

# Obstacles and Opportunities in Horticulture: Five Years of Responses to the HortBiz Quiz (2018-2023)

Joshua Knight<sup>1</sup> and Brett Wolff<sup>2</sup>

## Introduction

In August 2018, the Center for Crop Diversification introduced the HortBiz Quiz. This tool, a 5-minute quiz, helps users considering starting a horticulture enterprise to find crops suitable for commercial production. It considers their specific situation by asking questions about their access to capital, land, and labor. Based on answers to those questions, the HortBiz Quiz generates a list of crops to consider and a list of crops to limit or avoid.

The quiz’s response options for land, labor, and capital availability (for example \$1-5000) were chosen based on economic and production considerations from the Center for Crop Diversification crop profiles.

Question	Possible Responses				
How much capital (money) do you have to commit to this enterprise?	More than \$15,000	\$10,001 - \$15,000	\$5,0001 - \$10,000	\$1 - \$5,000	None
How much land do you have (or plan to have) available?		More than 5 acres	1 – 5 acres	Less than 1 acre	
How much labor can you access (besides yourself)?		A lot	A moderate amount	Little or none	

Table 1. List of Questions and Responses

## Characterizing Participation

From August 1st, 2018, to July 31st, 2023, the Horticulture Biz Quiz logged 942 responses. Though this resource is primarily promoted in Kentucky, these responses come from all over the earth, including as far away as Afghanistan. With some effort in processing this data, we were able to tag responses based on geographic location and time so we could isolate responses by year as well as by their proximity to Kentucky. This allowed us to make comparisons among responses from Kentucky only to responses in the region, nationally, or globally.

<sup>1</sup>Joshua Knight is a Senior Extension Associate with the Center for Crop Diversification in the Department of Horticulture.

<sup>2</sup>Brett Wolf is a Senior Extension Specialist with the Center for Crop Diversification in the Department of Agricultural Economics.

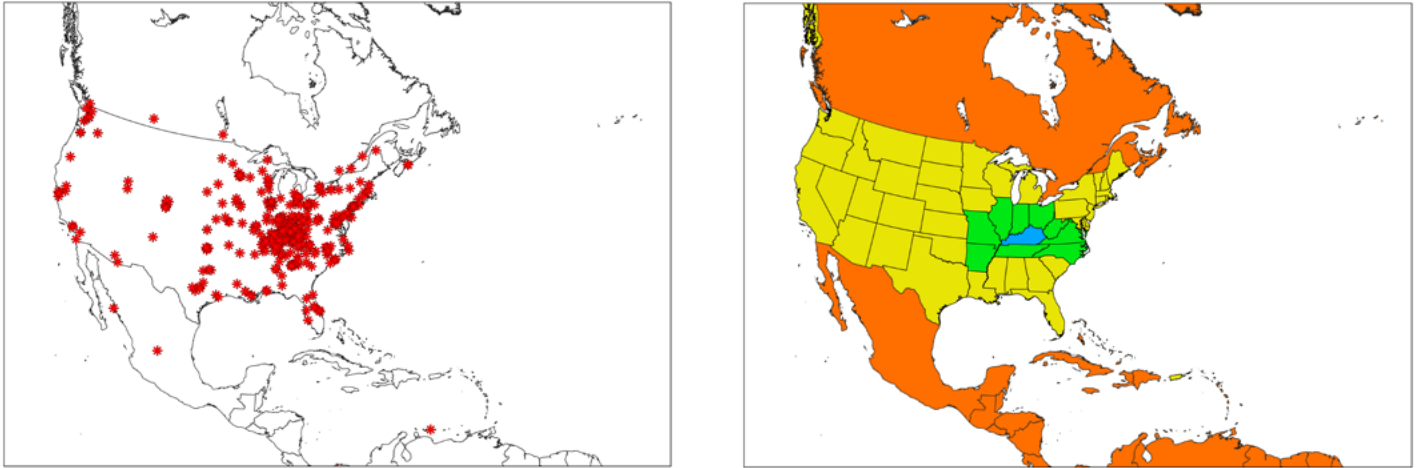


Figure 1. Left: Point map of responses, Right: Characterization of responses.

Roughly 80% of all responses occurred in the contiguous United States, while 61% occurred in this region (see Table). Forty three percent of all responses were in Kentucky. This means even the global data is heavily weighted to Kentuckians.

Designation	KY	Regional	US	Global
Description	Kentucky Only	Kentucky, Tennessee, Missouri, Illinois, Indiana, Ohio, West Virginia, North Carolina, Arkansas	All 50 US States & Territories	All Locations
Portion of Responses	43%	61%	80%	100%

Table 2. Geographic characterization of responses and their porportion of total.

Similarly, we categorized responses by year. Each twelve month cycle begins in August and are grouped according to Table 3 below.

Year	Start Date	End Date
2018	August 1st, 2018	July 31st, 2019
2019	August 1st, 2019	July 31st, 2020
2020	August 1st, 2020	July 31st, 2021
2021	August 1st, 2021	July 31st, 2022
2022	August 1st, 2022	July 31st, 2023

Table 3. Categorization of response dates.

### The Big 3: Access to Capital, Land, and Labor

Though we have captured response information to this quiz from around the US and even across the globe, in this section to discuss Capital, Land and Labor access, we have chosen only to look at responses originating from within Kentucky (labeled as “KY”) as well as responses from each of the states bordering Kentucky (labeled as “Region”).

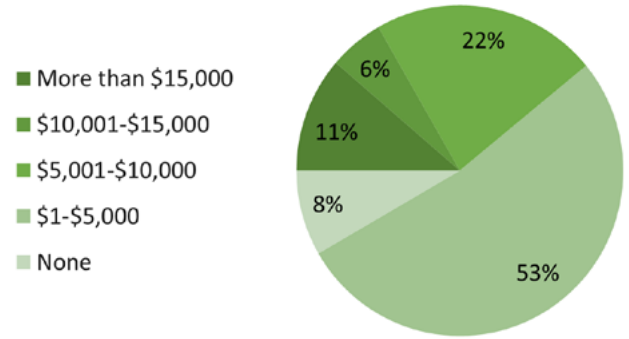
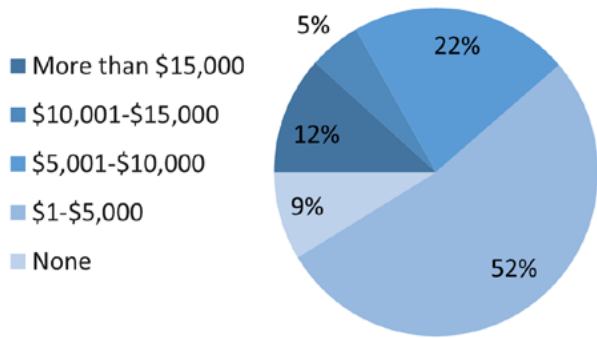


Figure 2. Responses to Q16 “How much capital (money) do you have to commit to this enterprise?”  
 Left/Blue: Kentucky responses only. n=310 Right/Green: Regional responses only. n=407

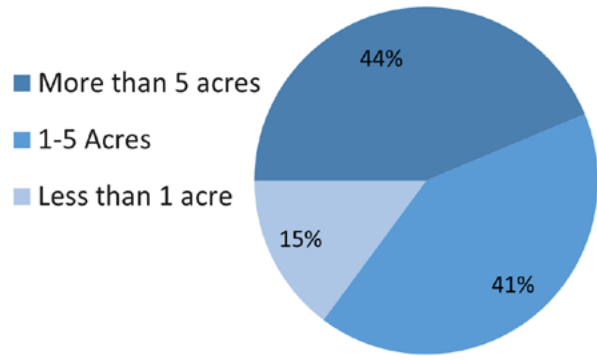


Figure 3. All Kentucky responses to question “How much land do you have (or plan to have) available?” n=304

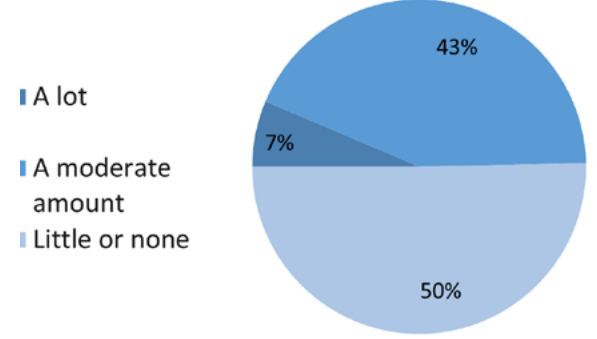


Figure 4. All Kentucky responses to question “How much labor can you access (besides yourself)?” n=298

Of all included respondents, nearly 2 out of 3 in both Kentucky and the region indicated having less than \$5000 to commit to the enterprise while around 10% indicated that they had more than \$15,000 to commit. This suggests that broad programming to support these producers should focus on less capital-intensive operations while there is a considerable niche of interested producers who may benefit from more direct assistance in establishing larger or more capital-intensive operations. There were minimal differences between the state and the region.

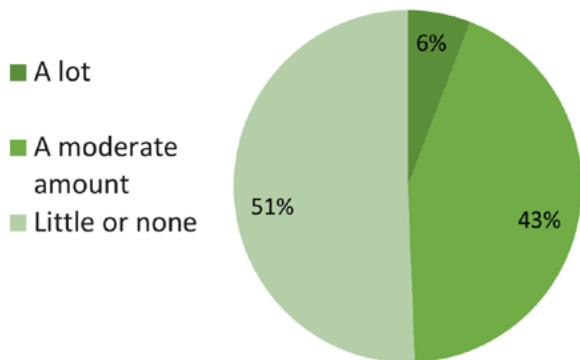


Figure 5. All regional responses to question “How much labor can you access (besides yourself)?” n=393

To those involved in row-cropping and livestock production the acreage sizes here may seem odd, but 5 acres of certain specialty crops can be quite a lot. In other cases, such as with pumpkins, an increase in acres of production can be developed without requiring as much labor as would be required by a similar production area increase in a labor-intensive crop like tomatoes. Over 85% of respondents have access to at least an acre to put into horticultural production, with almost half having more than 5 acres. This indicates access to sufficient land is not a common obstacle to those interested in horticultural production.

If you ask specialty crop producers (and other producers in general) one of the key challenges and considerations is labor. Given the labor-intensive nature of many horticultural crops, this variable cannot be overlooked.

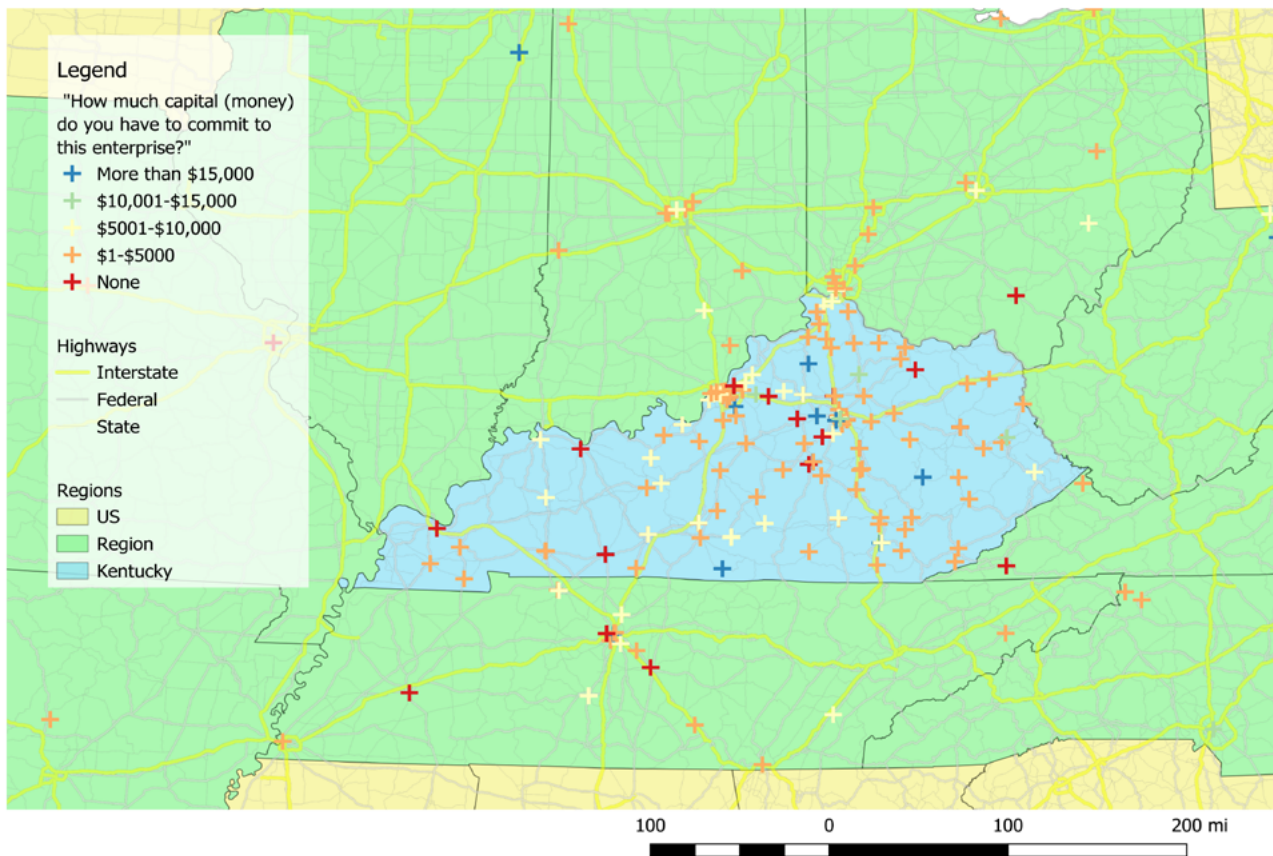


Figure 6. Map of regional responses to question “How much capital (money) do you have to commit to this enterprise?” n=407

Very few respondents indicated having an abundance of labor to commit to the enterprise, but nearly half indicated they had at least some available. Actions emerging from these insights might include the need to support producers more in navigating labor programs and hiring but may also mean focusing on less labor-intensive and/or high dollar enterprises.

### Access to Capital, Perception of Markets and Self-Knowledge

Capital is a crucial resource in many horticultural production systems, especially in comparison to agronomic or commodity crops. Less than 40% of respondents indicate they have \$5,000 or more to put towards an enterprise. In this section, we look at Access to Capital Over Time, Market Identification, and self-reported Horticultural Knowledge as a function of access to capital.

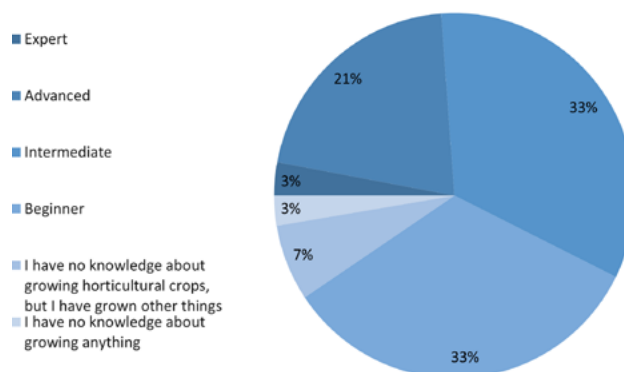
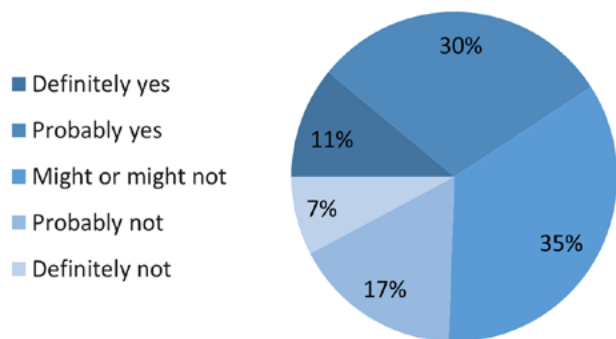


Figure 7. Above. Kentucky responses to Q11. “Do you have a specific market in mind?” n=311

Figure 8. Above. Kentucky responses to Q8. “How would you rate your current knowledge of growing horticultural crops?” n=340

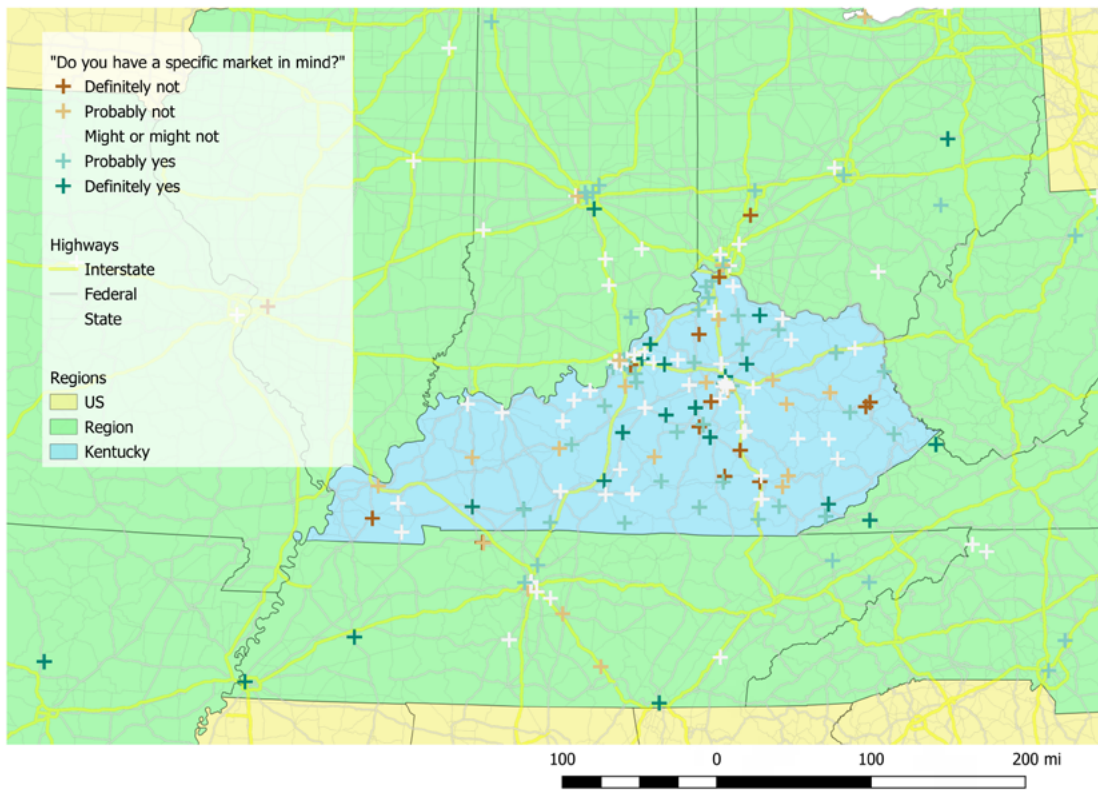


Figure 9. Mapped regional responses to Q11: “Do you have a specific market in mind?” n=415

If we map this data, we can see reduced access to capital in rural areas and areas with limited access to infrastructure. However, many potential growers closer to urban markets and significant transportation infrastructure (interstates are shown on map along with named places with census population over 1,000) also lack access to capital. Additionally, there are several operations in rural areas with significant access to capital, complicating what one might expect to be a simple picture.

Perhaps more instructive, access to transportation infrastructure does not imply access to capital.

### Perception of Markets

Within the Hort Biz Quiz, we asked the question: “Do you have a specific market in mind?” to get a picture of how confident respondents felt about accessing markets.

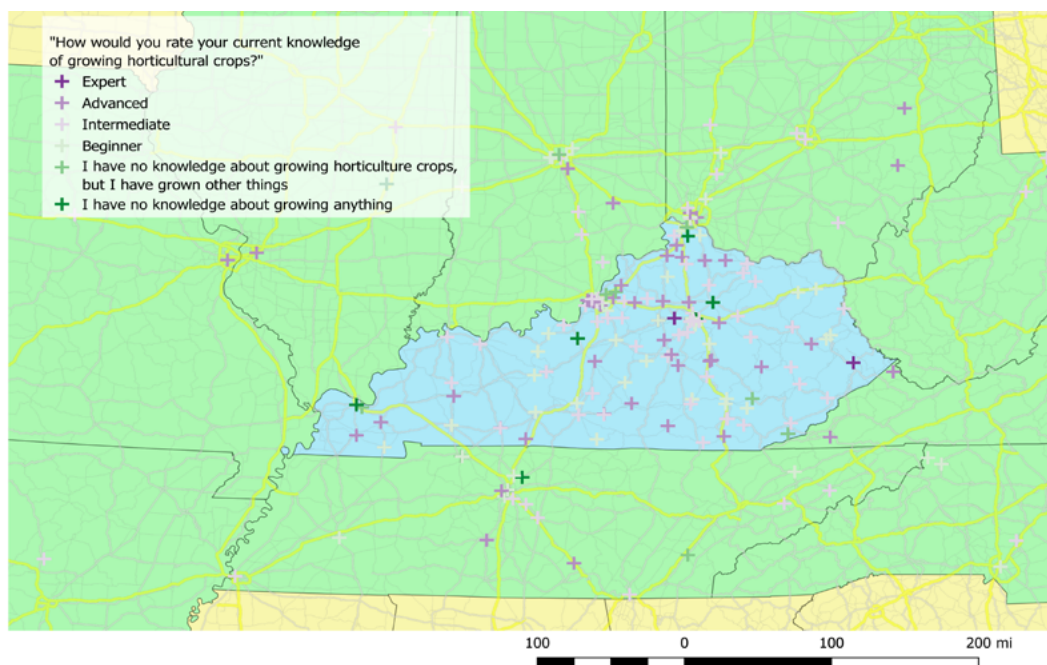


Figure 10. Mapped regional responses to Q8: “How would you rate your current knowledge of growing horticultural crops?” n=451

This could be a farmer’s market, a roadside stand, a restaurant, a grocery store, a produce auction, or some larger institutional market.

We can see from the responses 41% of the respondents feel positive about a specific market where they want to sell. A little over a third are ambivalent, and less than a 1/5 self-report as not having a market in mind.

We tend to associate urban-

ized areas with markets, and more heavily urbanized places with larger markets. We might assume respondents closer to populated places and transportation infrastructure are more likely to have a specific market in mind.

However, there are many respondents in and around urbanized areas less likely to report having a specific market in mind, while some of the more rural respondents report high confidence in their market. While there are more eaters and markets in highly populated places, identification of and access to markets for horticultural crops appears more complex than proximity to infrastructure and urbanized places.

Next, we look at responses to the question “How would you rate your current knowledge of growing horticultural crops?”

Around 57% of Kentucky respondents self-report as having intermediate-or-better knowledge of growing horticultural crops, with almost 1/4th identifying themselves as “advanced” or “expert”.

In the map of responses, we can see strong representation of intermediate-or-better horticultural expertise in very rural areas, as well as among respondents within and close to highly urbanized areas.

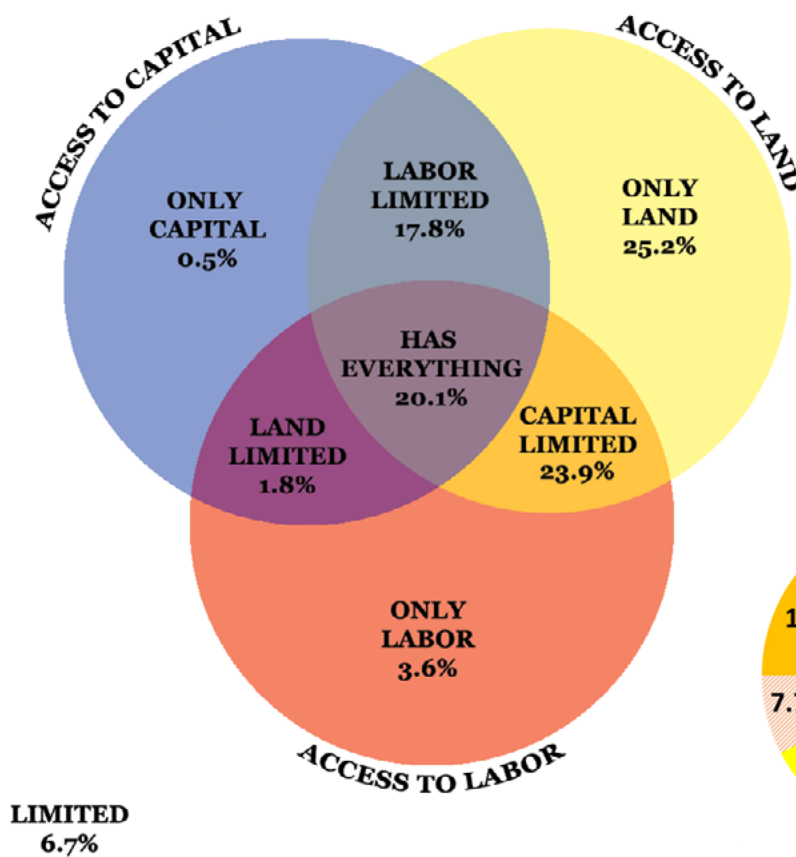
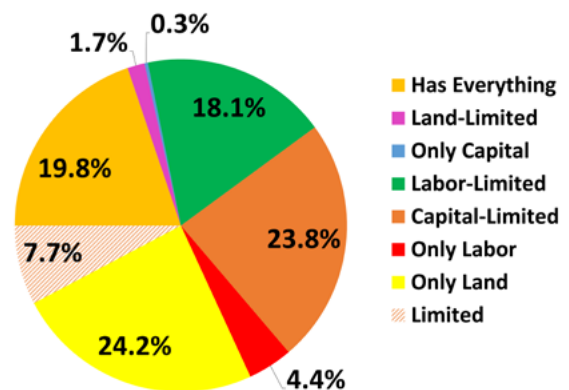


Figure 10. *Left.* Venn diagram of archetyped responses showing named “types” by their access to resources. Global responses. n=511  
*Lower Right.* Pie chart showing named “types” as a portion of the whole. Kentucky only responses, n=298



## A Typology of Responses

Deeper investigation into the responses let us develop a typology among the responses, based on how they characterized their access to the three main critical resources: capital, land and labor.



**Has Everything** has more than an acre of land, more than \$5,000, and at least a moderate amount of labor to dedicate to an enterprise. Has Everything accounts for 19.8% of Kentucky respondents. For Has Everything users, all crops are recommended and there are no crops listed to avoid.



**Land-Limited** has at least \$5,000 and access to at least a moderate amount of labor, but has less than 1 acre of land to dedicate to an enterprise. Land-Limited accounts for 1.7% of Kentucky respondents. For Land-Limited users, recommended crops include sweet potatoes, baby vegetables, mushrooms and cucumbers. The list of production systems to avoid includes grapes, greenhouses, and nursery production.



**Only Capital** has at least \$5,000 to dedicate to an enterprise, but less than 1 acre and little or no labor beyond what they can provide themselves. Only Capital accounts for 0.3% of Kentucky respondents. For Only Capital users, the recommended crops include maple syrup, asparagus, honey, and cauliflower. The list of crops to avoid includes tomatoes, tree fruits, tree nuts, Christmas trees, hand-picked beans, and berries.



**Labor-Limited** has at least one acre and \$5,000 to dedicate to an enterprise, but little or no labor beyond what they can provide themselves. Labor-Limited accounts for 18.1% of Kentucky respondents. For users designated as Labor-Limited, the recommended list of crops includes asparagus, winter squash, honey, broccoli & cauliflower. The list of crops for this group to avoid includes, strawberries, tomatoes, hand-picked beans, and berries.

Question	Possible Responses				
How much capital (money) do you have to commit to this enterprise?	More than \$15,000	\$10,001 - \$15,000	\$5,0001 - \$10,000	\$1 - \$5,000	None
How much land do you have (or plan to have) available?		More than 5 acres	1 – 5 acres	Less than 1 acre	
How much labor can you access (besides yourself)?		A lot	A moderate amount	Little or none	
Response Characterization	YES			NO	

Table 4. Table of questions and responses, colored coded by response characterization.

Archetype	Capital	Land	Labor
Has Everything	Y	Y	Y
Land-Limited	Y	N	Y
Only Capital	Y	N	N
Labor-Limited	Y	Y	N
Capital-Limited	N	Y	Y
Only Labor	N	N	Y
Only Land	N	Y	N
Limited	N	N	N

Table 5. Named “types” and their characterization according to resource access

**Capital-Limited** has at least 1 acre of land and access to a moderate amount of labor, but less than \$5,000 to dedicate to an enterprise. Capital-Limited accounts for 23.8% of Kentucky respondents. This is the second largest group of respondents. For Capital-Limited users, the recommended crops list includes sweet potatoes, baby vegetables, mushrooms, and cucumbers. The list of crops to avoid includes grapes, greenhouse and nursery crops.

**Only Labor** has access to a moderate amount of labor, but less than 1 acre and less than \$5,000 to dedicate to an enterprise. Only Labor accounts for 4.4% of Kentucky respondents. For Only Labor users, the list of recommended crops includes hand-picked beans, field grown cut flowers, baby vegetables, and cucumbers. The list of crops to avoid includes, grapes, greenhouse and nursery crops.

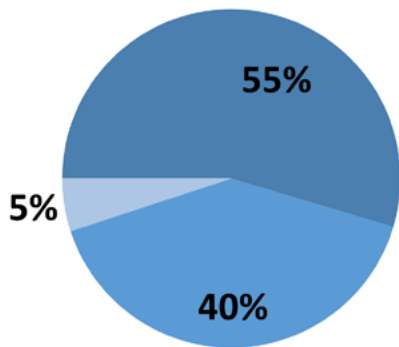


Figure 12. All Kentucky responses among those with MORE than \$5,000 in capital to “How much land do you have (or plan to have) available?” n=119

includes, fruit trees, grapes, tomatoes, and melons.

**Limited** has less than 1 acre of land, less than \$5,000, and little or no labor beyond what they can personally provide. Limited accounts for 7.7% of Kentucky respondents. The list of crops recommended for this users includes asparagus, wintersquash, sweet

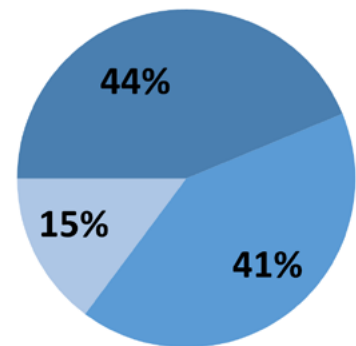


Figure 11. All Kentucky responses to “How much land do you have (or plan to have) available?” n=304

**Only Land** has access to at least 1 acre of land, but little or no labor beyond themselves and less than \$5,000 to dedicate to an enterprise. Only Land accounts for 24.2% of Kentucky respondents. This is the largest group of respondents. For Only Land users, the list of recommended crops includes ornamental corn, ornamental grasses, nut trees, and sweet corn. The list of crops for this group to avoid

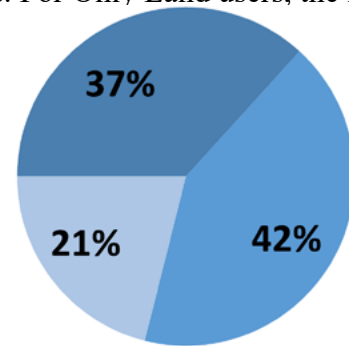


Figure 13. All Kentucky responses among those with LESS than \$5,000 in capital to “How much land do you have (or plan to have) available?” n=185



corn, and root crops. The list of crops to avoid for this group includes grapes, greenhouse and nursery crops.

### Land Access

Though many horticultural crops can be grown in commercial quantities on smaller plots of land than typical agronomic crops like corn and soybeans, land is still a critical resource for horticulture growers to access. Once again, the response categories (for access to capital, land acreage,

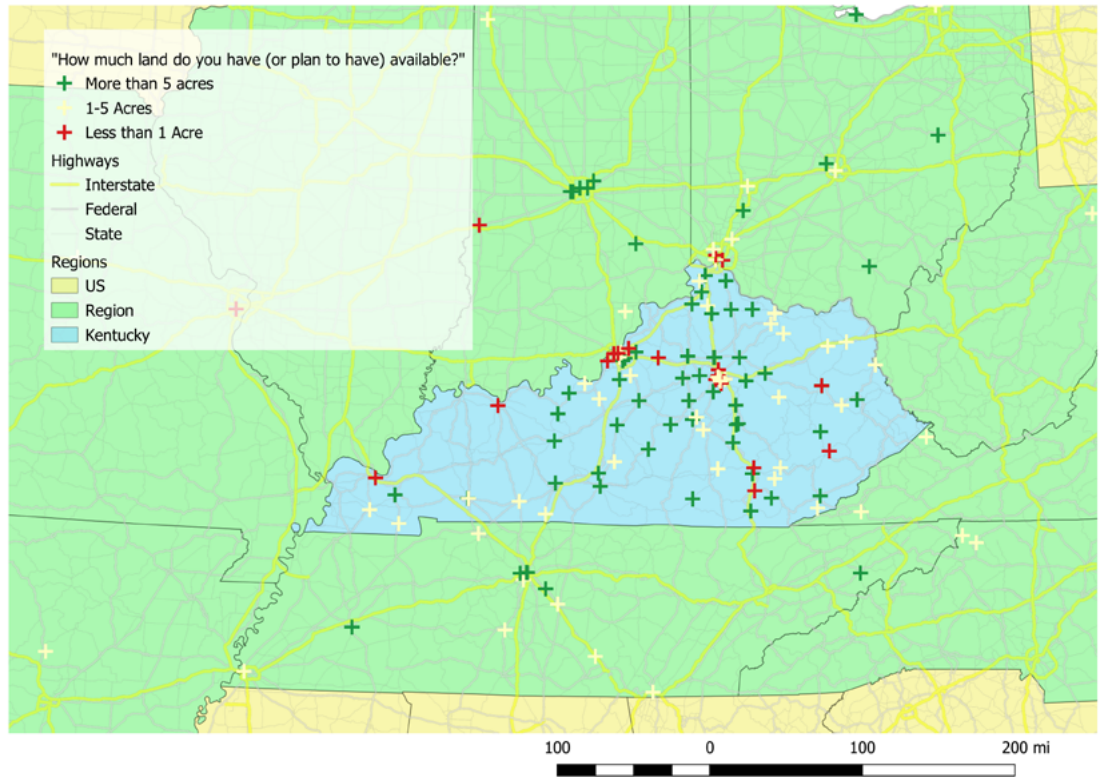


Figure 14. Mapped responses to “How much land do you have (or plan to have) available?” n=319

etc.) were chosen based on economic and production considerations from the Center for Crop Diversification crop profiles. If we look at the combined data, we see a picture showing almost half of all KY respondents having 5 or more acres to put into horticultural crop production. With over a third of respondents having between 1 and 5 acres available, this means 85% of respondents have at least 1 acre to put into horticultural production.

Further analysis can show us the breakdown of land availability among groups with different amounts of available capital. The graphs show land availability among those with at least \$5,000 in capital to contribute to the operation and land access among those with less than \$5,000 available.

We can see here almost over half of the respondents with access to at least \$5,000 in capital also have the land to start a larger acreage horticulture enterprise. 96% of respondents with capital access have at least 1 acre. Note that the group who have at least \$5,000 is nearly half the size of the group with less capital available.

Looking at the larger portion of respondents, with less than \$5,000 to invest in a horticulture enterprise, still over 80% have at least 1 acre and over 1/3rd have at least 5 acres.

We may expect potential growers in rural areas to have less access to capital and/or more access to land, but we can see many exceptions to this assumption in the statewide map.

Looking at the larger portion of respondents, with less than \$5,000 to invest in a horticulture enterprise, still over 80% have at least 1 acre and over 1/3rd have at least 5 acres. One might expect potential growers in rural areas to have less access to capital and/or more access to land, but we can see many exceptions to this assumption in the statewide map.

The broad conclusions we can draw here are that respondents who had more capital also tended to have access

to land and that there are a considerable number of potential horticulture producers with at least 5 acres to use in their operation. There are still technical support and programming needs for smaller scale, less capital intensive systems of horticulture production with land and resource constraints, but overall land access seems to be less of an issue than capital constraints based on these data.

### Access to Labor

In the survey, respondents were asked, “How much labor can you access (besides yourself)?”

With half of Kentucky respondents saying “little or none” and approximately the same amount indicating just a “moderate amount”, access to labor is a significant barrier to horticultural production in Kentucky. Just 5% of respondents claimed access to “a lot” of labor. This mirrors trends from regional and national level BizQuiz respondents as well, which were all within a few percentage points of these results.

Even if we examine labor data in the context of responses to other questions (land and capital access), the pattern remains. When considering respondents with over \$5,000 dollars to invest (our moderate- and high-capital categories), more than half of respondents describe their access to labor as “little or none.”

These responses indicate that accessing labor is a significant barrier to horticultural production and it is a barrier

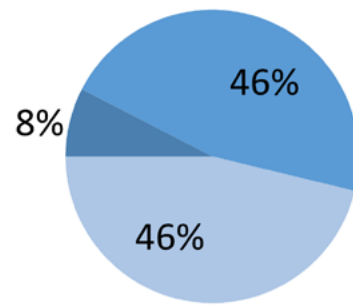


Figure 15. Responses among Kentucky growers with at least \$5000 in capital to the question “How much labor can you access (besides your self)?” n=119

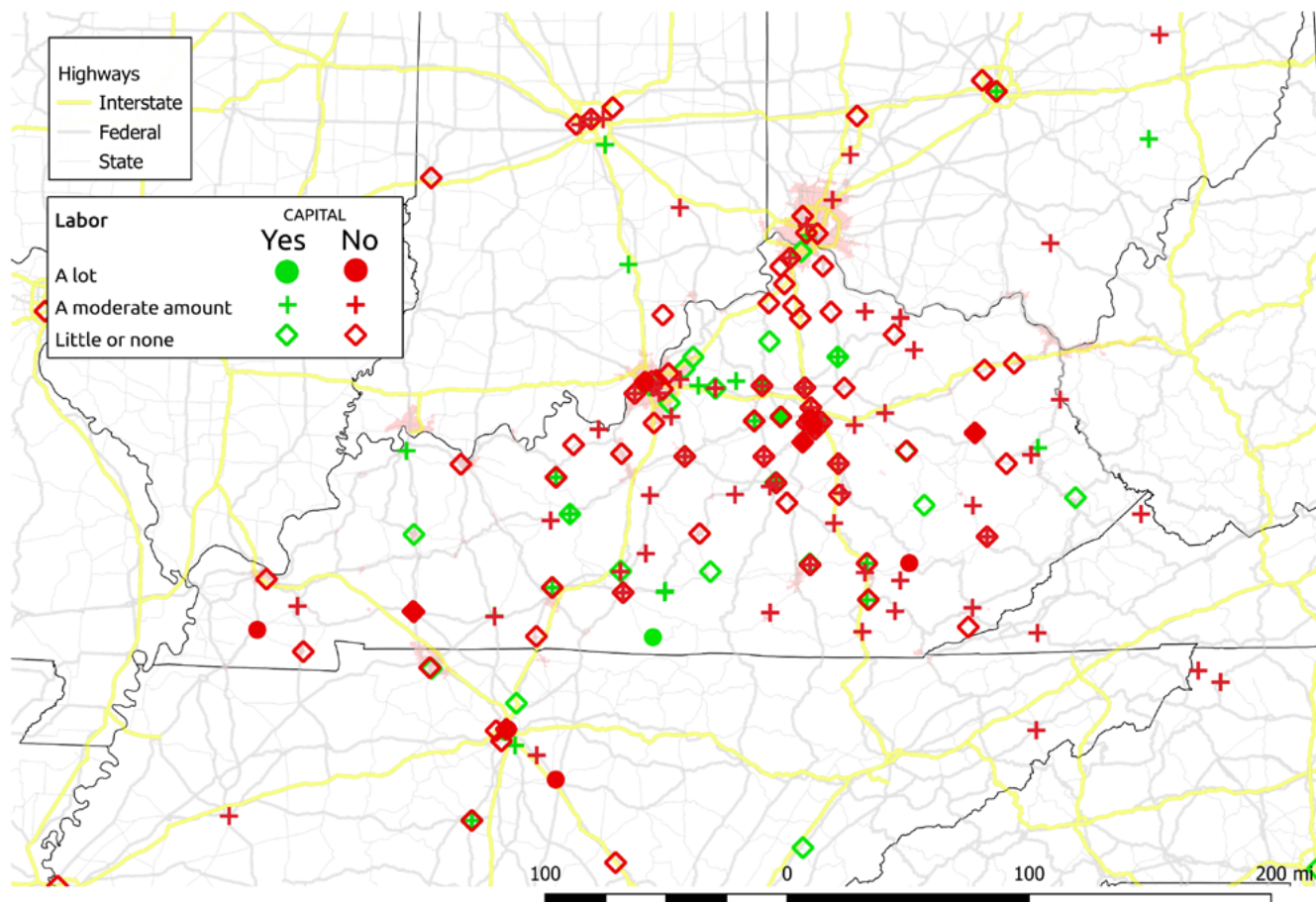


Figure 16. Mapped regional responses among showing responses to question “How much labor can you access (besides yourself)?” n=393

not easily overcome by simply having access to capital. Possible contributing factors here include insufficient wages to attract qualified workers, too much complexity or cost associated with guest worker

culture specifically is frequently appearing among top concerns with producers large and small, across a variety of sectors. While this information is not new, some of the data presented here might dispel myths about perceived labor availability and competition for the Kentucky Horticulture producer landscape. This data also makes clear the need for producers to verify they will be able to access reliable labor before they engage in any of the many labor-intensive horticultural enterprises.

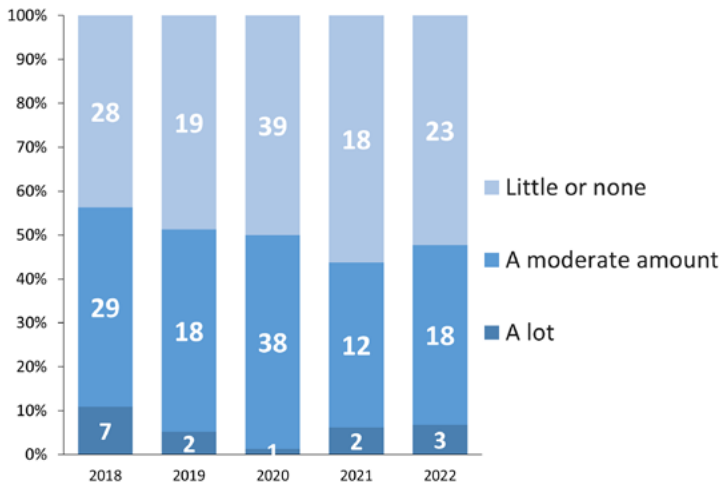


Figure 17. Responses among Kentucky growers over time to question “How much labor can you access (besides yourself)?” n = 298

programs, a general lack of available workers in local communities, or multiple other factors.

We can also consider these responses relative to geographic indicators. Below, we see a map of responses to the Labor Access question, split by access to capital (< \$5,000 is red, >\$5,000 is green), bigger darker circles indicate “a lot” of labor access, smaller lighter circles indicate less/no labor. The areas denoted in pink are urbanized areas, which have higher populations, larger labor pools, but also increased competition for labor and higher wages. Based on our responses, rural areas generally have less access to capital, but again access to labor seems to be an obstacle nearly everywhere.

Not all years had the same level of participation in the biz quiz, if we control for that by showing the portion of responses as they change throughout the year, it appears the access to labor may have tightened between 2018 and 2022.

Access to labor in agriculture in general and horti-

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Reviewed by Emily Spencer, Extension Associate, Center for Crop Diversification and Camille Dant, Extension Associate, Center for Crop Diversification

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