

Chapter 6

Food Processing

6.1 Overview of Food Processing Sector

Processed foods and beverages are often referred to as “value-added” products. They are valued-added products because raw products like wheat and yeast, for example, are transformed into higher value products like bread and pastry products. Processing activities may be more minor as in the case of canned fruits and vegetables or quite extensive, as in combining nuts, sugar, cocoa, milk, and other ingredients to make candy bars. Live beef sales are a raw commodity, even though they are a “high-value” good since grains are fed to fatten beef. As beef moves further through the marketing channel and is sold as carcass beef, boxed beef, or shrink wrap in the grocery store, it becomes a processed food product. The majority of processed food sales are made from large and well-known brand companies (e.g., Kelloggs, Pillsbury, Frito Lay, and PepsiCo).

Regional Importance of Sector

A new era of food processing began for Sonora in the 1960s with modernization of their food processing industry. Between 1955 and 1985, the total gross value of food processing production grew at a remarkable rate of 5.8 percent annually. Growth was not entirely smooth though. Problems related to lack of credit, inflation, scarcity of raw materials, and lower productivity reduced growth in the mid-1970s and later. Sonora’s food processing industry comprised 7.3 percent of their GSP in 1993 and employed 8.3 percent of their labor force (INEGI). The food processing industry of Sonora includes meat processing, dairy products, cereal processing, bakery products, tortilla processing, cooking oils, cocoa and chocolate processing, animal food, and beverages.

According to the number of establishments, jobs, and value-added activities from 1985 to 1993, sectors of Sonora’s food processing industry can be classed as either declining, stagnating, or growing. Industries that have followed a decreasing trend include baking and tortilla products (though growth was spurred some in 1993). Beef, dairy, cocoa, and chocolate products have been rather stagnant over this period. Beverage products, animal feed, cooking oil, and cereals have demonstrated more of an increasing trend.

The value contributed by Municipality for food processing in Sonora, in decreasing order is, Cajeme (38%), Hermosillo (26%), Navojoa (13%), Guaymas (10%), Huatabampo (6%), San Luis Rio Colorado (3%), Nogales (0.4%), and Empalme (0.3%). Thus, the principal food processing area for Sonora is in the south, in the midst of the Yaqui and Mayo valley's 950,000 acres of irrigated land. Southern Sonora has several modern processing plants that utilize state of the art technology. Other resources like uncontaminated water, an international airport, quality of life factors, and a good supply of educated, productive and low cost workers have been noted as reasons for attracting recent investments in international food processing firms. Sonora spends more than 60 percent of its state budget on education and their population is one of the most educated in Mexico and Latin America. Individuals average more than 8.5 years of schooling (Weissner). International companies located in Sonora include PepsiCo's Sabritas and Gamesa, the Corona and Tecate beer companies, Green Giant, and Ralston Purina (Weissner). In total, Sonora had 1,906 food processing establishments that generated 24,845 jobs in 1993.

Arizona's food processing industry has grown at an average annual rate of 3.5 percent from 1980 to 1992. However, the percentage of GSP contributed to the state has remained quite flat, around 0.7 percent (REIS, BEA). Employment for the food processing sector has increased from 7,900 workers in 1987 to 8,400 in 1992 (1992 Census of Manufactures). Arizona reported 204 establishments in 1992 that produced meat products, dairy products, preserved fruits and vegetables, grain mill products, dairy products, beverages, potato chips and similar snacks, ice cream, and other related goods. Most of the food processing activities are in or near the Phoenix metropolitan area. This area provided over 72 percent of the food and kindred product jobs for the state in 1992. Of the 204 food processing establishments in the state, 84 employ 20 or more individuals. These firms have an average employee payroll of 73 workers. Due to the relatively small number of firms, disclosure problems prevent attaining detailed information on employment and value-added activities for most product groups.

National Perspective

As mentioned above, food processing industries in Arizona employed 8,400 workers in 1992 or 0.52 percent of Arizona's employed workers. This percentage is somewhat higher than the 0.4 percent obtained from REIS, BEA, which provided the regional employment numbers referenced in Chapter 3. Although these two figures are close, they differ by enough to illustrate the difficulty in quantifying Arizona's manufacturing industry. The US food processing industry employs 1.3 percent of all US workers or almost three times the percentage of Arizona workers. Food and kindred products (SIC 20) account for 1.5 percent of GDP.

The 7.3 percent of GSP provided by Sonora's food processing industry in 1993 is higher than the 6.0 percent of GDP provided by this industry for Mexico. The relative share of economic activity accounted for by food processing is much higher in Mexico than the US. Sonora's share of economic activity in food processing is more than ten times the percentage of GSP share for Arizona. However, since the GSP of Arizona is almost ten times that of Sonora, the economic activity generated by the food processing industries of the two states are about equal. In 1995, Sonora's food processing industry produced about US \$1.3 billion in goods while Arizona's industry generated \$1.2 billion in processed food products.

Growth in food processing trade and foreign investment abroad has grown remarkably in the last five years. Much of this growth has been driven by increasing incomes in developing countries that have a large population like the Philippines, Thailand, India, Indonesia, Mexico, and similar countries. The section on trade patterns at the end of this chapter discusses this growth.

Government Programs and Regulations

One of the most important programs related to The National Development Plan in Mexico for 1995 to 2000, corresponds to the industrial sector, which includes food processing. The main objective of the plan is to spur growth at an accelerated pace. Special emphasis is given for the promotion of small and medium size companies that are labor intensive and have the potential to generate exports. The program also attempts to identify those regions and areas that may have a comparative advantage. Support from the Mexican government for the export of processed food products can occur in a number of different programs. Some of these programs involve tax refunds on tariffs of imported products (draw back), refunds of value added tax (IVA), the elimination of an export tax, machinery and equipment support (PITEX), and information support about markets and financing.

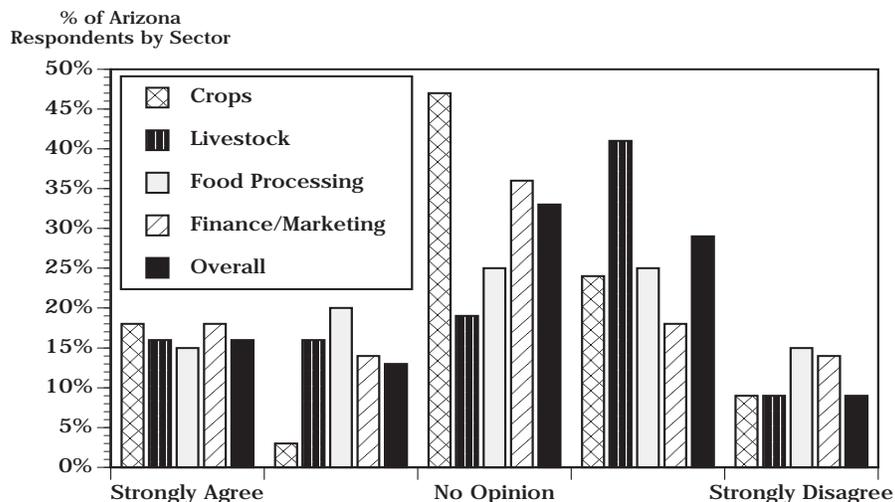
Government programs are almost nonexistent in the US's food processing sector. Some food products are eligible to receive export market promotion funds but these are time, product, and country specific. Most of the government involvement in food processing activities involves USDA or Food and Drug Administration (FDA) inspection and certification. For example, USDA certified beef is inspected by a federal employee. User fees are charged to recover the expenses associated with inspection and certification.

USDA's Food Safety and Inspection Service (FSIS) oversees much of the safety surrounding processed foods. FSIS has proposed regulations for food safety with what is known as Hazard Analysis Critical Control Point (HACCP) system. Under HACCP, individual firms examine their operations and identify the point(s) of their operation that pose the greatest food safety risks. HACCP involves steps for monitoring and verification from both FSIS and firms which may include microbial testing to ensure that safety targets are being met. Although pathogens (i.e., bacteria, parasites, viruses and fungi) can contaminate many foods, foods most likely to carry pathogens are high protein non-acidic foods like meat products, seafood, dairy products, poultry, and eggs. Increased concentration and production of a wider variety of meats have heightened the importance of pathogen control for ensuring a safe food supply. The Food and Drug Administration issued HACCP regulations for seafood which will go into effect in December 1997. HACCP for meat and poultry products will be phased in over several years, requiring large plants to comply sooner than small plants.

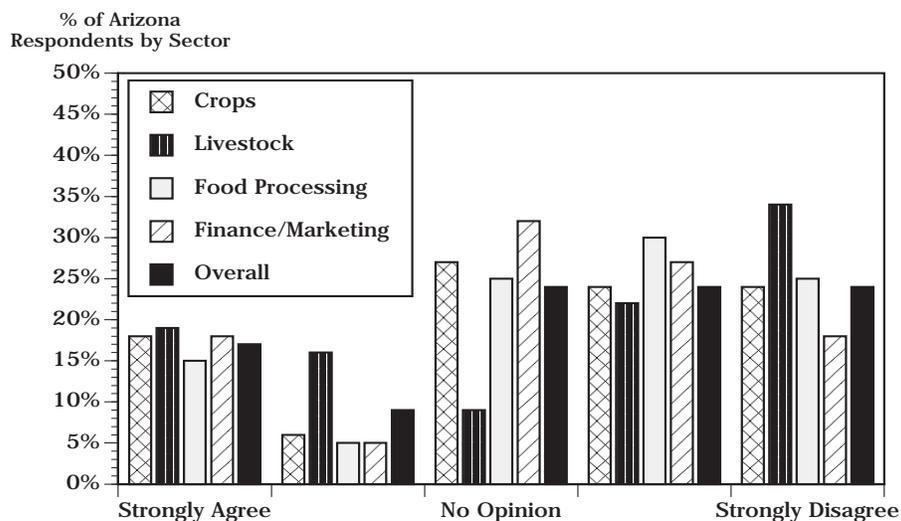
Figure 6.1a portrays the opinion that Arizona survey participants have, by sector, about food products processed in Mexico versus the US. Most individuals don't have an opinion on the processing technology in Mexico being the same as that in the US. Arizonans marginally disagree that food safety precautions in Mexico are the same as in the US, with 55 percent of food processing individuals and 48 percent overall disagreeing with this statement. Most significantly, Arizona participants overwhelmingly feel that Mexico needs FDA or USDA certification to be accepted by US consumers, even if the processing technology and safety precautions are the same as those used in

Figure 6.1a Survey Results: Arizona Participants' Response to Food Products Processed in Mexico compared to the US:

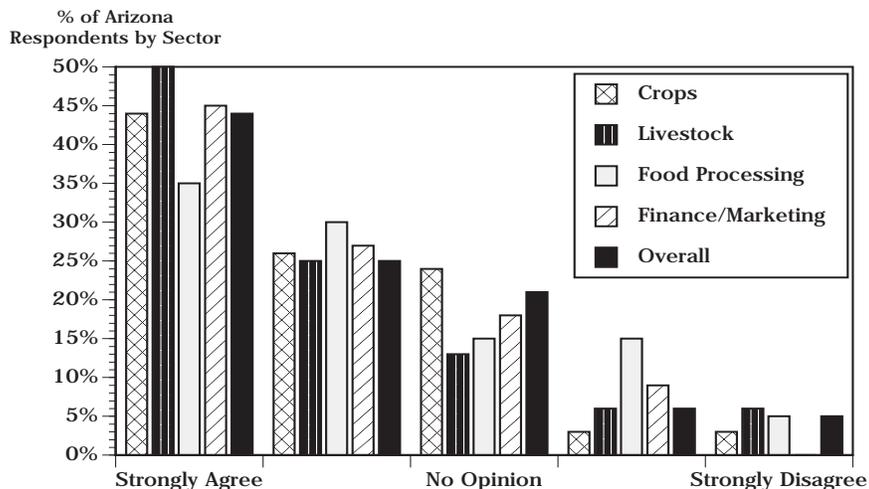
Panel A. Undergo Same Processing Technology?



Panel B. Undergo Same Food Safety Precautions?



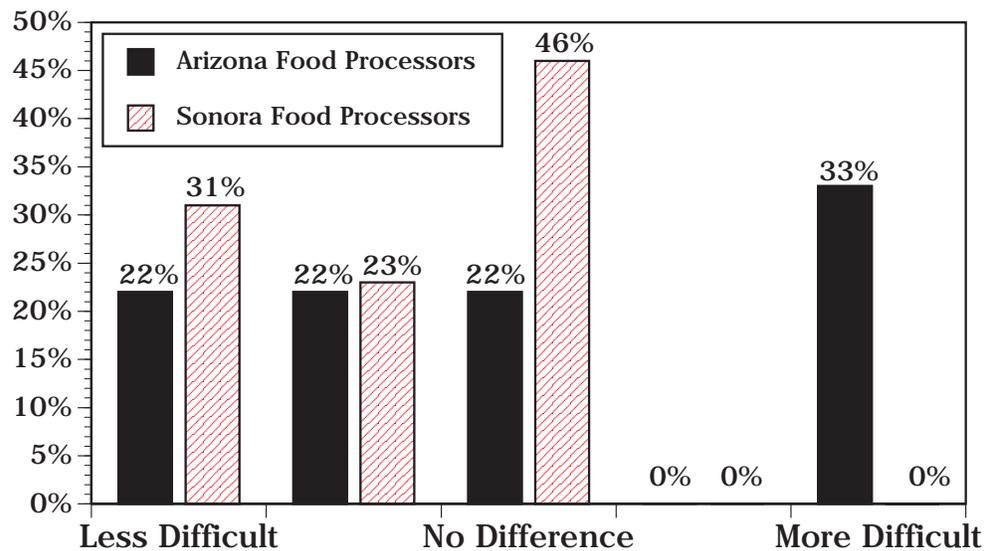
Panel C. Need FDA or USDA Certification to be Accepted by US Consumers, Even if the Processing Technology and Safety Precautions are Equal?



the US. To emphasize how real this issue is, USDA inspectors can currently be found in many of Sonora's meat packing plants and at produce loading docks. This is an important issue for the Arizona-Sonora region to consider with food safety concerns at the top of America's list in selecting goods at the supermarket.

Although most Arizona food processors found that labeling requirements for shipping to Mexico were easier than other foreign countries, 33 percent or 3 out of 9 food processing exporters indicated that Mexico was much more difficult than other countries. As shown in figure 6.1b, this result is noteworthy since none of the 13 Sonoran exporters found labeling requirements more difficult for the US than other foreign countries, and 54 percent indicated that labeling requirements were easier for the US.

Figure 6.1b. Survey Results: Difficulty of Labeling Requirements for Arizona (Sonora) Food Processors Shipping to Mexico (US) Compared to Other Foreign Countries.

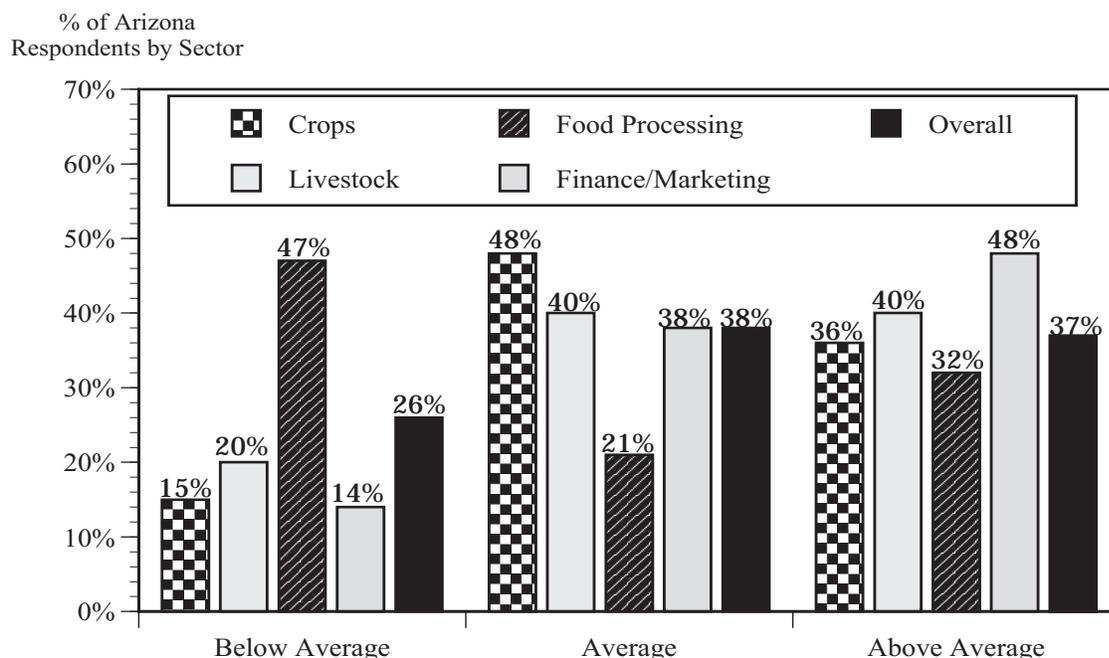


6.2 Production and Market Structure

Structure of Production

Arizona's food processing industry is comprised of a few large plants and several small food processing ventures that make salsa and chile products (Price). Not surprisingly, 47 percent of Arizona's food processing respondents said that their size was below average compared to others that sell similar products or services. As shown in figure 6.2a, this "below average" percentage is much higher than for other sectors in Arizona. Some of the larger companies produce cheese, potato products, beverage drinks, dairy products, nut products, and baby foods. Arizona has one of the largest cheese processing plants in the world. Arizona's dry climate, large dairies, and high production per cow allow the industry to produce a quality of milk that is conducive for manufacturing cheese competitively (Armstrong).

Figure 6.2a. Survey Results: Size of Operation Relative to Others that Sell Similar Products and Services for Arizona Participants.



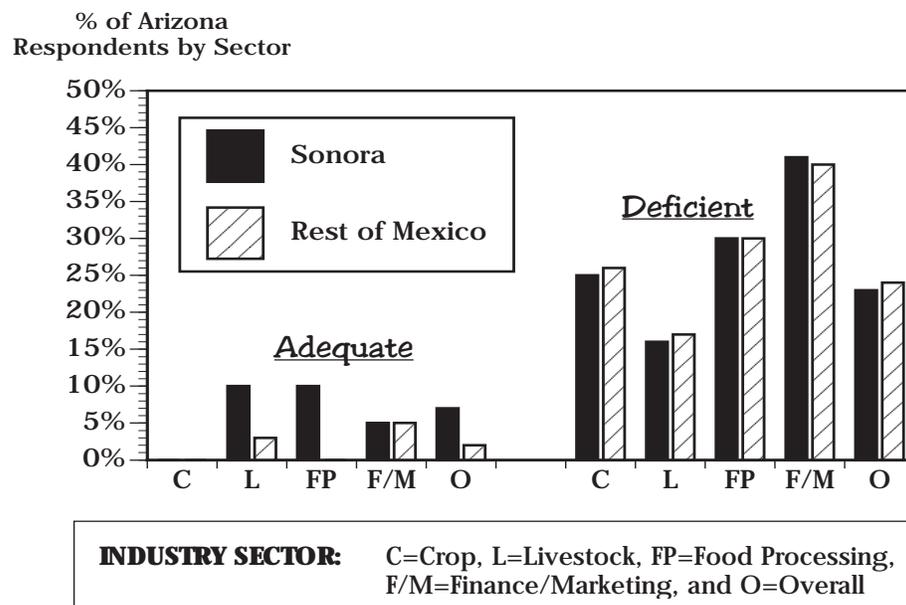
About 85 percent of Sonora's food processing establishments employ between 1 and 15 workers. In Arizona, establishments with less than 20 employees accounted for 59 percent of the state's food and kindred product firms. Sonora's food processing industry is fairly well established since about 50 percent have been in business for over 20 years and only 7 percent had been in operation for 3 to 5 years. In contrast to the food processing businesses surveyed in Arizona, 22 percent (4 out of 18) have been in business for 5 years or less. Businesses established 5 to 10 years and 11 to 20 years accounted for 22 percent each. The remaining 33 percent of Arizona's food processors have been in business for 20 years or more. The average age of respondents' business in food processing sector was 16.4 years. This is significantly lower than average ages in crop (31.3 yrs.), livestock (37.8 yrs.), and finance/marketing (35.9 yrs.) sectors.

Arizona food processing participants indicate that they receive most of their technical assistance/information from their own research and development, with government agencies a distant second. Of the food processing individuals that belong to a commodity association, trade group, or similar organization, 54 percent indicated that these organizations provide no information for them in conducting business with Mexico. This is almost double the "no information" percentage for the other three sectors.

When Arizona participants were asked to evaluate the cooling infrastructure in Sonora and Mexico, only 7 (2) percent from all sectors felt that the cooling infrastructure was adequate in Sonora (rest of Mexico), as shown in figure 6.2b. Although most respondents did not have an opinion or know, over three times as many indicated that Sonora's cooling infrastructure was inadequate compared to those that said it was adequate.

Food processors and finance/marketing individuals feel that Mexico’s cooling infrastructure is more inadequate than crop and livestock respondents. Over 30 and 40 percent, of food processors and finance/marketing individuals, respectively, feel that the cooling infrastructure in Sonora and the rest of Mexico needs improvement. Currently about 25 percent of the winter produce consumed in the US passes through Nogales from Mexico (Brooks) and further increases will necessitate infrastructure improvements in Sonora. Thus, a long-term commitment for improving the overall infrastructure in Sonora is needed for enhancing the Arizona-Sonora region’s agribusiness sector.

Figure 6.2b. Survey Results: Arizona Respondents’ Evaluation of the Current Cooling Infrastructure in Mexico.



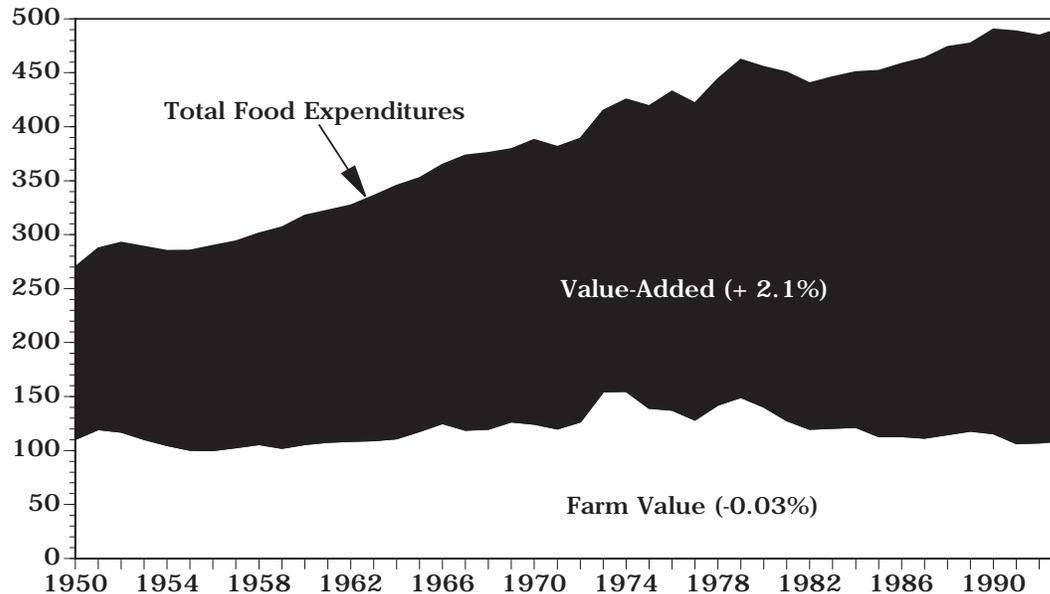
Market Environment

The importance of “value-added” agriculture or food processing and service activities beyond the farm grows every year, as shown in figure 6.2c. The real value (adjusting for inflation) of agricultural products at the farm gate has remained virtually unchanged since 1950, whereas the real dollar of services, packaging and conveniences paid for by consumers has almost doubled since 1950. In 1950 the farm value made up 40.9 percent of total food expenditures. But by 1993 the farm gate value slipped to only 22.2 percent of total food expenditures (both at home and away from home food expenditures).

The farm share of each consumers dollar spent on food varies greatly by product. In 1993, the farm value was 42 percent for fluid milk, 18 percent for iceberg lettuce, 22 percent for fresh fruit, 26 percent for fresh vegetables, 7 percent for bakery and cereal products, 49 percent for fresh eggs, and 40 percent for meat products (Dunham). But

Figure 6.2c. Components of US Food Expenditures, 1950-93.

Billion 1995 dollars

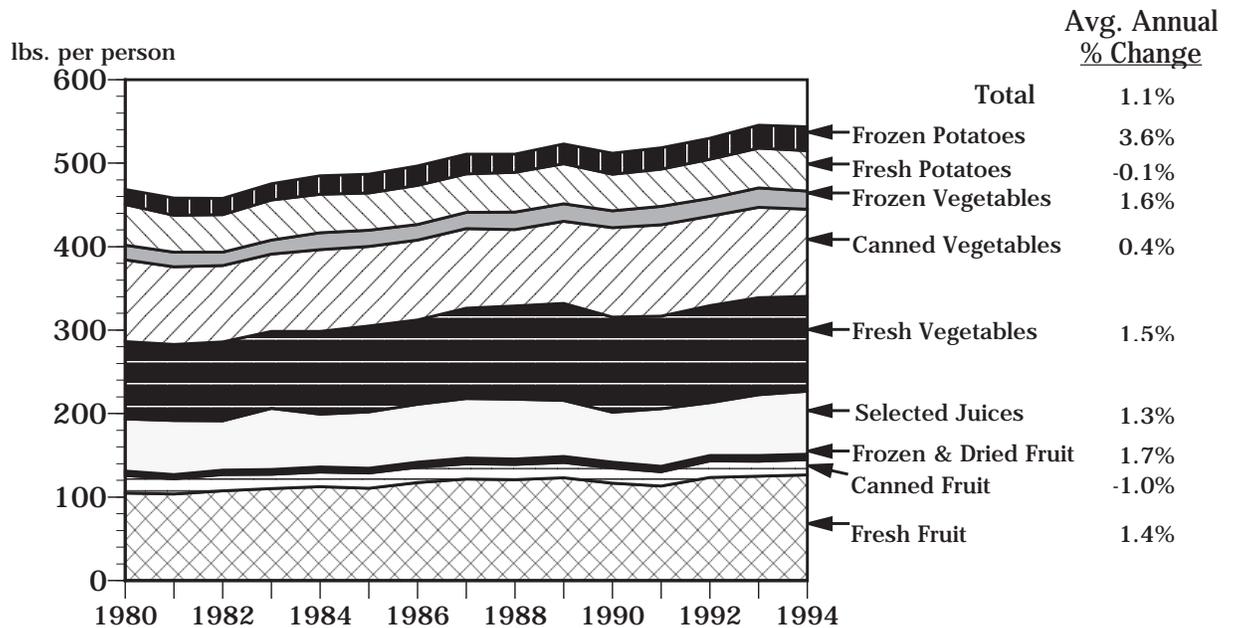


Source: 1993 Food Cost Review.

a word of caution is also in order before assuming that all of the farm value shown in the accompanying graph has been added by the farmer. In reality, the farmer also buys many manufactured inputs like fertilizer, seed, chemicals, fuel, etc. before a raw commodity can be sold. Because production expenses are a larger component of cash receipts (crop and livestock) today than in 1950, the actual real value added by farms has declined. Production expenses as a percentage of gross cash receipts has increased from 60.5 percent in 1950 to 85.4 percent in 1990 (USDA Agricultural Statistics). Thus, the actual "value-added" contribution by farmers for each dollar spent on food has declined from 16.2¢ in 1950 to only 3.3¢ in 1990.

Advances in production technology have increased average farm yields by two to three-fold for most raw agricultural commodities. For example, US average corn yields have increased from 37.4 bu. in 1950 to 118.5 bu. in 1990, a 317 percent increase (USDA Agricultural Statistics). Over the same period total corn production has increased 259 percent while the total real farm value (adjusted for inflation) of US corn produced has declined by 30.2 percent. During this period, average US wheat yields have increased 239 percent while total production has increased 268 percent. In spite of almost a three-fold increase in total wheat production the real farm value of all wheat sold has declined by 37.5 percent over this 40 year period. Clearly, producing more raw product of a commodity does not ensure that the total farm value received in the aggregate will increase.

Figure 6.2d. US Per Capita Consumption of Fruits and Vegetables, 1980-94.



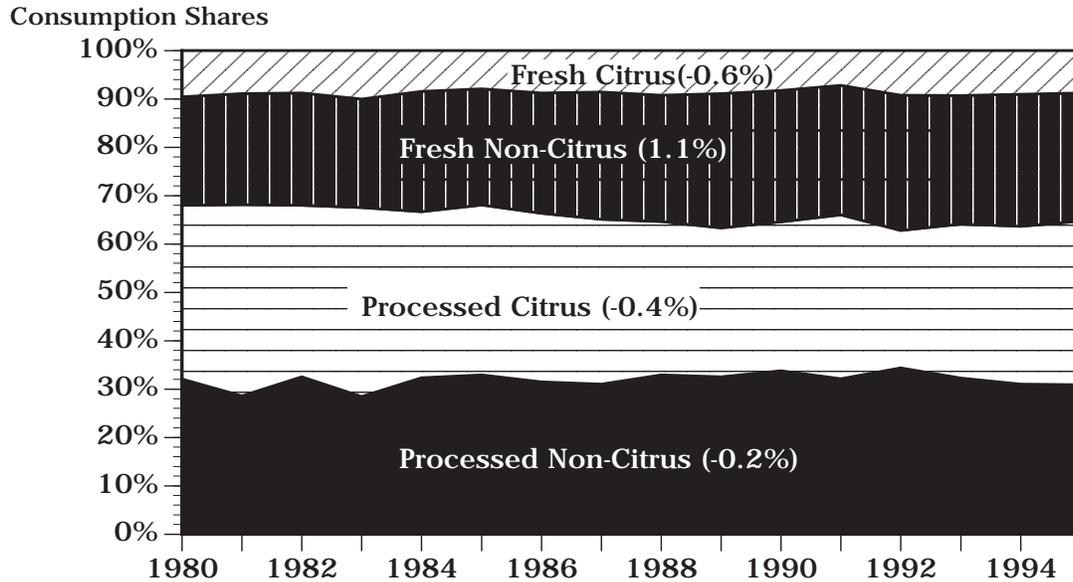
Note: Retail weight except for fresh fruit and vegetables.

Source: ERS/USDA .

Not all value-added activities related to food processing are growing though. As shown in figure 6.2d, canned fruit products consumed have declined at an annual rate of 1.0 percent in the last fifteen years. Overall, the per capita consumption of all fruit, vegetable and potato products has increased at 1.1 percent. Frozen potato product consumption has increased more than double any category at 3.6 percent while fresh potato products have declined .1 percent. The demand for french fries at fast food restaurants and easy to prepare meals has contributed to much of this increase. Private surveys indicate that consumers purchase almost half of their away-from-home meals at fast food restaurants (Lucier). Frozen french fry demand has paralleled the upward trend that has been observed in the away-from-home portion of food expenditures. The growth in US fast food restaurant chains has also expanded the market for frozen french fry exports abroad. In 1995 french fry exports accounted for about 9 percent of their market, up from 5 percent in 1990 and only 2 percent in 1985 (Lucier).

Figure 6.2e graphs the shares consumed of processed and fresh fruit for citrus and non-citrus between 1980 and 1995. The figure portrays how the share of fresh citrus consumed has declined relative to non-citrus fruits and how the share of processed fruits has lost market share to fresh non-citrus fruits. An increase in the availability and

Figure 6.2e. Fresh and Processing Share of US Citrus and Non-Citrus Fruits Consumption, 1980-95.



Source: ERS/USDA.

price attractiveness of fresh non-citrus products during the winter months has contributed to an erosion in the market share of citrus. Other fresh fruits are also somewhat more convenient to consume. A 1992 fresh trends consumer profile study by the Packer found that eating fruit for snacks and then health concerns were the two most important reasons for increasing fruit consumption. Although total fresh citrus consumption has dropped, oranges and grapefruit account for virtually all of the decline since they comprise about 75 percent of US's fresh citrus consumption.

6.3 Trade Patterns and NAFTA

National Trade

The growth in US processed food trade has been phenomenal in the last 5 years (Ruppel). Since 1991, US exports have grown by 55 percent while imports grew 21 percent. Total trade in processed foods and beverages amounted to \$54.2 billion in 1994, with \$29.4 billion in exports and \$24.8 billion in imports. Leading industry groups for US exports are meat and poultry products (27%), grain mill products (15%), fish (12%), and fats and oils (12%). From 1993 to 1995, these four groups accounted for 66 percent of processed food exports. Preserved fruit and vegetables products followed by beverages accounted for 10 and 8 percent, respectively, of processed exports during this period.

The US exports food products to many countries with a few countries accounting for the bulk of our trade. From 1993 to 1995 over half of these exports went to Japan, Canada, and Mexico. Over 60 percent of Japan's processed food imports from the US are meat packing products and frozen fish. Leading exports to Canada are meat packing, frozen fish, and canned fruits and vegetables. Meat and poultry products are the leading export industries for Mexican markets as described in Chapter 3. Although exports to Mexico were down significantly in 1995 with the collapse of the peso still being felt, fiscal year (Oct.-Sept.) estimates for 1995/96 indicate that many processed foods groups are making a comeback.

Exports show only part of the picture for food processing exports. In 1995, sales of US owned foreign affiliates were four times greater than US processed food exports. Sales of these affiliates have increased from \$75 billion in 1990 to over \$110 billion in 1995, a 46 percent increase. The US is one of the larger investors in foreign food processing and investments. Investments have grown from \$15 billion in 1991 to over \$31 billion in 1995. The European Union is a magnet for US companies with its high tariffs and affluent consumers. Of the \$31 billion of foreign direct investment in food processing firms in 1995, 42 percent was in the European Union, followed by Canada, Brazil, and Mexico accounting for 12, 8, and 7 percent, respectively. Nearly 70 percent of the US's food industry investments are in Western Europe, Canada, and Mexico. Typical to the average, sales of US owned affiliates are three to four times larger than exports for Canada and Mexico. Japan and Korea are countries where exports far exceed sales from US affiliates. Whereas, countries like Argentina, Brazil, Thailand, and the Philippines have sales from affiliates that exceed US processed food exports by tenfold. Although foreign ownership is not a one-way street, US investments abroad have exceeded foreign purchases of the US food processing industry (Bolling, Handy, and Neff).

For the three years from 1993 to 1995, US processed food imports totaled \$71 billion (Ruppel). US processed food imports have been dominated by fresh fish products and beverages that include wines, brandy and brandy spirits, and malt beverages. These two groups account for over 45 percent of processed imports, with fish and beverage products accounting for 27 and 18 percent, respectively. Meat packing products, preserved fruits and vegetables, and sugar and confectionery products follow accounting for 12, 11, and 11 percent of processed food imports, respectively.

The origin of US imports is more widely dispersed than export destinations for processed food products. However, over 60 percent of the growth in processed foods imports from 1989-90 and 1994-95 was due to an increase in purchases from Canada and Thailand. Meat packing and frozen fish accounted for 40 percent of the US's processed food imports from Canada from 1993 to 1995. Fish products make up about 75 percent of US's processed food imports from Thailand.

Regional Trade

Before the liberalization of trade policies between the US and Mexico which began in the 1980s, trade between Sonora and Arizona was in the hands of entrepreneurs that had to deal with strict regulations, tariffs, sanitation, and complex rules of foreign in-

vestment. New agreements have helped in the transition to freer trade. According to Sonoran survey participants, 57 percent of medium and large food processing companies have directly or indirectly traded with Arizona, 60 percent have traded with other regions of the US, and 60 percent have traded with other countries. Of these Sonoran businesses that have visited Arizona for business, 29 percent have visited an operation similar to theirs and 59 percent have explored export possibilities or joint venture opportunities in their visit. Arizona food processors responded similarly to this question since 59 percent considered export and joint venture activities in their business visit to Sonora. Approximately 20 percent of Sonora's food processors have conducted business in Arizona for over 10 years. About 65 percent of Arizona's food processing respondents have exported to Sonora, the rest of Mexico, and other foreign countries, all about the same rate. However, only 16 percent (3 out of 19) indicated that they have received production inputs or technical assistance from Sonora or the rest of Mexico in the last three years.

The primary destination of Sonora's processed foods is the domestic market. In 1995, 100 percent of Sonora's food processors sold within their state, 30 percent sell to the rest of Mexico, and 27 percent to foreign destinations. In 1996, Sonora exported US \$3.6 billion in goods abroad. Of these exports, \$525 million (14.6%) were accounted for by crops, livestock, fish, and processed food products. Sonora exports hundreds of agricultural products. The majority are processed food products originating from the agriculture or sea food sector. Also, new processing facilities have invested in equipment that is capable of processing a wide variety of products from the same machine. Goods that account for a large share of Sonora's export revenues include fresh produce, processed vegetables, preserved fish and seafood, ham and deli meats, sardines, frozen shrimp, and preserved sauces.

Large food retailers in Sonora have marketing agreements with some of the larger food distributors in the US. For example, Safeway maintains export agreements to Mexico with the supermarket Ley and Fleming Foods has an agreement with V.H. supermarkets. These US brand name products represent about 25 percent of Sonora's regional food supply.

Mexico is the place of origin for 32 percent of Sonora's machinery and equipment utilized in food processing. For equipment of foreign origin, 33 percent comes from Arizona, 54 percent is from other areas of the US, and only 12 percent is from other foreign trading partners. In total, the US supplies 59 percent of Sonora's food processing equipment. It is estimated that 57 percent of Sonora's equipment imports are purchased directly and in new condition while 22 percent are imported on a temporary basis, another 16 percent involve the purchase of used equipment, and the remaining 5 percent involve joint ownership agreements. Other products that Sonora imports from Arizona, California, Texas and Kansas include packaging materials, fertilizers, wax, plastics, refrigeration equipment, cans, labels, cardboard, wheat flour gluten, plastic bags, beef, cheese, machinery and equipment.

Arizona exports to Mexico that are related to the agribusiness sector are given in table 6.3a (nominal US \$). A word of caution should be noted in using this state of origin data source since it only counts value from the final shipping point. For example, the transportation sector of Arizona is a shipping point into Mexico for equipment, parts and services that are largely produced in the Detroit area. Very little of the value-added in producing these goods comes from Arizona, but the state of origin data source attributes the entire value of the sale to Arizona if the last shipping point before going into

Table 6.3a. Arizona Exports of Agribusiness Related Goods to Mexico, in million US \$, 1989-95.

Year	Ag Products	Livestock	Food Products	Textile Mill	Leather	Forestry	Fish
1989	29.83	5.40	27.14	1.92	3.68	0.13	0.40
1990	23.63	3.74	34.68	3.84	3.09	0.15	0.36
1991	32.52	19.73	53.56	10.93	2.62	0.09	0.09
1992	26.43	38.78	54.67	54.59	2.63	0.07	0.50
1993	38.79	12.35	46.93	62.21	1.91	0.28	0.02
1994	24.76	22.80	53.02	63.35	2.92	0.16	0.05
1995	13.89	1.96	18.16	60.69	1.91	0.09	0.12

Source: USDOC and Trade Info State of Origin Series.

Mexico is Arizona. This is the kind of shipping activity that is going on with textile mill products from Arizona since the value-added for textile mill products was only 14 million in 1987 census data (1992 figures are not disclosed). Livestock and food products going into Mexico show the biggest drop in 1995, after the peso crisis.

NAFTA Regulations and Legal Issues

Since the implementation of NAFTA, Mexico and Canada are much more open markets for the US. However, some food processing individuals in Mexico don't feel that trade has been completely open with them for the US market. The strongest limitations cited for Mexico's exports have been predatory pricing (pricing below cost) and trade practices such as the tuna embargo since 1990. Rigorous phyto-sanitation requirements for Mexico's agricultural commodities going into the US are also cited as an unfair trading practice and the reason why food product exports have lagged behind other sectors.

In spite of the negative impacts, NAFTA did reduce trade barriers for many products. For example, raisins had a 50 percent tariff rate in 1985 and this rate was reduced to 20 percent in 1988 and completely eliminated with NAFTA. Furthermore, when NAFTA was initiated it established a maximum period of 10 years to lift or waive tariffs for products such as beef, milk, cookies, toast bread, and other sweet bread. Some provisions that stipulate lower tariffs for consumer goods and higher tariffs for raw materials and supplies have encouraged the importation of these goods and discouraged domestic production. Some of the goods that fall into this category for Sonora include deli meats, fish, flour, agricultural supplies, and dairy products.

Opportunities for investing and doing business in Mexico changed from a lot of optimism before NAFTA to being more careful after the December 1994 peso devaluation. The financial crisis and skirmishes with the US regarding transportation issues, agricultural commodities like avocados and tomatoes, and tuna trade have produced a climate of unhappiness among many Mexican producers and food processors. However,

survey results indicate that NAFTA has had more of a positive impact for food processors from Sonora than Arizona. 58 percent of Sonora respondents felt that NAFTA has had a positive impact on their profit, albeit a modest increase, while only 4 percent indicated a negative impact. This is much more positive than for Arizona's food processors since only 15 percent felt that NAFTA has had a positive impact on their profit and 75 percent indicated that NAFTA has had no impact on their profits. Food processors feel that the 1994 peso devaluation has negatively impacted their profits more than NAFTA, with 48 and 16 percent from Sonora and Arizona specifying a negative profit impact, respectively.

Both sides seem to agree that NAFTA has brought a closer economic integration between Sonora and Arizona, especially for the medium to large size enterprises. Food processors are relatively optimistic that a more fully implemented NAFTA in five years will positively impact their profits. Over 63 and 83 percent of Arizona and Sonora respondents, respectively, responded positively to NAFTA's impact in five years. Sonora individuals feel that they can achieve economic growth in the manufacturing of labor intensive products, livestock, fishing, mining, and some segments related with beer, automobiles, pasta, cookies, lumber, citrus, and produce.

6.4 Cluster Analysis

Tables 6.4a and 6.4b summarize the main strengths, weaknesses, opportunities, and threats facing the food processing sectors of Arizona and Sonora. One of the more prominent strengths of the food processing industry in Arizona is the dairy products industry, especially cheese production. Several other strengths listed relate to US growth in food processing. The area that stands out in food processing now is the growth and amount of goods produced by US owned foreign affiliates. Arizona should be in a better position than most other states in the US to take advantage of these joint venture possibilities in Sonora and the rest of Mexico given our close proximity and familiarity with their region. Arizona's food processing industry is relatively small compared to other states. Most of the large processing firms in Arizona bring a high percentage of their raw vegetable and fruit inputs from outside the state. Historically, Arizona has been better off to utilize its scarce water and land resources for growing produce in the fresh market when other low input cost regions of the US cannot, rather than selling produce for processing. Arizona has to compete with lower water and land cost regions, like the mid-west, when producing storable processed goods.

Many of Sonora's opportunities relate to overcoming weaknesses that have slowed the development of their food processing sector. Deficient service capabilities for industrial equipment combined with inadequate transportation, shipping, and handling infrastructure restricts their growth. Foreign investment in food processing activities through joint ventures and marketing agreements could help overcome these weaknesses. The success of more than 20 large food processing firms in Sonora that are competitive in the world marketplace illustrate that food processing ventures in Sonora can be successful. Sonora's supply of qualified workers for food processing activities is a strength of the sector and opportunity for new firms. The threat of future financial and monetary instability is a real concern for food processors that could be buying inputs from one country and selling abroad in another country. Furthermore, delays caused by dealing with the bureaucracy of Mexican and US customs can ruin or significantly reduce the value of

many processed and semi-processed goods before they reach their final destination. These threats of monetary instability and dealing with bureaucracy could be the biggest challenge for the Region's food processing industry to overcome since they require federal action.

Table 6.4a. Assessment of Food Processing Sector for Arizona.

Strengths

- Dairy products industry has been solid, especially cheese production.
- Export growth of processed foods from the US has been phenomenal.
- US brand names have a desired appeal abroad.
- Sales of fresh cut lettuce have been strong.
- Total consumer food expenditures continue to increase.
- Sales of US owned foreign affiliates exceed total processed food exports fourfold.
- US exports and investment to Mexico more than doubled in the last 5 years.
- Industry has several small food processors that could grow through export sales.
- Processed and shelled nut activities have been strong.
- Well established food safety standards.

Weaknesses

- Share of processed citrus and non-citrus fruits has declined relative to fresh consumption.
- Food processing industry is relatively small in Arizona compared to neighboring states.
- The few larger processing firms bring most of their raw vegetable and fruit inputs from outside the state.
- Lack of cheap water for growing raw products locally.

Opportunities

- US consumer's increasing preference for convenience foods.
- Hazard Analysis Critical Control Point program to alleviate consumer's food safety concerns.
- Income growth in Mexico is likely to make a fast growing market for US exports.
- Fresh cut products for melons, fruits, and vegetables are poised to test the market.

Threats

- International events that would restrict exports abroad.
- Slow income growth in highly populated and low income countries.
- Food safety scares.

Table 6.4b. Assessment of Food Processing Sector for Sonora.**Strengths**

- High quality in food inputs.
- Strategic geographical location.
- High integration between food processing industry and products derived from wheat, corn, oilseeds, vegetables, and fish.
- More than 20 large food processing firms with high success in international markets.
- Technology innovation in export-oriented businesses.
- Dynamic production in the so-called “agromaquila” (new global agribusiness).
- Good levels of English and computerized systems (e.g., Internet) in industries with more than 15 employees.
- Low job-rotation in the industry.

Weaknesses

- Scarce information on markets and export feasibility.
- Too much bureaucracy and export prerequisites paperwork.
- High interest rates.
- High toll costs for highway traffic.
- Inadequate railroad system for raw transport materials.
- Deficient services available in some industrial areas.
- Deficient port facilities for handling and shipping containers.
- Scarce integration between research centers, the food processing industry and farmers.
- Current tax policy adversely impacts small and medium size businesses.
- Scarce innovation on research and development in domestic-oriented micro and small businesses.

Opportunities

- Growth in the supply of semi-processed goods in foreign markets, and legal facilities for their export.
- Improvement of pre-cooling, freezing, canning, packing and storing facilities for horticultural crops.
- Easy access for foreign investment into food processing industry.
- High opportunities and commitment to establish joint ventures with export-oriented food processing Mexican businesses.
- Growth in intermediate good segments of food processing industry.
- Oversupply of qualified workers for food processing activities.

Threats

- Non-tariff barriers in the US that affect the export of processed food products.
- High variability of international prices for semi-processed food, and high shifts in demand.
- Financial and monetary instability (inflation) that affects production costs for the industry.
- Bureaucracy of Mexican customs agency that delays the transport of fresh and processed products.
- Increasing competition due to the opening of markets to world competition.

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