

High Tunnels Greenhouses in Ashland/Bayfield Counties 2016 Survey Report

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Introduction

High tunnels are simple greenhouse structures typically unheated and used primarily to improve the quality and quantity of summer vegetable production while extending the growing season in the spring and fall. Plants grown in high tunnels are grown directly in the ground or in raised beds as opposed to in pots or on benches as is common in traditional greenhouses. High tunnels are a great resource for beginning farmers, in particular, as the structures are relatively low-cost and easy to install. In Ashland and Bayfield Counties of Wisconsin, where the season is very short and soils are slow to warm-up, high tunnels are an essential part of commercial vegetable production.



Photo 1. Gothic-style high tunnel greenhouses such as shown here are becoming more popular in the Chequamegon Bay region of northern Wisconsin.

In recent years, the USDA-NRCS Environmental Quality Incentives Program (EQIP) has been providing cost-share for farmers to install high tunnels as a means to reduce pesticide use in vegetable production. This cost-sharing has made high tunnels more affordable and the result is more high tunnel production across the country. To better understand the scale, impact, utilization, and educational needs relating to high tunnels in Ashland and Bayfield Counties, we conducted a survey of high tunnel owners in March of 2016.

Methods

A paper survey was distributed by mail to all growers that had received cost-share through the Ashland office of the Natural Resources Conservation Service. In addition, an electronic version of the same survey was distributed by email to all farmers and landowners known to have a high tunnel. As such, the survey was distributed to 34 individuals. We received 25 responses for a response rate of 74%.

Results and Discussion

High Tunnel Production Capacity

Between survey reports and NRCS records we have identified 56 high tunnels in Ashland, Bayfield, and Douglas Counties. These high tunnels range in size from 20' x 14' (280 ft²) to 146' x 30' (4380 ft²). Twenty-five (25) of these 56 high tunnels were installed with cost-sharing through the NRCS. Combined, there are

82,772 ft² (1.90 acres) of land under high tunnels in the Chequamegon Bay area. An additional 10 high tunnels were cost-shared in the 2015 round of EQIP funding and will be installed in 2016, but are not included in this survey. Given the high productivity in high tunnels, this acreage represents significant production capacity. For example, if all of the high tunnels were used for commercial tomato production (Photo 2) in the same year and the tunnels averaged 2.1 lbs of tomatoes per square foot, the tunnels could produce roughly 174,000 lbs/yr of tomatoes. Based on USDA per capita fresh tomato consumption of 12.6 lbs/yr and a total population of Ashland and Bayfield Counties of 30,800, the tunnels could supply roughly 45% of total annual fresh tomato consumption. In practice, not all high tunnels will be used to grow just tomatoes every year, but the calculations illustrate the significance of the growing capacity in the current high tunnels. That said, even using all the high tunnels in the region cannot fully supply even a single product for the Ashland and Bayfield market.



Photo 2. High tunnels are used to significantly increase production of summer crops, such as tomatoes shown here, and to extend the season in the spring and fall.

Production and Utilization

High tunnels in the region are used for a mix of commercial vegetable production and as means to grow food for the family. As shown in Figure 1, of the 24 respondents, 10 use their high tunnel(s) as part of a full or part-time business. The remaining use the tunnels to grow produce for their family or for educational purposes. (In 2014, five area school districts and the Bad River Band of Lake Superior Chippewa each received a high tunnel through the USDA Farm-to-School program to use for teaching community members how to grow produce.) Of the 52 tunnels reported on, 26 are used for commercial production and the rest for subsistence or teaching purposes. Of the high tunnels funded with cost-sharing through the NRCS EQIP program, 9 of the 22 are used for full or part-time businesses. The rest are used primarily for subsistence.

Respondents reported using high tunnels to grow a diversity of vegetables including: arugula, basil, beets, broccoli, broccolini, brussel sprouts, cabbage, cantaloupe, carrots, chard, celery, cilantro, collard greens, corn, cucumbers, dried beans, dill, eggplant, green beans, head lettuce, hot peppers, kale, kohlrabi, mache, melons, mixed greens, mizuna, mustard greens, nasturtium, napa cabbage, okra, onions, oregano, parsley, pineapple, plantain, potatoes, pumpkin, radishes, rosemary, sage, scallions, snap peas, snow peas, spinach, stevia, sweet onions, sweet potatoes, sweet peppers, tarragon, tobacco, tomatoes, turnips, watermelon, winter squash, yellow wax beans, and zucchini.

In terms of production practices, 70% of respondents reported being “organic but not certified,” 13% reported being “certified organic,” 9% reported using “organic pest control but conventional fertilizers,” and 4% reported using “conventional” production practices.

Statement	Number of respondents	Number of high tunnels	Number of EQIP high tunnels
To grow and sell food as full-time business	5	19	5
To grow and sell food as a part-time business	5	7	4
To grow food for my family and to sell any extra	8	13	8
To educate students and community members	6	7	0
To grow food for my family	5	5	4
To grow food as a hobby	1	1	1

Figure 1. Which of the following statements best describes how you currently use your high tunnel(s)?

The combined revenue from high tunnels in 2015 as reported by the respondents was \$119,704.76, although only 65% of survey participants reported receiving revenue from high tunnel production. For those reporting revenue, the average total income for each high tunnel was \$3,520.73, or \$2.17/sq ft. For reference, tomatoes are generally considered one of the more profitable high tunnel crops and at 2.1lbs/ft² and a price of \$2.25/lb, net income can be

Statement	Percent of respondents	Number of respondents
I have no problem selling everything I grow	17%	4
I don't sell my produce	17%	4
I sell everything I grow but it is a struggle	13%	3
If I could sell more I would grow more	13%	3
The markets are too small in Ashland and Bayfield counties to support my level of production	9%	2
I can sell some products but not others due to competition in the marketplace	4%	1

Figure 2. Which of the following statements best describes the existing markets in Ashland and Bayfield County?

as high as \$3.16/sq ft per year (Everhart et. al, 2009). The revenue data suggest the tunnels in our region are likely underutilized both in space and time. Focusing on higher value crops, efficient production systems, and careful crop rotations would help improve economic returns.

Markets

One concern about the rapid increase in high tunnel installations is flooding of local markets with vegetables, particularly in the peak season of August and September. As shown in Figure 2, 9 of the 17 respondents report having some difficulty selling what they produce. The larger growers indicate that local markets in Ashland and Bayfield County are too small for what they produce. These responses, which at first glance seem counterintuitive given the still overall limited production capacity in the region, highlight the ongoing struggle of local producers to gain market share in Ashland and Bayfield Counties, due largely to seasonality constraints and price competition in the larger retail stores. Certainly, it will be important to work to convince consumers in the Chequamegon Bay area to buy local, but growers will also need to look at other options including: using the high tunnels to produce crops at times outdoor crops aren't available, coordinating and aggregating production to access larger markets, and finding cost-effective means to move product to more affluent markets outside the region.

Figure 3 shows the percent of respondents that plan to increase or decrease production of vegetables, fruits, and flowers. Roughly half of the respondents plan to increase vegetable production. With more than half of the respondents also reporting some difficulty in finding a market for their production, it will be important for individual growers to identify marketable products and the local food community at-large to assist with market development.

Education Needs

Survey respondents were interested in learning more about growing artichokes, broccoli, carrots, cucumbers, cut flowers, eggplant, lettuce, melons, microgreens, peppers, tomatoes, and strawberries in high tunnels. When asked on which topics they would like more information or training, participants responded with “tomato grafting,” “increasing production with better, tighter rotations and varied management (pruning, spacing, trials, etc.),”

“mid-winter variables: heat vs. light vs. vent vs. planting dates,” “crop rotation, crop planning, soil health,” “pepper production,” “construction of raised beds, watering, cooling/shading, soil management (fertilizers and aeration),” “4 season gardening,” “pest control, weed control, soil management,” “handling non-insect, blight, and such problems,” “how to use [high tunnels] year round, automated venting to prevent overheating,” and “double fabric and air pump - water conservation for high tunnels.”

Crop	Increase Production	Decrease Production	Maintain Current Production
Vegetables	47%	4%	43%
Fruits	39%	0%	17%
Flowers	21%	0%	8%
Other (write-in: herbs)	17%	0%	4%

Figure 3. Over the next five years do you want to increase, maintain or decrease your production? Circle one answer per crop.

Figure 4 shows the percentage of respondents that would like to receive assistance and training for each of a wide range of production topics. Almost half of all respondents would like assistance with winter production. In response, UW-Extension submitted a grant proposal in April 2016 to develop protocols for optimizing production of winter greens. If funded, the research project will begin in the fall of 2016.

In addition to asking high tunnel operators about specific topics they wanted to learn more about, we also asked which learning methods they preferred. The following methods are listed in descending order of interest: summer high tunnel tours, winter high tunnel conference, high tunnel workshop series, quarterly newsletter, fall high tunnel tours, spring high tunnel tours, winter high tunnel tours, email listserve, being a high tunnel mentee, and being a high tunnel mentor.

Statement	Percent of respondents	Number of respondents
Winter production	48%	11
Scouting for insect and disease problems	35%	8
Pest management	30%	7
Choosing varieties	30%	7
Soil management	26%	6
Developing markets	26%	6
Crop planning	26%	6
Nutrient management	17%	4
Food safety planning	13%	3
Water management	9%	2
Weed prevention	4%	1

Figure 4. What type of assistance would be most helpful to you?

Conclusion

High tunnels are an important tool for vegetable production in the Chequamegon Bay region of northern Wisconsin. They create a better and longer growing season creating more revenue and profit potential for commercial growers and more produce for subsistence growers. High tunnels are an economically important tool for vegetable growers and will continue to grow in popularity. The survey results indicate the high tunnels are being used for a mix of commercial and subsistence production and there is clearly a need for research, outreach education, and training, particularly on ways to increase shoulder season and winter production.

Given the production capacity of these tunnels, there may be an opportunity for commercial growers to work with subsistence growers to focus on a few crops to supplement the commercial growers' production. This would provide some income for the subsistence growers while allowing commercial growers to aggregate product and access bigger markets.

Going forward, UW-Extension will organize summer high tunnel tours (to the extent high tunnel growers are willing to host tours) and will support ongoing networking efforts by existing and aspiring high tunnel producers. In addition, UW-Extension will host winter high tunnel events to provide classroom training and tours of winter production.

Comments or questions about this survey can be directed to Jason Fischbach at 715-373-6104 ext 5 or jason.fischbach@ces.uwex.edu.

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