GROWING QUINOA IN WASHINGTON STATE

Results from a Statewide Survey about the Experiences and Perspectives of Certified Organic Producers

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INTRODUCTION

A multidisciplinary team of scientists at four universities (Washington State University, Oregon State University, Utah State University, and Brigham Young University) secured funding from the U.S. Department of Agriculture's Organic Agriculture Research and Extension Initiative (OREI) to conduct quinoa variety trials in three western states, evaluate and develop best management practices for U.S. quinoa production, explore the market potential for U.S.-grown organic quinoa, and identify potential early adopters. One of the long-term goals of this four-year project (2012–2016) is to help U.S. farmers diversify their operations.

Learning about farmers' experiences and perceptives is critical when exploring the potential for an increase in quinoa production in the U.S. Therefore, as part of the OREI project, the social science team conducted a mail/web survey of Washington State certified organic producers in 2015. The survey included questions about farmer demographics, farm characteristics, sources of agricultural information, familiarity with quinoa and quinoa-related research, experience with quinoa production, perceived benefits and barriers to quinoa production, and opinions about quinoa-related topics.

The survey results provide answers to the following questions: What knowledge do farmers have about quinoa? Who has tried growing quinoa? What were their experiences? What are the perceived benefits and barriers to quinoa production in Washington State? What are farmers' opinions about quinoa demand and consumption? What are farmers' opinions about the potential for quinoa production and processing in Washington State? Are farmers interested in growing quinoa in the future? What do farmers need to know in order to consider adding quinoa into their crop rotations? Are farmers interested in working with university scientists on research projects related to quinoa production, processing, and marketing?

SURVEY METHODS

The population for this study included all certified organic producers in Washington State. In November–December 2014, a mailing list (N = 639) was compiled from the two main organic certification agencies in the state: Washington State Department of Agriculture (WSDA) and Oregon Tilth. The survey was conducted in March–May 2015 with the assistance of Washington

State University's Social and Economic Sciences Research Center (SESRC). Four individuals were excluded from the study because of ineligibility. Two hundred and forty-six (246) individuals completed the survey for a response rate of 38.7%.

Survey procedures followed the Tailored Design Method (Dillman et al., 2014) to help ensure the highest possible response rate. The questionnaire, a 12-page 8.5" x 11" booklet, was designed to be visually appealing and easy to follow. Individuals were contacted four times by mail: an initial mailing with questionnaire, a reminder postcard, a second mailing with questionnaire, and a reminder letter. A link to an online version of the survey was provided in each mailing. Two additional reminders were sent electronically to individuals with email addresses. All communications included information about the study's purpose, the voluntary nature of participation, and assurance of respondent confidentiality.

GROWER DEMOGRAPHICS

Seventy-four percent of the survey respondents were male and 26% were female. Respondents ranged in age from 20 to 84 years old with a mean age of 55 years. Thirty-six percent of respondents did not have a Bachelor's degree, 35% had a Bachelor's degree only, and 29% had attended graduate school. Respondents had spent 22 years, on average, involved in farming as a farm owner, manager, or other primary decision maker. Farming experience ranged from 1 year to 60 years. Fifty-two percent of respondents were first-generation farmers. Most respondents (85%) were farm operators, while 11% were farm managers.

FARM CHARACTERISTICS

Respondents operated, on average, 547 acres of farm/ranch land in 2014; however, 72% operated less than 50 acres. Respondents operated, on average, 137 certified organic acres, 478 conventional acres, and 85 acres of organically managed (but not certified organic) or in-transition-to-organic land. Respondents had been certified organic, on average, for 11 years. Most respondents (85%) planned to maintain their organic certification for the next five years.

Respondents produced a diversity of certified organic products for commercial sale in 2014: tree fruit (47%); vegetables (44%); berries or grapes (30%); small grains, corn, oilseeds, hay, forage, dry beans, dry peas, or other field crops (28%); livestock or livestock products (12%); floriculture or nursery crops (8%); and poultry or poultry products (7%).

Fifty-one percent of respondents used direct-to-consumer marketing channels (e.g., farmers market, CSA, farm stand, U-pick) for at least some of their certified organic products in 2014. Forty-one percent used direct-to-retail (e.g., natural food store, conventional supermarket), direct-to-institution (e.g., school, hospital), or direct-to-restaurant marketing channels. Fifty-eight percent used wholesale marketing channels (e.g., distributor, processor, miller, packer, grower cooperative, independent broker).

Thirty-seven percent of respondents had less than $50,000 in gross farm income in 2014, while 30% reported $500,000 or more in gross farm income. Twenty-six percent of respondents

reported that all of their 2014 household income came from farming, while 33% reported that all of their 2014 gross farm income came from the sale of certified organic products.

FAMILIARITY WITH QUINOA AND WSU QUINOA RESEARCH

The survey included a series of questions about respondents' familiarity with quinoa and WSU quinoa research activities. Twenty-seven percent of respondents were "very familiar" with quinoa before taking the survey, 29% were "moderately familiar," 23% were "slightly familiar," and 22% were "not familiar." Only 7% of respondents were familiar with White Mountain Farm (Mosca, Colorado), the oldest commercial quinoa operation in the United States. Twenty percent of respondents knew that quinoa was successfully grown in the Okanogan region of Washington State in the 1980s and 1990s. Twenty-seven percent of respondents were familiar with the quinoa-related research activities taking place at Washington State University. Only 5% of respondents had attended the International Quinoa Research Symposium, which took place at Washington State University on August 12–14, 2013 in Pullman.

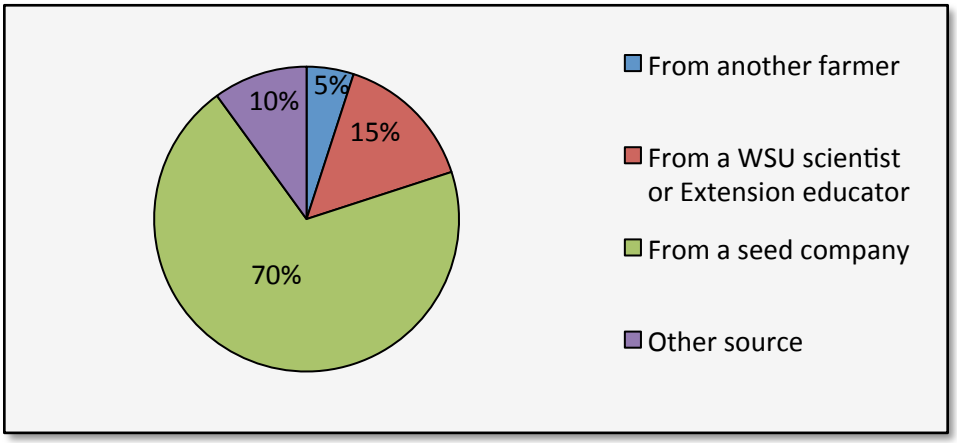
EXPERIENCE WITH QUINOA PRODUCTION

Twenty individuals (8% of survey respondents) reported that they had tried to grow quinoa in the United States. The data reported in this section pertain only to these twenty individuals. Seventy-five percent were male; average age was 52 years; and 65% had a Bachelor's degree or higher. Quinoa has been grown commercially in the United States since the early 1980s; however, quinoa's recent popularity is reflected in the fact that 75% of respondents reported growing quinoa in 2012–2015, 14% in 2004–2011, and only 11% before 2000.

Seed Sources, Quinoa Varieties, and Quantity Planted

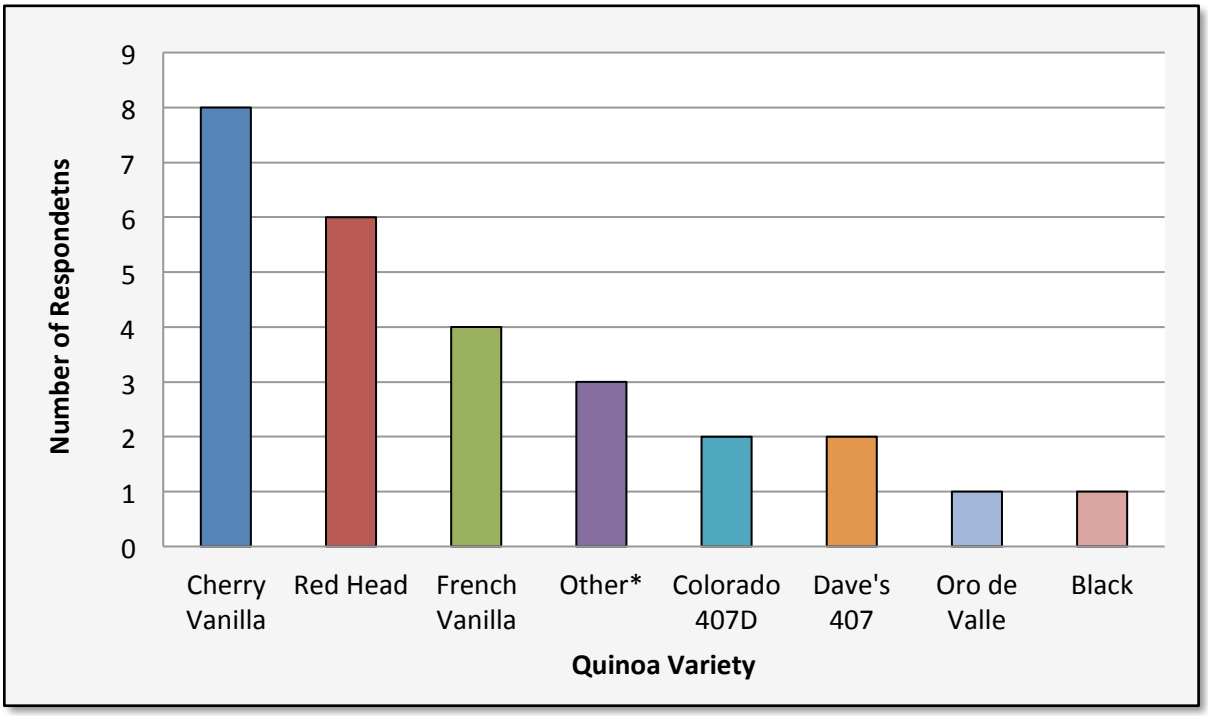
Most growers (70%) obtained quinoa seed from a seed company (see Figure 1). The seed companies mentioned by respondents included Wild Garden Seed, Territorial Seed Company, Seeds of Change, Uprising Seeds, Adaptive Seeds, and Sustainable Seed Company. One grower mentioned collecting quinoa seed from South America, while another listed White Mountain Farm as their seed source.

Figure 1. Sources of Quinoa Seed Planted in Washington State



Quinoa has been adapted over centuries to grow at sea level in Chile to the high plains region of Bolivia. Although there are many varieties of quinoa seed grown throughout the world, survey respondents grew primarily Cherry Vanilla and Red Head (see Figure 2). Both of these varieties come from Frank Morton's collection in Oregon (Wild Garden Seed, 2015). Growers reported growing vastly different quantities of quinoa, ranging from 100 plants to 100 acres. Thirty-five percent of respondents reported successfully harvesting quinoa seed.

Figure 2. Varieties of Quinoa Grown in Washington State



* Other quinoa varieties included Brightest Brilliant, Brilliant Rainbow, Calico 407, and Blanca.

Reasons for Growing Quinoa and Additional Comments

Survey respondents were asked an open-ended question about why they had tried to grow quinoa. The top three reasons were personal consumption, curiosity/experimentation, and economic reasons (see Figure 3). Respondents could mention more than one reason.

Survey respondents were asked to provide additional comments about their experiences growing quinoa. Of the sixteen respondents who provided comments, eleven mentioned lack of knowledge about quinoa production, ten mentioned agronomic challenges, and six recounted positive experiences (see Figure 4).

Figure 3. Reasons for Trying to Grow Quinoa

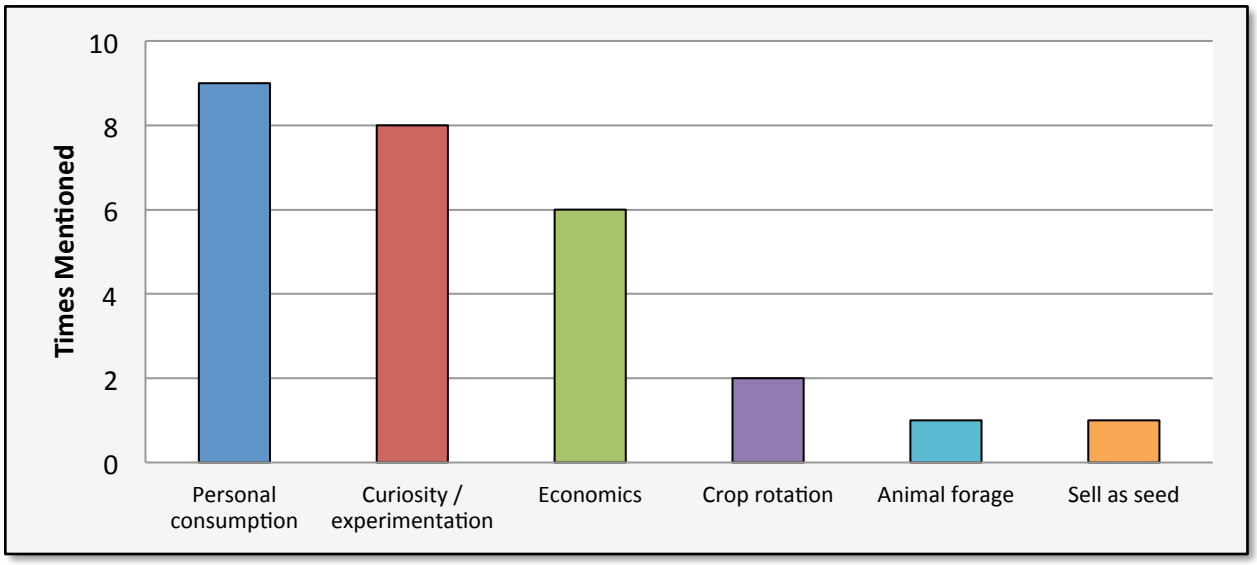
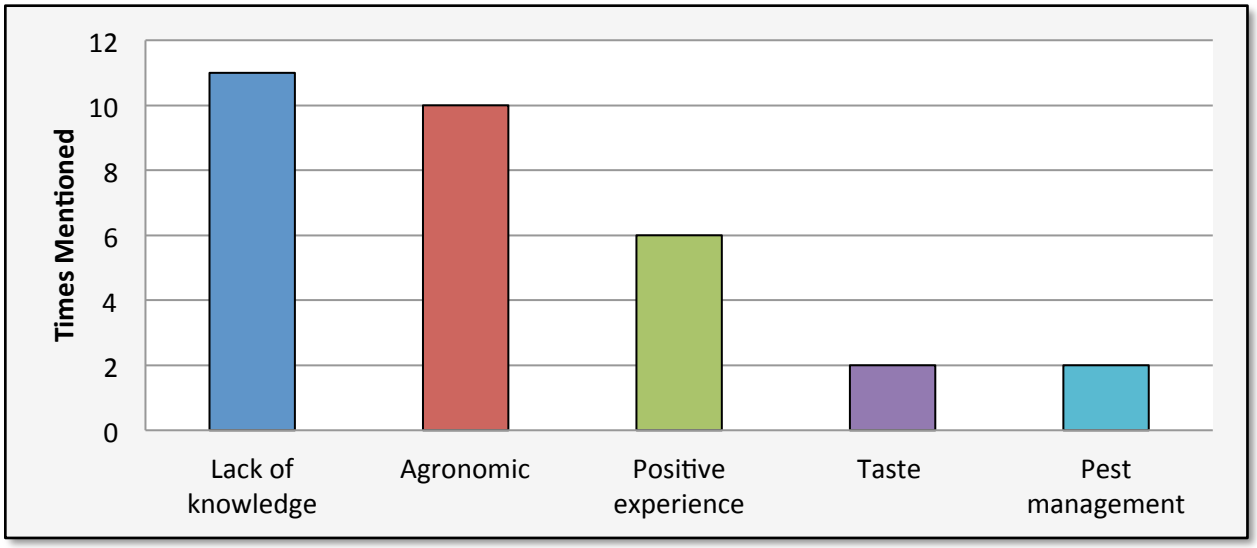


Figure 4. Additional Comments about Experience Growing Quinoa



FUTURE QUINOA PRODUCTION PLANS

Survey participants were asked: "Would you consider growing quinoa in the next five years?" Forty-nine percent of respondents said they would consider growing quinoa. Of these respondents, 72% were male, 69% had a Bachelor's degree or higher, 60% grew certified organic vegetables (in 2014), and 39% grew small grains, corn, oilseeds, hay, forage, dry beans, dry peas, or other field crops (in 2014). Respondents interested in growing quinoa ranged in age from 20 to 84 years old with a mean age of 52 years. Farm size ranged from 1 acre to 11,643 acres with a mean of 958 acres of farm/ranch land.

Main Reasons for Wanting to Grow Quinoa

The respondents who said they would consider growing quinoa in the next five years were presented with a list of nine potential reasons (see Table 1). The top reasons why respondents would consider growing quinoa were personal curiosity, economic benefits, and farm diversification. Within the "other reasons" category, several respondents mentioned a desire to feed their families as a motivating factor for wanting to grow quinoa.

Table 1: Reasons to Grow Quinoa in the Next Five Years

Reasons to Grow Quinoa	% of Respondents *
Personal curiosity	31.6
Economic benefits	29.8
To diversify my farm operation	28.1
Human health benefits	16.7
Consumer demand	13.2
New and innovative	13.2
Fits into my rotation	12.3
Soil health benefits	9.6
Other reasons	8.8

* Percentages do not total to 100% because some respondents selected more than one answer.

Main Reasons for NOT Wanting to Grow Quinoa

The respondents who said they would *not* consider growing quinoa in the next five years were presented with a list of nine potential reasons (see Table 2). The overwhelming reason for *not* wanting to grow quinoa was "does not fit my operation." Within the "other reasons" category, the majority of respondents stated that an approaching retirement was the main reason they were not interested in growing quinoa.

Table 2: Reasons to NOT Grow Quinoa in the Next Five Years

Reason to NOT Grow Quinoa	% of Respondents *
Does not fit my operation	74.6
Other reasons	16.9
Lack of equipment	11.9
Processing concerns	7.6
Marketing concerns	6.8
Weed management	6.8
Learning curve	5.9
Start-up costs	5.1
Insect management	3.4

* Percentages do not total to 100% because some respondents selected more than one answer.

PERCEIVED BENEFITS AND BARRIERS TO QUINOA PRODUCTION

All survey respondents—regardless of whether or not they had ever tried to grow quinoa—were asked open-ended questions about the *potential benefits* and *potential barriers* to quinoa production in Washington State. Respondents were instructed to write "don't know" or "none" if so desired. The answers (excluding "don't know" answers) to each question were coded into one or more categories (see Tables 3 and 4).

A total of 234 respondents answered the question about potential benefits to growing quinoa in Washington State. Of these respondents, 102 answered "don't know." Of the remaining respondents, 39% mentioned agronomic benefits, 36% mentioned economic benefits, and 24% mentioned health benefits (see Table 3).

A total of 230 respondents answered the question about potential barriers to growing quinoa in Washington State. Of these respondents, 126 answered "don't know." Of the remaining respondents, 24% mentioned processing barriers, 19% mentioned harvesting barriers, 19% mentioned climatic/geographic barriers, and 17% mentioned marketing barriers (see Table 4).

Table 3: Perceived Benefits to Quinoa Production in Washington State

Perceived Benefits	% of Respondents
Agronomic benefits	39.4
Economic benefits	35.6
Health benefits	24.2
Geographic benefits (e.g., locally grown crop)	14.4
Unspecified benefits	5.3
No benefits	4.6
Miscellaneous benefits	3.8

Table 4: Perceived Barriers To Quinoa Production in Washington State

Perceived Barriers	% of Respondents
Processing barriers	24.0
Harvesting barriers	19.2
Climatic / geographic barriers	19.2
Marketing barriers	17.3
No barriers	12.5
Lack of knowledge	9.6
Seed availability / lack of appropriate varieties	9.6
Economic viability	7.7
Weed and insect management	5.8

OPINIONS ABOUT QUINOA DEMAND AND CONSUMPTION (GLOBAL / U.S.)

Survey respondents were asked to indicate the extent to which they disagreed or agreed with nine statements about global and U.S. quinoa demand and consumption (see Table 5). For seven of the statements, a majority of respondents neither disagreed or agreed. However, 64% of respondents agreed that U.S. consumers would be interested in purchasing U.S.-grown quinoa. Fifty-four percent of respondents agreed that U.S. consumers' demand for quinoa is growing more than ever before.

Table 5. Opinions about Quinoa Demand and Consumption (Global / U.S.) *

Statements	Disagree	Neither Disagree or Agree	Agree
U.S. consumers' demand for quinoa is growing more than ever before.	8.0%	44.9%	**54.3%**
U.S. consumers' interest in quinoa is no different from other temporary food fads.	37.2%	**56.4%**	6.4%
U.S. consumers would be interested in purchasing U.S.-grown quinoa.	2.1%	33.8%	**64.1%**
U.S. consumers would be willing to pay a price premium for U.S.-grown quinoa.	11.9%	**59.8%**	28.2%
Quinoa will become a staple food in the U.S.	17.2%	**62.7%**	20.1%
Quinoa will always be a niche market crop.	25.0%	**55.7%**	19.3%
U.S. consumers want to support Andean (Peruvian, Bolivian) quinoa farmers.	27.0%	**63.5%**	9.4%
Andean (Peruvian, Bolivian) people cannot afford to eat quinoa.	12.1%	**72.4%**	15.5%
Increasing global demand for quinoa is hurting Andean (Peruvian, Bolivian) quinoa farmers.	10.8%	**72.4%**	16.8%

* The "disagree" category includes both "strongly disagree" and "disagree." The "agree" category includes both "strongly agree" and "agree."

OPINIONS ABOUT QUINOA PRODUCTION AND PROCESSING IN WASHINGTON STATE

Respondents were asked to indicate the extent to which they disagreed or agreed with six statements about quinoa production and processing in Washington State (see Table 6). Forty percent of respondents agreed that there is great potential for quinoa production in Washington State. Thirty-three percent agreed that quinoa has the potential to be locally adapted throughout the state. A majority of respondents (58%) disagreed with the following statement: "Farmers in Washington State should *not* grow quinoa."

Table 6. Opinions about Quinoa Production and Processing in Washington State

Statements	Disagree	Neither Disagree or Agree	Agree
There is great potential for quinoa production in Washington State.	1.3%	**58.3%**	40.4%
It is difficult to grow quinoa in Washington State.	13.2%	**81.5%**	5.3%
Quinoa has the potential to be locally adapted throughout Washington State.	3.1%	**64.5%**	32.5%
Farmers in Washington State should not grow quinoa.	**58.1%**	41.4%	0.4%
Information on how to grow quinoa in Washington State is not available.	16.8%	**74.3%**	8.8%
Information on the post-harvest processing of quinoa in Washington State is not available.	9.9%	**78.9%**	11.2%

* The "disagree" category includes both "strongly disagree" and "disagree." The "agree" category includes both "strongly agree" and "agree."

RESPONDENTS' PERCEPTIONS OF THEMSELVES

Respondents were asked to indicate the extent to which they disagreed or agreed with five statements about themselves (see Table 7). Sixty-four percent of respondents said they enjoy on-farm experimentation, while 14% said they do not like to take risks. Forty-five percent of respondents considered themselves to be agricultural innovators. Fifty-three percent of respondents agreed that economic feasibility is their biggest concern when considering new production practices. Lastly, 56% of respondents said they like eating quinoa.

Table 7. Respondents' Perceptions of Themselves

Statements	Disagree	Neither Disagree or Agree	Agree
I like to experiment on my farm.	8.3%	27.5%	**64.2%**
I do not like to take risks on my farm.	**54.3%**	32.2%	13.5%
I consider myself to be an agricultural innovator.	8.8%	**46.5%**	44.7%
Economic profitability is my biggest concern when considering new production practices.	18.0%	28.9%	**53.1%**
I like eating quinoa.	6.8%	37.4%	**55.7%**

* The "disagree" category includes both "strongly disagree" and "disagree." The "agree" category includes both "strongly agree" and "agree."

SOURCES OF AGRICULTURAL INFORMATION

Certified organic producers obtain information about organic production practices, farm management, and marketing strategies from many different sources. Survey respondents were asked about the level of importance of sixteen information sources (see Table 8). Personal experimentation and creativity, other farmers, and the Washington State Department of Agriculture (WSDA) were the most important sources of information. Private consultants, the Sustainable Agriculture Research and Education Program (SARE), and commodity or grower associations were the least important information sources.

Table 8. Importance of Selected Information Sources

Information Sources	Mean Scores on Scale from 1 ("Not Important") to 5 ("Very Important")
My own experimentation, creativity, or innovation	3.88
Other farmers	3.42
Washington State Department of Agriculture (WSDA)	3.07
WSU scientists or researchers	2.96
WSU Extension educators	2.84
Agricultural input suppliers	2.79
Family members	2.69
Farm employees or field workers	2.58
Washington Tilth Association	2.52
Intermediaries (e.g., distributors, processors, packers, retailers, etc.)	2.43
Marketing organizations or cooperatives	2.32
National Resources Conservation Service (NRCS)	2.24
National Sustainable Agriculture Information Service (ATTRA)	2.14
Private consultants	2.12
Sustainable Agriculture Research and Education Program (SARE)	2.07
Commodity or grower associations	2.07

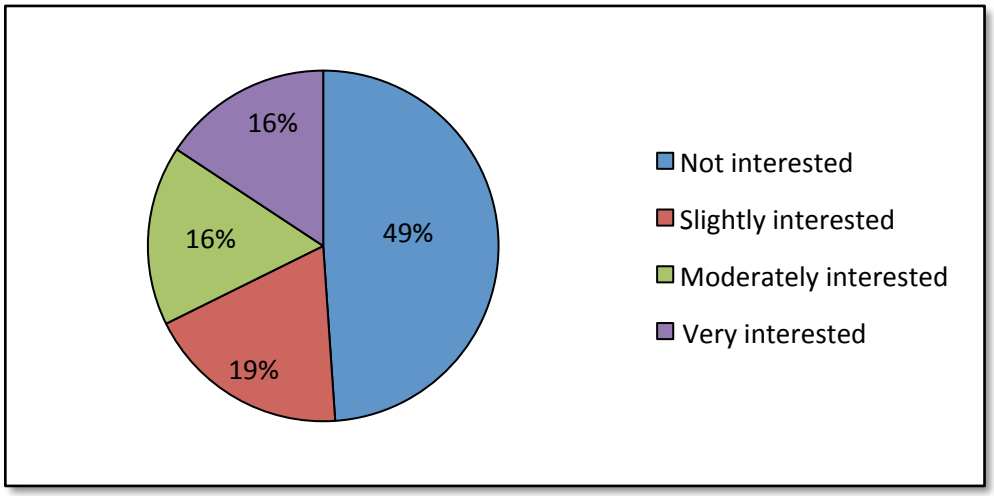
Agricultural information can be communicated in many different ways—from farm walks to workshops to social media. Survey respondents were asked to indicate the degree to which they preferred eleven different communication channels (see Table 9). The most preferred communication channels were online and printed materials, while the least preferred communication channel was social media (e.g., Facebook, Twitter).

Table 9. Preference for Selected Communication Channels

Communication Channels	Not Preferred	Slightly to Moderately Preferred	Very to Extremely Preferred
Online materials	6.2%	29.5%	**64.4%**
Printed materials	4.9%	43.6%	**51.6%**
On-farm demonstrations	14.8%	**44.9%**	40.1%
In-person workshops or courses	11.2%	**51.1%**	37.6%
One-on-one consultations	12.0%	**50.7%**	37.3%
Farm walks	18.1%	**47.8%**	34.1%
E-mail	13.5%	**52.9%**	33.6%
In-person conferences or large meetings	17.3%	**55.7%**	27.0%
University field days	27.4%	**49.8%**	22.8%
Online meetings, workshops, or webinars	27.6%	**53.3%**	19.1%
Social media (e.g., Facebook, Twitter)	**54.5%**	37.4%	8.1%

Survey participants were asked "How interested are you in working directly with Washington State University scientists or Extension educators on a research project related to quinoa production, processing, or marketing within the next five years?" Sixteen percent of respondents indicated they were "very interested," 16% said "moderately interested," 19% said "slightly interested," and 49% said "not interested" (see Figure 5).

Figure 5: Interest in Working with WSU Scientists or Extension Educators on Quinoa-Related Projects



CONCLUSION

The survey results provide insight into Washington State certified organic producers' past experiences and future plans with regard to quinoa production. A small percentage (8%) of survey respondents had experimented with growing quinoa, primarily for home use and economic reasons. These growers expressed concerns about lack of knowledge and agronomic challenges. Most (65%) did not harvest any seed. Approximately half (49%) of the survey respondents said they would consider growing quinoa in the next five years. The top reasons for wanting to grow quinoa included personal curiosity, perceived economic benefits, and farm diversification. For those respondents *not* interested in growing quinoa, the primary reason was lack of fit with current crop mix or production practices.

The survey results also provide information about certified organic producers' perceptions of the benefits and barriers to growing quinoa in Washington State. Approximately one-third of survey respondents believe there are agronomic and economic benefits. Approximately one-fifth expressed concerns about processing, harvesting, and climatic/geographic barriers.

Sixty-four percent of survey respondents believe U.S. consumers would be interested in purchasing U.S.-grown quinoa, 40% see great potential for quinoa production in Washington State, 64% said they like experimenting on their farms, and 51% said they would be interested in working with WSU scientists or Extension educators on quinoa-related projects. These results are encouraging for Washington State University's Alternative Crop Breeding Program, which seeks to increase the biodiversity of cropping systems across the state.

In sum, the survey results will be useful to researchers striving to identify the most productive avenues of research to best support future quinoa farmers in the region.

For more information about the quinoa-related activities taking place at Washington State University, please contact:

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ACKNOWLEDGMENTS

This research was funded by the Organic Agriculture Research and Extension Initiative (OREI) of the U.S. Department of Agriculture's National Institute of Food and Agriculture (Grant #2012-51300-20100). We thank the staff at Washington State University's Social and Economic Sciences Research Center (SESRC) for their survey services, as well as all the certified organic producers who took the time to participate in the survey.