Describing Commercial Berry Crop Production and Marketing in Virginia: Results of a 2006 Survey

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Describing Commercial Berry Crop Production and Marketing in Virginia: Results of a 2006 Survey

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Executive Summary

Traditional agricultural production in Virginia has focused on land-intensive commodities such as beef cattle and tobacco. In recent years, however, land prices have risen due to urban expansion and many commodity production costs have increased more than the commodity prices farmers receive. As a result, there is a general need for alternative high-value agricultural production among Virginia farmers. One possible alternative to commodity production is berry crop (small-fruit) production. While relatively few producers in Virginia currently grow berry crops, they offer a potentially high-value market and can be produced on smaller-scale farms, making them attractive to producers who are seeking alternatives to commodity production.

Researchers in the Department of Agricultural and Applied Economics at Virginia Tech conducted an in-depth, mail-based survey in order to gain a better understanding of the current structure and organization of berry crop production in Virginia. The objectives of this survey were to analyze commercial berry crop operations, farm characteristics, production systems, marketing strategies, and producer socioeconomic characteristics as well as to identify producers' educational needs and to tailor Extension programming to fit those needs.

The results show that berry crop producers in Virginia are diverse and differ along many dimensions from the average Virginia farmer. Berry Crop growers in the state produce an average of two acres of berries, are more involved in organic production, and depend heavily on sales made directly to consumers for the majority of their farming income. Producers have a need for education in areas such as market diversification, marketing strategies, consumer education, and legal issues in production and marketing.

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1.0 Introduction

This publication presents a detailed overview of the current supply of berry crops in Virginia. Specifically, it provides insight into the location of berry producers, their demographic makeup, the methods they use in production, the mix of products they produce, the marketing strategies they employ, the constraints they face in production, and their needs for further education.

2.0 Methods and Data

Data reported in this publication came from the results of a 2006 mail-based survey of commercial berry crop producers in Virginia. This survey was designed to probe into the production and marketing processes currently being used by the producers. Since a comprehensive list of berry crop growers in Virginia does not exist, the survey was mailed to a broad range of potential respondents identified through sources that include the Virginia Department of Agriculture and Consumer Services, the Virginia Small Fruit and Specialty Crop Growers' Association, and Virginia Cooperative Extension agents. In all, approximately 1,250 surveys were sent to possible berry crop or specialty crop growers in Virginia. In response, a total of 345 surveys were completed and returned with usable results. Of the respondents, 115 were presently involved in commercial berry crop production. These producers constitute the sample size used in the following report of frequencies and descriptive statistics. This sample accounts for 31 percent of the total number of producers included in Census of Agriculture[1] who grow berry crops commercially in the state. Thus, it is assumed that the results reported below in Section 3 are representative[2] of all berry crop growers in Virginia.

3.0 Results

3.1 Distribution of Berry Crop Production

According to county-level statistics, berries are commercially grown in 75 counties in Virginia (79 percent of all counties in the state) (NASS, 2004). While the sample used in this study includes respondents from only 40 counties (42 percent of all counties in the state), it closely mirrors the distribution of berry crop farms outlined in the Census. For example, both the Census and the survey results reveal that berry crop operations are more heavily concentrated in northern Virginia, with Loudoun County accounting for the highest number of operations and more than twice as many as the next highest county in Virginia. Appendix A shows a complete breakdown of the allocation of berry crop operations by county accounted for in the Census and in the sample.

3.2 Characteristics of Berry Producers

3.2.1 Demographics

Berry producers are diverse along most demographic dimensions,[3] with the exception of ethnicity. Similar to state-level statistics in which 96 percent of all Virginia farmers identify themselves as white, non-Hispanic (NASS, 2004), 94 percent of the survey respondents are white, non-Hispanic. The age distribution of berry crop producers is almost identical to that of all agricultural producers in Virginia, with the largest grouping between 45 and 59 years old (Figure 1). In contrast, gender profiles differ between the survey results and census. Namely, a higher proportion of berry crop producers (29 percent) are female as compared to the percentage of females in Virginia agriculture overall (14 percent) (Figure 2).

Berry crop growers are generally well educated. Specifically, 40 percent of berry crop producers have a Bachelor's degree, 26 percent have a graduate degree, and only 3 percent lack a high school diploma or equivalent (Figure 3).[4]

[1]All state- and county-level statistics reported in this chapter come from the 2002 Census of Agriculture, which was conducted by the United States Department of Agriculture (NASS, 2004).
[2]Salant and Dillman (1994) suggest that one can be 95 percent confident that this particular sample size, given the total number of small-fruit producers included in the Census, will generate estimates that are no more than ± 5 percent different from the true population parameter.
[3]All demographic variables in this section are specific to the principal farm operator.
[4]No corresponding statistics on education are available from the Census.

Figure 1. Age Distribution

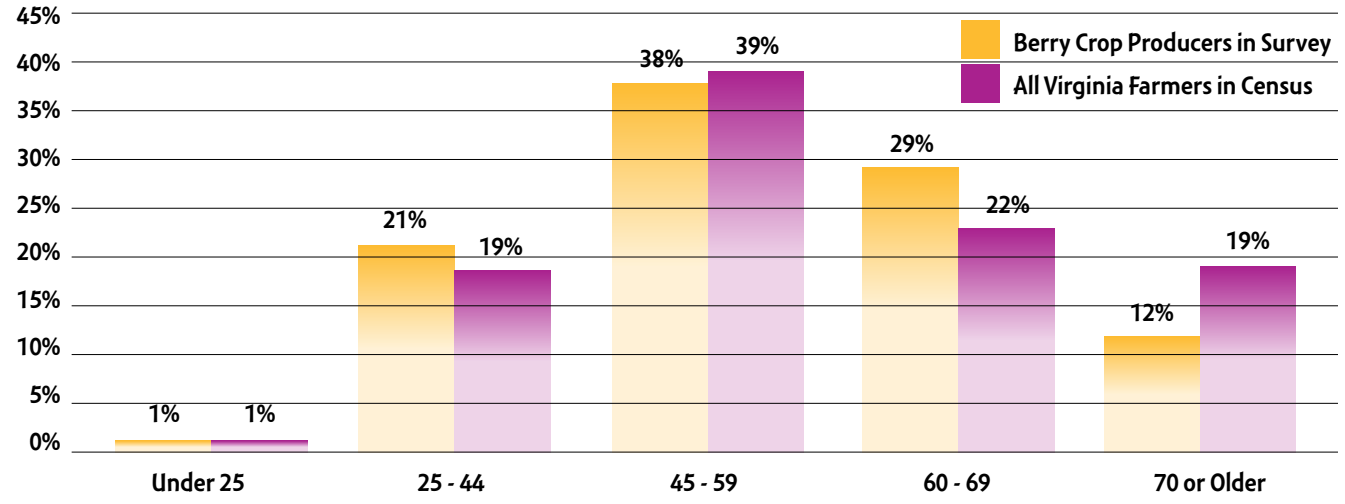


Figure 2. Gender

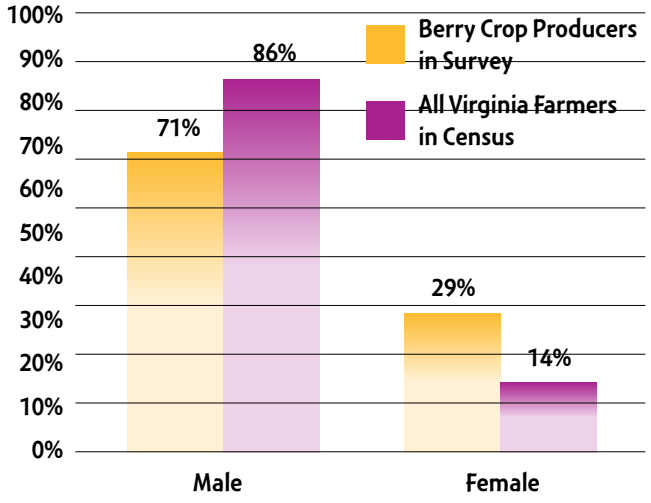


Figure 3. Education Level among Berry Crop Producers

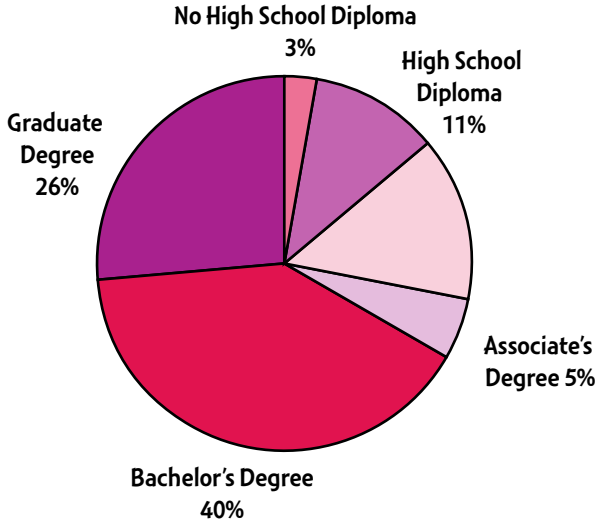
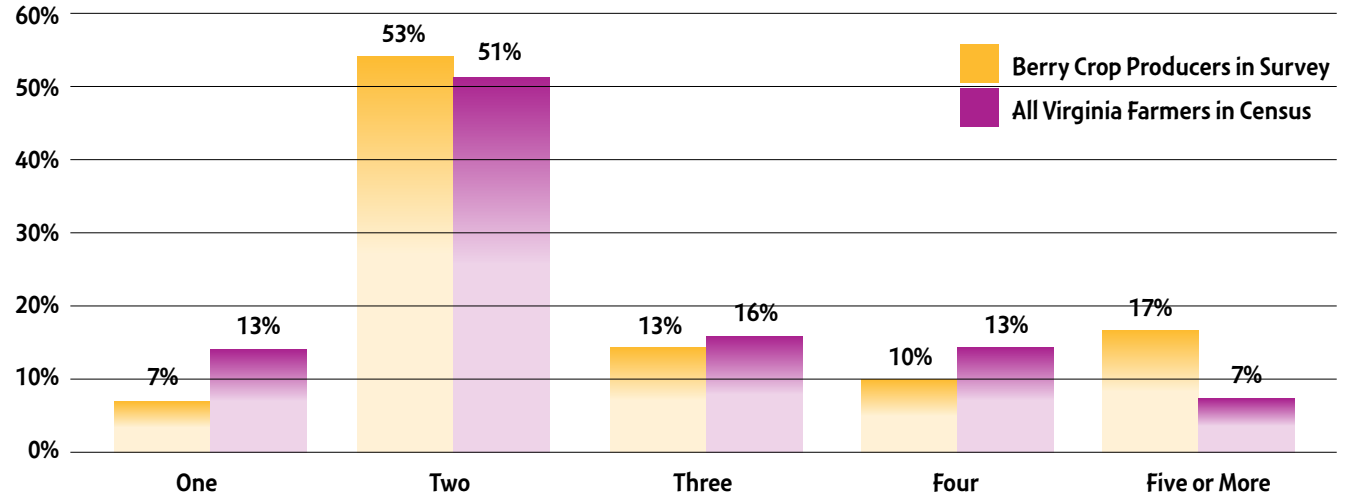


Figure 4. Household Size

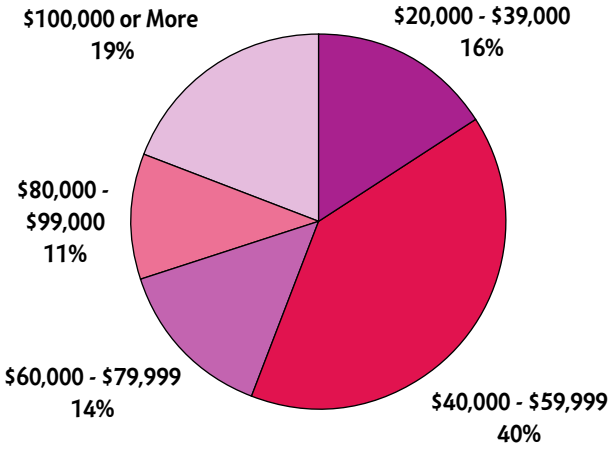


3.2.2 Household Composition and Income

The distribution of household size among berry crop producers is practically identical to state-level statistics, with two-person households comprising 53 percent and 51 percent, respectively (Figure 4).

The annual income of each household varies with the largest group (40 percent) earning between $40,000 and $59,999 (Figure 5). The mean and median respondents earn 43 percent and 33 percent of their annual household income from farming activities, respectively. In contrast, the majority of farmers in Virginia (69 percent) earn less than 25 percent of their annual household income from farming (NASS, 2004). Of the mean and median producer's total farming income, 26 percent and 10 percent, respectively, comes specifically from berry crop production.

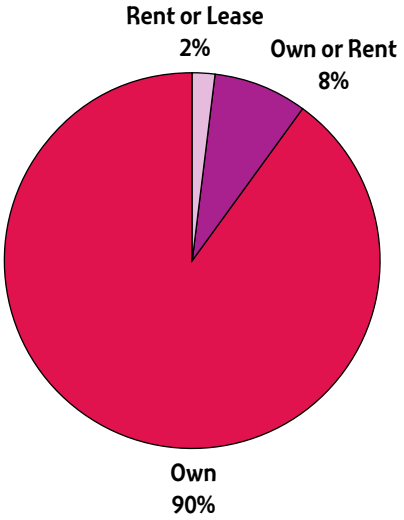
Figure 5. Annual Household Income among Berry Crop Producers



3.2.3 Experience and Farmland Tenure

Producers have been involved with commercial berry crop production from less than one year to 45 years with the average grower having 12 years of experience producing berry crops. The majority of the growers (90 percent) own the land they farm (Figure 6), which is similar to statewide statistics that indicated 95 percent of all farmers in Virginia own their farmland (NASS, 2004). Additionally, more than half of berry producers (55 percent) have farmed their land for fewer than 21 years (Figure 7), which matches the state average among all agricultural producers (NASS, 2004).

Figure 6. Farmland Tenure among Berry Crop Producers



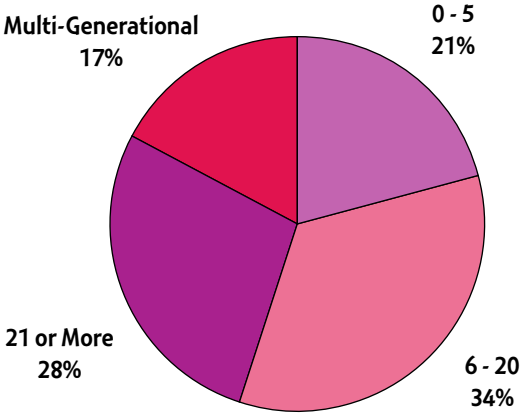
3.3 Characteristics of Berry Crop Enterprises

3.3.1 Farm Size and Product Mix

Berry crop growers produce a wide range of products on farm sizes ranging from one-half acre to 1,000 acres. The mean and median farm size of the respondents are 88 acres and 20 acres, respectively. This relatively low median indicates that most berry crop farms are small (20 acres or less in total) while a few are comparatively larger (with more than 88 acres in total).[5] Compared to the mean farm size in Virginia (181 acres), berry crop production takes place on substantially smaller farms (NASS, 2004).

The average berry grower allocates approximately two acres of his or her entire farm to berry crop production, which amounts to less than 3 percent of the mean farm

Figure 7. Number of Years Berry Crop Producers Have Farmed their Land



[5]Twenty-three percent of the respondents operate farms with a total surface area greater than 88 acres.

size. Berry growers tend to produce a highly diversified combination of output on their farming operations. In addition to berry crops, 77 percent grow vegetables, 50 percent produce fruits other than berry crops, 39 percent produce specialty products such as herbs and cut flowers, 30 percent raise livestock or dairy, and 22 percent produce commodity row crops such as corn and soybeans (Figure 8). Table 1 compares the acreage farmers in Virginia and berry crop producers devote to different agricultural uses, considering only those who produce each specific output.

3.3.2 Berry Crop Mix

Nearly half of berry producers only grow one type of berry; the remainder are more diversified: 23 percent grow two different berries, 14 percent produce three different berries, 8 percent grow four different berries, and 6 percent produce five different types of berries (Figure 9). More specifically, 52 percent of respondents from the entire sample produce strawberries (two acres on average), 48 percent grow blueberries (one acre on average),

Figure 9. Number of Different Berry Products Grown by Respondents

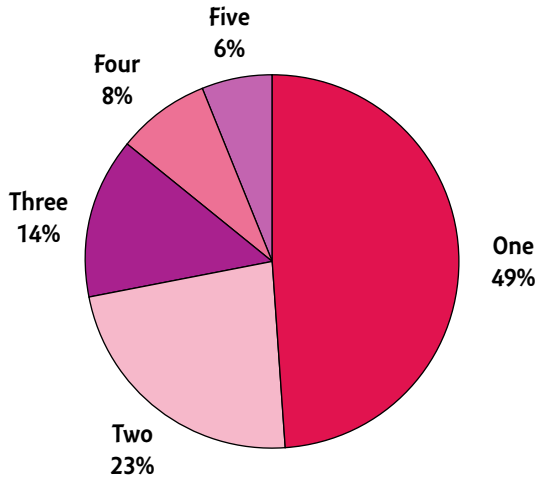


Figure 8. Percentage of Berry Crop Growers who Produce each Product

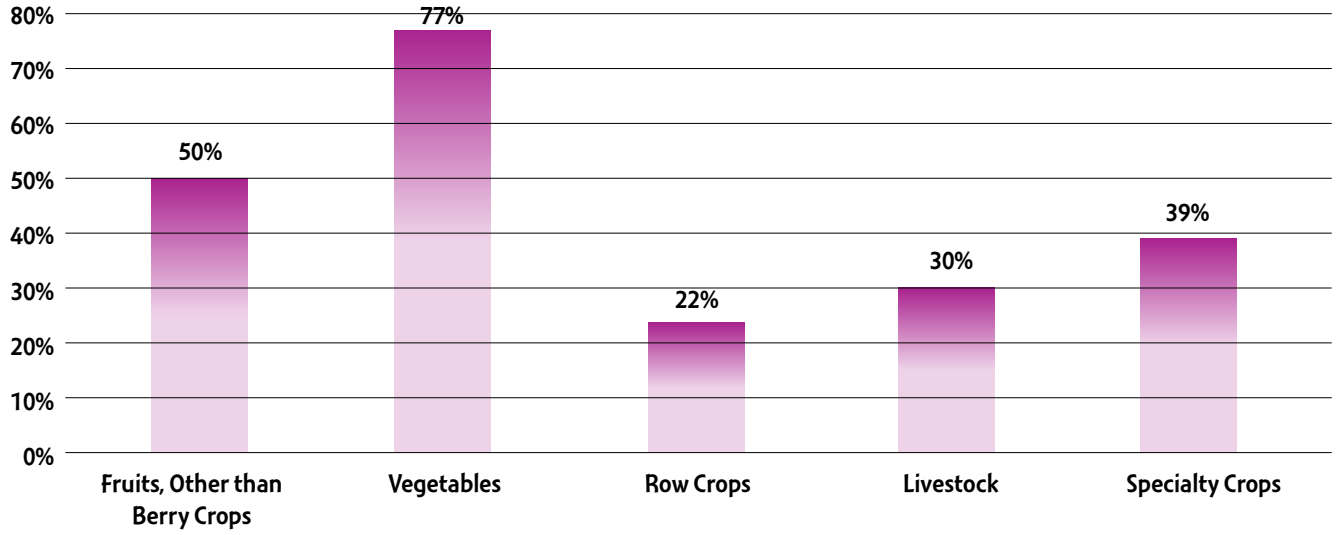


Table 1. Production Mix Acreage

	Census Mean	Survey			
		Mean	Median	Minimum	Maximum
Fruits other than berry crops	14.30	19.89	2.00	0.15	324.75
Vegetables	20.40	15.26	2.00	0.01	200.00
Row Crops	86.38	64.30	10.00	0.10	450.00
Livestock and Dairy	N/A[A]	91.19	16.00	1.00	750.00
Berry Crops	1.97	2.16	1.00	0.05	10.00
Specialty Crops	N/A[B]	0.62	0.38	0.08	5.25

[A]All livestock information in the Census is reported as herd size, not in acreage units.
[B]The definition of specialty crops is subjective and not quantified in the Census.

41 percent produce blackberries (one acre on average), 26 percent grow summer-bearing raspberries (one-half of an acre on average), 25 percent produce fall-bearing raspberries (less than one-half of an acre on average), and 8 percent grow other berry crops such as elderberries or gooseberries (one acre on average) (Figure 10 and Table 2). As seen in Figure 10 and Table 2, state-level statistics specific to berry crop production are nearly identical to the information mentioned above (NASS, 2004).

3.4 Berry Crop Production Methods and Technologies

3.4.1 Organic Production

A total of 46 percent of berry crop producers report practicing some form of organic production methods on all or a portion[6] of their farming operation (Figure 11). Of these producers, only 6 percent have the United States Department of Agriculture (USDA) organic certification, and an additional 3 percent are in transition to becoming USDA-certified organic (Figure 11). The remaining 37 percent of producers report using organic production methods without USDA certification or an intent to become officially certified.[7] According to state-level statistics, less than 1 percent of all farms in Virginia are USDA-certified organic (NASS, 2004). Thus, organic certification is significantly more prevalent in berry crop production than it is for many other crops or commodities.

3.4.2 Irrigation and Crop Protection

Most berry growers (79 percent) irrigate their berries (Figure 12). Of these, the average grower irrigates 92 percent of his or her berry crop acreage (2.47 acres on average) (Table 3).[8] Plasticulture is used by 41 percent

Figure 10. Percentage of Respondents who Produce each Berry Crop

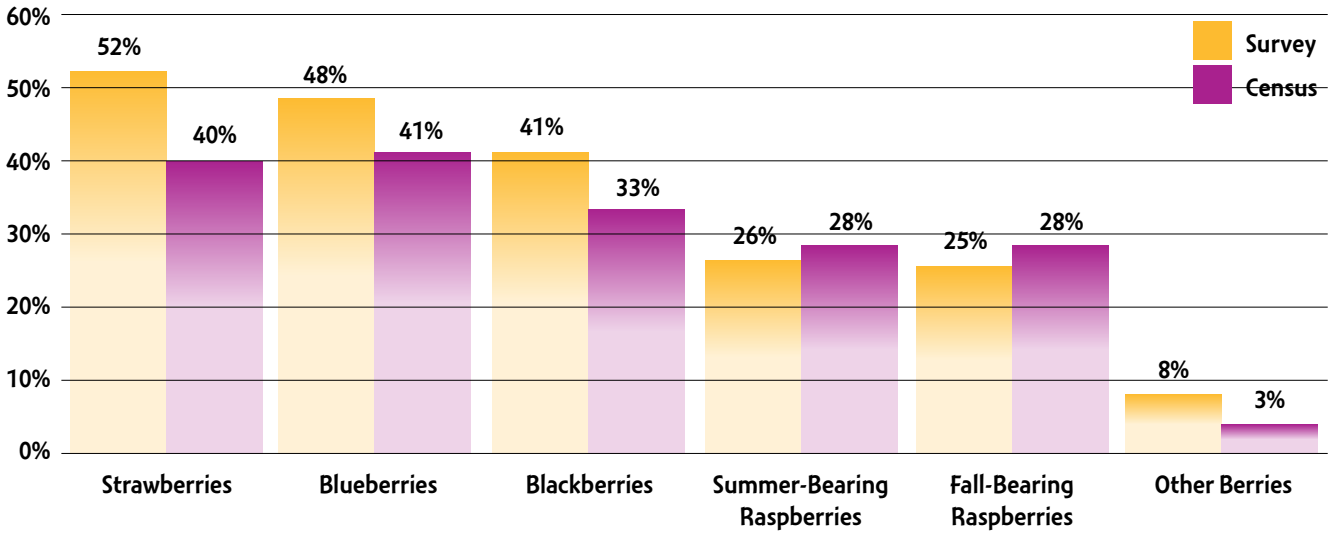


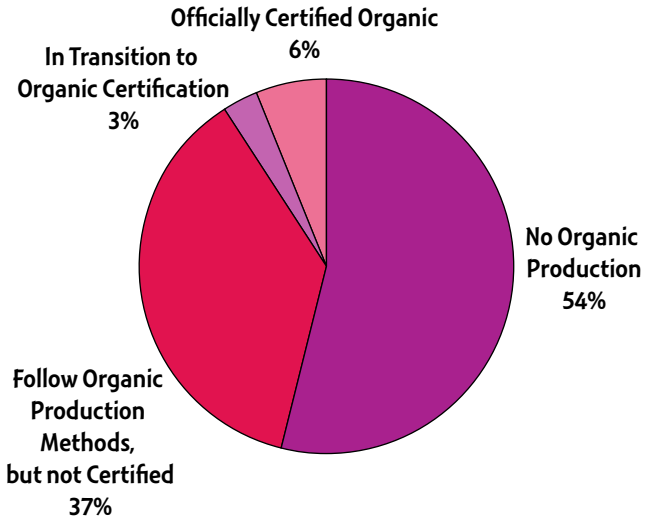
Table 2. Berry Crop Acreage

	Census Mean	Survey			
		Mean	Median	Minimum	Maximum
Strawberries	1.85	1.52	1.00	0.05	7.00
Blueberries	1.48	0.94	0.25	0.02	8.00
Blackberries	1.26	1.19	0.25	0.08	10.00
Summer-Bearing Raspberries	0.67[A]	0.49	0.23	0.02	4.00
Fall-Bearing Raspberries	0.67[A]	0.40	0.25	0.01	1.50
Other Berries	0.50	0.91	0.10	0.10	4.00

[A]Summer-bearing and fall-bearing raspberries are reported in the same category in the Census.

[8]Eighty-five percent of producers with irrigation systems irrigate all of their berry crop acreage (2.85 acres on average).
[6]Sixty-five percent of organic berry crop producers in the sample apply organic production methods to their entire farm, which is 16.62 acres on average.
[7]Under the National Organic Program, farming operations with $5,000 or less in gross annual income from organic sales are exempt from USDA certification (AMS, 2007).

Figure 11. Organic Production among Berry Crop Producers



of the respondents (Figure 12). The average grower who uses plasticulture does so on 88 percent of his or her total berry crop acreage (2.34 acres on average) (Table 3).[9] A few respondents (18 percent, 13 percent, and 7 percent, respectively) indicate using netting on their fields, greenhouses, and high tunnels for berry crop production (Figure 12). On average, the respondents who implement each of these technologies do so to roughly half of their total berry crop acreage, which amounts to 1.25 acres, 0.78 acres, and 0.35 acres, on average respectively (Table 3).

Based on the type of berry crop produced, specific production technologies are more favored than others. Of the 59 respondents who grow strawberries, 49 percent use plasticulture, 42 percent use matted rows, and 17

Figure 12. Percentage of Berry Crop Producers Using each Production System

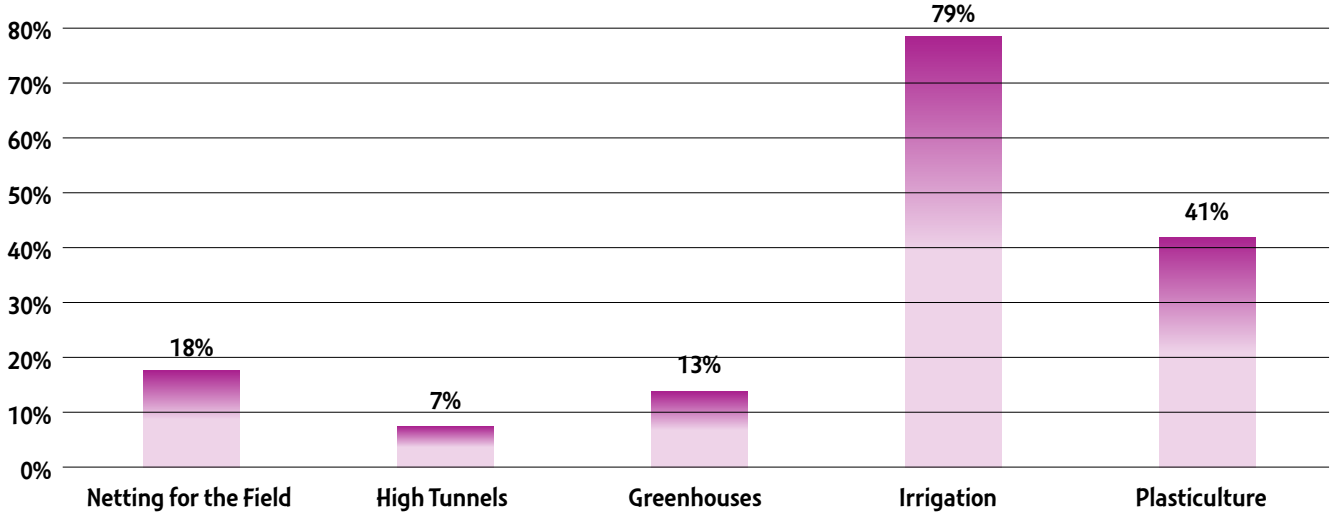


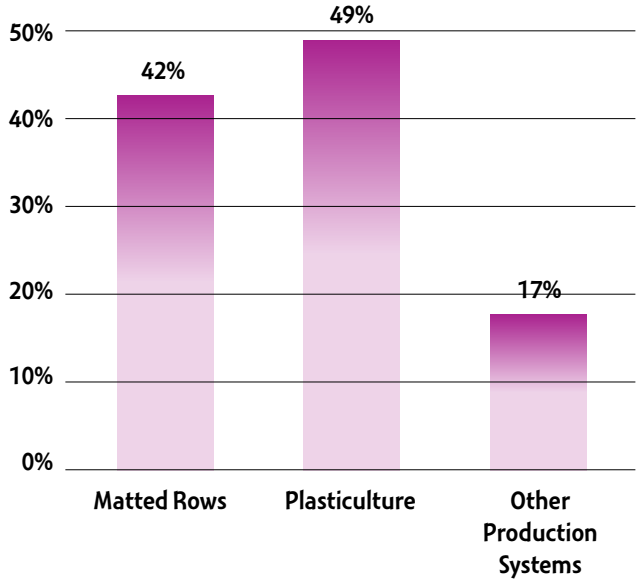
Table 3. Production Systems among Berry Crop Producers

	Mean	Median	Minimum	Maximum
Netting in Field				
(berry crop average under)	1.25	0.78	0.25	5.00
(% of berry crop acreage under)	53	50	10	100
High Tunnels				
(berry crop average under)	0.35	0.18	0.06	1.00
(% of berry crop acreage under)	47	38	12	100
Greenhouses				
(berry crop average under)	0.78	1.00	0.08	1.00
(% of berry crop acreage under)	47	20	10	100
Irrigation				
(berry crop average under)	2.47	1.25	0.05	10.00
(% of berry crop acreage under)	92	100	17	100
Plasticulture				
(berry crop average under)	2.34	2.00	0.10	10.00
(% of berry crop acreage under)	88	100	25	100

[9]Seventy-five percent of producers who use plasticulture implement it on their entire berry crop acreage (2.15 acres on average).

percent use other production methods, such as growing plants in raised beds and mulching with straw or wood chips (Figure 13). When considering the 46 blackberry producers in the sample, 59 percent use static trellises, 7 percent use shift trellises, and 22 percent use other production methods, including tying plants to vertical posts and planting upright (self-supporting) varieties (Figure 14). Of the 29 respondents who produce summer-bearing raspberries, 52 percent use static trellises and 21 percent use other production practices, such as tying plants to vertical posts and growing plants in raised beds (Figure 14). Finally, of the 28 fall-bearing raspberry growers in the sample, one-half use static trellises and 32 percent use other production practices such as temporary posts for support (Figure 14).

Figure 13. Percentage of Strawberry Growers Using each Production System



3.5 Berry Crop Labor Resources and Usage

Labor is a critical component to all production systems. While one respondent reports hiring as many as 35 permanent laborers annually, 22 percent of commercial berry producers hire at least one year-round laborer. Of these, the average berry crop producer employs four year-round paid laborers (Table 4). This statistic is slightly higher than the average number of hired year-round laborers (three) for all farms in Virginia (NASS, 2004). Seasonal labor is frequently used by berry crop producers, with 59 percent of the respondents reporting they hire at least one seasonal worker. On average, berry producers who use seasonal labor hire eight workers, although one respondent reports hiring as many as 45 seasonal laborers (Table 4). In contrast, the average farmer in Virginia only employs three seasonal workers, which is less than half of the average number of laborers hired by the average berry producer (NASS, 2004). Additionally, foreign labor accounts for 3 percent of permanent labor and 16 percent of the seasonal labor

Figure 14. Percentage of Bramble Berry Growers Using each Production System

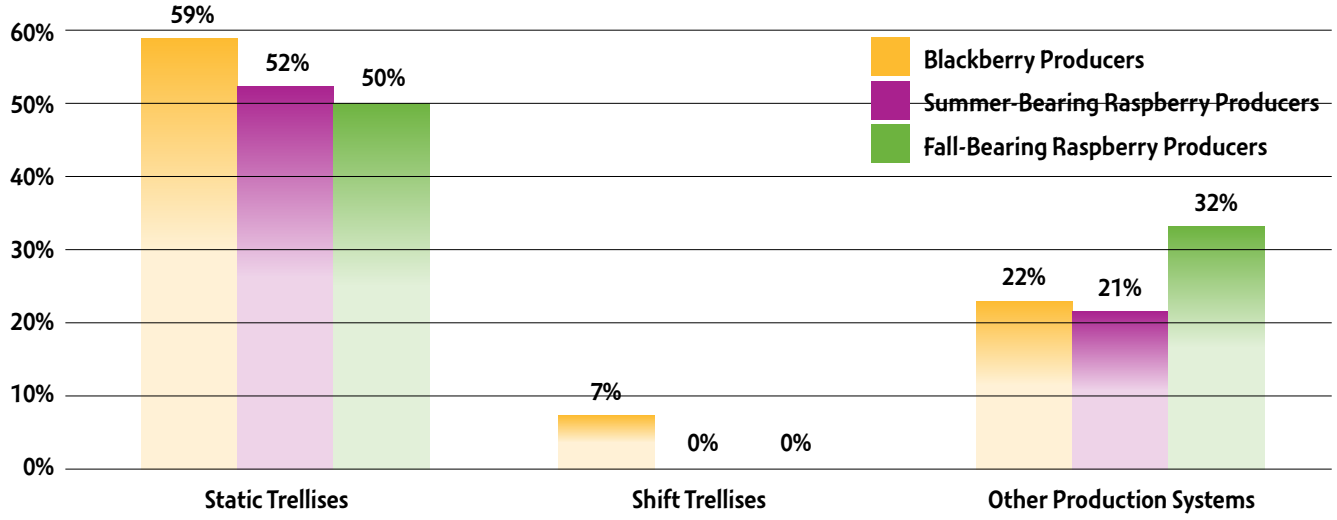


Table 4. Number of Laborers Employed Annually by Berry Crop Producers

	Census Mean	Survey			
		Mean	Median	Minimum	Maximum
Permanent Labor	3	4	2	1	35
Seasonal Labor	3	8	4	1	45

employed by berry crop producers (Figure 15), compared with only 2 percent of both permanent and seasonal labor used on all farms in Virginia (NASS, 2004).

3.6 Berry Crop Marketing Strategies

3.6.1 Market Outlets

While 35 percent of berry producers rely exclusively on one market outlet[10] to sell their output, the majority are more diversified: 41 percent use two different outlets to sell their products, 20 percent sell through three different outlets, and 4 percent use four different sales outlets (Figure 16).[11]

Direct marketing outlets are important to berry producers. In fact, of the 88 percent of berry producers who sell output directly to consumers, the median grower earns 80 percent of his or her farming income through these sales.

The majority (77 percent) of berry producers who sell directly to consumers use one or two direct marketing outlets (Figure 17),[12] with farmers' markets, pick-your-own (U-Pick) operations, and farm stands dominating. Specifically, 64 percent of berry producers use farmers' markets to sell an average of 68 percent of their direct-market output, 50 percent use U-Pick operations to sell an average of 50 percent of all their direct-marketed output, and 44 percent use farm stands to sell an average of 46 percent their direct-market output (Figure 18 and Table 5). Other market outlets such as Internet sales, Community Supported Agriculture (CSA) programs,[13] and informal sales to neighbors, friends, and co-workers are used less frequently (Figure 18) and a relatively small share of producers' direct-market sales (Table 5).

Most berry producers (71 percent) also sell to clients other than the consumer. Retail outlets are the predominant non-direct-market outlet used by berry producers, as 46 percent of berry crop producers sell an average of

[10]The word outlet is used to denote a specific type of buyer, such as a supermarket or farmers' market. Thus, it is possible (and common) for a producer to sell through only one outlet, but to multiple buyers.

[11]In this part of the analysis, all sales made directly to consumers are grouped together as a single outlet.

[12] When considering sales made directly to consumers, the word outlet denotes the specific avenue through which the grower-consumer transaction occurred. Here, farmers' markets and farm stands, for example, would be considered two separate outlets.

[13]Community Supported Agriculture programs consist of a group of individuals who financially support a farming operation in return for a share of the farm's output throughout the growing season (DeMuth, 1993).

Figure 15. Foreign Labor Employed by Berry Crop Producers

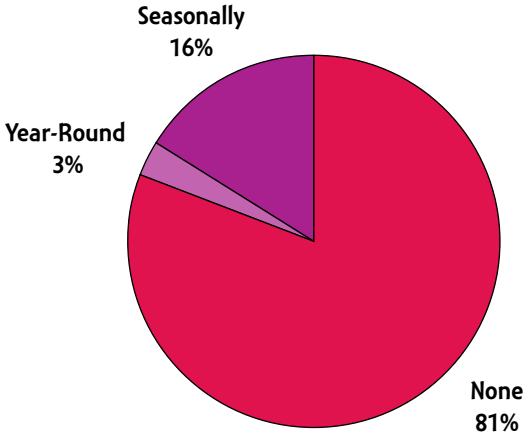


Figure 16. Number of Market Outlets Used by Berry Crop Producers

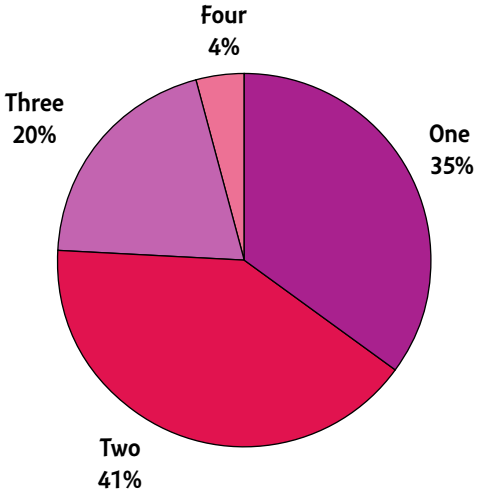


Figure 17. Number of Direct Marketing Outlets Used by Berry Crop Producers

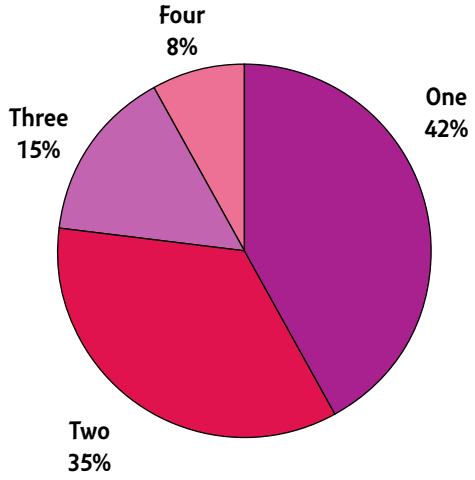


Figure 18. Percentage of Respondents who Sell through each Direct Outlet

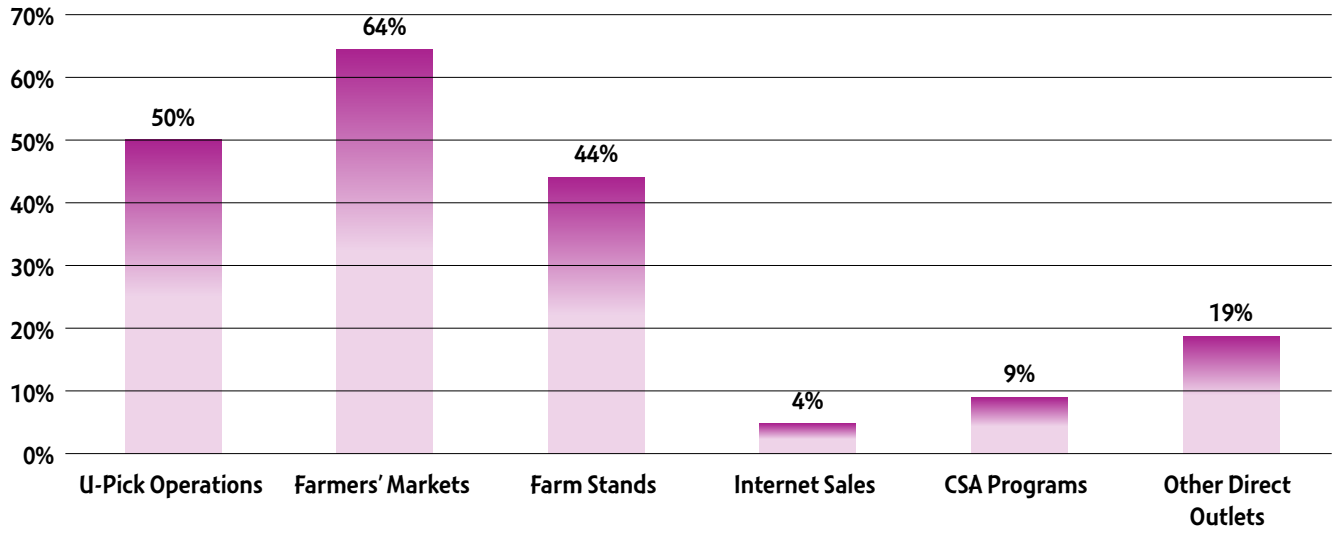


Table 5. Percentage of Total Direct Output Sold through each Outlet

	Mean	Median	Minimum	Maximum
U-Pick Operations	50	50	1	100
Farmers' Markets	68	80	2	100
Farm Stands	46	40	1	100
Internet Sales	21	15	5	50
CSA Programs	28	30	1	45
Other Direct Outlets	22	10	2	100

32 percent of their total output directly to retailers (Figure 19 and Table 6). Other less frequently used outlets include food-service businesses such as restaurants, shipping-point markets, processors, auctions, wholesale markets, and wineries. (Figure 19 and Table 6).

3.6.2 Advertising Methods and Media

In order for growers to inform potential customers of their products, it is important for them to advertise effectively. Most berry producers (77 percent) use multiple advertising vehicles (up to nine different methods) throughout the year (Figure 20). Word-of-mouth is the most common, used by 88 percent of berry producers (Figure 21). Other common advertising vehicles used by berry growers include road signs (used by 47 percent of respondents), newspapers (43 percent), state directories (39 percent), and personal websites and mailing lists (each used by 23 percent of respondents) (Figure 21). Less frequently used advertising methods include telephone directories, such as the Yellow Pages, paid Internet advertisements, farmers' market announcements, blogs, and radio advertisements (Figure 21).

Along with effective advertising methods, successful marketers also build and maintain lasting relationships with their customers. Forty-five percent of berry producers report that between one-half and three-fourths of their total customer base consists of "regular" customers, and 25 percent consider more than three-fourths of their customers to be "regulars" (Figure 22). Along with "regular" customers, infrequent and first-time visitors are always welcomed by direct marketers. During the peak time of the year, the mean and median berry crop producer has a total of 284 customers and 75 customers in one day, respectively.

3.7 Constraints to Berry Crop Operations

Berry producers encounter multiple limitations in production that hinder their ability to expand their acreage. In particular, 75 percent of strawberry growers, 74 percent of blueberry producers, 72 percent of blackberry growers, 62 percent of summer-bearing raspberry growers, and 79 percent of fall-bearing raspberry producers wish to expand production of their respective products, but cannot do so because of the constraints they face (Figure 23).

Figure 19. Percentage of Respondents who Sell through each Indirect Outlet

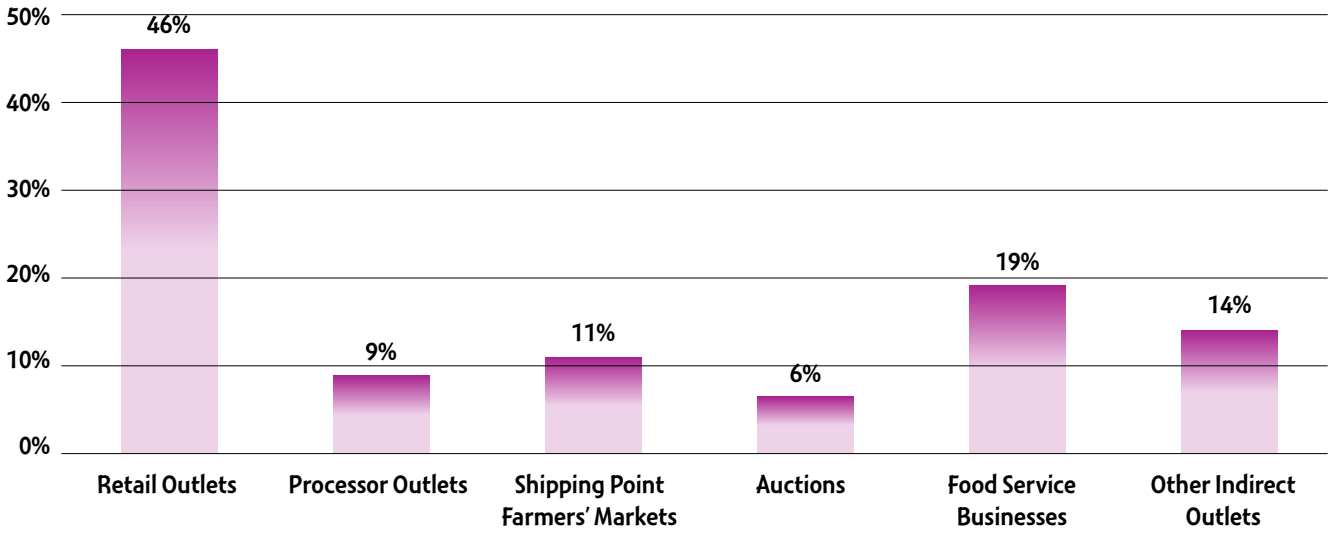


Table 6. Percentage of Total Output Sold through each Outlet by Producers Using a Specific Outlet

	Mean	Median	Minimum	Maximum
Retail Outlets	32	25	1	100
Processor Outlets	45	42	1	93
Shipping Point Farmers' Markets	45	45	5	100
Auctions	31	10	1	95
Food Service Businesses	17	10	1	60
Other Indirect Outlets	61	69	1	100

Figure 20. Number of Different Advertising Methods Used by Berry Crop Producers

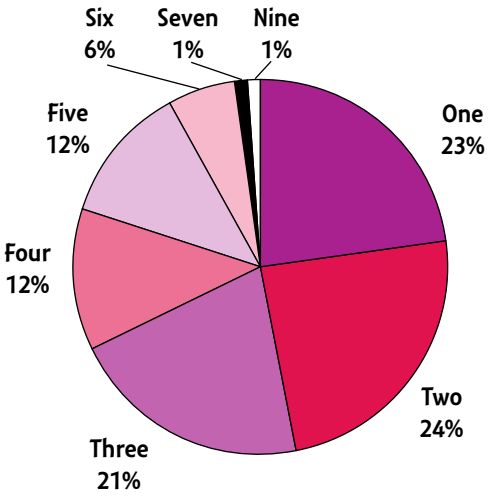


Figure 22. Percentage of "Regulars" in Total Customer Base

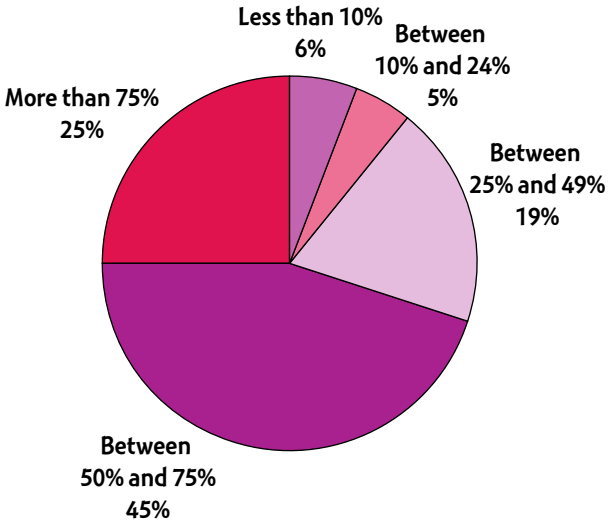


Figure 21. Percentage Berry Crop Producers who Use each Advertising Method

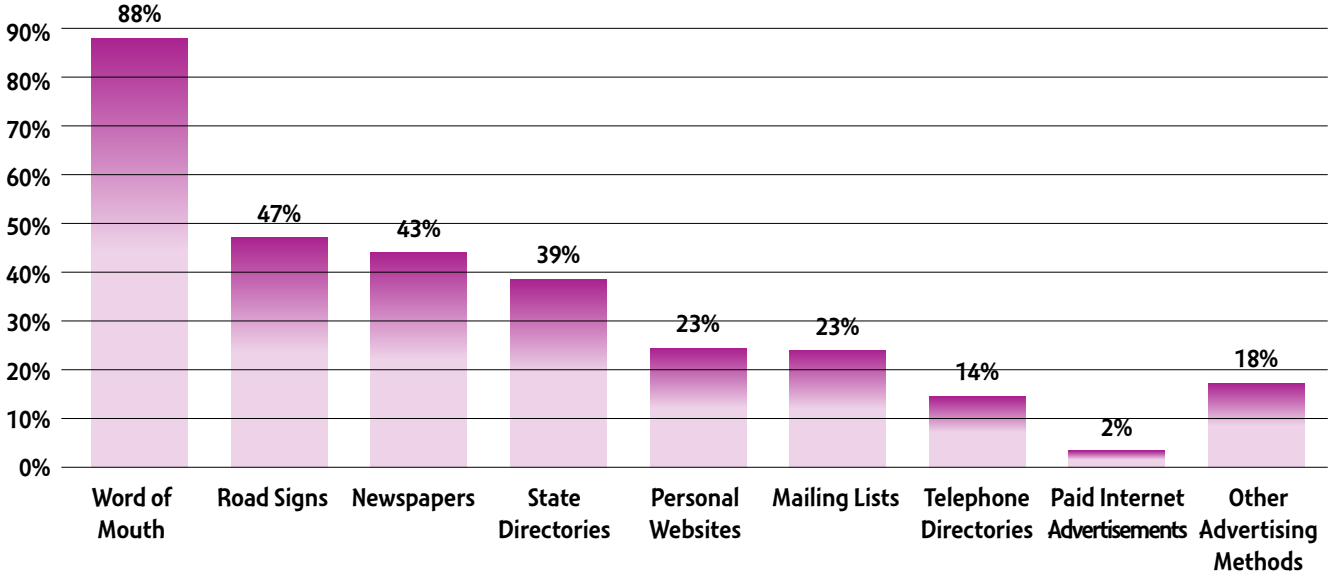
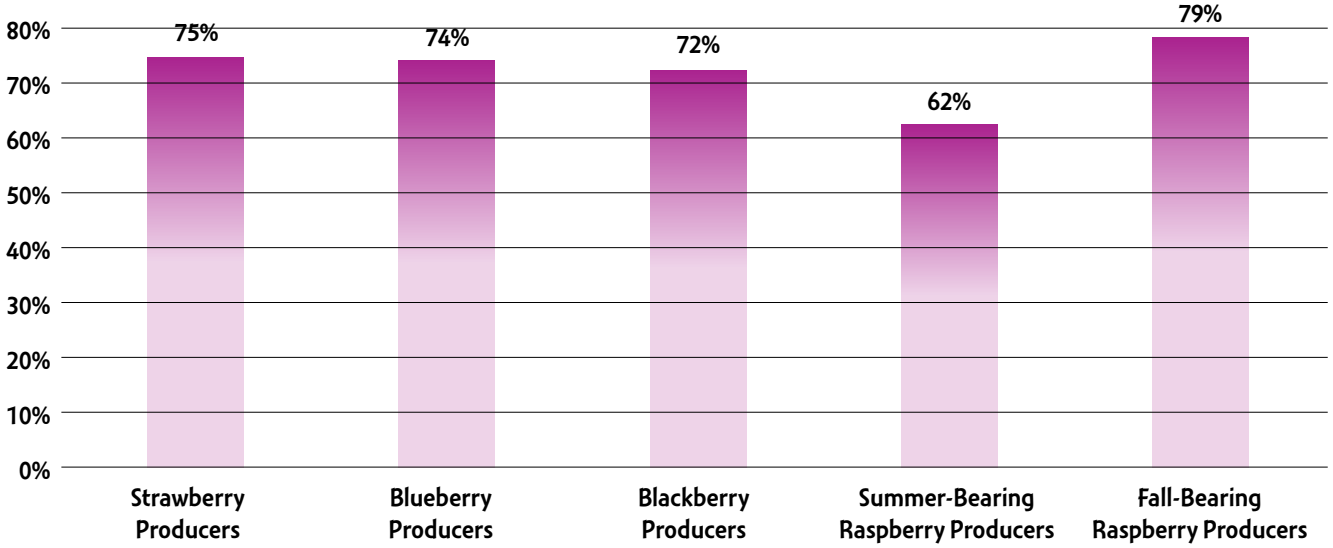


Figure 23. Percentage of Berry Crop Producers who Wish to Expand Acreage



3.7.1 Labor Constraints

Labor is the most commonly cited limitation, faced by 47 percent of the strawberry producers, 33 percent of the blueberry growers, 28 percent of the blackberry producers, 38 percent of the summer-bearing raspberry producers, and 39 percent of the fall-bearing raspberry growers in the sample (Figure 24). Combined, 47 percent of berry producers cite the cost of labor as a prohibiting factor, 27 percent have been unable to find qualified workers, 16 percent have been unable to find enough workers, and 18 percent cite other constraints, such as difficulties complying with labor laws and regulations, an unwillingness among local laborers to work for "the going wage," and an unavailability of housing for the laborers as limiting factors (Figure 25).

3.7.2 Additional Constraints

Other constraints faced by berry crop producers include financial constraints, production pests and diseases, land limitations, and market limitations. When considering strawberry growers, 14 percent are limited by financial constraints, 10 percent by a lack of market access, 7 percent by production pests and diseases, 3 percent by a lack of land access, and 24 percent by other constraints, such as old age, poor health, inefficient equipment, a lack of marketing knowledge, and weather variability (Figure 26).

For blueberry growers, 19 percent decide not to expand due to financial constraints, 7 percent due to issues related to land access, 6 percent due to problems with production pests and diseases, 6 percent due to

Figure 24. Percentage of Berry Crop Producers who Face Labor Constraints

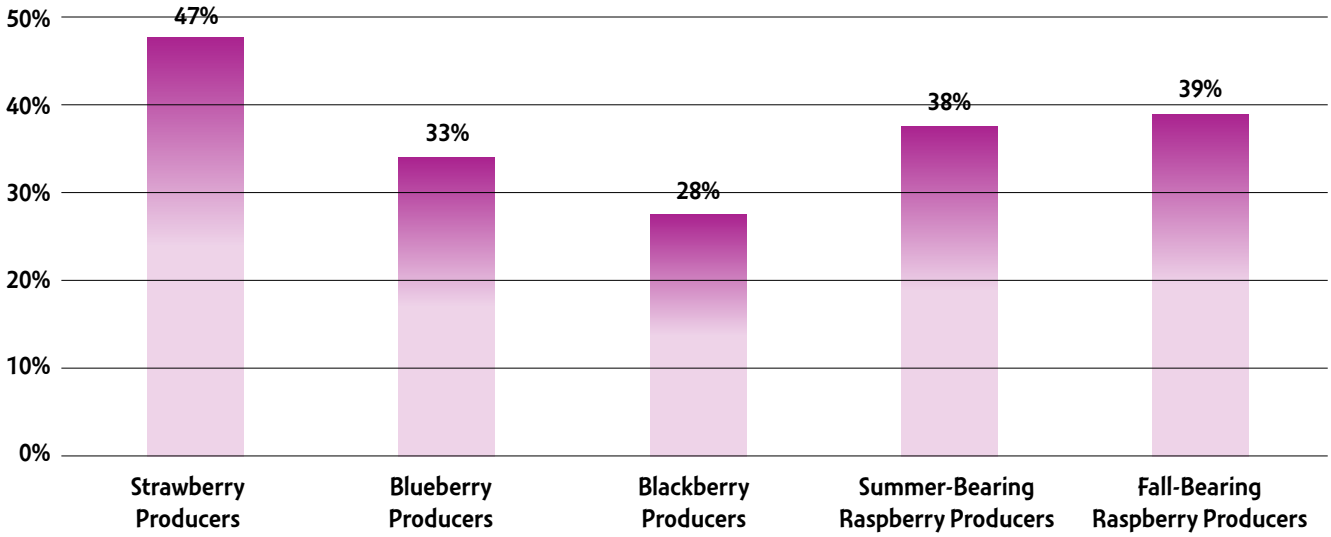


Figure 25. Percentage of Berry Crop Producers Facing each Labor Constraint

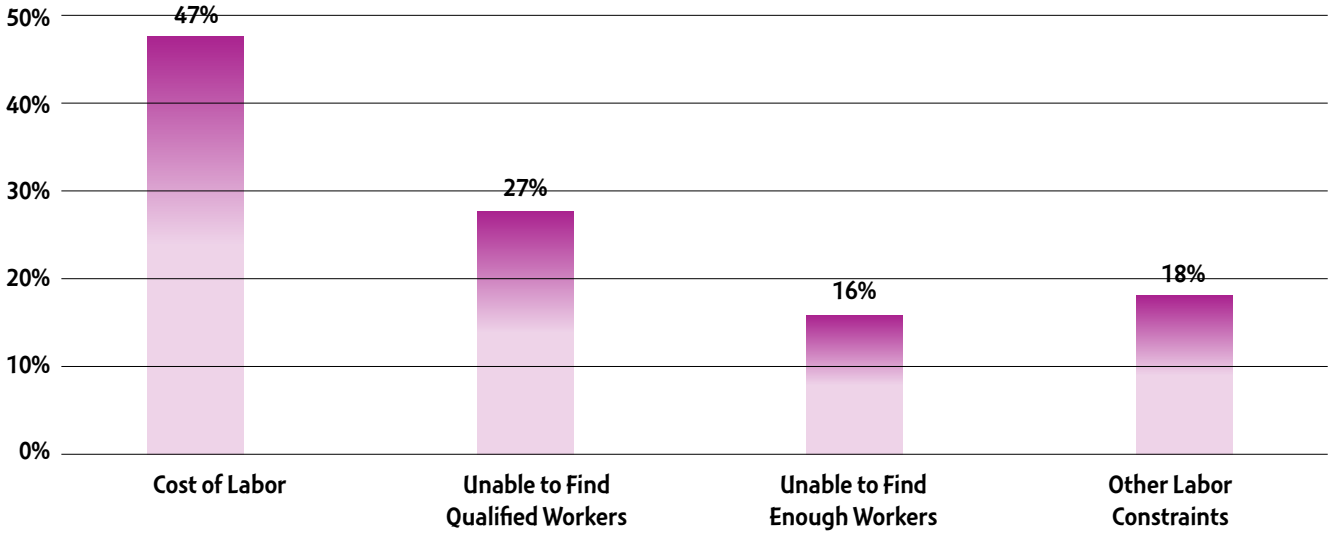
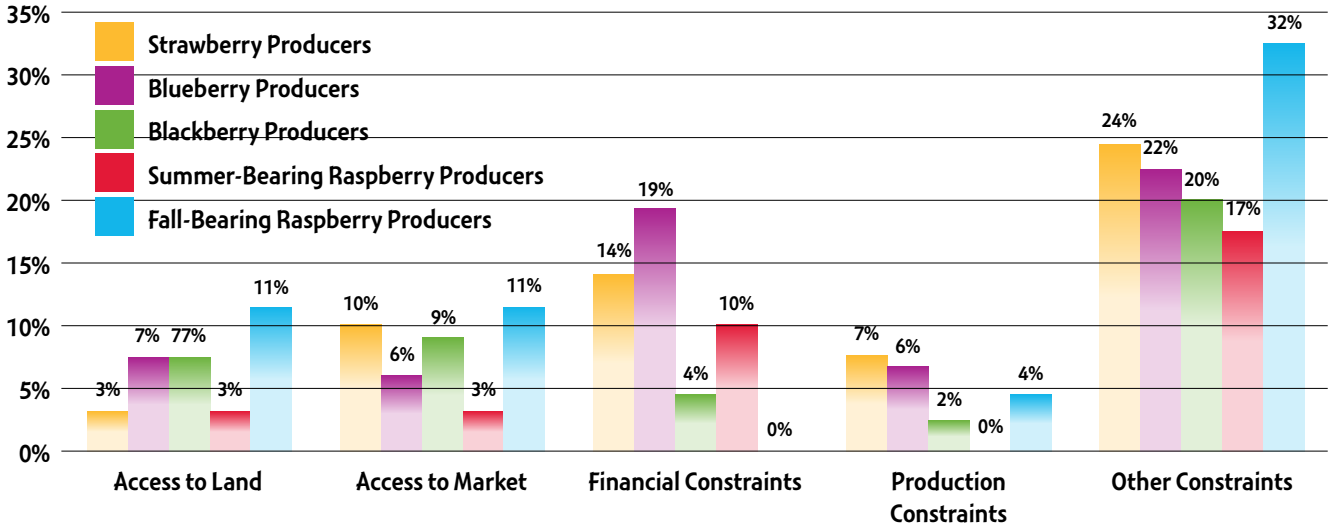


Figure 26. Percentage of Berry Crop Producers who Face Additional Constraints



complications with market access, and 22 percent due to other constraints, including a lack of time to properly manage an expanded operation, a lack of knowledge regarding organic production, and an uncertainty about demand for blueberries (Figure 26).

Blackberry producers express their reasons for not expanding production in the following ways: 9 percent are constrained by market access, 7 percent by land access, 4 percent by financial constraints, 2 percent by production pests and diseases, and 20 percent by other constraints, such as a lack of demand for blackberries and a lack of knowledge about organic production (Figure 26).

As for summer-bearing raspberry producers, 10 percent choose not to expand because of financial constraints, 3 percent because of land access, 3 percent because of market access, and 17 percent because of other constraints, including old age and a lack of demand for summer-bearing raspberries, (Figure 26).

Finally, fall-bearing raspberry growers report facing constraints such as market access (11 percent), land access (11 percent), production pests and diseases (4 percent), and others (32 percent) such as old age, a lack of demand for fall-bearing raspberries, and a lack of time to properly manage an expanded operation (Figure 26).

3.8 Educational Needs among Berry Crop Producers

At the close of the mail-based survey, berry crop producers were given the opportunity to identify any areas related to their berry crop operation in which they could benefit from further education. This open-ended question was designed to inform Extension specialists of the possible needs for future programming directed at berry crop growers. Of the responses, four key categories of educational needs among berry crop producers emerged: market outlet diversification, marketing strategies, consumer education, and legal issues in production and procurement.

As seen in Section 3.6.1, berry crop producers commonly sell through farmers' markets, U-Pick operations, farm stands, and retail outlets. However, many less frequently used market outlets are of interest to berry crop producers in Virginia. Of these market outlets, respondents desire educational programs emphasizing opportunities to sell berries through cooperatives, the Internet, and Community Supported Agriculture programs.

Respondents also desire formal training in marketing techniques that will influence sales through their choice of outlets. Specifically, respondents cite their need for educational programs highlighting advertising methods, sales promotions, display tactics, and market penetration strategies.

Multiple producers cited the need to learn about ways to educate the general public about the products they grow. Specific areas of interest within the broader category of consumer education include informing customers of the health benefits associated with berry consumption, and teaching customers about the benefits of consuming locally grown products.

Lastly, respondents desire educational programs regarding legal and liability issues in production and marketing. Specific topics for Extension education programs within this category include taxation, product liability insurance, food-safety regulations, on-farm certifications, and migrant labor issues.

4.0 Discussion and Conclusions

While berry crop producers in Virginia closely mirror state-level statistics on Virginia farmers along the lines of ethnicity, age, and land ownership, they differ along many other dimensions. Notably, the average berry crop grower has farmed his or her land for fewer years, is more likely to be female, earns more of his or her annual household income from farming, operates a significantly smaller farm, is more likely to obtain organic certification, and employs more labor than the average producer in Virginia. In addition to these characteristics, the average berry crop producer holds a bachelor's degree; earns an annual income of between $40,000 and $59,999; has been growing berries for 12 years; grows two different types of berry products on an average of two acres; relies heavily on direct market outlets, especially farmers' markets and U-Pick operations, to sell his or her products; advertises via word-of-mouth; serves a customer base in which more than one-half are "regulars;" and faces multiple limitations, including labor constraints, which hinder his or her ability to expand.

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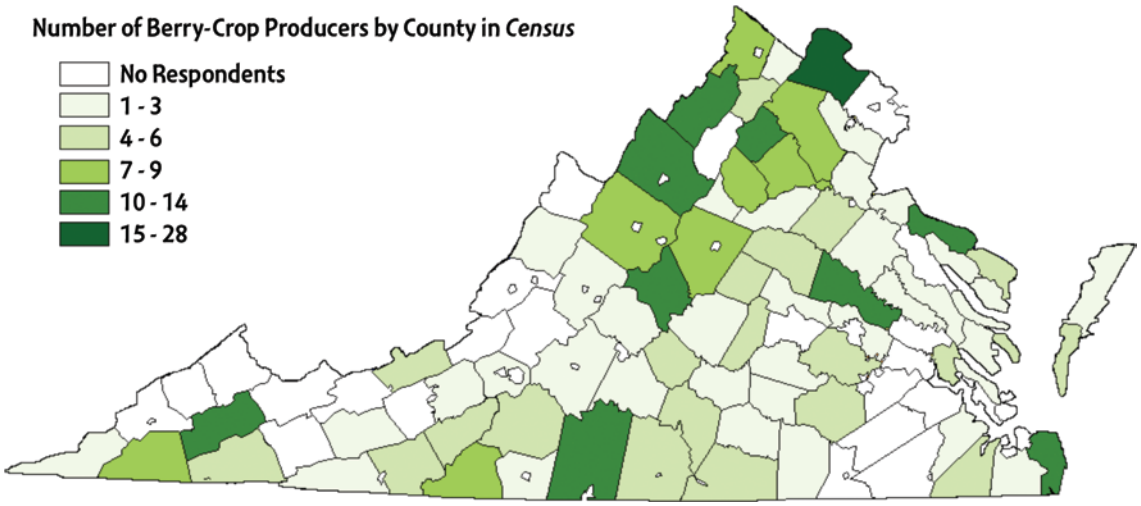
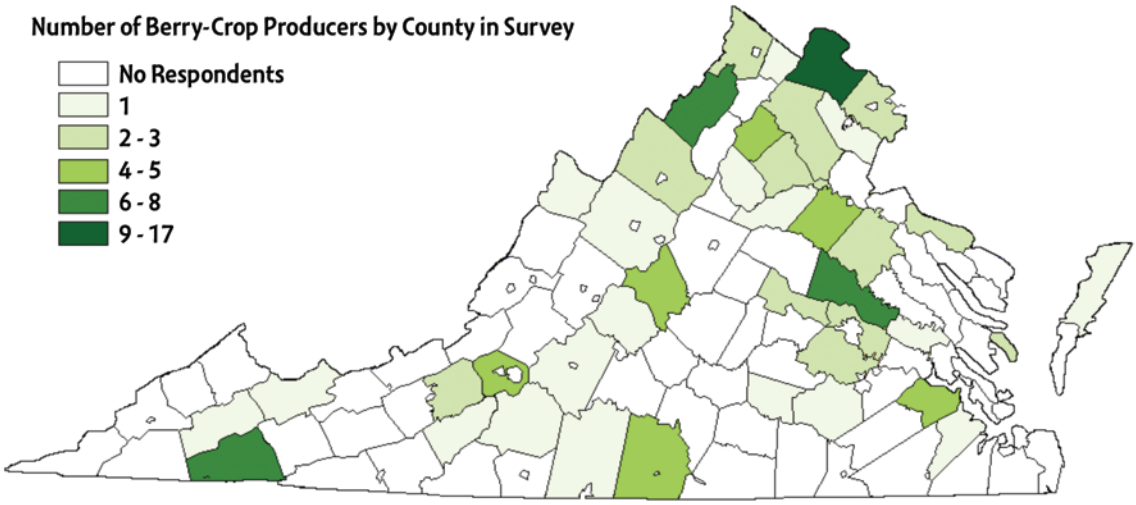
This research was funded by Virginia's Small Fruit and Specialty Crop Growers Association through a grant from the Tobacco Indemnification and Community Revitalization Commission. The authors gratefully acknowledge the thoughtful comments of Wythe Morris, Peter Warren, Allen Straw, and Charles Safely, which helped to strengthen this publication.

Appendix A: Berry Crop Producers by County

	Census	Survey
Accomack County	3	1
Albemarle County	9	0
Amelia County	1	0
Amherst County	3	1
Appomattox County	4	0
Augusta County	7	1
Bath County	1	0
Bedford County	2	1
Brunswick County	2	0
Buckingham County	1	0
Campbell County	1	0
Caroline County	3	3
Carroll County	5	0
Charlotte County	4	0
Chesterfield County	4	2
Clarke County	3	1
Culpeper County	7	3
Cumberland County	4	0
Dinwiddie County	4	1
Fairfax County	0	2
Fauquier County	8	2
Floyd County	4	1
Fluvanna County	5	0
Franklin County	5	1
Frederick County	9	3
Giles County	4	0
Gloucester County	2	0
Goochland County	3	3
Grayson County	3	0
Greene County	2	0
Halifax County	5	4
Hanover County	10	8
Henrico County	3	2
Henry County	2	0
Highland County	0	1
Isle of Wight County	2	1
James City County	5	0
King and Queen County	1	0
King George County	2	0
King William County	2	0
Lancaster County	1	0

	Census	Survey
Lee County	1	0
Loudoun County	28	17
Louisa County	5	0
Lunenburg County	3	0
Madison County	8	1
Mathews County	5	2
Mecklenburg County	4	0
Middlesex County	3	0
Montgomery County	2	3
Nelson County	12	4
New Kent County	0	1
Northampton County	4	0
Northumberland County	5	0
Nottoway County	3	1
Orange County	3	1
Patrick County	7	0
Pittsylvania County	11	1
Prince Edward County	3	0
Prince William County	3	1
Rappahannock County	10	4
Richmond County	1	0
Roanoke County	1	4
Rockbridge County	3	0
Rockingham County	11	2
Russell County	12	1
Scott County	7	0
Shenandoah County	14	7
Spotsylvania County	4	4
Stafford County	3	0
Surry County	0	5
Tazewell County	0	1
Warren County	4	0
Washington County	6	6
Westmoreland County	10	3
Wythe County	3	0
York County	3	0
Chesapeake City	2	0
Suffolk City	6	0
Virginia Beach City	13	0
Missing Values	0	4
STATE TOTAL	**369**	**115**





The intervals of these choropleth maps are categorized by natural breaks

2008 www.ext.vt.edu PUBLICATION 448-507

Produced by Communications and Marketing, College of Agriculture and Life Sciences, Virginia Polytechnic Institute and State University

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VT/0908/W/448507