

The Evolving Global Marketplace for Fruits and Vegetables¹

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OVERVIEW

The global fresh fruit and vegetable marketing system is increasingly focused on adding value and decreasing costs by streamlining distribution and understanding customer needs. In the U.S. and Europe this dynamic system has evolved toward predominantly direct sales from shippers to final buyers, both foodservice and retail, with foodservice channels absorbing a growing share of total volume, especially in the U.S.. Product form and packaging are changing as more firms introduce value-added products, such as fresh-cut produce, in response to the growing demand for convenience in food preparation and consumption. Fresh produce continues to be a critical element in the competitive strategy of retailers, and its year-round availability is now a necessity for both foodservice and retail buyers.

In the U.S. alone the estimated final value of fresh produce (fresh-cut and bulk) sold via retail and foodservice channels surpassed \$81 billion in 2002, off a farmgate value of \$19.2 billion plus a net import value of \$2.5 billion. Europe-wide fresh produce sales through supermarket channels alone (excluding green grocers and foodservice) were estimated to exceed \$73 billion in 2002, and total final sales to exceed \$100 billion. Estimated U.S. sales of fresh-cut produce were \$12.6 billion in 2002 compared to \$3.3 billion in 1994 and are expected to reach \$15 billion in 2005. Fresh-cut sales are even higher in Europe and beginning to develop in Latin America and Asia as well. The implications of this evolving shift in product form may become as important to the biotechnology industry as the changes in market structure.

In the developing economies of Asia, Latin America and elsewhere supermarket chains are capturing a growing share of the consumer food dollar and competing effectively with traditional fresh produce marketing channels. Over the next decade the rapid evolution of supermarkets should induce more direct linkages between suppliers and customers, gradually eroding the dominant role of traditional wholesalers and wet markets, following the trend occurring in the latter half of the 20th century in the U.S. and Europe.

International trade in fruit and vegetable products will also be handled via fewer, larger firms. Streamlining of marketing channels poses both challenges and opportunities for the horticultural biotechnology industry. On the one hand, buyers may be receptive to products utilizing biotechnology, particularly those with specialized input traits that can serve as a differentiation tool at the customer or consumer levels. Large foodservice and retail buying firms (and international traders) may offer easy access to consumer markets. On the other hand, if major buyers adopt policies unfavorable to genetically modified organisms (GMO's), distribution obstacles could become insurmountable.

¹ Chapter 3 in a Special Issue of California Agriculture, *Horticultural Biotechnology Challenges and Opportunities*, forthcoming January 2004.

STRUCTURE OF THE FRUIT AND VEGETABLE INDUSTRY

Trends in Production and Area

Fruit and vegetable production grew from 813.7 million metric tons in 1990 to 1.2 billion metric tons in 2002, while area harvested increased from 72.2 to 96.6 million hectares [Food and Agricultural Organization of the United Nations (FAO)]. Vegetables grew more rapidly than fruit with vegetables now representing 49 percent (47 million hectares) of total fruit and vegetable area and 62 percent (772.7 million metric tons) of total fruit and vegetable production. While total fruit and vegetable production grew by 47 percent between 1990 and 2002, population only increased 18 percent. Consequently, per capita supply or availability expanded from 155 to 193 kg over this period.

China's role in both vegetable and fruit area and production grew rapidly over the last decade. In 2002, China's share of world vegetable area and production were 42 percent and 48 percent, respectively, compared to 24 and 28 percent in 1990. With yields above the world average China is set to surpass a fifty percent share of global vegetable production in coming years. Clearly, China's position on the use of GMO's in the vegetable industry will have overwhelming market implications for breeders.

Despite approximately doubling fruit area and more than tripling fruit production between 1990 and 2002, China's share of world fruit area and production pales in comparison to vegetables. Nevertheless, its growth in market share is impressive, at 20 and 15 percent of world fruit area and production in 2002, respectively, compared to 13 and 6 percent in 1990. Although productivity gains made over the last decade in China's fruit industry far surpassed those in vegetables, its lower share of world fruit production relative to world fruit area shows that China's fruit industry has great room for improvement in yields.

The recent technological dynamism in the Chinese fruit sector, in conjunction with its still lagging yields, may bode especially well for the application of biotechnology in the future. On the other hand, China's attitude about GMO's may change if it becomes more export-oriented. Currently, the vast majority of China's horticultural production is destined for domestic markets; if its export share of production becomes significant so too should customer attitudes in foreign markets regarding the use of biotechnology. Japanese attitudes will be particularly important. For example, already in 2001 China sent over half of its fresh vegetable exports there and has become Japan's primary foreign supplier of processed fruits and vegetables.

International trade

The challenge to supply seasonal, perishable products year-round has favored imports and increased horizontal and vertical integration among shippers regionally, nationally, and internationally. Generally speaking, no country produces all of the fresh fruits and vegetables it demands in every week of the year, creating the opportunity for trade. Seasonality in the production and consumption of perishable commodities, due to natural climatic conditions, causes much horticultural trade to be contraseasonal, such as the shipment of Southern Hemisphere grapes, stone fruits, and avocados from Chile to the United States and Europe in order to meet consumer demand during the Northern Hemisphere's winter, when domestic supplies are low. Similarly, the United States imports grapes from Mexico in the spring and exports them to Mexico in the fall. Differences in natural climatic and growing conditions between countries can provide competitive advantages that lead to trade in complementary

products, such as U.S. apples and stone fruits shipped to Costa Rica and Costa Rican bananas and pineapples exported to the United States.

Regardless of the type of trade flow, as firm level integration increases among international traders and grower-shippers and these firms position themselves as consistent year-round suppliers of differentiated products, firms will increasingly seek out varieties that offer superior flavor and other attributes. Market requirements will increasingly dictate that these differentiated varieties (whether marketed on a branded basis or not) be consistently provided from multiple locations in both the northern and southern hemispheres. This poses great challenges to both conventional and biotechnology-oriented breeders. In other words, breeding a set of attributes into a particular fruit or vegetable variety in one location will be insufficient for suppliers aiming at consistent year-round offerings; the same final product attributes must be replicated in diverse locations with different agronomic and climatic conditions.

According to the FAO, world fruit and vegetable exports in both processed and fresh form totaled \$69.8 billion in 2001, up from \$51 billion in 1990. World trade peaked in value in 1996 at \$72.7 billion, in part reflecting lower demand in Asia resulting from the ongoing Japanese recession. However, exports continued to grow throughout the decade in quantity, totaling 122.7 million metric tons in 2001 compared to 84 million in 1990. Still exports represent a small share of total production, about 10 percent in 2001, unchanged over the decade. Further, the decline in average product value reflects saturation in developed country markets, highlighting the growing competitive pressures reported by shippers and exporters on diverse continents, and the necessity of developing viable strategies under market conditions imposing downward pressure on margins at all levels of the food system.

A snapshot of key import and export markets helps illustrate the direction and size of trade flows, highlighting the countries whose preferences will be most important to horticultural biotechnology firms, both as importers and exporters, as well as fleshing out values to part of the supply chain. This discussion follows.

Key Import Markets

According to FAO, world imports of fruits and vegetables reached \$76 billion in 2001, up from \$60.4 billion in 1990. (Differences between import and export values reflect transportation and other marketing costs, importer margins and statistical reporting issues.) As a single country, the U.S. is the largest import market for horticultural products in the world, including an import value of \$10.8 billion for fruits and vegetables (Chapters 7 and 8 of the Harmonized Tariff Schedule, excluding nuts) in 2001, up from \$6.7 billion in 1990.

As a bloc, the European Union (EU) dominates horticultural trade, importing \$36.2 billion of fruits and vegetables in 2001, compared to \$34.8 billion in 1990. However, the EU's share declined from 56 percent of world fruit and vegetable imports in 1990 to 48 percent in 2001 while the U.S. share grew from 11 to 14 percent. Germany has long been the most important import market within Europe but its declining share of world imports is the primary factor contributing to the EU's lower share; Germany accounted for 12 percent of world fruit and vegetable imports in 2001, down from 18 percent in 1990.

Japan is the third most important market, receiving 8 percent of world imports in 2001, with its share essentially flat since 1993. Japan imported \$5.9 billion worth of fruits and vegetables in 2001 compared to \$3.7 billion in 1990 but due to economic difficulties starting in the mid-1990s Japan has not surpassed its peak import level of \$6.3 billion in 1995.

While the EU's and Japan's influence on world horticultural markets has not been growing they will remain vitally important. Leading and emerging fruit and vegetable suppliers will continue to vie for these lucrative markets and will respond to market signals conveying evolving European and Japanese preferences regarding the use of biotechnology. Furthermore, in the case of Japan, declining domestic horticultural production over time and eventual economic recovery are expected to eventually cause imports to rebound.

From the U.S. horticultural industry perspective, preferences in both markets will be important. The EU imported \$1.1 billion of fresh and processed fruit, vegetables and nuts from the U.S. in 2001 and the U.S. had a \$300 million trade surplus with the EU in these products (Gain Report #E22104). Despite the fact that outside of nuts, raisins and fruit juices the U.S. no longer holds major market shares in the European import market, the absolute values of our exports there are still important; the EU imported over \$373 million of fruits and vegetables (excluding nuts, raisins and fruit juices) from the U.S., primarily early season fruits such as table grapes and other stone fruit, as well as citrus.

In the case of Japan the U.S. is a major supplier both in absolute and relative terms, across a diversity of products. In 2001 U.S. imports of fresh fruit into Japan were \$537 million, accounting for a 40% market share, followed by the Philippines (30 percent) and Ecuador (7%), the latter supplying primarily bananas (Gain Report #JA3701). China is the leading supplier of fresh vegetables, with a 57 percent share (\$1.1 billion) of the \$2 billion Japanese import market, followed by the U.S. with 2001 imports of \$278.3 million and a 14 percent share (FAS January 2003). Japan imported \$1.4 billion of processed fruits and vegetables in 2001, 41 percent provided by China, with a 25 percent share for the U.S., the second largest supplier (Gain Report #JA3701).

After Japan, France, The Netherlands and Canada are the principal import markets for fruits and vegetables, with only Canada's share growing, currently at 4.5 percent of world imports. For fresh vegetables specifically, the top five importing countries (U.S., Germany, UK, Japan and France) had a 55 percent share of the \$20.2 billion in 2001 world imports. Clearly, biotechnology firms must ultimately contend with consumer preferences in many international markets.

Key Exporters

Just as the U.S. is the world's leading importer of fruits and vegetables, it is the largest exporter, with \$7.9 billion in 2001 exports and an 11 percent market share. Despite exports growing from \$5.4 billion in 1990, U.S. market share was relatively unchanged over the decade. Again, although the EU dominates export trade as a group, with \$28.2 billion in exports in 2001, its share declined from 44 percent in 1990 to 40 percent in 2001 and actual value peaked in 1996 at \$32.1 billion. Despite the important export roles of the EU and the U.S. they are net importers, with \$8 billion and \$2.9 billion trade deficits, respectively, in 2001. The primary European exporters are Spain, The Netherlands, Italy and France, with 10, 7, 6 and 5 percent market shares, respectively. China is now similar in size to Italy and Mexico surpassed France in importance in 2000.

Countries well known for their fruit exports, such as Chile, Brazil, Argentina and Ecuador have market shares of 2.3 percent or less and Australia and New Zealand hover at the 1 percent level. Hence, while some countries in certain individual products may hold important market shares, in general, there is still quite a bit of fragmentation in world fruit and vegetable trade. For fresh vegetables, the world's top 5 exporters (The Netherlands, Spain, Mexico, U.S., and China) contributed 59 percent of total export value in 2001. Only the U.S. was ranked within the top 5

both as an importer and exporter, making its preferences and practices regarding biotechnology very important to vegetable breeders.

Trends in Food Retailing

Over the last decade the world has experienced a high level of mergers and acquisitions in the grocery retailing industry, both in home country markets and across borders via foreign direct investment (FDI). Modern supermarket sectors have emerged in developing countries, in several cases reinforced by FDI. This trend was stimulated by liberalization of laws surrounding FDI and incentives created by growing opportunities in developing country markets in the face of saturated food markets in Europe and the U.S.. Over the last decade this trend led to an estimated 30 firms accounting for 10 percent of global grocery sales (M+M PlanetRetail).

The top 25 global retail firms are mainly European and Asian, in particular in terms of chains with multi-country and -continent store locations. While there are conventional U.S. retailers with high global sales rankings (e.g., Kroger, Albertson's and Safeway) they operate almost exclusively in North America. However, a non-conventional grocery retailer known as a mass merchandiser, Wal-Mart, is not only the one U.S. firm with a global presence, with store locations in 10 countries, but also the largest grocery retailer in the world. Wal-Mart's approach concentrates on driving non-value-adding costs out of the food system, imposing a new competitive benchmark and downward pressure on margins for players at all levels of the food system.

Approximately 30 percent of Wal-Mart's \$244.5 billion in global 2002 sales (possibly \$83 billion) were estimated as grocery-equivalent, generating impressive new buying power in the food industry. Carrefour/Promodes, Ahold and Metro are examples of European retailing firms with world-wide buying power, derived from their operations throughout Europe, as well as in Latin America and Asia; each of these firms has stores in 24, 18 and 22 countries, respectively. However, economic difficulties in various markets may have slowed the trend toward retail globalization for now. For example, on April 3, 2003 Ahold announced the divestiture of its operations in Argentina, Brazil, Chile, Peru and Paraguay, despite continued profitability in some of these markets. Losses in the major markets in the region and the decision to divest there made it no longer appealing to Ahold to operate anywhere in South America.

Nevertheless, the high level of mergers and acquisitions has caused concentration levels to increase throughout the world, albeit at different rates. In 2002 the top 5 grocery retailers had a 67 percent market share in Spain compared to 73 percent in Germany, 64 percent in the U.K., 81 percent in France and 99 percent in Norway, Switzerland and New Zealand. Interestingly, on a Europe-wide basis (where the market size is more similar to the U.S. in population and geographic area) the share of the top 20 retailers is similar to the top 20 share in the U.S., about 60 percent in 2002.

In Central Eastern Europe, Metro (a German-based retailer and the fifth largest grocery retailer in the world) is the market leader with Tesco (U.K.-based) and Ahold (Netherlands-based) playing major roles. In South Eastern Europe, Western European retailers are also becoming more important players and expected to expand their share there over the next decade. Indeed, on a Europe-wide basis the top 30 grocery retailers had a combined market share of 69 percent in 2001 compared with 52 percent in 1992 and are projected to reach 89-90 percent in just a few years time (M+M PlanetRetail).

Although food retailing is still a relatively fragmented industry in most of the world, no continent seems exempt from the long-term trend towards higher concentration levels. Latin America and Asia have experienced striking growth in the role of supermarkets in food retailing over the past decade, with Southern and Eastern Africa engaged in the same transformation process (Weatherspoon and Reardon). For key Latin American countries the top 5 share of chains in supermarket sales varied from 47 percent in Brazil to 99 percent in Guatemala with 80 and 76 percent shares in important markets such as Mexico and Argentina, respectively (Reardon and Berdegue).

However, in many developing countries supermarkets represent a much lower share of food sales and an even lower share of fresh produce sales than in the U.S., Europe and Japan. Hence, the top 5 supermarket chain shares in several of these Latin American countries overestimates their role in food retailing as a whole, and fresh produce in particular. Mexico is a good example of this; AC Nielsen estimates that supermarkets and convenience stores had a 46 percent share of the 2002 retail food market there (compared to over 80 percent in the U.S.) and supermarkets sold only an estimated 21 percent of fresh produce (Schwentenius and Gomez), as consumers continue to prefer to purchase fresh produce in public markets, mobile street markets and from green grocers.

Nevertheless, the growth of supermarkets has been rapid by any measure and new types of handlers are emerging in Mexico, as elsewhere in the developing world, to facilitate more direct linkages between producers and supermarket retailers. Over time these firms, including forward-integrated grower-shippers also operating on wholesale markets, will exert growing influence, in their roles as sourcing agents for supermarket chains, on the varieties grown and product forms of fruits and vegetables.

CHANGING CUSTOMER REQUIREMENTS

The structural change just described is inducing consolidation at the supplier level as firms attempt to come closer to matching the scale of the fewer, larger buyers. This consolidation is generally not occurring at the production level but rather at the marketing level. For example, many grower-shippers that formerly operated independently have joined forces with competitors and are marketing jointly even though they may still be maintaining separate growing, packing and cooling operations. In some cases grower-shippers are forming strategic alliances with firms in distant parts of the globe to structure year-round supply chains. More retailers are reducing the number of suppliers per product and beginning to contract with two or three preferred vendors capable of offering consistent, year-round volumes, quality, and increasingly importantly, food safety programs and traceback capabilities.

While those retailers that are globally positioned in terms of store locations have generally not pooled their buying volumes across continents, this too may change, where warranted by relative transportation costs and local market supply and demand conditions. In cases where certain production regions have a sizable share of global supply in any given season, global purchasing and promotions could become attractive. For example, Florida is the world's largest fresh grapefruit exporter and at least one European chain is reported to be seeking relationships with Florida grapefruit shippers to supply their stores around the world. A large European retailer already did global promotions for bagged salads with a multi-national fresh-cut processor, and for mangoes out of Brazil, incorporating all their stores into the same supply and marketing program for the duration of the promotion. The choice of Brazil to supply its stores globally in that period of the year was facilitated by the chain's large store presence there and the ties that buyers in the Brazilian division had developed with local large-scale mango shippers. If this type of experience

ends up yielding proven efficiencies it may be replicated in other chains. In any case, global retailers are bound to exert powerful and growing influence on the future production and international trade in fruits and vegetables.

Furthermore, as the food distribution system consolidates retailers are seeking more marketing and promotional support from their suppliers, tailored to their specific needs. This movement towards account-based marketing is causing innovative suppliers to develop detailed knowledge of consumer buying habits for their respective products, by demographic and psychographic segment, for use in category management programs. Successful category management programs provide concrete recommendations on best retail merchandising practices. While these programs are designed to maximize retailer profits they may also increase shipper sales and profits, in part by helping shippers to differentiate themselves in the increasingly competitive marketplace, moving away from the traditional commodity orientation to sales. Increasingly, the food system is evolving toward technology-intensive demand-based information management practices to stimulate sales and profits for retailers. Successful suppliers are likely to be the ones that actively participate in the transition and biotechnology firms must be part of the process.

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