

Immigration Reform: Implications for Farmers, Farm Workers, and Communities

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Labor Issues Confronting Florida Tomato and Orange Growers

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Florida Tomatoes

General description of the Florida tomato industry

The Florida tomato industry generates an average of \$529 million, or more than one-half a billion dollars of agricultural revenues annually (FASD, 2008). Among Florida's vegetable crops, fresh market tomatoes account for more than 22 percent of total cash receipts and ranks as the third most important commodity among all Florida agricultural crops (FASD, 2008). While data does not exist to accurately quantify, industry experts agree that the tomato industry has diversified and significant acres have been planted to Roma varieties (i.e. plum or pear shaped), cherry, and grape tomatoes. The standard bearer for the Florida industry, however, remains the mature green or round tomato. Mature green varieties generate more than 90 percent of the total tomato.

During the late 1980s and early 1990s, more than 50,000 acres in Florida were planted to fresh market tomatoes (Florida Tomato Committee, 1992). After the passage of NAFTA in 1995, Florida tomato acreage decreased to 32,500. By the 1998-99 season, acreage rebounded to more than 44,000 acres and remained between 43 and 45,000 until after the 2004-05 season (Florida Tomato Committee, 2008). Since then, acreage has been falling and in 2007-08 31,500 acres were planted. During the 2007-08 season, 45 million cartons (25-lbs) were shipped through the Florida Tomato Committee. The Florida Tomato Committee administers the Florida tomato marketing order and monitors production on all round tomatoes south of I-4 (an east-west interstate highway bisecting peninsular Florida from Tampa through Orlando to Daytona Beach). The Committee is divided into four districts. Districts 1 and 2 encompass Miami-Dade County and the southeastern coastal counties, respectively. Each district sells between 6 and 9 percent of the total annual shipped cartons. Southwest Florida, or District 3, centers on Immokalee and ships between 30 and 35 percent of the total annual cartons. Ruskin and Palmetto are the focal points of District 4, which accounts for nearly 50 percent of the round tomatoes shipped from Florida. Growers in District 4 typically pick a late summer /early fall crop before giving way to growers in Immokalee (District 3) who start harvesting tomatoes in late October and early November (Florida Tomato Committee, 2008).

Historically, the Mexican tomato industry has been viewed as Florida's most important competitor within the round/mature-green market. In the past 10 years, however, tomato products from European and Canadian hot-houses have been increasing and reducing the market share of mature-greens (VanSickle, 2008).

Break-even prices are estimated to be \$8.50 per 25-lb carton (Scott and Taylor, 2007). Average seasonal prices listed in Table 1 suggest that growers received less than a break-even price for 4 out of the last 10 years. Alternatively, in 5 years out of the last 10 years, market prices have averaged higher than break-even levels. Production during the current season (t) tends to be positively correlated with the seasonal average price in the previous season (t-1). Prices higher than break-even levels seem to spur more production in the following year (Table 1 and Figure 1). Seasonal average prices, however, mask considerable market variability as demonstrated during the 2004-05 season. During early November 2004, farm prices for Florida tomatoes were reported as high as \$45 per carton, a price never seen before. By January 1, 2005, eight weeks later, market prices had fallen to below \$4 per carton. Hurricane Charlie was largely responsible for this dramatic swing in prices. On Friday, August 13, 2004, H. Charlie blew over the heart of District 4 and destroyed most of the tomato production in the Ruskin/Palmetto areas. Harvest of these tomatoes was to begin within weeks after the storm hit. Many of these growers replanted soon after the hurricane, and 90 days later their production in District 4 started to coincide with normal production in District 3 (Southwest Florida, Immokalee).

Harvesting and Labor Issues in the Florida Tomato Industry

Fresh market tomatoes are handpicked. Trained harvesters are especially important for mature green varieties in that, workers have to distinguish between mature and immature fruits, as well as pick the correct size (i.e. extra large vs. large vs. medium) for the current market. Techniques of hand harvesting remain unchanged. A worker fills a 30-35 pound bucket and then walks the filled bucket to a gondola or field truck where it is dumped into a bin. Workers are paid by a piece rate for each bucket they deliver to the field truck. Piece rates vary between 40 and 50 cents during the south Florida tomato harvesting season. Crew-level data suggest that hand harvester average between 20 and 25 buckets per hour implying the average hourly earnings during active harvesting is between \$8 and \$12 per hour (Roka, 2009).

Workers are limited in the total hours they can spend harvesting tomatoes both in terms of available days during the season and in the number of hours they can harvest each day. At best, workers in south Florida have 33 weeks per season to harvest round tomatoes, and even then, they may have to change housing locations or spend upwards to 4 hours per day traveling between home and a harvest site. By the end of April, tomato season in south Florida is finished and migrant workers are relocating to north Florida, or to other production areas in the Mid-Atlantic States. During a single harvest day, only between 4 and 6 hours per day are spent

actively harvesting. In order to protect crops from the spread of plant diseases, harvesting does not begin until late morning when the plants are dry of any early morning dew. Poor market conditions may limit what is picked on any given day. Conversely, favorable market conditions push for longer harvesting days. While actual harvesting may not begin until late morning, harvest crews are organized and transported to the field during the early morning hours. Crews may be “engaged to wait” for as many as 3 or 4 hours a day. Labor laws require that workers earn at least the minimum wage for the total hours they work plus any “waiting” time. If a worker’s earnings from the piece rate formula fall below the minimum wage income threshold, the employer must augment the worker’s income up to the minimum income threshold. Worker earnings and minimum wage income thresholds are calculated by pay period, which is typically one week. Consequently, productivity earnings are averaged across the pay period. In 2004, the Florida legislature raised the state minimum wage above the federal rate and has been incrementally increased annually. Effective January 1, 2009, the Florida minimum wage increased to \$7.21 per hour (Roka, 2009). By July 24, 2009, federal minimum wage will supersede Florida and increase to \$7.25.

Attempts at mechanizing the Florida tomato harvest have been limited and not with much success. During the 1970’s there was research to develop fresh market tomato varieties which could withstand the rigors of machine harvest. This effort waned as federal policies discouraged research into labor saving technology. In 2006, the Florida Tomato Committee funded a small project to analyze the viability of a mechanical harvest aid. The unit placed conveyers across the tops of tomato rows. Workers picked behind the system and placed fruit on the conveyers where they were transported and collected to a moving wagon. This system eliminated the time spent toting filled buckets to a field truck. To date, this system has not been completely adopted by any grower and data are limited to explain why. Perhaps the value increased worker productivity could not justify the capital expenditure, or perhaps such a system would require fundamental changes to the existing piece rate system that neither growers nor workers are prepared to make. This particular harvest system requires that workers perform and be paid as a team. Compensation would have to be a function of harvest speed, which in turn becomes a function of slowest worker in the team.

For three years in the late 1990’s and early 2000, the Florida Tomato Committee funded a robotics project through Carnegie Mellon University. While some technological progress was achieved, an economic model was not deemed possible. Advances in imaging technology, software development, and automated guidance provide encouragement for continued research into robotic harvesting. The biggest technological hurdle, however, remains developing robotic equipment that can pick tomatoes with the same discernment and speed of a trained human hand. Robotic technology must achieve significantly higher rates of harvesting

speed with the same quality in order to offset the expected high capital cost of a robotic system.

Farm Labor Advocates and Tomato Growers

Farmworker advocacy groups have applied steady and mounting pressure on Florida's agricultural employers. The Migrant Farmworker Justice Project (MFJP), the Farmworker Association of Florida (FAF), and the Coalition of Immokalee Workers (CIW) are a few of the organizations that have made an impact on worker-employer relations. Vegetable growers, and specifically tomato growers, have received the most attention from these advocacy groups.

The MFJP is an off-shoot of Florida Rural Legal Services and was established to provide legal counsel for seasonal and migrant farmworkers whether or not they were legally documented to work in the U.S. Lawyers for the MFJP successfully argued landmark cases that established a joint employer relationship between growers and their labor contractors. The implication of joint employment is that growers are jointly liable for infractions committed by their crew leaders and labor contractors. MFJP organizes and brings class action suits against agricultural employers who violate federal wage and hour rules. In addition, MFJP closely scrutinizes agricultural employers who contract for H2A guest workers.

The FAF has taken a lead role in lobbying for stricter enforcement of state and federal pesticide safety laws. A coalition of farmworker interest groups helped enact the Farmworker Safety Act during the Florida legislature's 2004 session. The Act incorporated the federal Worker Protection Standards (WPS) into state law. In addition, the Act increased fines for pesticide safety violations, increased the number of field inspectors, authorized the use of worker representatives to file complaints, and established an interagency working group to coordinate responses among state agencies to pesticide field violations. In 2005, a section of the Farmworker Safety Act was renamed the Alfredo Bahena Act in honor of the late Mr. Bahena who worked on behalf of the FFA.

The CIW works on behalf of farmworkers to increase their income through an increase in the piece rate. Initial CIW strategies sought to confront growers directly over farmworker income. In the past 15 years, the CIW staged boycotts, hunger strikes, church rallies, and marches to bring attention to farmworker wages and force growers into direct negotiations over piece rates and farmworker earnings. These efforts did not yield any appreciable increase in harvest piece rates. Starting in 2000, the CIW revised its strategy and started lobbying the retail buyers of Florida tomatoes to pay an extra "penny-a-pound." The additional money would be paid to the workers who harvested the tomatoes for each buyer. To date, Taco Bell, McDonalds, Whole Foods, Burger King, and Subway have agreed to pay a penny-a-pound more for all the tomatoes they buy from south Florida. The impact of a penny-a-pound payment could be substantial for

a worker. If a worker harvests the equivalent of 20 cartons per hour, an extra penny-a-pound from the retail buyer would translate into a \$5.00 per hour increase in income, or total hourly earnings of between \$13 and \$17 per hour.

Two questions remain about the long term sustainability of the CIW penny-a-pound contracts. These questions exist, in part, because each contract has been a bilateral agreement between the CIW and an individual buyer and the specific terms of the contracts are not available for public review. The first question has to do with ensuring that the correct worker receives his or her additional earnings. Given that tomatoes from a single block may go to several buyers, it is unclear how “ownership” of an individual worker’s cartons can be traced to the final retail buyer. The CIW’s ultimate goal is to put in place contracts that cover all tomatoes grown in south Florida. If that objective is achieved, accounting by individual worker would not be necessary as every worker would receive an additional penny-a-pound for every tomato picked. A second, a more substantive, question is whether the retail buyers will continue to buy tomatoes from south Florida growers at the same, if not greater volumes. Economic incentives will push buyers over time to shift their tomato purchases to other areas where a penny-a-pound is NOT paid, including off-shore production areas. Hence, the long term benefits to the south Florida tomato industry and its workers’ economic welfare are questionable.

The push from farmworker advocacy groups has led to some changes in the way south Florida tomato growers conduct their business. Farming operations are devoting more human resources to worker training, particularly with respect to WPS, and promotion of general farm safety. Most, if not all, of the large tomato growing operations have moved away from hiring workers through a labor contractor and view all workers as their employees. As such, they have developed accounting systems to track worker hours and directly pay each worker. In 2005, the Florida Fruit and Vegetable Association (FFVA) initiated the Socially Accountable Farm Employers (SAFE) program. SAFE certifies farm operations through a third party audit of the farm’s employment, worker payment and training practices. Increasingly, fresh fruit and vegetable retail buyers are requiring third-party audits as part of establishing long-term marketing agreements. While food safety concerns are the primary driver of third-party audits, increasingly retail buyers want assurances that all employees within the supply chain are being paid equitably and work in safe environments. Human trafficking and cases of indentured servitude are getting increased attention from law enforcement and community advocacy groups.

Florida Oranges

Description of Production Issues

Orange production is Florida's signature agricultural crop. The fruit is pictured on Florida license tags and the orange blossom is the official state flower. Since the 1998-99 season, cash receipts from oranges averaged more than \$830 million annually, ranging from a low of \$523 million in 2004-05 to a high of \$1.3 billion in 2006-07 (FASS, 2009). On-tree value of oranges account for between 85 and 90 percent of total citrus revenues. Overall oranges and other citrus fruits rank as Florida's second most important commodity group behind greenhouse and ornamental products (FASD, 2008).

Severe freezes during the decade of the 1980s reduced bearing acreage of orange trees to less than 400,000 acres (FASS, 2009). Beginning in the late 1980s and extending into the 1990s, significant acreage was replanted in the southwest region of the state where the frequency and severity of future freezes were expected not to be as pronounced. By 1996 bearing acres of oranges rebounded to 624,000 acres. Since then, bearing tree acreage has been declining as a result of citrus canker, hurricanes, and most recently, citrus greening (Table 2).

Citrus canker was reported in 1995 on dooryard trees near the Miami-Dade International Airport. For a variety of reasons, efforts to contain canker within the Miami area failed and by 1998 citrus canker spread into commercial groves in southwest Florida. Canker was aggressively fought between 1998 and January 11, 2006. Federal law require canker to be eradicated and refinements to the eradication protocol led to the removal of all citrus trees within 1,900 feet (~260 acres) of an infected tree. Growers were compensated for the trees that were removed. Despite the mandate of federal law and a compensation program, the eradication program was abandoned on January 11, 2006. Four hurricanes had blown through the Florida citrus belt during 2004 and 2005 and essentially spread the canker bacteria across the entire citrus production region. By the time the mandatory canker eradication program was stopped, more than 87,000 acres of citrus had been destroyed (DPI, 2007).

The hurricanes and the spread of canker had a devastating effect on the citrus nursery industry. During the spring of 2005, several nurseries became infected with citrus canker and nearly two-thirds of the citrus nursery stock was wiped out as part of the eradication program. Growers refused shipment on the remaining third out of fear that canker could be brought to their groves. A series of industry meetings formulated the Citrus Health Recovery Plan (CHRP), whose primary recommendation was to require all future nursery trees to be propagated under protected structures. Prior to 2005, more than 70 percent of the nursery trees were produced under "open-field" conditions. As a result the canker eradication of nursery stocks and the subsequent CHRP, replacement trees for the commercial industry were not available between fall 2005 and January 2008 when the first fully protected nursery trees were ready for planting.

Bearing tree orange acreage has fallen to below 465,000 acres (Table 2) and likelihood is very strong that orange acreage will decline even more within the next 3 to 5 years. The reason -

citrus greening. As devastating as canker had been on the Florida citrus industry, many growers and industry experts view citrus greening as a real threat to the future viability of the Florida industry. One industry sage contrasted the severity of the two diseases by likening canker to hemorrhoids and greening to liver cancer. The greening bacterium is vectored by the Asian citrus psyllid, whose populations are endemic throughout Florida. There is no known cure once a tree is infected. Scientists do not yet know how to culture the bacteria to even begin to design a cure. Breeding resistance to greening offers some promise and genetic work has identified possible DNA material to induce resistance. Breeding resistance, however, represents several years if not decades of work. Further, the breeding work will likely involve GMO techniques which may raise questions about consumer acceptance of fruit and juice derived from trees enhanced by GMOs. What is most insidious about greening is that a tree can be infected for several years without showing any symptoms. Further, HLB is often misdiagnosed as one of many nutritional deficiencies.

The standard University of Florida HLB control recommendation to growers is a three step process – 1) control psyllids, 2) scout the entire grove at least 4 times a year and flag all symptomatic trees, and 3) remove infected trees within 24 hours of identification. Unlike the canker program, there are no federal or state laws requiring removal of infected trees, and compensation is not being paid to growers who follow through on tree removal. Production costs are estimated to increase by at least \$300 per acre just to cover the psyllid sprays and additional scouting costs (Muraro, 2008). The value of lost future revenue from destroyed trees is likely to be greater.

Virtually every Florida citrus grower has ramped up their chemical spray programs in a concerted effort to control psyllid populations and movement. As to whether infected trees are being removed, grower behavior is mixed. Some large growers have aggressively scouted and rogued infected trees, but it remains unclear whether their efforts will ultimately succeed in controlling the rate of the greening infection within their groves. In addition to all the uncertainty about controlling the spread of citrus greening, it is unclear whether young trees can be planted and grown to produce sufficient fruit and keep citrus operations profitable. Young trees “flush” frequently, attracting psyllids and thereby increasing the likelihood of their infection. For many growers with a high incidence of greening and uncertainty over a viable replant strategy, following the standard recommendation to remove infected mature trees would be committing financial suicide. In general, growers are taking a “wait and see” attitude, which by itself will guarantee a further decline in citrus acreage.

Implications to Citrus Farmworkers

Seasonal and migrant farmworkers are the primary harvesters of citrus crops. Prior to 2004, a standard estimate for the total annual number of workers employed in citrus harvesting has

been 25,000 people (Polopolus et.al, 1998). The direct implication of declining citrus acreage is a decreasing demand for harvest workers. Total bearing citrus acreage prior to 2004 was 700,000 acres (FASS, 2009). By the end of the 2007-08 season, bearing acreage had fallen by 175,000 to 525,000 total citrus acres (FASS, 2009). Under average yield conditions, citrus harvesters can pick between 8 and 10 boxes¹ per hour (Polopolus, et.al, 1996; and Roka, 2009). If one assumes an average yield of 350 boxes per acre (FASS, 2009) and assumes that one worker is employed for 1,500² hours during the course of a season, then the reduction in citrus acreage that has already occurred, has reduced employment of citrus harvesters by nearly 4,100 workers, or a 16 percent reduction from the estimated base of 25,000 people.

Citrus Mechanical Harvesting

Given that more than 80 percent of the citrus acreage is oranges and that 95 percent of the oranges are delivered to juice processors, orange production and mechanical harvesting are closely linked. Citrus mechanical harvesting is a collection of technologies that include equipment design, abscission agents, and horticultural practices. The Florida citrus industry is pursuing mechanical harvesting as an option to hand harvest fruit for juice processing. Since 1995, the Florida citrus industry has invested more than \$19 million of grower taxes into a mechanical harvesting program.

Research and development of citrus mechanical harvesting systems started in the late 1950s lasted for over 25 years into the mid-1980s. The early program was motivated primarily by out of fear that sufficient labor would not be available to harvest the expanding orange grove acreage that was maturing during the late 1950s. A variety of equipment was developed and tested by engineers from USDA/ARS, Florida Department of Citrus, and the University of Florida. Trunk shake and catch systems were developed that improved harvest labor productivity by 3-fold. The freezes during the 1980s dramatically reduced production forecasts and created favorable market price conditions. The existing mechanical systems did hold much promise to dramatically lower harvesting costs and the constraints on labor supply were eased with the passage of IRCA in 1986. As a result, the Florida industry lost interest in pursuing mechanical harvesting technology. A more complete history with pictures and video clips can be found at the Citrus Mechanical Harvesting Website, <http://citrusMH.ifas.ufl.edu>.

Interest in mechanical harvesting renewed in the mid-1990s. Citrus production was rebounding from the earlier freezes and concerns over labor availability were raising with the crop production forecasts. A distinct difference from the earlier mechanical harvesting efforts was the presence of Brazil, whose citrus industry had emerged as the dominate producer in the

¹ One box of oranges weighs 90 pounds.

² One worker is assumed to work 45 hours per week during harvest season and harvest season lasts for between 33 and 34 weeks.

world orange juice market. Brazilian growers enjoyed advantages in lower land and labor costs that allowed them to grow, harvest, process, and deliver frozen concentrated orange juice (FCOJ) to the port of Tampa at less cost than a Florida grower. The motivation for the new mechanical harvesting program became lower harvesting costs.

Dr. Galen Brown was hired by the Florida Dept of Citrus to be the administrator of the mechanical harvesting program. Under Dr. Brown's leadership, several harvesting technologies were brought to Florida including a modified almond shaker from California. Dr. Brown stressed performance and harvesting speed that would significantly increase harvest labor productivity. By 1999, ten commercial harvesting contractors were operating various types of trunk and canopy shakers (Roka, 2000). Within three seasons, two systems emerged as the dominant systems, the trunk-shake-catch system and the continuous-canopy-shake-catch system. By 2006, continuous canopy shakers were being used almost exclusively because of grower perception that tree damage was less with canopy shakers than with trunk shakers. Both canopy and trunk shake and catch systems captured nearly 90 percent of the available fruit and improved harvest labor productivity by 10-fold (Roka and Hyman, 2005). More importantly, unit cost to mechanically harvest and glean remaining fruit was between 25 and 30 cents less than hand harvest crews. Acreage that was mechanically harvested increased to 35,000 acres during the 2006-07 season.

With the added production costs associated with citrus greening, lower harvesting cost and the potential for further cost reductions with improved machine efficiency, should have encouraged the industry to increase the rate of mechanical adoption. Instead, the enthusiasm within the industry for mechanical harvesting appears to be waning. In 1999, six equipment manufacturers were engaged in building machines. By 2006, only one company, Oxbo International, remained to build and service a continuous canopy shake and catch system. The acreage increases between 1999 and 2006 were steady, but slow. Overall, acreage mechanically harvested in 2006-07 represented less than 7 percent of the total orange tree acreage. For companies in the business of building and selling machines, the rate of growth for citrus mechanical harvesting in Florida was not fast enough. Complicating manufacturers' interests in the Florida harvesting market are the early indications that for the second consecutive year, mechanically harvested acreage in 2008-09 will decrease from the previous season. Inability to harvest late-season 'Valencia' oranges, tree health concerns, and trailer debris are dampening efforts to push the industry toward widespread adoption of mechanical systems.

Late-season 'Valencia' oranges always have been a significant technological challenge for mass-harvesters. 'Valencia' oranges are the premium fruit for juice processing are harvested between March and June. During the entire harvest period, two crops hang on the tree – this year's mature fruit and next year's emerging fruitlets. In normal growing years, the diameter of the

young fruitlets reach one inch by the middle of May and become susceptible for removal with mechanical harvesting equipment. Field trials indicate that at least 25 percent of next year's crop could be lost if mechanical harvesting proceeds through the late season.

University of Florida research concludes that mechanical harvesting prior to the late season period does not adversely affect the production or the longevity of well-nourished trees (Syvertsen, 2006). Alternatively, several growers observe a marked difference in overall tree vigor in blocks that have been mechanically harvested for several seasons. If declining tree vigor can be explained by an accumulation of stress, it is possible to reconcile both University research and grower observations. Hurricanes, extended drought, and more recently citrus greening have all stressed tree health. The mechanical beating of a tree during harvest adds additional physiological stress to the tree and, in conjunction with other environmental factors, could hasten a tree decline. Maintaining "well-nourished" trees could be an important prerequisite to effective mechanical harvesting. Maintaining "well-nourished" trees, however, will require dollars that growers may not be willing to invest at this time.

Harvesting debris is of concern to citrus processors. Current mechanical shake and catch harvesting systems deliver more debris per load than hand harvested loads. Processors view debris as a cost to their operations, and consequently, do not view mechanical systems very favorably. While processors charge mechanically harvested loads a higher "cull" rate for debris and split fruit, they argue that the current cull rate system does not allow them to be fully compensated for the added cost of debris from mechanical systems. Processors' attitudes toward mechanical harvesting are important because processors control the allocation of daily loads to specific harvesting sites. In order for mechanical systems to achieve their full economic efficiency, they need a sufficient number of daily loads to operate continually for at least an 8 hours per day six days a week for the duration of the harvest season. Until the debris issue is solved, processors have no economic incentive to facilitate the economic efficiency of mechanical systems.

Conceptually, it is possible to "fix" the debris problem with improvements in machine design that target debris removal. The sole remaining manufacturer of harvesting equipment has not sold a unit to the Florida industry since 2005. Without sales, nor the expectation of sales in the near term, this company has little incentive to invest in the needed R&D for machines to effectively remove debris from their loads. To some extent debris could be lessened by maintaining a well-nourished tree. Trees in poor physiological condition accumulate dead wood, which is more readily removed and deposited into a trailer by mechanical harvester than by hand harvesters. As stated previously, improving tree health will require an investment a grower is not willing, or capable of making.

A holding pattern is the best way to describe the current state of citrus mechanical harvesting in Florida. Growers are holding back because of tree health issues, processors are holding back because of debris, and since no one is ordering equipment, manufacturers are holding back from investing in improved machinery designs. One bright spot is looming for citrus mechanical harvesting, and that bright spot is spelled CMNP. CMNP is an abscission compound that allows fruit to be removed from the tree with considerable less mechanical force. The benefits of CMNP are the ability to mechanically harvest late season 'Valencia' oranges and allow existing equipment to operate faster with less cosmetic damage to the trees. Less tree damage should assuage grower concerns about tree health and reduce the volume of debris being delivered to processing plants from mechanically harvested sites. The registration package is being assembled and is expected to be sent to the USEPA for approval of an experimental use permit by spring 2011.

In this writer's view, the adoption of citrus mechanical harvesting for processed fruit is an economic necessity for Florida to remain economically sustainable in a global orange juice market and to cushion against production cost increases from citrus greening and other disease threats that will likely appear in the future. The widespread adoption of mechanical harvesters will have significant implications on long term labor demand. A 10-fold increase in harvest labor productivity suggests that mechanical harvesters could replace 90 percent of the current harvest labor force. For those workers who remain with citrus harvesting, they likely will move into positions of equipment operators, which are typically higher paid jobs. In the short term, job displacement of citrus hand harvesters should not be a problem. A full conversion to mechanical harvesting will likely take the better part of 20 years due in large part to the longevity of orange tree plantings and that most orange acreage will have to be replanted. If the Florida citrus industry has been over taken by citrus greening or some other disease threat, the question of citrus harvest by either hand or machine will be rendered a mute point.

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Table 1. Acreage, production, and average seasonal prices for round tomatoes grown in Florida from 1998/99 through 2007/08.¹

Season	Planted Acres (1,000 ac)	Shipped ctns (million 25 lb-ctn)	Average Seasonal Price²
1998-99	44.4	56.7	\$7.40
1999-00	43.2	58.0	\$6.89
2000-01	43.8	53.6	\$9.16
2001-02	43.5	54.6	\$7.82
2002-03	43.0	51.0	\$9.59
2003-04	43.5	58.0	\$8.04
2004-05	42.0	53.0	\$12.50
2005-06	39.5	47.9	\$10.27
2006-07	37.2	52.5	\$7.69
2007-08	31.5	45.2	\$13.71

Notes:

¹ Source: Florida Tomato Committee Annual Reports, 2004 through 2008.

² Price is a weighted seasonal average including all districts (4) and all maturities (green, pink, and field packed).

Table 2. Bearing tree acreage, production, and average on-tree prices for oranges grown in Florida from 1998/99 through 2007/08.¹

Season	Planted Acres (1,000 ac)	Production (million 90 lb-box)	Average on-tree Price
1998-99	612.6	186.0	\$4.84
1999-00	602.1	233.0	\$3.67
2000-01	605.0	223.3	\$3.21
2001-02	586.9	230.0	\$3.47
2002-03	587.6	203.0	\$3.17
2003-04	564.8	242.0	\$2.89
2004-05	541.8	149.8	\$3.49
2005-06	491.0	147.7	\$5.51
2006-07	475.9	129.0	\$10.16
2007-08	463.9	170.2	\$6.21
2008-08 ^P		157.6 ^P	

Notes:

^P Preliminary. Reported as of May 12, 2009.

¹ Source: 2007-08 Citrus Summary, USDA, NASS, Florida Field Office, Orlando, FL.

Figure 1. Acreage (1,000), shipped cartons (million), and average seasonal prices across all districts and maturities of round tomatoes, 1998 thru 2008.

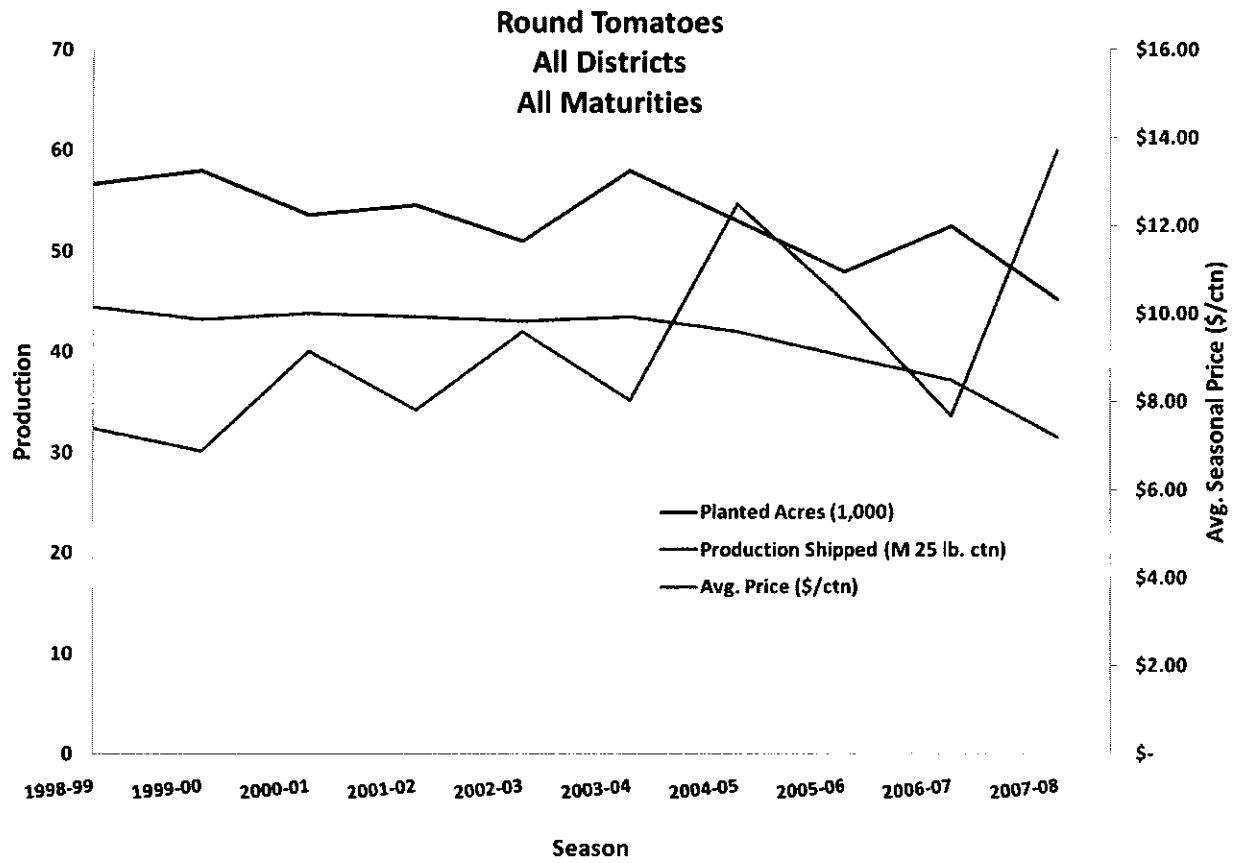


Figure 2. Bearing acreage (1,000 ac) and production (M boxes) of Florida oranges from 1998 thru 2008.

