



Rejected: Produce that didn't meet the criteria of large U.S. retail chains. Photos courtesy of Ron Clark, Imperfect Produce.

Beyond Beauty

The Opportunities and Challenges of Cosmetically Imperfect Produce

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**Report No. 1:
Survey Results from Minnesota Produce Growers**



ABOUT

Overview of the project

In late 2014, the Real Food Challenge and JoAnne Berkenkamp at Tomorrow's Table began a collaboration to explore the possibilities for expanding market opportunities for cosmetically imperfect fruits and vegetables. In particular, we are seeking to understand more about how fruit and vegetable growers view these products and to test the market for these products among collegiate foodservices.

This gave rise to the initiative *Beyond Beauty: Opportunities & Challenges for Cosmetically Imperfect Produce*. Funded by the USDA Specialty Crop Block Grant program, the initiative is focused on growers and collegiate markets in Minnesota.

A fuller description of the initiative is provided in Appendix A.

Our research and market development efforts include several components:

- Research with growers through an electronic survey and through one-on-one interviews
- Explorations with produce distributors and fresh-cut processors in Minnesota
- Partnerships with foodservice management companies at several public universities and private colleges
- Lessons learned from members of emergency food community that have explored procurement of cosmetically imperfect produce

Overview of the survey process

This report, the first in a series, provides the findings from our electronic survey with growers. Subsequent reports will share insights from our other areas of work as the initiative unfolds through early 2016.

For the purposes of our research, we have defined cosmetically imperfect seconds as: *“fruit and vegetables grown for the fresh market that are fresh, undamaged and suitable for human consumption, but too cosmetically imperfect to meet minimum industry-accepted standards for cosmetic appearance (e.g. too large, too small, misshapen, miscolored, superficial scarring, etc.)”.*

We sought survey responses from fruit and vegetable growers in Minnesota and offered a \$40 stipend to the first 40 growers who responded in thanks for their time.

We received 138 complete survey responses. Terry Nennich of University of Minnesota Extension collaborated closely with Tomorrow's Table in conducting our research with farmers.

Readers should note that this survey reflects input from a wide variety of fresh market produce growers in Minnesota. Results are not necessarily representative of other regions of the country.

Acknowledgements

The authors would like to thank all of the farmers who have contributed to this research, as well as many the individuals and organizations that helped us disseminate the survey tool. They include the Minnesota Department of Agriculture, Sustainable Farming Association of Minnesota, Southeast Minnesota Food Network, Hmong American Farming Association, Minnesota Farmers Market Association and the Minnesota Institute for Sustainable Agriculture.

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EXECUTIVE SUMMARY

- **Interest in expanded markets for cosmetically imperfect (CI) seconds:** Interest in developing additional markets for CI seconds was widespread with more than 80% of growers saying they are either moderately or very interested.
- **Willingness to adjust on-farm practices:** Nearly 95% of respondents indicated that they would be somewhat or very willing to change harvesting, sorting and packing practices on their farm if they had an attractive market for their CI seconds.
- **Rates of cosmetic imperfection:** Overall, rates of cosmetic imperfection were reported as being in the 1 – 20% range for most crops, with some growers reporting losses up to 30% or higher. Crops like apples, tomatoes, peppers, potatoes, carrots, parsnips, cauliflower and cantaloupe were shown to have some of the higher rates of imperfection.
- **Current uses and disposal of seconds:** Responding growers typically reported multiple ways of either disposing of or using their CI seconds. The most common fates for CI product seems to be composting on the farm or being left in the field. A large number of growers process some of their seconds into jam, salsa and other uses. Among farmers who direct market to consumers (e.g. through farmers markets, CSAs and farmstands), sale of CI seconds is quite common although the volumes appear to be modest overall.

A small minority of growers (e.g. 10 – 20%) indicate selling their CI seconds to commercial accounts such as fresh-cut processors, grocery chains or restaurants. Those who sell CI seconds this way typically indicate that commercial sales absorb roughly 10% of their CI seconds.

More than 70% of responding farmers indicate that they donate some of their seconds, although these farmers typically report that 20% or less of their CI seconds are donated. Some growers will use or sell their seconds as animal feed.

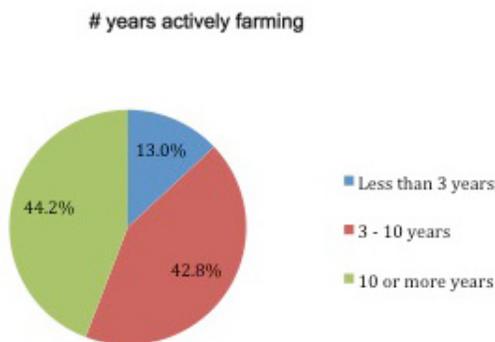
- **Harvesting techniques:** 90% of responding growers indicate that they use hand harvesting (rather than mechanical harvesting) for 80 – 100% of their production. The prevalence of hand harvesting was similar for certified organic growers and other growers, and was not significantly influenced by farm size.
- **Adverse weather:** In terms of adverse weather experiences, more than 50% of responding growers had experienced significant or catastrophic problems with excessive rain or flooding at some point in the past five growing seasons. Problems with unusual freezing events in the spring or fall have also been widespread.
- **Barriers to selling seconds:** The lack of an attractive market was most widely identified as the top barrier to generating a return for growers' CI seconds. In fact, nearly two-thirds of respondents identified the lack of an attractive market as a moderate or major barrier.
- **Product specifications:** The survey data suggests a significant need for clear product specifications and related communication with growers if foodservice markets for cosmetically imperfect produce are to expand.

SURVEY RESULTS

138 growers responded to the survey. Nearly all respondents farm in Minnesota.

1. How many years have you been actively farming?

- Less than 3 years: 13.0%
- 3 – 10 years: 42.8%
- More than 10 years: 44.2%

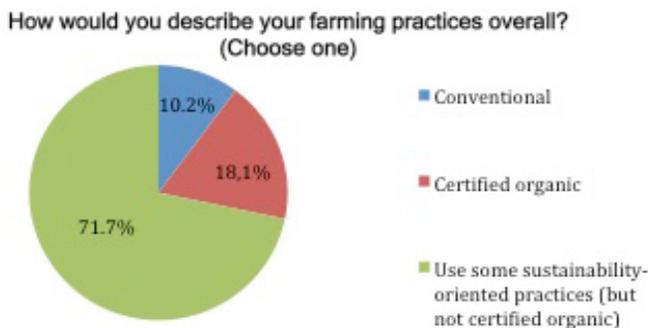


2. How many acres do you typically have in vegetable and/or fruit production each year?

- 0 – 4 acres: 55.1%
- 5 – 14 acres: 27.5%
- 15 – 24 acres: 2.9%
- 25 – 99 acres: 8.7%
- 100 – 300 acres: 2.9%
- more than 300 acres: 2.9%

3. How would you describe your farming practices overall?

- Conventional 10.2%
- Certified organic 8.1%
- Use some sustainability-oriented practices (but not certified organic) 71.7%



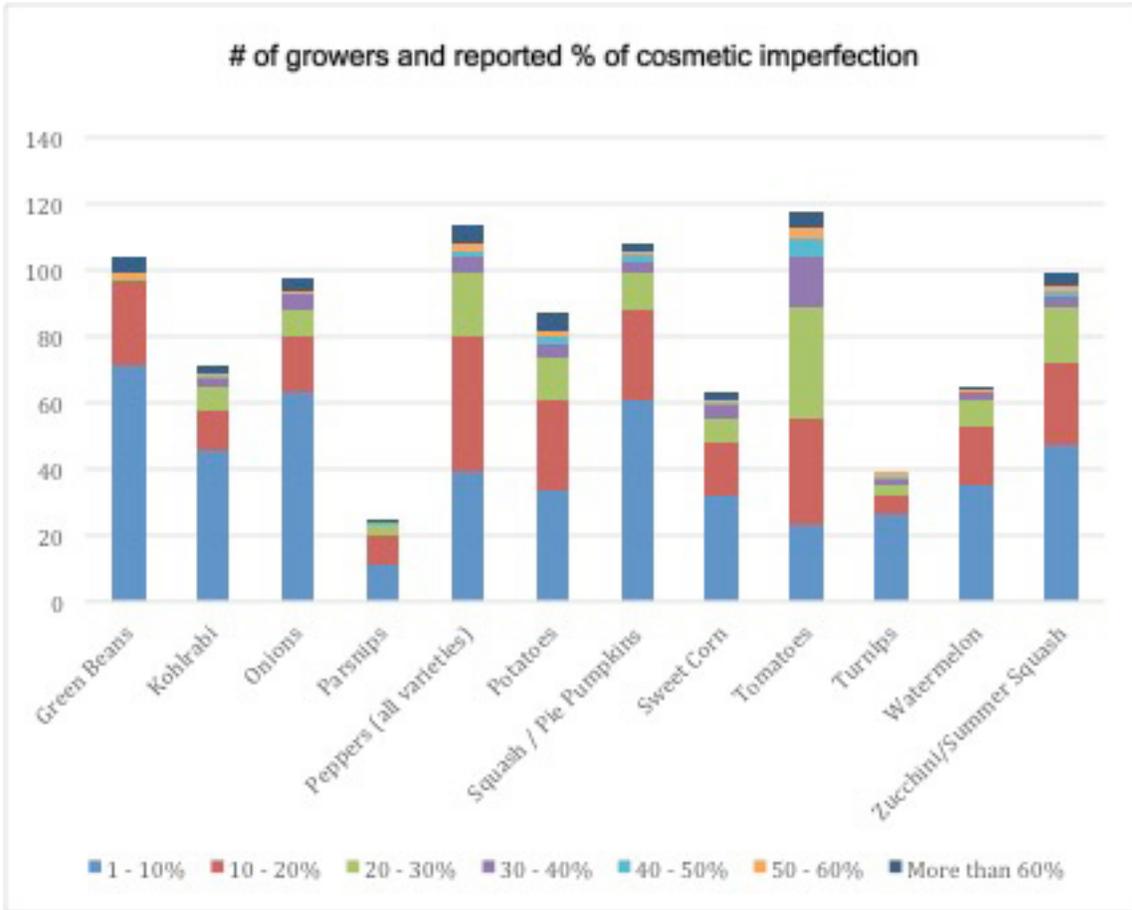
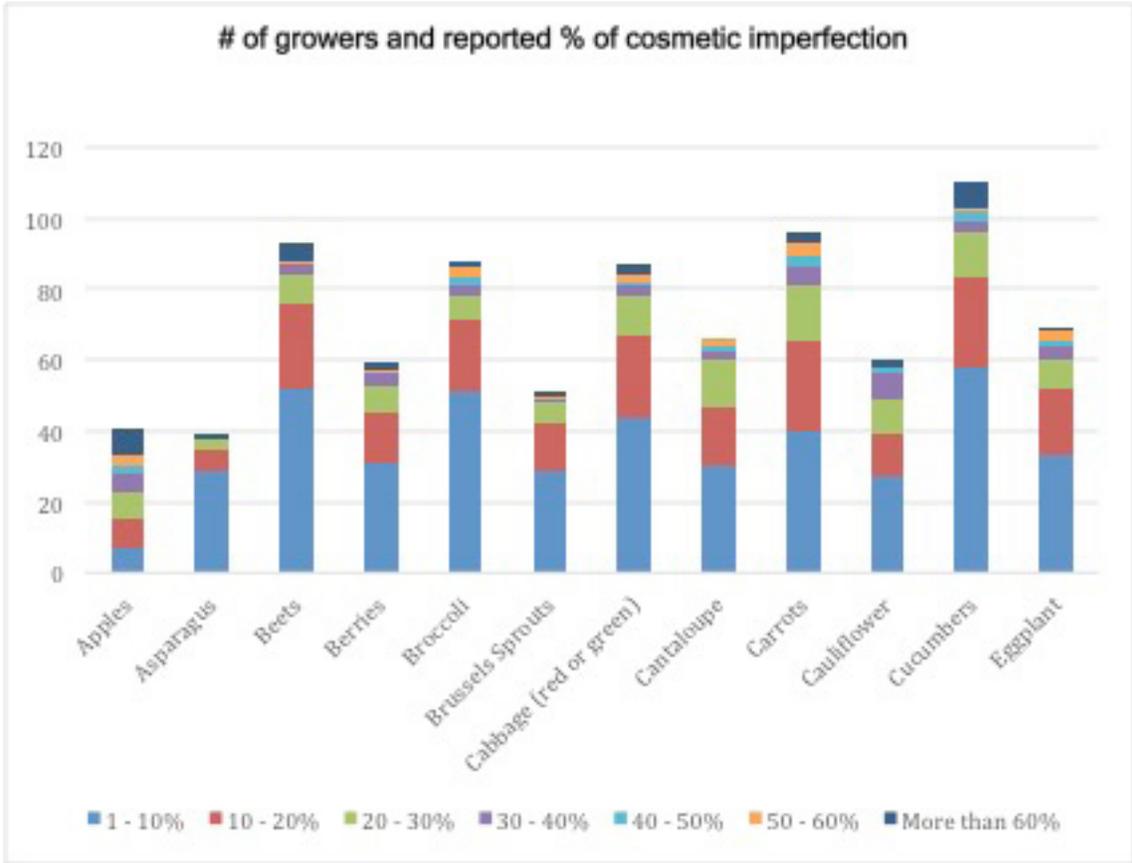
4. We recognize that cosmetic imperfection varies by crop and with the weather, but in an average year, what percentage of your annual production would you say is fresh, undamaged and suitable for human consumption, but too cosmetically imperfect to meet minimum industry-accepted standards for cosmetic appearance (e.g. too large, too small, misshapen, miscolored, etc.)?

Growers were asked to indicate which of a given list of crops they grow, and to check off the level of cosmetic imperfection they typically experience for each crop using ranges of 1 – 10%, 10 – 20%, 20 – 30%, etc. In the charts below, the overall height of the bar for each crop reflects the number of responding growers who grow that crop. Crops such as cucumbers are widely grown, for instance. Seventy percent or more of the survey respondents reported growing the following crops (in order of prevalence): tomatoes, peppers (all varieties), cucumbers, green beans, hard squash/pie pumpkins, onions, zucchini and yellow squash, carrots, beets, potatoes, cabbage (red or green) and broccoli.

Growers were also asked to check off the percentage of cosmetic imperfection they typically experience. Overall, rates of cosmetic imperfection were reported as being in the 1 – 20% range for most crops, with some growers reporting losses up to 30% or higher. Crops like apples, tomatoes, peppers, potatoes, carrots, parsnips, cauliflower and cantaloupe were reported to have some of the higher rates of imperfection.

For instance, as shown in the chart below nearly 60 of the 115 cucumber producers reported rates of cosmetic imperfection of 10% or less (as reflected below in the blue portion of the bar for cucumbers). Another 25 cucumber producers reported CI in the range of 10 – 20% (as shown in the red portion of the bar). While fewer respondents grow apples, rates of imperfection were shown to be higher for this crop, with more than half of respondents reporting CI rates ranging up to 30% (as reflected in the blue, red and green bands).

(Note that follow-up interviews with growers showed that CI losses can vary greatly with the weather and that the vast majority of growers we interviewed don't maintain records of the CI product. These issues and more information about causes of imperfection will be explored in the interview data to be released later in 2015.)



5. What do you currently do with your cosmetically imperfect seconds?

Please check off the percentage that applies to each category below. (For example, I leave 60% of them in the field, compost 20% and sell 20% directly to consumers). Options = 0% and 100% with 10% increments in between.

Most growers reported that they use or dispose of their CI seconds in multiple ways depending on their harvesting techniques, market opportunities and other factors.

The following percentages of respondents indicate that they use at least some of their CI seconds in these ways:

Useage of CI Seconds	% Growers who do this to some degree
Process them myself	87.0%
Compost	75.4%
Donate	71.7%
Leave in the field	60.2%
Sell directly to consumers (e.g. farmers market, CSA)	59.1%
Sell to restaurants, grovery stores or other commercial accounts	20.4%
Sell to a produce distributor or fresh-cut processor (for sale in the fresh market either whole or pre-cut)	11.0%
Sell to a processor for freezing, canning, or value-added processing	10.2%
Harvest and send to a landfill or other disposal facility	4.7%

However, in terms of the proportion of CI seconds that are used in various ways, the most common fates for CI product seems to be composting or being left in the field. Also, a significant portion is processed by growers into jam, salsa and other uses. This is most likely for personal use with some product sold through direct market channels.

More than 70% of responding farmers indicate that they donate some of their seconds, although these farmers typically report that they donate 20% or less of their CI seconds.

Among farmers who direct market to consumers (e.g. through farmers markets, CSAs and farmstands), sale of CI seconds is quite common. Nevertheless, among farmers who market CI seconds this way, the majority indicate that direct sales account for 20% or less of their CI seconds. We noted that some growers will use or sell their seconds as animal feed.

A small minority of growers indicate selling their CI seconds to commercial accounts such as fresh-cut processors, grocery chains or restaurants, as shown in the figures above. Those who do sell CI seconds this way typically indicate that these sales absorb roughly 10% of their supply of CI seconds.

All in all, it appears that only a modest portion of CI seconds are sold through commercial accounts. Rather, most are left in the field or are composted on the farm, with a smaller portion being processed by farmers or donated. Minnesota growers report that very few of their CI seconds are landfilled.

6. What percentage of your production do you harvest by hand (rather than mechanically)?

- 0 - 20% 3.1%
- 20 – 40% 1.5%
- 40 – 60% 1.5%
- 60 – 80% 3.1%
- 80 – 100% 90.8%

The data above highlights the widespread use of hand harvesting techniques by participating growers. The prevalence of hand harvesting was similar for certified organic growers and other growers, and was not significantly influenced by farm size. The use of hand-harvesting influences how CI seconds are handled on the farm, as hand-harvesting may afford the opportunity to reject product in the field rather than bringing it into a packing shed and sorting it there. In these cases, bringing seconds into the shed for sorting and washing – rather than rejecting it in the field – could add cost and labor.

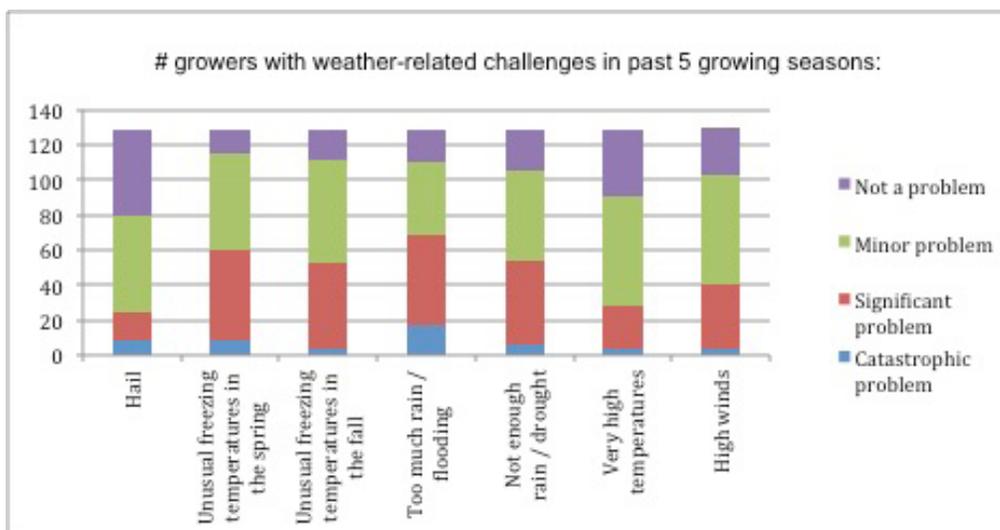
However, we found in subsequent interviews that some growers will harvest all grades of product (or at least cut them from the vine in the case of vine crops), implying that the cost of harvest and sorting seconds is already “sunk”, and would not add significant new labor costs to the farm operation if growers had additional ways to sell their CI seconds. Our follow-up interviews highlighted that the dynamics around harvesting and labor practices tend to be very crop- and farm-specific. They will be explored more fully in the next round of research to be released later in 2015.

7. To what degree have the following weather conditions been a problem on your farm at some point in the last 5 years (2010 – 2014)? Please indicate one of the following: Not a problem, minor problem, significant problem, or catastrophic problem.

Given the significant impact that adverse weather can have on rates of imperfection, growers were asked about the incidence of adverse weather on their farms. The chart to the left indicates the weather conditions that were identified as having been either a significant or catastrophic problem at some point during the period from 2010 – 2014 by the following percentages of growers.

The chart below highlights the number of growers who reported various weather-related challenges during the past five growing seasons:

Weather Condition	% of respondents
Too much rain / flooding	53.5%
Unusual freezing temperatures in late spring	46.5%
Not enough rain/drought	41.8%
Unusual freezing temperatures in the early fall	40.3%
High winds	30.7%
Very high temperatures	21.8%
Hail	19.3%



As shown in the blue bars above, “too much rain/flooding” was most commonly identified as having been a catastrophic problem, with nearly 12% of growers saying they had experienced catastrophic rains or flooding in the past five years. For most other weather conditions, between 3 and 6% of growers reported a catastrophic problem within the last five years.

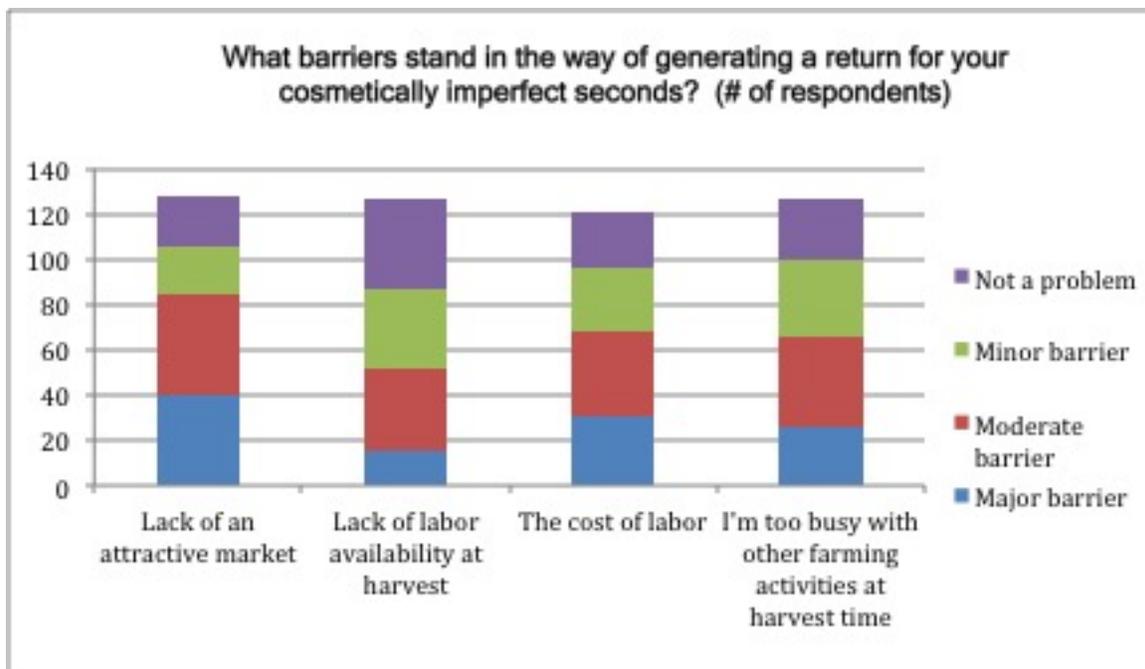
8. What barriers stand in the way of generating a return for your cosmetically imperfect seconds?

Please indicate whether each topic below is a major barrier, moderate barrier, minor barrier, or not a problem for your farm operation.

The lack of an attractive market was most widely identified as a barrier to generating a return for growers' CI seconds. In fact, nearly two-thirds of respondents identified the lack of an attractive market as a moderate or major barrier, as shown in the purple and blue bands below.

Somewhat to our surprise, a lack of labor availability was the least likely of the four areas to be viewed as a major barrier. This is despite the fact that many Minnesota farms face challenges in obtaining sufficient labor. In part this may reflect the dynamic noted above that the marginal impact on labor to harvest and sort CI seconds would be limited on farms where all items of a given crop are being evaluated in the field and/or are harvested, regardless of cosmetic attributes.

	Not a Problem	Minor	Moderate	Major
Lack of an attractive market	17.2%	17.2%	34.4%	31.2%
Lack of labor availability at harvest	31.6%	27.5%	29.1%	11.8%
Cost of labor	20.7%	23.1%	31.4%	24.8%
Too busy with other farming activities at harvest time	21.2%	26.8%	31.5%	20.5%



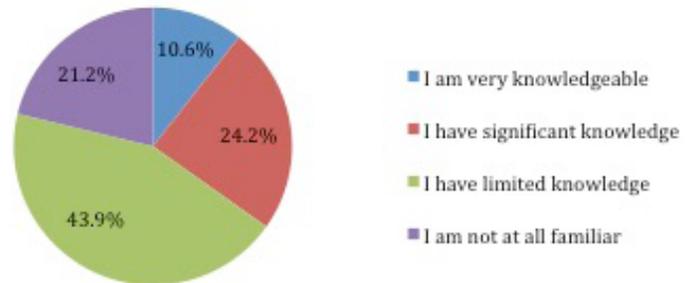
9. Do you sell to commercial accounts that require your product to meet specific industry grading standards (such as USDA grading standards or company-specific standards set by retail grocery chains)?

- Yes 27.7%
- No 70.0%
- Not sure 2.3%

10. How knowledgeable do you feel you are about USDA grading standards for the crops you grow?

- I am not familiar at all 21.2%
- I have limited knowledge 43.9%
- I have significant knowledge 24.2%
- I am very knowledgeable 10.6%

How knowledgeable do you feel you are about USDA grading standards for the crops you grow?



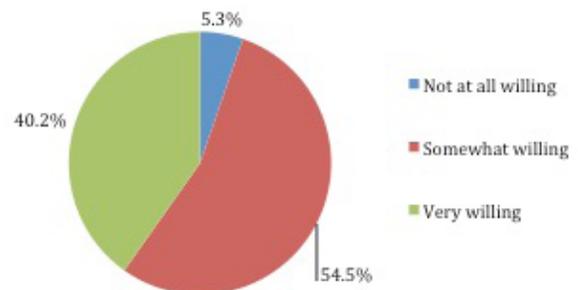
As reflected in the above two questions, 70% of responding growers do not sell into markets where their products must meet specific industry standards and nearly two-thirds report limited or no knowledge of USDA grading standards. This suggests that a significant effort would be needed with growers to communicate and implement clear product specifications if CI seconds were to be sold into the food-service market on a greater scale.

11. How willing would you be to change your harvesting, sorting and packing techniques if you had an attractive market for your cosmetically imperfect seconds?

Nearly 95% of respondents indicated that they would be somewhat or very willing to change harvesting, sorting and packing practices on their farm if they had an attractive market for their CI seconds:

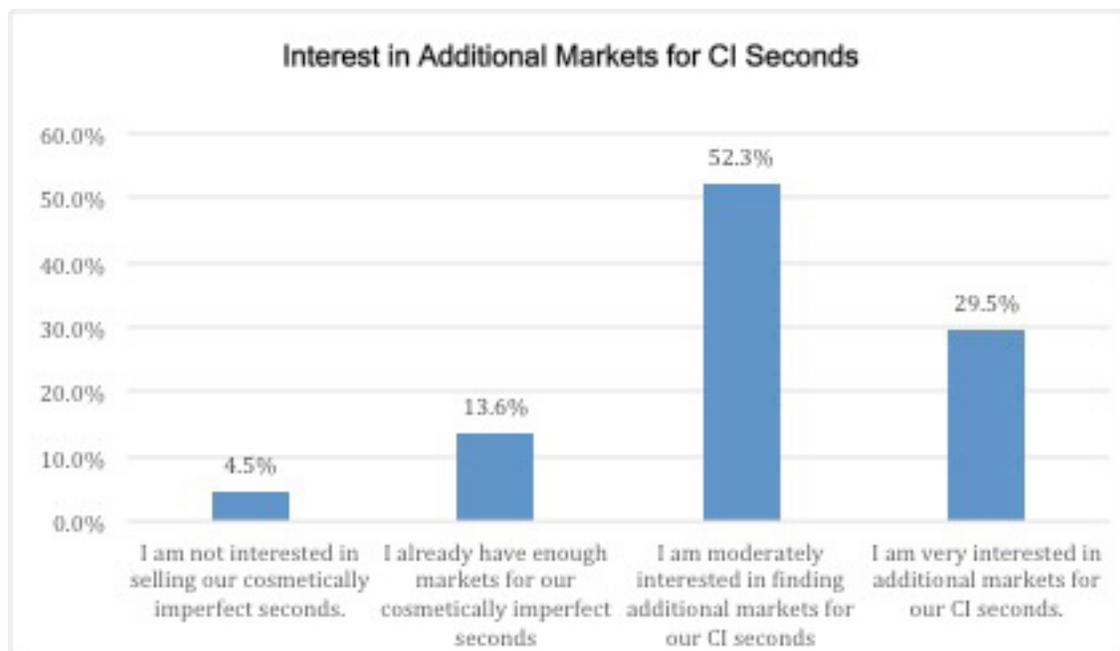
- Very willing 40.2%
- Somewhat willing 54.5%
- Not at all willing 5.3%

Willingness to change harvesting, sorting and packing techniques



12. Overall, which description best fits you?

(Choose one description of your interest in additional markets for your cosmetically imperfect seconds.)



Interest in developing additional markets for CI seconds was widespread, with more than 80% of growers saying they are either moderately or very interested. An additional 13% indicate that they already have enough markets for their CI seconds. Fewer than 5% are not interested in selling these products.

13. Please share any other comments or ideas you have.

Comments from growers are captured in Appendix B.

APPENDIX 1: INITIATIVE DESCRIPTION

Beyond Beauty: Opportunities & Challenges for Cosmetically Imperfect Produce

In the US, a stunning 50% of all the fruits and vegetables that are grown go to waste. Many of these losses occur at the “farm end” of the supply chain in the form of produce that is rejected in the packing shed or is never harvested.

A major contributor to these losses are the expectations of cosmetic perfection that drive the produce industry. These expectations have led to the huge strawberries, glossy apples and zucchini all of identical length that grace today’s grocery shelves. Produce that is entirely wholesome but is too large, small or misshapen to meet these standards is generally rejected at the packing shed or left in the field, never making it into the stream of commerce and resulting in significant market inefficiencies.

What’s more, enormous amounts of water, agriculture chemicals and labor are used to grow produce that is never eaten. Growing water scarcity in major growing regions and shifting weather patterns will make it unlikely that, as a society, we can sustain this level of waste in the decades ahead. When land-filled after rejection at the packing shed stage, fruits and vegetables also releases potent greenhouse gases, adding to climate change concerns.

Farmers typically bear the financial burden of produce that can’t be sold because it is cosmetically imperfect (CI). Such crops are a significant financial loss for growers and a drag on farm profitability.

At the same time, foodservice buyers are paying for retail-ready product even though they or their suppliers are likely to cut the product before serving it and do not need whole produce that looks beautiful on the grocery store shelf.

Wrapped within that irony lies an opportunity – the possibility of increasing financial returns to farmers while also reducing costs for foodservice buyers through market development for wholesome, cosmetically imperfect “seconds”. The “Beyond Beauty” initiative will research and test this concept, while also exploring potential pitfalls. Key components of the initiative include:

- Conducting research with fruit and vegetable growers in Minnesota to clarify the nature and scale of CI product supply in given areas, explore growers’ pricing needs, identify grower concerns, and determine the most feasible crops given growing conditions in the region.
- Engaging selected distributors and cut-fresh operators on issues such as market potential for CI seconds, equipment and facility issues, product specifications, distributor concerns, and pricing.
- Collaborating with Real Food Challenge collegiate foodservice partners to test this concept, identify success factors and challenges with seconds, and assess the culinary performance and potential cost savings associated with CI seconds in college foodservice contexts.

Timeframe: December 2014 – June 2016.

APPENDIX 2: GROWER COMMENTS

- The largest problem I see is the additional labor it takes to harvest and process 2nds which bring a much lower price.
- Perception of what is edible concerning the cosmetic looks of most produce is, in my opinion, one of the major challenges when selling seconds. Most of the time that 2nd produce or B grade produce is just as good as the A grade produce, if more people would be willing to not judge the fruit by its looks they might realize just how wasteful they are.
- I grow using hydroponic techniques and have very few CI. Virtually all of my production is in protected structures – high tunnels, greenhouses.
- I would be open to exploring ways to get my seconds to another market. I feel bad that a certain percentage of what I grow is completely edible and good but not acceptable to the main customer. We need to find other alternatives to bring this food to market.
- I wish there was more awareness of the win-win opportunity for restaurants to get lower-cost but still high quality CI produce.
- CI products have to be carefully evaluated because a farm does not want them to become the standard received from the farm.
- We use no chemicals on our farm or garden products. If we have imperfect or unsold produce we either can, pickle or freeze, feed to our animals or compost it. 99% is used in one form or another.
- Biggest factor is pick, pack and deliver. If there is a standard expectation for how items are packaged and delivered it will help us and help you. Delivery points have to be convenient as well.
- Thank you for looking into this. I HATE that I can't sell my "seconds" on the basis of looks alone. We can usually sell our seconds for a lesser price to small restaurants/cafes/coffee shops; places that make their own dishes or soups. Most of our "seconds" are from bug damage. Brassicas can suffer from flea beetle damage but it is still perfectly good to eat. We have a CSA and try to educate our members about this issue. If people know it's ok to eat "seconds" then they will.
- Thank you for asking about this. I'm curious what you find. We are very excited about the gradual increase in institutional local buying and hope to continue to be a part of it. One thing probably on your mind already, our experience has also been that buyers need to be extremely clear about what is meant by a "second" during pre- season discussions. Sometimes buyers say they want 2nds but realistically want 1sts at second prices, so grade standards and/or pictures and/or very specific descriptions are important.
- As a CSA farm, to ensure that we have enough for each share we always grow more of each crop than we need, therefore we often have an excess of "firsts" as well as seconds. Most CSAs likely have this issue (untapped resource).

- As we grow and have more CI's this would be a great market to have available!
- I find one of the best ways to use blemished produce is to feed it to my livestock. Hogs and chickens in particular, but also poultry love a veggie or fruit treat.
- We need to develop a market for our seconds on any produce line (tomatoes, peppers, broccoli, etc.). It is money and we throw away this money because we don't have the right industry for this produce.
- It's been my hope for the past couple years that someone come up with something like this. We all know that farmers are some of the busiest people in the world. It's so hard to be a farmer and find and communicate with people about how second goods are just as good. Furthermore, for my family the hardest part is finding the time to harvest the seconds and transport them. It takes time away from everything else we are doing (labor/market). I wish there was a way for farmers and those accepting these seconds to find a way to make use of the produce without having to expend so much energy away from the farm.