

August 24, 2006

FINAL ACTIVITY PROGRESS REPORT

Project Title: Irrigation Water Management Project

Organization Name: Ohio Farm Bureau Federation

Statement Period: July 1, 2005 through June 30, 2006

OHIO IRRIGATION ASSESSMENT

INTRODUCTION

The efficient and wise use of our freshwater resources is becoming more and more important at the national, regional and local level. Ohio is a water rich state with an adequate amount of precipitation in most years to meet the demands for drinking water, industrial and food processing, crop production and recreation. How Ohioans use and care for this precious and limited resource (especially in times of short supply) is increasingly coming under scrutiny.

The importance of the use of freshwater for irrigation in agricultural production is recognized in the United States and in the state of Ohio. Information collected and summarized in the 2003 USDA Farm and Ranch Irrigation Survey reveals that less than 15 percent of the total crop production area in Ohio is irrigated. However, it is high value crops such as vegetables, tree and small fruit, turf, landscaping and bedding plants and nursery stock that are typically produced and/or managed under irrigation.

The 2003 survey provided a general overview of the extent of irrigation water use in Ohio for crop production. While useful in it's present form, the information collected lacks the detail and specificity needed to obtain an accurate picture of agricultural irrigation in Ohio. To help fill this need, Ohio Farm Bureau Federation conducted an assessment of agricultural irrigation in Ohio.

METHODS

A direct mail survey, with self-addressed prepaid return postage, was determined to be the best tool to use for the information gathering process. The survey was distributed throughout Ohio with an emphasis being placed on nurseries and fruit and vegetable growers. To insure that an appropriate cross-section of Ohio growers were included, membership mailing lists were secured from the following organizations:

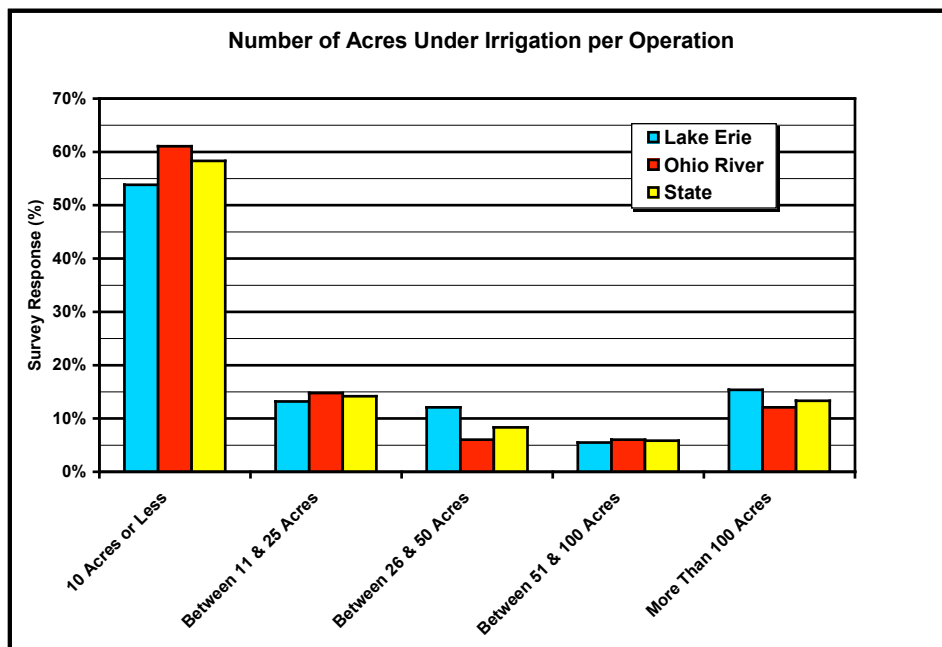
- Ohio Nursery and Landscape Association
- Ohio Sod Producers Association
- Ohio Turfgrass Foundation
- Ohio Fruit Growers Society
- Ohio Vegetable and Potato Growers Association
- Ohio Christmas Tree Association
- OFA - an Association of Floriculture Professionals.

A total of 2,200 surveys were mailed in mid-March 2006. The unsolicited direct mailing resulted in a 21% response rate. Responses were entered into an Access database for analysis.

RESULTS

Over 58% of the responders indicated that they irrigated at least some of the crops that they produce. The following presents an analysis of the collected information. For comparison purposes, the information was aggregated and is presented by major drainage basin (Lake Erie and Ohio River) and for the state in total.

NUMBER OF ACRES UNDER IRRIGATION



Smaller-sized plots of 10 acres or less (54% to 61 %) comprise the majority of the production areas in Ohio where irrigation has been incorporated into the production plan (see Figure 1).

The number of larger production operations incorporating irrigation range from 5% for operations between 51 and 100 acres to 15% for operations between 11 and 25 acres in size.

Figure 1. Number of crop acres per operation incorporating irrigation.

PRINCIPAL CROPS PRODUCED WITH THE AID OF IRRIGATION

Horticultural crops (greenhouse and/or nursery) comprise the largest portion (57 to 60%) of the agricultural crops produced in Ohio with the aid of irrigation (see Figure 2).

Vegetable and fruit crops follow at approximately 40%.

Few responders (less than 5%) indicated that they produced turf/sod, Christmas trees or field crops with the aid of irrigation.

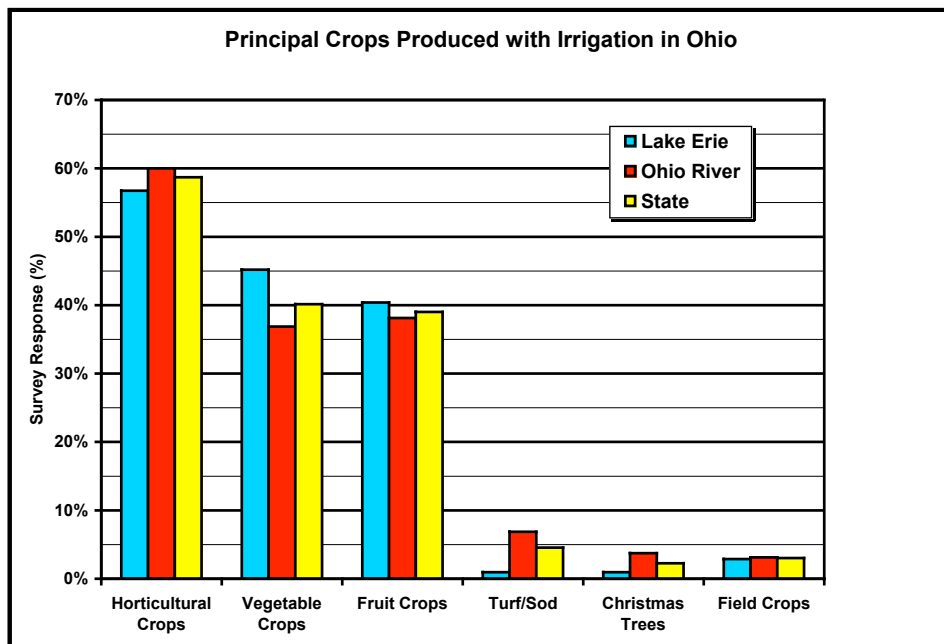
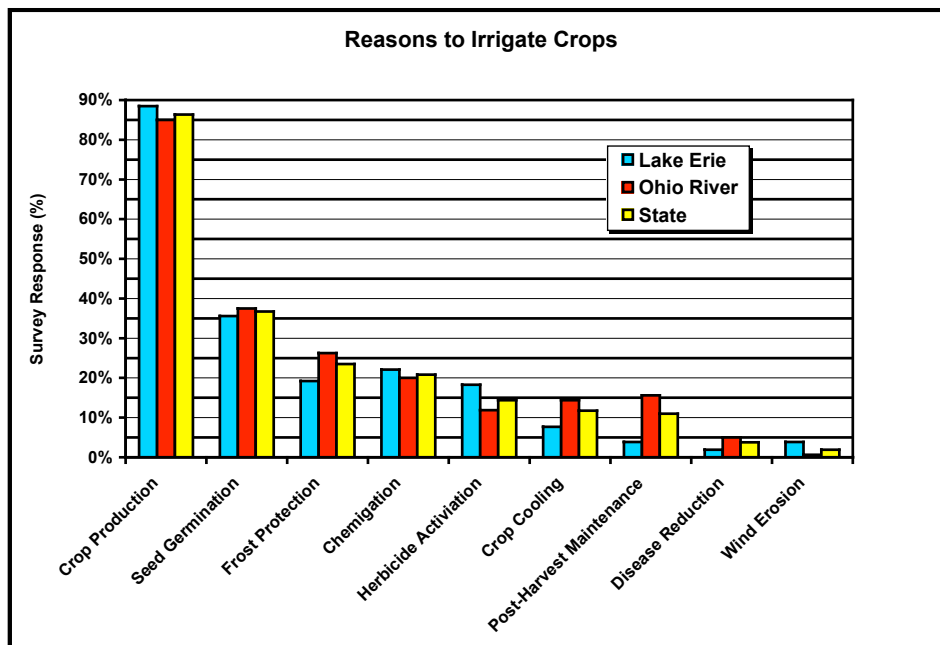


Figure 2. Principal crops produced in Ohio with the aid of irrigation.

REASONS TO IRRIGATE



The primary reason (85 to 88%) for Ohio growers to incorporate irrigation into their production practices is to enhance crop production (see Figure 3).

Other reasons why Ohio growers apply irrigation water range from seed germination (35%), frost protection (25%) and chemigation (20%) down to reduction of disease and wind erosion control at less than 5%.

Figure 3. Reasons why Ohio growers irrigate their crops.

TYPES OF IRRIGATION SYSTEMS

Over 60% of the survey responders indicated that their production practices incorporated drip, trickle or low-flow micro sprinkler irrigation systems (see Figure 4).

Hand move and center pivot irrigation systems are utilized by almost 35% of the growers in Ohio, mechanical move or solid set irrigation systems by a little over 20% of the growers and gravity flow and sub-irrigation systems by less than 5%.

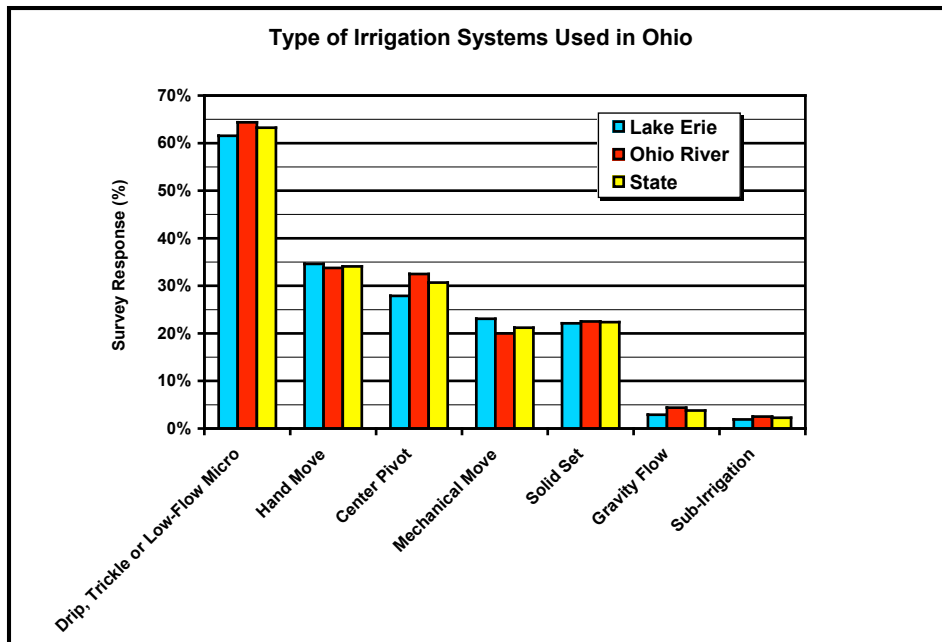
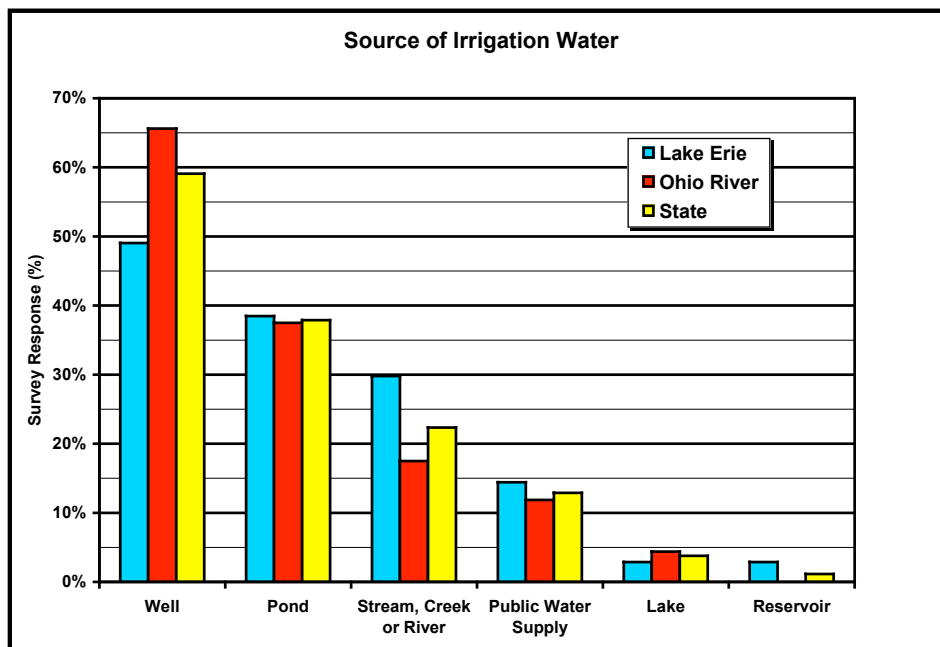


Figure 4. Types of irrigation systems used in Ohio.

Source of Irrigation Water



As shown in Figure 5, the majority of Ohio growers (49 - 66%) rely on groundwater as the water source for their irrigation system.

Ponds are the second most utilized water source (38%), followed by streams creeks or rivers (18 - 30%), public water supplies (13%), lakes (4%) and reservoirs (3%).

Regionally, Lake Erie growers utilize surface water sources more often than do growers in the Ohio River basin.

Figure 5. Sources of irrigation water used in Ohio.

IRRIGATION SCHEDULING

Visual (80%) and feel (42 - 56%) evaluations of crops and soil are the techniques utilized most often by Ohio growers to schedule the irrigation of their crops (see Figure 6).

The use of scientific scheduling and advanced, information-intensive methods are less common (less than 10%) among Ohio growers.

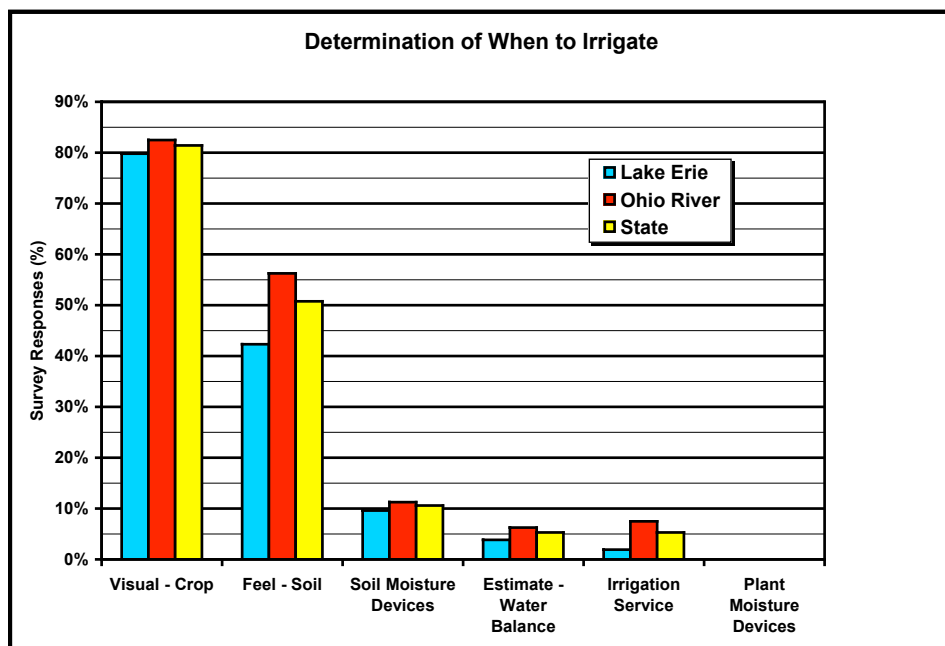
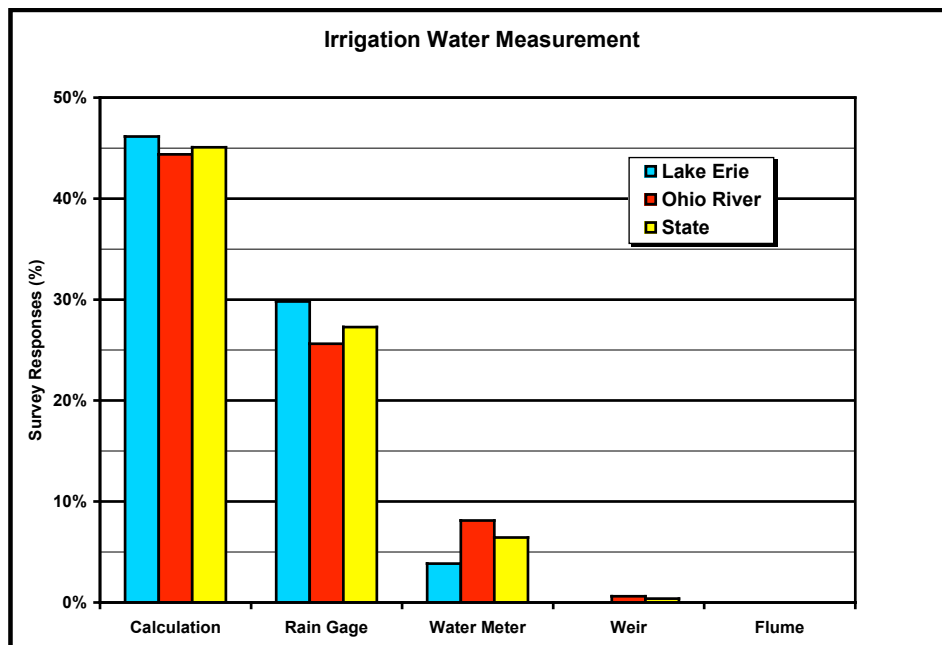


Figure 6. Techniques used by Ohio growers to determine when it is time to irrigate their crops.

DETERMINATION OF THE AMOUNT OF IRRIGATION WATER APPLIED



Ohio growers use calculation methods (e.g. pump capacity multiplied by pump running time) as their primary method (45%) to determine the amount of irrigation water they apply (see Figure 7).

The use of rain gages to directly measure applied water amounts (25% to 30%) is the second most commonly used method followed by the use of water meters (5%).

Figure 7. Methods used by Ohio growers to determine the amount of irrigation water applied.

Irrigation Water Use Efficiency

Maintenance (65% to 73%) and visual inspections (59% to 62%) of irrigation systems are the two most common methods used by Ohio growers to maximize water application efficiency (see Figure 8).

Operating the irrigation system to minimize drift and off-target water application (30%) and the calibration of sprinklers and spray nozzles (24%) follow.

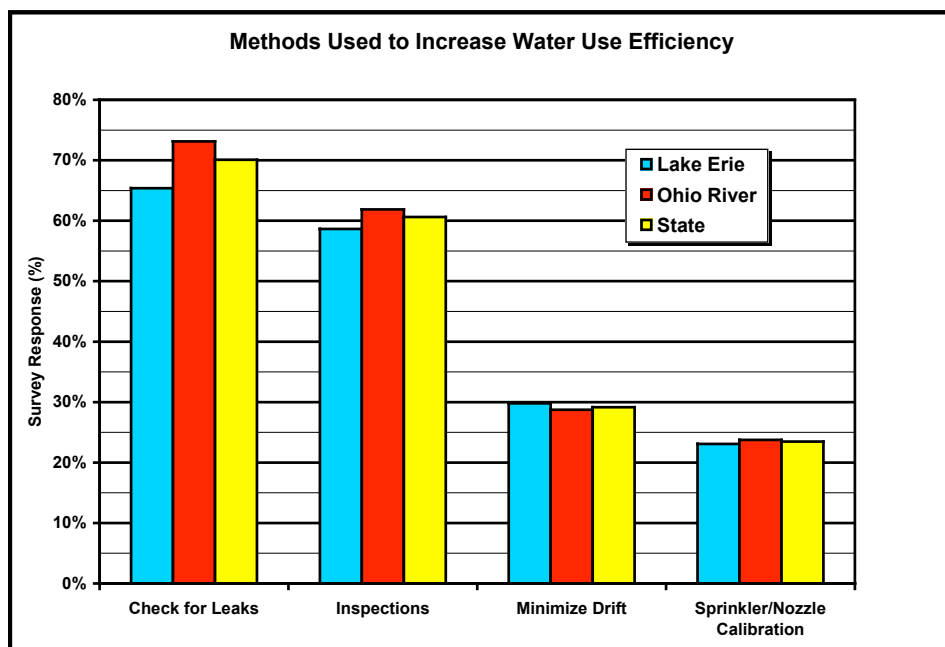
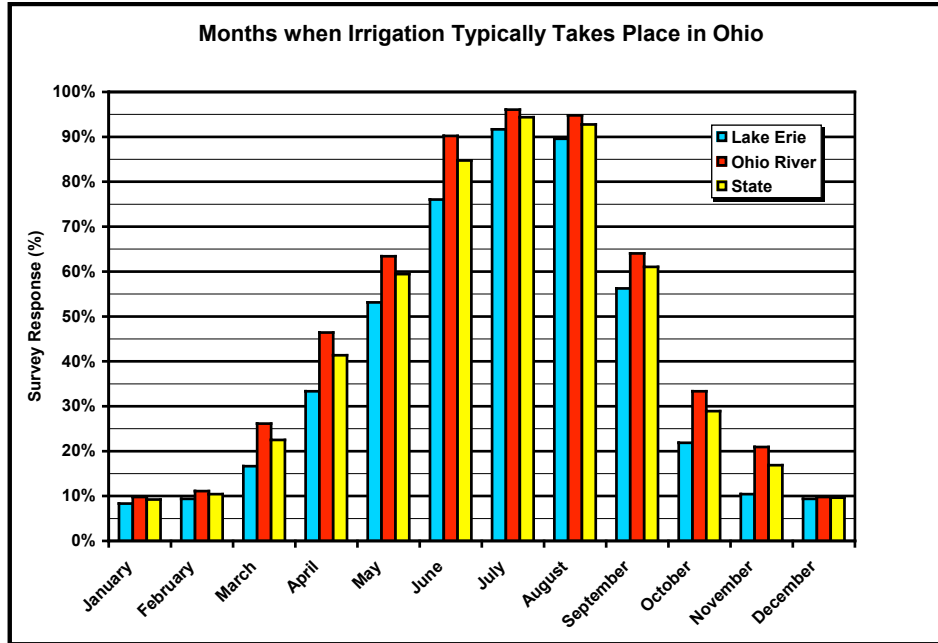


Figure 8. Methods used by Ohio growers to increase irrigation water use efficiency.

Irrigation Patterns



Ohio growers typically irrigate their crops during the summer growing season (see Figure 9). Survey responders indicated that during June, July and August between 75% and 95% of them applied irrigation water to their crops.

Regionally, a higher percentage of growers in the Ohio River Basin begin to irrigate earlier in the year (March) and continue later in the year (November) than do growers in the Lake Erie Basin.

Figure 9. Seasonal irrigation water application patterns in Ohio.

CHEMIGATION SAFETY MEASURES

Anti-siphon or back-flow prevention devices installed on the water supply line (65% to 97%) and/or chemical supply line (63% to 65%) are the two most common chemigation safety measures used by Ohio growers (see Figure 10).

Other safety measures utilized are low pressure shut down switches, inspection ports, power interlocks and secondary containment for chemical tanks.

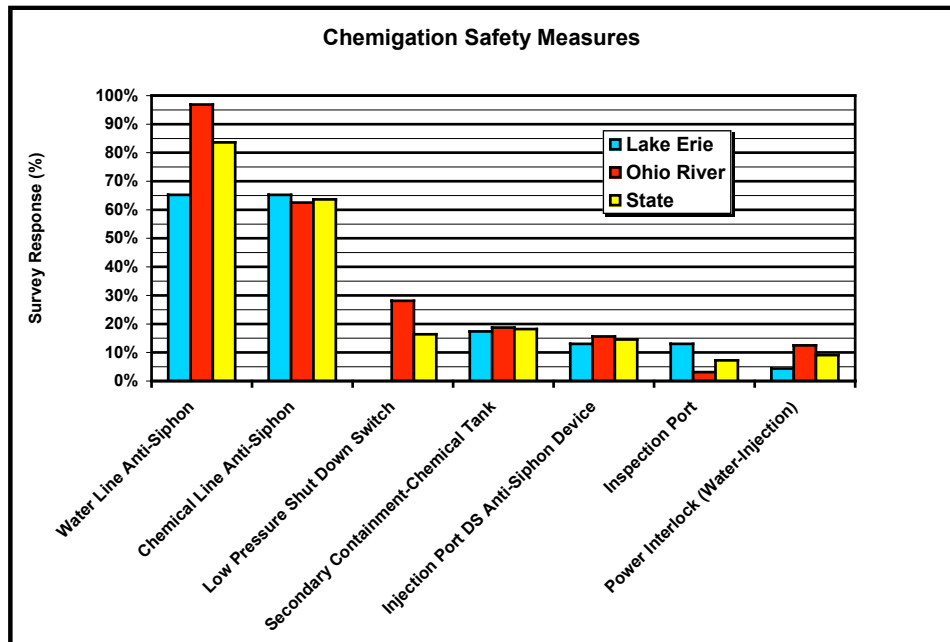


Figure 10. Safety measures utilized by Ohio growers who incorporate chemigation into their production plan.

CONCLUSIONS

Characteristics of Ohio Growers who Irrigate

Based on the responses received from the Ohio Irrigation Assessment Survey, the following is a generic description of Ohio growers who incorporate irrigation into their crop production management plan:

- ◆ Irrigate 10 acres or less
- ◆ Produce horticultural, vegetable or fruit crops
- ◆ Use irrigation principally for crop production – reflected in seasonal water use pattern
- ◆ Utilize pressurized irrigation application systems rather than gravity-flow systems
- ◆ Use wells or ponds as the source of irrigation water
- ◆ Have not fully embraced technology as an irrigation aid
 - Rely of visual and feel evaluations to determine irrigation scheduling
 - Water application volume based on calculation
- ◆ Maximize application efficiency through routine system maintenance and visual inspections
- ◆ Incorporate anti-siphon devices on water and chemical feed lines as chemigation safety measures.

Future Opportunities

Ohio growers are doing a good job when it comes to irrigation water management. The adoption of improved irrigation technology for measuring crop water needs and application rates can have a positive impact on the water-use efficiency at the farm level. Because the choice of irrigation technology is highly site-specific, a more detailed assessment into the factors affecting technology adoption would be very beneficial.