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Vegetables and Pulses Outlook

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Low Prices Continue for Fresh-Market Vegetables

Beginning in 2012, *Vegetables and Melons Outlook* has been renamed *Vegetables and Pulses Outlook* and will include four issues released in March, June, September, and December. Market analysis for potatoes and mushrooms will be included in the March and September 2012 reports. Market analysis for dry edible beans, dry peas and lentils, and sweet potatoes will be included in the June and December 2012 reports. Market analysis and data coverage for melons is now included in the *Fruit and Tree Nuts Outlook* and *Fruit and Tree Nuts Yearbook*. Market analysis of melons prior to 2012 can still be found in historical *Vegetable and Melon Outlook* reports.

Prices at the point of first sale remain low for most fresh-market vegetables and consumer prices also fell in the first 5 months of 2012. Volumes are strong as mild winter and early spring temperatures allowed early planting in many areas. Per capita use of fresh-market vegetables fell less than 1 percent in 2011 compared to the previous year.

California tomato processors have signed contracts for 12.9 million short tons of processing tomatoes in 2012 and contract price negotiations are concluded with most processors. Wholesale prices for many processed vegetable products were up in the first quarter of 2012 in response to reduced 2011 supplies.

Driven by a substantial reduction in dry bean production, per capita use fell 12 percent in 2011. Production of dry peas and lentils is expected to rebound in 2012 as acreage planted jumped 71 percent from the lows of 2011.

U.S. production of sweet potatoes jumped 13 percent in 2011 over the previous year to reach 27 million hundredweight, a record level over at least the past four decades and twice the production of 2002. Prices dropped 10 percent on average to \$18 per cwt.

Multiple production areas across seasons reduce the potential to capture off-season high prices in fresh-tomato markets. Multiple factors converged to influence low prices in 2012.

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The next release is
Sept. 27, 2012.

Approved by the
World Agricultural
Outlook Board.

Recent Trends in the Fresh Tomato Market 1/

Prices Sink

In the first half of 2012, grower prices for fresh-market tomatoes throughout the United States, Canada, and Mexico have remained low across all tomato categories. All major growing regions had good weather throughout the past winter and early spring 2012, unlike the past few years when freezes in either Florida or Mexico reduced volume and bolstered prices. This article examines shipment volumes and prices in the North American tomato market during recent months, and some trends that may have influenced these outcomes.

Types of Fresh-Market Tomatoes

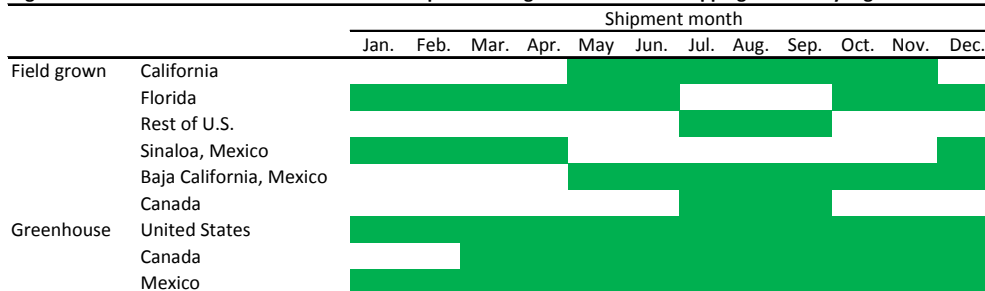
Fresh tomatoes are produced in open fields or under cover in some type of protected agriculture. The term protected agriculture is commonly used to describe crops produced under a cover that provides some level of protection from weather events. Protection can vary from lower-technology shade houses that cover crops planted in fields to higher technology, active environmental control greenhouses using hydroponics (see description at the end of this article). But even production in shade houses is still much more technology- and capital- intensive than in open fields. In the United States and Canada, large protected agriculture tomato operations are fairly homogeneous, high technology greenhouses. In contrast, Mexico has the full range of protected agriculture technologies.

Round field tomatoes are classified as either mature green or vine ripe. Mature greens are harvested at an earlier stage of ripeness than vine ripens, then ethylene gas is used to manage the ripening process; these tomatoes have a firmer texture than vine ripens and can be mechanically sliced, making them the mainstay of the fast food industry. Vine ripens are sold mainly through retail food channels although foodservice usage is growing. In the protected agriculture tomato industry, round tomato production is classified as beefsteak tomatoes (big round tomatoes) or tomatoes-on-the-vine (TOV). Protected agriculture tomatoes now dominate the retail industry but they are also becoming more common in the foodservice industry. Cherry, grape, and roma tomatoes are produced in both field and protected agriculture.

For the retail buyer and the retail consumer there is some degree of substitution among tomato types. Foodservice and retail buyers both traditionally purchased mature greens, but the retail market for this product declined sharply as many alternative types of tomatoes became available. Retailers increasingly turned to protected agriculture beefsteaks and TOVs, vine ripens, snacking (small tomatoes

1/Linda Calvin and Suzanne Thornsby, Crops Branch, Economic Research Service; Roberta Cook, University of California, Davis.

Figure 10. North American fresh-market field and protected agriculture tomato shipping seasons by region



Source: Cook and Calvin.

such as cherry, grape and pear which can be grown in either field or protected agriculture) and to a much lesser extent, heirloom tomatoes. In 1999, mature greens accounted for 43 percent of the volume of supermarket sales; in 2010 that share had fallen to just 18 percent (Cook).

Seasonality and Production Trends in the North American Tomato Market

Almost all fresh-market tomatoes consumed in the United States come from domestic production or imports from Mexico and Canada. Field and protected agriculture producers in all three countries provide a seamless supply of tomatoes to the market (figure 10). With multiple production regions in the market every month there are fewer and fewer periods of short supply and peak prices. Often a short period of high prices can make the difference between seasonal profit or loss.

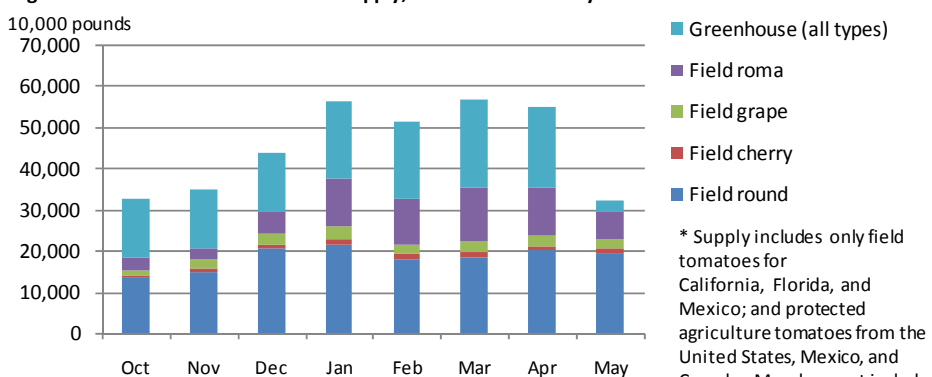
Field Production Generally Declining

Florida and California, combined, produce a year-round supply of mature green tomatoes (with a small quantity of vine ripens). The Mexican states of Sinaloa and Baja California, combined, produce a year-round supply of vine ripens with small quantities of mature greens in Sinaloa.

The Florida field tomato season runs from October through June. Florida and Mexico historically compete for the U.S. winter and early spring field tomato market. Field tomato imports from Mexico peak in the winter when southern Florida is the predominant U.S. producer. Florida tomatoes then dominate the field market during the spring as Mexican field production seasonally declines. California produces from May through November. Growers in the Baja California peninsula of Mexico, also export field tomatoes to the United States during the summer and fall months.

Long-term production trends for field tomatoes are generally down or stagnant in both the United States and Mexico. Florida round and roma field tomato production peaked in 1992 and declined 51 percent by 2011. Planted acreage peaked in 1989 and declined 48 percent by 2011. In 2011, round and roma tomatoes accounted for 84 percent of production in Florida, with the remainder made up of grape and cherry tomatoes.

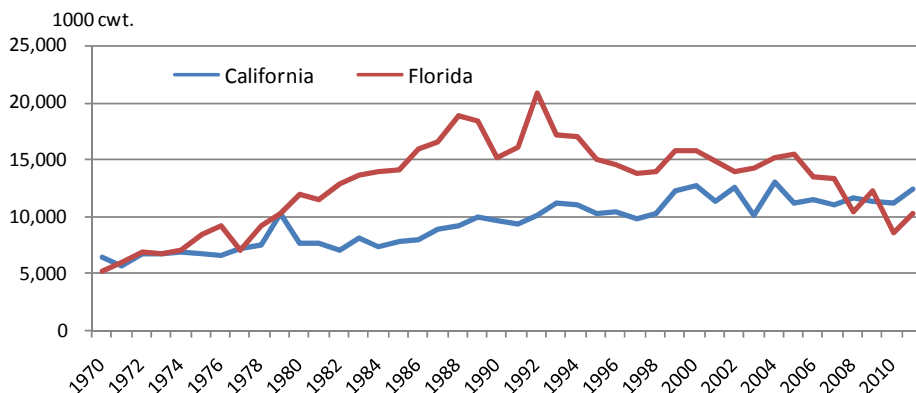
Figure 11. U.S. fresh-market tomato supply, October 2011 - May 2012*



Sources: USDA, Agricultural Marketing Service for shipments of: round, cherry, grape and roma field tomatoes, and U.S. greenhouse tomatoes; U.S. Department of Commerce for Mexican and Canadian imports of protected agriculture tomatoes.

* Supply includes only field tomatoes for California, Florida, and Mexico; and protected agriculture tomatoes from the United States, Mexico, and Canada. May does not include imports of greenhouse tomatoes from Canada or Mexico.

Figure 12. California and Florida field round and roma tomato production, 1970-2011

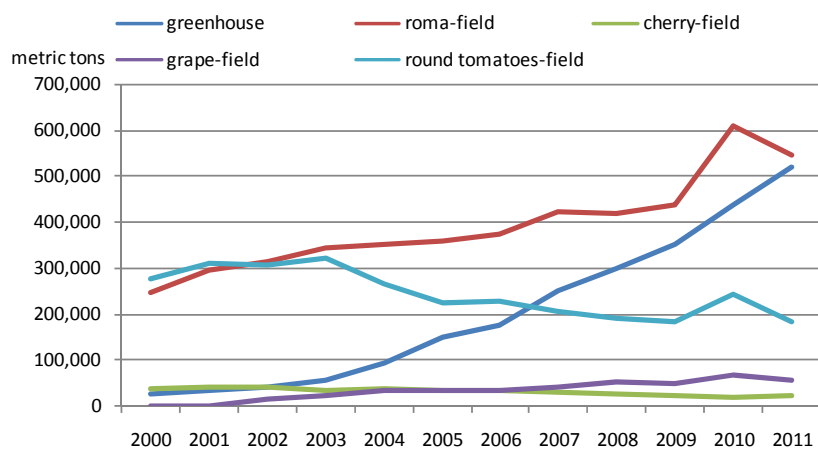


Source: USDA, National Agricultural Statistics Service.

Acreage planted to round and roma field production in California peaked in 1999 and declined 24 percent by 2011. USDA's National Agricultural Statistics Service production data show very little trend in California round and roma production since 2000. California industry analysts feel the production numbers do not adequately reflect the economic situation of field tomato growers in that State and that volumes have been declining rapidly. USDA's Agricultural Marketing Service (AMS) data show a 43 percent decline in California round and roma field tomato shipments since 1999. California has recently lost most of its vine ripe tomato production which typically has a much higher yield than mature green tomatoes; this likely accounts for the larger decline in shipments than in acreage. In 2011, round and roma tomatoes accounted for 98 percent of field production in California, with the remainder made up of grape and cherry tomatoes.

Total Mexican field tomato exports have been relatively stagnant in recent years compared to the rapid growth of protected agriculture tomato exports. Round field tomato exports have declined 43 percent since 2003. Major growth in field exports

Figure 13. U.S. imports of tomatoes from Mexico, calendar years 2000-2011



Source: U.S. Department of Commerce.

has been limited to roma tomatoes, which are still increasing. Producers in Sinaloa are able to grow both field and protected agriculture tomatoes and many field growers have diversified into the more costly protected agriculture growing systems in order to improve yields and quality, and reduce food safety risk and input usage.

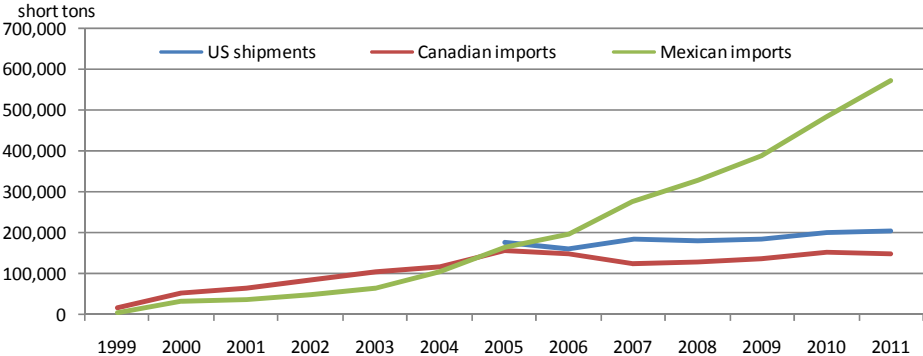
Traditionally, Florida growers were concerned with competition from field production in Mexico. Now, field producers in Florida and California, as well as Mexico, are feeling the effect of competition from the protected agriculture industry. Not only has the total volume of protected agriculture tomatoes in the market increased, but the diversity of tomato types brought to the market has also increased to compete with the traditional mature green and vine ripe tomatoes. In addition, shade house production (the lower end of protected agriculture) in Mexico has substantially improved yields and quality for part of the vine ripe tomato and roma supply, increasing Mexico’s relative competitiveness in these markets.

Movement Towards Protected Agriculture Production

In 2005, U.S., Mexican, and Canadian protected agriculture tomato shipments into the United States market were about equal. Since then production has increased in all three countries; however, shipments from Mexico have grown dramatically and that country now dominates volume in the U.S. market.

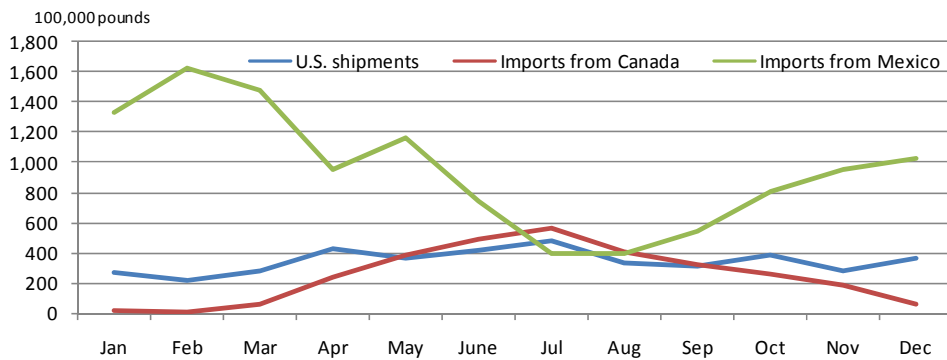
Between 2005 and 2011, Mexican protected agriculture tomato exports to the United States increased 248 percent. Mexico now accounts for 71 percent of the U.S. import market for protected agriculture tomatoes, while Canada's share has been reduced by half to 27 percent. Both U.S. and Canadian protected agriculture growers have invested in Mexico. Part of Mexico’s strength is the diversity of its climates and elevations; many areas require little heating or cooling. Protected agriculture tomatoes are now grown in diverse areas which together create year-round supply, although shipments are lower during the summer. While the export market may be the main objective of Mexican growers, some production now stays in Mexico to serve a growing domestic middle class market.

Figure 14. Protected agriculture tomato supplies in the United States, calendar years 1999-2011



Sources: U.S. Department of Commerce (Canadian and Mexican imports) and USDA, Agricultural Marketing Service (U.S. shipments)

Figure 15. Monthly protected agriculture tomato shipments in the U.S. market, calendar year 2011



The growth in shade house production in Mexico is a source of concern to U.S., Canadian, and Mexican greenhouse growers who have high technology and high cost operations. USDA does not have a definition of what constitutes greenhouse production. Various efforts are underway in the higher technology end of the industry to define their product and distinguish it from lower technology products, in order to maintain a premium market niche. The success of this strategy depends on buyers being willing to pay more for tomatoes grown with a more technology-intensive protected agriculture system.

The United States is a year-round supplier of greenhouse tomatoes with fairly constant supplies throughout the year. Large greenhouse production operations are located in Arizona, California, and Texas. Greenhouse operations have also opened in other, less traditional growing areas such as Michigan and Maine where climate increases growing costs and lowers yields but close proximity to large consumer markets reduces transportation costs.

In the United States, traditional field tomato growers have generally not been able to participate in the new protected agriculture market. Florida climate conditions are not conducive to protected agriculture production. In California, there are two high technology greenhouses on the southern coast, away from most of the traditional field tomato production in the center of the State. These greenhouses represent outside investment; they are not owned by California field tomato growers.

The United States does not report annual greenhouse tomato acreage or production. USDA's AMS began providing data on U.S. greenhouse shipments in late 2004 under a program in which several large greenhouse growers voluntarily report their weekly shipments of round tomatoes-beefsteaks and large TOVs (not the small specialty TOV). In 2012, there were five growers participating in the program, which AMS estimates to cover at least 90 percent of U.S. greenhouse tomato production. From 2005 through 2011, U.S. greenhouse shipments increased 17 percent.

In March 2012, AMS began to also collect shipment data from these growers on grape and roma greenhouse tomatoes (figure 14 shows only round greenhouse tomatoes). During April and May 2012 these two categories added 16 percent over the total volume for round tomatoes alone. Greenhouse tomato producers in the United States have opened several new facilities since late 2011 so production in 2012 is expected to increase further.

U.S. greenhouse tomato imports from Canada peaked in 2005 but have since weakened. Greenhouse tomato production in Canada is mostly a 10-month a year operation. There is very little natural light for production in January and February and the expense of providing lights at this period can be prohibitive. Canadian shipments are highest during the summer months.

From 2005 to 2011, Canadian exports to the United States declined 5 percent while total Canadian greenhouse tomato production increased 28 percent. The Canadian industry is still larger than its U.S. competitor. In 2011, Canadian production was 295,973 short tons compared with 205,500 short tons in U.S. greenhouse tomato shipments. In 2011, 50 percent of Canadian production was exported to the United States, down from 60 percent in 2003. Some greenhouse acres were added in Canada last year with plans for additional acreage in 2012.

October 2011-May 2012 Field and Protected Agriculture Tomato Shipments

Table 20 shows shipments to the United States from October 2011 through May 2012 and compares the levels with the same period the prior season. It should be noted that the prior season includes a December 2010 freeze in Florida and a major freeze in February 2011 in Sinaloa, the main winter production area in Mexico, which reduced export shipments from that State by about 30 percent (Foreign Agricultural Service).

Florida shipments are down for all four types of field tomatoes, with round (mostly mature green) the least affected—down 1 percent--and roma the most affected—down 16 percent. Mexican field tomato shipments are down for round (mostly vine ripe) by 8 percent and cherry tomatoes by 24 percent. Mexican field-grown grape tomatoes are about constant and roma tomatoes grew 9 percent. Mexican protected agriculture tomato shipments are up in each category, with an overall increase of 28 percent. Canadian greenhouse tomato shipments are up 5 percent but this refers to all Canadian shipments, not just exports to the U.S. market. U.S. greenhouse shipments are down 4 percent.

While it is clear that Mexican greenhouse tomato shipments are up, the exact magnitude of that increase is not as clear. There are two types of data available from the United States: AMS shipments and Department of Commerce trade data. Commerce data are reported monthly under a single tariff code for all greenhouse tomatoes without distinguishing the type of greenhouse tomato. Release of Commerce Department data typically is lagged about a month and a half. AMS data reports shipments daily and provides more information to the industry by breaking down the types of protected agriculture tomato imports from Mexico into round, cherry, grape, and roma.

Table 20. Monthly shipments of tomatoes in the U.S. market

	2010/11	2010/11	2011/12	Change
	Oct-Sep	Oct-May	Oct-May	2010/11-2011/12
	-----10,000 pounds-----			Percent
California round field	55,186	18,606	12,568	-32
California cherry field	565	170	114	-33
California grape field	1,300	349	445	28
California plum field	7,673	1,901	2,676	41
Florida round field	110,129	101,858	100,972	-1
Florida cherry field	6,162	5,856	5,166	-12
Florida grape field	17,404	15,902	13,782	-13
Florida plum field	17,309	16,155	13,649	-16
Mexico round field	44,971	38,336	35,180	-8
Mexico cherry field	5,740	4,331	3,299	-24
Mexico grape field	6,715	5,371	5,358	0
Mexico plum field	51,745	45,009	48,884	9
Mexico round greenhouse	79,480	60,604	76,567	26
Mexico cherry greenhouse	969	916	1,755	92
Mexico grape greenhouse	1,458	820	1,413	72
Mexico plum greenhouse	51,261	27,283	34,969	28
Mexico total greenhouse	133,168	89,623	114,704	28
Canada total greenhouse*	50,705	23,485	24,581	5
US total greenhouse**	39,674	24,244	23,256	-4

*Total Canadian production, not just imports to the United States. Commerce data from October through April show that U.S. imports from Canada are down 8% from last season.

**Does not include new data on greenhouse grape and roma tomatoes in 2011-12.

Source: USDA, Agricultural Marketing Service.

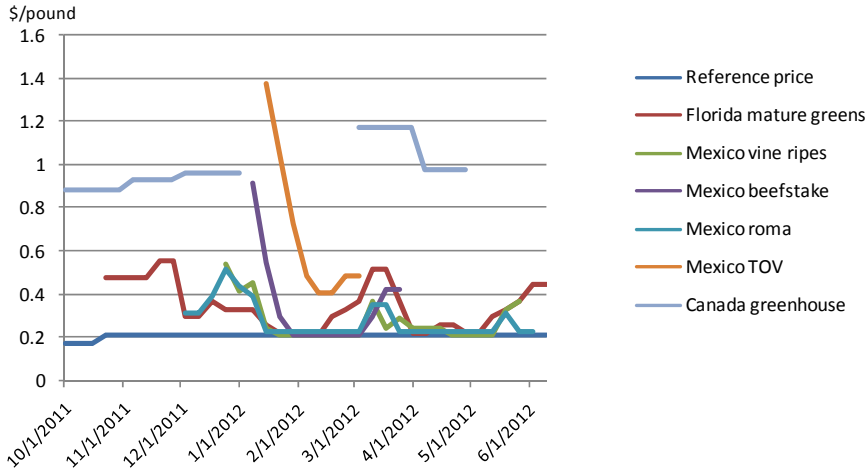
2/ The U.S. Department of Commerce suspended an antidumping investigation involving fresh-market tomatoes from Mexico by negotiated agreement, on November 1, 1996. The agreement set a minimum price (called the reference price) that covers the majority of fresh-market tomatoes imported from Mexico. Fresh-market tomatoes from signatory producers/exporters cannot enter the United States at less than the established reference price.

In Nogales, Arizona, AMS uses information from U.S. customs brokers which reports protected agriculture tomatoes by type. For tomatoes entering through Texas and California, the Department of Homeland Security provides data on protected agriculture tomato imports but with no breakdown by type. AMS uses information from shippers to estimate the breakdown by type. Unfortunately, the data do not match closely. Comparing just the October 2011 to April 2012 period, when both Commerce and AMS data are available, Commerce shows imports of Mexican protected culture tomatoes up 23 percent, while AMS reports an increase of 34 percent. More investigation is required to understand the differences in data.

Prices

It is difficult to compare tomato prices across time and/or production regions as data detail and availability vary considerably. For example, no price data are reported for U.S. greenhouse tomatoes. The only price data for Canadian greenhouse imports is from Commerce trade data for all greenhouse tomatoes; technically this is a unit value (total greenhouse tomato import value divided by total volume) not a price. AMS provides FOB prices for Florida and California field tomatoes and FOB prices for both field and protected agriculture tomato imports from Mexico. Given the available data, however, it is clear that for long periods of time from October 1, 2011 through June 6, 2012, most tomato prices were right at the U.S. Department of Commerce reference price (figure 16).² The price has approached this reference level in earlier years but the long duration of prices at this level in 2012 is unusual. A small rise in mid- to late-March for Florida mature greens represented the relative shortage caused by an earlier freeze that resulted in a temporary decline in available tomatoes.

Figure 16. Weekly FOB tomato prices, weeks ending October 1, 2011 through June 9, 2012



Sources: USDA, Agricultural Marketing Service, U.S. Department of Commerce.

Notes:

Figure shows the low price for the low/high prices listed for each week. Mexican prices are for imports through Nogales.

Prices for Florida mature greens are for 25-pound boxes of 5X6 size, with a grade of 85% U.S. 1 or better. Legally, a 25-pound box must contain 25 pounds but it often contains a bit more. For the purposes of the Suspension Agreement, the U.S. Department of Commerce determined these boxes weigh 26.79 pounds.

Prices for Mexican vine ripe tomatoes are for two-layer flats of 19 pounds of 4X5 size. Commerce determined these boxes weigh 23.83 pounds.

Prices for Mexican beefsteak tomatoes are for 1 layer flats of size 25. Commerce determined these boxes weigh 16.34 pounds.

Prices for Mexican TOVs are for 11 pound flats and Commerce determined these boxes weigh 12.31 pounds.

Prices for Mexican romas are for 25-pound cartons of loose, large size tomatoes. Commerce determined these weigh 26.79 pounds.

Prices for Canadian greenhouse tomatoes are unit values based on monthly Commerce data for all greenhouse tomato imports, not broken out by type. January and February prices are not reported here due to light shipment volumes.

The reference price is \$0.2169 from October 23 to June 30, and \$0.172 during the rest of the year.

Staked field tomatoes in Florida are typically harvested multiple times, depending on market conditions. When prices fall below the cost of harvest, growers may choose to forego additional harvests and abandon production. There are reports of growers in Florida reducing harvesting passes this season due to the low prices.

With such low prices in winter 2012, Mexican growers sent only their best tomatoes to the U.S. market. Some tomatoes were redirected to the domestic Mexican market but even that market was saturated. Roma wholesale prices in Mexico during April were 65% below the prior year. Some export quality tomatoes were discarded (Foreign Agricultural Service).

Future Trends

Grower prices in fresh vegetable markets are historically variable and often tied to short-term weather events. However there are some notable non-weather changes in fresh tomato markets that may have a more significant impact on future trends.

Multiple production areas across seasons reduce the potential to capture off-season high prices. The growth of tomatoes from protected agriculture, and particularly the rapid growth from Mexico in recent years, will continue to change the dynamics of tomato markets. Weather patterns in individual production areas may become less of an influence for these growers who can control the environment to varying degrees. The new technologies may allow new entrants to tomato production from States or regions where field seasons were previously very limited.

After a year of low prices, growers are considering potential political remedies. On June 22, 2012, the Florida Tomato Exchange filed documents with the U.S. Department of Commerce and the U.S International Trade Commission indicating the interest of the petitioners to withdraw from the antidumping petition filed against Mexico in 1996 (Florida Tomato Exchange). They are seeking to terminate the suspended dumping investigation and the suspension agreement which has been in place since November 1996. The Exchange stated that if the suspended investigation were terminated, then the industry would be able to “allow facts to drive the result should the industry file a new petition.”

Growers must also look forward to production decisions for the next season. Fixed cost investments in protected agriculture technologies have added some rigidity to tomato supplies. While a field tomato grower can change crop mix from year to year, it takes time to go from the concept of greenhouse production to full production. Growers who made the decision to start developing a protected agricultural operation when prices were higher may end up marketing product in the midst of very low prices. The ability to withstand periods of low market prices depends on capitalization rates, with some firms much more able than others to weather economic downturns. Sunk capital costs may encourage some tomato growers to continue in protected agriculture even if they must consider switching to potentially more lucrative crops. Even so, there are reports of sizeable abandoned protected agriculture operations in Mexico (Foreign Agricultural Service).

The transition to protected agriculture production is likely to accelerate if foodservice demand, particularly fast food demand, can be met. At retail, consumer recognition of different types of tomatoes has grown, while many foodservice users still focus on the large size, consistency, and firmness provided by mature green tomatoes destined to be sliced for hamburgers and sandwiches.

In recent years vegetable breeding technology has become much more efficient due to the use of genetic markers and faster DNA processing equipment. Today there are molecular markers for certain disease resistance, quality and other traits, enabling breeders to select directly for these traits and to stack them with other desirable genetic material. Already a proliferation of small snacking tomatoes in many shapes, sizes, flavors and colors are being marketed to receptive consumers. On May 30, 2012 it was announced that the genome of the tomato (*Solanum lycopersicum*) had been fully sequenced by an international consortium of 10 countries. This decoding is an important step toward improving yield, nutrition, disease resistance, taste and color of tomatoes whether grown in open field, shade house, or greenhouse operations.

Protected Agriculture Terminology

There are many terms used to describe protected agriculture and many are used vaguely. For example, while greenhouse is only one type of protected agriculture, the term is often used to refer to any type of protected agriculture. U.S. import

statistics are divided into “field” and “greenhouse” without any further specification of what constitutes greenhouse product and which in reality covers all protected agriculture.

At one end of the protected agriculture continuum is a low-technology strategy called shade houses which is a simple structure to support shade cloth, a type of screen. This provides passive control of the environment by shading the plants from excessive sunlight, wind, and potentially reducing pest and disease risk and hence agrochemical inputs, as well as water and labor usage per unit of production. These structures keep plants cooler on warm days but provide no significant protection from cold air temperatures. Because of the relatively limited environmental control they provide, growers can extend shipping seasons only marginally.

The most important benefits are generally much higher yields compared with open field production, and the potential for improved quality. Some Mexican growers market these tomatoes as a protected agriculture product. Other shade house growers do not attempt to differentiate their tomatoes from field tomatoes. Shade houses are very expensive relative to open field production but are the lowest cost option within protected agriculture.

At the other extreme of protected agriculture is the high technology greenhouse strategy involving a permanent structure, with glass, flexible film plastic, rigid panel acrylic, or polycarbonate roof and walls. With more protection from the elements, growers can actively control their environment to a high degree. The most sophisticated growers actively monitor and control light, air temperature, humidity, water, nutrients, and carbon dioxide levels in the structure to maximize profitable production, generally using hydroponics for water and nutrient management. These are the most expensive protected agriculture systems. Since the plants are completely dependent on human care for every requirement, greenhouse management is very intensive. Annual yields can be very high, as much as 15 times greater than field production.

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