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PROJECTIONS OF WORLD PRODUCTION AND CONSUMPTION OF CITRUS TO 2010

I. INTRODUCTION

1. The basis for this projections work is a mathematical model of the world citrus market developed at the University of Florida modified by expert opinion and other citrus outlook studies.

2. World citrus production and consumption have grown strongly since the mid-1980s. Production of oranges, tangerines, lemons and limes has expanded rapidly, and even faster growth has been realized for processed citrus products as improvements in transportation and packaging have lowered costs and improved quality.

3. Rapid expansion of production and slower demand growth for oranges and grapefruit, however, has resulted in lower prices for both fresh and processed oranges and grapefruit. The rate of new plantings has slowed and projected growth rates in both production and consumption over the next ten years are expected to be lower than those realized over the last ten years.

4. São Paulo, Brazil and Florida, United States will continue to be the two largest processed orange producing regions in the world. With expected continued growth of clementine consumption, Spain is expected to expand its production of tangerines (mainly clementine varieties). China is also expected to expand production and consumption of oranges and tangerines. Other Latin American producing countries such as Argentina, Mexico, Cuba, Belize and Costa Rica are expected to continue to expand production, but at a slower rate.

5. Citrus production and consumption in Asia is also expected to expand, but consumption will be supported primarily from domestic production. Many Asian countries maintain high tariffs on imports of citrus. In Africa production is expected to expand only in those countries along the Mediterranean Sea and in South Africa.

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6. This paper presents recent FAO projections of production and consumption of fresh and processed citrus by the four major varietal classifications: oranges, grapefruit, tangerines, and lemons and limes.

II. ORANGES

7. World consumption of oranges grew at a compound rate of 3.5 percent over the period 1987-89 to 1997-99. Consumption of fresh oranges grew at an annual rate of 2.8 percent, while processed orange consumption, grew at 4.4 percent per annum. Increased consumption of processed oranges in Europe was one of the primary forces supporting expanded world consumption. Even though per capita consumption of fresh oranges in the European Community declined from 12.6 to 9.5 kg, per capita processed orange consumption more than doubled to 28 kg (fresh fruit equivalent). Per capita consumption of processed oranges also grew in Canada and United States, which offset decreased fresh orange consumption in Canada. Among developed countries, the United States is one of the few that realized modest increased consumption of fresh oranges.

8. Processed orange consumption is concentrated in the developed countries of North America and Europe, which collectively account for over 90 percent of world consumption. Markets for processed orange products appear to be developing in other regions, particularly Latin America. Processed orange consumption in Mexico increased by nearly 70 percent and Brazilian consumption increased by 54 percent over the 1987-89 to 1997-99 period.

9. While fresh orange consumption declined in many of the developed countries, it expanded in many developing countries, including Mexico, India, Argentina and Brazil. Strong consumption growth was also observed in China. Fresh orange consumption is declining in the developed countries for two reasons. First, it is being replaced by orange juice consumption (NFC (Not From Concentrate) closely duplicates fresh-squeezed in flavour but offers greater convenience). Second, with advances in transportation and storage, fresh citrus now faces with more competition from other fruits such as bananas, grapes and strawberries.

10. Orange projections assume that orange production expansion will slow and consumption will decline on a per capita basis. The main reasons for this are serious disease problems in Brazil and Florida and fewer new plantings elsewhere in the Western Hemisphere due to the lagged effect of low prices in the past.

11. More specifically, projected orange production in 2010 is 66.4 million MT, approximately 14 percent greater than that realized over the 1997-99 period. The projected annualized rate of growth of 1.12 percent is substantially lower than 3.46 percent that occurred from 1987-89 to 1997-99. The projected production is expected to be utilized as 36.3 million MT fresh and 30.1 million MT processed. The share of production claimed by processed utilization is projected to increase marginally.

12. Orange production in developed countries is projected to grow at an annualized rate of 0.6 percent with most of that growth coming from the United States. Production in Europe is projected to show little change, with a small increase in Spain offset by declines in Italy and Greece. Production in South Africa is expected to continue to grow as it continues to exploit its advantage as an off-season supplier to the northern hemisphere. Production in Israel will continue to be affected by population growth that will compete with citrus and agricultural crops for land and water. Japan’s orange industry is also projected to continue its secular decline as availability of imports increases.

13. Production in developing countries is projected to increase at an annualized rate of 1.23 percent. Over the next 10 years, it is likely the Brazil will experience a sizeable contraction of production as the combined effects of disease and low grower prices are felt. By 2010, however, the Brazilian industry should recover with production returning to levels seen in the late 1990s

and be able to maintain its dominance of the world processed orange market. Mexico is vulnerable to the citrus *tristeza* virus that has already been found in the Yucatan peninsula. Mexican producers, mainly small growers, have been unable to take advantage of preferential access to the United States market offered under the North American Free Trade Agreement (NAFTA).

14. Smaller Western Hemisphere orange exporting countries such as Argentina, Cuba, Belize and Costa Rica should find market opportunities as the larger orange producing regions undergo adjustment. Cuba has expanded its orange processing capacity and its orange output despite the trade embargo imposed by the United States. The processing sector of Belize and Costa Rica has also undergone consolidation which should lower costs.

15. Orange producing countries in Asia are expected to continue to expand production, but nearly all of it will be consumed in domestic markets. China is projected to overtake Mexico as the third largest orange producing country and India will challenge Spain as the fifth largest producer. Huge domestic markets in both of these countries, however, mean that virtually all production will be consumed internally. The exception is Turkey, which can, because of its location and its association through a customs union with the European Community, compete in the European market. The Mediterranean countries of Morocco and Egypt are also expected to benefit from their proximity to Europe.

16. The relatively small overall projected increase in production will support small increases in consumption of fresh and processed oranges. Per capita consumption in both North America and Europe is expected to change little from current levels. Relatively flat per capita consumption growth rates in these regions are a direct result of slower domestic production growth and the projected small increase for the main suppliers of processed orange products: Brazil and United States. Most increases in consumption will be found in developing citrus-producing countries such as India, Pakistan, China, Mexico and Brazil.

17. Consumers in Brazil and Mexico have traditionally bought fresh oranges then produced juice at home. Rising incomes in these countries, however, have encouraged a trend towards the purchase of orange juice already prepared for consumption.

18. The recent trade agreement between China and the United States has opened the Chinese market to imports of fresh and processed citrus. However, infrastructure problems work against large-scale importation of fresh and processed orange products. It is likely, however, that consumers, especially the emerging middle classes, in the large cities of China will have increased access to imported citrus products.

19. Declining domestic production and high trade barriers that increase the cost of these products to consumers hampers expanded consumption of fresh and processed orange products in other East Asian economies. The Japanese processed orange market has failed to live up to expectations generated by the signing of the US-Japan Beef and Citrus agreement in 1986. The long distances that oranges and other citrus products must travel from the major producing countries in the Western Hemisphere also constrain citrus consumption in East Asia[1]. These observations notwithstanding, per capita orange consumption in nearly all of the countries of the Far East is projected to show small to moderate increases. Nearly all of this consumption growth will come from increased domestic production.

III. TANGERINES

20. Nearly all tangerine production is intended for the fresh market. The major producers are China, Spain and Japan followed by Brazil, Italy, Egypt, United States, Morocco, Argentina, Turkey, Republic of Korea and Pakistan. Spain has had significant success with its seedless

[1] Australia has had recent success in penetrating fresh and processed markets in East Asia.

clementine varieties in Europe and, more recently, the United States. Spain accounts for over 50 percent of world exports of fresh tangerines. The other major exporters are Morocco and China. Morocco mainly supplies the domestic fresh market but also exports to Europe, Canada and the United States. Most tangerines, however, are consumed in the country of production.

21. Processed tangerine consumption is scattered and difficult to track. Most tangerine juice is blended with orange juice. Spain, Japan and China have tangerine sectioning industries. It was reported at the 2001 China/FAO Citrus Symposium that China produces 250 000 MT of tangerine sections per year. China is the largest producer of this product. Canned tangerine sections from China, Japan and Spain are exported to North America and Europe.

22. World tangerine production is projected at 17 million MT in 2010, up from 15 million MT in 1997-99. The projected annualized growth rate of 1.07 percent is much smaller than the 4.31 annualized growth rate realized between 1987-89 and 1997-99. Tangerine production is projected to expand in Spain, China, Morocco, Brazil and Argentina. The industry may continue to contract in Japan and production in the United States is expected to decline as its production faces competition from imports and other fresh fruit alternatives.

23. The bright spot for fresh tangerine consumption is the seedless clementine varieties currently cultivated in Spain and Morocco. US consumption of this product has risen dramatically in the last five years. Their small size along with the characteristics of an easy-peeler and seedless nature make this a popular snack for children.

24. Spain is expected to continue its role as the dominant exporter of tangerines (clementines and mandarins). The success of the clementine varieties will serve to support its position as the largest exporter of fresh tangerines, with Morocco the second largest. Phytosanitary concerns have limited the ability of both Mexico and Brazil to expand into exportation of fresh tangerines. The main citrus producing area of east Mexico is still plagued by the Mexican fruit fly. The recent outbreak of citrus canker in Brazil will restrict producers there from large expansion of fresh exports of tangerines or other citrus varieties.

25. The allocation between fresh and processed utilization is expected to remain unchanged, with more than 90 percent of total production allocated to the fresh market. Tangerines are not suitable for juice production because of relatively low juice content, higher harvesting costs and a tendency for off-flavour juice. Thus processed utilization of tangerines will come from tangerines that do not make fresh market grade and the demand for tangerine sections.

IV. GRAPEFRUIT

26. Growth in world grapefruit production has slowed with production increasing from 4.55 million MT in 1987-89 to 5.45 million MT in 1997-99, an annualized growth rate of 1.8 percent. The freezes of the early 1980s severely reduced grapefruit production in the United States, when Cuba became an important supplier to traditional markets for US citrus. By the mid-1990s, world production had recovered to levels comparable to the 1970s. Producers in the three largest grapefruit producing countries, United States, Israel and Cuba, however, are facing a difficult period with stagnant demand for both fresh and processed grapefruit. The grapefruit production area in Florida, United States, is currently contracting as producers are exiting grapefruit production. The citrus *tristeza* virus is projected to kill millions of grapefruit trees in Florida. Grapefruit prices, at this time, are too low to encourage widespread replacement of trees lost to *tristeza*.

27. Among the major citrus varieties, only grapefruit has a level of processed utilization comparable to oranges. In the 1997-99 period, average fresh utilization was 3.5 million MT, and processed utilization was 1.9 million MT, with processed utilization accounting for 36 percent of total utilization. Processed utilization in Cuba has increased dramatically, with 90 percent of the crop processed in 1999.

28. The largest grapefruit producing country is the United States. The United States is the largest exporter of fresh grapefruit accounting for nearly 40 percent of total world fresh exports. South Africa and Israel are the next most important exporters. A new entrant to the fresh grapefruit export market is Turkey. On the other hand, with the loss of its preferential access to the socialist bloc countries, Cuban exports of fresh grapefruit have declined significantly. Most grapefruit production, however, is consumed in domestic markets, with total fresh exports accounting for less than 40 percent of world production. The United States, Israel and Cuba are the major suppliers of grapefruit juice to the world market. Exports account for approximately one-half of world processed production.

29. Projected world grapefruit production in 2010 is 6.23 million MT, an increase of 14 percent above the 1997-99 average. Nearly all of the projected increase will occur in developing countries. Production in the United States and Israel is expected to remain static, with modest increases projected for Cuba, Mexico, Argentina and South Africa. The recent high level of new plantings in Turkey will support higher production and provide competition to Israel and the United States in the European market.

30. Fresh consumption of grapefruit in developed countries will face the same difficulties that confront oranges and tangerines. Increased competition from other fresh fruits will result in small declines in per capita consumption. The opening of import markets in China is expected to allow per capita consumption in that country to grow.

31. Per capita consumption of processed grapefruit is also projected to decline. Processed grapefruit competes directly with processed oranges. As consumers in the developed countries continue to move towards orange juice and away from grapefruit juice, grapefruit producers will need to find new markets and/or new products.

V. LEMONS AND LIMES

32. Lemons and limes are acid citrus fruits that differ from other citrus varieties in that they are typically consumed in association with other foods. Lemons and limes are grown primarily for the fresh market with the juice from lemons and limes used primarily as flavouring in beverages. Lemons are generally produced in colder climates such as the western United States, Spain, Italy and Argentina. Lemons are also adapted to drier climates such as Egypt and Iran. India is also a major producer. Limes, on the other hand, are highly sensitive to cold weather and are grown exclusively in tropical climates. The major producers are Mexico and Brazil.

33. In 1997-99 lemon and lime production was 9.04 million MT with 7.0 million MT utilized in the fresh market and 2.04 million MT processed. Spain, Argentina and Mexico are the largest export suppliers. Spain and Argentina dominate the world export market for fresh lemons. Mexico is by far the leading exporter of fresh limes. Approximately 20 percent of fresh production is exported, while over one-half of processed production is traded. Argentina and Italy are major suppliers of lemon juice to the world market.

34. Lemon and lime imports account for approximately 27 percent of world consumption. Besides the developed countries of North America and Europe, lemon and lime consumption is also found in the countries of Eastern Europe, as well as developing producing countries such as India, Iran, Mexico, Brazil, Argentina, Bolivia, Peru and Jamaica. Countries in the Near East including Jordan, Cyprus, Lebanon and Egypt also have relatively high levels of per capita consumption.

35. World lemon and lime production is projected at 10.34 million MT in 2010, an increase of 14 percent from the 1997-99 level. The projected annualized rate of growth is 1.12 percent, down substantially from the 3.6 percent rate of growth observed from 1987-89 to 1997-99 due to declining prices.

36. Small increases in per capita consumption are projected across all of the major markets. Spain, Argentina and Mexico will continue to be the largest export suppliers of fresh lemons. With the decline of lime production in Florida and static lemon production in California and Arizona, United States will become the largest importer of fresh lemons and limes. Lemons and limes do not face the same competition from other fresh fruit crops that confronts the other fresh citrus varieties given their different consumption pattern.

37. The allocation of lemons and limes to fresh and processed uses is expected to remain near historical levels.

VI. PRICE PROJECTIONS FOR CITRUS TO 2010

A. PROCESSED ORANGE JUICE

38. Based on the most likely combination of effects resulting from disease pressures and price incentives to growers in Brazil, it is expected that prices by 2010 for Brazilian FCOJ at 65 Brix are likely to be close to US$1 200 fob Rotterdam, which translates to about US$3.00 per box delivered to processing plants in São Paulo.

39. In the case of Florida juice, much depends on whether trade barriers remain in place. Assuming those barriers do not change, and NFC juices continue to gain market shares, on tree grower prices could average US$4.25 per 90 pound box in 2010, which translates to about US$1 500 per tonne at 65 Brix in the United States.

B. FRESH ORANGES

40. Fresh market prices are almost impossible to predict out to 2010 as so much depends on variations in annual crops in key producing countries. There is likely to be some shift to processed juice consumption in some developing countries, but in most, oranges will continue to be consumed in fresh form in those producing areas. In view of demographic growth in some producing countries prices could remain stable in real terms or experience slight increases. In developed markets there continues to be a perceptible shift to easy peelers, which should put downward price pressure on oranges sold for fresh consumption. On balance however, prices are unlikely to change much in real terms by 2010.

C. FRESH AND PROCESSED GRAPEFRUIT

41. Grapefruit faces declining consumption in both fresh and processed forms. Florida production will continue to contract and Cuba is unlikely to fill the gap. In the Mediterranean, Turkey may fill gaps created by declining Israeli and Cyprus production, but on the whole prices may not change much in real terms by 2010.

D. FRESH AND PROCESSED TANGERINES

42. Although the rate of production increase in Spain and China will be greatly reduced to 2010, the popularity of mandarin/clementine varieties is likely to continue to grow, especially in transitional markets in Eastern Europe and in the United States. Growing supplies are likely to counterbalance increased demand, so prices are unlikely to change significantly in real terms.

E. LEMONS AND LIMES

43. Large availability of lemons for export in processed and fresh form, primarily from Argentina, Spain and Turkey, should inhibit price increases over much of the projections period. Lower lemon prices over the early part of the projections period could encourage the substitution of lemon juice for other products in processed beverages and other processed food. By the end of

the projections period lemon prices are expected to recover to a point where in real terms they differ little from those over the base period.

44. Limes could follow a similar trend in view of the substantial plantings over the past decade in Mexico and elsewhere, but prices are more likely to remain stable rather than fall as limes appear capable of retaining their popularity among consumers.

VII. SUMMARY

45. After a period of rapid growth in production, it is not surprising that citrus producers across the world are facing declining prices. Nearly all agricultural crops are affected by production/price cycles. For perennial crops such as citrus, price cycles are long, spanning several years, because of the long lag between price signals and output responses. Random events such as freezes, drought, pests and diseases have, also, tended to disrupt production by causing severe unintended contractions in supply.

46. In the analysis presented in this paper, the main assumption behind the slowdown in the rate of growth of citrus production is that lower prices currently faced by citrus growers will cause reductions in the rate of new plantings and thereby reduce output growth. Given the geographical concentration of citrus production, it is possible that some random event will result in a major reduction in output and stimulate a new round of production expansion. Without a random production shock, however, the first decade of the 21st century will see retrenchment and consolidation and eventually favourable prices will return. Higher prices will be the impetus for new grove development.

47. Citrus is a product with many desirable characteristics for consumers who are health conscious, demand convenience and place a premium on food safety. Continuing improvements in transportation logistics will allow exporters to provide year-round supplies of high quality fresh citrus products and also allow processed citrus producers to provide convenient, reasonably priced products to consumers throughout the world. These observations mean that world demand for citrus products will continue to expand and that the long-run outlook for citrus producers remains positive.