



Ohio Agriculture Conservation Initiative

OHIO AGRICULTURE CONSERVATION INITIATIVE ASSESSMENT REPORT:

Upper Scioto Watershed

October 2024



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In 2023, the Ohio Agriculture Conservation Initiative (OACI) conducted a randomized sampling of 384 crop production fields within the HUC8 Upper Scioto Watershed (HUC8-05060001). A statistical approach was implemented to determine what practices are being used by farmers within this watershed to manage water and nutrients in the crop year 2022.

In the field survey process, all the cropped fields within the watershed were considered in the randomized selection process regardless of farm and field size. However, only fields that were greater than 20 acres were selected for the survey; the average size of the fields surveyed was 38.9 acres. A trained Soil and Water Conservation District employee (SWCD) interviewed the landowner or farm manager for each field surveyed. The Ohio State University and the Center for Survey Statistics and Methodology at Iowa State University helped in designing the sampling strategy and data analysis.

The survey results establish a baseline of current adoption of agricultural best management practices (BMPs). A follow-up assessment in the Upper Scioto is planned for 2027, methodology may change.



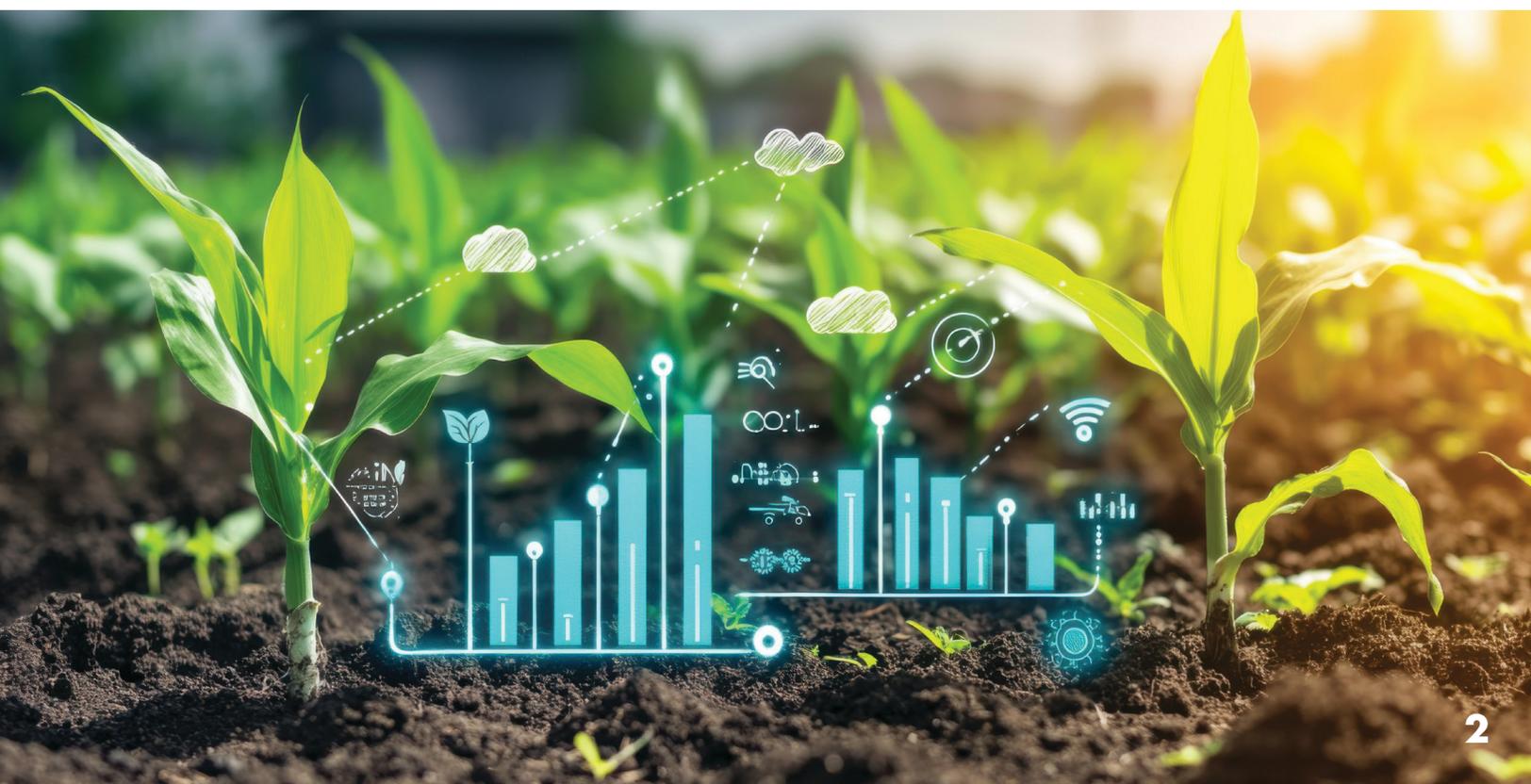
Upper Scioto Watershed Map

COUNTY	COMPLETED FIELDS
Champaign	55
Crawford	24
Delaware	5
Fairfield	39
Hardin	50
Logan	33
Madison	32
Marion	46
Morrow	48
Pickaway	34
Union	12
Total	384

Fields surveyed per county

KEY FINDINGS

- Approximately **62%** of the fields surveyed were currently enrolled in a cost share conservation program, including both state and federal level programs.
- The assessment found that most farmers were testing their soil, with **76%** of the surveyed fields being sampled at least once every four years. The vast majority of soil samples (**91%**) were completed using precision agriculture, via grid or zone methods.
- Approximately **64%** of fields surveyed had phosphorus applied using variable-rate technology (VRT); **24%** of fields had nitrogen (N) applied using VRT.
- Nearly **77%** of the fields were either no-tilled or minimally-tilled.
- The assessment found that **60%** of the farmland assessed was owned by the farmer and **40%** was in a lease.
- Farm familiarity is very high as **92%** of the fields were managed by the farmer for three years or longer with only **8%** being farmed less than three years.
- Farmers utilized fertilizer retailers and crop consultants for **85%** of fields surveyed.



COST SHARE PROGRAM ENROLLMENT

Approximately 62% of the fields in the watershed at the time they were surveyed were enrolled in a cost-share conservation program, including local, state and federal level programs, with 12% of those acres enrolled in H2Ohio. Due to the timing of the survey, these numbers represent fields that were enrolled in a program but may not have implemented practices yet as it related to H2Ohio or recent enrollment in other programs. Therefore, the information in this survey represented by Figure 1 includes intent to participate in practices, but not necessarily implemented practices in some areas at the time of the survey. No participants indicated enrollment in Private NGO Cost Share programs.

Enrollment in a Cost Share Conservation Program

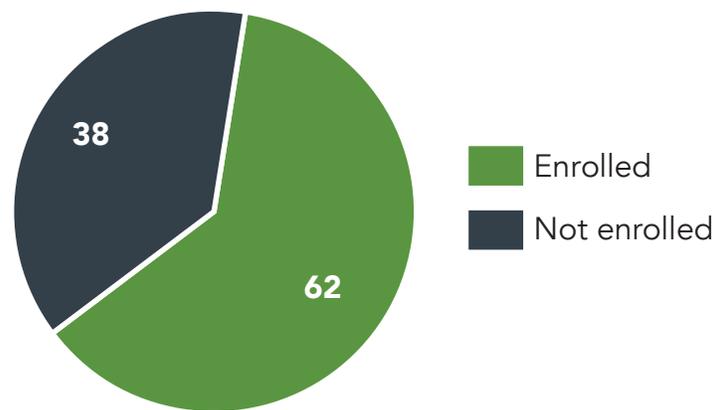


Figure 1. Summary of fields enrolled in conservation cost-shared programs

ACRES FARMED AND OWNERSHIP STATUS

The results indicated that the fields surveyed were being managed by farmers with a wide range of operation sizes (Figure 2). The fields surveyed were being managed by farmers broken down into the size categories of 0-500, 500-1,000, 1,000-2,500, 2,500-5,000 and 5,000-10,000 acres. The average size of the fields surveyed was 38.9 acres.

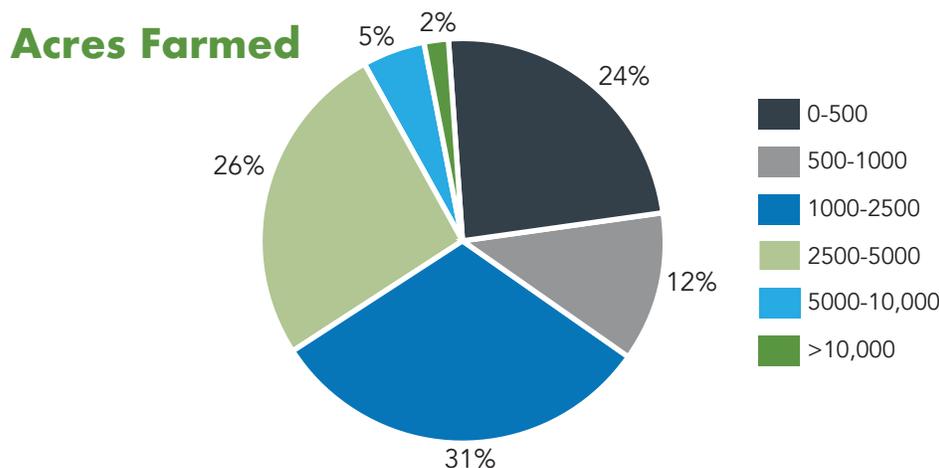


Figure 2. Distribution of number of acres farmed by farmers managing the fields surveyed

Figure 3 summarizes the ownership status of the fields with 60% being owned by the farmer or the farm family and 40% being leased, either in a long-term (>1 year) or short-term (year-to-year) lease. Farm ownership status is an important factor in the in-field decisions a farmer makes throughout the growing season. Farmers are often reluctant to make conservation decisions that require large investments or physical changes to the field without knowing they will be farming the field for a long period.

Ownership Status

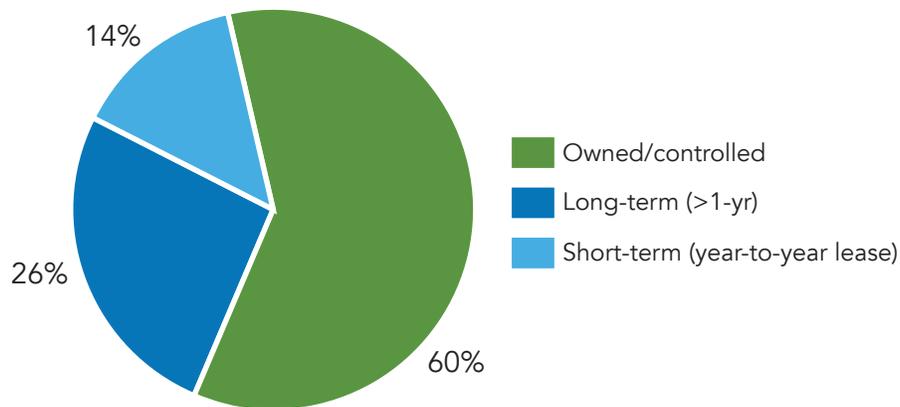


Figure 3. Percentage of surveyed fields that were leased versus owned

Figure 4 indicates 92% of the fields were managed by the farmer for three years or longer with only 8% being managed by the farmer for less than three years.

Years Farming Field

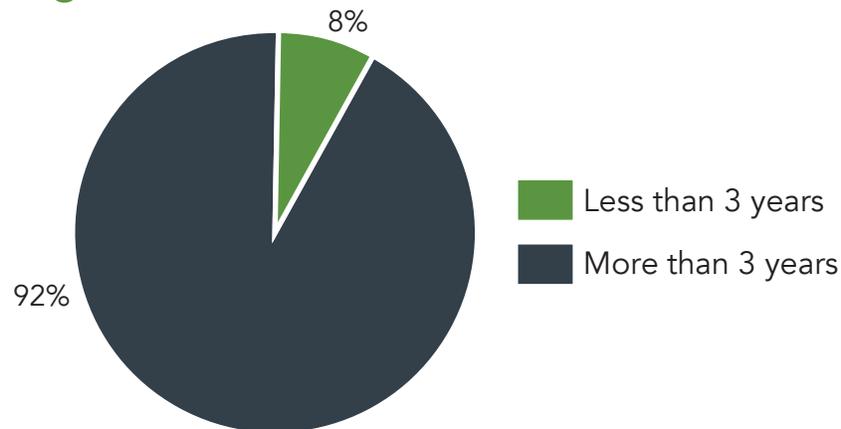


Figure 4. Summary of how long surveyed fields had been managed by the same farmer

TILLAGE TYPE

Figure 5 notes the type of tillage being used on fields surveyed within the Upper Scioto Watershed with farmers using rotational tillage on 16% of fields. Approximately 78% of the fields were no-tilled, minimally-tilled or strip-tilled (Figure 5).

Tillage Type

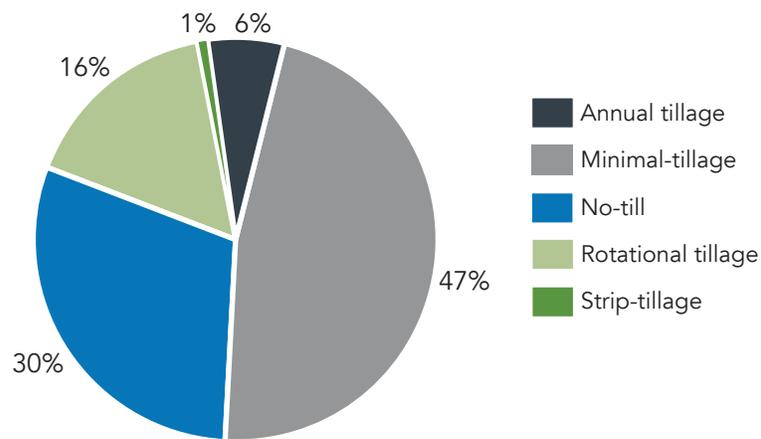


Figure 5. Type of tillage being used by farmers on surveyed fields

NUTRIENT MANAGEMENT AND RECOMMENDATIONS

As other surveys and studies have concluded, commercial fertilizer is the majority nutrient source (75%) used in this region, noted in Figure 6.

Total Farms that Use Nutrient Source

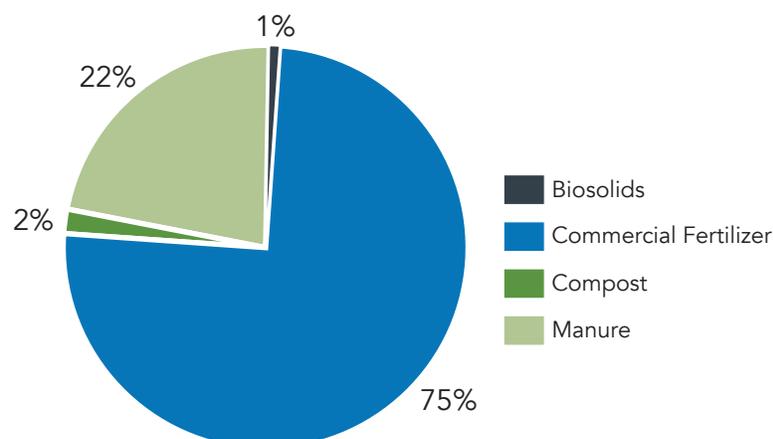


Figure 6. Distribution of nutrient sources across surveyed fields

In the Upper Scioto Watershed, 89% of the fields surveyed were soil tested at least every four years (Figure 7). Soil testing helps farmers determine the level of nutrients in their soil and make decisions about what nutrients need to be applied to achieve an optimal crop. In order to develop a nutrient management plan, farmers must test their soil at least every 3-4 years, according to Tri-State recommendations.

Frequency of Soil Testing

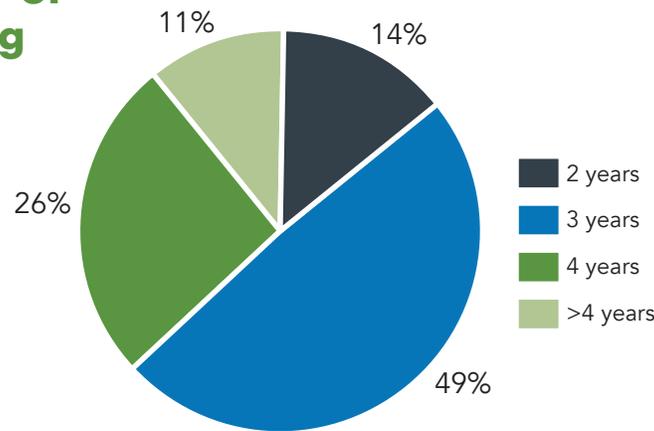


Figure 7. Distribution of soil testing frequency on surveyed fields

Grid and zone sampling are types of precision agriculture sampling strategies (Figure 8).

Soil Sampling Type

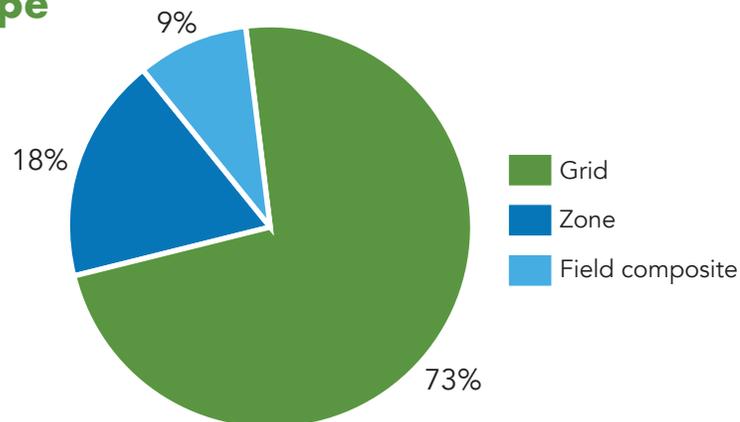


Figure 8. Distribution of soil sampling methods used on surveyed fields

For fertilizer recommendations, farmers utilized fertilizer retailers and crop consultants for 85% of fields surveyed. Farmers used their own knowledge regarding fertilizer on 15% of fields surveyed (Figure 9).

Fertilizer Recommendation Source

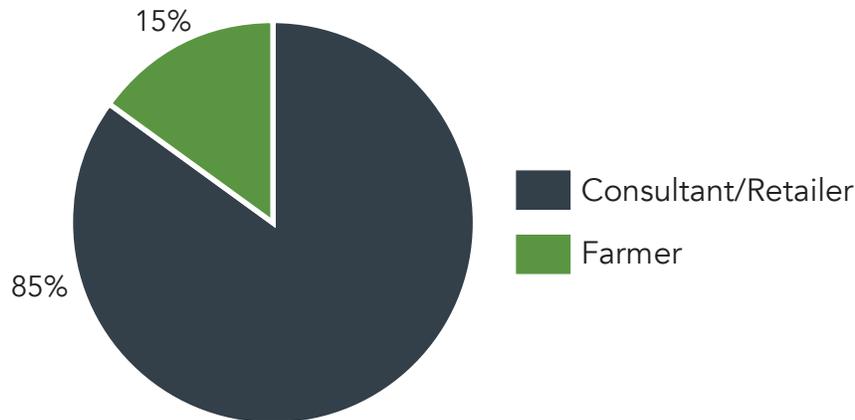


Figure 9. Distribution of fertilizer recommendation sources used for surveyed fields

NUTRIENT APPLICATIONS

Approximately 22% of fields surveyed were covered by an approved voluntary or comprehensive nutrient management plan (VNMP/CNMP) with 69% not covered with a VNMP, as noted in Figure 10. These plans were completed either by their local Soil and Water Conservation District (SWCD) or Natural Resources Conservation Service (NRCS).

Nutrient Management Plan

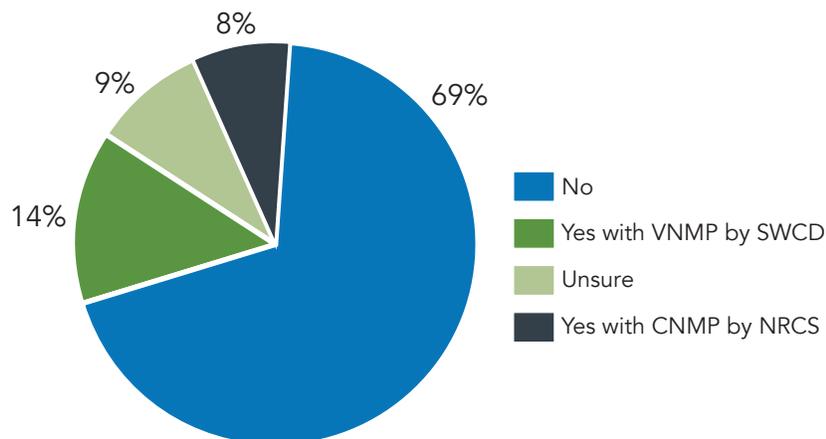


Figure 10. Percentage of fields covered by a nutrient management plan

Approximately 86% of phosphorus (P) applied is for the 1-2 year crop need (Figure 11). Various methods were used to apply P to the field surveyed, with 51% using surface application with incorporation, 26% placed with planter and 19% using injection (Figure 12). Those that responded with “unsure” are likely a result of Certified Crop Advisors (CCA) or retailers doing this on behalf of the producers.

Phosphorus Application

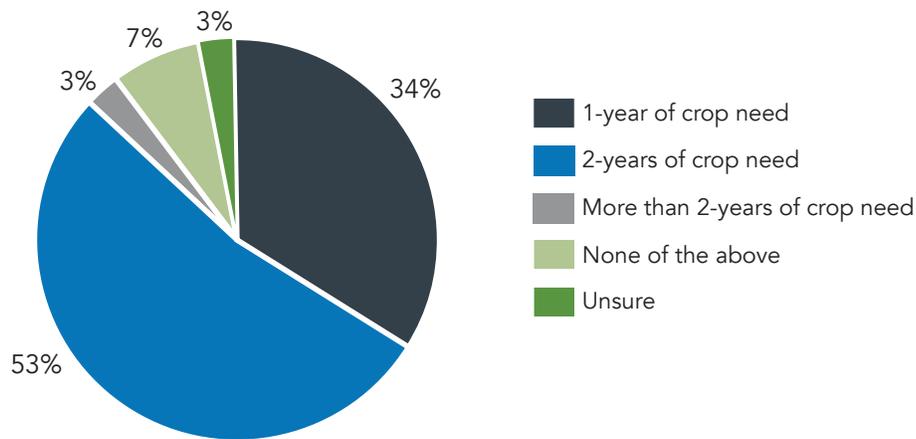


Figure 11. Distribution of amount of phosphorus applied on surveyed fields

Type of Phosphorus Placement

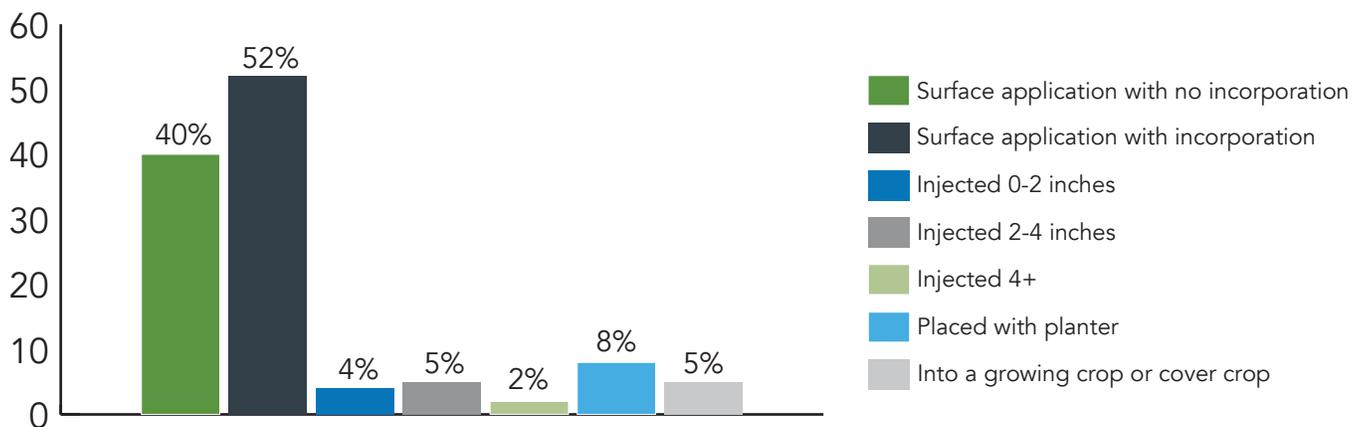


Figure 12. Distribution of phosphorus placement methods on fields

To determine the amount of nitrogen (N) to apply, farmers used adaptive management strategy on 35% of fields surveyed, Maximum Return to Nitrogen (MRTN) Model (Ohio State University recommended N tool) on 38% of fields surveyed and weather/soil modeling service on 26% of fields surveyed.

Farmers used N stabilizers on 31% of fields surveyed versus 18% of surveyed fields where N stabilizers were not used. N stabilizers or inhibitors help keep nitrogen (N) in forms that are less likely to leave the field. N stabilizers are widely available to farmers for use with N fertilizers; however, they are not readily available for P and potassium (K) inorganic fertilizers.

On the fields surveyed, surface application was the most popular method of nitrogen (N) placement (46%). Methods using a nitrogen (N) starter during planting were also utilized to place the nutrient near the seed (47%), making it accessible to a young root system (Figure 13).

Nitrogen Placement Method

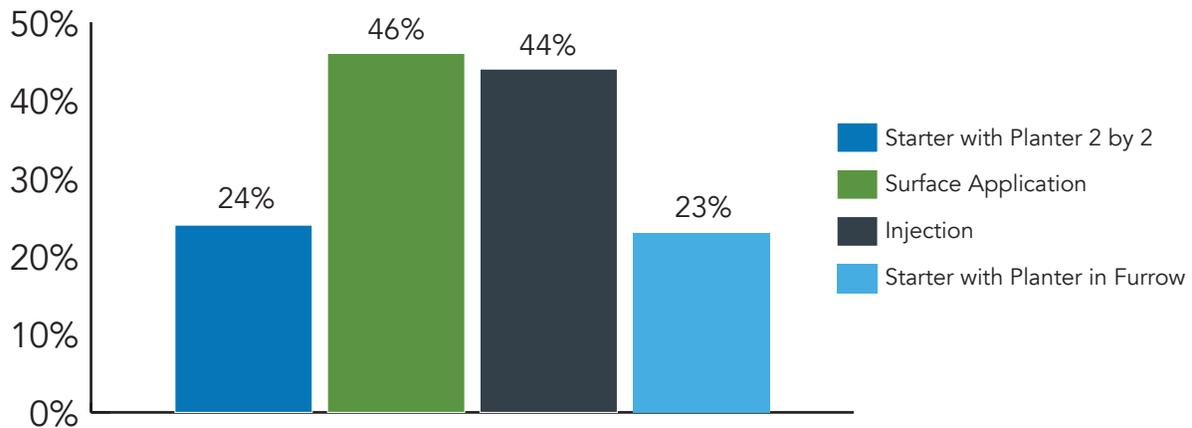


Figure 13. Distribution of nitrogen (N) placement methods on fields

The majority of farmers surveyed (58%) applied nitrogen (N) before or during planting. The remaining (42%) side-dressed most of their nitrogen in-season (Figure 13). Farmers are splitting their nitrogen (N) application throughout the growing season making it more available to the growing plant while minimizing the risk for loss.

Timing of Nitrogen Application

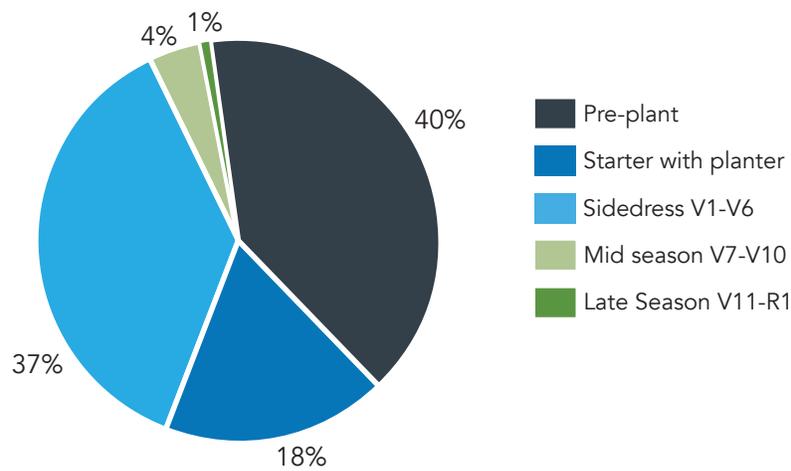
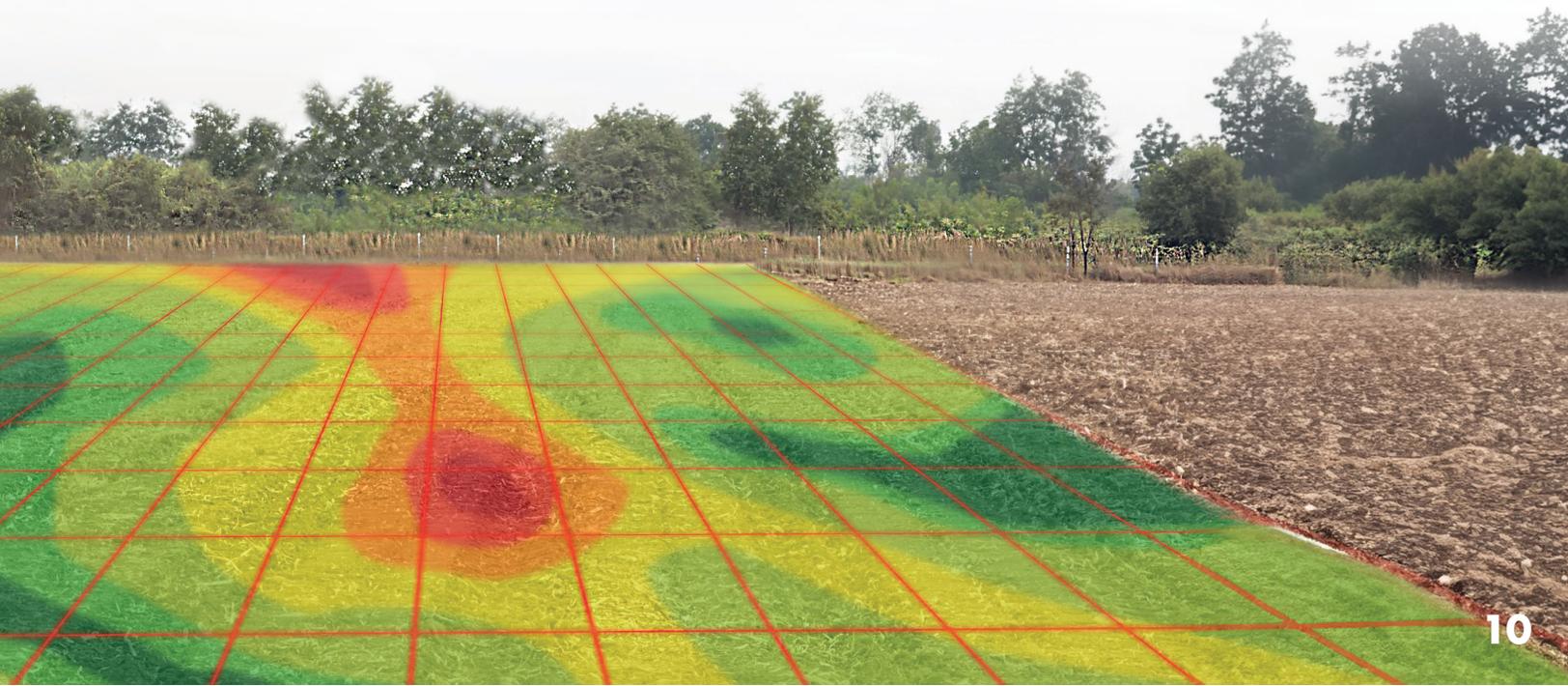


Figure 14. Distribution of N placement timing on surveyed fields



OTHER NUTRIENT MANAGEMENT STRATEGIES

Variable Rate Technology (VRT) Application

- **64%** of fields surveyed had been using variable-rate P application versus **36%** using fixed-rate application
- **24%** of fields surveyed had been using variable-rate N application versus **76%** using fixed-rate application
- **51%** have VRT capabilities that exist on farm versus **49%** that are through a supplier

Manure Application

As seen in Figure 6, **26%** of the fields surveyed received manure, of these:

- **79%** used appropriate setback distances according to USDA-NRCS 590 standards
- **21%** used subsurface application
- **85%** incorporated nutrients into the soil
- **16%** applied into vegetative cover or an actively growing crop, keeping nutrients in the field



WATER MANAGEMENT STRUCTURES

Water management structures and drainage improvement help to minimize soil erosion. Grassed waterways are the most popular method for water management, followed by buffers, controlled drainage and blind inlets (Figure 15). In the Upper Scioto Watershed, 56% of the fields surveyed had no visible sign of soil erosion.

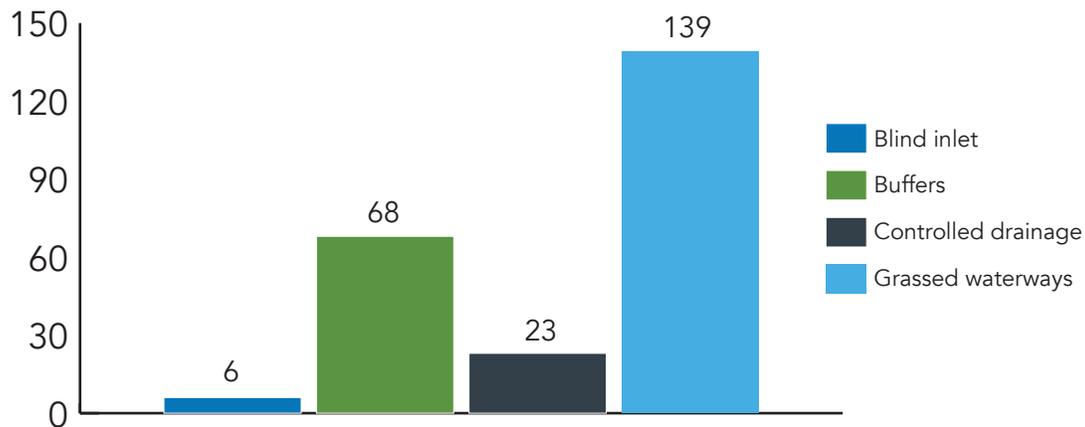


Figure 14. Percent of surveyed fields that had water management structures in-field or at the edge of field.



WATER MANAGEMENT PRACTICES EXAMPLES AND ASSOCIATED COSTS



Figure 15. Buffers – \$100-\$200 per acre



Figure 16. Controlled Drainage – \$2,000-\$4,000



Figure 17. Grassed Waterways – \$4-\$5 per linear foot



Figure 18. Blind Inlets – \$3,000-\$4,000

CONCLUSION

This survey was completed in 2023 referencing crop year 2022, prior to the implementation and availability of H2Ohio practices. The assessment results establish a baseline of adoption for various farming practices in the Upper Scioto Watershed.* This information allows for a more targeted approach to increase best management practice adoption. Demonstrated by data, certain practices are elevated to yield optimal results. We will continue to assess more watersheds around the state in the coming years, revisiting previously assessed watersheds in a few years to determine levels of change. We encourage Ohio's farmers to get involved in the OACI's Farmer Certification program, H2Ohio and any other conservation focused program to learn about new practices, share information and become better stewards of the land.

*The survey results may not fully represent the geographic distribution due to a lower number of responses from Delaware and Union counties, potentially impacting the overall geographic representation.