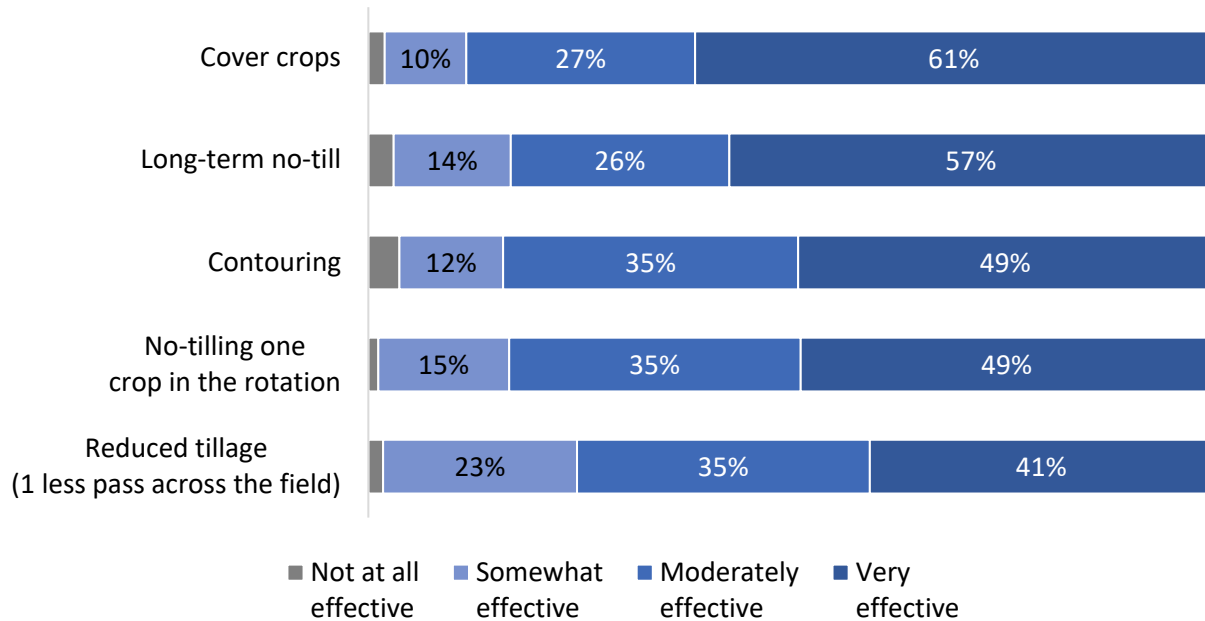


Figure 19. Perceived effectiveness of land use management practices.

Nitrogen and phosphorous management practices

Similar to the land use practices, farmers and landowners were asked about their experience with a variety of nitrogen and phosphorous management practices including application times and methods, soil testing, and use of nitrogen stabilizers. They were also asked about their interest in trying or continuing to use these practices, any barriers to their implementation, and the perceived efficacy of each practice. As shown in Figure 20, the nitrogen and phosphorous management practices used most often by farmers and landowners were regularly conducting soil tests (72%) and avoiding fall application of manure or nitrogen fertilizer (54%). Nitrogen stabilizers or inhibitors, variable rate application technology, and split rate/time nitrogen application were the practices least used by farmers and landowners. Over 40% of respondents indicated that they have never tried these practices (41%, 46%, and 48%, respectively). One-fifth of respondents (19%) reported having tried, but were not currently using, nitrogen stabilizers or inhibitors. Interest in continuing or trying nitrogen and phosphorous practices was high, ranging from 58% for splitting rate/ time nitrogen application to 82% for conducting soil tests on a regular basis.

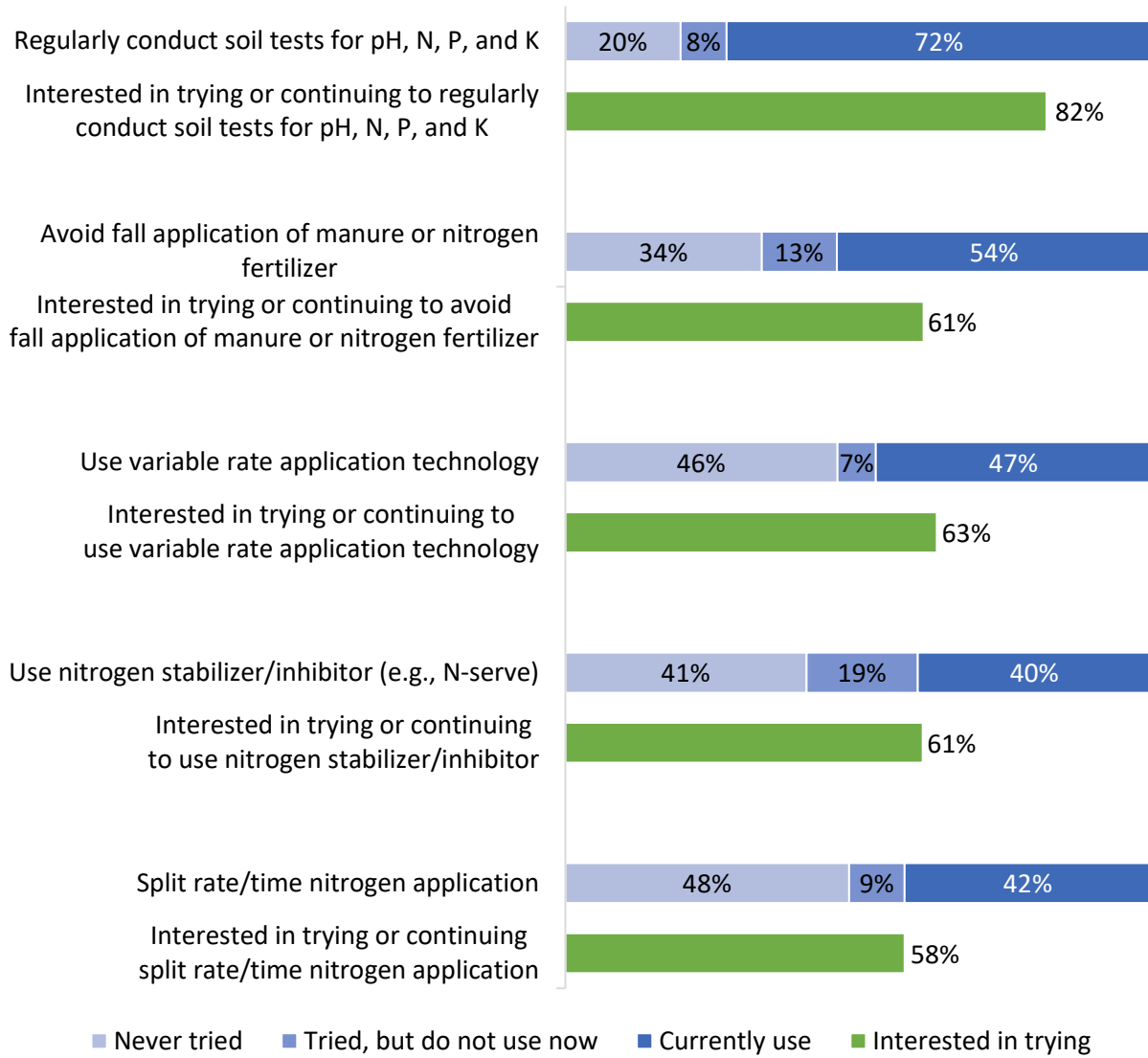


Figure 20. Experience with and interest in nitrogen and phosphorous management practices.

A majority of landowners and farmers indicated that no factors limited their ability to regularly conduct soil tests (55%) or kept them from being able to restrict their application of manure or nitrogen fertilizer to the spring only (53%; Figure 21). Expense was noted as a limiting factor by over one-quarter of respondents for four of five nitrogen and phosphorous management practices, with the highest proportion of respondents indicating such for using variable rate application technology (35%) and using nitrogen stabilizers or inhibitors (40%). Time was the primary limiting factor for farmers changing nutrient application practices including avoiding fall manure or nitrogen fertilizer application and using split rate/time nitrogen application.

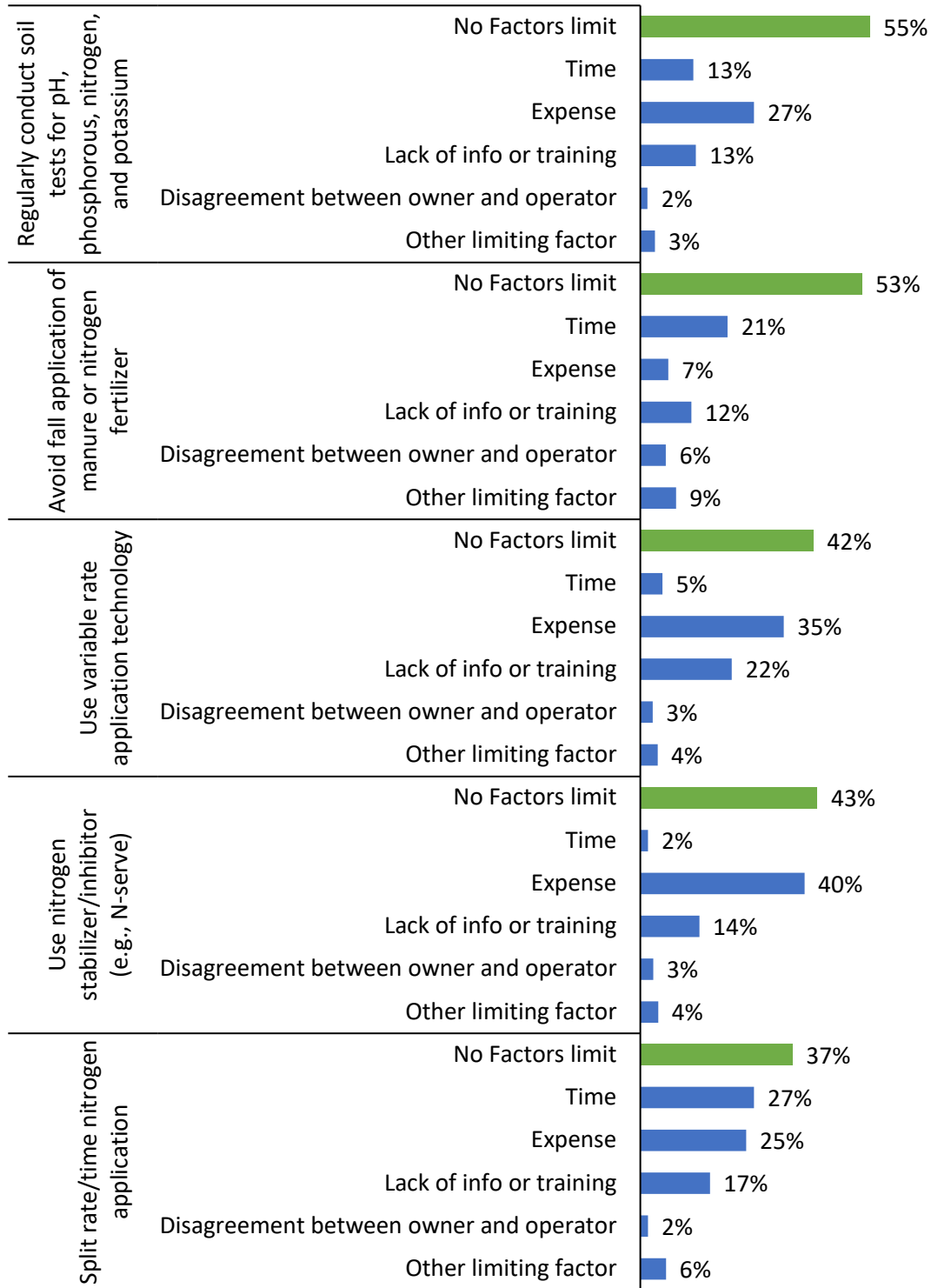


Figure 21. Factors limiting the adoption or extension of nitrogen and phosphorous management practices

A majority of farmers and landowners believed all the nitrogen and phosphorous management practices to be moderately or very effective at improving water quality in their area (Figure 22). However, among these practices, avoiding application of manure or nitrogen fertilizer in the fall was seen as the least effective, with over one-quarter of respondents (26%) indicating it was only somewhat effective at improving water quality. Regularly conducting soil tests for pH, phosphorous, nitrogen, and potassium was seen as the most effective practice for improving water quality, with 57% of respondents indicating they believed it was very effective.

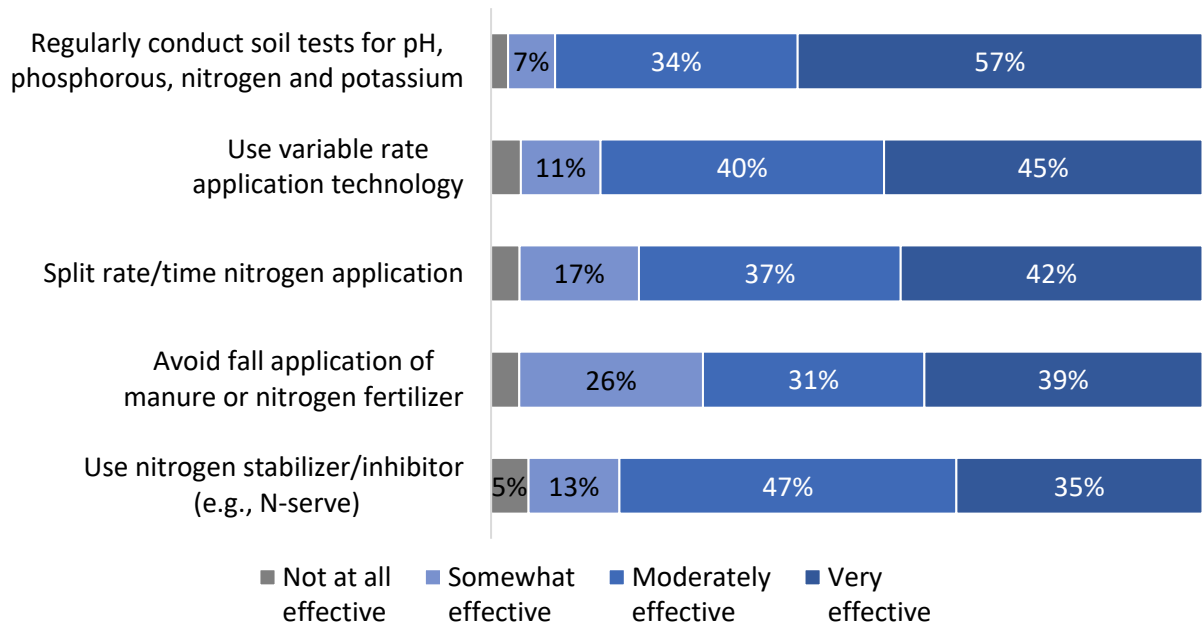


Figure 22. Perceived effectiveness of nitrogen and phosphorous management practices.

Soil and water conservation practices

Farmers and landowners were also asked about their experiences with a variety of soil and water conservation practices including water drainage management, stream bank stabilization, and bioreactors. They were also asked about their interest in trying or continuing to use these practices, any barriers to their implementation, and the perceived efficacy of each practice. The soil and water conservation practices with which farmers indicated they had the most personal experience were drainage tile water management (63%) and buffers (60%), with approximately six of 10 respondents indicating they currently use these practices (Figure 23). These practices also had the highest reported interest from farmers and landowners in regards to continuing or adopting these practices. However, due to higher than expected reports of past experience with drainage tile water management, it is possible that this term was interpreted more broadly than intended and warrants future study. That is, some participants may have read the item as reflecting the general work of managing water via use of tiling rather than the specific conservation practice of drainage water management to reduce nitrates leaving the fields. Farm ponds, terracing/basins (dry ponds), and stream bank stabilization practices had never been tried by a majority of respondents, but were all noted by over half of respondents as practices they would be interested in continuing or adopting in the future. Wetland construction,

saturated buffers, and bioreactors were used by the fewest farmers and landowners and had the lowest percentages of respondents indicating interest in adopting or continuing to use. However, the relative number of those currently using these practices to those interested in continuing or trying this practice in the future indicates opportunities for future implementation of these practices.

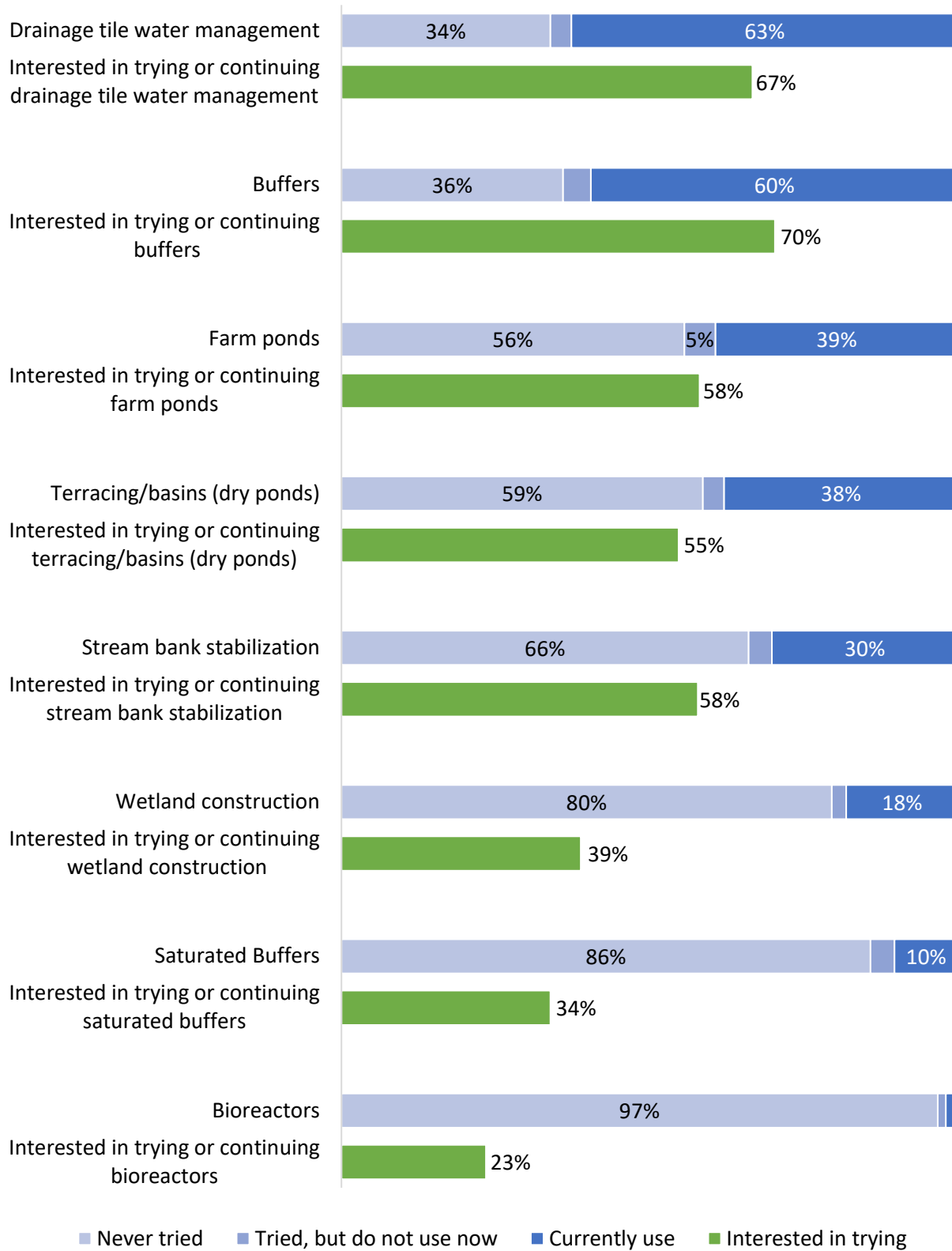


Figure 23. Experience with and interest in nitrogen and phosphorous management practices.

Expense was seen as the most limiting factor for all soil and water conservation practices, with over one-half of respondents citing expense for all but two practices, buffers (43%) and saturated buffers (47%; Figures 24 and 25). A lack of training was also seen as a limiting factor by one-quarter of respondents for implementing saturated buffers (26%) and by one-third of respondents for installing bioreactors (34%). Over a third of respondents noted no factors limiting their adoption of buffers and drainage tile water management (37% and 34%, respectively).

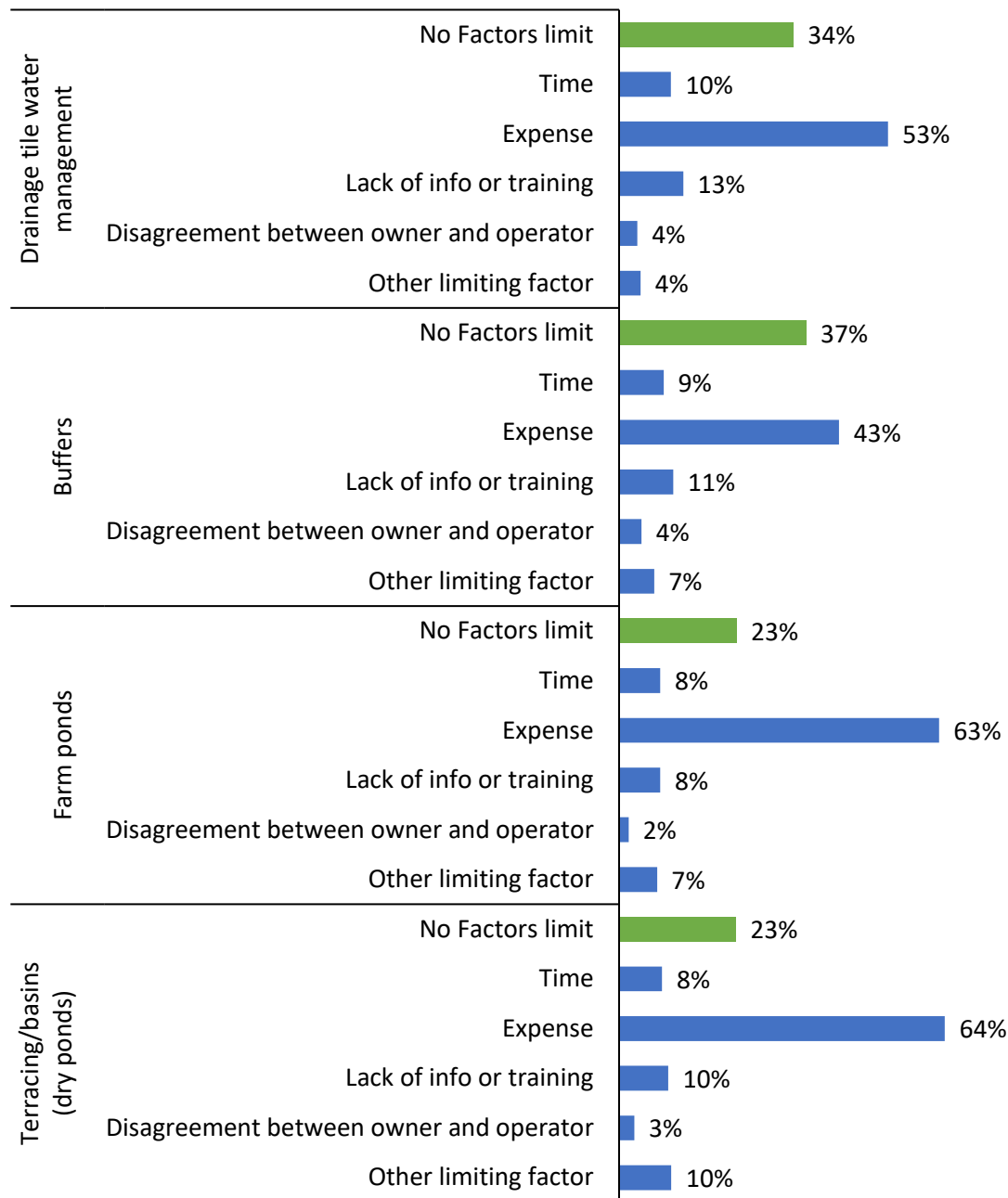


Figure 24. Factors limiting the adoption or extension of soil and water conservation practices (1 of 2).

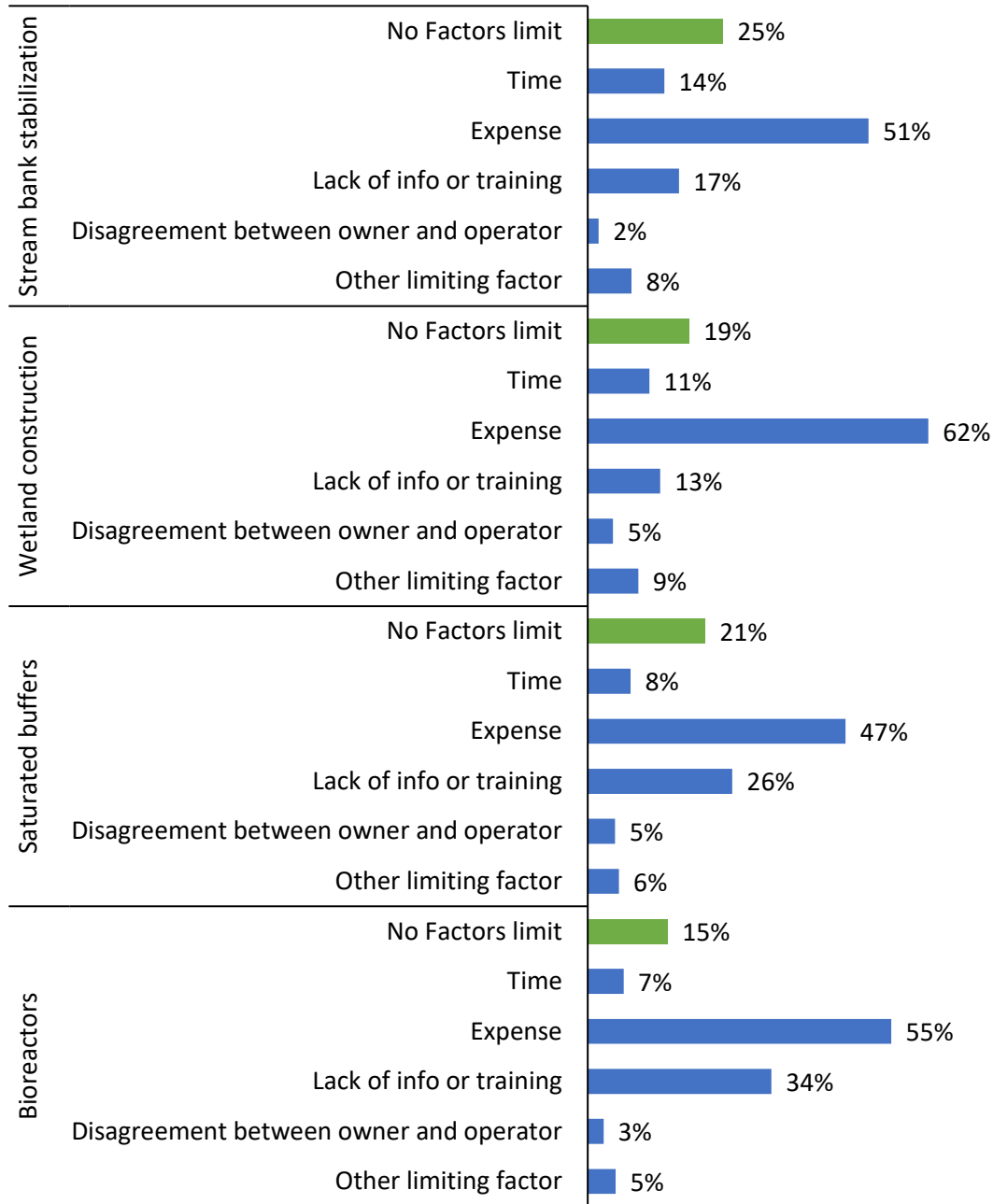


Figure 25. Factors limiting the adoption or extension of soil and water conservation practices (2 of 2).

A majority of farmers and landowners believed all the soil and water conservation management practices to be moderately or very effective at improving water quality in their area (Figure 26). However, saturated buffers and wetland construction were viewed as only somewhat effective or not at all effective by over one-quarter of respondents (26% and 29%, respectively), while bioreactors were viewed the same by four of 10 respondents (41%).

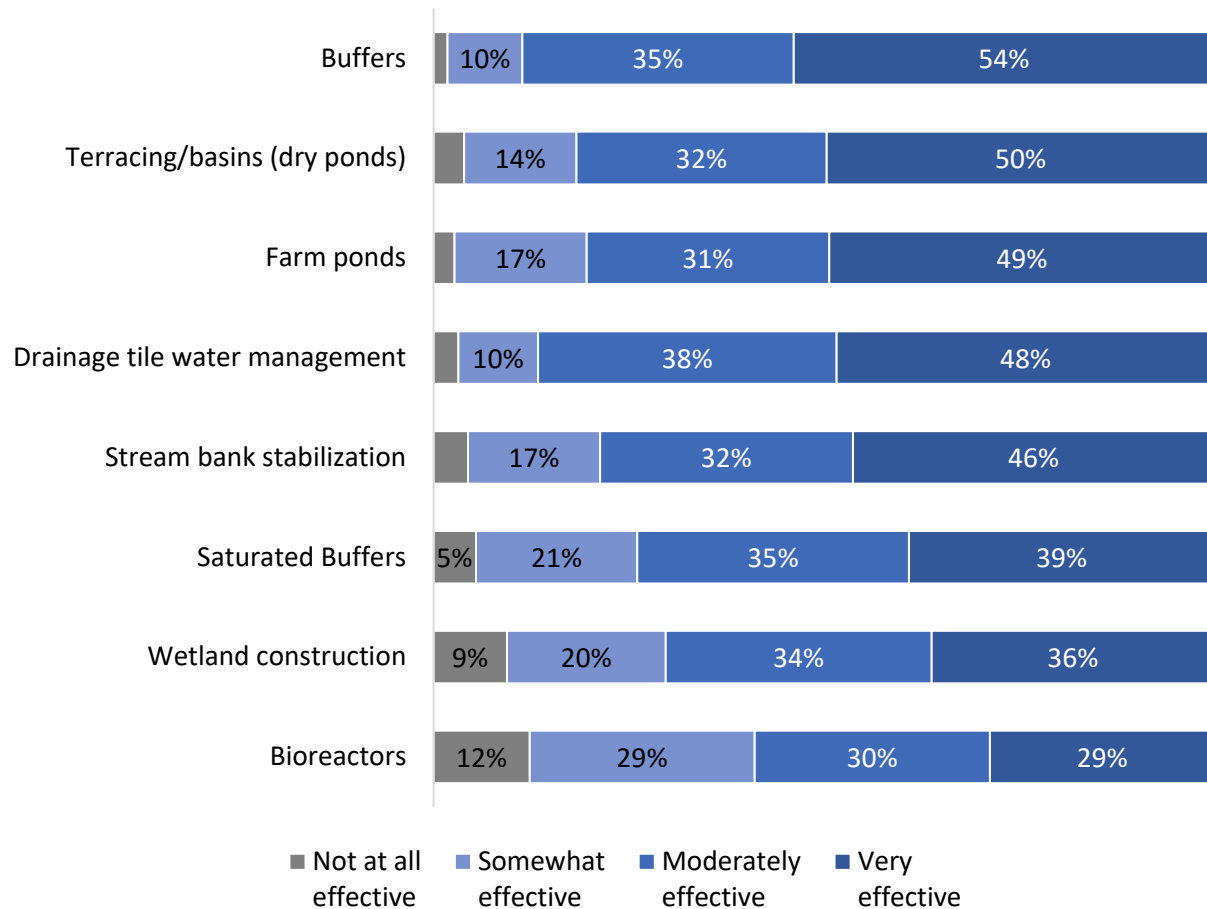


Figure 26. Perceived effectiveness of soil and water conservation practices.

All respondents were asked what they thought would be a reasonable financial incentive per acre per year for implementing various conservation practices including CRP buffer, cover crops, and no-till practices for five years. The majority of respondents indicated they were unsure about a dollar amount for these practices with approximately 50% of respondents selecting unsure for these questions. However, for those respondents who did provide an answer, amounts ranged from \$0 – \$500/acre/year for CRP buffer ($n = 49$), \$0 – \$250/acre/year for cover crops ($n = 52$), and \$0 – \$500/acre/year for implementing no-till for five years ($n = 46$) and averaged \$201.84/acre/year, \$45.31/acre/year, and \$76.30/acre/year for each practice, respectively.

Conservation and land stewardship attitudes

Respondents were asked to indicate their agreement or disagreement with a series of statements regarding land stewardship, concerns over soil health, erosion, and runoff on their fields, and improvements they could make on the land they owned or farmed. The term steward of the land resonated with respondents, with nine of 10 respondents (92%) having agreed (agreed or strongly

agreed) that they saw themselves as stewards of the land (Figure 27). Though expense was the limiting factor for all soil and water conservation practices, over 80% of farmers and landowners agreed or strongly agreed that they applied soil and water conservation practices regardless of commodity payments (85%). Moreover, few respondents indicated that implementation of management practices to improve water quality were too costly for their operation, with a plurality of respondents having disagreed (44%; disagreed or strongly disagreed) and four of 10 respondents (41%) having neither agreed nor disagreed with the statement. Farmers and landowners were concerned over erosion and runoff from their own fields (78%) as well as their neighbors' fields (72%), but were confident in their knowledge about reducing nutrient loss (83%) and improving soil health (83%) on the fields they owned or farmed. However, their concerns over runoff did not necessarily translate into their perceived ability to improve water quality through their actions, as only 54% of respondents agreed or strongly agreed that there were actions they could take to improve the water quality in the creeks near where they farmed. A plurality of respondents agreed or strongly agreed (46%) that farmers take undue blame for environmental problems in the Clear Creek Watershed.

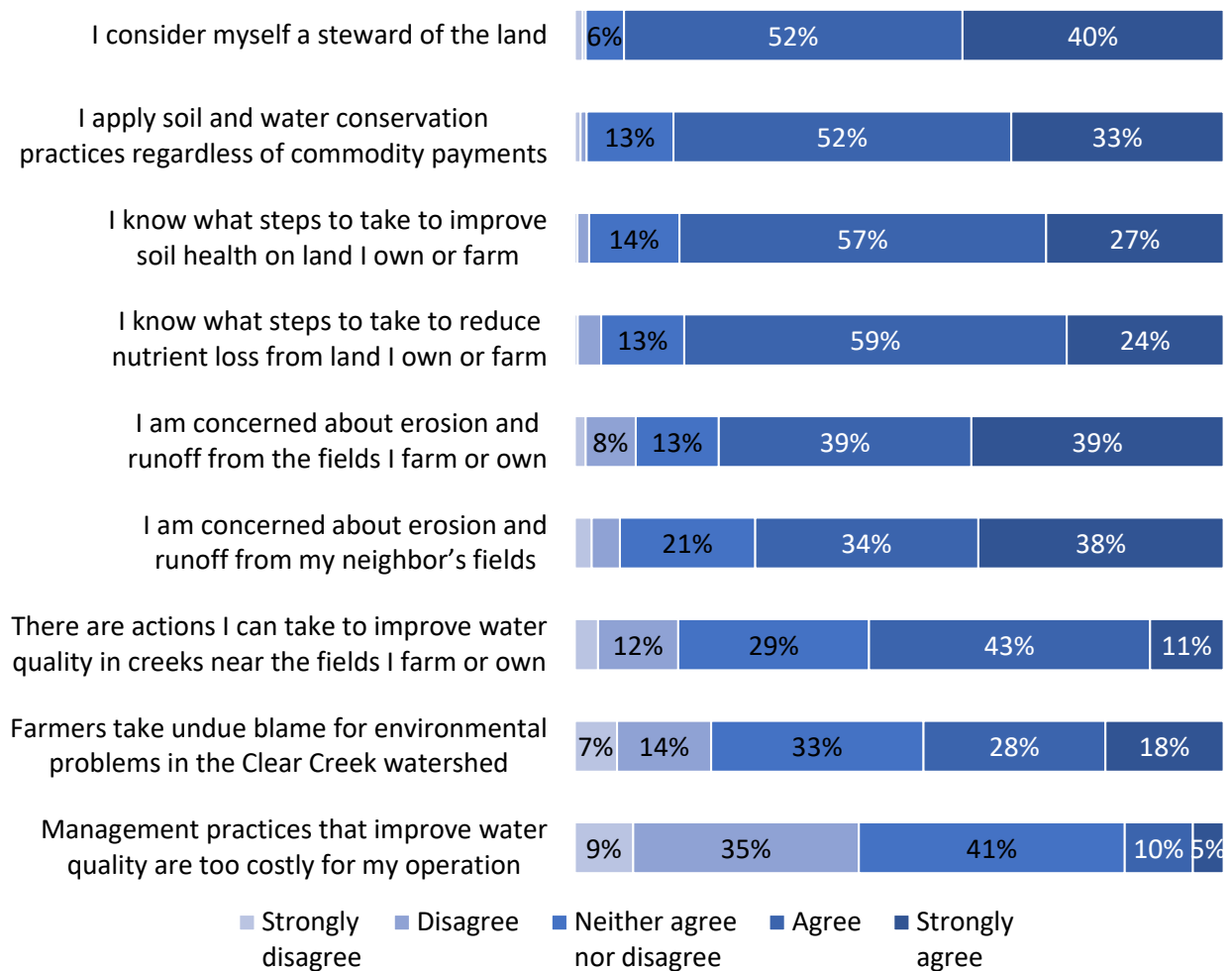


Figure 27. Agreement or Disagreement with statements about land stewardship.

In an uncued, open-ended question, respondents were asked to identify what they saw as the most important issues that faced farming in Iowa. The most prevalent theme among responses ($n = 128$) was profitability of farming operations (55%) including concerns over high input costs and land prices as well as low grain and livestock prices. Respondents identified a variety of environmental concerns (15%) facing farming, including runoff issues, erosion, and water quality as well as the use of and reliance on chemicals in farming. Other respondents identified over-regulation (13%), the growing size and increased corporatization of farms (5%), and the loss of farmable acres due to development (5%) as the important issues facing farming in Iowa. Some farmers expressed concern over the growing divide between urban residents and farmers, which they believe has led to blame for environmental issues or dismissal of farmers' efforts to improve practices (5%). Farmers also expressed concern for beginner farmers, both in developing interest in the occupation and a concern for the costs of getting started (4%).

Trust in the sources of conservation information

Respondents were asked how much they trusted various government and non-government entities as sources of information on conservation issues related to farming. The governmental groups with the most trust from respondents about conservation issues included Iowa State University (ISU) Extension and the Iowa or Johnson County Soil and Water Conservation District, which were trusted moderately or a great deal by more than two-thirds of respondents (75% and 70%, respectively; Figure 28). The Natural Resources Conservation Service (NRCS) and the Farm Service Agency (FSA) also had high levels of trust from respondents regarding farm conservation. In contrast, at least one of five respondents indicated they did not trust city or county government staff or their county's public health office as conservation information sources. Respondents were largely unfamiliar with the Iowa Learning Farms, with over half of respondents (57%) reporting they were not familiar with this institution.

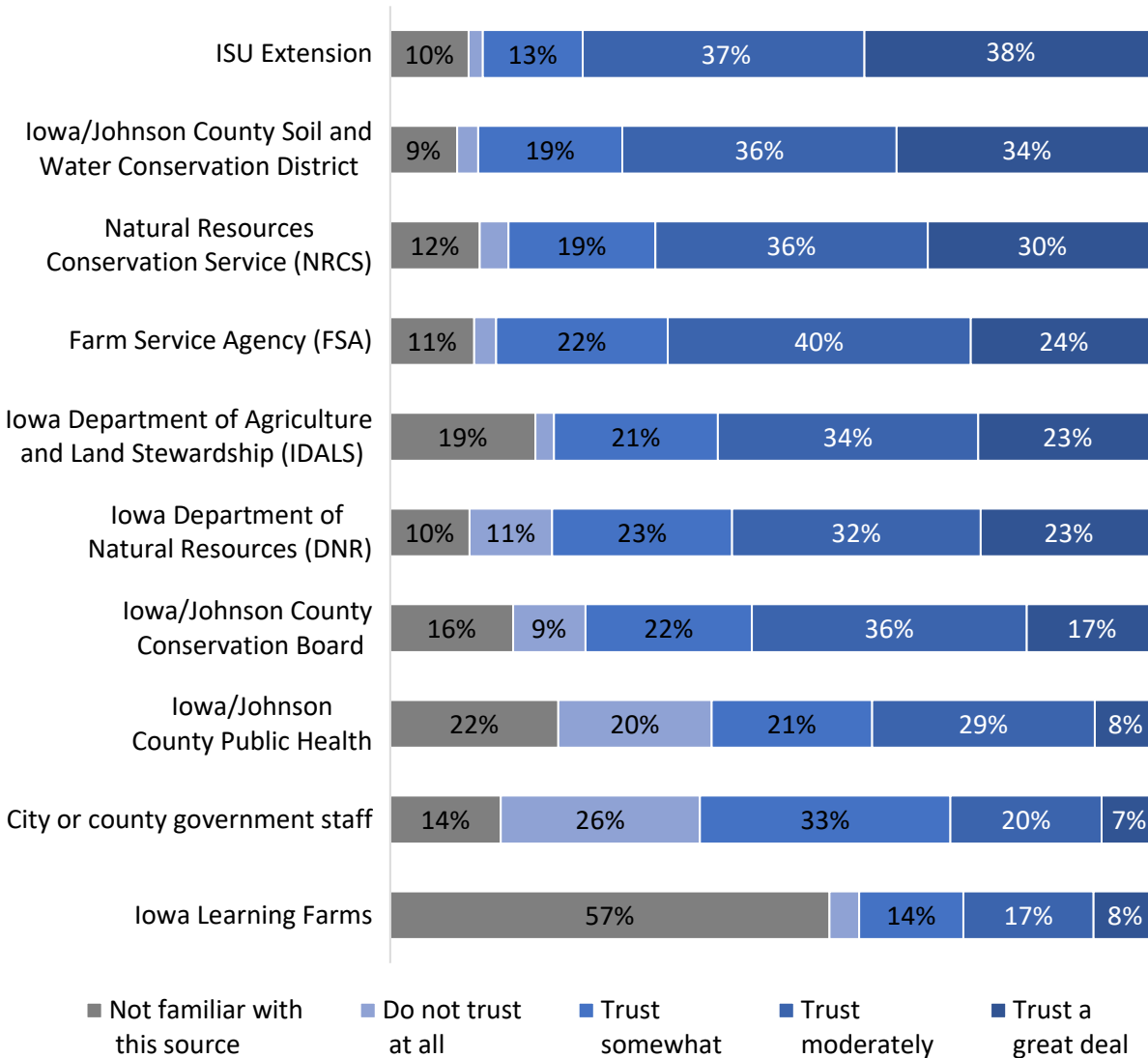


Figure 28. Trust in government entities for information on conservation issues related to farming.

Focusing on non-governmental sources of conservation information, respondents in the Clear Creek Watershed were most trusting of their family members (74%) and neighbors or friends who farm (69%), with seven of 10 having reported a moderate or a great deal of trust in these groups as sources of information about conservation on farms (Figure 29). Individuals also reported high levels of trust in their local cooperatives or certified crop advisors (63% moderate or a great deal of trust) as well as in the farm bureau (58% moderate or a great deal of trust). Pluralities of respondents indicated they moderately trusted various commodity agriculture groups such as the Iowa Corn Growers Association, Cattlemen’s Association, Soybean Association, and the Iowa Pork Producers. Farmers and landowners in the Clear Creek Watershed were largely unfamiliar with Practical Farmers of Iowa (PFI), with nearly half (46%) indicating they were not familiar with this group. The source with the lowest level of trust was local media (e.g., newspaper, television, radio); 39% indicated they did not trust it at all as a source of conservation information, but even for this source, the majority indicated that they trusted the source at least somewhat.

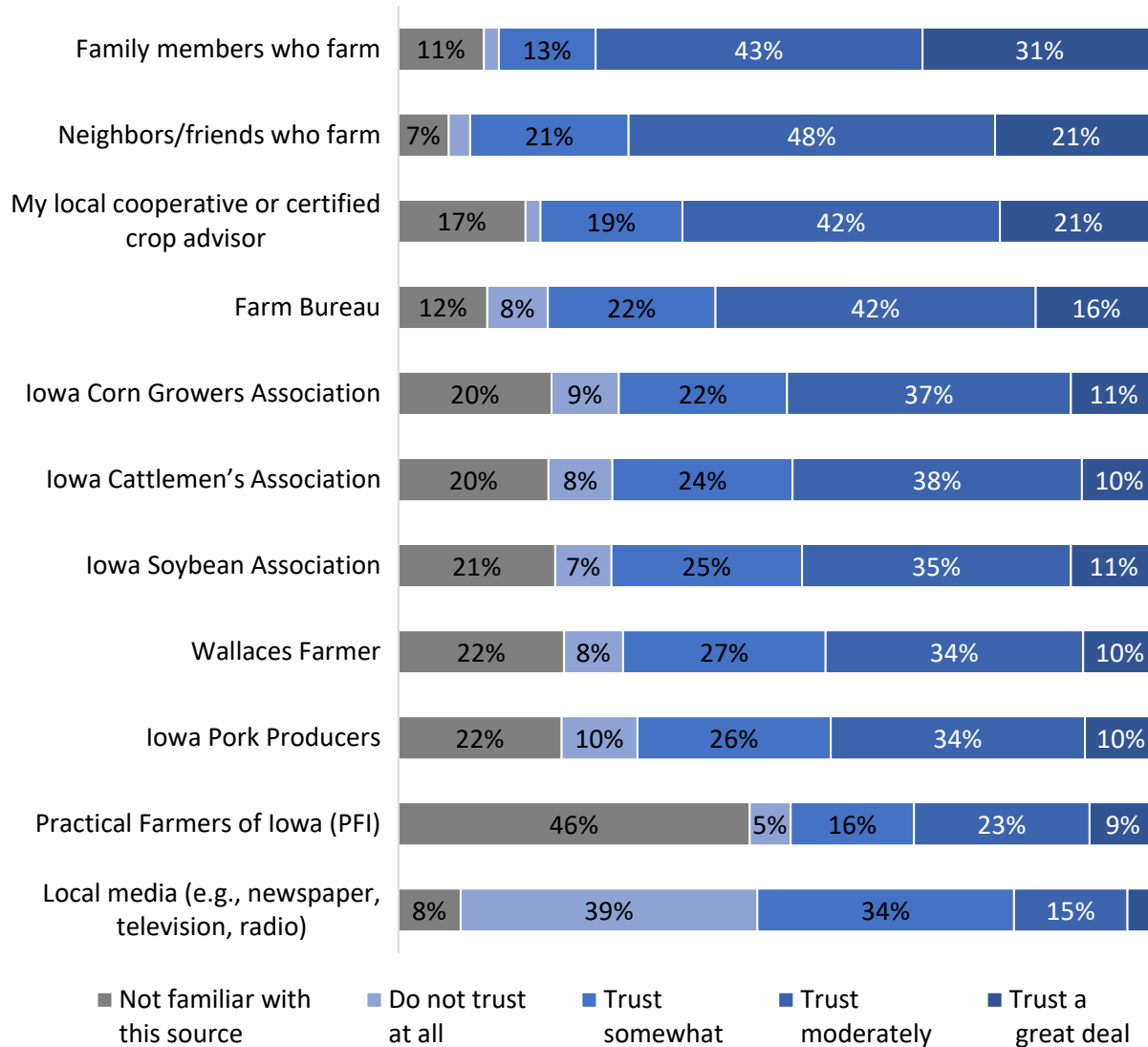


Figure 29. Trust in non-government entities for information on conservation issues related to farming.

Livestock and manure application

A series of questions regarding livestock ownership and manure use and application on fields was asked to farmers and landowners. About three in 10 respondents (31%) owned livestock at the time of the survey. The most common type of livestock was cattle, with two-thirds of livestock owners reportedly having them (Figure 30). The number of cattle ranged from 1 to 1,000, with 59% of cattle owners having between 25 and 100 cattle.

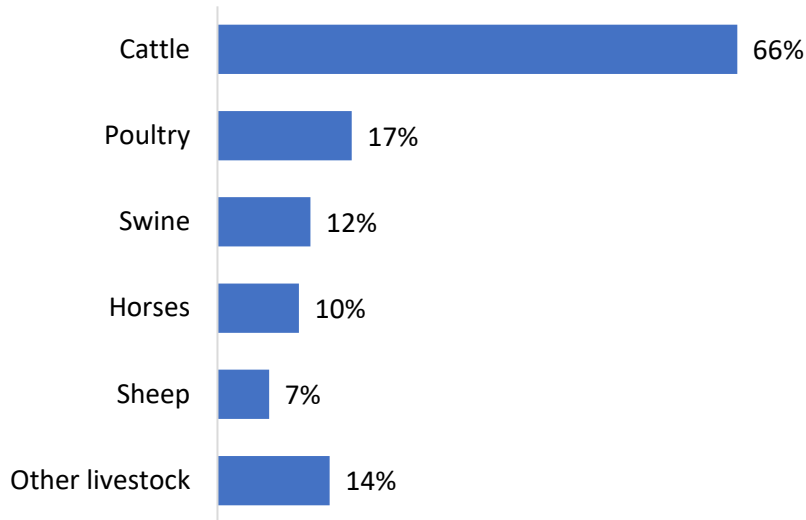


Figure 30. Livestock ownership.

All respondents were asked what they thought would be a reasonable cost-share percentage for improving pasture management with practices such as rotational grazing or improving watering systems. Sixty respondents answered this question with responses ranging from farmers paying 0% to 100% of the cost. A plurality of those who responded to this question (48%) viewed a 50/50 percentage split as reasonable.

Slightly less than one-third (31%) of farmers and landowners indicated manure was applied to the fields they farm or own; 5% were unsure whether manure was applied to the fields (Figure 31).

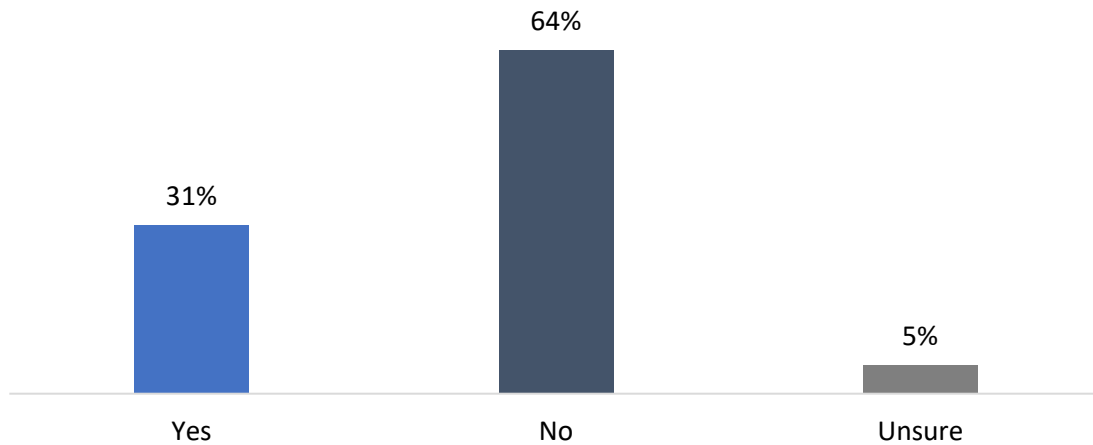


Figure 31. Application of manure to owned or farmed fields.

The most common form of manure applied to fields was solid manure (Figure 32). Most individuals who knew that manure was applied to their fields indicated using solid manure (91%), with all but one of those respondents indicating it was spread on their fields. Similar proportions of those who applied manure to their fields injected or knifed liquid manure (20%) into the soil or spread semi-solid manure

(23%) on their fields. Across all types of manure used, the majority of farmers applied manure in both the spring and fall.

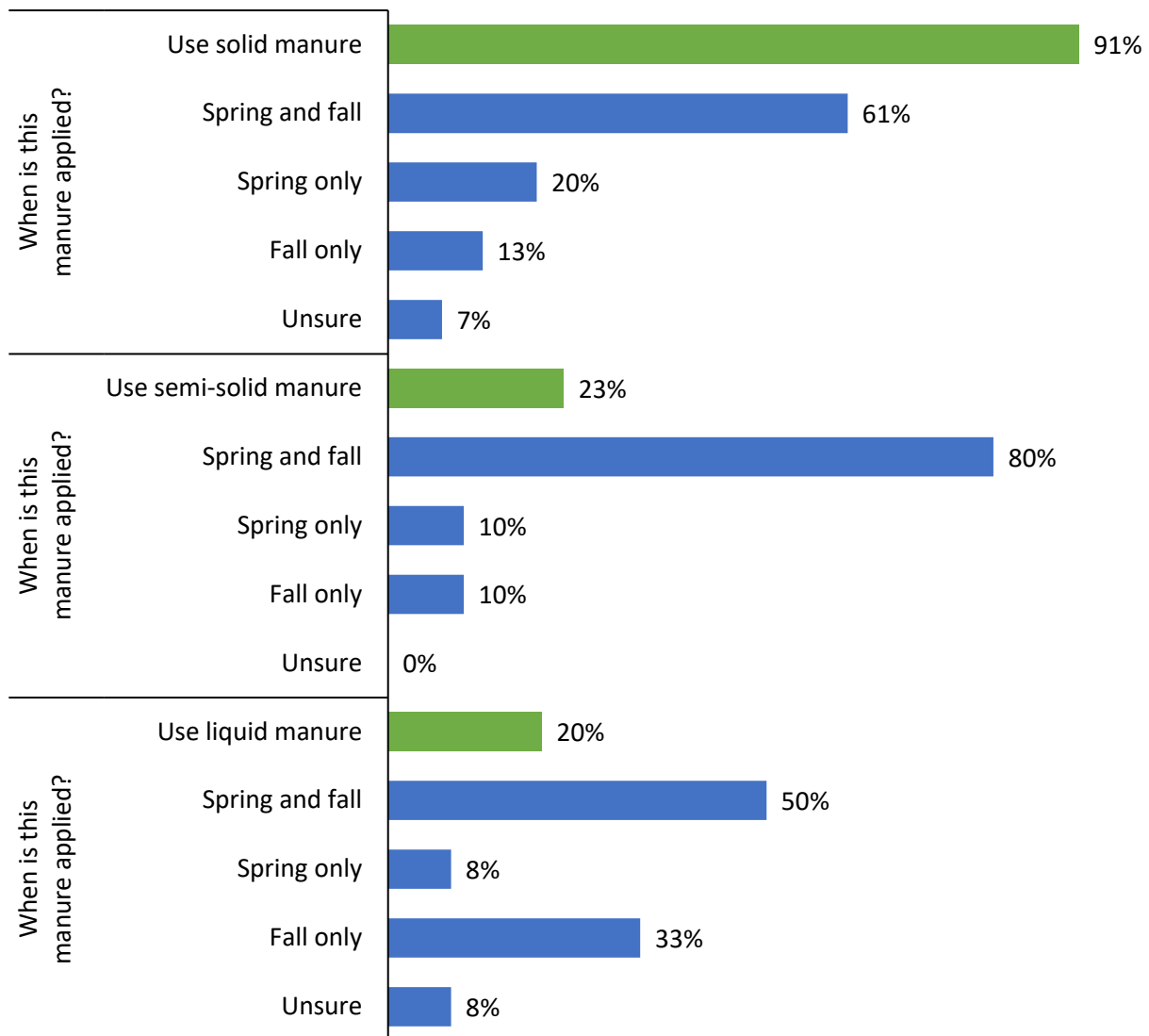


Figure 32. Type of manure used and time of application.

All survey participants were asked to identify how important they believed a series of factors were for determining where manure is applied on farms. Nearly two-thirds of respondents (64%) identified crop nutrient needs and over half (57%) identified soil test results as being very important for determining where to apply manure (Figure 33). More than three-quarters of respondents identified a farmers own judgment based on prior experience or the proximity to the manure source as being moderately or very important (81% and 76%, respectively) to manure application location. The least important factors for determining where to spread manure were recommendations from NRCS, family who farm, consultants, neighbors who farm, or equipment manufacturers, with pluralities of respondents indicating these as not at all important.

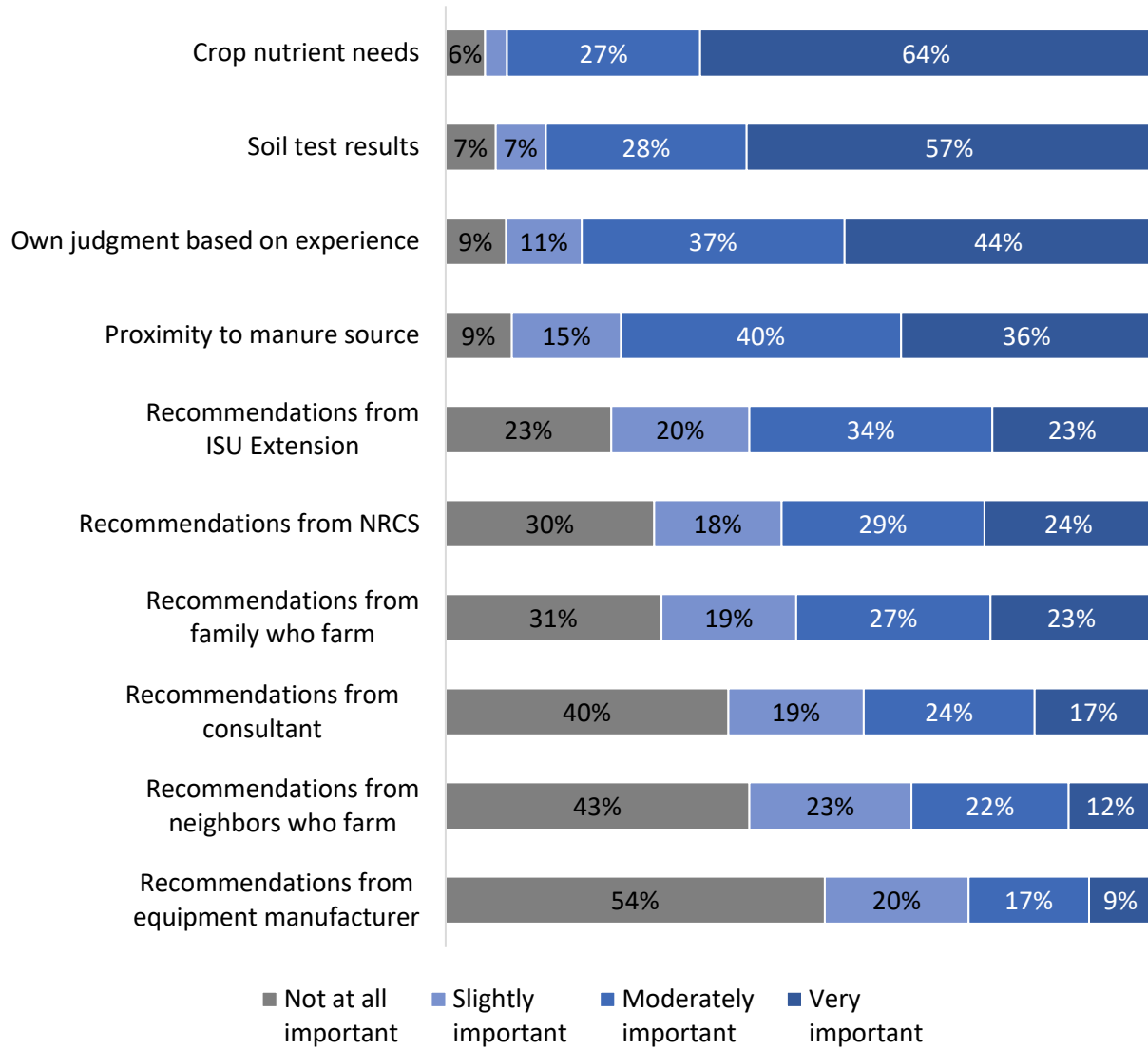


Figure 33. Importance of factors for determining where to apply manure.

Views on water quality

Respondents were asked to rate the quality of the water in their area's lakes, rivers, and creeks and to identify their preferred method of obtaining information about local efforts to improve water quality. Lakes were seen as having the best quality of the three waterways, with 53% of respondents indicating that the quality of the water in their lakes was good or excellent (Figure 34). In contrast, rivers were considered the body of water with the worst water quality. Overall, 41% of respondents rated their quality of water in rivers as good or excellent and 15% stated that it was poor.

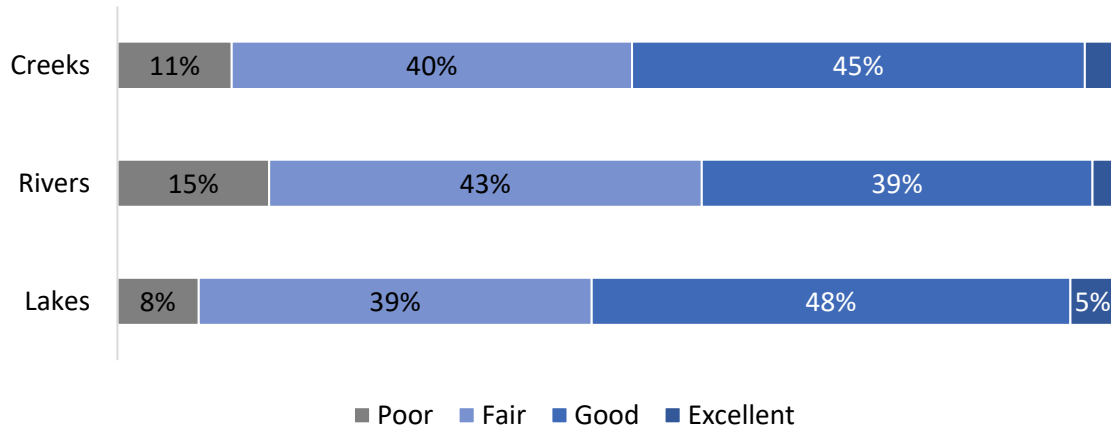


Figure 34. Rating water quality.

When asked in an uncued, open-ended question to identify what they saw as the most important factors positively or negatively affecting water quality in their area, farmers and landowners were more likely to provide a negative factor than a positive factor. Negative factors affecting water quality included runoff from agricultural activities (chemicals, fertilizers, pesticides) and urban sources (highways, lawns, parking lots), a lack of buffer strips in farm fields, urban sprawl and development, streambank destabilization from tree removal and livestock access to streams, as well as trash deposited in waterways. Respondents also commented on large rain events that have contributed to runoff and resulted in flooding, in part attributed to the damming of Clear Creek in Coralville. Some respondents identified low commodity prices as a hindrance to implementing more conservation practices.

The most common positive factors identified were an increase in conservation practices in the area including no-till methods, use of cover crops, and installed buffer strips and grass waterways. Respondents also noted changes to the timing of nutrient application, such as by avoiding fall application or using split application, as helping to improve water quality in the area.

When asked how they would prefer to get information about local efforts to improve water quality, about three-quarters (74%) of respondents indicated that they preferred to receive information by mail (Figure 35). More than one of five respondents selected either newspaper (28%), email (24%), Internet (21%), or radio broadcasts (21%) as their preferred medium for receiving updates on local efforts to improve water quality.

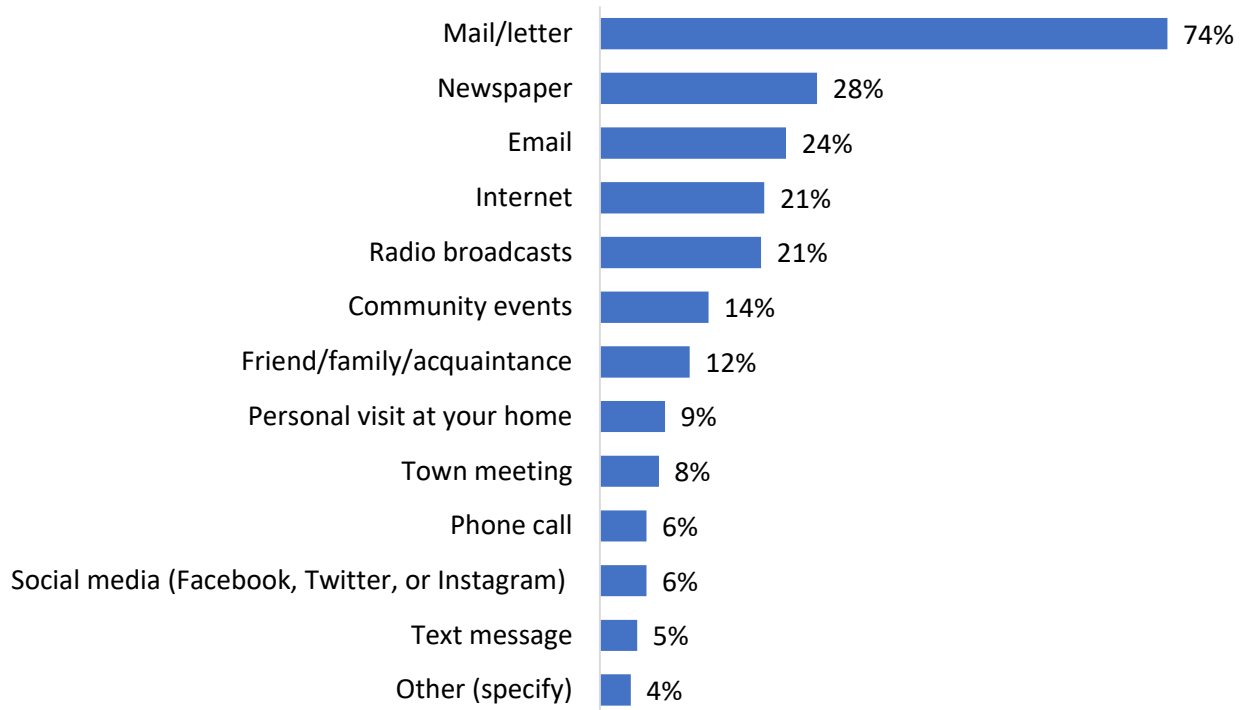


Figure 35. Preferred medium for receiving information about local water quality improvement efforts.

Flooding

When asked about their experiences with flooding in the past, one of five (20%) farmers reported that the ground they farmed is prone to flooding (Figure 36). Fourteen percent of respondents indicated the property they owned or farmed has been affected by flooding from Clear, Buffalo, Deer, or Rhine Creeks.

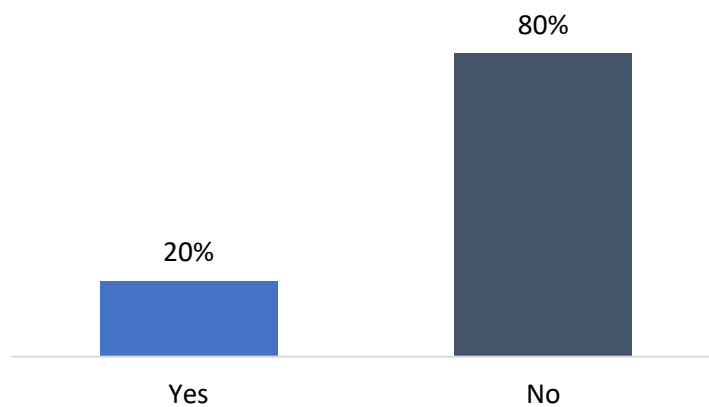


Figure 36. Own land prone to flooding.

Although most of the respondents indicated that their crops did not suffer from high or standing water in the past 10 years (77%), slightly less than one-quarter (23%) reported having had those experiences (Figure 37). Of them, most were affected during one or two growing seasons in the last 10 years.

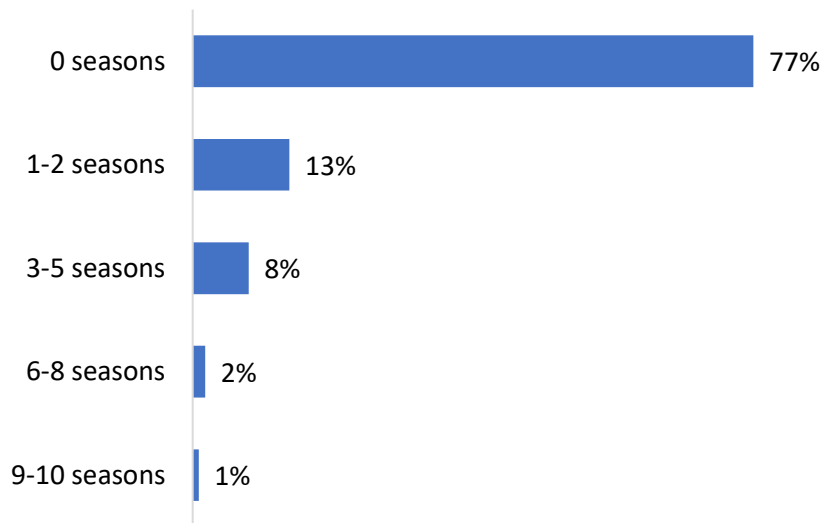


Figure 37. Number of growing seasons affected by high/standing water in the last 10 years.

Summary

With regard to landownership and farming, nearly one-half of the respondents owned land but did not farm and most farmers rented at least some of the acres they farmed. Upon retirement, one-third of landowners and farmers plan to transfer responsibility for their farm land to a family member, either by selling it or passing it on through a trust or inheritance. Across all farming situations, whether the acres were rented or owned, the operators of the land, not the owners, were most often making decisions about all aspects of the land, from crop rotation to soil and water conservation practices.

The most common crop rotation on all acres was a no-till corn/bean rotation. A corn/corn/bean rotation that used minimum-tillage on corn and no-till on beans and acres in hay were the next most common rotations. Tenant farmers were the most likely group to have used a no-till method with corn and beans. Nearly one-third of farmers had livestock, with cattle being the most common. The same proportion of farmers applied manure to their fields, most often using solid manure. Across all types of manure used, the majority of farmers applied manure in both the spring and fall. One out of five (20%) farmers reported that the ground they farmed was prone to flooding and 14% of respondents indicated the property they owned or farmed has been affected by flooding from Clear, Buffalo, Deer, or Rhine Creeks. Although most of the respondents indicated that their crops did not suffer from high or standing water in the past 10 years (77%), slightly less than one-quarter (23%) reported having had those experiences.

The most common land use management practices were reduced tillage, no-tilling one crop in the rotation, and contouring. In contrast, cover crops and long-term no-till were the practices least used. Although cover crops and long-term no-till were the land use management practices least used, they

were seen as the most effective in improving water quality. The nitrogen and phosphorus management practices used most often by farmers and landowners were regularly conducting soil tests and avoiding fall application of manure or nitrogen fertilizer. In contrast, nitrogen stabilizers or inhibitors, variable rate application technology, and split rate/time nitrogen application were the practices least tried by farmers and landowners. Regularly conducting soil tests for pH, phosphorous, nitrogen, and potassium was seen as the most effective practice for improving water quality while avoiding application of manure or nitrogen fertilizer in the fall was viewed as the least effective. The soil and water conservation practice with which farmers had the most personal experience was buffers. A majority of farmers and landowners believed all the soil and water conservation management practices to be moderately or very effective at improving water quality in their area. However, saturated buffers wetland construction, and bioreactors were viewed as less effective than the other practices.

As follow-up questions, landowners and farmers were also asked to indicate their interest in and any barriers to their continuing use of or trying the various land use, nutrient, and conservation practices. Although cover crops were one of the least used management practices, three of four respondents showed interest in continuing or trying it in the future. Cover crops and contouring were the land use practices perceived by the most individuals as having limitations to their adoption and expansion. For these two practices, time was considered a main obstacle along with expenses and lack of information and training. Interest in continuing or trying nitrogen and phosphorous practices was high, ranging from 58% for split rate/time nitrogen application to 82% for conducting soil tests on a regular basis. Expense was noted as a limiting factor by over one-quarter of respondents for four of the five nitrogen and phosphorous management practices and time was the primary limiting factor for farmers changing nutrient application practices including avoiding fall manure or nitrogen fertilizer application and using split rate/time nitrogen application. Buffers had the highest reported interest from farmers and landowners in regards to continuing or adopting this practice, while wetland construction, saturated buffers, and bioreactors had the least interest. However, the relative proportion of farmers currently using these practices to those who expressed interest may indicate untapped opportunities for implementation of these practices. Expense was seen as the most limiting factor for all soil and water conservation practices, with over one-half of respondents indicating as such for all but two practices, buffers (43%) and saturated buffers (47%).

When asked about soil health and water quality, a vast majority of respondents agreed or strongly agreed that they apply soil and water conservation practices regardless of commodity payments and that they know what steps to take to improve soil health on and reduce nutrient loss from the land they own or farm. Seven in 10 respondents agreed or strongly agreed that they are concerned about the erosion from the fields they own or farm (78%) or the fields owned or farmed by their neighbors (72%). However, this concern did not necessarily translate to perceived ability to make change, as only 54% of respondents agreed or strongly agreed that there are actions they can take to improve the water quality in the creeks near where they farm.

In their views of waterway quality, lakes were seen as having the best quality when compared to creeks and rivers, with 53% of respondents indicating that the quality of the water in their lakes was good or excellent. In contrast, rivers were considered the body of water with the worst water quality. Overall, only 41% of respondents rated their quality of water in rivers as good or excellent and 15% stated that it was poor. When asked how they would prefer to get information about local efforts to improve water quality, most respondents preferred to be contacted through the mail (74%). The next preferred

mediums for receiving information were newspaper (28%), email (24%), Internet (21%), and radio broadcasts (21%).

The governmental groups with the most trust from respondents about conservation issues included Iowa State University Extension and the Iowa or Johnson County Soil and Water Conservation District, which were trusted moderately or a great deal by more than two-thirds of respondents. On the contrary, the government entities with the least trust from respondents as conservation information sources were city or county government staff and their county's public health office. In regards to non-governmental sources of conservation information, farmers and landowners in the Clear Creek Watershed were most trusting of their family members and neighbors or friends who farm. In contrast, respondents indicated most often that they did not trust local media (e.g., newspaper, television, radio) at all as a source of conservation information.

Appendix: Questionnaire

1. Do you currently own or farm any agricultural land in Iowa or Johnson Counties? (Check only one)

- No Yes, Iowa Co. Yes, Johnson Co. Yes, own or farm agricultural land in both counties

If you DO NOT currently own or farm any agricultural land in Iowa or Johnson Counties, please stop here and return this survey in the envelope provided. Thank you very much.

2. Which of the following best describes your situation?

- I own all of the land that I farm
 I rent all of the land that I farm
 I own some of the land that I farm and rent some of the land that I farm
 I own land, but I do not farm
 Other (please specify) _____

3. Are you employed off-the-farm?

- No Yes, I work part-time off-the-farm Yes, I work full-time off-the-farm

4. Are you the primary decision-maker of a farming operation?

- No Yes → 4a. How many years have you been the primary decision-maker? _____ Years

5. How many more years do you plan to farm?

- _____ Years I am retired from farming I do not farm

6. Do you own or farm any ground that contains acres enrolled in the Conservation Reserve Program (CRP)?

- No (SKIP TO Q8) Yes

7. Please, indicate the number of acres for each of the following about the land you own or farm.

- a. Number of acres in CRP in 2017 _____ Unsure
b. Number of CRP acres you expect to put back into production in the next two years _____ Unsure

8. Do you purchase crop insurance? No Yes Unsure

9. Do you farm any land that is considered to be Highly Erodible Land (HEL)? No Yes Unsure

10. Do you farm any ground that is prone to flooding? No Yes Unsure

11. In the last 10 years, during how many growing seasons did any of your crops suffer from high or standing water?

- 0 seasons 1-2 seasons 3-5 seasons 6-8 seasons 9-10 seasons

12. Has any of the property you own or farm been affected by flooding from Clear, Buffalo, Deer or Rhine Creeks?

- No Yes Unsure

13. In the last 10 years, has your current home been flooded, or been threatened by flood waters, in any way?

- No Yes Unsure

14. In the last 10 years, has any flood event indirectly affected you in any of the following ways...

- a. Restricted your ability to get to work, school, or grocery store? No Yes Unsure
b. Workplace or school was temporarily closed? No Yes Unsure
c. Increased travel distance between home and school/work due to road closures? No Yes Unsure

15. Overall, how would you rate the quality of water in your area's lakes, rivers, and creeks?

	Poor	Fair	Good	Excellent
a. Lakes	1	2	3	4
b. Rivers	1	2	3	4
c. Creeks	1	2	3	4

16. What do you see as the most important factors positively or negatively affecting water quality in your area?

17. Please indicate your level of agreement or disagreement with the following statements (Circle one number for each statement).

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't Know
a. I know what steps to take to improve soil health on land I own or farm	1	2	3	4	5	7
b. I know what steps to take to reduce nutrient loss from land I own or farm	1	2	3	4	5	7
c. Farmers take undue blame for environmental problems in the Clear Creek watershed	1	2	3	4	5	7
d. I apply soil and water conservation practices regardless of commodity payments	1	2	3	4	5	7
e. I consider myself a steward of the land	1	2	3	4	5	7
f. I am concerned about erosion and runoff from <u>the fields I farm or own</u>	1	2	3	4	5	7
g. I am concerned about erosion and runoff from <u>my neighbor's fields</u>	1	2	3	4	5	7
h. Management practices that improve water quality are too costly for my operation	1	2	3	4	5	7
i. There are actions I can take to improve water quality in creeks near <u>the fields I farm or own</u>	1	2	3	4	5	7

18. What do you see as the most important issues currently facing farming in Iowa?

19. For each of the following practices, please indicate your **experience with (19a)** and **interest in trying or continuing (19b)** each practice.

	19a. Which of the statements below best describes your experience with the corresponding practice?			19b. Are you interested in continuing or trying this in the future?	
	I've never tried	I've tried, but do not use now	I currently use	No	Yes
Land Use Management Practices					
a. Reduced tillage (1 less pass across the field)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. No-tilling one crop in the rotation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Long-term no-till	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Cover crops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Contouring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nitrogen and Phosphorous Management Practices					
f. Regularly conduct soil tests for pH, phosphorous, nitrogen and potassium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Avoid fall application of manure or nitrogen fertilizer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Use variable rate application technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Use nitrogen stabilizer/inhibitor (e.g., N-Serve)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Split rate/time nitrogen application	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil and Water Conservation Practices					
k. Terracing/basins (dry ponds)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Wetland construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Drainage tile water management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. Buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o. Saturated buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
p. Bioreactors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
q. Stream bank stabilization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
r. Farm ponds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. For each of the following practices, please rate how **effective** you think each practice would be in improving water quality in your drainage area or watershed.

	How effective do you think this practice is in improving water quality in your watershed?				
	Not at all Effective	Somewhat Effective	Moderately Effective	Very Effective	Don't Know
Land Use Management Practices					
a. Reduced tillage (1 less pass across the field)	1	2	3	4	7
b. No-tilling one crop in the rotation	1	2	3	4	7
c. Long-term no-till	1	2	3	4	7
d. Cover crops	1	2	3	4	7
e. Contouring	1	2	3	4	7
Nitrogen and Phosphorous Management Practices					
f. Regularly conduct soil tests for pH, phosphorous, nitrogen and potassium	1	2	3	4	7
g. Avoid fall application of manure or nitrogen fertilizer	1	2	3	4	7
h. Use variable rate application technology	1	2	3	4	7
i. Use nitrogen stabilizer/inhibitor (e.g., N-Serve)	1	2	3	4	7
j. Split rate/time nitrogen application	1	2	3	4	7
Soil and Water Conservation Practices					
k. Terracing/basins (dry ponds)	1	2	3	4	7
l. Wetland construction	1	2	3	4	7
m. Drainage tile water management	1	2	3	4	7
n. Buffers	1	2	3	4	7
o. Saturated buffers	1	2	3	4	7
p. Bioreactors	1	2	3	4	7
q. Stream bank stabilization	1	2	3	4	7
r. Farm ponds	1	2	3	4	7

21. What do you think is a reasonable incentive amount for implementing each of the following?

- a. CRP buffer \$_____/acre/year Unsure
- b. Cover crops \$_____/acre/year Unsure
- c. No-till for 5 years \$_____/acre/year Unsure

22. What do you think is a reasonable cost-share percentage for improving pasture management (through rotational grazing, watering systems, etc.)?

Farmer pays _____% Cost-share source pays _____% Unsure

23. In your experience, which factors, if any, **limit adoption or expansion** of each of the following **Land Use Management Practices** on land you own or farm? (Check all that apply).

	No factors limit	Time	Expense	Lack of Info or Training	Disagreement between owner and operator	Other limiting factor (specify)
a. Reduced tillage (1 less pass across the field)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b. No-tilling one crop in the rotation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c. Long-term no-till	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d. Cover crops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Contouring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

24. In your experience, which factors, if any, **limit adoption or expansion** of each of the following **Nitrogen and Phosphorous Management Practices** on land you own or farm? (Check all that apply).

	No factors limit	Time	Expense	Lack of Info or Training	Disagreement between owner and operator	Other limiting factor (specify)
a. Regularly conduct soil tests for pH, phosphorous, nitrogen and potassium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b. Avoid fall application of manure or nitrogen fertilizer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c. Use variable rate application technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d. Use nitrogen stabilizer/inhibitor (e.g., N-Serve)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Split rate/time nitrogen application	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

25. In your experience, which factors, if any, **limit adoption or expansion** of each of the following **Soil and Water Conservation Practices** on land you own or farm? (Check all that apply).

	No factors limit	Time	Expense	Lack of Info or Training	Disagreement between owner and operator	Other limiting factor (specify)
a. Terracing/basins (dry ponds)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b. Wetland construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c. Drainage tile water management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d. Buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Saturated buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f. Bioreactors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g. Stream bank stabilization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
h. Farm Ponds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

26. Do you currently **farm any land that you own?**

No (SKIP TO Q31) Yes → 26a. How many acres that you own do you farm? _____ acres



27. For the land you own and operate, who makes decisions about... (Check only one for each item)

	I do	Farm Manager does	Decisions made jointly
a. Crop rotation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Land Use Management Practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Nitrogen and Phosphorous Management Practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Soil and Water Conservation Practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

28. What type(s) of crop rotation do you use on the land that you own and operate? (Check all that apply)

- Continuous Corn
- Corn/Corn/Bean (All Conventional till)
- Corn/Corn/Bean (Minimum-till corn, No-till bean)
- Corn/Bean (All Conventional till)
- Corn/Bean (All No-till)
- Hay
- CRP
- Other (specify) _____

29. Do you co-own any of your land? (Check all that apply)

- No, I am the sole owner of my land
- Yes, jointly own with a child/children
- Yes, jointly own with a spouse
- Yes, jointly own with sibling(s)
- Yes, jointly own with a parent(s)
- Yes, jointly own with a business partner(s)
- Other (specify) _____

30. When you retire, what do you think will likely happen to the majority of your land?

- I will have the land custom farmed
- I will sell the land to a family member to farm
- I will sell the land to someone outside of the family to farm
- The land will be enrolled in a set aside program such as the Conservation Reserve Program
- The land will be developed for residential, commercial or industrial purposes
- The land will become a park/hunting/conservation area
- Other (specify) _____
- Unsure

31. Do you **own land that you rent to others** to farm?

No (SKIP TO Q34)

Yes → 31a. How many acres do you own and rent to others to farm? _____ acres

32. For the land you own but rent to others to farm, who makes decisions about... (Check only one for each item)

	I do	Tenant does	Farm Manager does	Decisions made jointly
a. Crop rotation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Land Use Management Practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Nitrogen and Phosphorous Management Practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Soil and Water Conservation Practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

33. What type(s) of crop rotation is used on the land you own but rent to others? (Check all that apply)

- Continuous Corn
- Corn/Corn/Bean (All Conventional till)
- Corn/Corn/Bean (Minimum-till corn, No-till bean)
- Corn/Bean (All Conventional till)
- Corn/Bean (All No-till)
- Hay
- CRP
- Other (specify) _____

34. Do you **rent land from others** to farm?

No (SKIP TO Q37)

Yes → 34a. How many acres do you rent from others? _____ acres

35. For the land you rent from others to farm, who makes decisions about... (Check only one for each item)

	I do	Owner does	Farm Manager does	Decisions made jointly
a. Crop rotation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Land Use Management Practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Nitrogen and Phosphorous Management Practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Soil and Water Conservation Practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

36. What type(s) of crop rotation do you use on the land you rent from others? (Check all that apply)

- Continuous Corn
- Corn/Corn/Bean (All Conventional till)
- Corn/Corn/Bean (Minimum-till corn, No-till bean)
- Corn/Bean (All Conventional till)
- Corn/Bean (All No-till)
- Hay
- CRP
- Other (specify) _____

37. Do you own livestock?

No (SKIP TO Q38)

Yes → 37a. Please indicate how many of each of the following types of livestock you have? (If none, please write "0" in the blank)

	Swine	Cattle	Sheep	Poultry	Other (specify)
Approximate number	_____	_____	_____	_____	_____

38. Is manure applied to the fields you own or farm?

No (SKIP TO Q40)
 Yes
 Unsure (SKIP TO 40)

39. Manure Application Practices

		How is this type of manure applied? (Check all that apply)	When is this manure applied? (Check only one)
a. Do you use liquid manure?	<input type="checkbox"/> No (GO TO b) <input type="checkbox"/> Yes → <input type="checkbox"/> Unsure (GO TO b)	<input type="checkbox"/> Spread <input type="checkbox"/> Sprayed <input type="checkbox"/> Injected/Knifed <input type="checkbox"/> Unsure	<input type="checkbox"/> Spring only <input type="checkbox"/> Spring and Fall <input type="checkbox"/> Fall only <input type="checkbox"/> Unsure
b. Do you use semi-solid manure?	<input type="checkbox"/> No (GO TO c) <input type="checkbox"/> Yes → <input type="checkbox"/> Unsure (GO TO c)	<input type="checkbox"/> Spread <input type="checkbox"/> Sprayed <input type="checkbox"/> Injected/Knifed <input type="checkbox"/> Unsure	<input type="checkbox"/> Spring only <input type="checkbox"/> Spring and Fall <input type="checkbox"/> Fall only <input type="checkbox"/> Unsure
c. Do you use solid manure?	<input type="checkbox"/> No (GO TO Q39) <input type="checkbox"/> Yes → <input type="checkbox"/> Unsure (GO TO Q39)	<input type="checkbox"/> Spread <input type="checkbox"/> Sprayed <input type="checkbox"/> Injected/Knifed <input type="checkbox"/> Unsure	<input type="checkbox"/> Spring only <input type="checkbox"/> Spring and Fall <input type="checkbox"/> Fall only <input type="checkbox"/> Unsure

40. How important are the following factors for determining where manure is applied on farms? (Please circle one number for each item)

	Not at all Important	Slightly Important	Moderately Important	Very Important	Don't Know
a. Crop nutrient needs	1	2	3	4	7
b. Soil test results	1	2	3	4	7
c. Proximity to manure source	1	2	3	4	7
d. Own judgment based on experience	1	2	3	4	7
e. Recommendations from equipment manufacturer	1	2	3	4	7
f. Recommendations from ISU Extension	1	2	3	4	7
g. Recommendations from NRCS	1	2	3	4	7
h. Recommendations from consultant	1	2	3	4	7
i. Recommendations from neighbors who farm	1	2	3	4	7
j. Recommendations from family who farm	1	2	3	4	7

41. How much do you trust each of the following for information on conservation issues related to farming?

Government Entities	Do not trust at all	Trust Somewhat	Trust Moderately	Trust a great deal	Not familiar with this source
a. Iowa/Johnson County Soil and Water Conservation District	1	2	3	4	7
b. City or county government staff	1	2	3	4	7
c. Natural Resources Conservation Service (NRCS)	1	2	3	4	7
d. ISU Extension	1	2	3	4	7
e. Iowa Department of Agriculture and Land Stewardship (IDALS)	1	2	3	4	7
f. Iowa Department of Natural Resources (DNR)	1	2	3	4	7
g. Iowa/Johnson County Public Health	1	2	3	4	7
h. Farm Service Agency (FSA)	1	2	3	4	7
i. Iowa/Johnson County Conservation Board	1	2	3	4	7
j. Iowa Learning Farms	1	2	3	4	7

Non-government Entities	Do not trust at all	Trust Somewhat	Trust Moderately	Trust a great deal	Not familiar with this source
k. Farm Bureau	1	2	3	4	7
l. Practical Farmers of Iowa (PFI)	1	2	3	4	7
m. Neighbors/friends who farm	1	2	3	4	7
n. Family members who farm	1	2	3	4	7
o. My local cooperative or certified crop advisor	1	2	3	4	7
p. Local media (e.g., newspaper, television, radio)	1	2	3	4	7
q. Wallaces Farmer	1	2	3	4	7
r. Iowa Soybean Association	1	2	3	4	7
s. Iowa Pork Producers	1	2	3	4	7
t. Iowa Cattlemen's Association	1	2	3	4	7
u. Iowa Corn Growers Association	1	2	3	4	7

42. How would you prefer to get information about local efforts to improve water quality? (Select top 3 only)

- | | |
|---|--|
| <input type="checkbox"/> Mail/letter | <input type="checkbox"/> Newspaper |
| <input type="checkbox"/> Social media (Facebook, Twitter, or Instagram) | <input type="checkbox"/> Internet |
| <input type="checkbox"/> Town meeting | <input type="checkbox"/> Text message |
| <input type="checkbox"/> Personal visit at your home | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Radio broadcasts | |
| <input type="checkbox"/> Friend/family/acquaintance | |
| <input type="checkbox"/> Email | |
| <input type="checkbox"/> Community events | |
| <input type="checkbox"/> Phone call | |

43. Would you describe yourself as... Male Female

44. What is your age? _____

45. What is the highest grade or level of education that you have completed?

- Some high school or less
- High school diploma (includes GED)
- Vocational or technical diploma/certificate
- Some college but no Bachelor's Degree
- B.A., B.S., or equivalent
- Graduate Degree, Master's, Ph.D., M.D., etc.

46. In the past five years, approximately what percent of your household income has come from farming?

- No income from farming
- 1-25%
- 26-50%
- 51-75%
- 76-100%

47. Considering all sources of agricultural income (including government payments, farm rent received), approximately what was the total gross value of your agricultural income last year?

- None
- \$1-\$ 24,999
- \$25,000-\$ 99,999
- \$100,000-\$249,999
- \$250,000-\$499,999
- \$500,000-\$999,999
- \$1,000,000 and over

48. Which of the following best describes where you live?

- On a farm
- In a rural setting, not on a farm
- In a rural subdivision outside of city limits
- In a small town of less than 5,000 people
- In a larger town of 5,000 to less than 25,000 people
- In a city of 25,000 or more people

49. What is your ZIP Code? _____

50. In what City, or Town do you live? _____

END OF SURVEY

**Thank you very much for your participation!
Please provide any additional comments you may have on the next page.**

