

# Adding Profits to Organic Grain Rotations in Aroostook County



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**Farm CFO for hire**  
Cost Analysis / Market Development  
Crop Planning / Bookkeeping

# Summary/Table of Contents

## **Introduction (p3)**

The demand for organic grains is growing. Aroostook County, Maine is a region that could help to meet this gap in supply, but organic grain farming as a standalone business is not profitable in Aroostook County, at the scale that most grain farms currently operate at. Mixing other, more profitable crops into a rotation with organic grains is a possible path to increasing organic grain production. This report combines market research with grower cost of production analysis to evaluate which crops might be most profitably and easily expanded in Aroostook County.

**Potatoes (p4)** Organic potatoes are commonly rotated with barley on a 1:1 basis. Thus, every acre of organic potato production yields an additional 65 bushels (or about 1,300 lbs.) of organic barley.

**Industry Overview (p15)** The organic potato industry is growing but consolidating. Organic potato farms are getting fewer but bigger. As production grows, average prices received in the Northwestern states have declined, but this doesn't seem to be slowing growth. The increase in growth hasn't yet seemed to affect retail prices for organic tablestock potatoes at grocery stores. Maine occupies a small but important share of the organic potato industry, and can successfully compete in the Northeast retail market. The total organic potatoes purchased by Northeast retailers per year is about 76.8 million pounds. Maine had about 8% of the Northeast market share for organic potatoes in 2015.

## **Meet the Customers(p9)**

Overall, organic shoppers are more likely to be affluent and have younger children. The primary reason that shoppers buy organic is to avoid potentially unhealthful contaminants. The current price premium for organic potatoes is higher than most consumers are willing to pay. The current organic potato market is serving the needs of the organic enthusiast pretty well, but it's a very small niche.

**Retailers** Differentiated packaging is critical for organics. Getting "into" warehouses without an intermediary is doable, but difficult.

Organics are unlikely to have appeal to the foodservice sector.

**Repackers/Distributors** Distributors who serve retail customers are far more likely to be interested in organics, because their customers are. Transport Costs and just-in-time inventory give Aroostook an edge over Western competition. Consistency is the basis of a successful relationship.

## **Growings Regions (p13)**

Western states are very efficient producers, but transportation costs inhibit their ability to dominate Northeastern retail markets. Potatoes from Prince Edward Island are Maine growers' biggest current competitors in the Northeast. Organic potatoes from PEI and Quebec are trading for an average price of \$.41 per lb. at the Montreal terminal market. Canadian organic potato prices are more adversely affected by the exchange rate than they are by shipping costs. PEI potatoes are perceived by some buyers as having more consistent availability and grading.

## **Market Forecast (p18)**

Production of organic potatoes will continue to increase until the price received by a large potato grower provides a comparable net margin to that of conventional production. With trucking costs added in, this puts the price to ship an organic potato from Washington or PEI to New York City at about \$.28 per lb. Larger Maine farms can remain competitive in this market. Lowering organic potato prices to about 30% above conventional (about \$.75-\$.80 per lb.) could increase overall organic potato sales by attracting more “moderate” organic consumers.

**Keys to Increasing Maine’s share of the growing market (p20)**

Target sales of tablestock potatoes to organic moderates in the Northeast (and the retailers and distributors who serve them). Price items so the final organic premium at the checkout is 30-40% above conventional; and the price is competitive with other suppliers. Aggregate potatoes in a small cluster of packing houses (2-3?) to develop consistent grading standards and availability. Develop retail packaging that clearly differentiates products from their conventional counterparts, emphasizes their Maine-grown & GMO-free wholesomeness, and is easy for retailers to process through their checkout systems. Package items in smaller sizes. Work through existing distributors/brokers with existing access to target markets. If total consumption of organic potatoes in the Northeast doubled to 150 million pounds, and Maine increased its market share from 8% to 12%, Maine would increase its production to 18 million pounds and 1,125 acres of organic potatoes. This would increase organic barley production to about 3.5 million pounds.

**Other Crops (p22)**

**Broccoli (22)**

**Onions (24)**

**Sources (26)**

# Introduction

- **The demand for organic grains is growing.** In 2012, a sharp increase in demand for organic grains, combined with a relative shortage of supply, led to a spike in prices. For instance, the average national price for organic barley in the US jumped from about \$3-\$4 per bushel in 2010 to a high of \$12.66 per bushel in 2012 - before settling to about \$9 per bushel in 2015.

## US Organic Barley Prices per Bushel



- **Aroostook County, Maine is a region that could help to meet this gap in supply.** John Chartier from MOFGA notes that, “Aroostook County has the largest available growing region in New England. The area has a rich agricultural heritage and a long history of potato and small grain production. Over the past 10 years a scaled organic sector has developed with farmers producing small grains, potatoes, and recently a rapidly developing dairy pool.”
- **... but organic grain farming as a standalone business is not profitable in Aroostook County, at the scale that most grain farms currently operate at.** In 2016, a study by John Chartier and Noah Winslow of Irving Farms Marketing concluded that organic grains as a standalone business was not profitable at a scale of 300 acres or less. The study cited, “Enterprise budgets for organic oats, barley, and wheat, generated by the University of Maine [which] found negative net income returns.”
- **Mixing other, more profitable crops into a rotation with organic grains is a possible path to increasing organic grain production.** Chartier notes that, “Targeted grower engagement led to an understanding that a grain alone rotation was not lucrative enough for growers to feel it was worth it to take a risk into a new production system. Grower feedback identified that market development for more valuable crops such as potatoes or broccoli would enhance the attractiveness for farmers to expand into organic.”

- **Which crops can be most profitably rotated with organic grains?** To answer this question, this report combines market research with grower cost of production analysis to evaluate which crops might be most profitably and easily expanded in Aroostook County.
- **Report Methodology**
  - We interviewed 13 different buyers from different sectors of the Northeast food supply system. Buyers interviewed included retail (Hannaford, MOM's Organics, Fresh Direct), foodservice (Sodexo, Performance Food Group), and repackers/distributors (Gold Bell/Arrowfarms, Green Thumb Farms).
  - We used pricing and shipping data from the USDA's Agricultural Marketing Service, as well as the National Agricultural Statistics Service, to supplement the buyer interviews.
  - Secondary market research about the organic consumer came from publications of the Organic Trade Association, the Hartman Group (a marketing firm), and the National Potato Board.
  - We constructed enterprise budgets using data from grower interviews and MOFGA.

## Potatoes

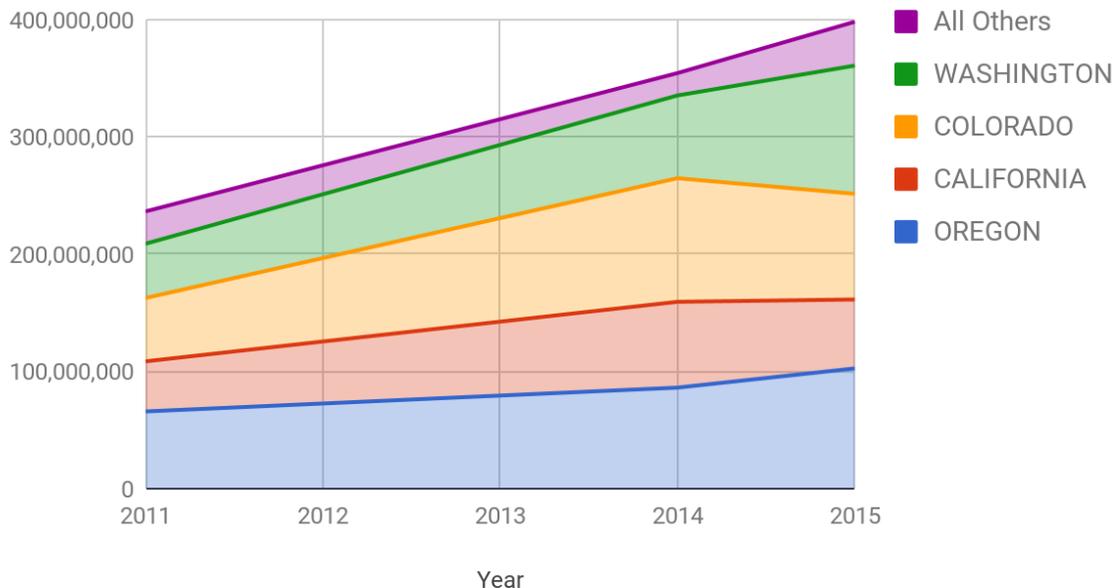
- **We quickly honed in on potatoes.** All the growers interviewed for this report expressed a desire to increase sales and production of organic potatoes as a central goal. Indeed, the vast majority of grains grown in Aroostook County are part of a rotation whose central purpose is to produce potatoes.
- Organic potatoes are commonly rotated with barley on a 1:1 basis. Thus, every acre of organic potato production yields an additional 65 bushels (or about 1,300 lbs.) of organic barley.

## Industry Overview

**The organic potato industry is growing but consolidating.**

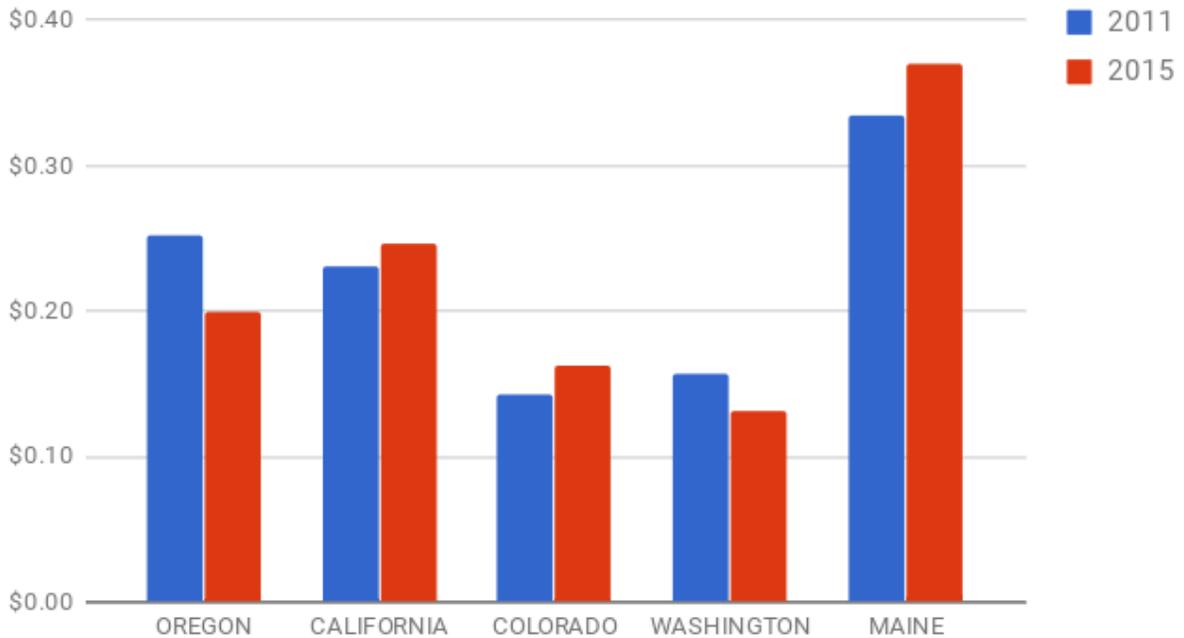
- Domestic production of organic potatoes increased by 68% from 2011 to 2015. USDA Agricultural Marketing Service data shows that average monthly shipments of organic potatoes have doubled from 2015 to 2017 - so it may be that production itself has doubled since the 2015 census.
- Nearly all of this growth came from four western states - Oregon, Washington, California, and Colorado. These "Big Four" produced 90% of all US organic potatoes in 2015. Washington, in particular, more than doubled its production over the four year period. Idaho, Wisconsin, Maine, and Iowa - the four "minor" organic potato producers - all saw gains, while in the rest of the country, organic potato production declined.

Lbs. of organic potatoes harvested by state, 2011-2015



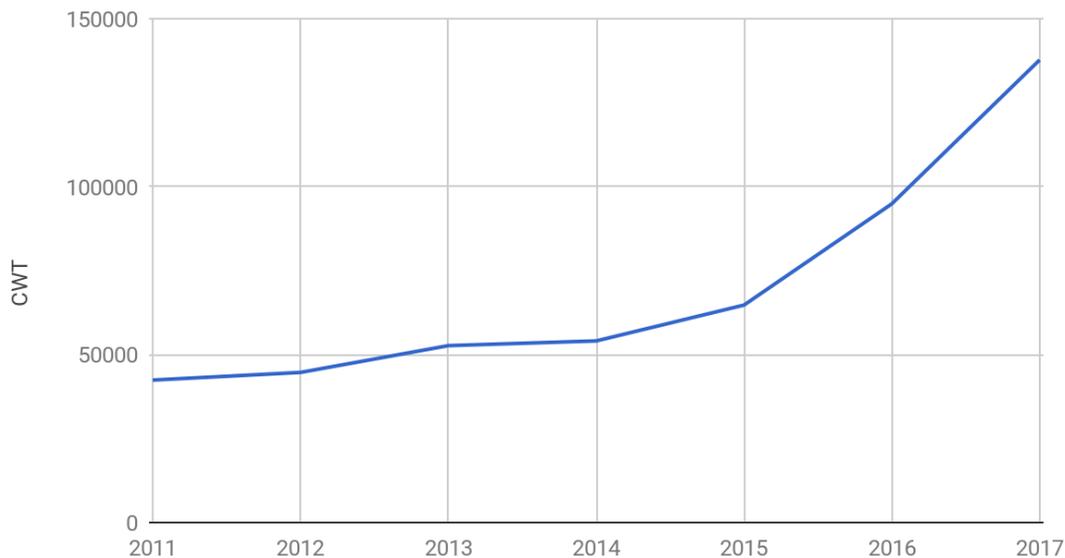
- **Organic potato farms are getting fewer but bigger.** Overall, the number of farms selling organic potatoes declined from 725 to 686, while the average acres harvested per farm increased by 58%. This trend is especially exaggerated in the “Big Four” states; in Oregon, for example, the number of organic potato farms dropped from 38 to 30, while acres harvested per farm increased from 49 to 125.
- **Overall, organic potatoes are a relatively small share of total potato production, when compared with other types of produce.** Despite its growth, organic potatoes accounted for about 1.67% of overall potato sales in 2015. This lagged far behind the overall category of produce, where about 13% of all sales were organic.
- **As production grows, average prices received in the Northwestern states have declined.....** Overall, the average price farms received per lb. for organic potatoes declined from \$.22 in 2011 to \$.20 in 2012. Different states are experiencing different trends however; Oregon and Washington saw relatively sharp declines, while Colorado, California, and Maine saw mild increases. Washington growers command the lowest prices, at \$.13 per lb. in 2015; Maine, by contrast, commanded an average of \$.37 per lb.

Average Prices Received per lb., 2011 and 2015

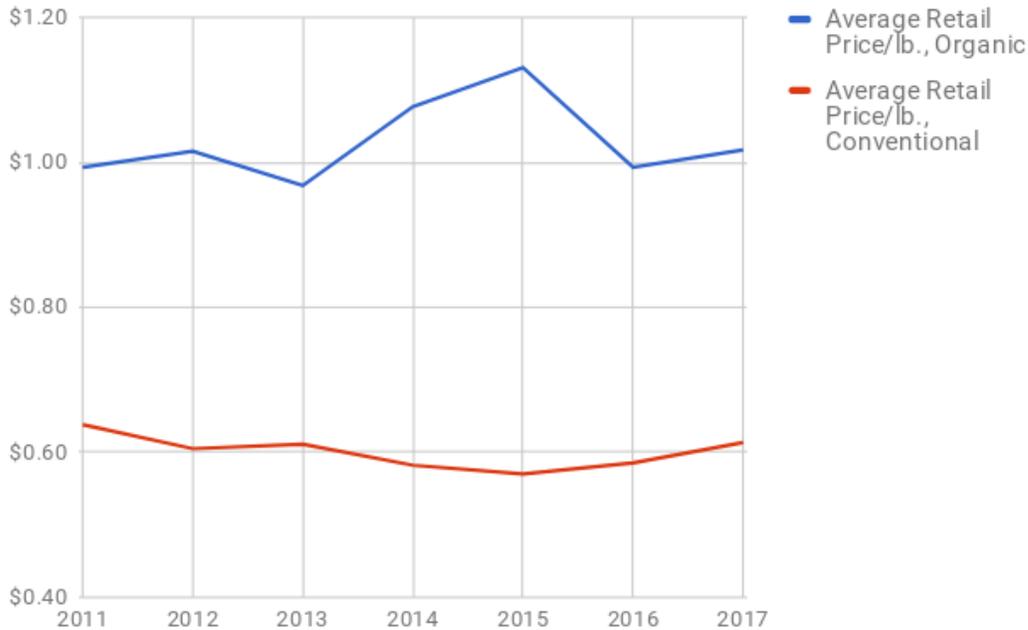


- ....but this doesn't seem to be slowing growth.** Despite the overall price decline, production of organic potatoes appears to be increasing rapidly. According to the USDA's Agricultural Marketing Service, monthly shipments of organic potatoes increased mildly from 2011 to 2015, then rose sharply; shipments are now about 14 million pounds per month, more than two times what they were in 2015. This indicates that producers in the Northwest are still profitable despite lower prices.

Average CWT Shipped Per Month, Organic Potatoes



- The increase in growth hasn't yet seemed to affect retail prices for organic tablestock potatoes at grocery stores.** While the price received by the grower has declined slightly, national retail prices for organic potatoes have remained relatively steady at just over \$1 per lb. (with the exception of a spike in 2015 to \$1.13). On average, organic potatoes have commanded a 72% premium over conventional potatoes; in the Northeast, the premium is 90%.



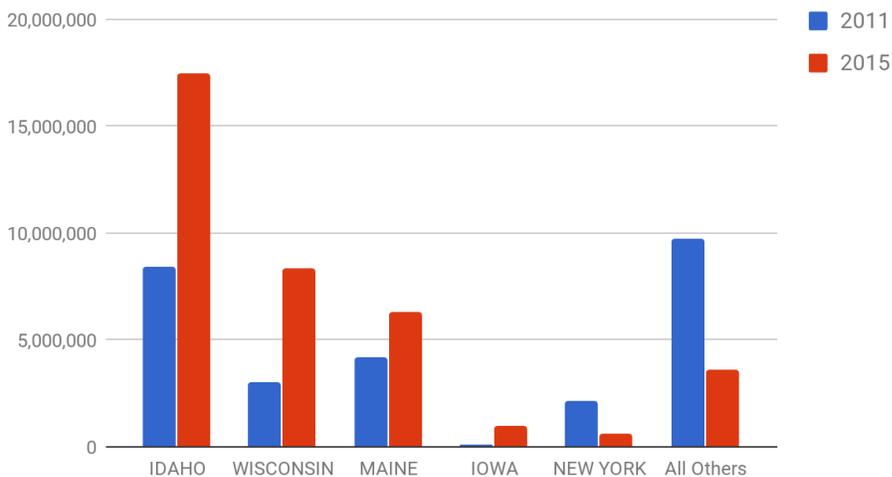
- Wholesale organic potato prices start out slow in the fall, spike in December, slump in the winter and spring, then rise to their highest point in summer.** The following chart illustrates the average price per lb. for organic potatoes by month at the Boston, Montreal, and Chicago terminal markets. The worst times for a grower to be selling potatoes are early fall and late winter/early spring. The spike in December is probably due to increased consumption around the holidays; the summer spike is probably due to limited supply. Most of the potatoes sold in summer are grown in California; however, Colorado also appears to be supplying organic potatoes in the summer out of storage. Growers who are able to store potatoes into the summer could enjoy prices that are about 50% above winter prices.

Average prices for organic potatoes at Boston, Montreal, and Chicago markets  
Fall 2016-Summer 2017



- Maine occupies a small but important share of the organic potato industry.** While Maine’s overall share of organic potato production in the US was only about 1.6% in 2015, Maine is the largest producer in the US Northeast. The only other Northeastern state to produce organic potatoes at any scale is New York - and production is on the decline there.

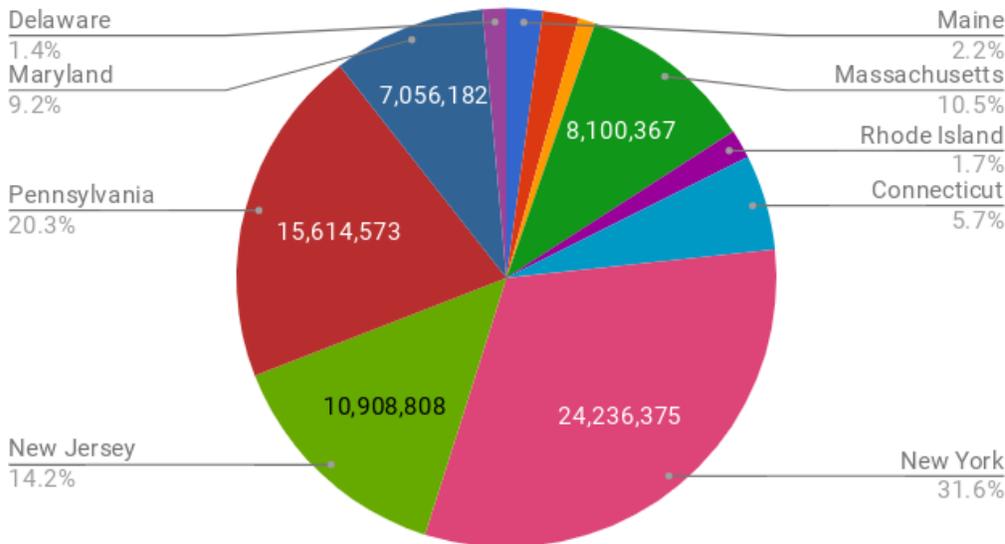
Lbs. of organic potatoes produced, excluding the "Big Four"



- This provides Maine with an advantage of location - it can ship organic potatoes to Northeastern markets more cheaply than the West.
- Total fresh potato consumption in the Northeast.** According to the Leopold Center’s “US Food Market Estimator,” Retailers in the Northeast region (Maryland-Maine) purchase a total of 2.2 billion lbs of potatoes per year.

- **Share that's organic.** According to a presentation prepared by the Organic Trade Association with data provided by Nielsen, about 3.52% of the potatoes purchased in retail environments are organic (This number is higher than the 1.67% overall share of organics because very few organic potatoes end up in the foodservice sector). Put together, we can estimate that the total organic potatoes purchased by Northeast retailers per year is about 76.8 million pounds.

Total Lbs. of organic potatoes purchased by retailers per year



- **Maine's share.** Assuming that nearly 100% of Maine's 6.3 million lbs. ended up in Northeastern grocery stores, Maine had about 8% of the market share for organic potatoes in 2015.

## Meet the Customers

- In order for Maine's organic potatoes to reach the end consumer, they have to pass through multiple components of the supply chain, each of which have their own specific needs that need to be addressed.

## End Consumers

**Overall, organic shoppers are more likely to be affluent and have younger children.**

- The Organic Trade Association notes that the "organic produce shopper is more affluent and kid focused than the total produce shopper." The OTA uses phrases such as, "Household Heads age 35-44," "affluent suburban spreads", and "younger bustling families" to describe this group. The Hartman group notes that, "Organic users are more likely to have higher incomes and be more educated, younger, be employed full time."

**The primary reason that shoppers buy organic is to avoid potentially unhealthy contaminants.**

- The Hartman Group's "The Organic Consumer: 2016 vs. 2006" lists the top three reasons that consumers buy organic foods as:
  - "Avoid products that rely on pesticides/chemicals"

- “Avoid products that rely on growth hormones”
- “Avoid genetically modified products”
- The bottom of the list includes things such as:
  - “To support the environment”
  - “To support small/family farmers”
  - “To support sustainable agriculture”
- In other words, the average organic consumer purchases organics more to avoid the perceived contamination of non-organic foods, and not as much out of a general goodwill toward the people and regions that produced the food.
- One of the most effective organic marketing tools is a list that the Environmental Working Group puts out called the “dirty dozen”: a list of “fruits and vegetables with the most pesticide residues.” The purpose of the list is expressly to help those want to buy more organic, but stay on a budget, do so: “we know that organics are not accessible or affordable for everyone, so we created EWG's Shopper's Guide to help consumers make the healthiest choices given their circumstances.”
- Strawberries and spinach are both high on the list; these are also the items that (with bananas) are “driving organic velocity”, by leading the pack in terms of expanding their market share, according to the Organic Trade Association.

**The current organic potato market is serving the needs of the organic enthusiast pretty well, but it's a very small niche.** The Organic Trade Association identifies segments shoppers into three groups:

- *Organic enthusiasts* are about 2% of the overall population, and spend more than 50% of their produce dollars organically. They spend about 5.1% of their total produce dollars on potatoes; and almost 60% of the potatoes they buy are organic.
- *Moderate organics* are about 7% of the population, and buys 20-50% of its produce organically. This group spends about 4.5% of its produce dollars on potatoes; but only buys about 18% of its potatoes organically.
- *Organic lite* shoppers make up the remaining 91% of the population. These shoppers spend 8.3% of their total dollars on potatoes, but only 1.1% of the potatoes they buy are organic.

**The current price premium for organic potatoes is higher than most consumers are willing to pay.**

- Currently, organic potatoes are priced at about 90% higher than conventional in Northeast Retail.
- One study, “Willingness to Pay for Locally Grown, Organic and Natural Foods: Implications for Producers and State-Sponsored Agricultural Marketing Programs,” by faculty at the University of Delaware, suggests that consumers, on average, might be willing to pay about 30% more for organic potatoes.
- Mark Jewell, produce category manager for Hannaford, agrees: “If a [Hannaford] customer sees organic potatoes for \$3.99 and conventional potatoes for \$2.99 side by side, they might buy the organics. Any higher than that, they wouldn't.” [this equates to 33% premium].

## Retailers

### **Retailers expressed little to no difficulty in sourcing sufficient organic potatoes**

- Comments such as, “we generally have good market coverage for organics,” or, ““We’re generally fairly well supplied with potatoes and the storage crops that you mentioned with our existing local and regional network of growers,” were common.
- They tended to view organic potatoes as a commodity; they made purchasing decisions based on price, quality, and availability, rather than allegiance to a particular brand.
- Chris Miller of MOM’s organics in Maryland states that, in order for him to buy organic potatoes from Aroostook, “it would be more at commodity pricing - unless the potato itself has some distinctive quality to it that differentiates it.”

### **Differentiated packaging is critical**

- Mark Jewell from Hannaford emphasizes that, in order for organic products to be successful in a retail store, the packaging must be strongly differentiated from their conventional counterparts, or else they “get lost”. That’s one of the reasons that organics are a relatively small share of overall purchases at Hannaford.
- At the checkout, cashiers need an easy way to code produce items as organic - that’s why all organics need some of kind of packaging.
- The key, says Mark, is to “call out” that the product is organic and from Maine in a way that’s visual and easy to recognize quickly. This includes logo, but also a different packaging type of some sort - for example, with potatoes, not the traditional paper bags that most conventional potatoes come in.
- According to Mark, smaller size retail packages are better for organics. For instance, 3 lb. bags are the best package size for organic potatoes. This helps reduce the sticker shock of the organic premium.

### **Getting “Into” Warehouses Without an Intermediary is Doable, But Difficult**

- In terms of distribution arrangements, Mark Jewell notes that, “working direct with the farms is always better.”
- At the same time, when it comes to warehouse purchases, Mark notes that there is limited space to add new vendors; “we can only work with so many people.” Hannaford has a desire to limit the number of vendors it works with at its warehouse; and so would prefer to source organic potatoes through one of its existing vendors if possible.
- The exception to this would be if the vendor brought something else really exciting to the table - such as organic strawberries.
- Other retailers expressed similar desire to limit the number of vendors they work with. MOM’s organics for instance, works through Four Seasons as their sole distributor.

### **Differentiating products by variety and region could be effective, but only if the product itself has a noticeably different quality to it**

- In terms of a “Maine” or “Aroostook” focused brand, most buyers outside Maine said that such a brand would not add a lot of value for them. As Chris from MOM’s organics put it, “I don’t know if there’s a whole heap of value or marketability.”
- Eric Stone from Fresh Direct thinks that a Maine organic brand would have appeal only if the product itself had some intrinsic quality associated with Maine. “We want a product

that's strongly differentiated from other products"; ie one that's unique and tells its own story.

- For example, Fresh Direct sells “a ton” of wild Maine blueberries, lobster, and craft beer; “all of these products you can’t find anywhere else, and they tell a Maine story.”
- Both Chris and Eric liked the idea of an organic Caribou Russet potato as a specific variety with a specifically Maine story, and were interested in buying it, provided the packaging conveyed that story to their end customers.

### Pricing Varies

- Retailers pay around \$.70 per lb. at Boston terminal market.
- Retailers that buy full truckloads direct from growers pay \$.33-\$0.50 per lb.

### Pricing - Retail, Terminal Market, and Direct from Grower



### Foodservice/Restaurants

#### Organic potatoes are unlikely to have appeal to the foodservice sector.

- The foodservice buyers interviewed for this study indicated little to no preference for organics vs. conventional. Their main considerations were quality, price, and local vs. non-local. For instance, Maeve McGinnis of Sodexo (one of the world's largest institutional foodservice companies; they work with colleges, universities, and hospitals, as well as with corporate entities such as offshore oil drilling rigs) notes that, “We do buy some organic but it’s not a priority or a directive our chefs have to buy – we ask them to purchase local, and sometimes that could mean organic. If there was organic produce at a decent point, and providing us a product we wouldn’t otherwise have access to we might purchase it.”
- The Hartman Group's *2016 Organic & Natural Report* concurs: “Organic and natural foods are a lower priority at food service, where consumers are more likely to prioritize indulgence, experience, variety seeking and social engagement.”

## Repackers/Distributors

- Distributors buy products from growers and resell them to either retail or foodservice customers.
- In some cases (such as Goldbell), distributors are also repackers; that is, they buy product in bulk (usually cleaned, graded, and in 50 lb. bags) and repackage it into retail packaging.
- While Gold Bell does pack under their own brands, most of their business comes from being a private label packer for supermarkets, including Trader Joe's and Hannaford.

### **Demand for organic potatoes is lackluster**

- Similar to retailers, distributors expressed little to no difficulty sourcing organic potatoes
- Distributors in the Northeast reported sourcing mainly from either Maine or Prince Edward Island
- While most do buy organic potatoes from the West, these are mainly to supplement when more local potatoes are not available (mostly the summer)

### **Transport costs and just-in-time inventory give Aroostook an edge over Western competition.**

- Mike from Gold Bell thinks that main advantages of working with an Aroostook County farmer are that "I would hope to get a price break on transportation [vs. product from the West]" and that he can maintain lower levels of inventory, as the supplier can more readily deliver on a just in time basis.

### **Consistency is the basis of a successful relationship**

- Consistency is also very important; Mike is not interested in "in and out" plu's - he wants items he can move consistently, all year round. The longer a supplier can deliver a product, the better.

### **Pricing is in the low \$.30 per lb. region.**

- Similar to retailers who buy full truckloads direct from growers, many distributors pay in the low \$.30 per lb. region for potatoes.

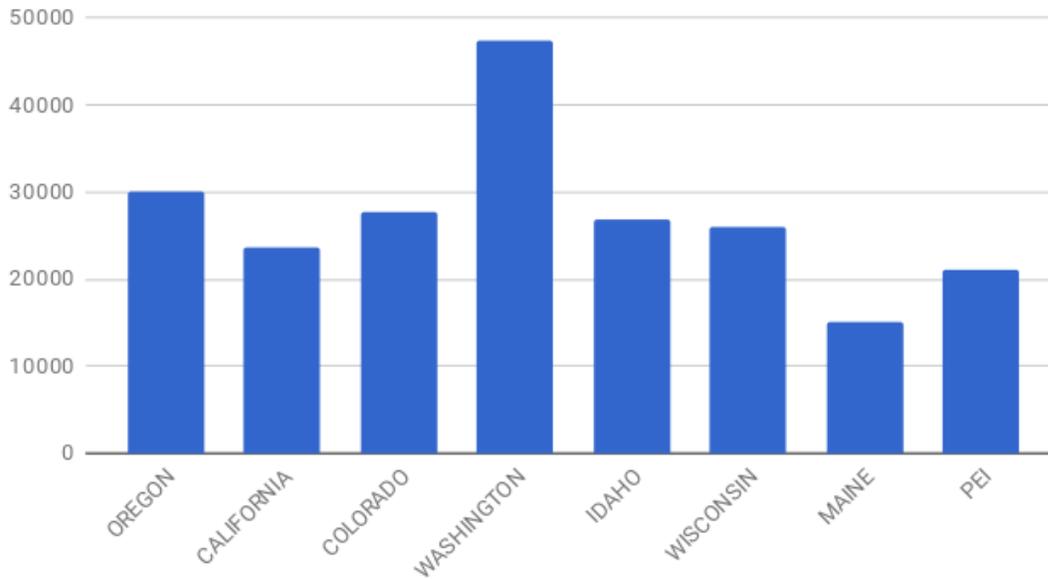
## Growing Regions

### **The West**

- **Pounds harvested per acre in the western states are higher than in other regions.** Washington state farmers harvested an average of 47,395 lbs. Per acre of organic potatoes; California, Oregon, and Colorado ranged between 23k - 30k lbs. This difference in yields per acre also translates to conventional potatoes; one publication by the Washington State Extension Service, "2015 Costs Estimates or Producing Fresh and

Processing Potatoes in Washington,” estimates conventional potato production in

Average lbs. per acre harvested by state



Washington is about 61k lb. per acre.

- Organic potatoes are more profitable than conventional for big Western growers at current market prices.** An enterprise budget produced by the Washington State Extension service projects the unit cost to produce a pound of potatoes to be about \$.0812. The average price received is \$.0875; so the net profit margin is 6.5%. When the same enterprise budget is adjusted for organic production (yields per acre are lowered, seed, fertilizer, and pest control costs are increased), the unit cost to produce an organic potato in Washington is around \$.1187. At the average price of \$.13 per lb., the net margin is 8.6%. This slightly higher net margin means it is more profitable to grow organic potatoes than conventional potatoes - and it helps to explain why production continues to increase, despite downward trending prices.

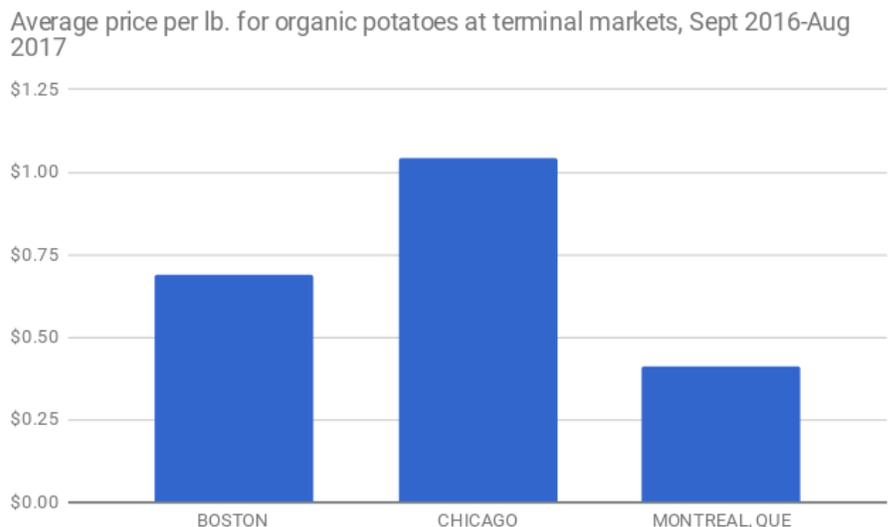
Washington State Organic Potato Budget	
Yields per acre	47396
Costs per acre	
Soil Prep and Planting	\$995.00
Fertilizer & Pesticides	\$1,800.00
Irrigation	\$200.00
Harvest	\$1,487.75
Other	\$180.71

<b>Variable Cost/Acre</b>	<b>\$4,663.46</b>
Fixed Cost/Acre	\$962.00
<b>Total Costs per acre</b>	<b>\$5,625.46</b>
<b>Cost per lb.</b>	<b>\$0.1187</b>

- **Western organic farms will probably continue to dominate the market for organic processing potatoes.** John Chartier notes that most (if not all) organic potato processing companies that started on the East coast have moved to the West. Given the much lower prices for organic potatoes in the West, that’s no surprise. Western growers tend to be larger, and have higher yields per acre; these two factors contribute to lower costs per lb., which means they can afford to sell potatoes more cheaply. Given this, it is unlikely that Maine’s organic potato producers will be able to capture much of the market for organic processing potatoes.
- **But currently, western potatoes are prohibitively expensive to ship to Northeastern markets, due to distribution costs.** While Washington growers are receiving \$.13 per lb. for their potatoes, organic potatoes from the West trade at around \$1 per lb. at the Chicago terminal market. This compares unfavorably to the \$.69 per lb. or so that organic potatoes from the Northeast and Atlantic Canada command at the Boston terminal market.
- While some buyers in the Northeast region did report buying some organic potatoes from the West, most organic potatoes reaching Northeastern retailers originated from either Maine or Canada - despite the West’s lower production costs. Mike Guptill from Goldbell buys from either PEI or Maine because “I get a break on shipping costs.”

### Prince Edward Island

- **Potatoes from PEI are Maine growers’ biggest current competitors in the Northeast.** While shipping costs are currently preventing Western organic potatoes from entering the Northeast retail market during any season but the summer, organic potatoes grown in Prince Edward Island have quickly taken over a large share of Northeastern US retail. Accounts that are largely serviced by PEI organic potatoes include a large chunk of Whole Foods, and Costco.
- **PEI potatoes have competitively low unit costs.** An academic study published in the journal, *Agriculture and*



*Agri-Food Canada*, estimates the average cost to produce one lb. of PEI organic potatoes to be \$.17 USD per pound. While this is slightly higher than Washington State, shipping costs to NYC from PEI are only about \$.04 per lb., compared to \$.16 from Washington State.

- **Organic potatoes from PEI and Quebec are trading for an average price of \$.41 per lb.** at the Montreal terminal market; in particular, potatoes from PEI traded for an average of \$.33 per lb. on average. This may be abnormal; some potatoes from PEI entered Montreal market at the very low prices of \$.22-\$.24 per lb. in June and July, which may indicate that growers were desperate to get rid of inventory.
- **Canadian organic potato prices are more adversely affected by the exchange rate than they are by shipping costs.** The chart below projects the price to land a full 44k lb. truckload of organic PEI potatoes shipped from the terminal market in Montreal to five major Northeastern cities at exchange rates ranging from 81% to 100%. An average reefer freight rate of \$2 per mile was used. The price per lb. declines only slightly between Montreal and Baltimore, indicating that shipping costs have only a slight effect. As the exchange rate increases, however, the price per lb. goes up significantly. Thus the exchange rate has the most dramatic impact up on PEI's ability to compete in Northeastern US markets.

	At exchange rate:				
<b>Cost per lb. to transport a FTL of organic potatoes from Montreal to:</b>	81%	85%	90%	95%	100%
<b>Boston</b>	\$0.43	\$0.45	\$0.47	\$0.50	\$0.53
<b>New York</b>	\$0.44	\$0.46	\$0.49	\$0.51	\$0.54
<b>Philadelphia</b>	\$0.44	\$0.46	\$0.49	\$0.52	\$0.55
<b>Baltimore</b>	\$0.45	\$0.47	\$0.50	\$0.52	\$0.55

**PEI organic potatoes have the perception of being consistent in grading quality and availability**

- Several distributors noted that they often purchased PEI organic potatoes because they perceive them to have more consistent availability and grading.
- Most organic potatoes from PEI “flow” through one of three packing houses - this provides a high level of consistency.

**Maine**

**Maine can be competitive in the Northeast market.**

- In order to compare Maine's efficiency of production with that of PEI's and Washington State's, we constructed two enterprise budgets: one for a farm growing organic russet, red and yellow potatoes at total scale of 400 acres of potatoes; and one for a packing house that washes, bags, and sells 10 million lbs of potatoes per year. In many cases, the same farm is both growing and packing their own product; but we broke out the to see how the

market could affect farms that grow and sell to packing houses as well as farms that “do it all”.

- These models demonstrate that it costs a farm at this scale about \$.10-\$.12 per lb. to grow ungraded organic potatoes. Farms that do so and sell to packing houses are currently receiving \$.18 -\$.20 per lb.
- It costs the packing house about \$.105 per lb. to wash, grade, and pack potatoes so the total cost to grow and pack potatoes is about \$.20 to \$.23 per lb.
- This puts Maine in a position to remain competitive with PEI and the West on price.

Enterprise Budget - Field Potato Production	Organic Russet Potatoes			Organic Red/Yellow Potatoes		
	Qty. per acre	\$ per acre	\$ per lb.	Qty. per acre	\$ per acre	\$ per lb.
Average Price Received			\$0.18			\$0.20
Total Gross Field Yields	22500	\$4,050.00		18000	\$3,600.00	
Total Variable Costs		\$1,748.44	\$0.08		\$1,748.44	\$0.10
Gross Profit		\$2,301.56	\$0.10		\$1,851.56	\$0.10
Gross Margin			56.83%			51.43%
Total Fixed Costs		\$436.70	\$0.02		\$436.70	\$0.02
Total Costs		\$2,185.14	\$0.10		\$2,185.14	\$0.12
Net Profit		\$1,864.86	\$0.08		\$1,414.86	\$0.08
Net Margin			46.05%			39.30%

Enterprise Budget - Packing House	Organic Russets Cost per lb.	Organic Reds/Yellows cost per lb.
Total Direct Labor	\$0.01	\$0.01
Total Packaging Costs	\$0.08	\$0.08
Fixed Costs		
Total Equipment Depreciation Costs	\$0.0036	\$0.0036
Total Other Overhead Costs	\$0.0049	\$0.0049
Farmer Ownership Profit Goals	\$0.0060	\$0.0060
<b>Total Packing House Costs</b>	<b>\$0.1046</b>	<b>\$0.1046</b>

<b>Summary - Field and Pack House Costs per lb.</b>	Russets	Reds/Yellows
Variable -Field	\$0.08	\$0.10
Variable - Pack house	\$0.09	\$0.09
<b>Total Variable</b>	<b>\$0.17</b>	<b>\$0.19</b>
Fixed - Field	\$0.02	\$0.03
Fixed -pack house	\$0.0145	\$0.0145
<b>Total Fixed</b>	<b>\$0.04</b>	<b>\$0.04</b>
<b>Total Costs</b>	<b>\$0.21</b>	<b>\$0.23</b>

## Market Forecast

**Production of organic potatoes will continue to increase until the price received by a large potato grower provides a comparable net margin to that of conventional production.**

- Large scale mixed conventional/organic potato farms are driving the increase in organic production at the moment. Since these farms are comparing the profitability of organic vs. conventional production, they will continue to increase organic production until the profitability of organic is equivalent to their conventional production.
- Based on the studies referenced above to detail unit costs for Washington State and PEI, it appears that this “threshold” price received for organics would be \$.126 per lb. for Washington growers, and \$.24 per lb. for PEI growers.

**With trucking costs added in, this puts the price to ship an organic potato from Washington or PEI to New York City at about \$.28 per lb.**

- Freight costs from Washington average \$.16 per lb., while those from PEI average \$.04 per lb. - either way, this puts the landed cost in NYC at \$.28.

<b>Predicting the Effects of Increased Supply on Pricing in the Northeast Retail</b>		
	Washington State	PEI
Yields per acre	47396	20698
Divided by: Total Costs per acre	<b>\$5,625.46</b>	\$3,526.76
<b>Cost per lb.</b>	<b>\$0.1187</b>	<b>\$0.17</b>
Net Margin for conventional producers in the region	6.53%	38.00%
Organic Price/lb. at which net margin is comparable to that of a conventional farm (AKA the lowest organic prices that are tolerable to growers in that region):	\$0.1264	\$0.24

Plus: Truck Rate per lb. to land potato in NYC	\$0.16	\$0.04
<b>Total Cost per lb. to land a potato in an NYC Supermarket Warehouse</b>	<b>\$0.29</b>	<b>\$0.28</b>
<b>Projected Retail Price/lb. @ 300% markup</b>	<b>\$0.86</b>	<b>\$0.83</b>

**To compete, a Maine packing house will have need to be able to tolerate prices in the mid-twenty cents per pound region for bagged grade A organic potatoes, pre-freight costs.**

- Freight costs for a Maine grower are about \$.03 per lb. to NYC; this puts the price received at about \$.24-\$.26 per lb.
- For growers who sell ungraded potatoes to packing houses, this translates to a price of around \$.11-\$.13 per lb.

**Maine can remain competitive**

- In order to remain competitive in the face of declining prices, supplying farms will need to maintain a minimum scale of at least 400 acres in potatoes each year (organic or conventional) to cover fixed costs. This may push some smaller growers out of the commodity market.
- The supplying farms maintain or increase gross (pre-grading) yields of 22,500 lbs per acre for russets, 18,000 lbs per acre for reds/yellows. If soil organic matter and yields deteriorate, the farms will need to diversify their production so that potatoes are grown on only about 25%-33% of their available acreage.
- Smaller farmers who can't or won't expand acreage or increase yields will need to strongly differentiate themselves into niches in order to remain competitive. One option is to grow more purple or other colored potatoes; Mark Jewell thinks that specialty potatoes, such as fingerlings or purples, would play well as organics. He notes that sales of conventional purples are up 50%; and other "specialty" potatoes remain on a rising trend.

**Lowering organic potato prices to about 30% above conventional (about \$.75-\$.80 per lb.) could double or triple overall organic potato sales by attracting more "moderate" organic consumers.**

- If retailers reduced their prices commensurately as the grower prices went down, the retail price would shrink to \$.80-\$.85 per lb., about 35% above the price for conventional potatoes. This is near the threshold at which more shoppers may be induced to switch to organic. If organic enthusiasts bought 80% of their potatoes organically, and moderate organic shoppers bought 60% of their potatoes organically, overall sales in the Northeast would double to 150 million pounds; while farmers would increase sales by a little less than \$10 million; however, the price received by the farmer would drop from \$.37 to \$.25.
- It is very important to note that this would have to be done in a coordinated fashion along the supply chain so that all actors shared equally in costs and benefits. The danger is that, if a farmer lowers prices and a distributor doesn't see a need to increase volume, then the distributor will of course accept the lower price, but not increase volume, leaving the farmer high and dry.

- Mark Jewell from Hannaford cites lack of supply as the main reason retail prices are still high. This is curious, given that supply seems to be sharply increasing; the cause may be that distributors aren't yet convinced that lowering prices and increasing sales are in their best interest.

**Enhancing consumer perception of the “purity” or organic potatoes could also help increase sales.**

- Potatoes are actually on the dirty dozen list, at #12; but, as mentioned before, potatoes lag behind in terms of overall market share vs. conventional, at 3.52% vs. 13% overall.
- Increased consumer awareness of the degree of pesticide residue on potatoes would help increase sales of organic potatoes.
- Ironically, the [development of GMO potatoes](#) by Idaho potato giant Simco could be a boon to the organic potato industry; “avoid genetically modified products” is the #3 reason consumers buy organic, and marketing an organic potato as “GMO free” may increase sales.

<b>The Organic Potato Industry: A Summary</b>	
Current size	398 million pounds harvested in 2015
Growth Rate	68% growth from 2011-2015; growth has increased since
Major Players	Four Western states (WA,OR, CA, CO) account for 90% of all production
Maine's share	1.6%; but Maine is largest Northeast state
Organic premium	90% above conventional at retail level
Best target market for Maine:	Northeast retail
Major competitors in this market area	Prince Edward Island, the West
Estimated consumption in Northeast:	76.8 million pounds
Current pricing received by Maine farms	\$.33-\$.50 per lb.
Seasonal trends	Prices start out slow in fall, peak around Holidays, slump to lowest point in March, rise sharply in summer
Pricing predictions	Prices received will drop to \$.25-\$.30 per lb.; organic retail premium will drop to 30-40% above conventional
Volume predictions	Lbs. consumed in market area may double or triple as prices come down

**Keys to Increasing Maine’s share of the growing market**

- **Target sales of tablestock potatoes to organic moderates in the Northeast**

- **(and the retailers and distributors who serve them).** A high concentration of affluent, suburban families who are food enthusiasts (the prime segment for new organic purchases) lives in the Northeast; Foodservice customers are not likely to pay organic premiums; and working within the Northeast provides Maine growers with a transportation advantage over their Western competitors.
- **Price items so the final organic premium at the checkout is 30-40% above conventional; and the price is competitive with other suppliers.** Marketplace competition is driving the price down to this range, probably within 3-5 years. This is also the price range that induces more “moderate organic” shoppers to make the switch to organic. For organic potatoes, this will land the price at somewhere between \$.25-\$.30 per pound received by farmer for bagged grade A potatoes.
- **Aggregate potatoes in a small cluster of packing houses (2-3?) to develop consistent grading standards and availability.**
- **Develop retail packaging that clearly differentiates products from their conventional counterparts, emphasizes their Maine-grown & GMO-free wholesomeness, and is easy for retailers to process through their checkout systems.** Remembering that top the reasons consumers purchase organic include, “avoid products that rely on pesticides/chemicals . . . growth hormones . . . [and] genetically modified organisms,” the packaging should emphasize the absence of these “contaminants” in a way that associate it with a Maine-grown wholesomeness. Visually, the packaging must be so clearly differentiated from conventional offerings that a customer notices the difference with a cursory scan. This includes noticeably different packaging types and colors. Additionally, each item needs to have an easy to find PLU/bar code to expedite the checkout process.
- **Package items in smaller sizes.** Smaller sizes mean less “sitcker shock” when shoppers compare organics to conventionals; and food enthusiast segment prefers to buy smaller sizes of more diverse items. This means 3 lb. bags for potatoes.
- **Work through existing distributors/brokers with existing access to target markets.** While it makes sense to develop a brand that the end consumer recognizes (and most retailers would welcome it for organics), gaining access to retail warehouses can be a complicated and difficult business - usually, you either need a really special, hard-to-produce-but-high-in-demand item, or an existing supplier needs to step away.

### **How Might an Increase in Production of Organic Potatoes Affect Production of Maine Grains?**

- If total consumption of organic potatoes in the Northeast doubled to 150 million pounds, and Maine increased its market share from 8% to 12%:
  - Maine would increase its production to 18 million pounds and 1,125 acres of organic potatoes.
  - This would increase organic barley production to about 3.5 million pounds.

	Current	Projected Growth	% increase
NE retail consumption:	76,816,665	150,000,000	95%
Maine's share of the market:	8%	12.00%	46%
Lbs. produced in Maine:	6,317,000	18,000,000	185%
Acres of potatoes required to do this:	395	1125	185%
Lbs. of organic barley that would get produced:	1,231,815	3,510,000	185%

## Other Crops

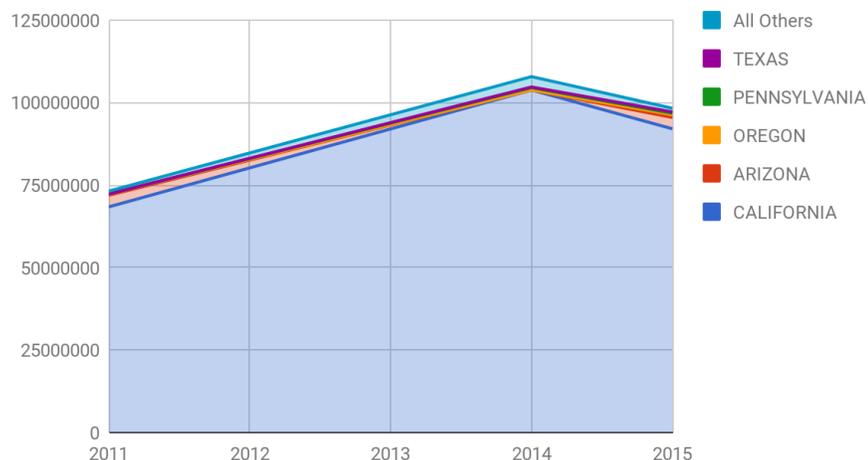
- While organic potatoes are the most likely candidates to increase grain production, two other crops emerged from the research process of this report that could improve and diversify the profitability of organic farmers in Aroostook County.

### Broccoli

#### Industry Overview

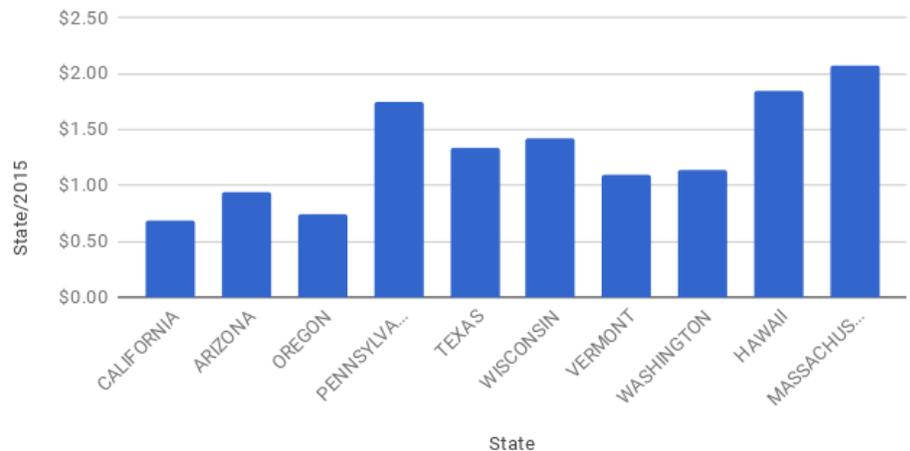
- **Organic Broccoli Production grew by 34% from 2011-2015.** US organic broccoli yields grew from 7.3 million pounds to 9.8 million.
- **California accounts for 90% of organic broccoli production.** California farms harvested 9.2 million pounds in 2015. Arizona and Oregon are the next two top states, but they trail far behind, at 3.5% and .8% of the overall total.
  - **Pennsylvania is the largest East coast producer of organic broccoli.** PA organic broccoli production shot up from 19,500 lb. harvested in 2011 to almost 700,000 in 2014. Production dipped back down slightly in 2015. Pennsylvania had about .5% of the overall market in 2015.
  - **Prices paid to Pennsylvania growers and other Eastern states are far better than prices in the West.** While growers received an average price of \$.69 per lb. in California in 2015, the price in Pennsylvania was \$1.75. In general, East Coast states had higher prices than the biggest three Western states (Arizona, California, Oregon).

Organic broccoli production, in lbs.



- **Broccoli's high level of perishability probably contributes to this difference.** While the higher price per lb. in PA is probably a function of scale and low transportation costs, the fact the broccoli perishes faster than potatoes or other storage crops probably also plays a role. High perishability means higher risk of shrinkage for those involved in distributing broccoli - and the further the broccoli has to travel, the higher the risk, and thus cost. The transportation cost advantage that East coast growers enjoy is magnified by more perishable crops.

Average Prices per lb. for the top 9 organic broccoli producing states in 2015



- **Overall, the average price received by farmers has climbed a little.** The price rose from \$.64 per lb. in 2011 to \$.72 in 2015.

- **The average acres harvested per farm has held steady.**

Nationally, this is around 14 acres per farm; farms in California harvest about 49 acres each. Unlike the potato industry, organic broccoli does not appear to be consolidating into the hands of larger farms.

- **In 2016, organic fresh broccoli had about 4% share of the overall fresh broccoli market.** Of the 202 million pounds harvested total, 8.9 million lb. were certified organic.

#### Total Market Size

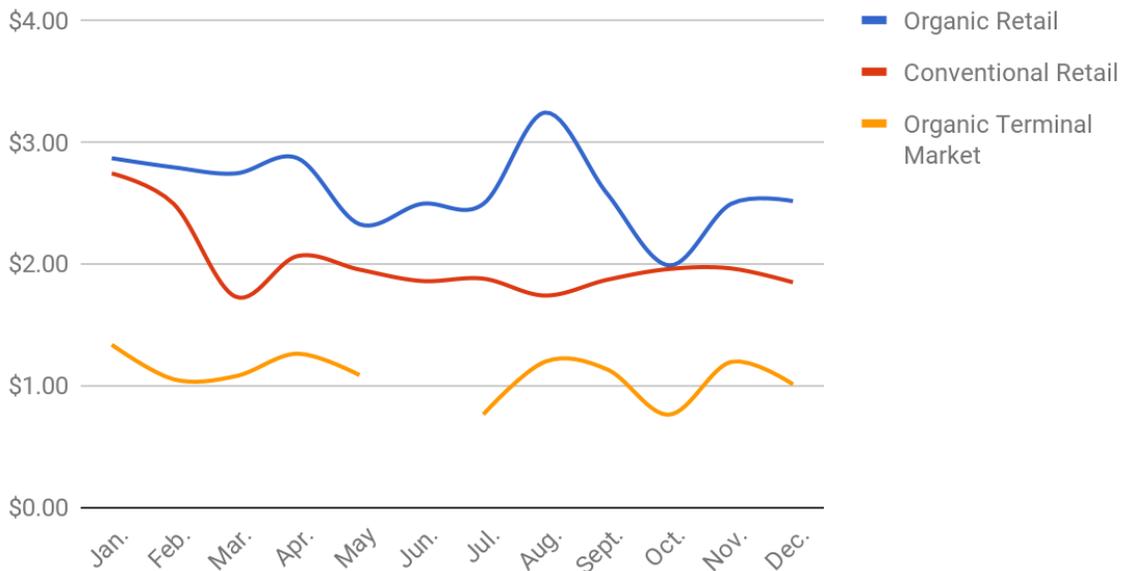
- **Total organic fresh broccoli consumption in the Northeast is estimated to be about 4.9 million pounds annually.** According to data supplied by the Leopold Institute's Food Estimator, The Northeastern states along the coast consume about 124 million pounds of fresh broccoli annually. Assuming the 4% organic share, this means that the Northeast consumes about 4.9 million pounds of fresh organic broccoli annually.

#### Pricing

- **On average, organic broccoli retails for \$2.61 per lb. in Northeast grocery stores.** This is a 30% premium above conventional, which retails for just about \$2 per lb. on average.
- **On average, the markup between the retail and terminal market price is x2.4.** The average terminal market price in 2016 in the Northeast was \$1.08 per lb.
- **Organic broccoli prices spiked in the late summer/early fall of 2016.** Retail prices jumped from \$2.50 in June and July to \$3.24 in August, before dropping back down to

\$2.57 in September. The terminal market price jumped from \$1.06 to \$1.19. By October, the market was glutted, and prices dropped to \$1.99.

## Northeastern Organic Retail, Conventional Retail and Organic Terminal Market Broccoli Prices by Month, 2016



### Market Needs

- **Buyers expressed a strong desire to source more organic broccoli from Aroostook County, especially in the late summer and early fall.** As the pricing data demonstrates, organic broccoli is in short supply in the Northeast in late July, August, and September. This is because growers in hotter, drier climates have trouble establishing new plantings through the the early summer.
- **Put altogether, the buyers interviewed expressed an interest in about 108,000 lb. of broccoli, for \$129,000 in gross sales.** At the conservative yield estimate of 3,500 pounds per acres, this would require 31 acres to trial.

### Onions

- Distributors who handle potatoes often handle potatoes often also handle onions - probably because the storage conditions for both crops are similar.
- Onions also share many of the same harvest/postharvest handling characteristics as potatoes. They are windrowed, harvested with a harvester that resembles a potato harvester, placed in cold storage, and packed for retail in 3, 5, or 10 lb. bags using similar bagging machines.
- For these reasons, organic onions may be a good match for an Aroostook farm looking to diversify.

- Of the crops discussed, Mike Guptill from Goldbell has the strongest interest in organic onions. He buys most of what they use from CA and NV, but “I would rather buy from the Northeast if the quality was the same.” Goldbell packs 4-6 truckloads a week (160,000 to 360,000 lbs.) for Trader Joe’s.
- Organic onions are often sold in grocery stores in 3 lb. bags; retail prices averaged about \$4 per bag (\$1.33 per lb.) in Northeast grocery stores.
- Terminal market prices averaged a little over \$.70 per lb.
- In order to sell to a repacker like Goldbell, a farm would probably expect a price of around \$.40 per lb.

### **Other storage crops (winter squash, rutabaga, carrots, turnips).**

- In general, buyers expressed less interest for organic versions of these storage crops, citing sufficient existing supply.
- Mark Jewell from Hannaford Mark notes that, in general, there is not a high level of demand for the organic storage crops we listed. Demand for turnips and rutabagas is very seasonal.
- Chris Miller from MOM’s is not as interested in other storage crops, as he has good local sources for those.
- Matt Burt from Boston Organics notes that they are, “generally fairly well supplied with . . . the storage crops that you mentioned with our existing local and regional network of growers.”

### **Conclusions - Other Crops**

- For both farms, adding organic broccoli and/or onions to the rotation could improve profitability. Mid-size farms would need to go direct to supermarket warehouses to get the price they need; whereas larger farms could work with distributors.
- Adding broccoli or onions wouldn’t necessarily increase organic production, however; it may actually reduce grain acreage, as farms replaced less profitable grains with more profitable broccoli and onions.

# Sources

**Introductory grain information** - *Planting New Ground: Organic Grain Market Analysis: Aroostook County & Western New Brunswick*. John Chartier and Noah Winslow, August 10, 2016. Presented to Elizabeth Reaves of the Sustainable Food Lab.

## Potato Industry Overview

Most industry data from the USDA's National Agricultural Statistics Service "Quick Stats" online database: <https://quickstats.nass.usda.gov/>. The data used in the report is summarized in the accompanying "Potato Industry Data" spreadsheet.

## Consumer Behavior

*The State of Organic Produce*. Presentation by the Organic Trade Association, June 2016.

*Organic & Natural 2016*. [Hartman Group].

*Profile of Organic Users* [Hartman Group].

*Dining out trends. When organic is on the menu . . . are diners willing to pay more?* [Hartman Group].

*Willingness to Pay for Locally Grown, Organic and Natural Foods: Implications for Producers and State-Sponsored Agricultural Marketing Programs*. John C. Bernard, John D. Pesek, Jr., & Kathryn A. Onken, University of Delaware, 2008.

<https://www.ams.usda.gov/sites/default/files/media/DE%200663.pdf>

## Wholesale Buyer Information

Most of this derives from direct interviews. These are captured in the accompanying "Buyer interviews" document. There is also a list of buyers that were contacted.

## Pricing/Volume Data.

Most of this derives from the USDA's Agricultural Marketing Service's "Specialty Crops" customizable online database: <https://www.ams.usda.gov/market-news/custom-reports>. The data used in the report is summarized in the accompanying "Potato Industry Data" spreadsheet.

Total consumption data came from the Leopold Center's US Food Market Estimator: <http://www.ctre.iastate.edu/marketsize/>

## Enterprise Budgets

*2015 Costs Estimates of Producing Fresh and Processing Potatoes in Washington*. Suzette Galinato and Peter Tozer, Washington State University, 2015.

<http://extension.wsu.edu/publications/pubs/tb14/>

*Economics of organically managed and conventional potato production systems in Atlantic Canada*. M. Khakbazan, R. Henry, J. Haung, R. Mohr, R. Peters, S. Fillmore, V. Rodd, A. Mills. *Agriculture and Agri-Food Canada, 2014*.

Enterprise budgets for Maine growers were constructed using data from grower interviews and MOFGA. These are contained in the accompanying enterprise budget spreadsheet.