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Marketing Michigan Asparagus:
Potentials for Fresh Market Expansion

presented by

Clyde Bruce Taylor

has been accepted towards fulfillment
of the requirements for

M.S. degree in Agricultural Economics

Donald J. Ricks
Major professor

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MARKETING MICHIGAN ASPARAGUS:

POTENTIALS FOR FRESH MARKET EXPANSION

By

Clyde Bruce Taylor

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
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ABSTRACT

MARKETING MICHIGAN ASPARAGUS:
POTENTIALS FOR FRESH MARKET EXPANSION

By

Clyde Bruce Taylor

Current strong grower prices for processing asparagus have resulted from national supplies decreasing more rapidly than demand. In the future, U.S. asparagus production will probably increase, and processor prices will likely weaken.

An analysis was made of the U.S. fresh asparagus market during the time of Michigan's season. The following factors were analyzed regarding Michigan's potential for fresh market expansion: overall market size, market positions of major competing regions, within-season volume distribution, prices, transportation costs, trade preferences, potential for marketing snap-harvested asparagus, and Michigan's alternatives for fresh market development.

Wholesale produce buyers indicated that a demand exists for additional fresh asparagus supplies during the time of the Michigan season. However, fresh Michigan asparagus is currently either unknown or has a weak trade preference position.

By means of a strong marketing program, Michigan's fresh asparagus volume can probably be expanded. This would be desirable for the industry in order to reduce future marketing risks.

To my wife, Dona Maria

For her patience
in suffering through
my completion of this project.

ACKNOWLEDGMENTS

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INTRODUCTION

This study focuses on the market situation of the Michigan asparagus industry. Information and data relating to the trends of supply and demand in the U.S. asparagus market in general are presented and analyzed in terms of the potential economic impact on the Michigan asparagus industry in the future. The main objective of this study is to examine the fresh asparagus market in the U.S., and to analyze the feasibility of increasing the proportion of Michigan's asparagus production which can be marketed as fresh product.

The first chapter provides a general background for the study, identifies the problem which is central to this study, and includes a discussion of the economic relevance of this problem. Chapter II details the specific objectives, the major hypothesis, and covers the methodology used in the research. The situation in the U.S. asparagus market in general is addressed in Chapter III. In Chapter IV, the findings from the study of the fresh asparagus market in the U.S. are presented. The findings are based primarily on interviews conducted with wholesale produce buyers in several major midwestern cities. Chapter V consists of the analysis, conclusions, and recommendations drawn from the study. This chapter is divided into two parts. The first is an economic analysis of the U.S. asparagus market in general. The second part is concerned with the development of the market for fresh Michigan asparagus. Chapter VI summarizes the overall thesis study.

CHAPTER I.

BACKGROUND INFORMATION

1. THE MICHIGAN ASPARAGUS INDUSTRY

Asparagus is a major crop within the Michigan vegetable industry. In terms of acreage, asparagus ranks as the third most important vegetable crop in the state (behind cucumbers and snap beans) with 17,300 acres harvested in 1977. The production of asparagus in Michigan was undertaken by some 1,200 growers, with total production amounting to more than 19 million pounds in 1977, and valued at $8,345,000 at the farm level. Production increased to 22.5 million pounds in 1978 (a 18 percent increase from 1977), and the value of the crop increased to $12,660,000 (up 52 percent).

Asparagus production can be characterized as a rapid growth industry in Michigan, yielding increasing returns to growers and processors. Acreage planted to asparagus has increased steadily from an average of 4,100 acres during the period 1945-49 to an average of 17,480 acres for the period 1974-78. Average production increased during this time from 12.6 million pounds for 1945-49 to 20.8 million pounds for 1974-78. The expansion of this industry within the last seven years has been particularly pronounced, in terms of the total value of production (Appendix A).

The Michigan asparagus crop is utilized almost entirely by processors, with a consistent average of 92 percent of the production of asparagus

in the state so utilized from 1960 to 1978.[1] Canned asparagus is the primary processing use, although freezing is becoming increasingly important. During the period 1973-78, an average of 67 percent of the total Michigan crop was utilized as canned product, and 25 percent was frozen.[2]

2. THE U.S. ASPARAGUS MARKET

The quantity of asparagus produced in Michigan constitutes only a small percentage of total U.S. asparagus production, and hence the market conditions of the Michigan industry are determined largely by the production and marketing in other asparagus producing states. During the four-year period 1975-78, annual total U.S. asparagus production averaged 210.4 million pounds, of which California accounted for 50 percent, Washington for 30 percent, and Michigan for 9.4 percent. Michigan accounted for an average of 14 percent of total U.S. production for processing use during this period. Thus, it is necessary to consider the situation in the entire U.S. asparagus market, in order to analyze the marketing situation of the Michigan asparagus industry.

The quantity of asparagus produced and consumed in the U.S. has declined dramatically since 1960. Total U.S. production decreased by 158 million pounds between 1960 and 1977, a 42 percent decline from the 376 million pounds produced in 1960. Total U.S. consumption of asparagus in all forms declined by 18 percent during this same period. The production of asparagus for processing use declined substantially more

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[1]Michigan Agricultural Cooperative Marketing Association, 1977 Asparagus Crop Statistics and Marketing Analysis, March, 1977.

[2]U.S.D.A., Processed Report, Benton Harbor, 1978.

rapidly than did the production of fresh asparagus in the U.S. since 1960. Likewise, total U.S. consumption of processed asparagus has decreased more rapidly than has fresh consumption since 1965. It appears that the total U.S. demand for asparagus is contracting, particularly the demand for processed asparagus.

3. PROBLEM AREA

There is a strong possibility that the market for processed asparagus in the U.S. could become weaker in the future. Although asparagus producers in Michigan have experienced a strong demand for processing asparagus in recent years, this is due largely to the fact that the production of asparagus in the U.S. as a whole has declined sharply for the past 15 years. This rapid decline in total U.S. production appears to have been a major factor in maintaining a strong grower price for processing asparagus. Evidence suggests that, in the near future, U.S. asparagus production will probably increase. The expected effect of such a change in U.S. asparagus production, given current market conditions, would be to considerably weaken the grower price situation for processing asparagus.

The high degree of reliance on the processing market, therefore, poses a substantial marketing risk for the Michigan asparagus industry. The industry currently lacks a substantial fresh market alternative capable of absorbing substantial supplies of Michigan asparagus at profitable prices.

4. ECONOMIC RELEVANCE OF THE PROBLEM

If the Michigan asparagus industry is to continue its growth trend, there must be sufficient markets to absorb the future production. Since

there is a high probability that the processing market may not continue to provide a strong and steady market for Michigan asparagus in the future, the development of the fresh market for Michigan asparagus may be necessary in order to secure a sufficient market for future supplies.

Increasing the proportion of the Michigan asparagus crop which is utilized as fresh product would reduce the degree of marketing risk to producers, in that supplies of asparagus could be channeled into a viable alternative market in the event of a reduction in demand for processing asparagus. California, the asparagus industry leader, has historically maintained both its fresh and processing asparagus markets, balancing production between these two markets so as to achieve optimum market stability and returns.

Expansion of the market for fresh Michigan asparagus would contribute to sectors of the Michigan economy other than agricultural production. The support industries providing packaging materials and transportation in particular would benefit from increased fresh asparagus sales, and employment in both the agricultural and non-agricultural sectors could also be increased as a result.

From the viewpoint of the consumer, the development of Michigan's fresh asparagus industry has several potential economic advantages. The distance from asparagus production areas in Michigan to several major population zones is considerable less than the distance from the western states (California and Washington) to these markets. This could reduce the energy requirements for distribution to some extent, contributing to overall national energy goals. The importance of the energy factor will increase in the future. The reduced cost of distribution for Michigan asparagus may be passed on to consumers in the form of lower food prices

for the product. An additional consumer benefit could potentially be realized in the form of fresher produce. The shorter distance to some markets would allow Michigan asparagus to reach consumers several days fresher than product transported from the western states, giving consumers, potentially, a higher quality food product.

CHAPTER II.

OBJECTIVES, HYPOTHESIS, AND METHODOLOGY

1. OBJECTIVES OF THE STUDY

The specific objectives of this study are as follows:

A. Analyze Michigan's competitive position in the fresh asparagus market.

B. Analyze the alternative ways by which Michigan shippers might best increase the volume of asparagus marketed via the fresh market, and make appropriate recommendations.

C. Analyze the potential economic impact of the long-term trends in supply and demand affecting the U.S. asparagus market on the Michigan asparagus industry in the future.

D. Clarify and analyze the marketing channels for fresh asparagus.

E. Determine the image which the major fresh asparagus supply regions have among produce buyers in the Midwest.

F. Determine the market positions of major asparagus production areas in the U.S., including the seasons in each area and the volume of fresh asparagus which each area supplies to the U.S. market.

G. Determine the transportation costs for shipping fresh asparagus from those major areas into Midwestern markets.

H. Evaluate the market acceptance of snap-harvested, all-green asparagus, and of non-oriented (jumble) packed asparagus from Michigan.

I. Identify the characteristics of fresh asparagus packs which are important to wholesale produce buyers.

J. Provide data on fresh asparagus prices received by shippers.

2. HYPOTHESIS

1. There exists a segment of the U.S. fresh asparagus market in which Michigan producers can expand the volume of asparagus which they market as fresh product.

2. Michigan shippers can market fresh asparagus in a snapped, all-green form.

3. Michigan shippers cannot market a non-oriented fresh asparagus pack.

4. Fresh Michigan asparagus has some potential advantage over competing asparagus which will allow Michigan shippers to effectively compete in fresh markets in the Great Lakes region.

3. METHODOLOGY

Information gathered in interviews with wholesale produce buyers constitutes the principal source of data for this study. Interviews with various other professionals in the product industry, and statistical sources were used in obtaining certain background data.

1. Statistical Data

Statistical sources were used to provide the data necessary to meet the following specific objectives: to analyze the potential economic impact of the long-term trends in supply and demand affecting the U.S. asparagus market on the Michigan asparagus industry in the future (Objective A); to provide data on fresh asparagus prices (Objective I); and partially to determine the market positions of the major asparagus producing regions (Objective D).

The statistical sources which were used in meeting these objectives are the following: U.S.D.A. Fresh Fruit and Vegetable Unloads in 41 U.S. and 5 Canadian Cities; U.S.D.A. Annual Vegetable Summary; the report Marketing Asparagus from California, by the California Department of Agriculture; and The Asparagus Report of the U.S. International Trade Commission.

2. Buyer Interviews

The following specific objectives were accomplished using information obtained in interviews with wholesale produce buyers: identify the marketing channels for fresh asparagus (Objective J); determine the image of the major fresh asparagus producing states among produce buyers in the Midwest (Objective E); identify the important characteristics of fresh asparagus packs (Objective G); and evaluate the market acceptance of all-green and/or jumble packed asparagus (Objective H).

The market areas covered in this study include: Chicago, Illinois; Detroit, Michigan; Cleveland, Ohio; St. Louis, Missouri; Kansas City, Missouri; and Minneapolis-St. Paul, Minnesota. The term "market area" refers to the geographical area serviced by wholesale produce operations located in these urban centers or their environs. These market areas represent major population and commercial centers located within relatively close proximity to Michigan. Grand Rapids, Michigan was included in this study, because two of the major retail food chains in Michigan have headquarters in that city.

The sample set for this study consisted of the produce buyers for those firms which handle a substantial proportion of the total quantity of fresh asparagus shipments entering their particular market area. This criteria for selecting buyers to be interviewed was used because

the wholesale marketing of a specialty produce item like asparagus is concentrated, with a few produce wholesalers (includes chain store wholesalers) handling a large proportion of the volume of fresh asparagus in a particular market area.

For this reason, it was possible to take a sample of only a few buyers in each urban area and yet obtain a high degree of coverage of that area. In the cities of Chicago and Detroit, the sample included buyers whose firms account for at least 65 percent of the total fresh asparagus volume marketed in those cities. For the other cities, coverage of at least 40 percent was achieved.

The list of specific firms in each market area whose produce buyers will be interviewed for this study appears in Appendix D.

3. Other Data Sources

For the purpose of fulfilling the specific objective of determining the transportation costs for shipping fresh asparagus into Midwestern market areas (Objective F), price quotations were solicited from major refrigerative trucking companies which service these markets. At least two quotations were obtained for each route. Transportation costs were obtained for shipments from California, Washington and Michigan to the following cities: Detroit, Michigan; Chicago, Illinois; Minneapolis-St. Paul, Minnesota; and Kansas City, Missouri.

Informal interviews with various professionals involved in produce marketing, such as produce shippers, Federal-State Market News representatives, and post-harvest physiologists contributed to a minor degree to several of the objectives.

CHAPTER III.

THE U.S. ASPARAGUS MARKET

The purpose of this chapter is to examine the situation in the U.S. asparagus market. Information and data are presented on the trends in the demand for asparagus in the U.S. and the important causal factors involved. U.S. asparagus production is studied first from the overall perspective of the trends in total U.S. asparagus production, and followed by a brief description of production trends, relevant causal factors, and possible future trends for the individual asparagus producing states. Data is then presented on historical trends in U.S. asparagus imports and exports.

1. DEMAND FOR ASPARAGUS IN THE U.S.

1.1. Declining U.S. Consumption

1.1.1. Total Consumption

The total quantity of asparagus consumed in the U.S. in all forms generally increased from 1950 to 1965, but has since declined. Total consumption reached a peak during 1960-64 at an average annual amount of 277.6 million pounds. By 1973-77, this average annual figure had declined to 226.3 million pounds, which is 51.3 million pounds (18 percent) below the 1960-64 average figure (Table 1).

In recent years, the consumption of asparagus in canned or frozen form in the U.S. has declined much more rapidly, on the average, than

TABLE 1. Total U.S. Asparagus Consumption, Five-Year Averages, 1945-74, Annual 1965-77

(In millions of pounds)

	Fresh	Frozen	Canned	Total consumption[1]
5-year average:				
1945-49	121.1	19.2	113.0	253.3
1950-54	106.1	24.7	114.7	245.5
1955-59	116.0	30.2	128.2	274.4
1960-64	104.2	33.9	139.5	277.6
1965-69	84.7	31.2	146.1	262.0
1970-74	85.7	26.7	135.4	247.9
Annual:				
1965	96.6	30.2	148.5	275.3
1966	79.9	30.8	147.2	257.9
1967	78.4	32.7	140.0	251.1
1968	87.0	33.0	146.5	266.5
1969	81.9	29.8	148.3	260.0
1970	92.6	31.3	149.4	273.3
1971	82.3	28.5	137.7	248.5
1972	90.3	25.9	133.4	249.6
1973	82.8	26.4	149.1	258.3
1974	80.6	23.1	117.6	221.3
1975	84.8	21.9	122.2	228.9
1976	89.7	25.7	118.9	234.3
1977	68.6	24.1	96.3	189

[1]The frozen and canned components of the combined consumption data shown contain different amounts of raw product per pound; therefore, the fresh-weight equivalent of each combined consumption total shown would vary as the relative proportions of its three components vary.

Source: Data to 1974 from Asparagus Report, U.S. International Trade Commission. For 1975-77, Production Data from Annual Vegetable Report, USDA. Import-Export Data from U.S. Department of Commerce, Bureau of the Census. Carry-in Stocks for Frozen from Monthly Cold Storage Report, Statistical Reporting Service, Agricultural Estimates Division, USDA. Carry-in Stocks for Canned from National Canners Association Statistics.

has fresh consumption. Total U.S. consumption of canned and frozen asparagus averaged 176 million pounds annually during the three year period 1965-67; by 1975-77, this figure had declined to 136 million pounds, a decline of 40 million pounds (23 percent) between these period averages. Fresh asparagus consumption declined by only 4 million pounds (5 percent) between these same period averages, from 85 million pounds for 1965-67 to 81 million pounds for 1975-77 (Table 2).

TABLE 2. Annual Consumption of Asparagus in the U.S., Three-Year Period Averages, 1965-67 and 1975-77

Form	Consumption (million lbs.)		Change	
	1965-67	1975-77	Total (million lbs.)	Percent
Frozen	31	24	- 7	22
Canned	145	112	-33	23
Total Processed	176	136	-40	-23
Fresh	85	81	- 4	5
Total Consumption	261	217	-44	-17

Source: Table 1, this report.

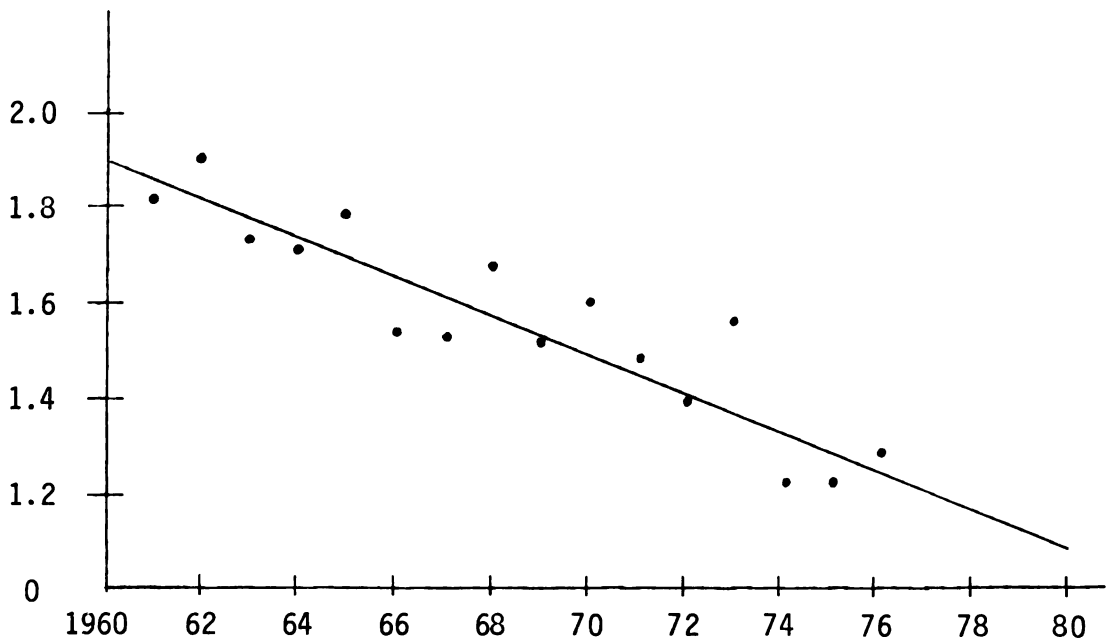
1.1.2. U.S. Per Capita Consumption of Asparagus

U.S. per capita consumption of asparagus has declined steadily during the last three decades, from an annual average of 2.15 pounds per person in 1945-49 to a 1.31 pound annual average for 1973-76 (39 percent decline). Per capita consumption has decreased steadily since 1960 (Figure 1).

Per capita consumption declined by a total of 0.38 pounds per person between the average of 1.61 pounds for the three year period 1965-67 and the average for 1974-76 of 1.23 pounds (Table 3). Of this total decline, 53 percent was accounted for by the decline in consumption of canned

asparagus, 29 percent by the decline in consumption of frozen asparagus, and 18 percent by the decline in the consumption of fresh asparagus.

FIGURE 1. U.S. Per Capita Consumption of Asparagus, 1960-1976



Source: Table 3, this report.

1.2. Factors Affecting Consumption

Economic theory and a general knowledge of the asparagus market suggests that important factors affecting U.S. asparagus consumption would include asparagus prices, consumer tastes and preferences, volume of asparagus supplied to U.S. markets, and prices of alternative vegetable products. An earlier study of the national asparagus market situation found that the relatively high price of asparagus in recent years has been one of the most important factors affecting the decline in U.S. asparagus consumption.[1] That study also stated that changing

[1]U.S. International Trade Commission, Asparagus Report, Washington, D.C. USITC Publication 755, 1976.

TABLE 3. U.S. Per Capita Consumption of Fresh Canned, and Frozen Asparagus, 1957-1976

Year	Fresh	Canned	Frozen	Total
	Pounds, fresh equivalent basis			
1957	.80	1.00	.31	2.11
1958	.80	.98	.29	2.07
1959	.70	.97	.38	2.05
1960	.70	.88	.40	1.98
1961	.60	.92	.30	1.82
1962	.60	.96	.34	1.90
1963	.60	.83	.30	1.73
1964	.50	.88	.33	1.71
1965	.60	.90	.28	1.78
1966	.40	.83	.30	1.53
1967	.40	.80	.32	1.52
1968	.50	.87	.30	1.67
1969	.40	.83	.28	1.51
1970	.50	.81	.28	1.59
1971	.50	.73	.24	1.47
1972	.50	.70	.19	1.38
1973	.50	.84	.21	1.55
1974	.40	.62	.19	1.21
1975[a]	.40	.64	.17	1.21
1976[b]	.40	.67	.20	1.27

Source: Compiled from the Vegetable Situation, August 1977, issued by the Economic Research Service, U.S. Department of Agriculture, Washington, D.C.

[a]Revised.

[b]Preliminary.

consumer tastes and preferences have probably been another significant factor contributing to this decline. In this subsection, the effect on U.S. asparagus consumption of asparagus prices and of changing consumer tastes and preferences are investigated.

1.2.1. Price Factor

Asparagus prices have increased rapidly since 1965, both in absolute terms and relative to other vegetable products. Asparagus has become one of the most expensive vegetables in the market in recent years. Between 1965 and 1974, the wholesale price index for all processed fruits and vegetables increased at an average annual rate of 5.56 percent; for all canned vegetables and juices, this rate was 5.73 percent; but for canned asparagus, the rate was 7.66 percent.[1] The consumer price index for fresh asparagus increased at an average annual rate of 6.15 percent from 1965 to 1974, while the index for all fresh fruits and vegetables increased at a rate of 5.85 percent. During the period from 1965 to 1974, the wholesale and consumer price indexes for all goods (inflation) increased at an average annual rate of 5.43 percent.

From 1945 to 1959, asparagus prices at the grower level increased at an average annual rate of 1.5 percent, while the wholesale and consumer price indexes increased at a rate of 2 percent. Per capita consumption of asparagus declined in total by 0.13 pounds per person (6 percent decline) during this period. Between 1960 and 1974, grower prices increased at an average annual rate of 6.1 percent, while the wholesale and consumer price indexes increased at a rate of 4.15 percent. The

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[1]U.S. Bureau of Labor Statistics, Wholesale and Consumer Price Indexes, which appear in Appendices A and B.

total decline in per capita consumption of asparagus amounted to 0.77 pounds per person, or a total decline of 39 percent during this period. This data suggests that increasing asparagus prices have been a significant factor contributing to the decline in U.S. consumption since 1964.

1.2.2. Changing Tastes and Preferences

There is also evidence which suggests that the basic tastes and preferences of the U.S. population may be shifting away from asparagus. During the period 1945 to 1959, U.S. asparagus production (supplies) increased, and asparagus prices actually declined in real terms. Yet per capita consumption of asparagus declined also, though only slightly, during this time. This indicates that the consumer demand (tastes and preferences) for asparagus in the U.S. was declining during this period.

Since 1960 the quantity of asparagus consumed per capita in the U.S. has declined sharply. The longer asparagus consumption remains at these lower levels, the more established this pattern may become; basic consumer tastes and preferences may change, as fewer new consumers are attracted to the commodity and previous consumers form other product preferences. A study of consumer preferences for certain vegetables found that the younger age categories in the U.S. population have the lowest preference for asparagus, while the oldest age categories have the highest preference.[1] Over time, the expected effect will be reduced consumer demand for asparagus, unless some major change occurs to reverse this trend. Consumer tastes and preferences, therefore, may shift away from asparagus at a more rapid rate in the future.

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[1] U.S.D.A. Consumers' Preferences, Uses and Buying Practices for Selected Vegetables, A Nationwide Survey, USDA Marketing Research Report #1019, 1974.

Changes are occuring at the retail level which may tend to further reduce consumer demand for asparagus. This is particularly true in the case of canned asparagus. Retail sales of this product have declined in recent years, corresponding to the high price of the product. When the movement of a canned item declines substantially over a period of years, retailers may give the item a larger mark-up. This accentuates increases in the wholesale price of the product, increasing consumer prices, and further reducing sales. Retailers also will be likely to reduce the amount of space on the shelves which is allocated to asparagus, and may relocate the product to less favorable locations in the store. Generally, as demand decreases, the product receives less promotional effort from the retailer.

As the price of canned asparagus remains at relatively high levels over a period of years, the segment of the population which purchases this product is likely to become smaller. It has been hypothesized by industry sources that this situation is occurring, leading to a more limited and price inelastic retail demand for canned asparagus.

Persons familiar with the food canning industry have suggested that canned asparagus is no longer allocated promotional resources by these manufacturers as the demand for this item is not considered to be sufficiently responsive to promotional efforts. Further, these sources suggest that food manufacturers may be tending to increase their mark-up on the wholesale price of this commodity, which may increase the consumer price and further reduce the retail demand for canned asparagus. All of these factors have important added effects of reducing consumer demand for asparagus, both presently and in the future.

An additional consideration in evaluating future consumer demand for asparagus is the quality of the asparagus "pack" in recent years. The short supplies for asparagus have motivated some processors to pack asparagus of substandard quality. Consumer reaction to tough, stringy asparagus at very high prices can be expected to be damaging to future consumer demand.

While the decline in asparagus consumption in the past has been in part the result of increasing asparagus prices, the factor of changing consumer tastes and preferences relative to asparagus will likely become increasingly important in the future. The significance of this to the U.S. asparagus industry is that the trend of reduced consumer demand due to changes in tastes and preferences is difficult to reverse, either to expand demand or to prevent demand from declining further. This poses a major obstacle to expanding consumer demand for asparagus if supplies were to increase again in the future.

2. ASPARAGUS PRODUCTION IN THE U.S.

2.1. Special Features of Asparagus Production

As a prerequisite to understanding certain aspects of the asparagus industry, it is necessary to know some general features of asparagus production. Asparagus is a deep-rooted perennial plant, annually producing edible shoots (spears) from the root system (crown). In order to establish an asparagus field, one to two years of advance preparation is frequently necessary to get the field in condition. Commercial fields are typically planted with crowns that have developed for one year from seeding in a nursery field. From the time these first-year crowns are planted, it generally takes two to three years before the first commercial crop is harvested. The first harvest is typically light, with full

production reached in two to three harvest seasons. Depending upon the growing area, most commercial asparagus fields will produce for 8-15 years. During the last several years in production, the yields from an asparagus field are generally much lower than for younger fields.

A substantial investment is involved in establishing an asparagus field, consisting of direct costs, opportunity costs for the land which does not produce a crop for several years, and capital costs. To producers, asparagus production poses a marketing risk in the commitment to a single crop for a number of years (compared to annual crops). Thus, it would be expected that asparagus production will tend to respond in a cyclical manner over a longer time period to market conditions, as do most perennial crops. Producers will tend to retain asparagus fields despite some poor price years.

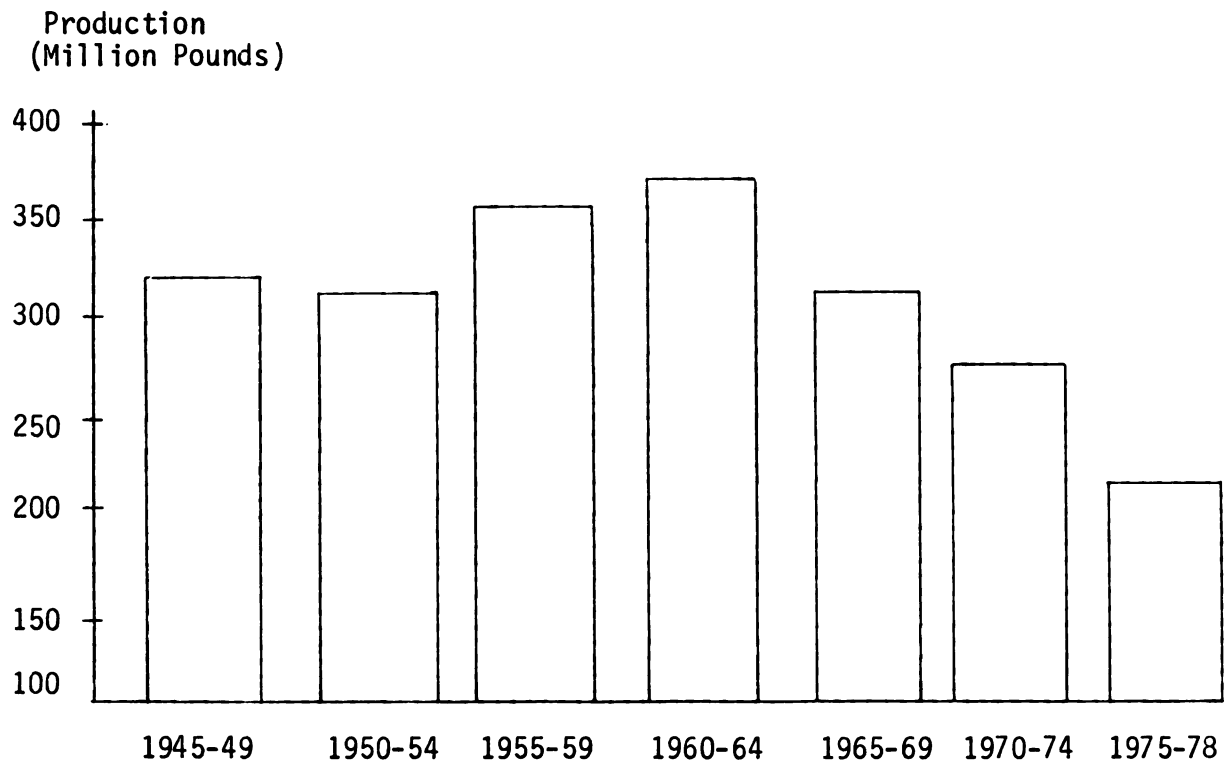
Asparagus is harvested by cut harvesting, where the spears are cut with a knife below the surface of the soil, or by snapping the spears off above the ground. Michigan is the only state which uses the snap-harvest method. Snap-harvesting results in substantially lower yields per acre than the cut-harvesting method. This is due to the fact that the snap-harvest method produces an entirely edible product, as the fibrous, inedible butt of the asparagus spear is left in the field. The butt section of the asparagus spear accounts for 30-40 percent of the weight of the cut harvested spear. This consideration is important when comparing data between states, particularly prices. However, the Michigan data which appears in this study is not adjusted for this factor, but rather appears here in the form in which it is given in all statistical sources cited.

The snap method of harvest requires substantially less labor than does the cut harvest. Further labor savings are achieved by the use of mechanical harvest aids, which carry pickers through the field as they harvest. The use of non-selective mechanical harvesters is another substantial step in saving harvest labor, but involves a considerable reduction in yields per acre.

2.2. U.S. Asparagus Production

Total asparagus production in the U.S. generally increased from 1950 to 1960, but has since declined. Annual U.S. production averaged 312.1 million pounds during the period 1950-54; this figure had increased to 369 million pounds by 1960-64 (Figure 2). Since 1960, production has declined dramatically.

FIGURE 2. U.S. Asparagus Production, By Period Averages, 1945-1978



Source: U.S.D.A. Statistics.

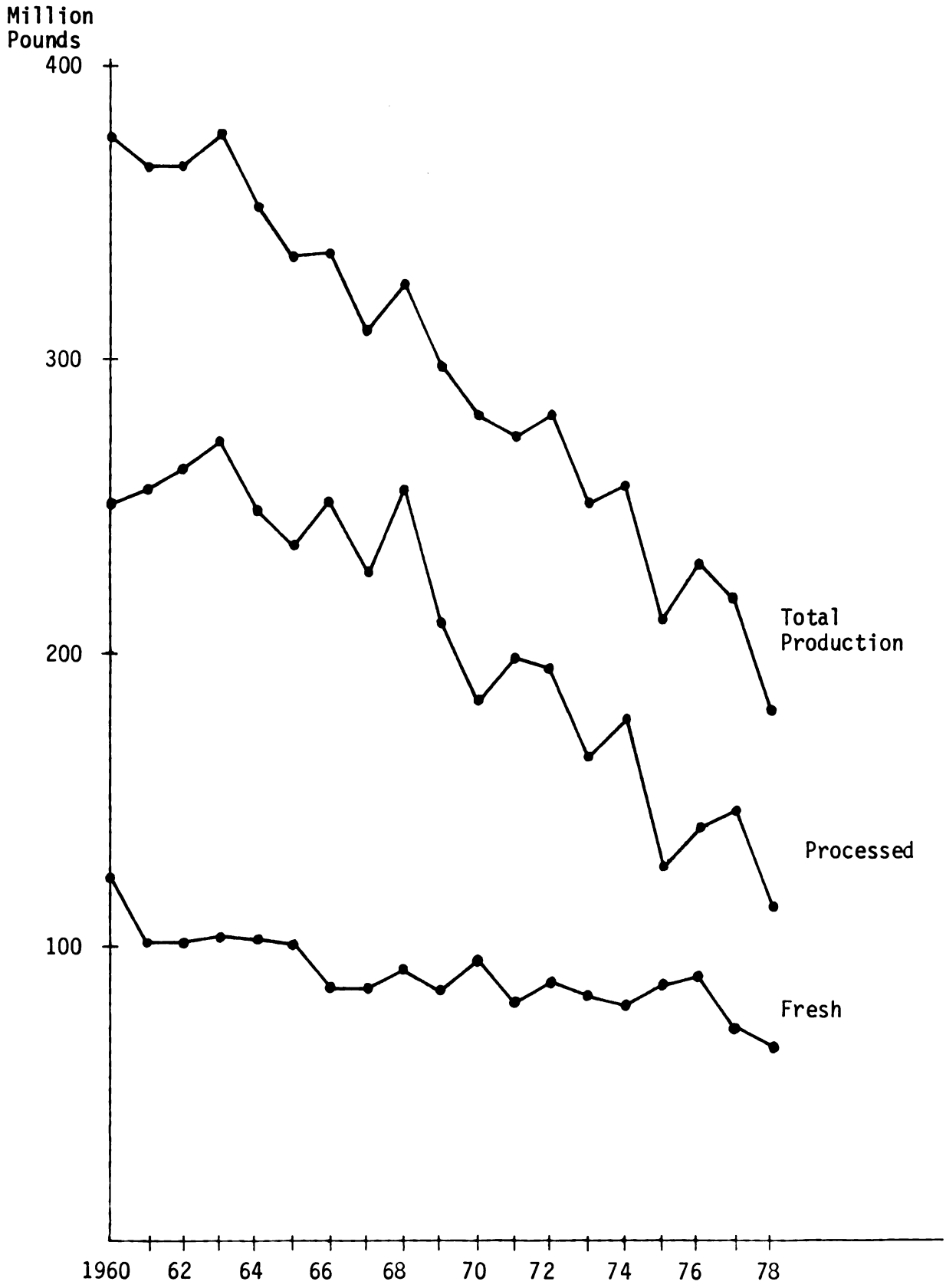
From an average annual production of 372 million pounds during the period 1960-63, total U.S. asparagus production decreased to only 210 million pounds for the period 1975-78, a decline of 162 million pounds (44 percent) from this earlier period average. The decline in the production of asparagus for processing accounted for 131 million pounds (81 percent) of this total figure, while the reduction in fresh production accounted for 31 million pounds (19 percent). (See Figure 3.)

Asparagus is produced primarily in the states of California, Washington, Michigan, New Jersey, and Illinois.

Since 1960, the relative importance of the asparagus producing states has changed substantially. Asparagus production in California and New Jersey has declined by almost 50 percent and 96 percent respectively. The only states that have increased asparagus production since 1960 are Washington and Michigan. The situation is illustrated by the following table, which shows the relative importance of the asparagus producing states in 1960-63 and in 1975-78 (Table 4).

Asparagus production since 1971 is shown in Table 5. Factors contributing to the trends in each state will be explained in detail in the following section.

FIGURE 3. U.S. Asparagus Production--
Total, Fresh, and Processed, 1960-1978



Source: Compiled from U.S.D.A., Vegetable-Fresh Market Summary.

TABLE 4. U.S. Asparagus Production and Acreage by States, 1960-63 and 1975-78

State	Harvested Acreage	1975-78 Production (Mil. lbs.)	% of U.S. Production
California	32,600	105.7	50.2
Washington	20,400	63.3	30.0
Michigan	17,600	19.8	9.4
Other[1]	11,400	11.7	5.5
Illinois	5,200	5.7	2.7
New Jersey	3,000	4.1	1.9
Total U.S.	90,200	210.4	100.0

State	Harvested Acreage	1960-63 Production (Mil. lbs.)	% of U.S. Production
California	68,000	198.3	53.1
Washington	15,400	47.1	12.6
Michigan	10,900	16.3	4.3
Other[1]	15,000	23.5	6.2
Illinois	9,900	16.7	4.5
New Jersey	29,400	71.3	19.0
Total U.S.	148,600	373.2	100.0

[1]Includes for fresh market: Indiana, Iowa, Maryland, and Massachusetts. For processing includes: Indiana, Delaware, Iowa, Maryland, Minnesota, Virginia, and Oregon.

Source: U.S.D.A. Annual Vegetable Summary.

TABLE 5. U.S. Asparagus Production, Total, Fresh, and Processing, Annual, by States, 1971-77

	Calif.	Wash.	Mich.	N.J.	Ill.	Other	Total U.S.
				Total Production			
1971	137.6	65.9	18.9	23.8	12.4	20.5	279.1
1972	155.4	61.3	21.8	17.9	14.1	18.6	289.1
1973	126.0	64.3	24.6	12.5	10.4	16.7	254.5
1974	127.9	70.1	25.5	8.8	8.6	19.5	260.4
1975	107.0	56.7	19.6	6.4	9.5	14.9	214.1
1976	125.4	65.3	18.0	4.3	4.7	12.5	230.2
1977	112.1	66.7	19.0	3.2	5.0	12.1	218.1
1978	78.4	64.0	22.5	2.7	3.8	8.1	179.5
				Production for Processing Use			
1971	78.1	57.3	17.8	13.6	11.5	17.5	195.8
1972	85.1	54.2	20.3	8.7	13.1	15.6	196.9
1973	60.0	56.6	22.9	5.2	9.3	14.5	168.5
1974	67.1	59.0	24.1	2.4	7.7	17.7	178.0
1975	41.3	45.6	17.5	.7	8.6	13.7	127.7
1976	52.9	53.6	16.0	1/	4.0	11.8	138.3
1977	56.0	57.8	17.7	1/	4.1	11.1	146.7
1978	25.5	55.4	21.0	1/	3.2	7.5	112.6
				Fresh Production			
1971	59.5	8.6	1.1	10.2	.9	3.0	83.3
1972	70.4	7.1	1.5	9.2	1.0	3.0	92.2
1973	66.0	7.1	1.7	7.3	1.1	2.2	86.0
1974	60.8	11.1	1.4	6.4	.9	1.8	82.4
1975	65.7	9.6	2.1	5.7	.9	1.2	87.4
1976	72.5	11.7	2.0	4.3	.7	.7	91.9
1977	56.1	8.9	1.3	3.2	.9	1.0	71.4
1978	52.9	8.6	1.5	2.7	.6	.6	66.9

1/ No processing production.

Source: U.S.D.A., Annual Vegetable Summary, 1978.

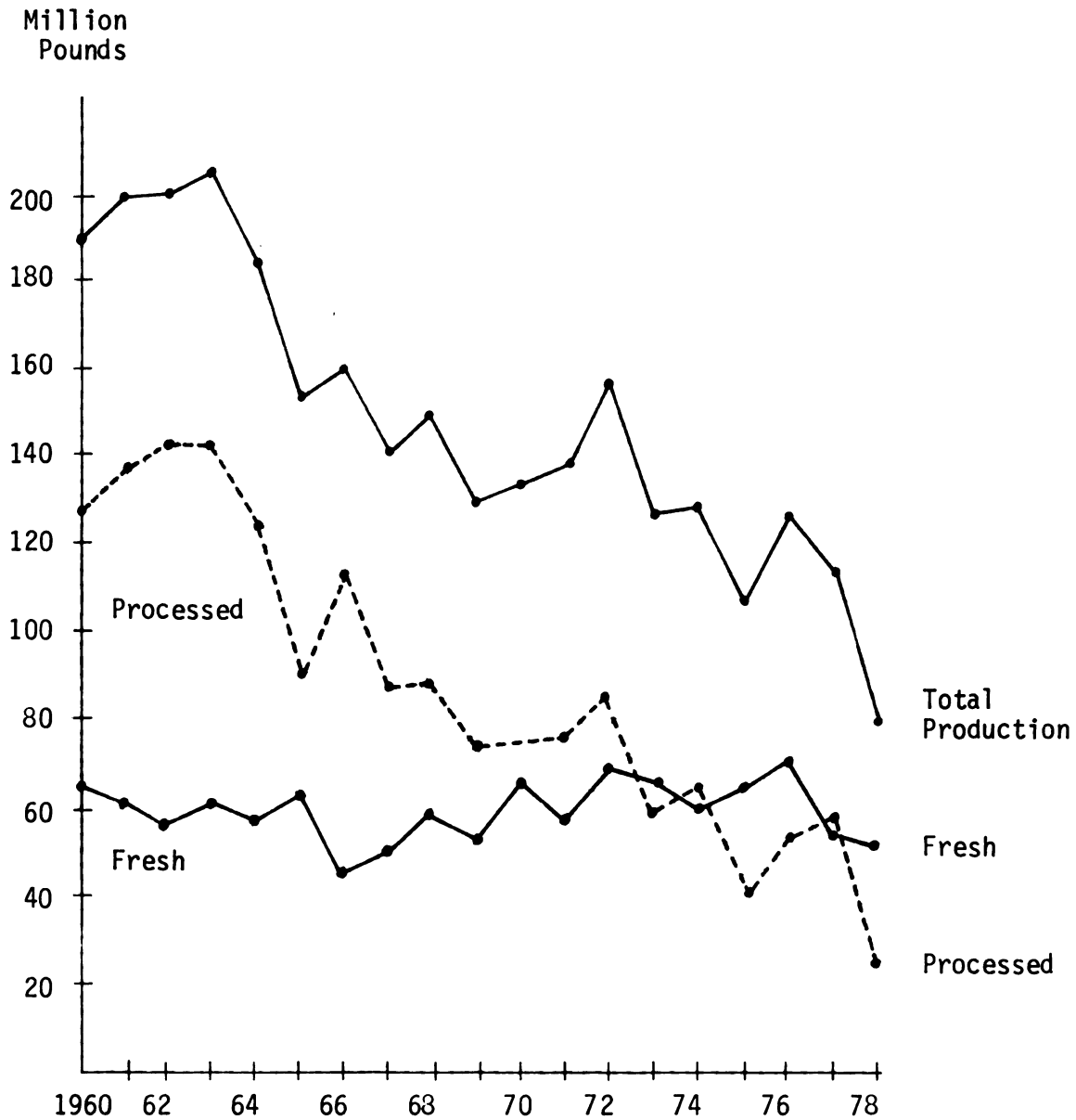
2.3. Asparagus Production by States

2.3.1. California

California is the most important state in the U.S. asparagus industry, consistently producing approximately 50 percent of total U.S. asparagus production since 1945. From 1950 to 1963, total asparagus production in California generally increased, reaching a peak of 204.3 million pounds in 1963. Since then, production has declined sharply, falling to only 112.1 million pounds by 1977 (a 45 percent decline). Production of asparagus for processing use averaged 135.3 million pounds annually during the period 1960-64; for 1975-78, this figure was only 43.9 million pounds. Fresh market production has remained essentially stable during this period, from an annual average of 60.2 million pounds for 1960-64 to 61.8 million pounds for 1975-78 (Figure 4). California has dramatically increased the proportion of its total crop which is utilized as fresh product, from 31 percent of average annual production for the period 1960-64 to 58 percent for 1975-78. California's share of total U.S. fresh production increased from an average of 56 percent of annual fresh production for 1960-64 to 78 percent of the 1975-78 average. The percentage of annual U.S. production for processing accounted for by California declined from an average of 52 percent during 1960-64 to 34 percent for 1975-78.

Asparagus acreage has declined substantially in California, from the peak of 73,500 acres in 1960 to 28,000 acres in 1978 (62 percent decline). Reported yields in California apparently tend to fluctuate quite widely from year to year due to weather factors and discrepancies in the crop statistics. From 1975 and 1978, yields averaged 2,800 pounds per acre across the state; but 1976 and 1977 yields both averaged 3,700 pounds

FIGURE 4. California Asparagus Production, 1960-1978



Source: U.S.D.A., Annual Vegetable Summary.

per acre. The average yield for the period 1970-78 was 3,128 pounds per acre. The effect of this variation is very significant on California and hence on U.S. annual asparagus production. In any year, California production can vary by as much as 18 percent from this average, which amounts to approximately a 9 percent variation in total U.S. production.

The evidence gathered in the course of this study indicates that there are four factors primarily responsible for the decline in California's asparagus production: inadequate labor availability, the high cost of labor, high opportunity costs for asparagus land, and inadequate grower prices for asparagus.

Agricultural labor became a major problem for California growers following the termination in 1964 of the Bracero program, which allowed Mexican nationals to perform agricultural labor in the U.S. Labor intensive crops such as asparagus (white asparagus particularly) were strongly affected by this. White asparagus production in California declined from 80.3 million pounds in 1963 to 12 million pounds by 1967. The quantity of white asparagus produced in California after 1971 was no longer significant.[1] Rising labor costs and increasing labor difficulties continue to pose problems for California asparagus producers. Governmental regulations relating to agricultural labor, in terms of wages, fringe benefits, and housing, and a rising tide of unionization of agricultural labor, have rapidly increased the real costs of harvest and production labor. Industry sources in California stated that labor costs and difficulties are the major factors which have caused the decline in asparagus production in that state since 1964.

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[1]U.S. International Trade Commission, Data from Asparagus Report, Table 6, 1974.

Opportunity costs for land have risen rapidly in the last 25 years in California. Land development (urbanization) has been a significant source of upward pressure on the value of agricultural land; but of perhaps greater significance is the range of profitable alternative crops for the California agribusinessman. Particularly considering the investment of capital which is required to establish an asparagus field (4-5 years before full production) at the current high capital costs, and the commitment to a single vegetable crop for a period of 8-15 years, asparagus may not be the most profitable choice of crops in California. According to limited industry contacts, other crops, such as corn, beans, and alfalfa hay have replaced asparagus to a large extent. These crops are highly profitable when raised on the irrigated crop lands of California, and they require only a small fraction of the labor which is required to produce asparagus.

Grower prices for California asparagus have increased at an average annual rate of 5.26 percent for processing and 6.17 percent for fresh from 1960-62 to 1974-76. This is only slightly above the average rate of increase for wholesale and consumer prices in the U.S., which rose at an annual rate of 4.15 percent during this same period.

Although California's asparagus production has been steadily declining since 1963, there is a high probability that production will level off and perhaps begin to increase in the future. Currently, two factors in combination favor an increase in California asparagus production. The first is the development of a superior new asparagus variety in that state. In addition, the grower prices for asparagus have risen dramatically during the last two years.

A substantial stimulus to increased asparagus production in California is provided by the grower price situation in the past two years. Prices increased from 1976 to 1977 by 20.2 percent for asparagus for processing, and by 24 percent for fresh. From 1977 to 1978, the increase was another 15 percent for processing, and another 7.7 percent for fresh.

Researchers at the University of California at Riverside have developed a new hybrid asparagus variety, called U.C. 157, which has passed the development stage and is becoming commercially available in some California districts. This new variety has demonstrated an increase in yields of 40-100 percent over current varieties in actual field tests, and the variety begins to produce within 2 years of planting, compared to 3-4 years with the old varieties. Approximately one percent of California's asparagus acreage in 1977 was planted with U.C. 157, and it is projected that within ten years, all California acreage could be converted to this variety.[1] This variety has the potential of substantially reducing asparagus production costs in California, providing higher yields and with less production lead time. U.C. 157 may increase the profitability of asparagus production in California sufficiently to halt the declining trend of the past 18 years, and could potentially lead to an increase in asparagus acreage in that state.

Should the California asparagus industry find that U.C. 157 is sufficiently profitable to produce, the result could be to either (1) slow the current rate of decline in California's asparagus acreage, (2) stabilize acreage at the current level, or (3) increase asparagus

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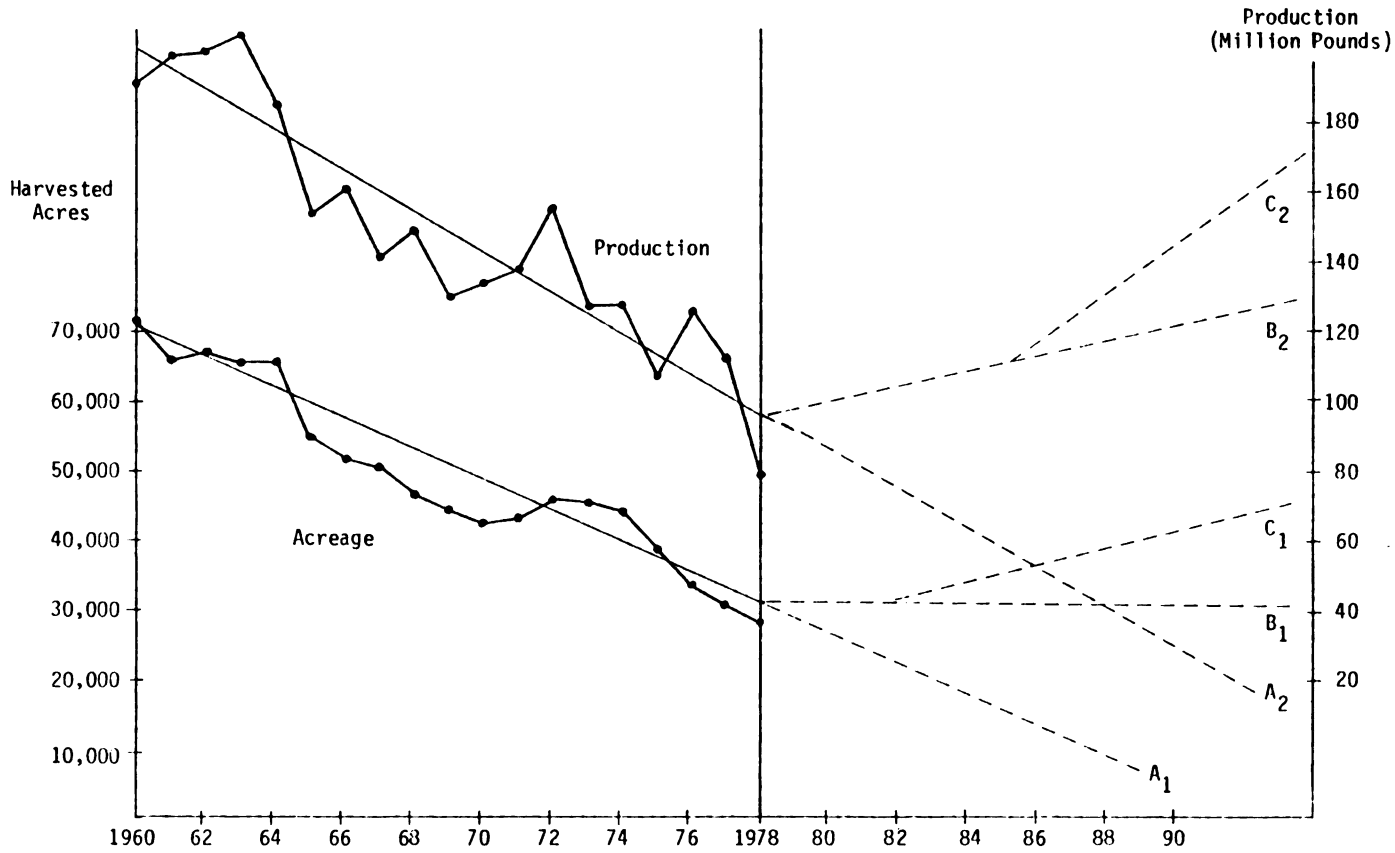
[1]"Hybrid Cultivars May Help Revive Asparagus Industry in California," article from The Packer newspaper, May 20, 1978, p. 26B.

acreage in that state. As U.C. 157 produces substantially larger yields per acre than the current varieties, the effect of such a shift in California's asparagus acreage trends would be to substantially increase total asparagus production in that state. Some projections of potential future trends in California asparagus acreage and production are shown in the following figure (Figure 5). Three alternative projections are shown. A_1 illustrates the current declining trend in California asparagus acreage, with total production based on current yields projected by A_2. Projections B_1 and B_2 assume that (1) asparagus acreage remains at approximately the current level of 31,000 acres, but that (2) all acreage is gradually converted to the new variety, U.C. 157. This would result in a steady increase in California asparagus production, illustrated by B_2. Finally, the projections labeled C illustrate the potential effect of increasing the acreage planted to asparagus, with all new acreage being U.C. 157 and all existing acreage being gradually replaced by this variety. In these projections, it was assumed that U.C. 157 will increase yields per acre by 40 percent over current varieties (to 4,379 pounds/acre).

The potential effect of these changes in California's asparagus industry would be to substantially increase the quantity of asparagus supplied to U.S. markets. The increase in California production which is represented by B_2 could increase total U.S. asparagus production by approximately 15 million pounds over the current level by 1990. Production projection C_2 implies a potential for California asparagus production to increase by 40 million pounds from the current (1975-78) average by 1990. This represents a potential increase in total U.S. asparagus production of 19 percent by 1990. Perhaps even more

FIGURE 5. Trends in California Asparagus Acreage and Production.



A_1 = Current acreage trend, projected

A_2 = Current production trend, projected

B_1 = Projected: Level acreage, U.C. 157

B_2 = Corresponding projected production

C_1 = Projected acreage increase, U.C. 157

C_2 = Corresponding production, projected

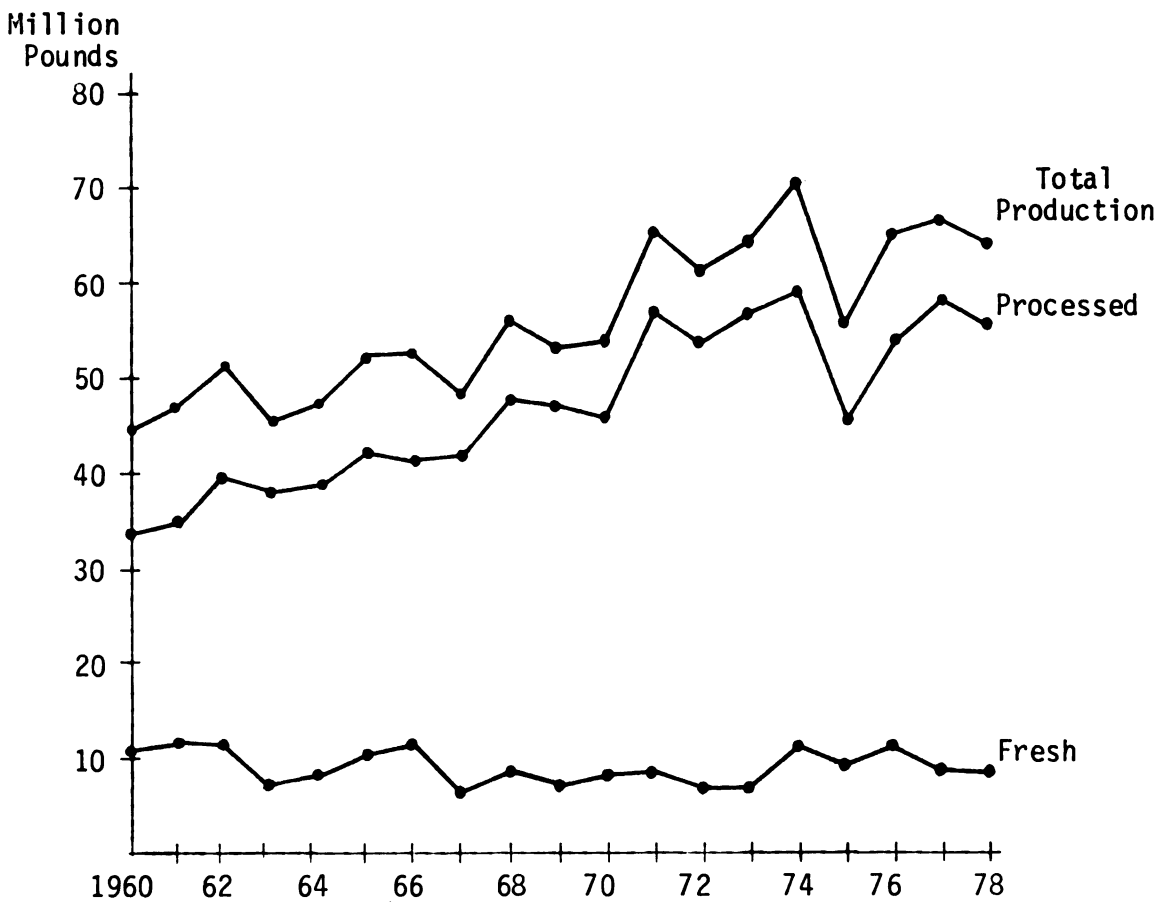
Source: U.S.D.A. Annual Vegetable Summary.

significant is the implication that the substantial decline in total U.S. asparagus supplies which has been caused in the past largely by the decline in California production, may not continue into the future. The economic effect of this is discussed in a later section (Section 4).

2.3.2. Washington

Asparagus production in Washington steadily increased from an annual average of 47.2 million pounds during 1960-64 to 63.1 million pounds in 1970-74. Since then, average total production has leveled off; the annual average for 1975-78 amounted to 63.3 million pounds (Figure 6).

FIGURE 6. Washington Asparagus Production, 1960-1978.



Source: U.S.D.A., Annual Vegetable Summary.

Washington is the second most important asparagus producing state in the U.S., and has surpassed California in the production of asparagus for processing since 1977. Washington's crop is utilized primarily by processors, with an average of 84 percent of the crop so utilized during 1975-78. During this same period Washington accounted for 40 percent of U.S. production of processing asparagus, and for 9.2 percent of fresh production.

Asparagus acreage in that state rose steadily from about 15,000 acres in 1963, peaked at 23,400 acres in 1974, and has since leveled off at about 20,200 acres. Yields have increased gradually, from an average annual amount of 2,800 pounds per acre during 1960-63, to 3,150 during 1975-78.[1]

The expansion of the asparagus industry in Washington parallels the expansion of irrigated acreage of farm land in that state. Major irrigation projects in the Columbia basin have led to expansion of the Washington agricultural industry in general, allowing for the production of irrigated crops in Eastern Washington where wheat was previously the major crop.

The production of asparagus in Washington appears to be quite sensitive to the prices of alternative crops. In 1974 for example, wheat prices rose substantially; 2,400 acres of asparagus (10 percent of 1974 acreage) were taken out of production despite steady asparagus prices, and much of this was planted to wheat. Asparagus prices in Washington have increased between 1960-63 and 1974-76 at an average annual rate of 5.59 percent for processed, and 6.05 percent for fresh.[2]

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[1] U.S.D.A., Annual Vegetable Summary.

[2] Ibid.

There exists a strong potential for increased asparagus production in Washington in the near future, according to industry experts in that state. The market situation for two of the major alternative crops in eastern Washington, wheat and sugar beets, has deteriorated substantially in recent years, giving impetus to growers to expand acreage of asparagus. Wheat prices have declined sharply since 1975, and the major sugar refineries in Washington are planning to discontinue operations as of 1978. This development is occurring at a time when the asparagus price situation is particularly encouraging. Since 1976, grower prices have increased at an average annual rate of 15 percent for processed and 21 percent for fresh.

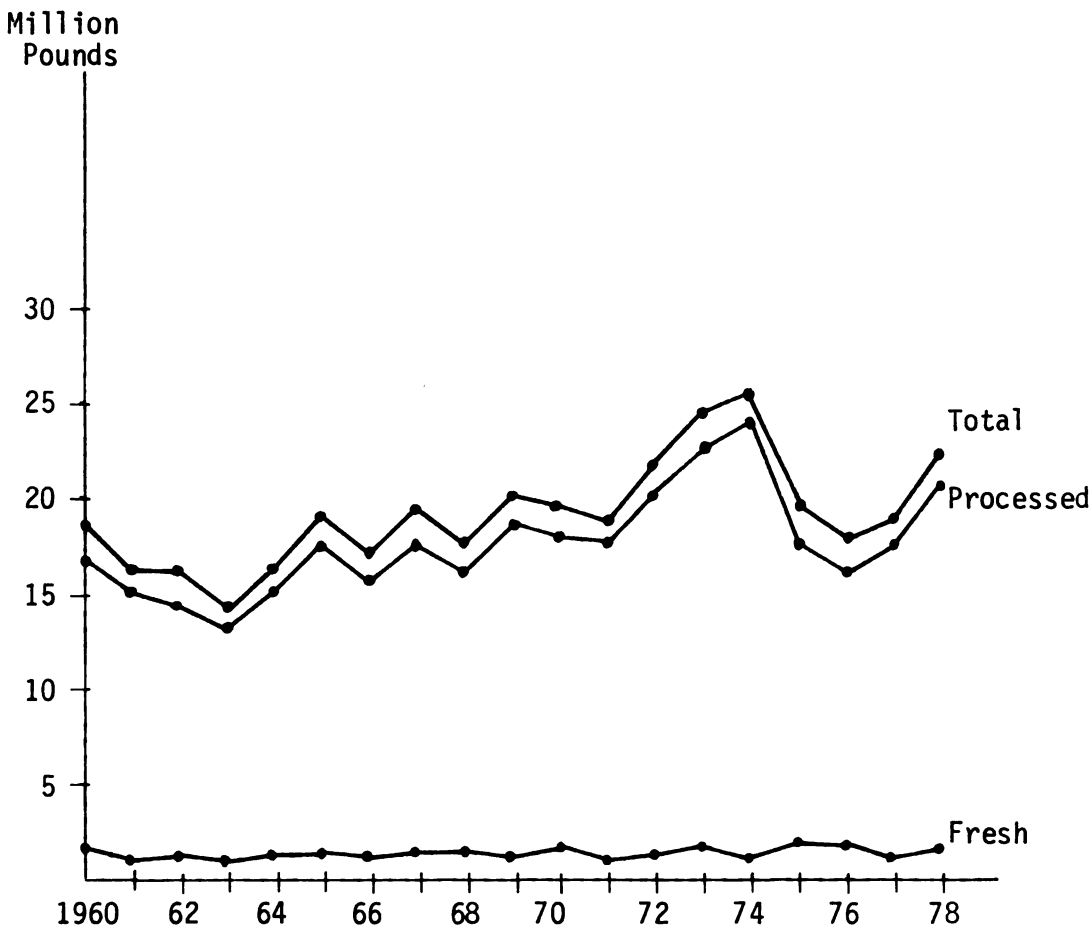
Further encouragement to increased asparagus production is provided by the recent development of a selective mechanical harvester in Washington, which, according to these same industry sources, is economically feasible and will soon be commercially available. Mechanical harvesting of asparagus reduces the amount of labor required and thus the cost of harvest. This development could potentially provide a major stimulus to increased asparagus production in Washington, mainly in the production of asparagus for processing use.

Although asparagus production in Washington has leveled off in recent years, these factors could well lead to an increase in production in the future. As Washington accounts for approximately 30 percent of total U.S. asparagus production at the present time, such an increase could potentially add significantly to overall U.S. asparagus supplies in the future. Asparagus production in that state is utilized primarily (84 percent) by processors, which implies that an increase in Washington's production would probably be supplied to processed asparagus markets.

2.3.4. Michigan

Asparagus production in Michigan has increased slightly, on the average, since 1960 (Figure 7). During the period 1960-63, Michigan production averaged 16.3 million pounds annually, from an average statewide acreage of 10,900 acres. For 1975-78, these figures were 19.8 million pounds produced (21 percent total increase) on an average of 17,600 acres (61 percent total increase). Yields averaged 1,800 pounds per acre from 1960 to 1974; but for 1975 to 1978, the average annual yield was only 1,100 pounds per acre. Michigan fields have experienced declining yields after 8-10 years of production, as opposed to the typical 12-15 year production in the past.

FIGURE 7. Michigan Asparagus Production, 1960-1978



Source: U.S.D.A., Annual Vegetable Summary.

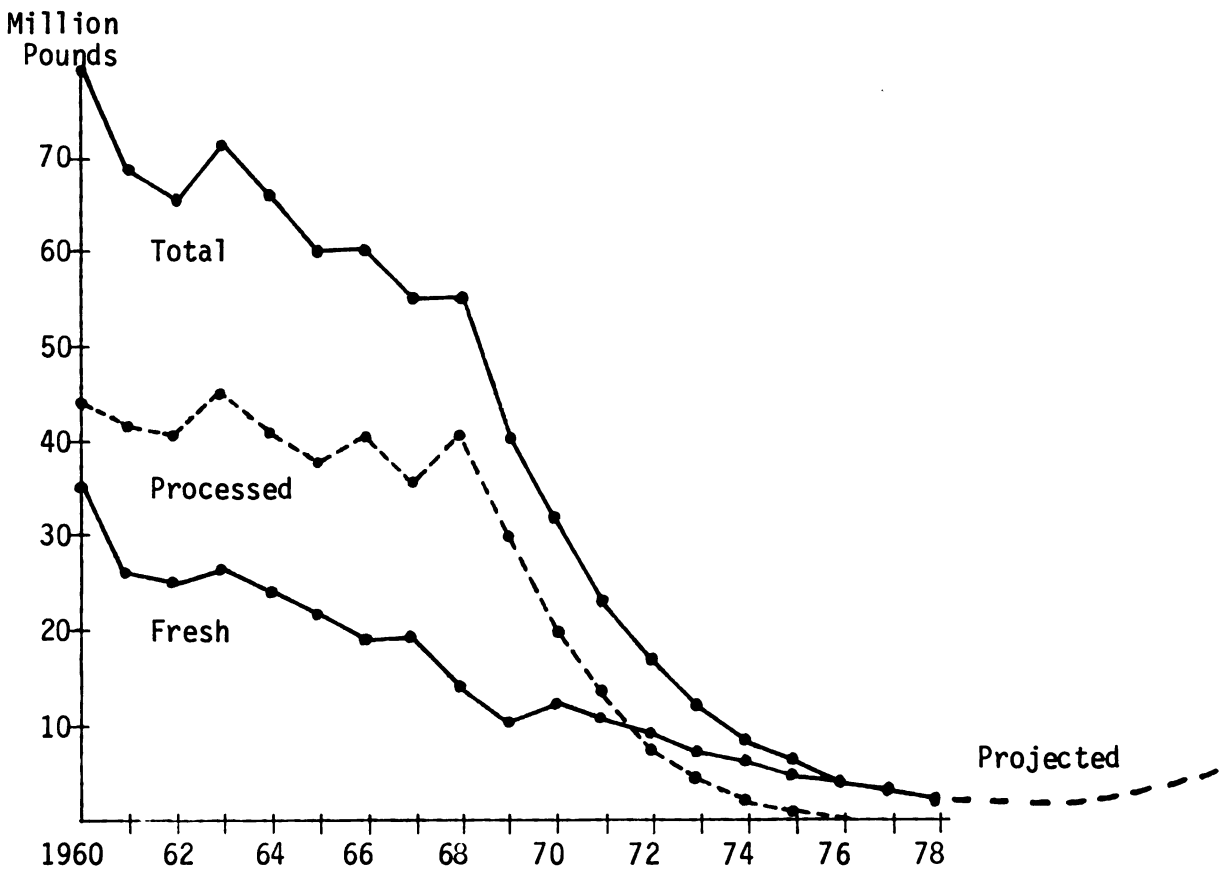
Several factors have contributed to the expansion of the Michigan asparagus industry since 1960. Grower prices for processing asparagus have increased at an average annual rate of 5.59 percent from 1960-62 to 1974-76. As U.S. consumer and wholesale prices increased at the average annual rate of 4.15 percent during the same period, Michigan grower prices have increased in real terms. Asparagus produces well on sandy soils which are not well suited to the production of other Michigan crops (low opportunity value for land). The early season for this crop, coming at a time earlier than most other fruit and vegetable crops, allows producers to diversify operations across the year. The asparagus industry in Michigan has not been subjected to as strong land development or labor pressures, which have been a major factor in declining asparagus production in other states such as California and New Jersey.

There exists a strong future potential in Michigan for increased asparagus production. Michigan grower prices have increased dramatically for asparagus for processing in the past two years, up 35 percent from 1976 to 1977 and up another 29 percent from 1977 to 1978. This has provided a strong impetus to increased asparagus production, as can be seen from the tremendous increase in new plantings in that state. Industry sources estimate that sufficient seed to establish roughly 8,000-10,000 additional acres of asparagus was planted in 1978, but horticultural factors reduced the amount of acreage successfully established to approximately 2,000-3,000 acres. It is estimated that an even larger acreage may be planted in 1979. This strong interest in increasing asparagus production indicates that there exists a high probability that Michigan asparagus production will likely increase in the near future.

2.3.5. New Jersey

Prior to 1963, New Jersey ranked second in asparagus production among states, with a total of 71.2 million pounds produced in that year. Production then began to decline, and after 1968 plummeted rapidly; by 1976 production was only 4.3 million pounds, a 95 percent decline (Figure 8). New Jersey accounted for 19 percent of total U.S. production in 1960-64, with 16 percent of the U.S. processing production, and 26 percent of U.S. fresh production; by 1975-78, the figures were 1.9 percent of total, 0 percent of processing, and 4 percent of fresh. Acreage in that state totaled 30,700 acres in 1960; by 1978, it was down to only 1,900 acres.

FIGURE 8. New Jersey Asparagus Production, 1960-1978.



Source: U.S.D.A., Annual Vegetable Summary.

The demise of the asparagus industry in New Jersey is the result of two major trends. The first began in the early 1960s, and was caused primarily by labor problems and high opportunity costs for land. The labor problems are related to restriction of the importation of foreign agricultural labor. New Jersey growers had historically relied upon Puerto Rican laborers to harvest asparagus. The resulting labor shortages and large increase in wages put pressure on labor intensive crops such as asparagus. In addition, governmental restrictions, particularly in housing, with respect to the treatment of agricultural labor caused growers to view the use of migrant labor as too costly. At the same time, the opportunity cost of asparagus lands rose dramatically. Intense land development for urbanization purposes exerted an upward pressure on land values. The increasing profitability of alternative crops, such as soybeans, during that period contributed to a steady decline in asparagus acreage.

After 1968, plant disease became significant in the decline of the asparagus industry. Fuserium rot became a severe problem in New Jersey fields following a period of above average rainfall during the late 1960s and early 1970s (the disease is aggravated by damp field conditions). This disease is now a major obstacle to asparagus production in New Jersey, as infected fields remain unsuitable for asparagus production. Results of these trends on asparagus production can be seen in Figure 8.

It is unlikely that New Jersey asparagus production will increase to an appreciable extent in the near future. Although a new asparagus variety has been developed in New Jersey which is greatly resistant to fuserium rot, it will be a number of years before the variety is

commercially available. Horticulturalists at Rutgers University predict that asparagus acreage could increase with this new variety to a level of 10,000-15,000 acres, producing for the fresh market.[1]

Economically, it seems unrealistic to predict such an increase. There are several limitations which will have a strong negative bearing on the ability of New Jersey producers to expand asparagus production. Several major factors which were largely responsible for the decline in asparagus production in that state, such as labor and land development pressures, remain as major obstacles to any significant expansion. It appears that New Jersey asparagus production is not likely to expand substantially within at least the next decade. A more moderate increase to 8,000 acres is shown in Figure 8, in a projection which is based on pre-fuserium yields. The effect on total U.S. production would be minor.

There appear to be two major reasons which support the contention that such an increase in New Jersey asparagus production would be utilized by the fresh market. At the present time, the quantity of asparagus grown in that state is minor relative to national production, and all of it is utilized in fresh form. Asparagus processors have discontinued operations in that state. Industry sources believe that it is unlikely that the asparagus processing industry will revive in New Jersey in the foreseeable future. Another reason, according to industry sources, is that the demand for fresh asparagus from New Jersey is sufficient to absorb such an increase in production.

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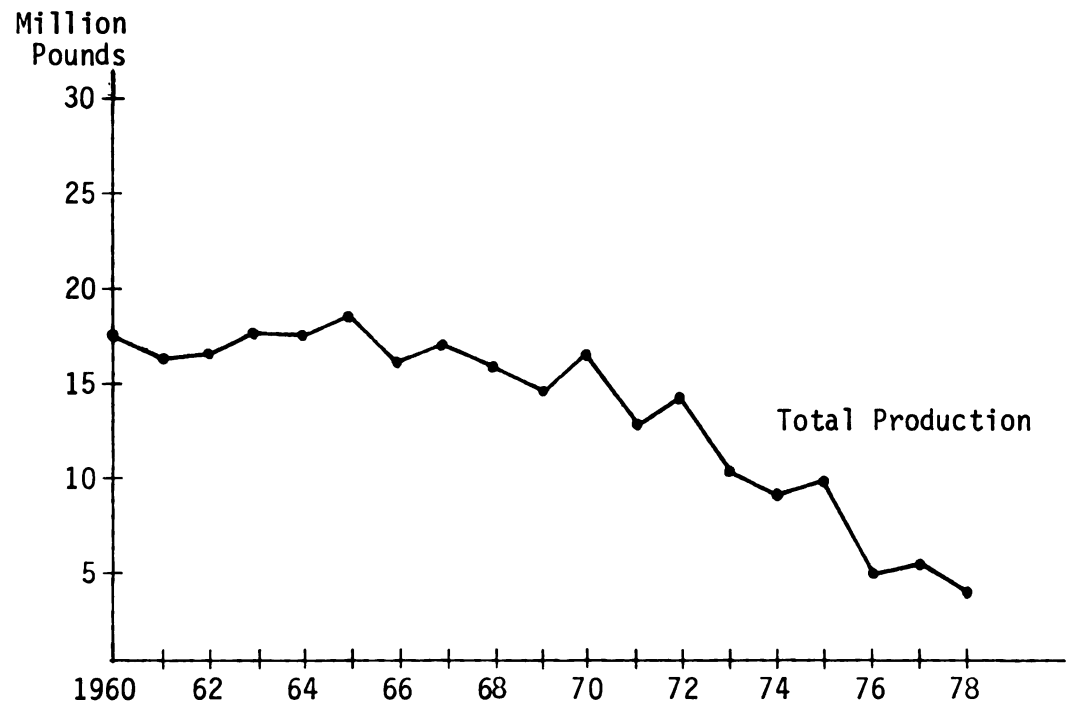
[1]"Cloning Technique Could Revive New Jersey Asparagus Volume," The Packer, May 13, 1978. p. 6A.

2.3.6. Illinois

Asparagus production in Illinois has steadily declined since 1960. In 1960-63, total production averaged 16.7 million pounds (about equal to Michigan in that period); by 1975-78, total production amounted to only 5.7 million pounds. In 1978, production totaled only 3.2 million pounds (Figure 9). Acreage fell from 10,200 acres in 1961 to 4,200 acres in 1978. Industry sources predict that asparagus production in Illinois will continue this declining trend.

FIGURE 9. Illinois Asparagus Production, 1960-1978



Source: U.S.D.A., Annual Vegetable Summary.

Industry sources cited two sets of factors which have affected the decline in asparagus production in Illinois. The soils in that state apparently are not well suited to asparagus production, and fields tend to decline in yields per acre rather early. Another factor is the profitability of alternative crops such as corn and soybeans.

2.3.7. Other States[1]

Production of asparagus in all other states combined has declined substantially from a peak of 26 million pounds in 1968 to 8.1 million pounds in 1978 (a 69 percent decline). The data for these states is not highly accurate due to the nature of crop reporting on minor crops. However, the data is of sufficient accuracy to illustrate the overall decline in these states (Figure 10).

These other states will be most likely to continue this past trend of declining asparagus production. The minor nature of the crop in these states means that the substantial levels of support (horticultural and marketing research and development), which sustain production in the major asparagus producing states, would probably not be available. The exception is Oregon, due to the similarity with Washington producing areas. Overall, the most likely scenario for the near future is one of continuing decline in combined production.

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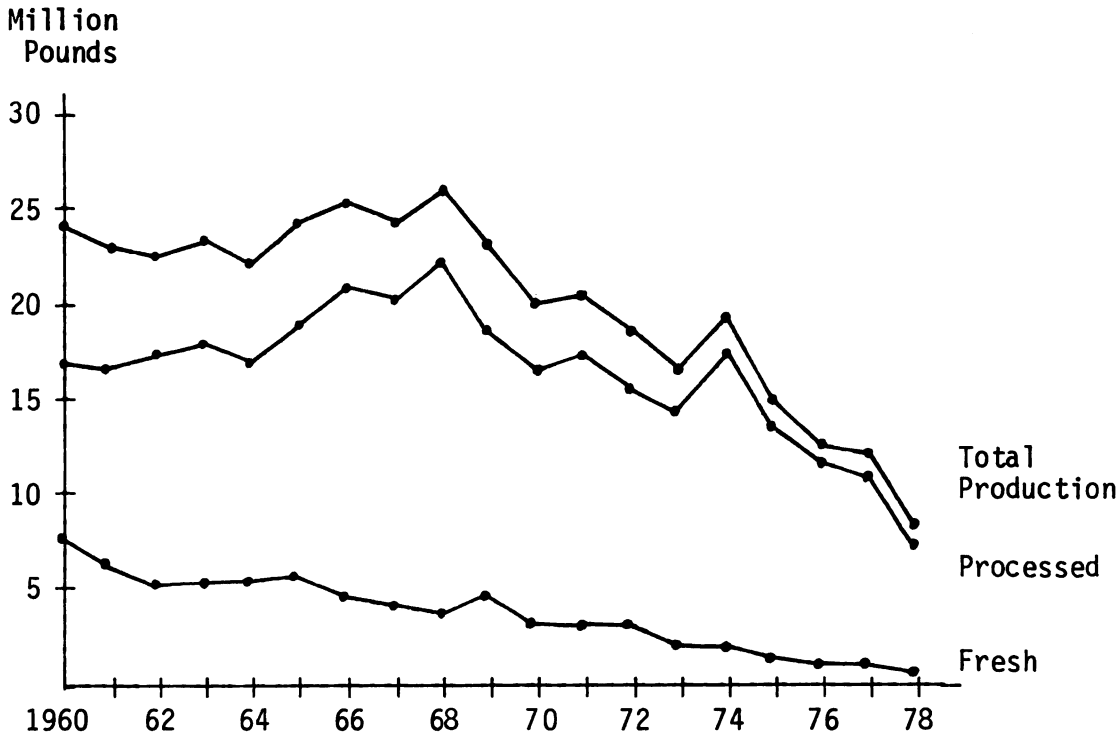
[1]Includes Fresh market: Indiana, Iowa, Maryland
Processing: Indiana, Delaware, Iowa, Maryland, Minnesota, Oregon, and Virginia.

FIGURE 10. Asparagus Production in Other States,*
1960 to 1978



*Includes:
Fresh Market: Indiana, Iowa, Maryland, and Massachusetts.
Processing: Indiana, Delaware, Iowa, Maryland, Minnesota, Oregon Virginia.

Source: U.S.D.A., Annual Vegetable Summary.

2.3.8. Summary

Although U.S. asparagus production has declined steadily from 1963 to 1978, there appears to be a strong potential for production to level off and possibly increase in the future. Factors appear to be favorable to expanding asparagus acreage in California, Washington, and Michigan, which together account for 90 percent of U.S. asparagus production.

3. U.S. ASPARAGUS IMPORTS AND EXPORTS

3.1. General

During the last 13 years, the quantities of asparagus imported and exported by the U.S. have changed substantially.

During the period from 1960-64, U.S. exports of asparagus averaged 61.9 million pounds, which was approximately 17 percent of total U.S. production. From 1965 until 1971, the export volume declined rapidly. Since 1971, U.S. asparagus exports have leveled off at approximately 13.9 million pounds (1973-77 average), which accounts for approximately 6 percent of U.S. production.

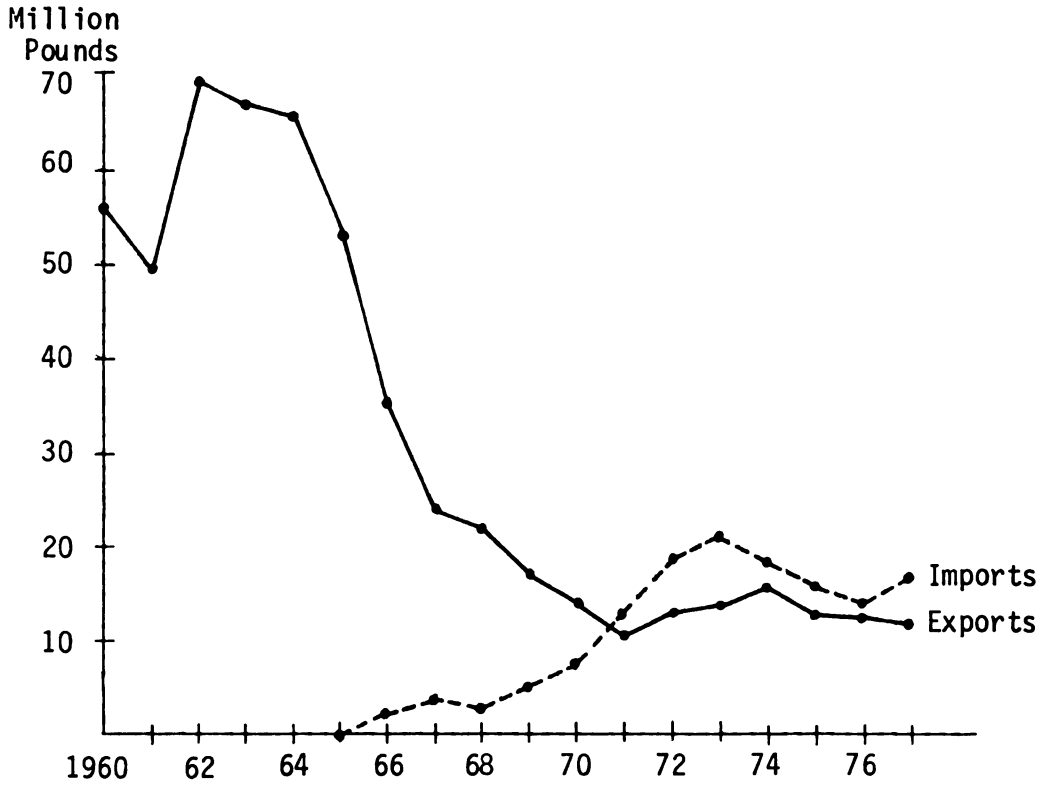
Imports of asparagus into the U.S. began to reach significant levels by 1965. Total asparagus imports increased fairly rapidly until 1973, and have since declined. Presently, U.S. imports approximately equal U.S. exports of asparagus (Figure 11).

As U.S. exports of asparagus have decreased while imports into the U.S. have increased, the net effect is an increase in U.S. asparagus supplies.

3.2. Exports

The majority of U.S. asparagus exports before 1968 were of canned white asparagus, and hence, the rapid decline of U.S. exports of canned asparagus parallel the decline of the white asparagus industry in California. Taiwan increased production of canned white asparagus in the last 1960s, replacing the U.S. as the major supplier of this product to world markets. Since 1970, U.S. exports are believed to be entirely green asparagus. Fresh asparagus exports have increased substantially since 1965 (Table 6). In most years, about 90 percent of fresh exports have gone to Canada. Trade sources indicate that in some years a

FIGURE 11. U.S. Asparagus--Total Imports and Exports, 1960-1977



Source: Statistics from U.S. Department of Commerce, Bureau of Labor Statistics.

substantial share of the U.S. asparagus entering Canada in the fresh form has been utilized by processors in that country to extend their production season.[1] However, Canada is a significant market for U.S. produced fresh market asparagus, particularly with the increase in per capita vegetable consumption in recent years. Also, the availability of jet transportation has opened new European markets for fresh U.S. asparagus. Europe will probably remain a minor market for fresh U.S. asparagus, however. This market receives fresh asparagus from the U.S. primarily during the period from January through March, before

[1]U.S. International Trade Commission Asparagus Report, 1974.

TABLE 6. U.S. Exports of Asparagus, 1960-1977 (Million Pounds)

Year	Canned	Fresh	Total
1960	51.2	5.2*	56.4
1961	44.3	5.2*	49.5
1962	64.1	5.2*	69.3
1963	62.2	5.2*	67.4
1964	61.7	5.2*	66.9
1965	46.4	6.8	53.2
1966	29.0	6.7	35.7
1967	18.9	5.8	24.7
1968	15.7	6.9	22.6
1969	11.5	6.9	17.4
1970	7.5	6.8	14.3
1971	4.5	7.2	11.7
1972	3.8	10.1	13.9
1973	4.1	10.5	14.6
1974	5.1	10.9	16.0
1975	2.9	10.9	13.8
1976	2.7	10.3	13.0
1977	2.4	9.7	12.1

*Average for 1960-64. Exports of frozen asparagus, if any, are minor.

Source: Export data from official statistics of the U.S. Department of Commerce.

European asparagus begins to come into those markets. Export markets are not expected to provide a significant demand for U.S. produced asparagus in the near future.

3.3. Imports

U.S. imports of asparagus come almost entirely from two sources: Taiwan (which supplies only canned white asparagus) and Mexico. Taiwan became an important supplier beginning in 1969, filling the domestic demand for white asparagus. Mexico has become a more important source of asparagus imports in recent years, supplying fresh, frozen, and canned (green and white) asparagus to the U.S. (Table 7). The quantity of asparagus imported into the U.S., in all forms, has averaged approximately 6.7 percent of U.S. asparagus consumption in recent years.

To a large extent, the processing of asparagus in Mexico is carried out either directly by major U.S. food processors or through an agreement with these U.S. processors. The processed asparagus from Mexico is marketed in the U.S. almost entirely by two U.S. food processors.[1] Imports of processed asparagus from Mexico, which posed a threat to U.S. asparagus producers due to the lower production costs (land and labor) in Mexico, have declined in recent years. Limited industry contacts suggest that increasing labor costs and higher opportunity values for land in Mexico have had an effect on this decline.

The bulk of the imports of fresh asparagus (which come entirely from Mexico) enter the U.S. in February and March, although light shipments continue into early May. As fresh Mexican asparagus enters the U.S. at a time when domestic supplies are very light, imports of

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[1]International Trade Commission Asparagus Report, 1974.

TABLE 7. U.S. Asparagus Imports by Types and Major Sources, 1965 to 1977 (Million Pounds)

	Canned Imports			Fresh Imports (Mexico[3])	Frozen[4] Imports	TOTAL U.S. IMPORTS
	From Taiwan[1]	From Mexico	Total Imports[2]			
1965				.7		.7
1966			.6	2.3		2.9
1967			2.5	2.0		4.5
1968			.9	2.1		3.0
1969	1.2		1.5	3.7	.1	5.3
1970	2.2	.1	2.5	5.0	.5	8.0
1971	3.3	1.9	5.4	6.8	1.6	13.8
1972	5.4	4.0	9.8	8.2	3.1	21.1
1973	9.0	3.3	12.5	7.3	2.0	21.8
1974	4.2	4.5	8.8	9.1	1.2	19.1
1975	2.3	5.6	8.0	8.3	1.3	17.6
1976	3.1	2.7	6.0	8.1	na	14.1
1977	7.8	2.3	10.5	6.9	na	17.4

[1]Taiwan canned asparagus is believed to be entirely white asparagus.

[2]Other extremely minor sources of canned imports account for the difference between total imports and Mexico and Taiwan.

[3]Mexico is the only source of U.S. fresh imports (at any significant level).

[4]Estimated by the U.S. International Trade Commission from data supplied by industry sources and official statistics of the U.S.D.A.

na--data not available.

Source: Compiled from official statistics of the U.S. Department of Agriculture and the U.S. Department of Commerce.

fresh asparagus tend to supplement domestic production by extending the asparagus season. The quantity of fresh asparagus imported into the U.S. has leveled off since 1972, and has averaged approximately 11 percent of total U.S. fresh production in recent years.

CHAPTER IV.

FINDINGS FROM THE STUDY OF THE U.S. FRESH ASPARAGUS MARKET

This chapter presents information and data relating to the marketing of fresh asparagus in the U.S., and provides information needed in order to analyze Michigan's competitive position in the fresh asparagus market and to evaluate alternative means of increasing the volume of fresh asparagus marketed from that state. Central to this chapter are the findings from the interviews with produce buyers. The chapter also develops background information about the entire U.S. fresh asparagus market; volumes shipped, seasons, major market regions for fresh asparagus, market shares of the major asparagus producing states, and selected transportation cost and fresh asparagus price data. This chapter also includes a summary of a fresh asparagus marketing study conducted in New Jersey.

1. THE U.S. FRESH ASPARAGUS MARKET

1.1. Size of the Market

The U.S. market absorbed an estimated average of 76.5 million pounds of fresh asparagus per year from 1975-78. This estimate is based on the quantity of fresh asparagus shipments reported by the USDA Agricultural Marketing Service, modified by information gathered from industry experts in the major asparagus producing states, and adjusted for imports and exports on the basis of data from the U.S. Department of

Commerce. Of this total, an average of 8.6 million pounds per year consisted of imports from Mexico. The Canadian market absorbed an estimated 6 million pounds per year during the same period.[1] The following table shows the estimated fresh market volume on a yearly basis (Table 8).

TABLE 8. Fresh Market Asparagus Volume, U.S. and Canada, 1975-77 (Million Pounds)

	1975	1976	1977	1978
U.S.	84.6	89.5	68.6	63.3
Canada[2]	6.5	6.1	5.4	N/A
Total	91.1	95.6	74.0	

[2]Based on Unload Data for five Canadian cities, adjusted.

Source: U.S.D.A., Annual Vegetable Summary; Import-Export Data from U.S. Department of Commerce.

1.2. Major Market Regions for Fresh Asparagus

The data which was used in determining the relative importance of various regions in the U.S. and Canada as market regions for fresh asparagus was from the publication "Fresh Fruit and Vegetable Unloads in 41 U.S. and 5 Canadian Cities," published by the U.S.D.A. This data does not accurately account for the total volume of fresh asparagus moving to markets in the U.S. and Canada since the total volume from the unload data is about 20 percent less than total shipment volume reported. Nevertheless, this data is useful and perhaps of sufficient accuracy in determining the relative importance of different regions. The cities included in each region, and the average volume of fresh asparagus

[1]Based on Unload Data for 5 Canadian cities, adjusted. Source: USDA Annual Vegetable Summary; Import-Export Data from U.S. Department of Commerce.

unloaded in each city, appear in Table 9. In the text which follows, the term percentage of unloads refers to the share of these total three-year average unloads accounted for by the particular market referred to.

The east coast constitutes an important market region for fresh asparagus, accounting for 38 percent of U.S. unloads. The cities of New York, Boston, and Philadelphia accounted for 82 percent of total east coast volume. The western region is also a major market area, accounting for 39 percent of U.S. unloads. Midwestern cities accounted for 17 percent of U.S. unloads, with Chicago, Detroit, and Cleveland receiving 60 percent of the volume in this market region. Southern markets received only 5 percent of U.S. unloads. While Canadian unloads of fresh asparagus were minor, it is important to note that 64 percent of this volume was marketed in the cities of Montreal and Toronto alone. Combined, these two cities are as important as the city of Chicago.

2. MARKET POSITIONS OF THE MAJOR ASPARAGUS PRODUCING STATES

2.1. Market Shares

California dominates the U.S. fresh asparagus market, supplying an average of 74 percent of the total annual volume during the period 1975-78. Mexico accounts for the next largest share, averaging 10 percent of the total fresh volume during this same period; Washington supplied 6.5 percent, New Jersey 5.2 percent, Michigan 2.2 percent, and all other states combined 2.1 percent (Figure 12).

These average market shares are based on production data from the Annual Vegetable Summary published by the U.S.D.A., adjusted for exports and imports on the basis of data from the U.S. Department of Commerce.

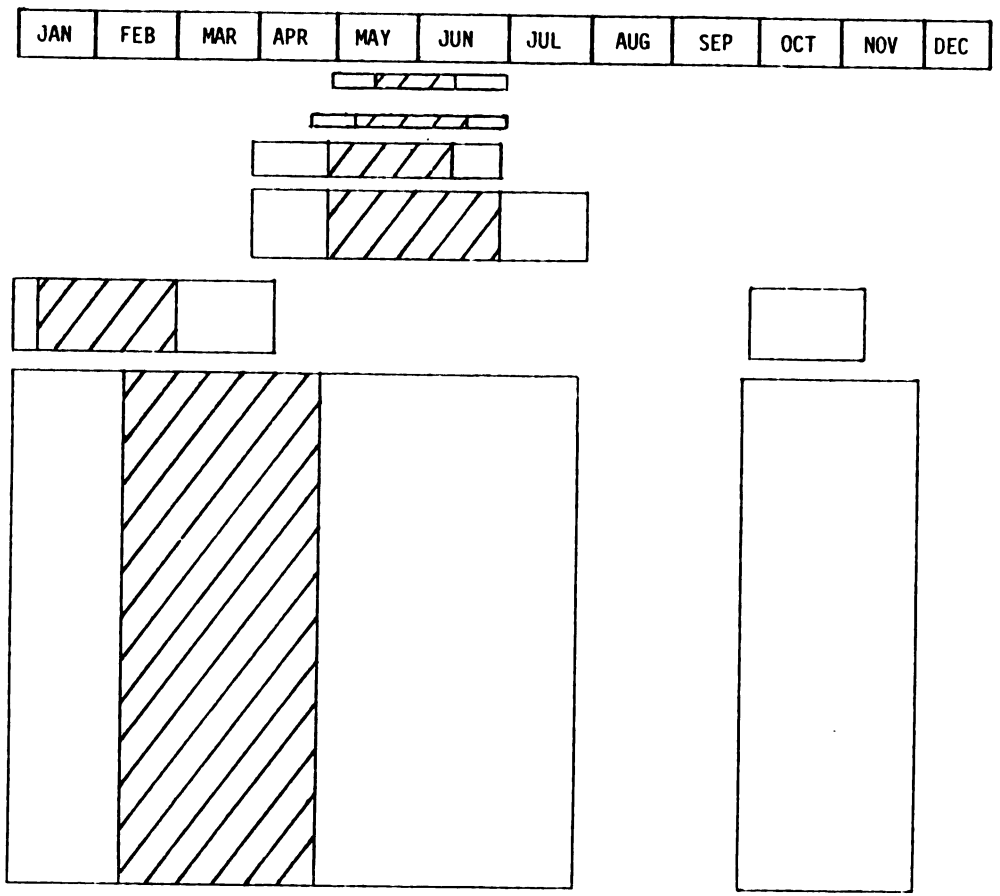
TABLE 9. Unloads of Fresh Asparagus in 41 U.S. and 5 Canadian Cities, 1975-1977, Carlot Equivalents[1]

Unload City	1975	1976	1977	3-Year Average
EASTERN				
Albany, N.Y.	24	23	16	
Baltimore, Md.	58	66	63	
Boston, Mass.	122	169	148	
Buffalo, N.Y.	32	32	17	
N.Y.-Newark, N.J.	262	247	238	
Philadelphia, Pa.	142	167	165	
Pittsburgh, Pa.	24	20	16	
Providence, R.I.	9	5	4	
TOTAL	703	729	667	699
MIDWESTERN				
Chicago, Ill.	109	118	76	
Cincinnati, Ohio	28	31	32	
Cleveland, Ohio	46	49	46	
Detroit, Mich.	44	49	43	
Indianapolis, Ind.	10	6	6	
Kansas City, Mo.	25	44	12	
Louisville, Ky.	6	5	3	
Milwaukee, Wis.	12	10	6	
Mpls.-St. Paul, Minn.	9	31	26	
St. Louis, Mo.	24	25	27	
TOTAL	313	368	277	319
SOUTHERN				
Atlanta, Ga.	6	8	6	
	10	14	15	
Memphis, Tenn.	17	17	17	
Miami, Fla.	38	41	37	
New Orleans, La.	3	4	4	
Oklahoma City, Okla.	2	3	2	
San Antonio, Tex.	6	10	19	
TOTAL	83	97	100	93
WESTERN				
Denver, Colo.	42	36	21	
Los Angeles, Calif.	268	265	210	
Portland, Ore.	44	45	35	
Salt Lake City, Utah	30	26	22	
S.F.-Oakland, Calif.	312	304	253	
Seattle-Tacoma, Wash.	70	81	56	
TOTAL	766	757	597	706
TOTAL U.S.	1,820	1,936	1,641	1,817
CANADA				
Montreal, Que.	44	34	31	
Ottawa, Ont.	6	7	4	
Toronto, Ont.	63	52	33	
Vancouver, B.C.	23	26	28	
Winnipeg, Man.	6	7	4	
TOTAL	142	126	100	122
TOTAL U.S. AND CANADA	2,007	2,007	1,741	1,939

[1] 32,000 pounds per carlot.

Source: U.S.D.A., Fresh Fruit and Vegetable Unloads.

FIGURE 12. Normal Shipping Seasons for Fresh Asparagus[1]



Shares of U.S. Fresh Asparagus Market,[2] by Major Producing States (and Mexico)	
Michigan	2.2%
Other States	2.1%
New Jersey	5.2%
Washington	6.5%
Mexico	10.0%
California	74 %

[1]Shaded portion for each state shows period when major volume is marketed.

[2]Based on 1975-78 average.

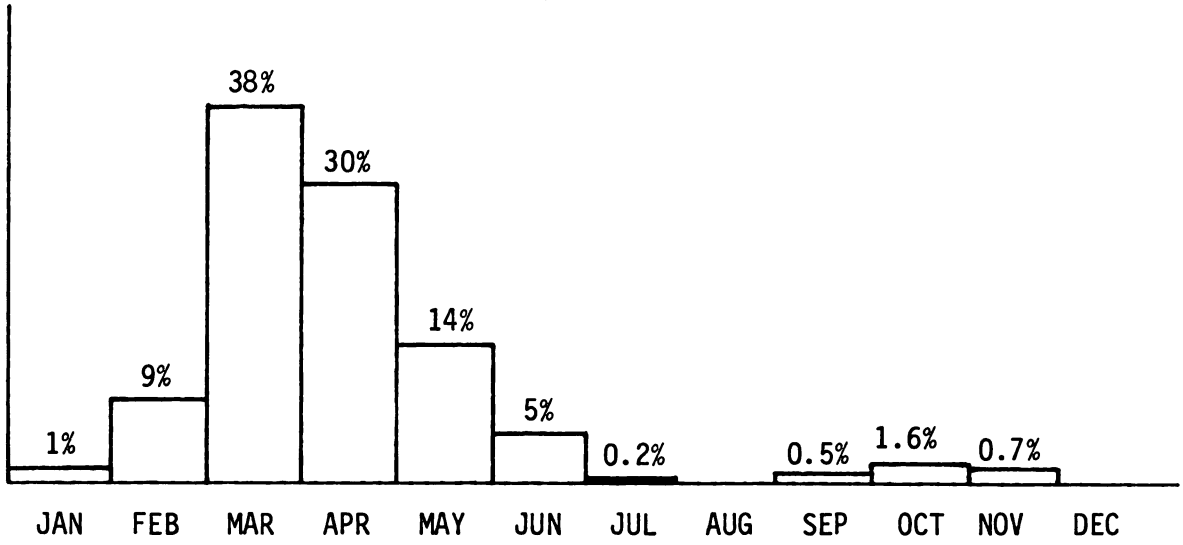
2.2. Seasons

The first major shipments of fresh asparagus into U.S. markets begin in early January from Mexico. The major volume of asparagus shipped from Mexico occurs during January and February. By March, Mexican shipments begin to decline rapidly. The desert regions of California (Imperial and Coachilla Valleys) begin shipments of fresh asparagus in early January, as well; but the major volume from these regions occurs in late January. Near the end of February, various other California districts begin to ship, so that the peak volume period for California asparagus extends continuously across the three month period of February, March, and April. By the end of April, the volume of asparagus shipped from California declines, although significant amounts are shipped until July. Both New Jersey and Washington begin shipping asparagus in early April, although the major volume period begins in May and continues until about the middle of June. Michigan's asparagus season is the shortest of all major states, with the major volume harvested during the period from early May until mid-June. These seasonal positions are illustrated in Figure 12.

2.3. Distribution of Fresh Asparagus Volume During the Year

The peak volume period for shipments of fresh asparagus to U.S. markets occurs in March and April (Figure 13). By the end of April and the beginning of May, the volume supplied begins to decline rapidly. The following figure shows how the volume of asparagus shipped to U.S. markets is distributed during an average year.

FIGURE 13. Percentage of Total U.S. Asparagus Unloads, By Months (Average 1975-77)



Source: Fruit and Vegetable Unloads in 41 U.S. Cities, 1975-77.

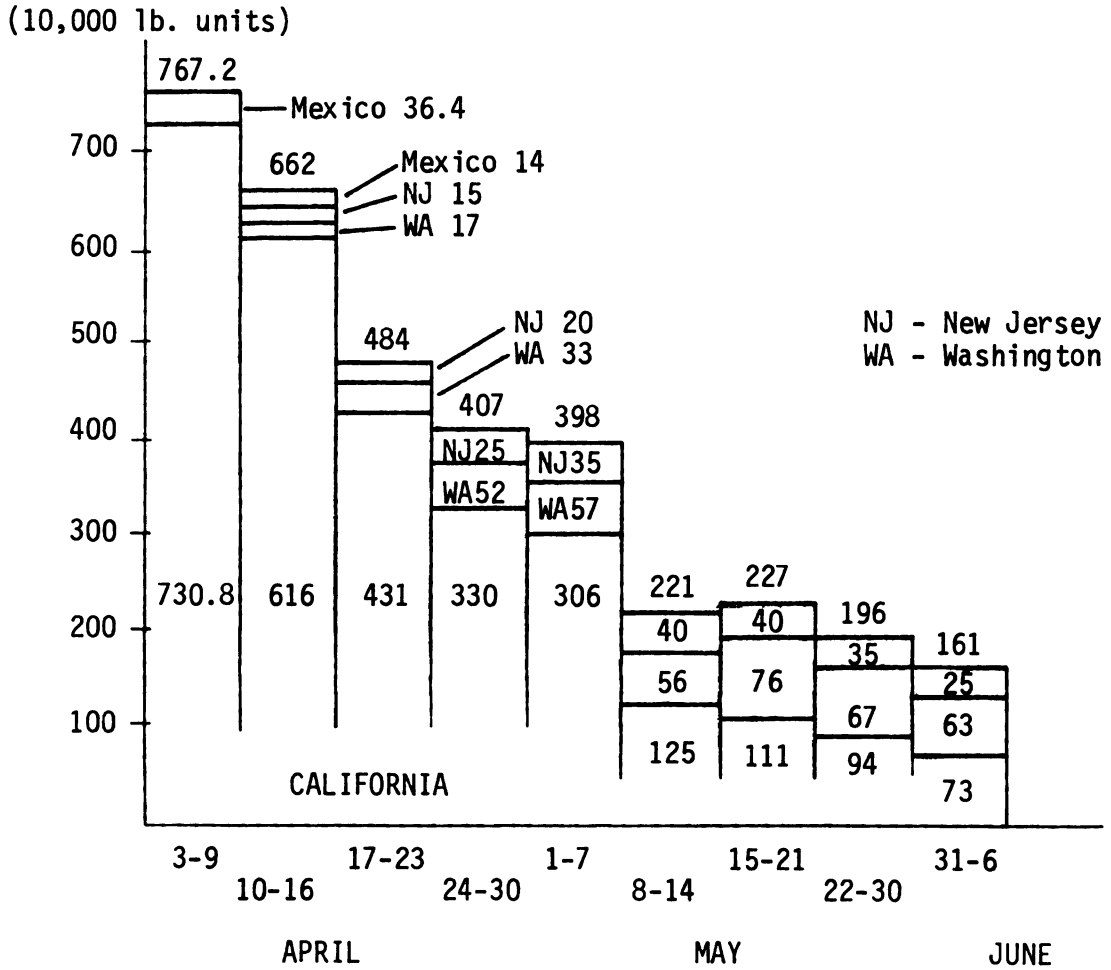
The volume of fresh asparagus shipments during May and June are most relevant for this study. The weekly shipments during this period are shown for 1978 in Figure 14. As the figure illustrates, the basic level of supplies available to national market during the time of the Michigan season is largely determined by the level of California shipments. Data on California weekly shipments during this period, compiled for 1974-1978, illustrate that trend shown for 1978 is an accurate representation of the typical yearly situation (Appendix E).

The implications of this data for the Michigan asparagus industry are addressed in Section VIII. 1.1.

3. FRESH ASPARAGUS PRICES AND SELECTED TRANSPORTATION COSTS

The purpose of this section is to determine the average price received by shippers for fresh asparagus delivered to certain midwestern market areas during the time of the Michigan asparagus season (May to June). In recent years, more than 90 percent of the fresh asparagus

FIGURE 14. Weekly Fresh Asparagus Supplies,
April 3 - June 6, 1978



Source: Shipment data reported by the Stockton Asparagus Report, Fed-State Market News Service, Stockton, California, 1978.

shipments to midwestern markets during this time period originated in either California or Washington state. In addition, accurate shipping point price data is available from only these two states. Hence, prices received by asparagus shippers in California and Washington are used in this section.

During the period from May first until about June 15, 1978, Washington asparagus shippers received an average price, f.o.b. Washington,

of $0.552 per pound of fresh asparagus. California shippers received an average of between $0.54 and $0.61 per pound, depending upon the grade.[1]

The costs of transporting fresh asparagus from California, Washington, and Michigan to four major midwestern cities were compiled from prices quoted by major trucking companies providing refrigerated service between these points. The following table presents these costs on a per pound basis, based on 1,050 30-pound crates of asparagus per truckload (Table 10). Where the rate was quoted as a range, the midpoint of that range is given.

TABLE 10. Selected Transportation Costs

From	Detroit	Chicago	Minneapolis	Kansas City
California	9¢	5.7¢	6¢	5¢
Washington	9¢	6 ¢	6¢	6¢
Michigan	1.4¢	1.6¢	2.6¢	2.9¢

The average delivered prices per pound for fresh asparagus from California and Washington during May and early June, 1978, are shown in the following table (Table 11).

[1]Prices from U.S.D.A., Annual Vegetable Summary, and the report "Marketing California Asparagus," Fed-State Market News Service, Sacramento, California, 1978.

TABLE 11. Delivered Prices for Fresh Asparagus

From	To: Detroit	Chicago	Minneapolis	Kansas City
California	63-70¢	60-67¢	60-67¢	59-66¢
Washington	64¢	61¢	61¢	61¢

4. FINDINGS OF THE INTERVIEWS WITH PRODUCE BUYERS

The purpose of this section is to present the buyer's reactions and comments on various subjects and questions covered in the interviews. The trade preference positions of the major asparagus producing states are discussed on the basis of the buyer's perceptions. The marketing channels for fresh asparagus, and the important characteristics of fresh asparagus packs are also examined. Finally, comments about the factors which are important in developing the demand for fresh Michigan asparagus and the buyer's reactions to some alternative methods of packing fresh Michigan asparagus, are summarized.

The term "buyers" here refers to produce buyers who represent wholesale produce distributors; "secondary customers" refers to firms such as restaurants, institutions, and food retailers who procure fresh produce supplies predominantly through wholesale produce distributors. The term "consumers" refers to the final purchasers, representing individuals or households. A list of the market areas which were covered in this study, and the particular firms where the produce buyers were interviewed, appears in Appendix D.

4.1. Trade Preference Positions of the Major Fresh Asparagus Producing States

4.1.1. California

California asparagus has a strong image of high, consistent quality and reliable, ample supplies among the produce buyers interviewed. That state has been consistently supplying the market with more than 50 percent of all fresh asparagus supplies for the past three decades, with a higher proportion in recent years, and has an excellent and well-established reputation in fresh produce generally. Thus, California fresh asparagus has a high degree of trade preference among midwestern buyers.

The Salinas Valley district produces most of California's fresh asparagus during the time of the Michigan asparagus season. Asparagus from that district is considered to be of very high quality, and offers buyers a wide range of other fresh vegetables to mix with less than truckload quantities of asparagus. This marketing feature is becoming very popular among produce buyers in the Midwest. As a result of the combination of high quality product and opportunities for mixed loads, Salinas district asparagus generally is in high demand. However, asparagus supplies from other California districts, which are finishing their season in May, are of lower quality during this time.

California has the substantial advantage of consistently favorable weather during the shipping season, allowing generally for a usually uninterrupted flow of high quality supplies.

4.1.2. Washington

Washington asparagus has established an image of good quality and consistent supplies among midwestern buyers. Asparagus from this state

is considered to be generally not as high quality in terms of grading as California asparagus; but the Washington product is perceived to be of high quality by buyers, even better than some California asparagus, in general, from late April to July. Buyers cited the advantage of being able to mix loads of asparagus with apples, to some extent, as being an advantage of the Washington product. Certain buyers also liked the pricing practices of Washington shippers, who maintain a fairly constant price throughout the season. Washington, like California, has the advantage of consistently good weather during the asparagus season.

4.1.3. New Jersey

New Jersey has had a good reputation for high quality asparagus among midwestern buyers, but in recent years the trade preference for asparagus from that state has declined. The major reason for this is that the volume of fresh asparagus supplies available from New Jersey has fallen drastically in recent years. Most buyers interviewed in this study believe that New Jersey is no longer a substantial source of asparagus supplies for the midwestern market region.

4.1.4. Michigan

In the midwestern market region as a whole, fresh Michigan asparagus has a low level of recognition and a lack of preference by the trade. About half of the buyers were not aware that Michigan is a source of fresh asparagus. Almost a quarter of the buyers viewed fresh Michigan asparagus as an inferior product, insufficiently cooled, poorly graded, not well packaged, and inconsistent in quality and availability.

Some buyers in Chicago and in western Michigan currently purchase Michigan asparagus in a snapped, all-green form, in either a standard

pyramid package or in overwrapped, one pound consumer packages. The Chicago buyers thought that the Michigan product was acceptable, but that the cooling was inadequate and supplies were insufficient and inconsistent.

Several buyers, however, believed that Michigan asparagus has a strong potential for market acceptance due to the close proximity of that state to midwestern markets. These buyers cited the potential for fresher product and the shorter order delivery time as the main potential advantages.

4.2. Marketing Channels for Fresh Asparagus

Fresh asparagus is considered by buyers to be a "specialty" produce item. This is because asparagus is one of the most expensive fresh vegetables on a per pound basis. Most retailers, restaurants, and institutions use fresh asparagus in relatively small quantities. Consequently, they find it to their advantage to procure asparagus in small lots from terminal market wholesalers. Several of the major food retailing chains who generally procure supplies of fresh produce directly from produce shippers also purchase fresh asparagus from terminal market wholesalers. Very few of the food retailing chains in the market areas covered by this study procure fresh asparagus supplies directly from shipping points.

Buyers who procure fresh asparagus directly from shipping points prefer to receive the product in less than truckload quantities. Asparagus is often mixed with other fresh produce items at shipping point; another practice is to divide a full truckload of asparagus between two or more receivers in a given market. The mixed load method

is becoming increasingly popular, particularly among chains, as it allows buyers to offer fresher product to the stores.

By far the greatest percentage of all fresh asparagus shipped to U.S. markets moves by truck. None is transported by rail, and air transport generally is used only for distant market areas and in times of short supplies.

The marketing channels for fresh asparagus are illustrated in Figure 15.

4.3. Important Characteristics of Fresh Asparagus Packs

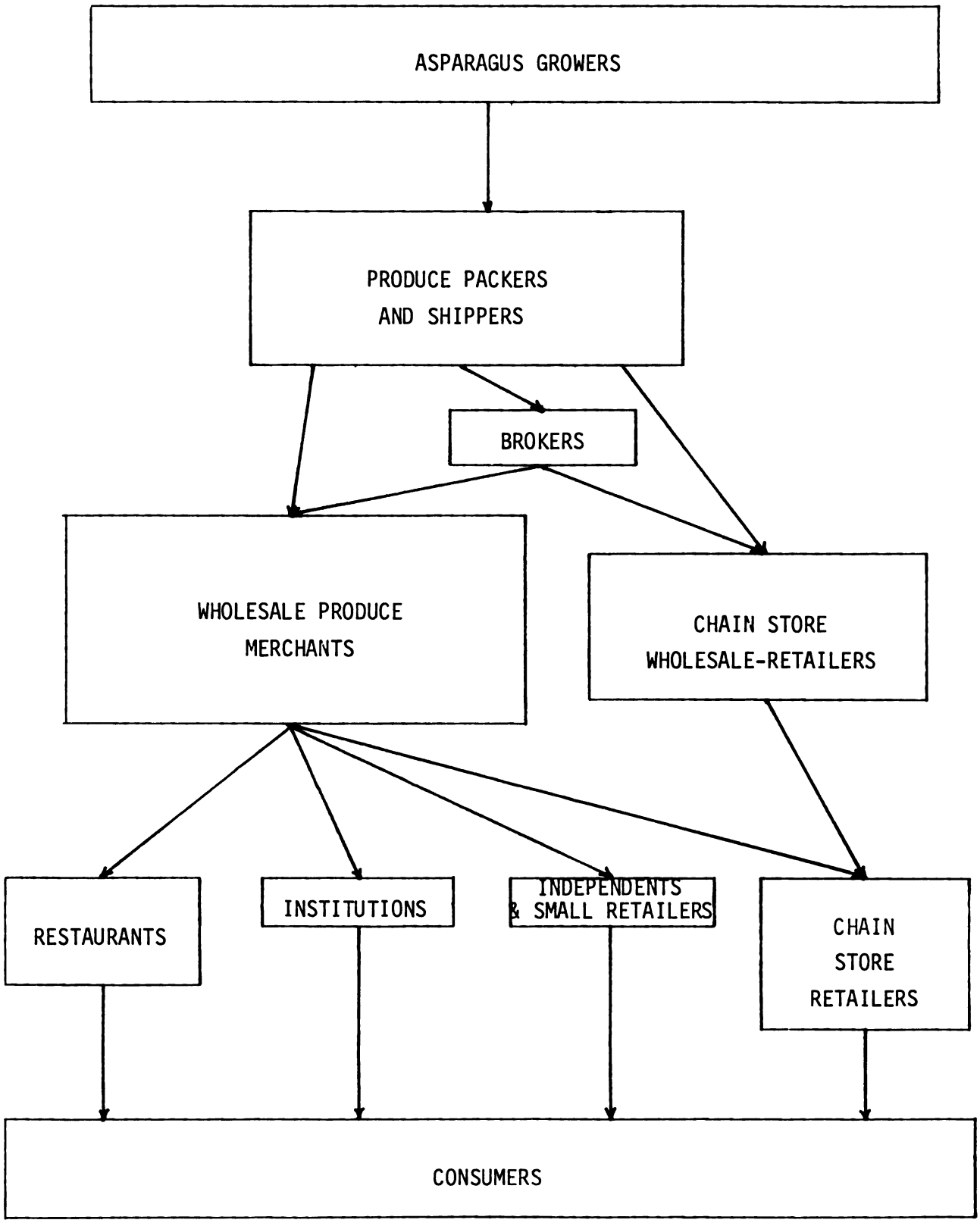
4.3.1. Product Freshness

Product freshness is an extremely important factor to all of the buyers interviewed in this study. Although the characteristic "freshness" cannot be measured precisely and quantified in a highly accurate manner by economically feasible means, it directly affects the value, and hence the profitability of the product for buyers and secondary customers.

As a basis for understanding the economic relationships involved in freshness and deterioration, it may be useful to present some limited information concerning the physiology of fresh asparagus after harvest.

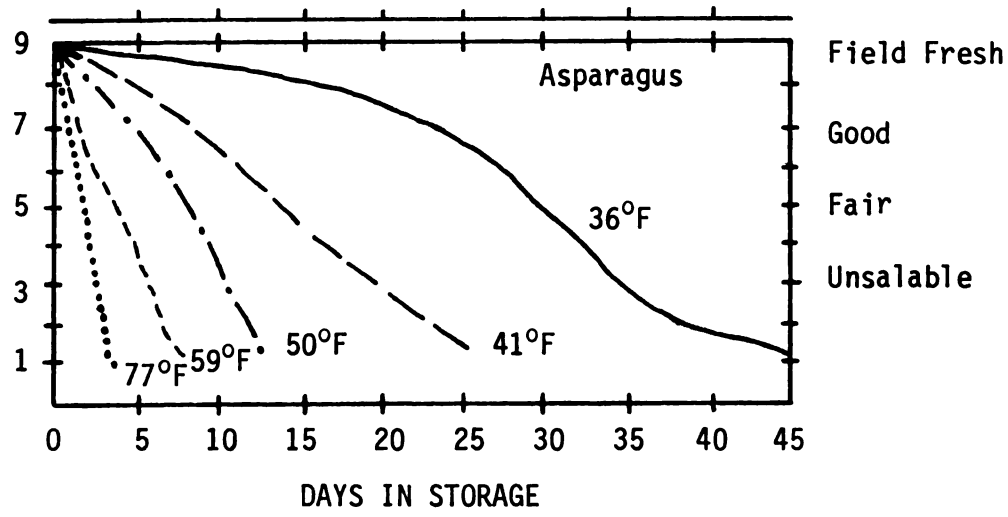
The market life, or length of time during which a fresh produce item is acceptable for sale and/or consumption, is principally a function of a time-temperature relationship. Other factors also affect it, but these two are most important. The rate at which the biological "life process" is occurring in fresh fruits and vegetables is a function of temperature: The rate increases by 2-3 times for each $10^{\circ}F$ increase in temperature which will shorten the acceptable shelf-life of the product. This rate varies basically between different products. Fresh

FIGURE 15. Marketing Channels for Fresh Asparagus



asparagus is one of the most perishable vegetables. Thus, the market life of fresh asparagus is determined largely by the temperature at which the product is held, as the following figure illustrates (Figure 16).

FIGURE 16. Quality Rating of Fresh Asparagus at Various Temperatures



Source: U.S.D.A. Handbook 66.

The market life of asparagus is longest at the lowest temperature the commodity can attain before freezing (32°-36°F). The quality level and retention in fresh asparagus is substantially affected by the length of time between the point when the spear is harvested and the point when the spear attains this final temperature. California fresh asparagus shippers, who require high product quality and a market life sufficient to allow them to market their product across the continent, cool the asparagus spears to this 32°-36°F range within 2-4 hours of harvest. Temperature attainment is usually accomplished by means of hydrocooling, the process of running ice-cold water over the commodity.

Physiological deterioration of fresh asparagus results in the following: increasing fiberousness (causing the spear to become tough and stringy), wilting and weight loss (loss of moisture), loss of flavor, softening and decay of tissues, and growth (elongation, sprouting buds).

A major consideration in fresh asparagus distribution is the loss of product moisture, which this commodity is particularly susceptible to. The loss of moisture represents, to the buyer, the loss of salable weight. Thus, the retention of product moisture is of direct economic concern to those marketing asparagus. The ideal environmental conditions for fresh asparagus distribution, from field to consumer, include a humidity level of 95 percent. This is, however, very rarely the case in the current distribution system. For the purpose of resisting moisture loss, high quality asparagus is usually shipped with a moisture-laden pad at the bottom of the container; this allows the asparagus, which stands butts-down in the case, to absorb moisture through the stem. Most fresh asparagus is cut-harvested because the fibrous butt greatly reduces the rate of moisture loss in fresh asparagus during distribution.

Physiological deterioration of fresh asparagus causes economic losses for both consumers and merchants. These losses are greatest at the end of the marketing channel because: (1) at this point the product has attained its highest dollar value, having been packed, transported, handled, warehoused, and distributed, and (2) deterioration which is caused by damage inflicted at earlier points in the marketing channel may not be manifested in the product until it reaches the end of the channel.

For the food retailer, the costs of deterioration in the product, both direct and indirect, greatly affect the profitability of fresh

asparagus sales. The direct costs include: labor costs invested in preparation, display, and sorting; loss of salable weight through moisture loss and trimming; purchase price plus added labor in the store for product which must be discarded, and management costs involved. The indirect costs are lower consumer demand for fresh asparagus, and potentially an effect on business of the store as a whole, if consumers become highly dissatisfied.

Consumer losses include direct product losses (product deteriorates beyond usable condition after purchase), loss of eating quality (flavor), and nutritional losses.

The produce buyers interviewed all stated that the market life of fresh asparagus must extend to the point of consumption in good condition. These buyers stressed the need for adequate precooling and temperature maintenance during distribution of the product in order to achieve this aim. The means which buyers used to insure a high degree of freshness consisted mainly of buying labels of shippers which have proven themselves through experience, and the use of temperature recorders to insure that proper temperatures are maintained during transit.

4.3.2. Packing

4.3.2.1. Product Protection

Protection from damage during distribution, which is important for all product items, is particularly critical for fresh asparagus. Asparagus spears are quite fragile; the tips are easily broken, and the buds which occur on the sides of the spears are prone to injury from even minor physical contact. These damages will result in an accelerated rate of physiological deterioration of the product.

Buyers strongly stressed the need for the asparagus package to provide adequate physical protection for the product during distribution. Several buyers stated that the presence of physical damage in a shipment has a detrimental effect on the demand for the product on the wholesale market. The presence of a few damaged cases of asparagus may discourage secondary customers from purchasing any of the load, as this is sometimes taken to be an indication of rough handling during transport. In general, product damage was considered by all buyers to be a major problem. The buyer who receives less marketable asparagus than he planned for may have to break commitments, rearrange orders, arrange credit with the shipper and the trucker for the merchandise, and pay the labor costs involved in restacking and salvage.

Fresh asparagus is virtually always shipped from the production region to market with the spears all oriented with the tips up, standing on the butt end of the spear. There are several important reasons for this practice. The tips are very fragile and must not receive any substantial physical force or pressure. Another reason is that the fibrous butt presents a physically strong surface to resist the force of the spears pounding against the bottom of the package during distribution. The tough, fibrous butt remains undamaged, whereas the more tender, green section of the spear would suffer bruising damage, which is unsightly and greatly accelerates moisture loss. Finally, the asparagus is handled and displayed in the retail store in this oriented manner for reasons of protecting the spears from damage and for reasons of appearance. The packages used for fresh asparagus are of a pyramid design, being wider at the base (as the asparagus spear is wider at

its base) and tapering in towards the top, so that the spears are held upright and cannot shift positions inside the package.

Many food retailers merchandise fresh asparagus in consumer packages in which the asparagus is placed on a plastic or fiberboard tray and overwrapped with transparent plastic film. The buyers cited the main advantage of this method of packaging as being that product damage as a result of consumer handling is virtually eliminated. This type of damage is particularly costly with fresh asparagus. Another advantage cited is the reduction in labor required to display the product.

4.3.2.2. Package Sizes

Fresh asparagus is predominantly marketed in two different package sizes. The large size contains 30-33 pounds of asparagus per crate, and the smaller (referred to as a half-crate) contains 13-14 pounds. The half-crate is used mostly during the periods of the year when fresh asparagus supplies are light, mainly January to mid-February, and again in September and October. The reason for the exclusive use of the small package during these times according to the produce buyers is that the prices for fresh asparagus are then very high. Most chain stores and secondary customers use a lower volume of the product at these prices. During the rest of the asparagus season, the larger crate is mainly used. However, the half-crate is becoming more popular during the regular season as well. Only a very small percentage of the volume of fresh asparagus marketed during the main season is packed in half-crates. Some buyers liked the flexibility of having smaller unit sizes, such as the half-crate, available during the regular season, particularly since a number of secondary customers prefer to purchase less than a full 30 pounds at a single time.

Although most buyers (particularly produce wholesalers) preferred only these two standard sizes, some buyers were more concerned with economic efficiency and willing to accept alternative package sizes. In particular, the objectives of this latter group were to minimize packaging costs per pound of product and to maximize handling efficiency.

The cost of packaging per pound of product decreases with larger packages due to lower material and labor costs. Buyers stated that they would be willing to accept larger package sizes if they would realize cost reductions.

In order to achieve maximum handling efficiency in produce distribution, packages must be designed to fit the standard pallet (40 x 48 inches), and preferably the metric pallet (100 x 120 cm.) and to stack efficiently on the pallet with other types of product. It is important to note that those buyers who were willing to receive fresh asparagus in package sizes other than the current industry standard constitute a limited segment of the fresh asparagus market, and the alternatives mentioned here are industry ideals, not industry standards at the present time.

4.3.2.2. Packaging Materials

The 33 pound asparagus package is virtually always made of wood, while the 13-14 pound half-crate is predominantly made of fiberboard. The wooden crate is the traditional asparagus crate, and many buyers believed that this material makes a stronger container and hence is better for packing asparagus. However, some buyers who represent top food retailers preferred a fiberboard material for asparagus packages. They cited the advantages of fiberboard as being: (1) Easier for the store to handle after use, because it can be collapsed and baled, and (2) recyclable,

allowing for some economic recovery of the package. According to these buyers, it is possible to design a fiberboard box which is of sufficient strength to meet protection requirements. In fact, the half-crate is almost always a fiberboard box, and that box has performed successfully in fresh asparagus distribution.

4.3.3. Sizing and Grading

Asparagus spears are typically cut-harvested at approximately a nine inch length. Uniformity of length was not a highly important characteristic, according to buyers, and variations in spear length within a package by one to three inches is considered to be standard.

Asparagus is packed in a wide variety of grades which basically relate to the diameter of the spears within the crate. The typical grades are Extra Large, Large, Standard, and Small, although a variety of names for these various sizes are used depending upon the shipping district.

The larger sizes are preferred to the smaller sizes in the national market, as evidenced by the higher prices at shipping points for the larger grades. However, there exists a wide variation in size preferences among the buyers interviewed, both between market areas and within the small market area.

The buyers stated that they greatly prefer to purchase fresh asparagus which is graded by size. This allows them to procure a product which matches the size preferences of the secondary customers or consumers for whom they are buying.

There are two major types of packs for fresh asparagus: the "bunched pack," in which the spears have been bound together in 25-35 separate bunches within the crate; and the "loose-pack," in which the

spears within the crate are separate. The buyers stated that the bunched pack is utilized primarily by retail stores for two major reasons. First, the bunches are more easily handled and displayed, reducing labor costs in the store. Second, the amount of damage to the product resulting from consumer handling in the store is less than for loose asparagus. The preference of these buyers for bunched packed asparagus was not highly consistent but varied according to market conditions.

In periods of moderate demand the price of bunch-packed asparagus remains steady, and the price for bunched asparagus is between $1.00 and $1.50 above comparable grades of loose-packed asparagus (f.o.b. shipping point prices). During periods of strong market demand the price of bunch-packed asparagus decreases in relationship to the loose-pack. The price difference between comparable grades of loose and bunched declined to $0 - $0.50 in strong markets.[1]

4.4. Factors Important in Increasing the Market Demand for Fresh Michigan Asparagus

4.4.1. Product Quality

Buyers strongly stressed the need for Michigan fresh asparagus packs to be of a consistent quality. Once the buyer has begun to use a particular shippers' label, variation in the quality of the pack he is buying causes major problems. The buyer typically has obligated most of the asparagus shipment before its arrival on the basis of a level of quality acknowledged by the buyer and his secondary customers. According to all buyers interviewed, fluctuations in the quality of the Michigan

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[1]Shipping point prices from the Fed-State Market News Service, Stockton Asparagus Report, Stockton, California, 1978.

fresh asparagus pack would have a strongly adverse effect on the demand for that product. Buyers, of course, expect some quality variations due to weather and declining quality towards the end of the shipping season.

4.4.2. Consistent Supplies

According to the buyers interviewed, it is necessary to consistently supply the market with fresh Michigan asparagus every year and throughout the season in order to develop and increase the market demand for that product. The demand for a certain produce item is strongly affected by the level of recognition and acceptance which that item has with the various buyers and secondary customers. As these purchasers become assured of the consistent quality and availability of Michigan asparagus, said the buyers, this product will improve its trade preference position.

To the buyers, consistent availability of the product means it is available to a particular buyer in his market area throughout the shipping season and from year to year. Consistent supplies during the shipping season are particularly important to the buyers because they must plan the marketing program and schedule their orders accordingly. Flexibility exists, of course, to work with variations in supply which are the result of the weather. Buyers stressed their willingness to work with shippers to accommodate for such variations, so long as the shippers showed good faith and maintained active communication with the buyers, keeping them up to date on the supply situation. Buyers stated that the volume of fresh asparagus which Michigan supplies to a particular market area may be varied from year to year, as long as some minimum level of supplies are consistently available each year. California

asparagus shippers vary the yearly quantity of fresh asparagus depending upon prices in the processor markets.

4.4.3. Promotional Considerations

The buyers were asked during the interviews to comment on various methods of promoting the fresh Michigan asparagus, and to offer their suggestions as to the methods which they felt would be most effective. The aim was to establish how Michigan shippers might best establish the necessary contacts with the produce trade to generate demand for fresh asparagus.

The majority of the buyers said that it would be highly ineffective and inefficient for Michigan suppliers to direct demand stimulation promotion towards consumers. The reasons given for this statement centered mainly on the point that Michigan, both now and potentially, accounts for a very minor proportion of the fresh market volume of asparagus.

The most effective promotion for fresh Michigan asparagus would be directed at the wholesale buyers themselves, according to the interviews. Buyers felt that the promotional efforts and resources of the Michigan asparagus industry should be oriented towards informing the trade that Michigan fresh asparagus exists, when it is available, and where they can procure the product. Many buyers outside the Michigan area did not know that Michigan was a source of asparagus, and all buyers wanted to be reminded each season of the possibilities for asparagus supplies from Michigan.

Most of the major retailers interviewed like to offer specials on fresh asparagus, and to run ads in a local newspaper promoting fresh asparagus. Promotional allowances (special price deals) when a retailer

is willing to feature fresh Michigan asparagus on special was another means of promotion suggesting by buyers. However, the buyers currently advertise and feature fresh asparagus without a promotional initiative from shippers.

4.5. Buyers' Reactions to Alternative Packs for Michigan Asparagus

4.5.1. Field Run Versus an Oriented, Graded Pack

The standard fresh asparagus pack requires a substantial amount of labor to orient the spears, separate these into various grades by size, trim the spears to a fairly uniform length, and hand pack the asparagus into pyramid crates. The cost of marketing fresh asparagus could be considerably reduced if any of these steps in the packing process could be eliminated.

An earlier study of this particular subject found that consumers would be willing to purchase asparagus without some or all of these steps performed.[1] According to that study, the asparagus could be of random sizes (diameters) and lengths, with the spears not oriented. The marketing idea was for retailers to offer the entire ten pound box for sale to customers.

Except for a few buyers in western Michigan, the buyers generally rejected the idea of this type of pack. Marketing non-oriented asparagus spears was rejected for reasons of product damage and appearance. It was believed that the spears would suffer bruising damage and breakage during distribution, and particularly in displaying the product in

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[1] Beckman and Zehner, Summary Report of Michigan Fresh Asparagus Quantity Pack Project, Michigan Agricultural Extension, January 1978.

the retail store. The buyers were also of the opinion that a non-oriented asparagus offered a poor appearance to customers.

The idea of marketing asparagus which was not graded by size was more acceptable to the buyers interviewed. Although most buyers preferred to have the asparagus graded, many buyers were willing to accept an ungraded pack at some reduced price.

Hand packing asparagus into a pyramid crate is done to protect the product from damages. Although there may exist a strong traditional trade preference for this type of pack, any alternative means of packing which would not damage the product and would lower marketing costs appeared to be acceptable to buyers.

4.5.2. Snap-Harvested Asparagus

The fibrous butt is left intact on most fresh asparagus marketed in the U.S. for important reasons of postharvest physiology (Section 4.3.1.) and product protection (Section 4.3.2.1.). Asparagus from California, Washington, and probably also New Jersey could not be marketed in the midwest without leaving the fibrous butt attached. Deterioration of the product would occur too rapidly.

This fibrous butt is inedible, and is discarded before consumption. This inedible portion constitutes 30-40 percent, by weight, of the typical cut-harvested asparagus spear. Michigan asparagus is all snap-harvested and thus lacks this fibrous, inedible portion.

Buyers clearly recognized this waste weight inherent in cut-harvested asparagus. Several food retailing operations trim the fibrous butt from the asparagus spears before retailing the product. Asparagus marketing in this manner is virtually always consumer-packaged after trimming. Those retailers which process asparagus in this way stated

that they realize a sufficiently higher price for the trimmed, packed product to justify the costs involved. Furthermore, consumer demand for this product was believed to be higher than for standard asparagus.

When asked to comment on the potential for Michigan to market an all-green asparagus, and to receive a price premium based on the quality advantage of this product, buyers gave rather vague responses. They agreed that theoretically the all-green product should command some price premium, but they would not give any estimate as to how much of a premium the market would pay. Further, they expressed strong reservations about the market life of an all-green asparagus.

5. NEW JERSEY MARKETING STUDY

The purpose of this section is to summarize a study of the economic feasibility of marketing mechanically harvested asparagus in the fresh market. That study was concerned with testing the market acceptance of a mechanically harvested asparagus, which is a snapped, all-green product identical to that produced in Michigan.

Mechanical harvesting produces a product which is of various lengths and diameters, and is not oriented. Agricultural engineers at Rutgers State University in New Jersey developed a mechanical process capable of receiving mechanically harvested asparagus, cleaning the spears, sorting these by size, and longitudinally orienting the spears. These spears were packed in consumer packages and overwrapped with a specially designed plastic film which preserves the moisture in the asparagus and slows the rate of deterioration by increasing the concentration of carbon dioxide inside the package.

The consumer packaged, snap-harvested asparagus resulting from this process was test marketed in several New Jersey supermarkets during

1971 and 1972. This prepackaged asparagus was packed in three length categories: five to seven inches, three to five inches, and less than three inches. Standard, cut-harvested, bunched asparagus was available in all test stores at all times.

The results of this marketing test indicate a significant consumer preference for the snap-harvested (in this case mechanically), consumer packaged asparagus. This pack, called the Rutgers pack, sold 38 percent more by weight than the standard, cut-harvested pack even though the weighted average price of the Rutgers pack was 58 percent higher. Consumer attitudes were measured by means of a questionnaire following the study, and consumers clearly recognized that an entirely edible (snap-harvested) asparagus was of greater value by weight than a cut-harvested spear which contains the inedible butt end.

CHAPTER V.

ANALYSIS, CONCLUSIONS, AND RECOMMENDATIONS

1. ANALYSIS OF THE U.S. ASPARAGUS MARKET

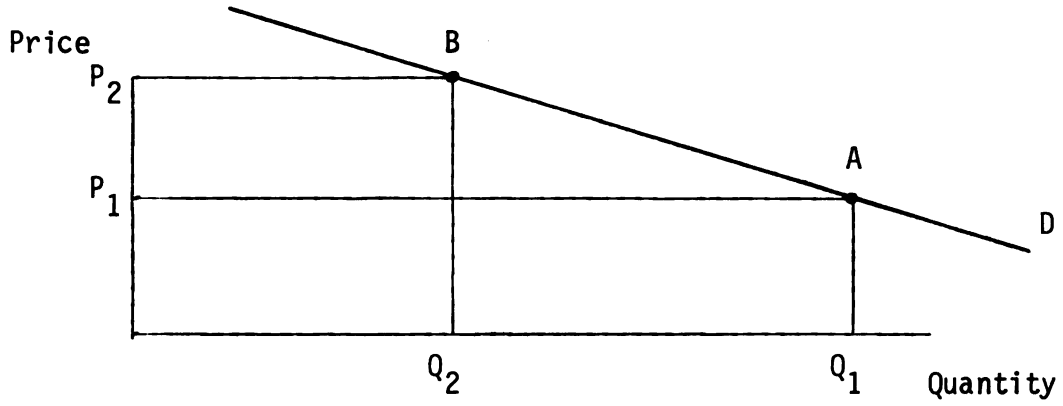
The purpose of this section is to analyze the trends in demand for asparagus in the U.S. which have occurred since 1964, and to analyze the potential effect that these trends may have on the U.S. asparagus market in the future.

For purposes of illustration, generalized demand schedules are used to represent the market situation. The data is insufficient to permit a precise estimate of the price-elasticity of the demand for asparagus in the U.S. Thus, the demand schedules which appear in this section represent relative changes in demand, but do not imply a knowledge of the exact degree of price-elasticity prevailing in the market.

The decline in the quantity of asparagus demanded in the U.S. market since 1965 appears likely to have been significantly affected by increasing asparagus prices during this period. Both canned and fresh asparagus prices increased at a more rapid rate than other processed and fresh fruits and vegetables between 1965 and 1974, making asparagus one of the most expensive vegetables (per pound) on the market (Section III. 1.2.1.). Total asparagus consumption per capita declined by 24 percent during this period. This implies that consumers have reduced the quantity demanded in a typical response to higher

prices. The following figure illustrates this response, as prices increase (in real terms) from P_1 to P_2, and the quantity demanded decreases along the existing demand schedule from Q_1 to Q_2 (Figure 17).

FIGURE 17. CONTRACTION OF DEMAND IN RESPONSE TO HIGHER PRICES



The price factor by itself is only one aspect of the changes which are occurring for asparagus. Another major feature is the interrelationship between high prices and changes in consumer tastes and preferences for asparagus. As the price of asparagus has remained high over a period of years, this has set into motion changes in patterns of asparagus consumption and retailing which appear to, over time, have had the effect of shifting consumer tastes and preferences away from asparagus and thus reduce the demand for that product.

Changes have occurred in the patterns of asparagus consumption. As asparagus prices have increased, both absolutely and relative to other food products, consumers reduced the quantity of asparagus purchased. It is logical to assume that other vegetable products have been substituted for asparagus, particularly in the case of processed asparagus. As this pattern of reduced asparagus consumption continues over time, the level of consumer preference, hence the demand, for asparagus will tend to decline.

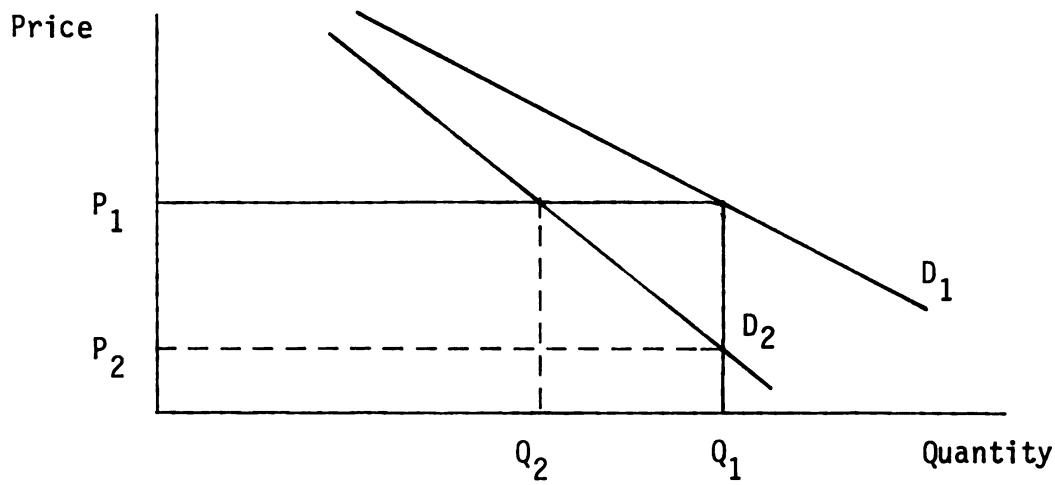
Another factor which has probably contributed to a decline in the demand for asparagus is the poor quality product which has been packed by processors in recent years (Section III. 1.2.2.). Particularly at the high prices for processed asparagus, the receipt of poor quality product by consumers would be expected to be damaging to future consumer demand for that product.

The level of demand for processed asparagus products is also strongly affected by changes in the characteristics of asparagus marketing at the wholesale and retail levels. This factor is a very important aspect of processed asparagus marketing, as it will strongly affect consumer demand for processed asparagus products in the future. Due to high prices and reduced retail sales, processed asparagus has become a minor item for food retailers. These merchants tend to give processed asparagus less space on the shelf, to increase the mark-up on this product, and to reduce (or discontinue) promotional effort allocated to this product. Major national brand food manufacturers have reduced the level of promotional support for processed asparagus items as well. These occurrences have the effect of reducing consumer demand for processed asparagus.

The demand for asparagus in the U.S. is probably becoming more inelastic. As processed asparagus remains at high price levels over a period of years, the market segment of consumers which are buying asparagus tends to become smaller. Only those consumers with a highly inelastic demand preference for asparagus are likely to continue purchasing the product. Thus, the expected effect over time is for the consumer demand for asparagus to tend to become increasingly inelastic. Trade sources, in fact, indicate that the demand for processed asparagus has become highly inelastic.

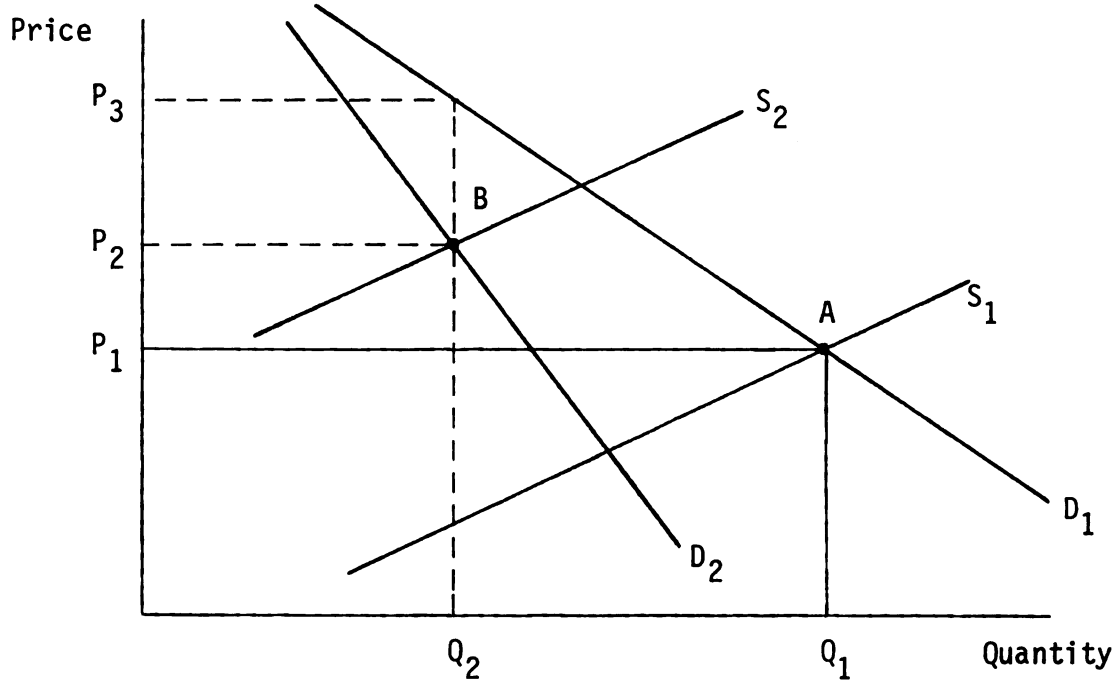
The following figure illustrates these changes in consumer preferences and demand elasticity (Figure 18). The original demand schedule is represented by D_1. As preferences decline, the schedule shifts downward. At the same time, however, the demand for asparagus is becoming more inelastic. The demand schedule thus shifts to D_2. The effect of such a shift in the demand schedule is that a given quantity of product (Q_1) will be absorbed by the market only at a substantially lower price (P_2).

FIGURE 18. Falling Demand Schedule for Asparagus



The decline in U.S. asparagus consumption since 1964 has almost certainly been the result of a combination of two factors: rising asparagus prices and changing consumer tastes and preferences. The following figure illustrates the economic relationship which appears to hvae occured in the U.S. asparagus market (Figure 19). In the diagram, point A represents market equilibrium in the early 1960s. The quantity Q_1 of asparagus is demanded at price P_1, on demand schedule D_1. Since then the price of asparagus has increased as U.S. asparagus production has declined sharply. During this period consumer tastes and preferences

FIGURE 19. Changing Market Situation for Asparagus



have been shifting away from asparagus with the remaining consumers having a more inelastic preference function for this product. The demand schedule thus shifts to D_2. Point B represents equilibrium in the late 1970s, where a lower quantity of asparagus (Q_2) is demanded at a higher price (P_2). The prevailing price, P_2, is lower than the market price (P_3) would have been had the demand schedule remained stable at D_1.

The higher prices for asparagus in the late 1970s is thus primarily the result of substantially lower asparagus supplies. While high prices for asparagus may give producers the impression that the demand for asparagus is increasing, this is not the case. Overall demand for asparagus is declining. Prices have been strengthening only because supplies are decreasing at a more rapid rate.

The factors which have affected the decline in the demand for processed asparagus products will be substantial barriers to expanding

the demand for these products in the future. One important barrier is the position which processed asparagus products now occupy in the product mix of food retailers and major national brand food processors. Industry sources indicate that it is unlikely that processed asparagus products would receive the substantial levels of promotional effort required to increase the demand for these products. Further, consumers would be expected to be highly unresponsive to efforts to expand the demand for processed asparagus products. Tastes and preferences have shifted away from asparagus to alternative products, and the consumer segment which purchases processed asparagus products has probably become smaller. Another consideration suggested by industry sources is that a change has occurred in the nature of manufacturers' and retailers' demand for food products generally. This change is a shift away from most basic processed commodity items to compound, synthesized, and/or combinations of commodities and other ingredients. All of these factors imply that the demand for processed asparagus may be very difficult to expand, and if it can be expanded that a considerable promotional effort and a substantial period of time will be required to do so.

The major economic implication of this decline in the demand for asparagus is that an increase in U.S. asparagus supplies would probably result in substantially lower prices for producers. The total quantity of asparagus demanded in the U.S. cannot be increased, in the near future, except by considerable price reductions, as the demand schedule has become more inelastic. Further, export markets probably cannot be expected to absorb larger quantities of U.S. asparagus in the future. Thus, an increase in U.S. asparagus production or imports would be expected to substantially weaken the U.S. asparagus market.

The interrelationship between the several factors which affected the decline in the demand for asparagus can be expected to continue to negatively influence asparagus demand in the future, unless some major change is made to reverse the current trend.

The fresh asparagus market has been more stable than the processed market, in terms of volume demanded. The demand for processed asparagus in the U.S. has declined much more rapidly since 1965 than has the demand for fresh asparagus. Of the rapid decline in per capita consumption of asparagus which occurred between the period averages for 1965-67 and 1974-76, 82 percent of this decline was accounted for by processed asparagus (Section 1.1.2.). In terms of total volume, the decline in processed asparagus consumption between the 1965-67 annual average and that for 1975-77 totaled 40 million pounds, while the decline in total fresh consumption amounted to only 4 million pounds between the same periods (Section 1.1.1.). Average U.S. grower prices increased between 1965 and 1977 at an average annual rate of 10 percent for fresh, and only 7.5 percent for processing asparagus.

The demand for fresh asparagus is believed to be quite strong, and can probably be expanded much more readily than the demand for processed asparagus. In the interviews of buyers representing major midwestern food retailers, several buyers said that the demand for fresh asparagus is very strong, despite high prices and short supplies. Further, food retailers will respond much more favorably to expand the demand for fresh asparagus than for processed. There are several reasons for this. Fresh asparagus is not a branded nor nationally promoted product. Rather, fresh asparagus is promoted on a store by store basis. The above mentioned buyers indicated that fresh asparagus is a product which they

like to feature and promote. Another consideration is the unique position which fresh asparagus occupies in the product mix of the retail store. In the winter and spring, fresh asparagus offers the retailers an attractive fresh vegetable at a time when the produce department does not have many alternative items to feature. Also, fresh asparagus is highly visible in the store, in contrast to processed asparagus. Thus, demand-influencing factors tend to be more favorable to expanding the demand for fresh than for processed asparagus.

In summary, it appears that the market situation for processed asparagus is likely to deteriorate in the future. Demand is declining, and it is unlikely that the demand for processed asparagus could be expanded to a substantial extent. There is a fairly high probability that the production of asparagus in the U.S. could increase in the future, and that export markets would be unlikely to absorb an increased volume of U.S. asparagus. This would likely lead to an oversupply of the processed asparagus market, and hence to substantially lower asparagus prices. Finally, it appears that demand for fresh asparagus is declining at a substantially lower rate than for processed asparagus. Further, there is a strong possibility that demand for fresh asparagus is stronger and could be expanded considerably more rapidly than could the demand for processed product.

2. DEVELOPING THE MARKET FOR FRESH MICHIGAN ASPARAGUS

2.1. Michigan's Competitive Position in the Fresh Asparagus Market

2.1.1. Factors Favorable to Increasing Michigan's Fresh Asparagus Volume

The Michigan asparagus harvest occurs during a period (early May to mid-June) when the total quantity of fresh asparagus supplies to U.S.

markets is declining rapidly. Fresh asparagus supplies reach their annual peak during March and April; the total volume shipped to U.S. markets in May amounts to only 48 percent of the total April volume, on the average. In 1978, fresh asparagus shipments average 5.8 million pounds per week during the month of April; during May, the average weekly volume amounted to only 2.6 million pounds. Fresh asparagus supplies continue to decline through June. This implies that Michigan asparagus may be in demand to decrease this gap in national fresh asparagus supplies as shipments decrease from April to May.

The demand for fresh asparagus in U.S. markets is strong during the time of the Michigan asparagus season. In late April, the fresh asparagus market strengthens, and prices hold firmly throughout May and early June. In recent years, the average market price for fresh asparagus has been approximately 15 percent higher in May than during April. This indicates that the level of seasonal demand for fresh asparagus in the U.S. is declining less rapidly than are supplies during the time of the Michigan season.

New Jersey, which has in the past been a major competitor in the midwestern and eastern region markets for fresh asparagus during the time of the Michigan asparagus season, is no longer a major supplier of this commodity to midwestern markets. The volume of fresh asparagus supplied by New Jersey shippers has declined dramatically in recent years. The weekly shipment volume of fresh asparagus from New Jersey averaged approximately 1.7 million pounds per week during May and early June of 1971. This weekly average figure had declined to only 0.45 million pounds during this same period in 1978.

Michigan asparagus shippers have a substantial potential advantage in marketing their product in midwestern market areas in the close geographical proximity to Michigan. The most important economic advantage of this locational position is that the transportation costs for delivering Michigan product into these markets average four to five cents per pound less than the costs to transport product from California and Washington. This advantage will become increasingly more important in the future as transportation costs increase.

Another major advantage of Michigan's close proximity to these market areas is the potential to deliver asparagus within one day of harvest. To transport product from either California or Washington to Chicago by truck may take between two to three days longer than to transport product from Michigan to this city. Michigan asparagus shippers thus have the potential for delivering a fresher product to midwestern markets. This may be a significant advantage, as freshness is considered an extremely important characteristic by produce buyers. Buyers also stated that the shorter lag between ordering and receiving the produce would be an advantage for Michigan asparagus shippers.

The potential for Michigan produce shippers to offer mixed loads of fresh apples and asparagus may be an additional advantage in marketing fresh asparagus. Many buyers expressed a very strong preference for receiving fresh asparagus in partial truckload quantities, mixed with other produce items. As Michigan is a major source of fresh apple supplies for the midwestern market region during May and June, there is a good possibility that produce shippers could market mixed loads of asparagus and apples.

2.1.2. Barriers to Increasing the Demand for Michigan Fresh Asparagus

Michigan asparagus has a poor trade preference position among mid-western buyers. The product was either not recognized or had a negative image with approximately three quarters of the buyers interviewed. The other major competitors in this market, namely California, Washington, and New Jersey, all have a strong image of high quality and consistent supplies among buyers and consequently strong trade preference positions. This implies that initially the level of demand in the fresh market may be significantly lower for Michigan asparagus than for asparagus from California or Washington.

Michigan does not have a significant base established in the fresh market from which to build demand. Of the average total annual volume of fresh asparagus marketed in the U.S. from 1975 to 1978, Michigan supplied only approximately 2.2 percent. The amount supplied to produce wholesalers was only approximately 68 percent of the small total Michigan fresh asparagus volume, with the balance sold through roadside stands, farmers' markets, and pick-your-own operations.

The Michigan asparagus season is of substantially shorter duration than are the seasons of the other major fresh market competitor states. On the average, asparagus is available from Michigan for only about six weeks of the year, from around May 10 until mid-June. California shippers can supply fresh asparagus from January til July, and again in the autumn. Both Washington and New Jersey supply fresh asparagus from late April until the end of June. The Michigan asparagus harvest is often disrupted by weather factors, such as late frosts and rain. Washington and California usually have very consistent, favorable

weather during the asparagus harvest, allowing shippers in these states to consistently supply their markets during the season. The shortness and irregularity of the Michigan asparagus harvest is a significant barriers, as buyers expressed a strong preference for obtaining fresh produce from shippers who can consistently supply the product during the season.

2.1.3. Summary

In summary, it appears that there exists a potential for Michigan shippers to increase the volume of asparagus marketed fresh. There are, however, substantial obstacles to increasing the demand for Michigan asparagus in the market. At the present time, the level of the demand for fresh Michigan asparagus is significantly lower than the level of demand for fresh asparagus from California, Washington, and New Jersey.

2.2. Marketing Fresh Michigan Asparagus--The Product

2.2.1. Snap-Harvested Asparagus

The major fresh asparagus producing states, California and Washington, shift production from fresh to processor markets during the harvest season, depending upon quality and price factors. When asparagus quality declines, as it does towards the end of the harvest or during periods of adverse weather, it can no longer be successfully shipped to the fresh markets. It is necessary, therefore, that the method of harvesting asparagus for the fresh market be compatible with processor market use.

All states other than Michigan cut-harvest the asparagus crop. Processors in those states receive the asparagus with the fibrous butt attached. Michigan processors, however, receive only snap-harvested asparagus. In order for the fresh market to be an economical alternative

for Michigan asparagus growers, it is probably necessary to market fresh asparagus in a form which is compatible with the current harvest methods. To shift to a cut-harvest method would not only require that the harvest operation be completely changes, but also that any asparagus not suitable for fresh market use would have to be trimmed to an all-green state before being diverted to processors. Further, the snap method of harvest allows for substantial labor savings in harvesting. For these reasons, Michigan shippers will probably find it most efficient to market fresh asparagus in the snap-harvested form from the production point of view.

The snap-harvested asparagus has several economic advantages over the cut-harvested product. The snap-harvested product has 30-40 percent less unusable weight, as the inedible butts are left in the field. This means a direct saving in transportation and packaging costs, as the waste product is not packaged and transported to market.

An entirely edible asparagus has a clearly proven market acceptance. Many of the buyers interviewed, who represented major food retailers, currently merchandise an entirely edible asparagus in consumer packages. Michigan fresh asparagus shippers have had success in marketing snap-harvested asparagus. Finally, marketing studies have demonstrated a strong consumer acceptance of all-edible asparagus, and a willingness to pay a premium price for the greater edible weight when the product is consumer packaged.

The major obstacle to successfully marketing snap-harvested asparagus is perishability of that product. Asparagus spears which have been snap-harvested are substantially more susceptible to moisture loss, and these deteriorate at a more rapid rate than cut-harvested asparagus.

Hence, the market life of snap-harvested asparagus is shorter than it is for cut-harvested asparagus under identical conditions.

2.2.2. Methods of Marketing the Product

2.2.2.1. Standard Pack for Snapped Asparagus

One method of marketing snap-harvested asparagus is in the standard pyramid pack. This type of pack has the advantage of being accepted as the standard fresh asparagus pack. Many buyers, such as restaurants, use fresh asparagus in this bulk form.

There are several disadvantages to using the standard pyramid pack for snap-harvested asparagus. This method of packing asparagus requires a substantial amount of labor to orient and grade the spears, and to hand-pack into the pyramid package. Spears which are less than six inches in length are generally not acceptable in this type of package. Snap-harvested asparagus packed in this way is highly susceptible to physical damage, as this product lacks the tough fibrous butt to protect the spear from bruising as it is pounded against the bottom of the container during distribution. Because the spears in this standard pack are exposed to the low relative humidity typical in product distribution systems, moisture loss can be a substantial problem with this type of pack. A standard pyramid package of snap-harvested asparagus is difficult to differentiate from the standard pack of cut-harvested asparagus, which may increase the difficulty of obtaining a price premium for the snap-harvested product.

2.2.2.2. Consumer Packaged Snap-Harvested Michigan Asparagus

An alternative method of marketing snap-harvested asparagus is to pack the product in consumer-size packages. This package consists of a

fiberboard or plastic tray on which the asparagus spears are placed. The package is overwrapped with a plastic film.

Several major food retailers currently merchandise fresh asparagus in consumer packages. The buyers representing these firms cited reduced losses and waste resulting from consumer handling, and reduced in-store labor as being major economic advantages of consumer packaged asparagus.

By performing the consumer packaging function at shipping point, the produce shipper may reduce the cost of marketing this type of packaged product. The asparagus can be consumer packaged more efficiently at shipping point, in that the product is packed directly into the final package and thus additional handling required to repack the product at destination markets is eliminated. Further cost reductions may be possible as the facilities and labor required to consumer package the asparagus are often less expensive at shipping point locations than at the urban locations of most food retailers. Consumer packaging the asparagus at shipping point can thus offer food retailers this cost-reducing package product at a lower cost than with the current marketing method.

Additional reductions in the cost of marketing fresh Michigan asparagus in consumer packages may be achieved by the use of mechanical handling equipment. This mechanical process has been outlined in Section VIII. 5. According to the New Jersey marketing study, asparagus spears need only be longitudinally oriented in a consumer package, as opposed to the standard asparagus pack in which the spears must all be oriented in the same direction. This substantially reduces the quantity of labor required to pack fresh asparagus in consumer packages, and permits the use of mechanical handling equipment to longitudinally orient

the spears. Grading and sizing the asparagus spears can also be handled mechanically. The use of non-selective mechanical equipment to harvest asparagus for the fresh market was shown to be economically feasible when combined with the mechanical handling-packing process.

The rate of physiological deterioration and moisture loss in snap-harvested asparagus can be minimized by consumer packaging the product at shipping point. Specially designed plastic films, which modify the environment within the package, can be used to overwrap the trays of asparagus. These environmental modifications include: (1) increasing the relative humidity within the package, which reduces the rate of moisture loss, and (2) controlling the concentrations of carbon dioxide and oxygen within the package in such a way that physiological deterioration is reduced.

According to the New Jersey asparagus marketing study, consumer packaging the product allows producers to market the shorter asparagus spears as well. This method of marketing snap-harvested asparagus would thus permit Michigan producers to utilize all spears of good quality in the fresh market pack. In this way, the shorter spears need not be graded out and taken to processors, an operation which can add significant costs for the asparagus shipper.

With the consumer package, snap-harvested asparagus, Michigan shippers would be offering a unique product to midwestern produce buyers. None of the other major asparagus producing states can offer such a product in midwestern markets, as the greater perishability of the snap-harvested spears make it unfeasible to transport this type of product across substantial distances. This would give Michigan a unique product position in the market. The ability to differentiate the

all-edible Michigan product from typical cut-harvested asparagus, and to receive a price premium for the increased percentage of edible weight in the Michigan product, may be increased by this method of marketing.

The major difficulty in marketing consumer packaged asparagus is the attainment and maintenance of the 32^{o}-36^{o}F temperature range in the product. If the asparagus is not cooled to this temperature before packaging, it is difficult to lower the product temperature further after it is packaged. Another important requirement for maintaining this temperature range during distribution is for adequate circulation of cold air around the consumer packages after the product is packed in a master container and palletized. Failure to meet these two requirements in handling consumer-packaged asparagus will result in increased product deterioration, and hence a reduced market life.

Another potential difficulty in marketing asparagus in this way may be that some major fresh asparagus purchasers, such as restaurants, are accustomed to receiving this product in the bulk pack and may not accept the consumer-packaged product.

2.2.3. High Quality Product

Product freshness is probably one of the key factors in successfully marketing Michigan asparagus. This factor is extremely important to produce buyers, and is a major determinant of the level of demand for a particular product. The ability to deliver a fresher product to mid-western markets is perhaps the greatest potential advantage for Michigan asparagus shippers. Further, the lack of freshness was cited by produce buyers as being one of the main weaknesses of fresh Michigan asparagus packs at the present time.

In order to accomplish the goal of delivering a highly fresh product to midwestern markets, the following factors must be taken into consideration.

The asparagus spears need to be cooled to within a 32°-36°F range within 2-4 hours of harvest in order to maximize the market life of the product. The accomplishment of this objective requires the use of rapid cooling processes such as hydrocooling. A storage room where this 32°-36°F temperature is maintained is not sufficient, as the product will not cool to the final temperature for many hours. The requirement of rapid cooling after harvest must be met if the product is to maintain high quality during distribution, and for moisture loss to be minimized.

A sustained airflow of 32°-36°F air must circulate around the asparagus packages in order to maintain the correct temperature range in the product. It is critical that the vehicles used for transporting fresh asparagus are capable of maintaining a 32°-36°F temperature range and providing adequate air circulation in the refrigerated compartment. There exists a strong relationship between the maintenance of proper temperatures during distribution and the quality level and market life of the product at destination point. It is therefore advisable that asparagus shippers pay the necessary price to obtain high quality refrigerated trucking service. Snap-harvested asparagus is a highly perishable product; the economic value of the product can be quickly eroded if these requirements are not met. The image of the Michigan product among buyers, and hence the potential future sales, is strongly affected by the quality of the product which they receive. It is particularly important that the product be of consistently high physiological quality during the time when the market for Michigan asparagus is being developed. The

major barrier to gaining acceptance of snap-harvested asparagus among produce buyers is the fact that this product is more perishable than cut-harvested asparagus. In order to develop a strong trade preference position for Michigan asparagus, it is necessary to demonstrate to produce buyers that snap-harvested Michigan asparagus can maintain a high level of quality throughout the marketing system.

2.3. Prices for Fresh Michigan Asparagus

The purpose of this section is to estimate the price which Michigan asparagus shippers could receive for their product in the fresh market.

The price of fresh asparagus from California and Washington determines the price level for this commodity in midwestern markets during the time of the Michigan asparagus season. The average delivered price to four midwestern cities for asparagus from California and Washington was calculated in Section VII. 3. These average delivered prices can be adjusted to an f.o.b. Michigan shipping point basis by subtracting the cost of transportation from Michigan shipping points to these markets. This adjustment yields the average prices which Michigan asparagus shippers could have received, had they shipped asparagus of identical quality and trade preference position as the asparagus from California and Washington. These prices have been averaged to yield a single f.o.b. Michigan shipping point price of 60¢ per pound in 1978.

Fresh Michigan asparagus does not, however, have an equal trade preference position as asparagus from California or Washington at the time. Michigan asparagus shippers may need to price their product somewhat below the price for California and Washington asparagus in order to develop the market for their product. Pricing Michigan slightly lower than competing asparagus packs of comparable quality may allow Michigan

shippers to penetrate the midwestern market and to develop the trade acceptance of their product. As an estimate, a price reduction of five percent from the market price for asparagus from California or Washington may be sufficient to accomplish this objective.

This price reduction is based on asparagus packs which are of highly similar quality. Michigan asparagus is, however, a fundamentally different product from either California or Washington asparagus. This product is entirely edible, in contrast with cut-harvested asparagus which is 30-40 percent waste (inedible) by weight. Michigan asparagus should command a price premium on the basis of its greater proportion of edible weight per pound of product.

Buyers were unable or unwilling to estimate the price premium, if any, which snap-harvested asparagus could bring. The processor markets, however, pay a premium for all-edible asparagus, which has averaged 13.5¢ per pound during the period 1976-1987. This premium is based on the greater percentage of edible weight, and hence can be expected to increase as asparagus prices rise. A premium of at least the amount paid in the processing market can be justified for snap-harvested asparagus in the fresh market. In the New Jersey marketing study (Section VII. 5.), consumers were apparently willing to pay 28¢ per pound more for an all-edible, snap-harvested, consumer-packaged, 5 to 7 inch asparagus than for the standard, cut-harvested product. This price difference, however, is at the retail store level, and it is not clear if the New Jersey researchers have included the cost of consumer-packaging the product in the final selling price per pound quoted in that study. As an estimate of a realistic price premium which Michigan shippers may well be able to receive for their snap-harvested, all-edible

product, a price range of 17-23¢ per pound, on a raw product basis, may be reasonable.

One of the major concerns expressed by the produce buyers interviewed is the greater perishability of the snap-harvested asparagus. In the buyers' mind, there appeared to be a trade-off between the greater edible weight of the snap-harvested product and the shorter market life which can result from this greater perishability. Unless the Michigan snap-harvested product proves itself to be of top physiological quality and well able to maintain this quality during distribution, it may be reasonable to assume that produce buyers may discount the price which they are willing to pay for this product. This type of discounting could possibly greatly diminish or eliminate the price premium for the greater edible weight of the snap-harvested asparagus.

Utilizing the figures which were derived and estimated earlier, a projected price for Michigan asparagus, f.o.b. shipping point, for 1978 can be calculated. In order to arrive at this price estimate, the prices for California and Washington asparagus will be used as a base. These prices have been averaged and adjusted to an f.o.b. Michigan basis. The average of these prices for California and Washington asparagus, calculated as if this product had originated in Michigan (f.o.b. Michigan shipping point), for 1978 was 60¢ per pound. The Michigan product, however, is of higher quality in that the asparagus has 30-40 percent less waste per pound than either California or Washington asparagus. This should justify a price premium for Michigan asparagus of between 20¢ and 23¢ per pound, on a raw product basis. Since Michigan asparagus does not have a trade preference position comparable to California or Washington product, a price reduction of

5 percent is subtracted from this 60¢ price. Finally, there should be an adjustment for the greater perishability of the snap-harvested asparagus. If Michigan shippers carefully meet the post harvest handling requirements for asparagus described in Section VII. 4.3.1., and thus market a product which is of top physiological quality, a price reduction of only approximately 3 percent in the final selling price may be sufficient for this factor once the produce buyers have come to trust the quality of the Michigan product. The calculation of the f.o.b. Michigan price for a standard pyramid pack of snap-harvested asparagus from Michigan packaged and ready to market, in 1978, would be as follows:

[(Price, f.o.b. Michigan shipping point, for asparagus identical to California and Washington product) + (price premium for greater proportion of edible weight) - (5 percent reduction for lower trade preference position of Michigan asparagus) - (3 percent reduction for greater perishability) = (f.o.b. shipping point price for fresh, snap-harvested Michigan asparagus)]

In numerical terms this equation would be as follows:

[60¢ + (20¢ to 23¢) - (8 percent) = 73¢ to 76¢ per pound]

This estimated price range is for an oriented, graded, packed and cooled product, ready to ship to market.

Limited information from produce shippers in Michigan who currently handle fresh asparagus was used to derive the following estimated shippers' margins in 1978. For a standard oriented pyramid pack, the shipper margin has been between 15¢ and 20¢ above the price paid to growers for oriented, 6 to 9 inch field-run asparagus. This margin includes handling, sorting and grading, and packing labor and shrink, and the cost of the package, hydrocooling, overhead costs, and marketing

costs. To pack fresh Michigan asparagus in consumer packages, total shipper margin of 30¢ to 35¢ is estimated to be necessary to cover the additional labor and material costs of this product. The grower price for fresh market asparagus needs to include a premium of approximately 5¢ per pound over the processor price, according to these shippers, to compensate for the cost of orienting the spears, and extra handling costs.

The prices received by Michigan producers for fresh market asparagus may be, in some cases, slightly above the processing prices at the present time. When the additional cost to the grower of harvesting and handling asparagus for the fresh market are included, however, the actual returns to growers may be lower for the fresh than for the processor markets. The price estimate derived earlier, adjusted for the shipper margin of 15¢ to 20¢, yields an estimated grower price for 1978 of 55¢ to 58¢ per pound. The average processing price for Michigan asparagus in 1978 was 56¢ per pound.

There are two additional important points which the Michigan industry should consider. There exists a strong potential for substantially reducing the cost of packing asparagus for the fresh market compared to present operations. The mechanical handling equipment mentioned in Section IV. 5. could considerably reduce the labor required in packing fresh asparagus, particularly for consumer-sized packages. Further, if the volume of fresh asparagus being packed increases, there is a possibility that costs could be reduced. Materials could be purchased in larger quantities, and overhead costs per unit could be reduced.

The other consideration which is important for the Michigan asparagus industry in the future is the need to develop the fresh market

alternative in order to reduce the level of marketing risk and to aid in profitable growth for the industry in the long run. The risks inherent in relying almost exclusively on the processed asparagus markets were discussed in an earlier section. Thus, although the prices for fresh asparagus may be slightly lower than for processing asparagus at the present time, in the long run it is probably in the best interest of the Michigan asparagus industry to develop a substantial fresh market. There exists a high probability that the prices for processing asparagus will decline relative to the price of fresh asparagus in the near future.

Finally, as Michigan asparagus shippers build up a more favorable trade preference position with produce buyers, the price discount (five percent) could possibly be reduced.

2.4. Promotion

The buyers indicated that the most effective promotion of fresh Michigan asparagus would be aimed at informing wholesale produce buyers about the Michigan product. To accomplish this goal, the industry may find that the following methods may be useful. A short pamphlet which describes the Michigan asparagus deal, including seasonal information and crop outlook for the year, and which includes a list of shippers who supply fresh Michigan asparagus, could be distributed to buyers in the target market areas. This pamphlet will probably be most effective if it reaches these buyers within three to four weeks of the beginning of the Michigan asparagus season.

Another effective means of reaching produce buyers, but one which cannot be limited to a particular market area, is an advertisement in the newspaper of the produce industry, "The Packer." It is also highly

likely that the Michigan industry can persuade the editor of this newspaper to publish an article about Michigan asparagus.

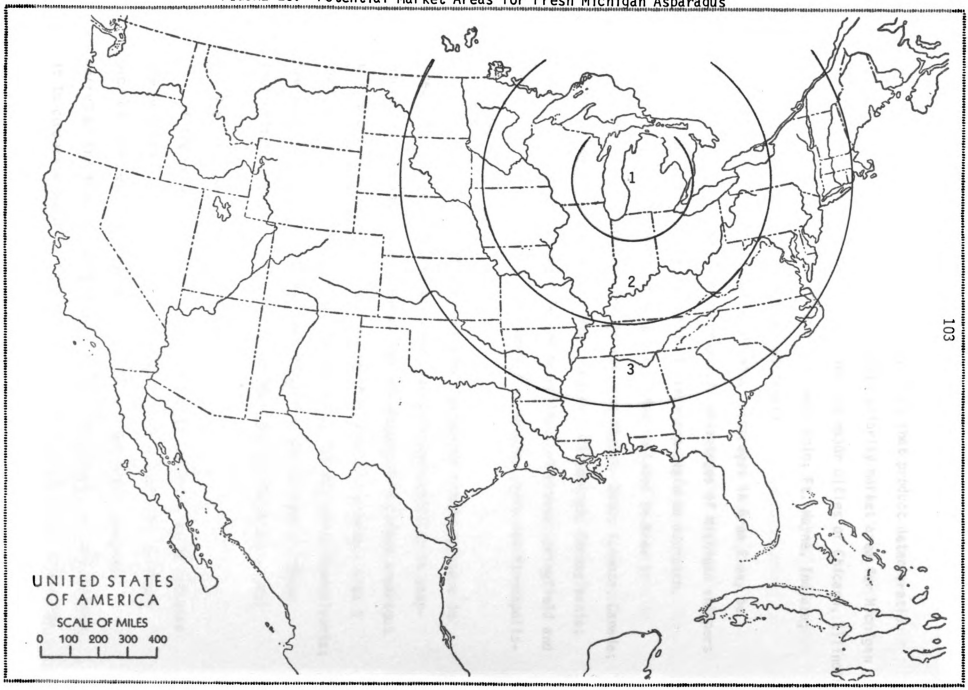
The use of a representative in the field to specifically promote fresh Michigan asparagus is probably not the most effective method of utilizing promotional resources. The costs of fielding a representative are high, in comparison with distributing pamphlets by mail and contacting selected buyers by telephone. The asparagus industry may, however, find it advantageous to maintain a fresh Michigan asparagus representative during April, May, and June. This representative could organize the annual fresh Michigan asparagus pamphlet, contact selected produce buyers to promote this product, channel inquiries from produce buyers to shippers, and gether market intelligence relative to the market performance of Michigan asparagus.

2.5. Potential Market Areas

There are two main factors which limit the market area in which Michigan asparagus could probably compete successfully in the fresh market. Michigan's major competitive advantage in the fresh asparagus market is its close geographical proximity to certain midwestern markets. The advantages of this locational position diminish as the distance between Michigan and the market increase. The market area for fresh Michigan asparagus is limited by the perishability of snap-harvested asparagus. This product probably cannot be successfully marketed if the distance from production area to market is quite long.

The areas designated "1" and "2" in the following figure represent those areas in which Michigan shippers may have the greatest potential of marketing fresh asparagus (Figure 20). In these areas, the geographical advantages of Michigan asparagus are maximized, and the

FIGURE 20. Potential Market Areas for Fresh Michigan Asparagus



distribution distance is sufficiently short that product deterioration can be minimized. Area 1 is the highest priority market area for Michigan asparagus shippers. This area includes the major cities of Chicago, Illinois; Detroit, Michigan; Windsor, Ontario; Toledo, Ohio; Ft. Wayne, Indiana; Milwaukee, Wisconsin; and Madison, Wisconsin.

The potential for marketing Michigan asparagus in Area 2 may be favorable; but in Area 2 the geographical advantages of Michigan shippers in terms of delivery time and product freshness begin to diminish. Area 2 includes, in addition to those cities included in Area 1: Cleveland, Akron, Columbus, Cincinnati, and Dayton, Ohio; Toronto, Canada; Buffalo, New York; Charleston, West Virginia; Pittsburgh, Pennsylvania; Louisville, Kentucky; Knoxville and Nashville, Tennessee; Springfield and Peoria, Illinois; St. Louis, Missouri; Des Moines, Iowa; and Minneapolis-St. Paul, Minnesota.

The potential for Michigan shippers to market fresh asparagus in Area 3 is limited mainly by the high degree of perishability in snap-harvested asparagus. The geographical advantages of Michigan asparagus will probably be much less important within this market area. Area 3 includes the major cities of Washington, D.C.; Philadelphia, Pennsylvania; New York, New York; and Boston, Massachusetts, among others. These four cities constitute very substantial markets for fresh asparagus.

2.6. Volume and Market Impact

If the objective of the Michigan asparagus industry is to increase the proportion of their annual production which is marketed as fresh product, this will have an impact on the national fresh asparagus market at the time of the Michigan season. The purpose of this section is to compare a possible increased volume of fresh asparagus production

from Michigan with the size of the fresh asparagus market at the present time, in order to estimate the extent of the marketing effort which may be required to accomplish this objective.

Annual asparagus production in Michigan averaged 19.8 million pounds during the period 1975-78. Of this total, an average of 8 percent, or 1.5 million pounds, was marketed as fresh. An estimated average of 38 percent of Michigan's fresh production was utilized by roadside stands, u-pick, and similar markets.[1] Thus, approximately .98 million pounds of Michigan fresh asparagus, on the average, has been marketed through the standard wholesale channels for fresh produce. (The volume marketed via roadside stands and similar markets will not be included in this analysis, as this volume is considered as local supplies and is not included accurately in the USDA data which will be used to estimate the size of the fresh asparagus market.)

For purposes of example, an annual production figure for Michigan asparagus of 20 million pounds will be used. Since approximately five percent of Michigan's annual asparagus production is marketed through the standard fresh produce channels, approximately one million pounds of Michigan asparagus enters the national fresh market during May and June. To increase the proportion of the Michigan asparagus crop marketed through these channels from 5 to 10 percent would mean marketing an additional 1 million pounds of product. Thus, each increase of 5 percent would place another 1 million pounds of fresh Michigan asparagus on the market during this two-month period.

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[1]Michigan Department of Agriculture, Michigan Asparagus Survey, Crop Reporting Service, 1977.

The current size of the fresh asparagus market in the midwestern region[1] during May and June can be estimated as follows. The total annual volume of fresh asparagus unloaded in the midwestern region, reported by the USDA (Table 9, this report), averaged 10.2 million pounds for 1975-77. This unload data, however, accounts for only approximately 73 percent of the total reported shipments of fresh asparagus in the U.S. (Tables 8 and 9). Adjusting the midwestern total to compensate for this data omission, the total annual asparagus market in this region is estimated to be approximately 14 million pounds. An estimated 19 percent of this total volume is marketed during May and June (Figure 3, this report), for an estimated fresh asparagus market volume of 2.66 million pounds in the midwestern region during these two months. This figure, however, does not include, due to statistical omission, the full volume of fresh Michigan asparagus which is marketed through the standard wholesale produce channels. A total midwestern region market volume of approximately 3.4 million pounds during May and June is probably a more realistic estimate.

Thus, each 5 percent increase in the proportion of Michigan's asparagus production which is marketed through the standard fresh produce channels will place an additional 1 million pounds of fresh asparagus, or approximately 29 percent of the current market volume, on the midwestern market during May and June.

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[1]Includes the market areas served by the following cities: Chicago, Illinois; Cincinnati, Ohio; Cleveland, Ohio; Detroit, Michigan; Indianapolis, Indiana; Kansas City, Missouri; Louisville, Kentucky; Milwaukee, Wisconsin; Minneapolis-St. Paul, Minnesota; St. Louis, Missouri.

There are several other considerations which have a bearing on the ability of Michigan shippers to market increased volumes of fresh asparagus. One is that Michigan shippers may possibly be able to market fresh asparagus in the eastern region of the U.S.[1] Using the same data sources as for the midwest, the current volume of fresh asparagus marketed during May and June in the eastern region is estimated to be 5.8 million pounds. Thus, if Michigan shippers could penetrate the eastern market region, an increase of 5 percent in production marketed fresh would amount to approximately 10 percent of the current market volume in the combined eastern and midwest regions.

Another consideration is that New Jersey, which in the past supplied a substantial quantity of fresh asparagus to the national fresh market during May and June, has greatly reduced fresh asparagus production in recent years. This suggests that there may be a good possibility to expand the market for fresh asparagus in the eastern and midwestern regions during May and June.

An increase in fresh asparagus supplies on the order of five percent of Michigan's production would amount to a substantial increase in the quantity of this commodity supplied to the fresh market during May and June, in the midwestern or eastern market regions. Thus, a major marketing effort is probably required in order for the Michigan asparagus industry to substantially increase fresh asparagus production.

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[1] Includes the market areas serviced by the cities of: Albany, New York; Baltimore, Maryland; Boston, Massachusetts; Buffalo, New York; New York-Newark, New Jersey; Philadelphia, Pennsylvania; Pittsburgh, Pennsylvania; Providence, Rhode Island.

CHAPTER VI.

SUMMARY

The U.S. asparagus market situation is undergoing several substantial changes which could have a major economic impact on the Michigan asparagus industry in the future. Asparagus consumption in the U.S. has declined dramatically in the past decade. The consumption of processed asparagus has decreased at a significantly more rapid rate than has the consumption of fresh asparagus. Total U.S. consumption of processed (canned and frozen) asparagus declined by 40 million pounds (23 percent) between 1965-67 and the average for 1975-77. Total consumption of fresh asparagus in the U.S. declined by only four million pounds (four percent) during this same period.

U.S. asparagus supplies have decreased dramatically in the last 15 years. Total U.S. asparagus production decreased by 44 percent between 1963 and 1978. This decline is due mainly to reduced asparagus production in California, where production has declined by approximately 93 million pounds in the past 15 years, and in New Jersey, where production declined by 67 million pounds during this time. As a result of this rapid contraction in available supplies, the price of asparagus has increased substantially.

The demand for asparagus in the U.S. has declined in the past 15 years. Initiated by high consumer prices for asparagus which caused consumers to decrease the quantity of asparagus demanded, basic

consumer tastes and preferences have shifted away from asparagus. As asparagus prices remained high over a period of years, consumers have switched purchasing patterns from asparagus to alternative food products. Over time, this has brought about a decline in consumers' preference for asparagus.

Also, due to the high consumer prices for asparagus, it is believed that the market segment of consumers who purchase asparagus has diminished, and those who continue to purchase asparagus have a highly price-inelastic preference function for the product.

These trends which are effecting a decline in consumer demand for asparagus are difficult to reverse if the asparagus industry needs to re-expand demand in the future. There are substantial barriers to re-expanding the demand for processed asparagus. Processed asparagus has become a minor item for food retailers and national brand food processors, and thus is unlikely to receive sufficient promotional support to reverse the declining demand trend. Because of these factors, it appears that the demand for processed asparagus will continue to decline in the future.

Current high grower prices do not indicate that there is a strong demand for asparagus. The strong market prices for asparagus in recent years are due to supplies declining more rapidly than the level of demand for asparagus.

U.S. asparagus production could well increase in the near future. A superior new asparagus variety has been developed in California which, according to industry sources in that state, is likely to lead to substantially greater yields per acre and to increases in the asparagus acreage of that state. Washington asparagus production is also likely

to increase in the near future, according to industry sources. The profitability of some key alternative crops in that region are declining, providing an incentive for producers to increase asparagus acreage. These two states currently account for 80 percent of total U.S. asparagus production.

There is a high probability that the U.S. asparagus market, particularly for processed asparagus, will weaken in the future. Since the demand for asparagus has declined and become more price-inelastic, and demand cannot be readily expanded, if supplies increase, the expected effect will be a substantial decline in asparagus prices. Further, the factors which have led to the decline in the demand for asparagus are continuing to decrease consumer demand.

The fresh asparagus market has remained fairly stable in terms of total quantity consumed in the U.S. The demand for fresh asparagus is also believed to be more readily expandable, in a shorter time period, than is the demand for processed asparagus.

The high degree of reliance on the processing markets poses a substantial marketing risk for the Michigan asparagus industry. The Michigan industry currently lacks a substantial fresh market alternative capable of absorbing substantial supplies of asparagus from that state. It appears that it would be desirable for the Michigan asparagus industry to develop this fresh market alternative in order to reduce future marketing risks and to aid in securing profitable, long run growth for the industry.

It appears that Michigan asparagus shippers have a potential to offer a competitive fresh product to midwestern markets at a time of the year when fresh asparagus is in short supply nationally. Supplies of fresh

asparagus to U.S. markets reach peak volumes during March and April, and supplies decline rapidly after the last of April. Weekly supplies of fresh asparagus in U.S. markets during May are, on the average, only 48 percent of the weekly volume available in April. According to industry sources and implied by price statistics, there appears to be a strong demand for additional supplies of fresh asparagus in the U.S. market during the time of the Michigan asparagus season in May and June. New Jersey, which previously had been one of the major sources of supplies during this period, has reduced asparagus production drastically, providing some apparent opportunities for Michigan.

Michigan's close geographical proximity to several major market areas in the midwest provides Michigan shippers the advantage of low transportation costs, short delivery time, and the potential for delivering a fresher product than competing regions. The potential for marketing partial truckload quantities of asparagus mixed with fresh apples is an additional advantage. Thus, Michigan asparagus shippers have important potential advantages in marketing fresh asparagus.

At the present time, however, Michigan asparagus has a limited position in the national fresh market. The market share and trade preference position held by the Michigan product are substantially lower than those of the major competing states. Since the Michigan asparagus season is relatively short and occurs during the last six weeks of a six-month fresh asparagus season, this is a disadvantage for Michigan shippers.

The fresh asparagus market during the Michigan asparagus season (May and June) is fairly limited in size. An increase in the proportion of the Michigan asparagus crop marketed as fresh product could

substantially increase the total supplies of asparagus available in the fresh market.

It appears that a major marketing effort will be required in order to market a substantially larger quantity of fresh Michigan asparagus. The major points of this marketing effort are: (1) achievement of a fresh pack which is of high physiological quality, meaning properly handled, cooled, graded and packaged; (2) pricing Michigan asparagus somewhat below competing asparagus initially, to establish the product in the market; (3) promotional effort directed at produce buyers, not at consumers; (4) differentiating Michigan's snap-harvested, all-edible product from California, Washington, and New Jersey asparagus which is 30-40 percent waste. For reasons of both product differentiation and to reduce the product deterioration of snap-harvested asparagus, the Michigan industry may find it advantageous to market their asparagus in consumer packages.

The price which Michigan asparagus producers could currently receive for fresh asparagus may be somewhat lower than the price for processing asparagus. However, the fresh asparagus price could potentially increase relative to the processor price which certainly changes. The use of mechanical handling equipment to pack fresh asparagus could reduce the cost of marketing the fresh product, and therby increase the grower price. Also, the processor price will probably decline relative to the fresh asparagus price in the near future due to a weakening of the processed asparagus market.

Despite potentially lower prices for fresh asparagus than for processing asparagus at the present time, the Michigan industry may find it desirable to channel an increased quantity of asparagus into the

fresh market. The development of the fresh asparagus market, so that the Michigan industry has a viable alternative to the processing market, would in the long run reduce the marketing risks for the industry in the future.

APPENDICES

TABLE 8. Michigan Asparagus Production, 1965-1978

Period	Acreage Harvested	Production		Utilization		Average return to growers	
		Value	Quantity	Fresh market	Processing	Fresh market	Processing
	1,000 acres	1,000 dollars	Million pounds	Million pounds	Million pounds	Cents per pound	Cents per pound
5-year average:							
1945-49	4.1	1,145	12.6	2.4	10.2	13.7	8.0
1950-54	7.5	1,883	14.3	2.1	12.2	15.4	12.8
1955-59	9.7	2,020	15.8	2.1	13.7	15.8	12.5
1960-64	11.0	2,326	16.4	1.4	15.0	15.7	14.0
1965-69	11.6	3,511	18.7	1.5	17.3	20.2	18.6
1970-74	14.6	6,067	22.1	1.5	20.7	30.9	26.7
Annual:							
1965	11.2	3,107	19.0	1.4	17.6	18.3	16.2
1966	11.4	2,852	17.1	1.4	15.7	21.5	16.3
1967	11.5	3,689	19.6	1.6	18.0	20.2	18.7
1968	11.7	3,625	17.6	1.5	16.1	20.5	20.6
1969	12.0	4,284	20.4	1.4	19.0	21.0	21.0
1970	12.4	4,164	19.8	1.6	18.2	24.8	20.7
1971	13.5	4,570	18.9	1.1	17.8	27.1	24.0
1972	14.5	5,892	21.8	1.5	20.3	28.7	26.9
1973	15.4	7,117	24.6	1.7	22.9	33.4	28.6
1974	17.0	8,593	25.5	1.4	24.1	40.6	33.3
1975	17.8	4,772	19.6	2.1	17.5	28.9	23.8
1976	18.0	5,934	18.0	2.0	16.0	38.7	32.2
1977	17.3	8,345	19.0	1.3	17.7	51.0	43.4
1978	17.3	12,660	22.5	1.5	21.0	60.0	56.0

Source: U.S.D.A., Annual Vegetable Summary.

Appendix B

U.S. Wholesale Price Indexes for Canned Asparagus and Other Commodities, 1960-1975

(1967 = 100.0)

Period	All processed fruits and vegetables	Canned vegetables and juices	Canned asparagus[1]
1960	92.8	82.0	82.4
1961	94.9	85.6	83.7
1962	91.4	83.3	84.3
1963	96.9	80.3	85.7
1964	97.8	80.5	83.6
1965	95.2	86.2	85.7
1966	97.8	92.2	91.4
1967	100.0	100.0	100.0
1968	106.5	101.3	105.8
1969	108.1	100.5	106.7
1970	110.6	105.1	110.8
1971	114.3	107.8	124.4
1972	119.7	110.7	135.7
1973	129.6	117.9	149.6
1974	154.6	142.2	165.8
1975	170.1	163.9	155.9

[1]The specification for canned asparagus is "Asparagus, all green, cut spears, mixed sizes, fancy, No. 300 can; canner to wholesaler or chain store, f.o.b. cannery."

Source: Compiled by the U.S. International Trade Commission from official statistics of the Bureau of Labor Statistics, U.S. Department of Labor.

Appendix C

U.S. Consumer Price Indexes for Fresh Asparagus and Other Commodities, 1960-1975

(1967 = 100.0)

Year	All fruits and vegetables	All processed fruits and vegetables	All fresh fruits and vegetables	Fresh asparagus[1]
1960	88.3	92.9	84.6	2/
1961	88.7	96.7	83.3	2/
1962	89.4	94.0	85.5	2/
1963	94.5	99.2	90.6	2/
1964	98.1	101.5	95.9	74.9
1965	98.0	98.3	97.9	89.1
1966	100.1	100.6	99.7	103.7
1967	100.0	100.0	100.0	100.0
1968	107.9	105.6	109.4	109.3
1969	109.3	106.5	111.1	121.7
1970	113.4	109.2	116.3	122.9
1971	119.1	116.2	121.0	131.0
1972	125.0	120.5	128.0	141.8
1973	142.5	130.2	150.8	155.0
1974	165.8	170.6	162.6	152.1
1975	171.8	176.6	168.6	183.8

[1]Priced only in season (March - July).

[2]Not available.

Source: Compiled by the U.S. International Trade Commission from official statistics of the Bureau of Labor Statistics, U.S. Department of Labor.

Appendix D

Buyers Interviewed

The produce buyers which represent the following firms were interviewed for this study:

Chicago, Illinois: Jewel Foods, Dominick's, LaMantia, E.L. Kemp.

Detroit, Michigan: Allied Markets (Great Scott), Chatham's, Harry Becker Produce, Ciarmitaro Produce, Schwartz Produce, A & P.

Cleveland, Ohio: Pick and Pay, Fisher Foods.

St. Louis, Missouri: Associated Grocers, C.H. Robinson Co.

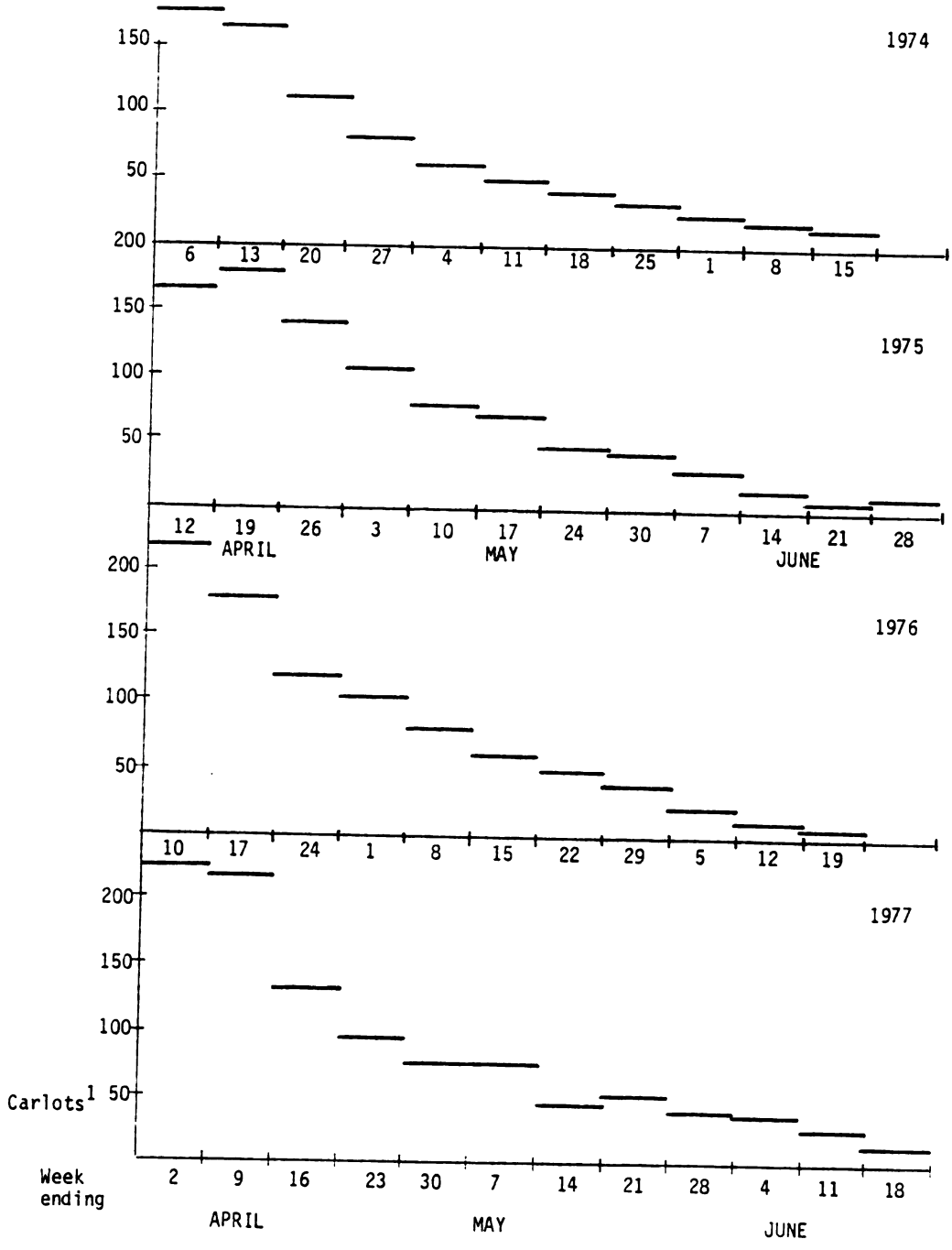
Kansas City, Missouri: Safeway Stores, Associated Grocers.

Minneapolis-St. Paul, Minnesota: Applebalm's, Red Owl, Super Value, H. Brooks Produce.

Grand Rapids, Michigan: Spartan Stores, Meijers.

Appendix E

California Fresh Asparagus Shipments, by Weeks



[1] 1 carlot = 32,000 lbs.

Source: Fed-State Market News, Annual California Asparagus Summary.

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