

The World Cactus-Pear Market

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INTRODUCTION

This paper presents the most important results of a wide-reaching study on the world cactus-pear market on which the Prickly Pear (Nopal) Program of CIESTAAM has been working for the last five years. Volumes of supply and demand, marketing channels, prices, and geographic distribution of production and consumption of the fruit are presented for the domestic market. For the international market, major aspects of the market are presented: size of competing enterprises, tariffs and NAFTA agreements, and competitive advantages of the countries competing as exporters to the world market.

MARKETING

The cactus pear is a fruit that is becoming increasingly important worldwide with the incorporation of countries such as Italy, South Africa, Chile, Israel, and even the United States into the European market. These countries expect to be strong competitors for Mexico in the race for foreign markets.

In Mexico, cultivated cactus-fruit orchards cover 57,000 ha; 330,000 tons of cactus pears are sold every year. Sales of the fruit take place during well-defined seasons, marked by the entry of fruit from specific producer regions of the country. This condition generates the marketing problems typical of perishable products. Further complicating this situation is the fact that the cactus pear is considered "second class" and has not received due attention in terms of grading and management, which would add value and quality necessary for more sophisticated markets in the large chains of food stores.

Structure of the Domestic Demand and Patterns of Consumption of Cactus Pears

Geographically, the cactus pear market is confined to the central plateau region, significantly excluding the coastal states and the tropical regions of Mexico. This does not mean that the population living in these regions do not consume cactus pears, but preference for the fruit is limited, partly because of different cultural patterns and partly because of the lack of efficient distribution to these regions.

In terms of demand, by income groups, the demand-income elasticity of the cactus pear is very low or negative indicating that the major consumers of cactus pears in the country are from

middle and low income groups. This is reflected in the fact that a large proportion of the product is distributed in establishments that are accessible to low income families, in open-air markets, municipal markets, and along the highways. A small proportion is sold in the large supermarkets.

The season in which cactus pears are consumed massively is limited to the harvest period in June and September. Because the international market is just beginning, there is no imported fruit supplied during the rest of the year.

The per capita consumption of cactus pears is 3.69 kg a year, ninth place among fruits consumed in the country (Table 1).

Table 1. Cultivated Area, Production, and per Capita Consumption of the Most Important Fruit Crops in Mexico in 1994

Fruit	Area		Production		Exports	Imports	Per Capita Consumption (kg/year)
	1000 ha	%	1000 t	%	1000 t	1000 t	
Oranges	267	26.8	2,988	26.7	2.3	2.8	33.85
Mangoes	134	13.5	1,286	11.5	109.6		13.32
Mexican limes	92	9.2	778	6.9	134.1	0.1	7.29
Avocados	90	9.0	772	6.9	20.0		8.52
Bananas	77	7.7	2,237	20.0	57.8		24.68
Apples	68	6.8	674	6.0	0.1	154.0	9.38
Cactus Pears	57	5.0	328	2.9	2.1		3.69
Cantaloupe	44	4.4	637	5.7	94.3	8.0	6.24
Peaches	41	4.1	153	1.4		25.7	2.02
Grapes	40	4.0	488	4.4	43.6	45.1	5.54
Pecans	38	3.8	45	0.4	20.6	1.5	0.29
Watermelon	32	3.2	399	3.6	142.3	2.0	2.93
Tangerines	11	1.1	105	0.9	4.1		1.14
Pineapple	6	0.6	241	2.2	4.2		2.68
Strawberries	5	0.5	74	0.7	17.0	9.4	0.75
TOTALS	1,002	100.0	11,205	100.0			

Source: SAGAR. Anuario Estadístico 1994; BANCOMEXT. Comercio Exterior.

Production Costs, Dethorning-packing, and Marketing of Cactus Pears by Region

Harvesting is the main cost for the producers of cactus pears. The cost of the second most important component is different for each zone, reflecting specific problems for each region of production. For example, in Puebla the problem is weeding; in San Martín de las Pirámides it is fertilization, and in Victoria, Zacatecas, it is disease and pest control. The marked differences among regions in terms of the second most important production cost largely explain the differences observed in the total costs for the three regions.

The cost of dethorning and packing is basically determined by the yield and, thus, the differences in the costs for this component is due to the differences in the yields obtained. Another factor that explains this difference is the cost of labor. For example, in San Martín de

las Pirámides, the daily wage for dethorning and packing is 30 pesos (about 7 pesos/US\$) and a laborer can pack 20 crates; in San Sebastián Villanueva, with the same wage, a laborer dethorns and packs 24 crates, while in the north-central region, if the producer is not an associate in the ownership of a dethorner, it costs him two pesos a crate for dethorning and packing.

The costs of production per kg of cactus pears in Villanueva, Puebla, and Victoria, Zac., are very similar, between US\$0.18 and US\$0.19 per kilogram. The cost of production per kilogram reported in San Martín de las Pirámides is ostensibly higher than in the other two places. The factor that most affects this great difference is yield.

Marketing costs constitute a very important component of the costs accumulated along the production-consumption chain of the cactus pear. Logically, the highest marketing costs in absolute amounts and percentage of total costs occur in the north-central region. The lowest costs are found in San Martín de las Pirámides, due to its nearness to Mexico City, the main distribution center for this product. In general, marketing cactus fruit involves a percentage of the total cost that varies from 28.5% to 46.4%.

Finally, despite important differences in the cost structure in the three localities, total costs per kilogram are similar, especially between Villanueva, Puebla, and San Martín de las Pirámides. The relatively high costs for Victoria, Zac., can be explained by the elevated cost of transportation.

Marketing Infrastructure in the Producer Regions

One of the main deficiencies that the process of marketing cactus pears faces is the lack of storage and refrigeration facilities. The existing infrastructure for marketing in the main producer regions is limited to a few dethorning plants and places adapted for wholesale of cactus pears located in strategic areas. No more than 10% of the domestic production goes through the dethorning plants and no more than 70% is sold in open-air markets called *tianguis*.¹

Marketing Channels

In the domestic market, the most frequent marketing channel for cactus pears begins with a buyer who normally owns equipment for dethorning and packing. Occasionally, some growers have their own dethorners. Wholesalers or shippers generally acquire the fruit dethorned and packed for shipping to the central distribution markets in the large cities, especially the Central Distribution Market of Iztapalapa in Mexico City (CEDA). From the CEDA, cactus pears are distributed to the supermarket-chain stores, open-air markets, municipal markets, and all kinds of retailers, who sell the fruit to the consumer.

There are different complementary forms of marketing cactus pears:

- Occasionally, they are delivered to packing plants for shipping to the domestic markets or for exportation.
- Most of the shipments are delivered to warehouses for the domestic market (Guadalajara, Monterrey, Torreón, Cd. de México, etc.) or to the produce warehouses of the large chains of supermarkets (Soriana, Ley, Aurrera, Comercial Mexicana, Gigante, etc.).

¹ Native name by which people's markets are known in Mexico.

Only five of the packing plants have been successful in shipping directly to foreign markets. In other words, all of the plants dethorn and pack cactus pears for export, but some deliver to other plants because of the failure they have had in collecting payment for the exported fruit, and thus have decided to sell only on the domestic market.

In the process of exportation, the most important agents in the domestic sector are the grower and the exporter; in the foreign sector, they are the broker and the wholesaler. Together with these, there are a series of agents called "indirect exporters" whose main contribution is transportation and packaging. Indirectly, agents such as Banco Mexicano de Comercio Exterior (BANCOMEXT), customs agents, and others, also intervene.

Cactus Pear Prices in the Major Distribution Warehouses and Markets of Mexico

Cactus-pear prices clearly show seasonal movements in all of the central distribution warehouses or markets of Mexico. This product is marketed in the central distribution warehouses during July and November and in a few distribution centers until December. Like other fresh produce, prices drop during the period of maximum production.

The prices in the central distribution warehouses vary, depending on their location: the farther from the producer region, the higher price, because of the cost of transportation. Throughout the months in which there is a supply, it can be clearly seen that during the months in which the supply is greatest, the prices are lowest (Figure 1).

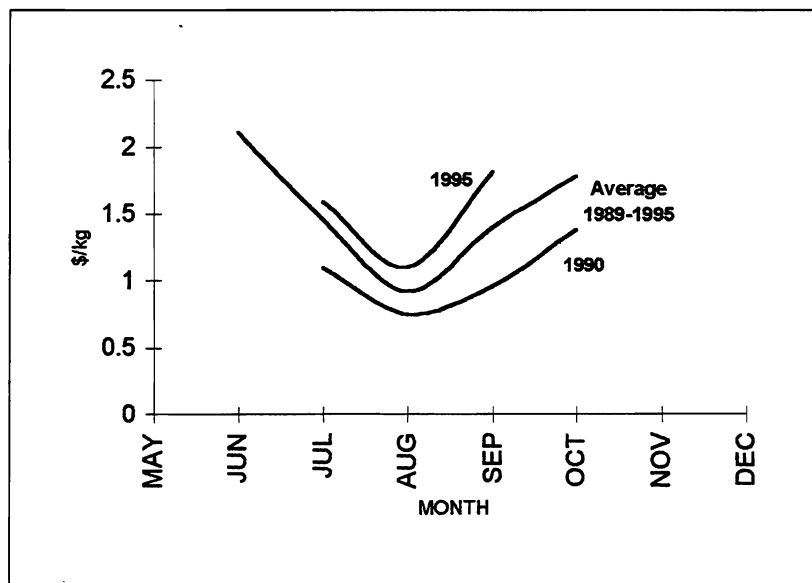


Figure 1. Evolution of Average Monthly Prices of Cactus Pears in CEDA Iztapalapa

The single most important explanation of the variation in prices in the different marketplaces is the cost of transportation. However, the difference between the supply and demand is related to the entry of produce from different producer regions and differences in eating habits at the local level also affect, in some measure, how these prices are determined.

In the last seven years, the rate of increase in nominal prices of cactus pears in the different marketplaces of the country exhibit very contrasting tendencies. One explanation of this behavior might lie in the fact that in the last decade more competition for the domestic market has been taking shape. As a result, better systems of information and transportation form a more efficient domestic market. This has eliminated structural deformations to favor a better functioning of market forces.

Marketing Margins in the Domestic Market

In terms of absolute margins, the differences in margins for the growers in each region are notable. Margins are greater for the growers of Villanueva because part of their production is harvested in the absence of competition. They sell at higher prices and their yields are higher, thus, their production is more profitable (Table 2).

Absolute margins for distributors and retailers are greater for higher-priced fruit. This is the reason that regional differences are so marked. Margins for distributors and retailers of cactus pears produced in San Sebastián Villanueva, Puebla, are almost double those made by the same agents for cactus pears produced in the north-central region where margins are lower.

In terms of relative margins, growers have a significant participation in the total margins, between 45% and 47%, a relatively high percentage considering the type of perishable product. Relative margins for distributors and retailers are similar in the regions of Villanueva and San Martín de las Pirámides and much lower in the north-central zone.

Table 2. Marketing Margins of Cactus Pears in Three Producer Regions, 1995. (US\$/kg)

Margin/Price	Villanueva	San Martín de las Pirámides	Centro Norte
Cost of production	0.19	0.27	0.18
Harvest, dethorning, and packing	0.17	0.18	0.20
Grower's margin	0.54	0.35	0.32
Price for buyer in the field	0.90	0.80	0.70
Shipping to and storage in the central distribution warehouse	0.15	0.10	0.20
Distributor's margin	0.35	0.30	0.20
Selling price	1.40	1.20	1.10
Transportation to retail markets.	0.08	0.08	0.08
Retailer's margin	0.52	0.47	0.32
Consumer price	2.00	1.75	1.50
Relative Margins (% above consumer price)			
Grower's margin	45.00	45.71	46.67
Distributor's margin	17.50	17.14	13.33
Retailer's margin	26.00	26.86	21.33
Total of Margins	88.50	89.71	81.33

Source: Constructed by the authors based on direct interviews with growers, 1995

An interesting finding is the important participation in the margins in the consumer price of the fruit, with percentages that vary from 80% to 90%. This percentage does not correspond strictly to added value, because, in the different phases, inputs are used to a greater or lesser degree. Nevertheless, these high margins are certainly an approximate indicator of the fact that the cactus-pear business in Mexico, from production to consumption, generates incomes that are distributed within the agricultural sector (within the production-consumption chain). However, there is little impact outside the sector because intermediate consumption is modest.

FOREIGN MARKET FOR MEXICAN CACTUS PEARS

Despite the fact that Mexico is the country with the greatest area cultivated in prickly-pear cactus fruit (57,000 ha), the largest production (353,890 t) and the largest diversity of cactus pears (white, red, yellow, and orange), it is not the leading exporter.

The U.S. market is clearly the most important destination of Mexican cactus-pear exports, which have been increasing significantly from 1991 to 1994 (Table 3). The Canadian market is erratic, with volumes of little significance, but it is the second most important market for Mexican cactus-pear exports. The rest of the foreign markets are sporadic and circumstantial, with the exception of Japan, which is the third most important market, but which has had a notorious fall in its imports of the fruit. More than 94% of the exports are shipped to the U.S., followed by Canada. Japan has been displaced by France for third place (Table 4).

During the period 1991 to 1995, the average weighted price for exported cactus pears has remained at about US\$0.52/kg (Table 5). It is notable that the best prices are obtained in the Japanese market and the lowest price is received in the most voluminous market, the U.S. The Canadian market offers more than double the price of the U.S. market. Prices on the European market are also superior and more attractive for this product.

Table 3. Volume of Mexican Exports of Cactus Pears (kg)

Country of Destination	1991	1992	1993	1994	1995*
Germany, Federal Republic	0	12	0	10	0
Belize	0	0	40	0	0
Brazil	200	0	0	0	0
Canada	65,723	189,260	30,557	33,600	15,220
U.S.A.	867,515	1,396,515	1,837,923	2,062,010	746,061
France	0	941	830	685	734
Japan	1,863	305	974	1,352	257
United Kingdom	0	0	0	10	0
Switzerland	0	0	0	0	15
Total	935,301	1,587,033	1,870,324	2,097,667	762,287

* The 1995 exports include data only up to September 1995.

Source: SECOFI.

Table 4. Value of Cactus Pear Exports (US\$)

Country	1991	1992	1993	1994	1995*
Germany, Federal Republic	0	7	0	16	0
Belize	0	0	80	0	0
Brazil	200	0	0	0	0
Canada	44,943	157,880	39,660	36,960	21,906
U.S.A.	462,316	700,754	870,739	999,551	391,647
France	0	1,650	1,707	1,710	1,473
Japan	15,670	1,155	3,100	5,940	894
United Kingdom (Including Channel Islands)	0	0	0	16	0
Switzerland	0	0	0	0	11
Total	523,129	861,446	915,286	1,044,193	415,931

* The 1995 exports include data only up to September 1995.

Source: SECOFI.

Table 5. Average Value of Cactus Pear Exports (US\$/kg)

Country	1991	1992	1993	1994	1995*
Germany, Federal Republic		0.58		1.60	
Belize			2.00		
Brazil	1.00				
Canada	0.68	0.83	1.30	1.10	1.44
U.S.A.	0.53	0.50	0.47	0.48	0.52
France		1.75	2.06	2.50	2.01
Japan	8.41	3.79	3.18	4.39	3.48
United Kingdom				1.60	
Switzerland					0.73
Average weighted value	0.56	0.54	0.49	0.50	0.55

* The 1995 exports include data only up to September 1995.

Source: SECOFI

Of the total volume imported by the U.S., 99.58% comes from Mexico. It can also be observed that less than 1% (0.79%) passes through internal customhouses (Chicago, Dallas, Los Angeles, and San Francisco), probably entering by air cargo. The customhouses in Arizona (Nogales and San Luis) and California (Los Angeles, San Diego, and San Francisco) document 44.87% of the imported cactus pears and the rest are documented in the customhouses of Chicago and Texas. The customhouses in order of importance, by volume of cactus pear documented are: San Diego, CA.; Hidalgo, TX; Laredo, TX; Nogales AZ. Mexico exports 97% of its cactus pears through these entry points (Table 6).

Table 6. U.S. Imports of Cactus Pears, by Country and Port of Entry (fiscal year 1991)

Country	Port of Entry	Kilograms
Chile	J.F.K., NY	7,622
	Los Angeles, CA	2,224
	Miami, FL	3,701
	SUM	12,547
Mexico	Chicago, IL	716
	Dallas, TX	250
	El Paso, TX	23,343
	Hidalgo, TX	548,291
	Laredo, TX	432,676
	Los Angeles, CA	13,533
	Nogales, AZ	97,559
	Progreso, Tx.	12,825
	Roma, TX	3,285
	San Diego, CA	705,699
	San Francisco, CA	18
	San Luis, AZ	8,031
	SUM	1,846,226
TOTAL		1,853,848

Source: Green and Charles, 1992

The global market of fresh cactus pears is fragmented, with the characteristics of market niches. The world leader in exports is Italy, which exports more than seven times the volume Mexico exports, especially to the European and North African markets. It is notable that this country also exports cactus pears to the U.S. and Canada, covering a market that should naturally be covered by Mexican exports. Other important exporters, besides Mexico, are Israel, Columbia, South Africa, and Chile, which could become important competitors with Mexican exports, especially for the European and North American markets.

Cactus Pears Under NAFTA

Mexican cactus pears enter the U.S. as fresh fruit, which is subject to a duty of 3.4% *ad valorem*. However, with the signing of NAFTA, they are transferred to a duty reduction code B, which means that as of 1998 the tariff will be reduced to zero. For Canada, exports of cactus pears have always been duty free.

Quality Standards for Cactus Pears

For cactus pears, there is a "Codex alimentarius" norm, which defines the product, quality, grading for quality and caliber, provisions on levels of tolerance, presentation (packaging), labeling, and pesticide residues. Also included are provisions from Mexican norms for fresh cactus pears, which include grading of the fruit by weight and size, as well as levels of tolerance in terms of quality and size, and also norms for packaging, marking, and labeling.

Structure of the International Demand and Patterns of Cactus-Pear Consumption

The international demand for cactus pears is only some 20,000 tons per year (Table 7). Of these, more than half are consumed in Europe. The U.S. and Canada is a region that absorbs 35% of the world demand. Only a small percentage goes to regions which have only recently joined the international demand, such as Japan and the Arab countries.

Table 7. International Demand for Cactus Pears, 1996

Destination	Tons	%
U.S.	5,000	25.00
Canada	2,000	10.00
Western Europe	7,200	36.00
Eastern Europe	3,000	15.00
Arab Countries	2,000	10.00
Japan and others	800	4.00
Totals	20,000	100.00

Source: Our own estimates based on different sources. 1995.

Cactus pears are consumed basically fresh and ripe. Although it is considered an ethnic product, its market is not confined only to families of Mediterranean or Mexican origin. The fruit is well accepted in the Eastern and Western European markets, especially in Germany, Belgium, Holland, and France.

Consumers prefer the fruit without thorns, peeling them just before eating. Thorns are a facet of the prickly pear that operates against its consumption. Consumers are reluctant about the peeling process and the problem of getting rid of the large volume of waste this generates. Thus, it would be a great advantage if the product could be delivered on the market peeled and frozen in order to gain a position on the European markets.

There is a great potential for expanding the cactus-pear market in the country to our north, if new ways of presenting the product could be found, such as peeled and frozen cactus pears, to attract Anglo-Saxon consumers.

Competitive Advantages

The world cactus pear market is limited to niches of consumers with well-defined cultural traits. In the U.S. and Canada, the demand is localized principally in this type of consumer, families of Mexican origin, Hispanics in general, and Europeans with Latin origins. The countries that supply these markets do so in well-defined regions. For example, Mexico supplies the populations of the southern and central parts of the U.S., while Italy supplies the northeast (principally New York).

In terms of prices, the Italians obtain better prices than the Mexicans. Their competitiveness lies in the variety of fruit adapted to the tastes of consumers of Italian descent, a factor that gives them a captive market.

Italian exports dominate the European market because of their quality and price. Italy has better installations for packing and better networks for distribution. Recently, Italy's dominion has been threatened by the entry of products from South Africa and Chile, whose advantage lies in the season in which they enter the market—winter in the northern hemisphere. These countries produce during the southern summer and reach the European market when there is almost no produce from the Mediterranean region.

Eastern Europe and the Arab countries are other markets that could be very feasibly developed. For Mexico, the main competitive disadvantage is shipping and the use of conservation technology that is presently not used. It is highly probable that these markets will be captured by Italy and other Mediterranean countries that have efficient distribution networks and advanced technology for conservation. These countries are able to access these markets more efficiently and rapidly with lower costs, giving them competitive advantages over Mexico.

On the international market, some countries are emerging as possible serious competitors in the near future: Israel, Columbia, Chile, and South Africa. The latter two have the competitive advantage of harvesting during the northern hemisphere's winter months.

The bases for competitiveness, which begin to show during the process of production itself, lie in the yields, quality, and production costs. Although there are no precise data, it is estimated that the costs of production in Italy are relatively low, due to their relatively high yields.

The general conditions of the economy, the degree of development of the infrastructure and, above all, the level of experience and organization in the promotion of exports, grant Italy, Columbia, Chile, and South Africa some comparative advantages that Mexico should try to overcome on a medium term if it wants to occupy and maintain an important place in the world market of cactus pears.

CONCLUSIONS

In Mexico there is great potential for the development of plantations of prickly pear cactus fruit because of its extensive and rich agroclimatic conditions. At present, there are 57,000 hectares, almost all rainfed, distributed in the three producer regions: North-central, Central, and South.

The plantations of cactus pears are now in a state of serious deterioration, due principally to problems of profitability and the little support they receive from government institutions. Average yields do not reach 7 tons per ha, which is lower than the productivity achieved in competing countries.

Costs of production have increased notoriously, a fact that has contributed to the abandoning of cultural practices crucial for optimum maintenance of the plantations.

There is no marketing infrastructure.

Marketing is done through traditional channels, with the intervention of an excess of middlemen and economic agents.

Consumption of cactus pears has not been promoted at a national level. Per capita consumption is relatively low (3.69 kg/year) and important markets on the coasts and borders and in the major cities in the southeast of the republic remain to be developed.

Cactus pears do not have proper post-harvest handling. This reduces their quality and shelf life. Standards of quality are not applied.

There are about 20,000 tons on the world market with a value of approximately 50 million dollars. The most important importers of cactus pears are Western Europe, Canada, Eastern Europe, and some emerging countries from the Pacific Basin, led by Japan.

The Mediterranean countries, with Italy (leading the world market) and Israel, dominate the European market, although Italy has traditionally exported important volumes to the east coast of the U.S. Recently, new exporting countries, such as Columbia, Chile, and South Africa are emerging and are sending their products to Europe and the U.S. taking advantage of the fact that their harvest period coincides with winter in the northern hemisphere.

Mexico could significantly expand their exports to member countries of NAFTA, taking advantage of the relative nearness of these markets and of the population of nearly 20 million Hispanics and Latinos, 13 million of which are Mexicans who reside in the U.S.

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