

USDA-SBIR Phase I Final Report  
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Project Title: **Encouraging Small Farms to Adopt Produce Traceability Technology  
Through Creation of Brand Value**



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CAFF – Community Alliance with Family Farmers  
 LLC - Limited Liability Corporation  
 PTI – Produce Traceability Initiative

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## Executive Summary

### Project Title: Encouraging Small Farms to Adopt Produce Traceability Technology Through Creation of Brand Value

Consumers are increasingly concerned about the safety and wholesomeness of the food they eat. At the same time, public health officials and advocates concerned about American dietary habits are emphasizing the need for plentiful supplies of fresh produce available to and affordable for all consumers. Traceability technology promises to aid in resolving these apparently conflicting goals.

However, small farmers do not have the resources to provide traceability due to the high price and time commitment required to implement existing traceability systems. At the same time, consumers increasingly wish to buy locally-produced food, and to “know their farmer.” The objective of this research was to determine if unifying small farmers to sell through a standardized line of 100% traceable produce would allow them to capitalize on consumers’ demands for locally-produced food and their desire to know the farmer who produced the food, providing traceable food for consumers while increasing the profitability of small farms.

*Top 10 Produce* has developed a technology and marketing approach (“Know your farmer, know your food”) that provides the traceability and food safety features of GS1 technology, but expands those benefits in a way that will especially benefit small and mid-size family farmers. An important feature of the technology is that it provides these benefits to small producers at a much lower cost than other GS1 alternatives. It benefits consumers by providing them the opportunity to learn details about the farmer and the farmer’s production practices instantly at the point of sale through a smartphone app, or later by simply typing the product number into a home computer.

Research in three experimentally-controlled markets, together with cost estimates of implementing the technology, indicated that the gains from using Top 10 LLC’s “Know Your Farmer” transparency technology are likely to substantially outweigh the costs. Taken together, observations from the three markets suggest that the “know-your-farmer” benefit of the traceable oranges is enough by itself to increase sales revenue, even without including potential benefits of traceability. Return on investment is likely to be positive. The results suggested that increased promotion and improved marketing of the traceable products would likely increase sales even further, but further marketing research in settings with a control group is necessary to verify that observation. Part of improved marketing could also focus on food safety benefits of traceability, in addition to “know your farmer” benefits.

Alliances with several unique companies have enabled us to offer this technology to small family farmers at a sufficiently low cost to make it economically attractive for them, so that this venture is more likely to be sustainable over the long term.

## USDA-SBIR Phase I Final Report

### Project Title: Encouraging Small Farms to Adopt Produce Traceability Technology Through Creation of Brand Value

#### TECHNICAL OBJECTIVE

Consumers are increasingly concerned about the safety and wholesomeness of the food they eat. Recent well-publicized salmonella outbreaks have heightened that concern. At the same time, public health officials and advocates concerned about American dietary habits are emphasizing the need for plentiful supplies of fresh produce available to and affordable for all consumers. Traceability technology promises to aid in resolving these apparently conflicting goals. To minimize costs of providing fresh produce to consumers by optimizing their supply chain management, as well as to increase safety of the product, a growing number of retail chains requires that their suppliers employ sophisticated traceability technology.

However, small farmers do not have the resources to provide traceability due to the high price and time commitment incurred to implement existing traceability systems. As a result, small, local growers will be increasingly shut out of retail chains. The prominence of this emerging issue was identified as early as March 2004, when the U.S.D.A. published a study regarding traceability of the nation's food supply.

Although the industry responded with the Produce Traceability Initiative (PTI), intended to move the supply chain to a common standard for electronic produce traceability by the end of 2012, a significant challenge to the plan's success has been smaller growers' reluctance to adopt the GS1 technology required for participation, because the technology can be expensive for a very small operation to acquire and implement. A GS1 manufacturer's number is required before a small grower can label any of their cases of produce for traceability under the system required for compliance with the PTI. The cost of a manufacturer's number can range from \$750 into the thousands for the first year, with subsequent annual renewal fees that varies depending on a company's annual sales. For the struggling small to medium sized grower, even \$750 is too steep a price to absorb. Because small farmers do not have the resources to provide traceability due to the high price and time commitment required to implement existing traceability systems, small, local growers will be increasingly shut out of retail chains (USDA 2009).

The objective of our research was to determine if unifying small farmers to sell through a standardized line of 100% traceable produce under a nationally recognized trademark would increase the profitability of the small farm and provide a net return on investment for the technology and marketing expense required for the plan's implementation.

Top10 is a technology-based marketing business focused on helping small- and mid-size farms promote sale of local products. It adds value through enhancing marketability of growers' produce through consumers' preference for "know your farmer, know your food." *Top 10 Produce* has developed a technology and marketing approach that provides the traceability and

food safety features of GS1<sup>1</sup> technology, but expands those benefits in a way that will especially benefit small and mid-size family farmers. An important feature of the technology is that it provides these benefits to small producers at a much lower cost than other GS1 alternatives.

Specifically, the technology provides consumers the opportunity to learn details about the farmer and the farmer's production practices instantly at the point of sale through a smartphone app, or later by simply typing the product number into a home computer. This allows small farmers to capitalize on consumers' desire to "know the farmer" as they are able to do at farmers markets. Knowing they are buying from smaller growers would especially appeal to those consumers who are most interested in buying "local" food for its perceived health and environmental benefits and because they value sustainable agriculture. It would allow consumers to verify that farmers are, in fact, growing their produce the way they say they are.

Under the *Top 10 Produce* marketing approach smaller growers unified under a nationally-recognized brand would have increased access to large retail chains and a method to differentiate produce based upon quality. Consumers would benefit from having many of the "buy local" features of a farmers market without the added cost and inconvenience of traveling to farmers markets. Using consumer feedback as a marketing tool, small farms would be able to create an identity for their product outside the operation of a commodity based approach and facilitate consumer education and dialogue on high quality produce. Through our online community, consumers would become educated, developing the ability to appreciate produce that has distinguishable characteristics, such as a higher sustainability rating or fresher taste. Growers would be able to create a relationship between consumers and their produce, not unlike wineries and their wine club members. The development of the consumers' ability to discern high quality produce among the nominal produce and identify with that produce would allow the small producer to sell their produce at a premium. This in turn would help the business of farming on a small-scale turn profitable, thereby stimulating local communities across this nation. Consumers would also benefit from the added assurance of food safety that traceability technology provides.

## Background

Consumers are increasingly concerned about the safety and wholesomeness of the food they eat. Recent well-publicized salmonella outbreaks have heightened that concern. At the same time, public health officials and advocates concerned about American dietary habits are emphasizing the need for plentiful supplies of fresh produce available to and affordable for all consumers. Traceability technology promises to aid in resolving these apparently conflicting goals. To minimize costs of providing fresh produce to consumers by optimizing their supply

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<sup>1</sup> GS1 is an international not-for-profit association that developed the most widely-used supply-chain standards system. One component of the GS1 system is barcodes.

chain management, as well as to increase safety of the product, a growing number of retail chains requires that their suppliers employ sophisticated traceability technology. However, small farmers do not have the resources to provide traceability due to the high price and time commitment required to implement existing traceability systems. As a result, small, local growers will be increasingly shut out of retail chains (USDA 2009).

At the same time, consumers increasingly wish to buy locally-produced food. Farmers markets, for example, are growing in popularity and in sales volume. In spite of that growth, though, sales at farmers markets represent only a little more than one percent of total food sales (USDA 2010 Local Food Systems). Retail grocery stores are increasing efforts to tap into consumers' preferences for buying locally-produced food, and knowing the farmer who produced their food (Mulvaney 2010).

In spite of this promising opportunity for increasing sales of locally-produced food, small and mid-size family farmers with limited or no access to farmers markets are subject to demands of packing houses and large retailers, including traceability and other compliance requirements that, while they promise improved food safety and food supply chain management, increase costs to farmers, especially impacting small and mid-size family farmers. The Produce Traceability Initiative (PTI) is an industry-wide effort intended to move the supply chain to a common standard for electronic produce traceability by the end of 2012. The plan involves implementing a standardized system of case bar coding for all produce sold in the United States, to allow product to be tracked throughout the distribution chain. If it is successful, the plan will improve the effectiveness of the industry's current traceability procedures

### ***Previous Research on Consumer Willingness to Pay for Locally-Produced Food and for Traceability***

There is increasing evidence that consumers' desire to buy locally-produced food and to know the farmer who produced it is not just a fad. According to Sloan (2011), 70% of consumers said they were more likely to visit a restaurant offering locally-sourced items, and about 70% of restaurants, and 53% of grocery retailers offered locally-sourced items. On a list of Top 20 Trends in food, locally grown produce is #2 (#1 is locally-sourced meats and seafood; sustainability and children's nutrition are further down the list.) On a "Top 20 Restaurant Trends for 2011" list from Quickservice, locally-sourced produce ranks #4.

Consumers' preference to know the farmer who produced their food is similarly strong. Feedstuffs Foodlink (2010), reporting on interest in locally-grown food, quoted Walter Robb, co-president and chief operating office of Whole Foods Market: "Our customers want to know where and how food was produced and who grew it. We see an entire new granulation in the information dissemination process coming."

Sloan (2011) notes that claims of "farm-fresh," "Farmer's Market," "Farm-Style," and "Farm-Grown" on restaurant menus have increased by 80% over the past three years, suggesting that the farmer may have become restaurants' most valuable spokesperson. She quotes Al Ferone

of Hilton Hotel Corporation as saying “I believe the producer/grower will become the next series of celebrities to hit the food circuit (Sloan 2011).”

Much literature has examined market transactions for which data on quality characteristics of the traded goods is available. In many situations, such as when a new characteristic must be evaluated, no transactions have occurred and no data are available to analyze. For example, when beef producers want to determine the extent to which consumers would value a new organic beef product, they cannot use traditional demand estimation methods including the hedonic price model because the product is not then available for purchase. That was the case faced in this project. No market transactions data were available for produce that was both locally-grown and traceable back to the farmer, in a form that could be compared with produce that did not have one or both of those characteristics.

While a rich and growing set of methods has been developed for these situations, and research using them is part of a proposal by **Top 10 Produce** for SBIR Phase II research, their use was beyond the scope of this Phase I research project. Instead, in-store displays were created to present traceable, locally-grown produce side-by-side with produce that did not have those characteristics, and actual consumer transactions for produce in these displays was analyzed. Although this type of research was limited in the number of data points it provided, it yielded useful results, as described below.

A few studies have addressed economics of traceability, finding that traceability is an important issue in the food industry. Using auction models, Dickinson and Bailey (2002) showed that U.S. consumers were willing to pay a premium for traceability-assured meat products. Dickinson and Bailey (2005) also used experimental auctions to estimate WTP for red meat traceability and found a significant premium for traceability in the U.S., Canada, the U.K., and Japan. The experimental results showed even higher premiums when traceability was provided with additional food safety and humane animal treatment guarantees. Hooker et al. (1999) surveyed U.S. and Australian food processors on the feasibility of traceability at the processor level and found overall positive response from the processors.

More recently, Pouliot and Sumner (2008) found that exogenous increases in food traceability created incentives for farms and marketing firms to supply safer food by increasing liability costs. The study also showed, though, that food safety declined with higher number of farms and marketers, and imperfect traceability from consumers to marketers dampened liability incentives to supply safer food by farms. Past economic studies on traceability have focused primarily on evaluating its value to consumers, particularly concentrating on red meat products. These studies have been based on limited samples using experimental auction models. Few, if any, of these studies have analyzed the value of traceability to consumers of fresh produce. Also, few studies have evaluated the economic costs of implementing traceability.



## RESULTS AND ACCOMPLISHMENTS

Results from Phase 1 indicated that consumers are willing to pay more for produce sold using this technology, because it captures a growing desire by consumers to know more about their food and about the farmer who produced it. That conclusion was reached through a series of findings.

The specific objectives of Phase 1 were to:

- 1) attract growers in the proper demographic: small growers that produce higher-than average quality produce
  - a. growers willing to market to consumers who prefer to buy from a local, small grower
  - b. growers willing to tell “the story” behind their production, including the grower’s value system, life story, and plan to balance profitability and “doing the right thing” for their community and the environment.
- 2) Continue development of a smart-phone “app” so consumers can scan the barcode on the item labels of produce from these growers to find out the information the growers have provided. In turn the consumers can provide feedback to the growers.
- 3) Continue to develop a recently established grower-owned cooperative, Salinas Valley Growers’ Reserve, in partnership with Growers’ Collaborative and other similar type aggregators, to market the cooperative’s produce to local grocery stores. Growers’ Collaborative is an organization that assists small farms that aggregate their produce in bringing their produce to local supermarkets and conventional produce distributors.
- 4) Measure returns on investment in the Top 10 technology and approach.

We noted in our Phase I proposal that for our plan to be a success, we would require a sufficient volume of small growers participating in the program so that: 1) the statistical data received would be representative of the industry as a whole, and 2) consumers would know to seek out the information provided through the individual item labels as the GS1 system became the traceability standard in the produce industry. Early indicators at the time suggested that we would have the volume of growers that we needed, but that was not the case.

### **Attitudes and Perceptions of Small Growers to Investment in Traceability**

Although we accomplished objectives 2 and 3 above, accomplishing objective 1 proved much more difficult, which in turn made objective 4 much more difficult to accomplish. In spite of focused efforts at recruiting growers, in cooperation with Community Alliance with Family Farmers, growers proved reluctant to commit to the program. We encountered this difficulty during the first part of our Phase I project (May 2010 to September 2010) and investigated the reasons. We learned through informal discussions with small growers that their reluctance to invest in traceability technology was in part because of implementation cost, as well as a failure to perceive the full benefits of the technology.

Specifically, most of the growers cited the extra labor cost in applying item-level labels to their produce, as well as the lost revenue from delaying shipment of the produce to market. The growers also declined to use traceability because they could not quantify the benefits – many of these growers sold their produce through farmers’ markets and food service companies. In the growers’ estimation, these produce customers did not value traceability and therefore the additional costs involved with traceability could not be recouped with higher produce prices.

This lack of reception to traceability by small growers was unexpected – at least to the extent that we experienced during the initial months of the study. Prior to the study, our company had managed to sign up small growers from all over the United States to use traceability in marketing their produce. The small growers’ lack of interest in traceability stood in contrast to consumer interest in traceability.

By that time, on-line polling among visitors of our food enthusiast website, *www.ourlocale.com*, suggested that a significant percentage of consumers may be willing to pay 10% more for produce that features traceability that enables them to know their farmer. Specifically, we posed the question “Would you pay more money for fresh produce to know your farmer?” Of the 70 individuals polled, 9% said they would not pay more, 17% stated that they would pay 1-5% more for produce featuring traceability, 39% stated that they would pay 6-10% more for produce featuring traceability, 21% stated that they would pay 11-15% more for produce featuring traceability, and 14% asked to see a picture of the farmer before answering. Thus, at least 60% of consumers stated that they would pay at least 6% more for fresh produce if they knew the farmer who was producing it and 1 in 5 stated that they would pay over 10% more. (By the end of this project, in continued on-line “Know Your Farmer” polling achieving a total of 116 votes, these percentages had changed only a small amount, as seen in Table 1, with at least 52% willing to pay at least 6% more. Moreover, 21.55% wanted to see a picture of the farmer before answering, a capability that our technology provides.)

Table 1. Willingness to Pay for Knowing the Farmer Who Produced Fresh Produce

<b>Willingness to pay</b>	<b>Total of 116 votes</b>
Nothing	10.34% (12 votes)
1-5%	15.52% (18 votes)
6-10%	35.34% (41 votes)
11-15%	17.24% (20 votes)
Want to see picture of farmer before answering	21.55% (25 votes)

These results supported our hypothesis that consumers would be willing to pay for our brand-ensured transparency technology, but also confirmed the need stated in our original objective to determine whether producers can earn a sufficiently high return on investment to implement the technology.

After recognizing this reluctance on the part of small growers, we used the remainder of our Phase I project to measure as objectively as possible the benefits that producers could expect

to receive from selling their produce using this technology and associated marketing concept. We did this by putting non-traceable and traceable Valencia oranges side by side in three retail stores and tracking sales of each. The results (explained in more detail in the following paragraphs) validated the hypothesis that not only did consumers prefer produce that was traceable back to the farmer, they were willing to pay more for it as well. This is a double benefit to farmers: using this technology differentiates their produce from that of non-traceable produce so that when the market is over supplied farmers with a recognized brand do not have to reduce their price as much and, second, consumers are willing to pay a higher price for produce sold using this technology.

In addition, we recognized that we could achieve most of the benefits of the technology by using case labels rather than item labels. The cost of item-labeling is much higher than case-labeling. While large producers can spread the cost of investment in labeling machines and associated supply chain costs over a large volume, for small producers the cost is prohibitive. As a result of this discovery, *Top 10* now recommends case labels to producers, but provides item labels to stores that regularly use item labels for easier and more accurate checkout, and wish to apply the labels in-house, as this store did.

#### **Results of Phase I Market Research Experiments**

In Phase 1, three markets were tested to determine how consumer purchases of Valencia oranges with *Top 10* technology and traceability would compare with nearly identical non-traceable Valencia oranges, when the *Top 10* oranges were priced 30% higher. Although the results were not overwhelmingly conclusive, taken as a whole they strongly suggested that consumers were willing to pay a higher price, and to spend more, for oranges with *Top 10* technology.

Figure 1 shows that for Bi-Rite Market, consumers bought fewer pounds of the higher-priced traceable Valencia oranges (250 pounds compared with 360 pounds). However, the higher price partly offset the reduced quantity, so total revenue was only \$35 less for the traceable oranges. This was not the expected result: we expected that the total revenue would be higher for the traceable oranges. The produce buyer for Bi-Rite Market noted though, that although his customers loved to hear the story behind the growers (the “know your farmer” benefit of the traceability technology), Valencia oranges are not a premium product (primarily used for juicing), many of the customers were not aware of the unique “know-your-farmer” characteristics of the traceable oranges because the display material was not very attractive, and for those customers who did notice the “know-your-farmer” benefits, the explanation was not very clear. In other words, the marketing of the traceable product could have been much better. Also, because of the great interest shown by some of the consumers in the “know-your-farmer” benefits of the traceability technology, the produce buyer expressed interest in trying the experiment again.

At Oliver’s Market (Figure 2), by contrast, more traceable oranges were sold than non-traceable oranges, and because of the higher price for the traceable oranges, revenue for the traceable oranges was substantially higher than for non-traceable oranges. While consumers purchased

280 pounds of non-traceable oranges, they purchased more than 500 pounds of the traceable oranges. Since the price for the traceable oranges was higher, revenue for the traceable oranges was more than double that of non-traceable oranges (\$650 compared with \$280).

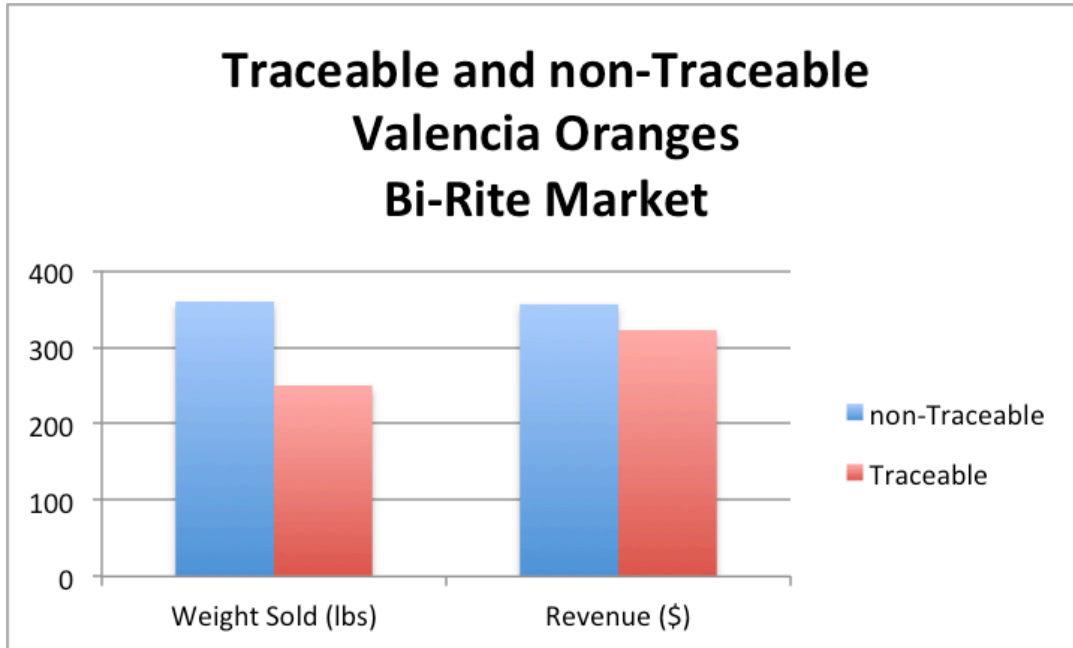


Figure 1. Pounds Sold and Revenue, non-Traceable and Traceable Valencia Oranges, Bi-Rite Market

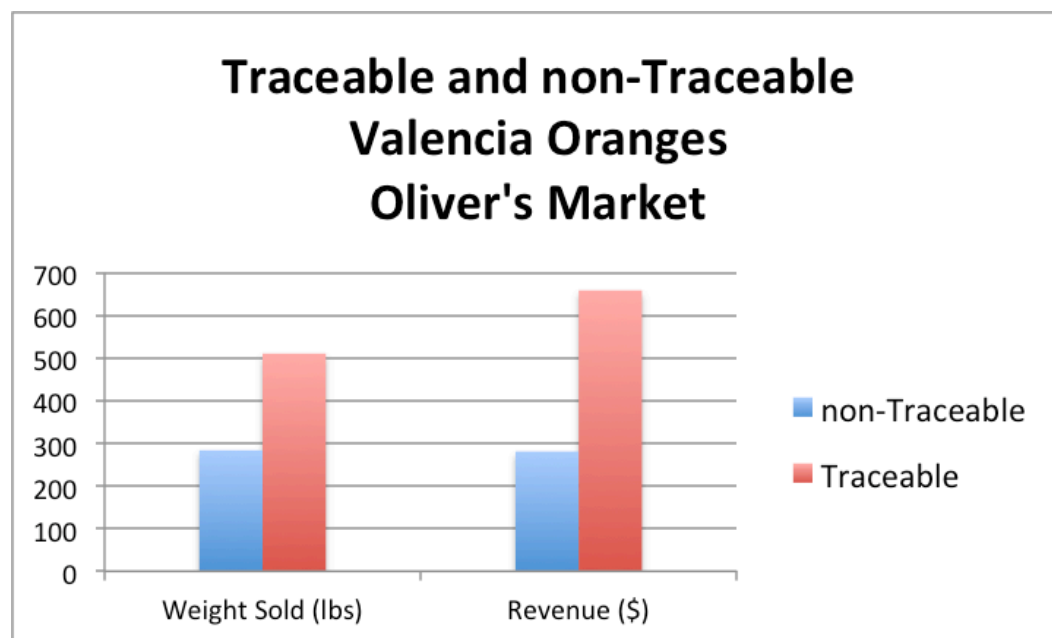


Figure 2. Pounds Sold and Revenue, non-Traceable and Traceable Valencia Oranges, Bi-Rite Market

At a third market, Star Market in Salinas, we had an opportunity to track daily sales of both traceable and non-traceable oranges. The photos below (Figures 3 and 4) show the non-traceable and the traceable Valencia oranges side by side. The enlarged pictures show the item labels (stickers) on each of the traceable oranges identifying them as “*Top10 Produce*” products that are traceable (right slot). In all other aspects the oranges are the same as the non-traceable organic oranges on the left. (Although *Top 10* now assumes producers will use case labels rather than item labels because of the higher cost to small and mid-size farmers to apply the labels, *Top 10* provides item labels to stores that regularly use item labels for easier and more accurate checkout, and wish to apply the labels in-house, as this store did.)

In the top photo, the “Know Your Farmer” information tag is visible next to the handwritten price tag “Traceable Organic Valencia Oranges, \$1.29/lb.” This limited marketing is the extent to which potential consumers were informed of the benefits of traceability benefits in Oliver’s Market and Star Market in Salinas (as noted above, there was even less marketing conducted in conjunction with the experiment in Bi-Rite). Even with that limited marketing, though, revenues were higher for the traceable oranges (\$250) than for the non-traceable oranges (\$230). As Figure 5 illustrates, quantity of traceable oranges was less than quantity of non-traceable oranges, but the higher price of the traceable oranges was more than enough to offset the reduced quantity, thus generating higher revenue. Also, demographics for this market indicate that the typical consumer is older, average 70 years or so. This demographic is less likely to care as much about traceability and knowing who the grower is, suggesting that the interest in traceability was probably less than in a more typical market.



Figures 3 and 4. Non-traceable (on left) and Traceable (labeled *Top10 Produce*) Organic Valencia Oranges

For this particular market, the cooperating retailer provided more detailed daily information in addition to summary data as provided by the other markets. These daily data provide additional insight, as seen in Figure 6. This figure shows that there was considerable variation in sales of each kind of orange from day to day, and that for most of the time period, cumulative revenue for non-traceable oranges exceeded cumulative revenue for traceable oranges. Statistical analysis covering the whole time period showed no difference between sales of traceable and non-traceable oranges. However, the data suggest that the longer the traceable oranges were available for sale the more frequently sales of traceable oranges exceeded sales of non-traceable oranges. Indeed, trend lines fitted to the daily data indicate that the trend in daily sales was increasing for traceable oranges, but flat for non-traceable oranges. Consumers seemed to increase purchases of the traceable oranges as they had increased exposure to them. Because of the later increases in purchases of traceable oranges, revenue for the entire time period for traceable oranges was higher than for non-traceable oranges.

Taken together, observations from the three markets suggest that the “know-your-farmer” benefit of the traceable oranges is enough by itself to increase sales revenue. In some cases (e.g., Oliver’s Market) quantity of traceable oranges was higher than for non-traceable, even though the traceable oranges were priced higher. It appears likely that increased promotion and improved marketing of the traceable products would increase sales even further, but further marketing research in settings with a control group is necessary to verify that observation. Part of improved marketing could also focus on food safety benefits of traceability, in addition to “know your farmer” benefits. The positive results obtained in these three markets should make it easier to obtain full cooperation from retail stores for such a study.

#### *Costs to Growers of Case-Labeling for “Know Your Farmer”*

These gains compare quite favorably to preliminary cost estimates of adopting the *Top 10* technology with the grower using case labels rather than item labels. Using case labels, the initial investment costs \$280 to be spread over a farmer’s total production of, say, 100,000 lbs. of produce for average fixed cost of \$0.0028/lb. Each case label costs 8¢, and with about 200 items per case, and 4 to 6 items per pound, the case labels cost from \$0.0016 to \$0.002/lb., bringing the fixed and variable costs of the labels and technology to about ½¢/lb. Extra labor required would probably be less than 2 minutes per case, leaving total costs at less than 2¢/lb. Thus, the premium is attractive relative to the cost. Better estimates are needed for labor costs, though, as well as opportunity costs of adjusting packing procedures for adding case labels.

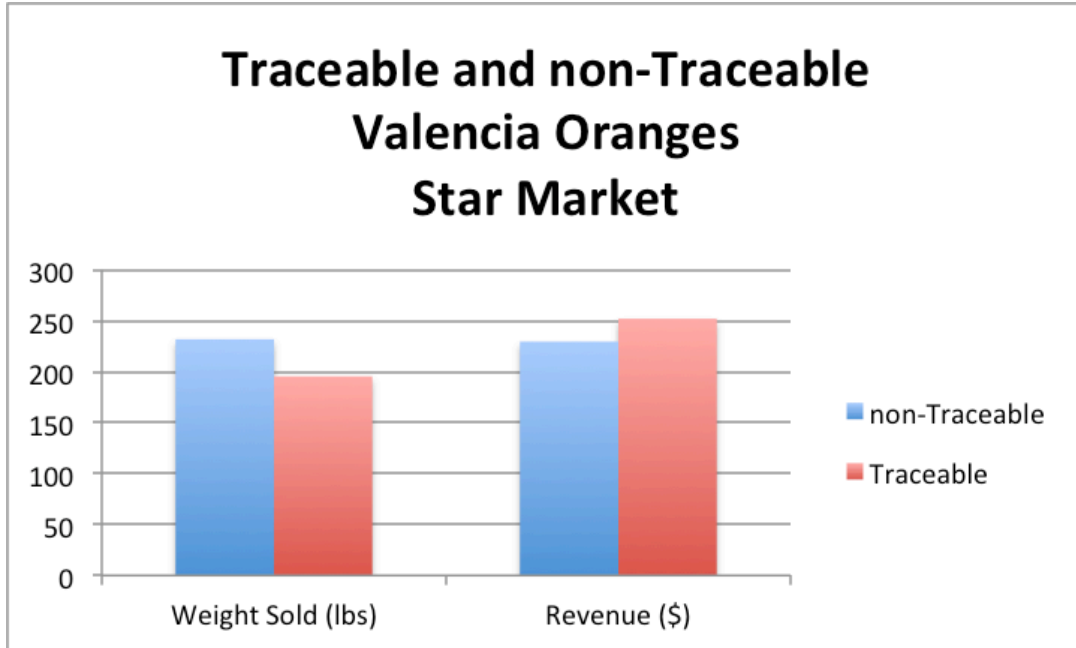


Figure 5. Pounds Sold and Revenue, non-Traceable and Traceable Valencia Oranges, Star Market.



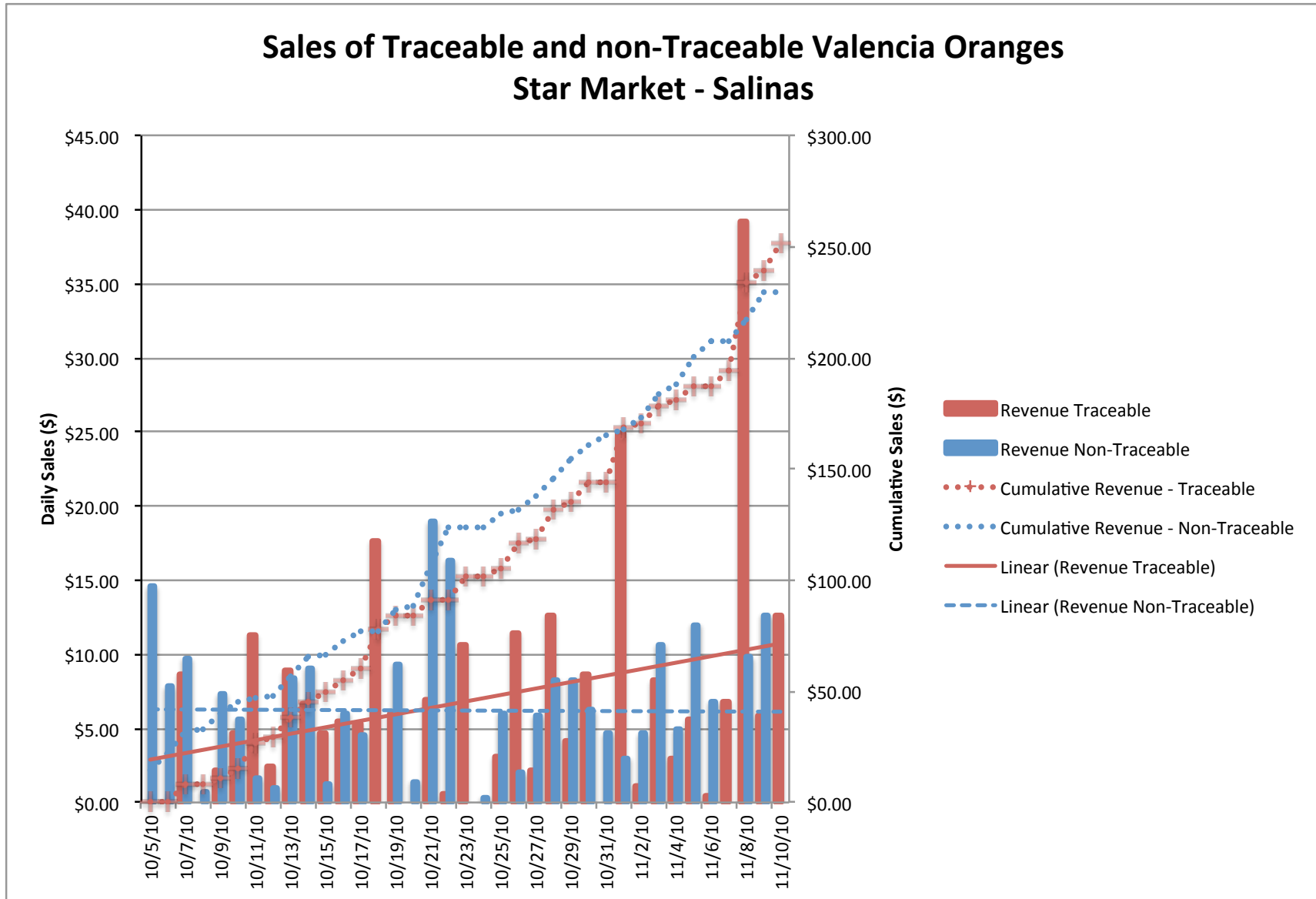


Figure 6. Revenue and Cumulative Revenue for non-Traceable and Traceable Valencia Oranges. Star Market - Salinas

## Commercialization Plan

1. The Top 10 Produce LLC technology provides branded GS1 traceability technology to small independent farms for an affordable fee, and provides a return on investment to the farmer for their investment in traceability. This is a critically important project because there is an imminent need for farmers to acquire GS1 traceability due to the recent passage of the Food Safety Enhancement Act, which became law in January 2011. We have chosen to follow the GS1 produce traceability standard developed by the international standards organization GS1 (formerly known as EAN-UCC) as the most efficient worldwide approach to achieve system-wide (i.e., both internal and external) traceability. We have concluded that this will be widely adopted as the produce industry standard since the industry-driven Produce Traceability Initiative requires GS1 traceability to be implemented by January 2012.

Because the GS1 technology is expensive for the farmers to obtain individually, they achieve significant cost savings by selling under our brand. For example, a strawberry grower selling a million dollars worth of strawberries next year might pay GS1 \$4,000 if they signed up directly with GS1 whereas they pay our brand only \$280. We are rolling this project out on a national scale, however the funding from this grant will be used primarily to promote small growers in the Salinas Valley, in California for a single commodity – strawberries. The reason for this focused geographic single commodity approach is that by uniting the small independent strawberry growers under a brand name in a smaller geographic area – "Locale Salinas Valley", our brand provides the benefits currently enjoyed only by the large national brands. This approach will allow these struggling smaller growers to retain their independence and to simultaneously participate in larger wholesale markets that will provide financial stability that will ensure the long-term sustainability that currently eludes them.

2. Top 10 Produce LLC's objective is to provide small independent growers with the lowest priced traceability available that will comply with all legal and retail requirements. The company was launched in June of 2009 in response to news about the pending Produce Traceability Initiative. Our executive Director, John Bailey, is a land use attorney in the Salinas Valley. He learned from the smaller growers he was representing that the traceability program being proposed as the industry standard would be cost prohibitive for small independent growers to acquire. He devised a system whereby small independent growers could unite nationally in order to spread out the costs of acquiring the technology through economies of scale, similar to what the large multinational brands enjoy. The business model is strictly efficiency driven and all work done by the company is done through alliances where possible. All services are provided on a cost-recovery basis with each new grower paying a subscription fee of \$280 per year (or \$360/year if they choose the \$30/month payment option). We currently have growers subscribed in twelve states, and a significant foothold of growers in the state of California. We had approximately \$3,000 in annual subscription income and we estimate we will have approximately \$20,000 in annual subscription income by September 2011. Because our business is set up on a cost recovery model, and to ensure that we are able to continue to meet our financial obligations, all other work is accomplished through the use of alliances or subcontractors, with the executive director being the sole full-time employee.

Examples of alliances are: Al Johnson, our certified GS1 US label consultant works in alliance with our company. We have paid for his certification training but he continues to work in alliance with our company because his company prints labels through his own company Agri-Label & Tag LLC. Therefore, Al is able to provide all of our GS1 services to the growers free of additional charge to our company. Furthermore, we recently added an additional fee service whereby growers can print their own case labels, and we will receive an additional \$280 as a "finders fee" from Agri-Label & Tag LLC for each of our growers who takes that route. Finally, for item labels, Agri-Label & Tag LLC pays us a fee equal to 10% of their net profit on each label order that goes into an earmarked account that we use to market the brand, to drive consumer sales. For a million dollar a year grower we estimate that this will equal approximately \$600 per grower in marketing funds that will help us to grow the brand.

Our relationship with Shopsavvy Inc. is similar. Alex Muse, the founder of Shopsavvy Inc. works in alliance with our company to connect our databases to their mobile application on ten million plus phones because Shopsavvy Inc. has independent revenue derived from advertisers who wish to have consumers see a brief ad when the item is scanned. Therefore, the services that Shopsavvy Inc. provides are free of charge to our growers. Other services we provide through paid subcontractors include marketing consulting, database entry, marketing, graphic design and photography/video work. To date this work has been paid with a combination of grant funds and grower subscriptions. Going forward, this work will be paid with grant funds and label copyright fees. Finally, as we begin to scale up, there are several sustainable models that present themselves as far as volume discounts from service providers. The most significant of these is the ability to negotiate discounts for cooling, and we have included a letter of commitment to that effect at the end of this commercialization plan adequate to provide \$500,000 of funding to take the project through phase III.

3. There are approximately 2 million farms in the United States. Under the Food Safety Modernization Act passed in January of 2010, the vast majority of these will need traceability. Though the Tester Amendment to the Food Safety Modernization Act exempts farms selling less than \$500,000 and shipping direct to a store or restaurant less than 275 miles away, the reality is that at some point in time nearly every farm will be included. First, the paperwork in filing for the exemption is onerous. Few, if any, farms will be willing to file the necessary paperwork each year. Second, even if exempted, farms need to place grower cards similar to those provided by our program. Our grower cards alone would cost a grower more than \$280 to develop. Therefore, we see 2 million farms as a realistic market potential. As far as competition, our competition is GS1. GS1 is a global monopoly and is the only organization that provides the traceability being required by the industry driven Produce Traceability Initiative. Because this traceability is the industry standard, and uses the same barcodes scanned at the checkout of stores nationwide, it is our opinion that any company that does not comply with the GS1 standard will be required to add the GS1 barcode system on top of whatever traceability system it settles upon. This redundancy is inefficient and is counterproductive to the most efficient model, in our opinion. Therefore we see GS1 as our only competition and we plan to compete on price and service. Our pricing is significantly lower than GS1's and our efficient business structure will ensure that it stays that way. However, our growers tell us that

the ease of implementation is our best selling feature. When a grower signs up with GS1 directly, they do not receive the personalized service that enables them to roll out the GS1 system without any hassle whatsoever. When they sign up with Top 10 Produce LLC, we ensure that our GS1 certified solutions partner consultant does all of the number assignment, barcode creation, software preparation, and label design. All the grower needs to do is to provide us with a product list and we do the rest. Our online marketing has proven effective in marketing our program nationwide. Now, when a grower Googles "Produce Traceability Initiative" or "Produce Traceability" our company webpage ranks high enough to be listed on the first page of results, along with the website promoted by the industry, including the Produce Marketing Association, United Fresh, and GS1. This is marketing more precious than money could buy and we receive it without cost due to our work with small independent farms nationwide.

4. We have secured our leadership position with trademarks, servicemarks and trade secrets, and while we did have significant legal expenses on startup, those legal expenses have concluded, and our leadership position was successfully secured. Our trademarks and service marks include: Top 10, Locale, and Grower's Reserve. We have completed the legal work to secure these marks and all three are currently in use in our ongoing operations. Therefore, no significant expenditures are required going forward and we do not see any other organization positioned in a way that could threaten our continued leadership position for small farm traceability. Top 10 Produce LLC has had our services provided by Al Johnson, certified by GS1 US and listed on their website as a certified solutions partner. We are the only produce brand in the nation to be so listed. While the training for this certification had some cost, it has further strengthened our leadership position and enhanced the value of our Grower's Reserve servicemark, through which we provide certified agricultural consulting services to our clients.

5. Revenue Stream: Our revenue stream comes from five areas:

- a) Annual Subscription. \$280 per grower if paid annually or \$360 per grower if paid monthly.
- b) Label copyright fees. \$0.01 per item label paid by the distributor, but charged to the grower. This penny is used to market the berries to the consumer.
- c) Label printing system sales fees. \$280 per label printing system sold to a Top 10 Produce Licensed grower. Currently the label printing system costs the growers who choose that option \$3,000 and the \$280 paid to Top 10 Produce LLC is actually a discount given to the brand, that is used to market the Top 10 Program to new growers.
- d) Printer discounts: As the number of item labels increase, the company is able to achieve volume discounts from contractors. These volume discounts can be used to further strengthen the brand. An example of this is provided for a recent strawberry label order:
  - 100,000 Press Run 2" X 4" Strawberry labels for 16oz Clamshells for C&R Farms. All 100,000 labels will be for 16oz Clamshells.  
Label cost: 100,000 Press Run 2" X 4" Strawberry labels for 16oz Clamshells with a label cost: \$22.69 per 1,000 labels = \$2269.00
  - Volume reimbursement to Top 10 less \$50 plate = \$ 369.00

- We have similar volume discounts we receive on our shelftalkers but we use these discounts to reduce the cost of future orders rather than to market the brand.
- e) Other volume discounts. As the brand grows, we will be able to achieve economies of scale in many areas, such as packaging, grower supplies, and cooling. As the most significant of these costs is cooling, we have focused on this as a point of beginning. As demonstrated by the commitment letter from Uni-Kool provided with this application, cooling the berries grown by independent growers from one cooler to another can result in significant cash payments which can then be used to market the brand to consumers and to pay for the development of additional technology that will enhance the consumer-brand experience.

We are confident that the revenue provided by the above will be sufficient to sustain our company, and will ensure long term sustainability and profitability for our company and for the small independent growers we represent. We have received commitments for follow on funding from Uni-Kool and commitments for in-kind support from Agri-Label & Tag LLC and Buy Health America, Inc., supporting our belief that such revenue streams will supplement the annual subscription fees paid by the independent growers who are join our brand nationwide.

## Conclusions

The results from this research have already helped convince both growers and retailers that the *Top 10* technology and approach is worth considering further. In a sense, Phase I served as an extremely useful “proof of concept” for the technology and the hypothesized benefits.

The difficulties incurred in the initial phase of our Phase I project have proved to be an invaluable learning experience for *Top 10*. We now have a much more nuanced understanding of the difficulties growers face in implementing traceability – the direct cost of implementing the technology is only part of the cost; disruption in supply chain management, particularly at harvest time, is also a significant cost. This understanding has helped redirect our focus towards lowering the direct and indirect costs of implementing a comprehensive and therefore workable produce traceability system, as well as a better estimate of the extent to which growers might experience increased demand.

One way that Phase I research helped reduce those costs is by convincing us to focus on case-level labeling rather than item labeling. This allowed us to offer essentially the same traceability and “know your farmer” benefits, but at a greatly-reduced cost and much less disruption in farmers’ packing operations. While large grower/packing house enterprises can label each item (e.g., labeling individual Fuji apples) because they have made an expensive investment in assembly-line machines that affix the labels, small and mid-size farmers cannot afford this. By providing case-label traceability, affixing labels and cards to cases rather than to individual items within a case, *Top 10* can reduce costs to these farmers while still providing the benefits of traceability to consumers as well as retailers and farmers. This shift has greatly improved the probability that small and mid-size farmers can profitably implement the technology.

However, these costs are still important for them, so further research is needed to more precisely estimate costs of adjusting their operations, as well as the cost of the technology itself. In order to provide a greater degree of confidence for farmers/investors to make a well-informed decision about whether to adopt this technology, the research conducted within the limited scope of Phase I should be expanded to include more replications with more types of fresh produce, at more stores with a greater diversity of clientele, over a longer time period. It also must estimate the less obvious costs, such as disruption in produce handling, that appear to be a significant barrier to adoption.

Also, in order to assess the potential for expansion to other regions and other states, further research should include locations outside the Salinas Valley. Although consumers outside the region may not technically fall under the definition of buying local, the technology would provide them with many of the same benefits as consumers located closer to actual production. These consumers would also be able to “know their farmer” because scanning or typing in a number would allow them to see all the information about the farmer that a local customer would be able to see. Since many consumers away from production areas cannot always buy fresh produce locally (for example, Oklahoma public schools who have committed to buy from local sources cannot buy locally-grown fresh strawberries in winter), *Top 10* farmers can gain a

potentially large market by selling to customers who want to know the farmer, particularly a family farmer, but would otherwise only be able to obtain fresh produce through a large-scale distributor who aggregates produce from large as well as small producers.

The results indicated that the gains from using Top 10 LLC's "Know Your Farmer" technology are likely to substantially outweigh the costs. Taken together, observations from the three markets suggest that the "know-your-farmer" benefit of the traceable oranges is enough by itself to increase sales revenue: even if quantity sold decreases, it is likely that price gains more than offset the quantity decreases. It also seems likely that increased promotion and improved marketing of the traceable products would increase sales even further, but further marketing research in settings with a control group is necessary to verify that observation. Part of improved marketing could also focus on food safety benefits of traceability, in addition to "know your farmer" benefits. The positive results obtained in these three markets should make it easier to obtain full cooperation from retail stores for such a study.