



# Understanding National Food Supply Chains: Frozen Fruits and Vegetables

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In today's global food systems, the prices of food reflect not only the cost of the initial product but also the process of moving products from producers to consumers. The intent of this paper is to identify what functions command the greatest value, and consequently, what roles local producers should facilitate to become more competitive in the global food systems. It is useful for local producers to understand the market for these products and the steps that national food products go through. A few questions they need to consider are: How is value transferred and generated along the supply chain? Where are the market opportunities and challenges for local producers?

## Who buys frozen fruits and vegetables?

The total value of frozen fruits and vegetables purchased by consumers nationally is estimated at \$30 billion.\* Grocery-selling stores purchased approximately \$3.1 billion and delivered it to consumers for about \$4.3 billion. Food service venues purchased approximately \$6.9 billion and delivered it for \$25.6 billion. In general, prepared foods are sold through full service (sit down) or limited service (fast food) restaurants, caterers and institutional contractors, or other entities such as grocery store delis or gas stations.

Approximately 27 percent of consumer dollars spent on frozen fruits and vegetables delivered as groceries is retained by the retail venue, 11 percent is kept by the wholesale/distributor and 62 percent is passed back to the processor (38 percent of that goes to the producer).

Approximately 73 percent of prepared food value is retained by the food service venue, 4 percent is retained by the wholesale/distributor, and 23 percent is passed back to the processor.

## How fast does it move?

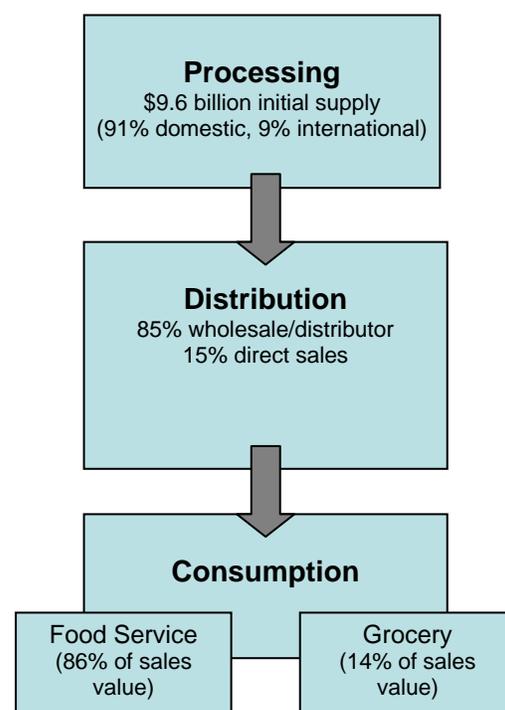
Because supplies of fruits and vegetables are generally seasonal, and distribution occurs throughout the year, storage is a key issue with frozen fruits and vegetables. Crops are generally processed within 17 days after receipt by the processor, and then stored at the processing facility for an average of fifty two days as a finished product. If wholesaled, distributors generally hold the product for an additional thirty days.

\*\$4.3 Billion (sales as groceries) added to \$25.6 billion (sales as prepared foods), \$4.3 billion/\$438 billion in total grocery sales ~ 1%; \$25.6 billion/\$311 billion ~ 8% of total prepared food sales, from 2002 Census of Agriculture.

## How is value generated across the supply chain?

Domestic processors and imports provide \$9.6 billion in initial value, which generates \$11.3 billion in total purchases by grocery, food service, and other downstream venues - \$3.1 billion (28 percent) by grocery-selling stores, \$6.9 billion (61 percent) by food service venues, and \$1.3 billion (11 percent) by other entities (food manufacturers, etc.). Of total downstream purchases, only \$1.7 billion (15 percent) are sold directly from the processor; 85 percent are purchased from wholesale/distributors. Overall, wholesale adds approximately \$0.5 billion in value to frozen fruits and vegetables sold as groceries and \$1.1 billion to those sold as prepared foods.

**Figure 1. Movement of Frozen Fruits and Vegetables**



**Table 1: Comparison between Grocery and Prepared Foods**

	<b>Grocery</b> (foods sold for human consumption outside the venue)	<b>Prepared Food</b> (prepared for immediate consumption at the venue)	<b>Total</b>
Consumer Purchases	\$4.3 billion (14% of value)	\$25.6 billion (86% of value)	\$29.9 billion (100%)
Manufactured Value	\$2.6 billion (31%)	\$5.8 billion (69%)	\$8.5 billion (100%)
<i>Value Increase</i>	<i>1.6 x</i>	<i>4.4 x</i>	<i>3.5 x</i>
Post Production Margin Added	\$1.6 billion	\$19.8 billion	\$21.4 billion
Post Production Transaction Costs	\$1.4 billion	\$17.8 billion	\$19.2 billion
<i>Transaction Costs/Margin Added</i>	<i>86%</i>	<i>90%</i>	<i>90%</i>
Share of Food Sales	1% (of \$438 Billion)	8% (of \$311 Billion)	4% (of \$749 Billion)

### How do frozen fruits and vegetables compare as a prepared food vs. grocery item?

Table 1 provides a side-by-side comparison of frozen fruits and vegetables sold as a grocery product with that sold as prepared food.

The manufactured value of frozen fruits and vegetables sold as groceries is \$2.6 billion, or less than half the amount sold as prepared foods. This indicates that almost twice the volume is sold as prepared foods than as groceries. Prepared foods also generate 86 percent of consumer purchases, or six times the amount generated by groceries (14 percent). Similar ratios for all food products are 59:41 percent respectively.

This indicates that frozen fruits and vegetables sold as prepared foods generate more volume and more value and are also more accepted (i.e., easier to market) as a prepared food relative to other food products than those sold as groceries. Many prepared food venues use these products because they are easy and quick to use in food preparation.

Service increases manufactured value by 4.4 times, compared to only 1.6 times for grocery-selling stores. However, even though food service adds more value to the product, 90 percent of added value is absorbed by the cost to deliver through food service, while the cost to deliver through grocery(-selling) stores only absorbs 86 percent.

This indicates that marketing frozen fruits and vegetables as a grocery item is relatively more profitable than as a prepared food, but not by much.

### Conclusions and Recommendations

Frozen fruits and vegetables are clearly food service products in regard to volume, value, and consumer acceptance relative to other food products. Other key features include the relatively high percentage that is wholesaled, and the relatively long storage periods. Turnover of finished product inventories average 52 days at the manufacturer and an additional 30 days at the wholesaler (and 85 percent of product is wholesaled).

The storage and the logistics of converting seasonal harvests into the daily needs of food service venues should be of primary concern to farmer-distributors intending to build capacity in this field. Packaging and developing handling methods should take priority over advertising and brand identity for these products.