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# The U.S. Processed Strawberry Market: An Analysis of Trends and Commodity Characteristics as They Impact on Oregon



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# Abstract

The composition of the U.S. processed strawberry market has changed, but its size has not. California, Oregon, Washington, and Mexico are the major areas of production, accounting for more than 90 percent of the U.S. supply. In 1966 these areas produced about equally, with Oregon and Mexico holding a slightly higher market share. By 1982 California had captured 70 percent of the market, while Oregon maintained a market share of only 17 percent. California growers have made this progress through aggressive varietal research programs resulting in an extended harvest season, yields of 28 tons per acre, and a crop which can be sold as two commodities: fresh and frozen berries.

Consumption trends are flat and unresponsive to price changes. Production is highly cyclical and tends to be over-responsive to price. The result is that inventories are used as a buffer to reduce upward price pressure in seasons of undersupply, and to capture price advantages in seasons of oversupply.

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# The U.S. Processed Strawberry Market: An Analysis of Trends and Commodity Characteristics as They Impact on Oregon

Harland Padfield and Helen Thaler

## I. Introduction

The data for this article were gathered originally to address the issue of equity in the distribution of the burdens of achieving national social goals—specifically child labor prohibitions as they affect Oregon strawberry producers in comparison to California and U.S.-Mexican producers. The immediate problem was the decline of the Oregon processed strawberry economy and the possible negative effects of 1974 amendments to the Fair Labor Standards Act which removed agriculture exemption from the Child Labor Provisions, effectively prohibiting the use, or presence in the fields, of people younger than 12.

There is a coincidence of the largest annual percentage drop (20 percent) in acreage since 1957 with the enactment of child labor laws. Most strawberry growers cite labor regulations as the prime cause of decisions to reduce strawberry acreage (Padfield, Smith, and Thaler, 1983: pp. 193-198). Although there have been modest increases in aggregate acreage and production during each of the last 3 years, Oregon strawberry farming had been steadily declining for the previous 21 years. Acreage had declined from a high of 18,500 acres in 1957 to a low of 5,000 acres in 1978. Aggregate production had declined from 100 million pounds in 1964 to 34 million pounds in 1978. Although 1982 acreage was up to about 6,000 acres and production up to about 58 million pounds, there is a long way to go to regain previous levels.

Oregon also has a long way to go to regain previous shares of the U.S. market. Oregon's share of the U.S. processed strawberry market has declined dramatically since the 1960s with the gap taken up first by Mexico, then by California, whose producers accounted for 70 percent of the U.S. market in 1982 as compared to 39 percent in 1974. Clearly, regulatory legislation and Oregon's strawberry economic problems in general must be evaluated in a macro economic context. This means that to evaluate possible disproportionate effects which national labor standards or any other factors may be having on Oregon's producers, it is necessary to investi-

gate the strawberry industries of its competitors, Mexico and California.

In the process of gathering information on Mexico and, especially, California, it became increasingly reasonable to make the case that the loss of Oregon's dominance of the U.S. processed strawberry economy has been caused by factors which are as important as, if not more important than, the differential regional costs of labor regulations. Regarding the issue of child labor prohibitions, there are data, both internal and external to Oregon, that indicate that this issue is becoming increasingly less important economically despite the issue remaining highly politicized. In Oregon, data collected by the researchers during the 1983 harvest (Appendix 2) indicate there has been an increase in the supply of workers. One source of the increase has been a high rate of local unemployment. Another major source has been an influx of Vietnamese and undocumented immigrants. There are also data which indicate a relaxation of prohibitions on children in family crews (drive-outs).

Outside Oregon, data collected by Alan Haight (Appendix 2) on the California strawberry industry indicated that sharecropping, which is a form of surrogate ownership making the sharecropper's use of his "family" not subject to labor regulations, was not of sufficient magnitude to be a factor in inter-regional competition. Furthermore, his data indicated that California's labor benefits and costs are generally higher, not lower, than Oregon's. Haight's data, in combination with the data we have obtained independently, indicate that the continuous expansion of the California strawberry supply in the U.S. processed market can be attributed to aggressive innovation in three areas: 1) long-range objectives and strategies for the research and development of new plant varieties, 2) concepts and mechanisms for coherent management of the industry within the state context, and 3) labor management or personnel practices. In all of these factors or inputs, California has accumulated decisive advantages in the

U.S. market for processed, as well as fresh, strawberries in the last 15 years.

We are conducting an in-depth study of the history, sociology, and economic significance of these components of the California strawberry economy from the

viewpoint of Mexico and Oregon. Basic to this study, however, is an analysis of the U.S. processed strawberry market and the dominant trends over the last 15 to 18 years in terms of what these trends tell us about Oregon's position and the commodity itself.

## II. Characteristics of the U.S. Market

The U.S. processed strawberry market receives inputs from producing areas on both sides of our nation's borders. Within the United States, Oregon, California, and Washington produced 98 percent of the strawberries that were processed in 1982. Mexico is by far the most prominent supplier of imported strawberries for processing, providing 75 percent of the strawberries imported in 1982. The quantity imported from other countries was 9.7 million pounds and represents only 2.9 percent of the entire U.S. market (PSAB, 1983a; OSU/CES, 1971-1983; USDA/FAS, ND).

Taking into account all sources of strawberries for processing which are marketed in the United States, Oregon, California, Washington, and Mexico comprise more than 90 percent of this market (Table 1). For this reason, we have confined our analysis to these major producing areas. Hereafter, the term "U.S. processed strawberry market" will be defined as the total quantity of strawberries produced and processed in Oregon, California, Washington, and Mexico and marketed for sale to U.S. consumers.

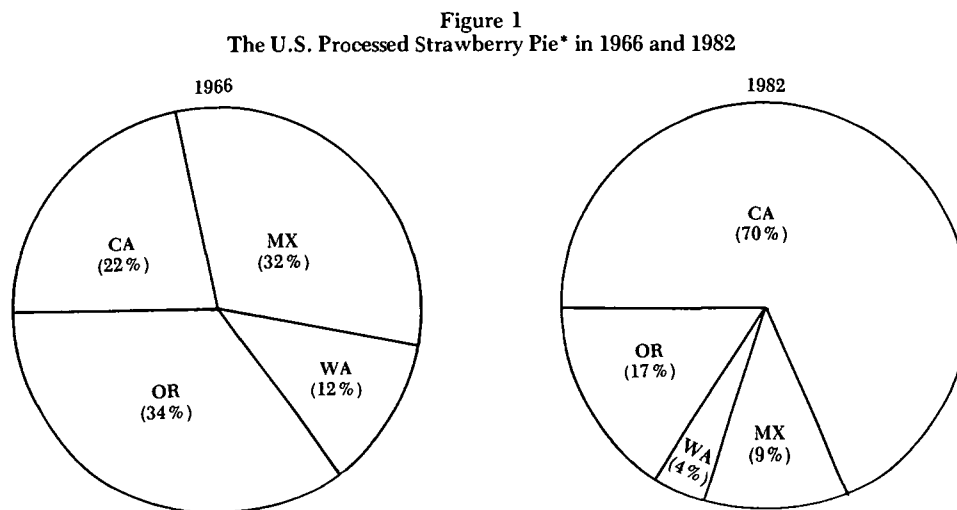
Our analysis indicated that major shifts in market share and production technologies have occurred since 1966. For the most part, the 1966-1982 period will be considered the relevant range.

Table 1. Composition of U.S. Processed Strawberry Market

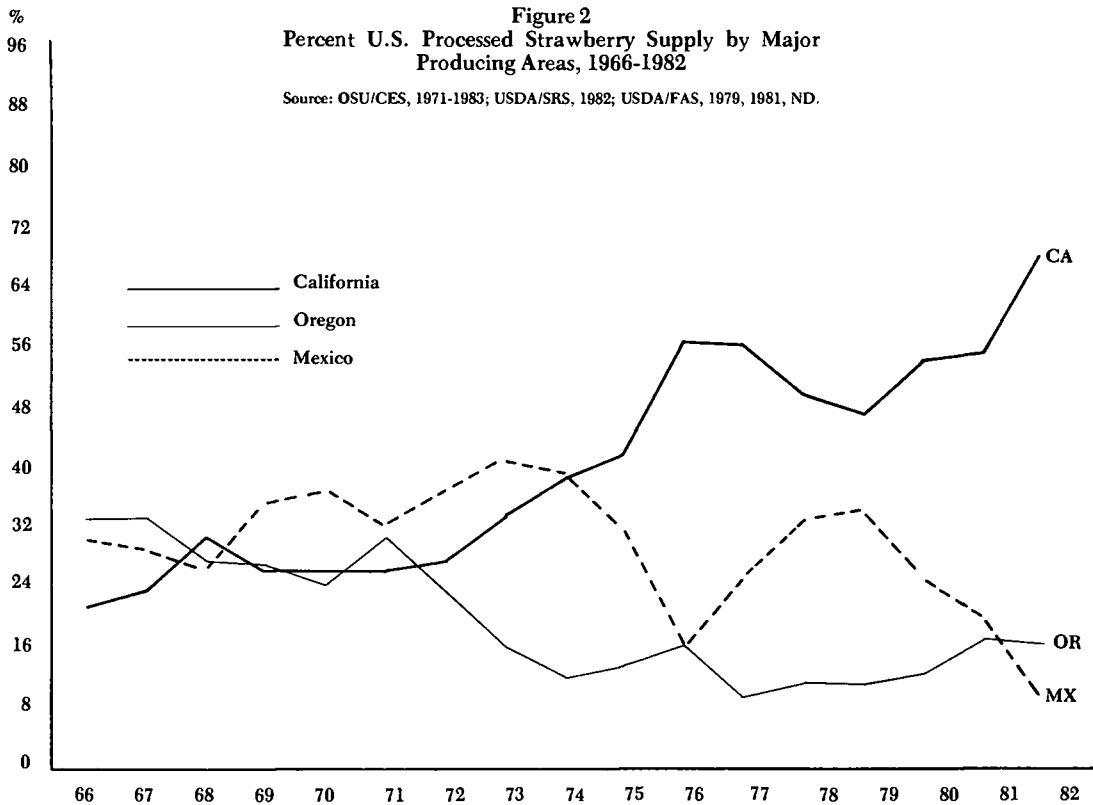
Region	1966		1982	
	Million lbs.	Percent	Million lbs.	Percent
Oregon	93.0	31.6	53.3	16.0
California	59.6	20.2	222.3	66.8
Washington	33.9	11.5	13.4	4.0
Mexico	82.8	28.2	29.9	9.0
Other	25.1	8.5	14.0	4.2
Total U.S. Market	294.4	100.0	332.9	100.0
Oregon, California, Washington, and Mexico	269.3	91.5	318.9	95.8
Other	25.1	8.5	14.0	4.2
Total U.S. Market	294.4	100.0	332.9	100.0

Source: OSU/CES, 1971, 1976; USDA/FAS, ND; PSAB, 1983a.

Since 1966, the U.S. market has changed from one composed of three major areas and one minor area of production to a market composed of three minor and one major producing areas (Figure 1).



\*Based upon the sum of the Oregon, Washington, California, and Mexican supplies as exhibited in Table 1.



In 1966, Oregon produced 34 percent of strawberries used for processing in the United States, California produced 22 percent, Mexico produced 32 percent, and Washington produced 12 percent. By 1982, this situation had changed drastically. California now dominates the market, producing 70 percent of the strawberries used for processing. Oregon's share has dropped to 17 percent, and Mexico and Washington's share now comprises 13 percent of the market (Figures 1 and 2).

A year-by-year analysis (Figure 2) since 1966 suggests a relationship between Mexico's and Oregon's peaks and troughs. Mexico is clearly much more erratic than Oregon and both are more erratic than California.<sup>1</sup> The California pattern is to rise and level off rather than to rise and fall; its overall tendency is to achieve an increasing net gain as opposed to Mexico's and Oregon's increasing net losses.

Although, on balance, the aggregate production and consumption of processed strawberries have increased since 1966, the increases amount to less than 1 percent per year (Appendix 1, Table A-1). Per capita consumption trends, on the other hand, are basically constant. In fact, current per capita consumption is off about 2 percent from 1966 levels (Table 2).

<sup>1</sup>The reasons for these dramatic differences in supply behavior beg explanation. Although we could offer a tentative explanation now, we feel it is best to delay this exercise until our structural analysis of these three industries is complete.

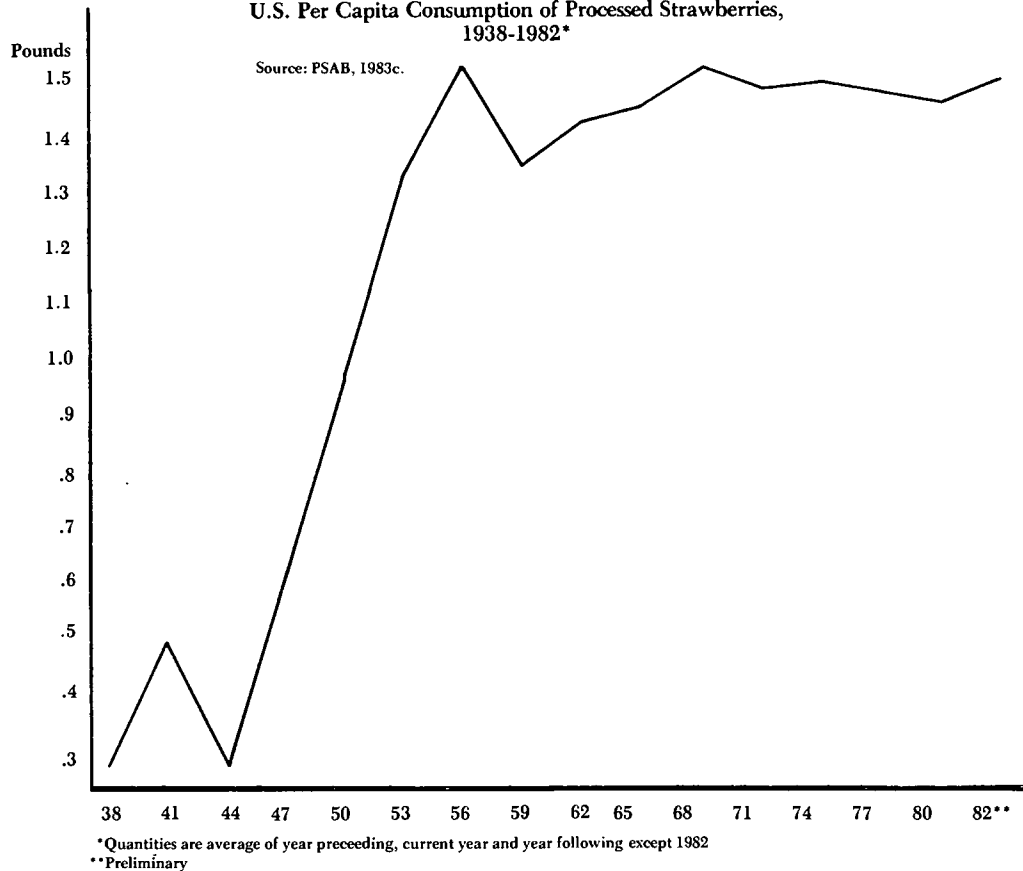
**Table 2. United States Per Capita Consumption of Processed Strawberries (1966-1982)**

Year	Pounds	Percent Change from 1966
1966	1.49	
1967	1.53	+ 2.7
1968	1.43	- 4.0
1969	1.47	- 1.3
1970	1.48	- 0.6
1971	1.45	- 2.7
1972	1.41	- 5.4
1973	1.43	- 4.0
1974	1.44	- 3.4
1975	1.52	+ 2.0
1976	1.42	- 4.7
1977	1.41	- 5.4
1978	1.49	0.0
1979	1.50	+ 0.6
1980	1.37	- 8.0
1981	1.41	- 5.4
1982	1.46*	- 2.0

\*Preliminary  
Source: PSAB, 1983c.

A time frame of per capita consumption from 1938 (Figure 3), however, shows a dramatic increase from an all-time low in 1944 to an all-time high in 1956. World War II production priorities, the abrupt imprisonment and release of farm-occupied Japanese who constituted the majority of strawberry growers in California in 1941 (Wells 1981: p. 686), and rapid develop-

Figure 3  
U.S. Per Capita Consumption of Processed Strawberries,  
1938-1982\*



ment and adoption of postwar food processing technologies are factors in the anomaly. The important point here is that the per capita consumption trend for the last 15 years is flat, suggesting that demand is inelastic and that, beyond modest population growth, the market is stagnant.

Market stagnation and inelasticity of demand for processed strawberries are also indicated by the fact that in addition to production and consumption increasing only slightly since 1966, fluctuations in consumption are of a substantially lesser magnitude than fluctuations in either production or inventory levels. This demonstrates that consumption is less responsive to changes in price, or other inducements, which is an indicator of inelasticity. (For a more intensive discussion of this see Appendix 1.)

## Price Data

Price data at the farm level were analyzed with respect to trends, production and inventory level responses, and regional differences. Retail prices<sup>2</sup> were examined with respect to consumption and inventory level responses, and their relationship to farm prices.

<sup>2</sup>Calculated as 12-month average and adjusted for regional differences in market share.

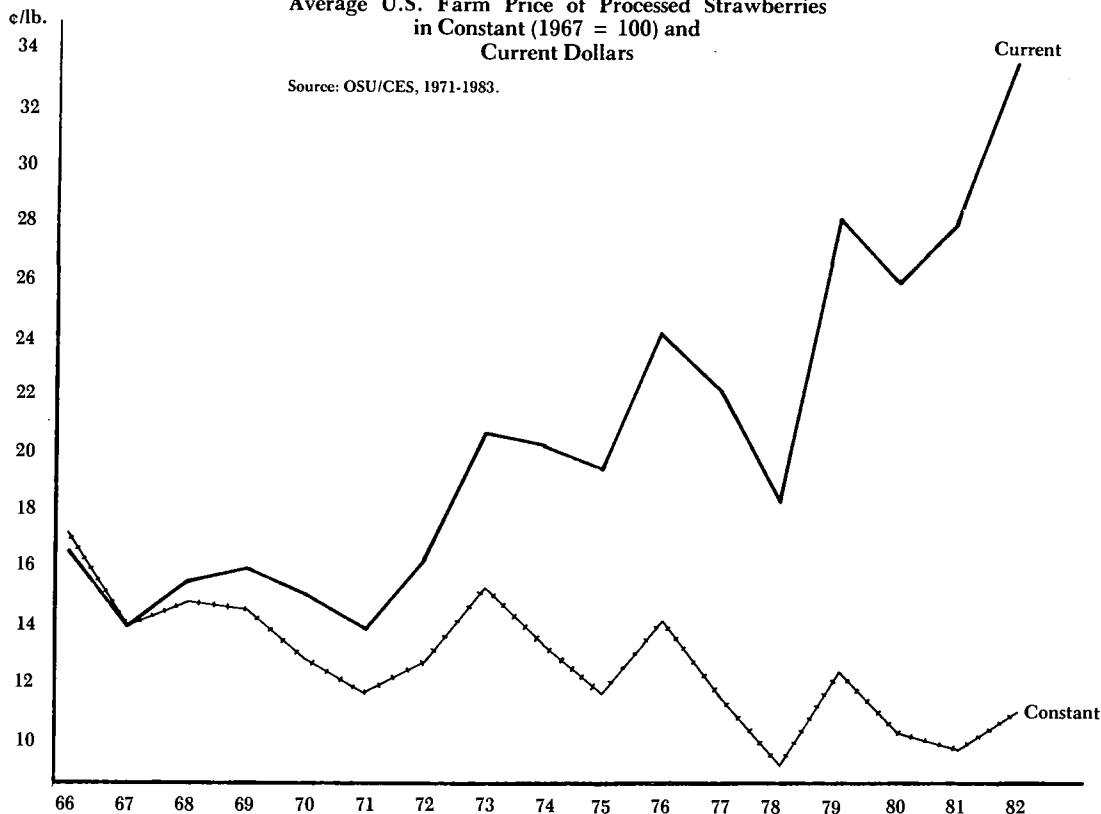
Overall, since 1966 the average U.S. price paid to the farmer for strawberries for processing has increased more than 100 percent on a current (not adjusted for inflation) dollar basis, from 16.5 to 34 cents per pound. However, when taking into account the inflationary trends which have occurred in the last 16 years, the actual price, based on Bureau of Labor Statistics Consumer Price Index, has declined 33 percent, from 17.4 to 11.7 cents per pound in constant (1967 = 100), as shown in Figure 4. This clear downward trend in price makes the absence of change in consumption trends, and California's increased share of what market does exist, even more significant for Oregon growers.

Considering regional differences, Oregon growers have consistently received a higher price for their berries, an advantage that does not appear to be diminishing. From 1966-1972 the average price differential (without adjusting for inflation) was less than 1 cent per pound, whereas the differential from 1973-1982 was slightly higher than 7 cents per pound (OSU/CES, 1971-1983).

Taking into account the price differential, increases in strawberry yields, and decreases in real prices, the value of an acre of Oregon strawberries was approximately 12 percent greater in 1982 than in 1966. However, when the increases in the real prices (costs) of farm inputs like land, capital, and energy are considered, this 12 percent increase in value is probably not realized at the farm level.



Figure 4  
Average U.S. Farm Price of Processed Strawberries  
in Constant (1967 = 100) and  
Current Dollars



Retail prices are based on the 30-pound tin of sliced-frozen berries as this product represents approximately 60 percent of all processed berries marketed.

Price fluctuates throughout the year and usually peaks from November to January, depending on inventory levels and region. Fluctuations from 1972-1982 ranged from 5 percent to 62 percent with an average of 20 percent difference between the low and high price each year (AIFD, 1974-1983).

Again, prices in the Northwest tend to exceed those received in California, although the difference is not as great as at the farm level. Northwest processors received an average of 2.7 cents per pound more from 1973-1982 compared to 7.1 cents per pound at the farm level (AIFD, 1974-1983; OSU/CES, 1978-1983).

Overall, the average retail price of strawberries, in current dollars, has increased 164 percent since 1972 from 25.6 to 67.5 cents per pound. Adjusting for inflation, per pound prices have remained about constant with modest (15 percent) increases from 20.4 cents in 1972 to 23.4 cents in 1982 (AIFD, 1974-1983). Increases in other input costs such as labor, capital, and energy have driven up the price at which strawberries are offered to food manufacturers. Because of the distribution structure of the industry and because of the storability of strawberries once they are frozen, retail prices have managed to keep pace with inflation whereas farm prices have not.

## Strawberry Supply Behavior

The difference in market share distribution since 1966 is a result of changes in both the amount of land used for strawberry production and the intensity of use of that land, i.e., acreage and yields. Reflecting the stark reality of stagnant consumer demand and increasing competition in the form of yield-increasing varieties, total acres of strawberries for processing have decreased 32.7 percent from a high of 41,800 acres in 1967 to 28,100 acres in 1982. Of the four major producing areas, only California has increased its strawberry acreage. Oregon's acreage has decreased 52 percent from 12,500 to 6,000 acres in 1982; acreage of strawberries for both the fresh and processed market in Mexico has decreased from 15,000 in 1966 to 7,900 in 1982, a drop of 47 percent (Figure 5).

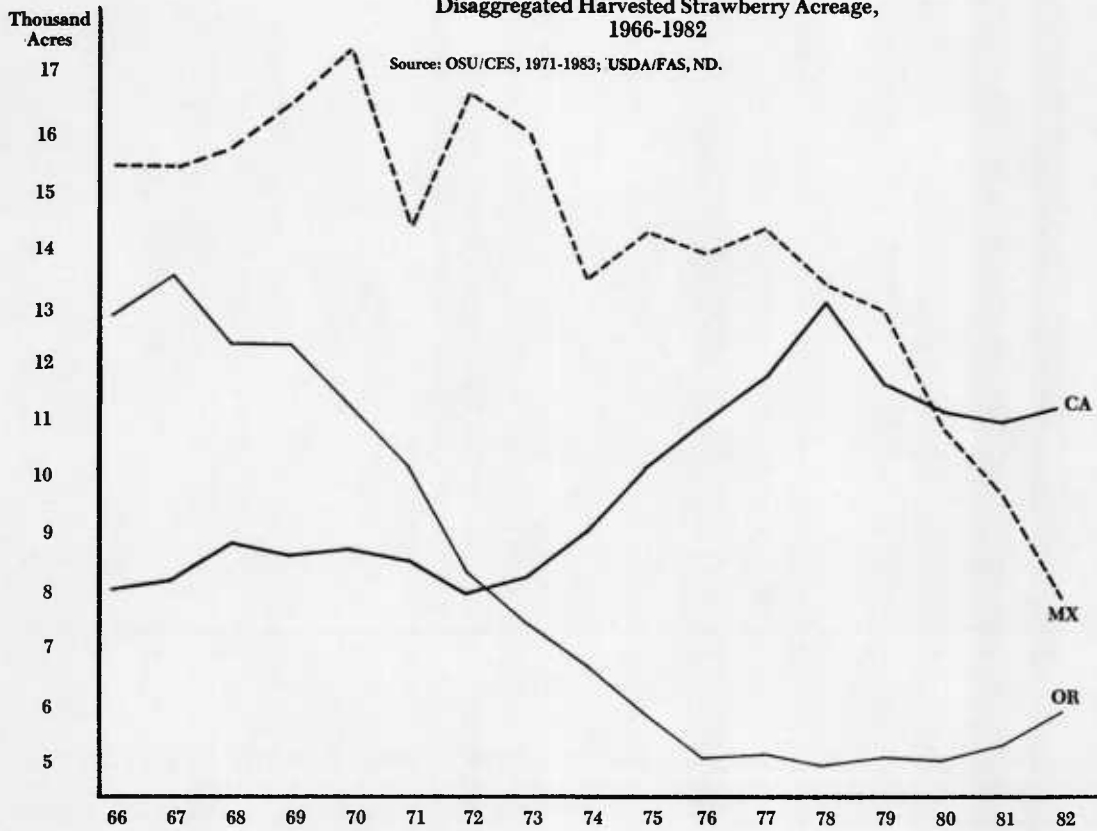
Dramatic increases in yields have occurred since 1966, particularly in California. This has been made possible by plant research aimed at developing strawberry varieties which bear more fruit for an extended period and improved cultural practices. In 1982, yields in California were 27.5 tons per acre compared to 5 tons in Oregon, while Mexico's yields decreased to 5.5 tons (Figure 6).

Thus, not only has California's acreage increased in the face of stagnant demand for processed strawberries, but its yield increase is more than two times the yield increase achieved in Oregon. This combination of yield

and acreage increases creates a formidable supply capability which is reflected in the rise of the California input into the processed market from 60 to 222 million pounds (Table 1 and Figure 7).

Combining yield increases of greater than 130 percent, acreage increases of 44 percent, and a slightly larger percent of the entire California strawberry crop being sold in the processed market, the total quantity

**Figure 5**  
Disaggregated Harvested Strawberry Acreage,  
1966-1982



**Figure 6**  
Strawberry Yields 1966 and 1982—Oregon, Mexico,  
and California

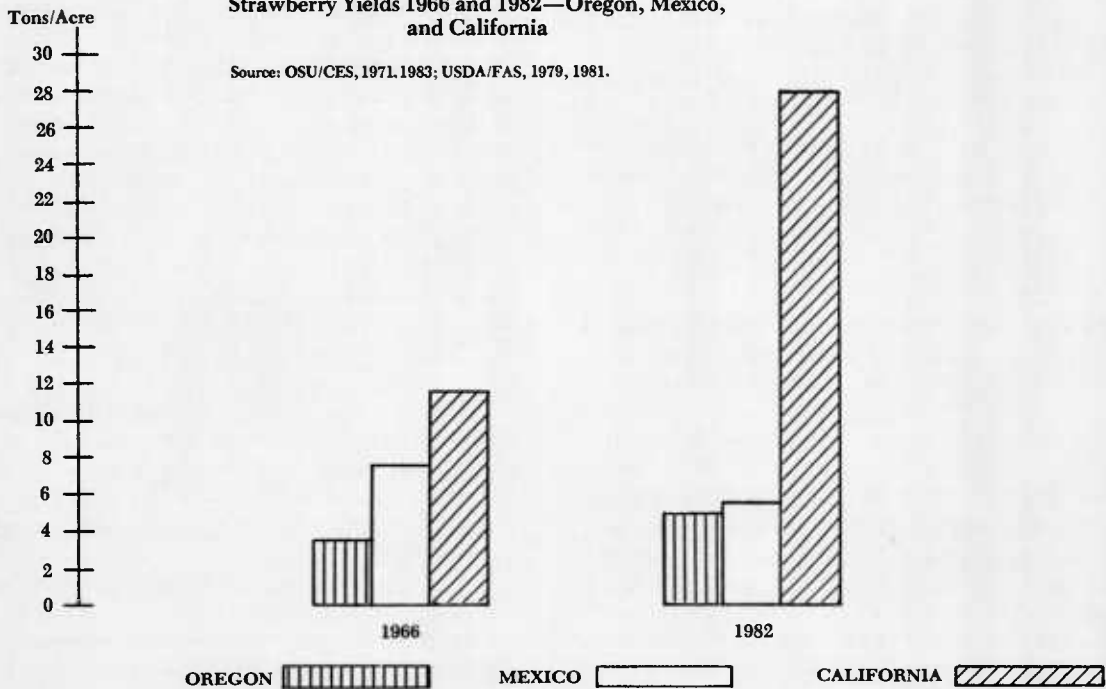
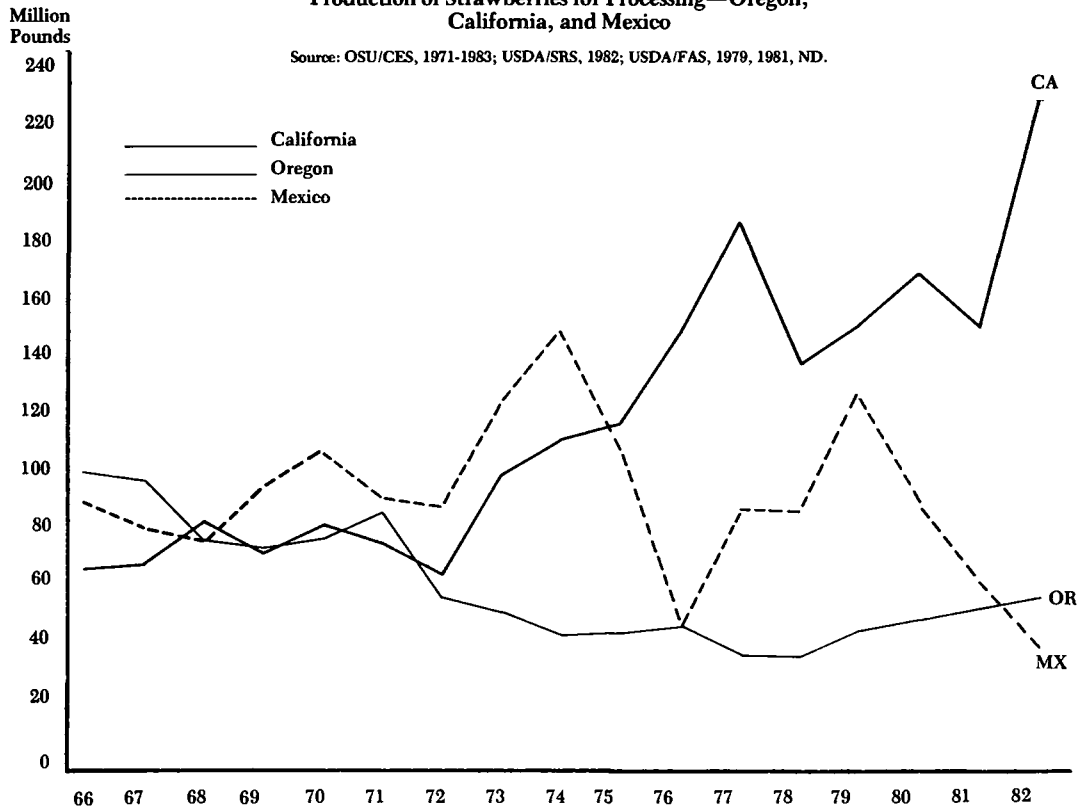


Figure 7  
Production of Strawberries for Processing—Oregon,  
California, and Mexico

Source: OSU/CES, 1971-1983; USDA/SRS, 1982; USDA/FAS, 1979, 1981, ND.



of this commodity produced in California is nearly three times what it was in 1966. More importantly, this increase has occurred during a time when all other regions supplying the market have decreased their production.

In Oregon, significant (67 percent) improvements in yields have not been sufficient to offset declining acreage. Although acreage has increased by small increments annually since 1978, total production is still 42 percent below 1966 levels. In Mexico, decreases in both acreages and yields have resulted in a 64 percent decline in total production (Figure 7).

The point should also be made that California's acreage increases are actually further proof of the comparative economic advantages it has developed in the strawberry industry. For instance, in 1982 the value of a California acre of strawberries on the processed market was 55 percent higher than it was in 1966; this compared to Oregon's value increase of only 12 percent.

### Consumption Response

We have already established that per capita consumption has been constant since 1966 (Figure 3, Table 2). This is a condition which has persisted even in the presence of highly cyclical price trends (Figure 8).

From this, we can infer that consumption is price inelastic, that is, a substantial decrease in retail price is necessary to stimulate an increase in per capita con-

sumption. Rather than prices, other means are needed to induce consumers to purchase more strawberries. Apropos of this need, the Processing Strawberry Advisory Board of California annually expends on consumer advertising alone an amount which is three to four times larger than the total annual budget of the Oregon Strawberry Commission. Most recently, in 1981, a record budget of \$2.54 million was allocated to this cause. Included in this was a \$1.35 million direct investment in advertising, merchandising, and publicity for both fresh and frozen berries (Blue Anchor, 1981: p. 14).

### Production Response

While consumption quantities are constant over time, production trends exhibit major fluctuations (Figure 9).

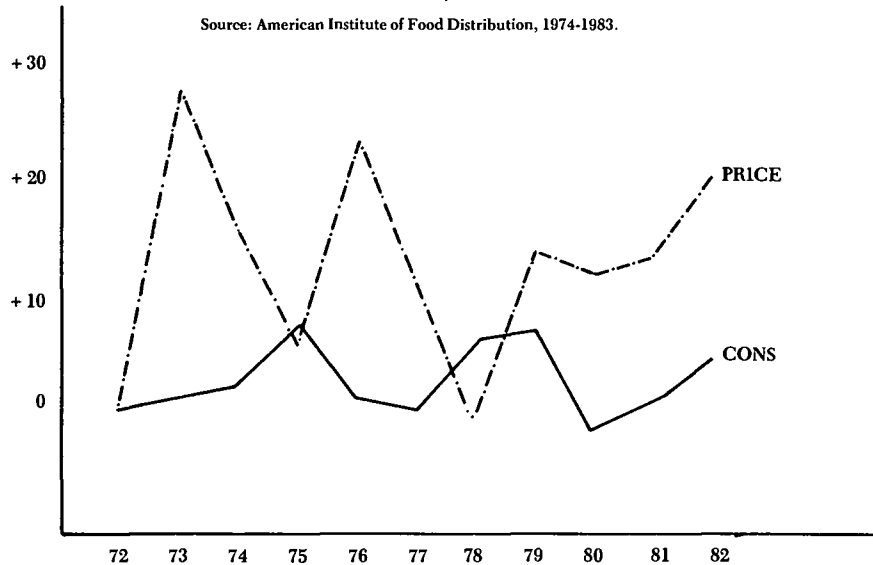
Price, of course, is the stimulus which growers respond to in making their planting and harvesting decisions, and which leads to this large amount of variability in production trends. The magnitude of the variability is primarily attributable to one factor: the producers' over-response to price changes. The producers' response to a rise in farm price is to increase their production by increments which cause excess supply leading to a price drop and subsequent production decreases (Figure 10). This response appears to be occurring faster in recent years, primarily because of California's market dominance.

California, unlike Oregon, has two strawberry commodities within a one-crop industry: fresh and frozen strawberries. Since growers are able to sell their crop in either market, in essence they can withhold their product from the market with the lower profit potential. Oregon farmers, on the other hand, sell almost exclu-

sively in the processed market. Furthermore, the price they receive depends, in part, on the California fresh market price. This price in turn is affected by Mexican imports, although the effect has been minimized in recent years by Mexico's declining importance in both markets.

**Figure 8**  
**Percent Change in Per Capita Consumption and Retail Price\*, 1972-1982**

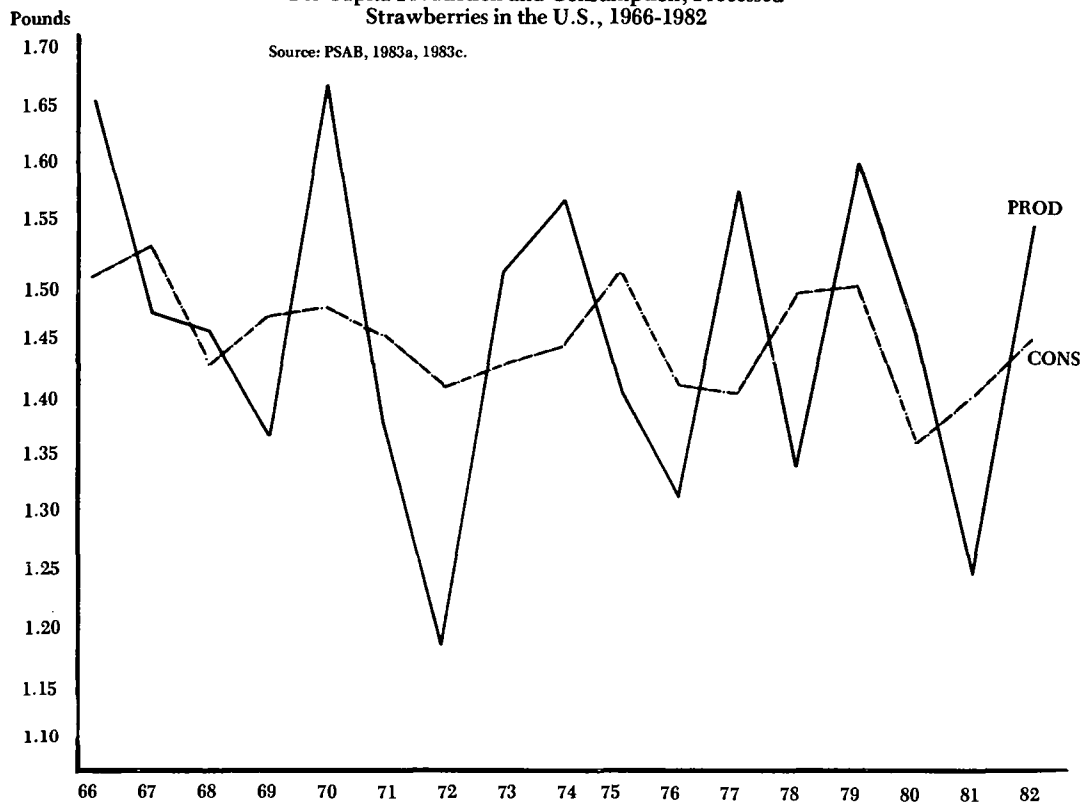
Source: American Institute of Food Distribution, 1974-1983.



\*Average U.S. price for 30-pound tin in constant (1967 = 100) dollars.

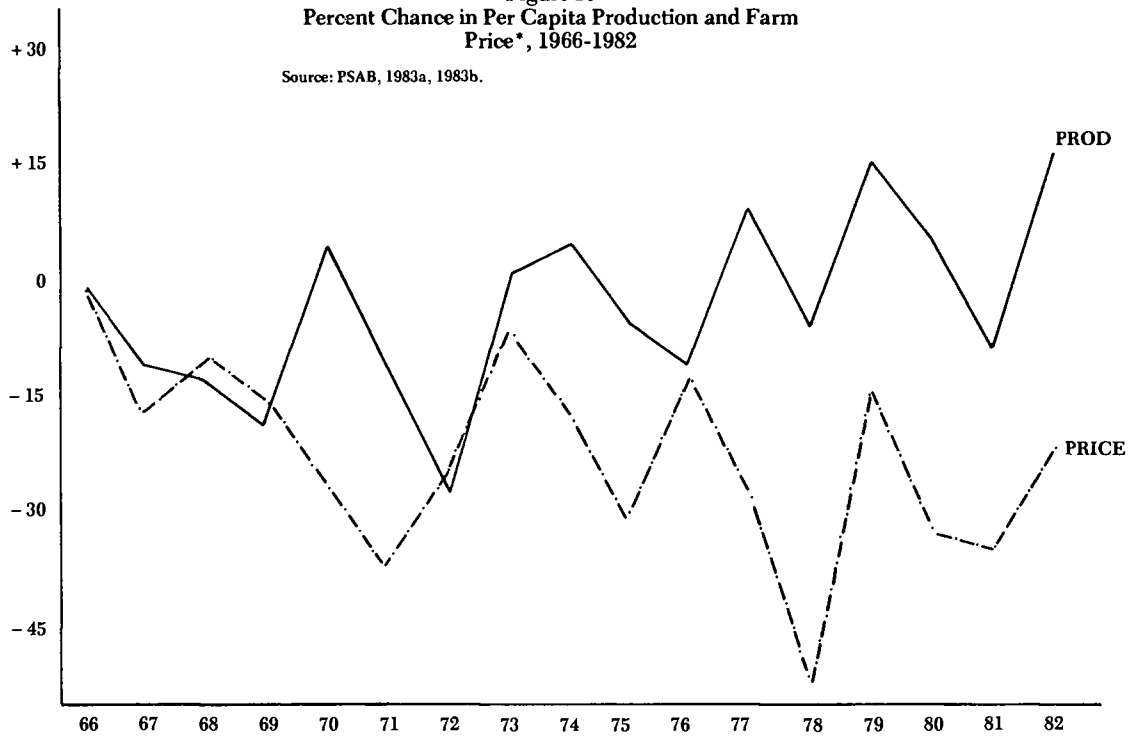
**Figure 9**  
**Per Capita Production and Consumption, Processed Strawberries in the U.S., 1966-1982**

Source: PSAB, 1983a, 1983c.



**Figure 10**  
**Percent Change in Per Capita Production and Farm Price\*, 1966-1982**

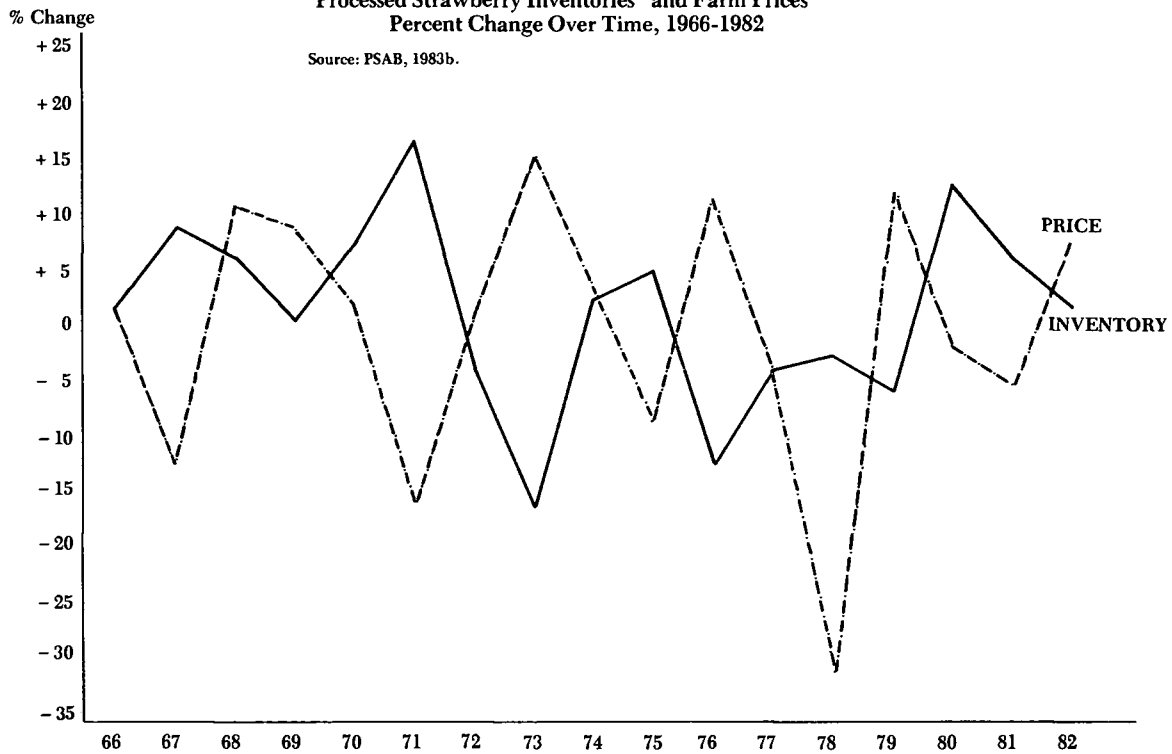
Source: PSAB, 1983a, 1983b.



\*Price is in Constant (1967 = 100) dollars.

**Figure 11**  
**Processed Strawberry Inventories\* and Farm Prices \*\***  
**Percent Change Over Time, 1966-1982**

Source: PSAB, 1983b.



\*Inventories are average of 1/1 and 12/31 reported inventory.

\*\*Price is in constant (1967 = 100) dollars.

## Inventory Response

A significant factor affecting price is the level of processor inventories (Figure 11). In a situation of undersupply at the farm level, which normally drives price up, the use of inventories provides processors with an additional source of strawberries, effectively increasing supply and offsetting upward price pressure. Conversely, in a situation of oversupply the ability of processors and growers with processing/storage facilities to replenish inventories at a low price provides the opportunity to capture price advantages. Naturally, there is some degree of risk associated with such a strategy, as well as high fixed and variable costs such as capital investment and interest costs. However, the fact that retail prices—representing processor revenues—have managed to keep pace with inflation, whereas farm prices have not, indicates that the advantages to the processor outweigh the risks. In California, growers are able to avoid selling at a low processed price to some extent by continuing to sell in the fresh market,

therefore withholding from the processed market and counteracting the downward pressure on price brought about by excess supply.

## Summary

Clearly, the market for processed strawberries has not increased in size over the past 15 years, except to accommodate population growth. In fact, demand (consumption) has increased somewhat less than the overall population. Using a three-year average for 1969-1971 and 1979-1981, aggregate consumption increased only 7 percent. The population growth during this same time was 11.4 percent (U.S. Bureau of the Census, 1982).

Furthermore, the differences in variability among these three components show that the information being used as a basis for the decision to produce, consume, or store strawberries is not responded to in the same way. Producers over-respond, consumers under-respond, and processors respond in a rational economic manner.

## III. Conclusions and Recommendations

In 1966, Oregon produced 34 percent of the strawberries used for processing in the United States while California produced only 22 percent. Mexico produced 32 percent and Washington 12 percent. Today, California dominates the market, producing 70 percent of the strawberries used for processing. Oregon's share has dropped to 17 percent and Mexico and Washington combined now comprise 13 percent of the market.

In terms of regaining some of its lost market share, the dominant reality Oregon growers and processors face is stagnant demand. This stagnation is of long standing, meaning there is little likelihood of a change for the better occurring soon or without considerable effort.

Another reality of long standing is the intensity of supply competition. Mexico's competitive pattern has been to create enormous periodic surges in production, followed by collapses. This pattern is a predictable consequence of the fact that it is basically a U.S. industry operating in the Mexican environment.

California's pattern is unremitting challenge. Almost invariably, it gains the most when any other sector reduces its market inputs. But when another sector, such as Mexico, increases its inputs, California's share of the market tends to remain firm causing the increased market supply to impact directly upon the shares of other sectors, such as Oregon. California's resilience is largely caused by an increasing capacity, within single plant varieties, to produce optimally for the processed or fresh market. "One crop, two commodities" is a revolutionary agronomic technology—one which poses a major threat to the Oregon industry in the foreseeable future.

Oregon's pattern appears to be basically a maintenance strategy—one of developing vigorous replacement stock for the higher quality niche of the processed market and to leave unchallenged the concept of a one-crop, one-commodity system revolving around a one-month producing berry.

Another major finding of these analyses is that there is a persistent impulse among Oregon growers to over-produce their product. A corollary finding is that it is processors' inventories, not farmers' acreages, which are rationally responsive to price. The significance of this relationship is that aggregate inventories of frozen stock mediate between farm producers and price. The inference is that prices alone constitute for strawberry growers very inadequate signals for decisions regarding acreage increases or decreases.

## Recommendations

1. Data on frozen strawberry inventories should be added to the information now available to Oregon farmers through the "Commodity Data Sheet" of the Oregon State University Cooperative Extension Service.

2. Market analyses which monitor the impacts of developments among Oregon's chief competitors should become a regular component of the Strawberry Commission budget.

3. A comprehensive agronomic and economic evaluation of Oregon's potential for a dual commodity (fresh and frozen) strawberry should be conducted cooperatively by the Strawberry Commission and Agricultural Experiment Station.

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# Appendix 1: Aggregate Production, Consumption, and Inventories

The information presented in Table A-1 reinforces two points. First, that neither production nor consumption has increased substantially since 1966, indicating a market which, if not stagnant, is certainly not growing. Second, that fluctuations in consumption are of a substantially lesser magnitude than fluctuations in either production or inventory levels.

The averages and standard deviations (SD) of production, consumption, and inventories are indicative of the relationships between these three market components. The average production, at 206 million pounds, is equal to average consumption, confirming that all inventories do eventually get consumed. However, the SD (a measure of variability) of production is greater than twice that of consumption. Inventories, with a SD equal to that of consumption, have an average that is less than half the average of production and consumption. Comparing the SD's as a percentage of the average, we find that production and inventories are about equal in their magnitude of variability (9.4 and 9.7 percent, respectively), whereas consumption, being unresponsive to price changes, has little variability with ratio of the SD to the average of only 4.2 percent.

The actual numbers confirm this. Ignoring the 1982 figures, which are preliminary and which we feel represent an unusual deviation from the norm, the greatest deviation occurs in production (-18.9 percent in 1972). Inventory fluctuations are next with deviations of 18.7 percent in 1971 and -15.7 percent in 1973. The greatest fluctuation in consumption occurred in 1979 and was only 7.5 percent.

**Table A-1. Aggregate U.S. † Production, Consumption, and Inventories of Processed Strawberries**

Year	Production		Consumption		Inventories*	
	million lbs.	percent million deviation from $\bar{x}$	million lbs.	percent million deviation from $\bar{x}$	million lbs.	percent million deviation from $\bar{x}$
	$\bar{x} = 306$		$\bar{x} = 306$		$\bar{x} = 134$	
	SD = 29		SD = 13		SD = 13	
	million lbs.		million lbs.		million lbs.	
66	325	6.2	293	-4.2	139	3.7
67	293	-4.2	304	-0.6	150	11.9
68	290	-5.2	286	-6.5	146	9.0
69	277	-9.5	296	-3.3	138	3.0
70	341	11.4	302	-1.3	147	9.7
71	285	-6.9	300	-2.0	159	18.7
72	248	-18.9	296	-3.3	128	-4.5
73	315	2.9	299	-2.3	113	-15.7
74	331	8.2	304	-0.6	135	0.7
75	302	-1.3	326	6.5	136	1.5
76	286	-6.5	306	0.0	114	-14.9
77	343	12.1	305	-0.3	123	-8.2
78	292	-4.5	324	5.9	126	-6.0
79	353	15.4	329	7.5	121	-9.7
80	330	7.8	311	1.6	142	6.0
81	284	-7.2	321	4.9	134	0.0
82	359**	17.3	335**	9.5	127**	-5.2

†Includes all imports and domestic production.

\*Inventories are average of 1/1 and 12/31 reported inventory.

\*\*Preliminary

Source: PSAB, 1983b.

## Appendix 2: Description of Data

The original primary data for this project were collected by Harland Padfield and Wes Smith in 1981. A time-depth questionnaire concerning acreage, cropping pattern, costs and returns, labor practices, and reasons for increasing or decreasing strawberry acreage was administered to a random sample of 99 Oregon growers. These data were analyzed and interpreted in an article presented at the 1983 meeting of the Oregon Horticultural Society and subsequently published in the proceedings of that meeting (Padfield, Smith, and Thaler, 1983).

In addition to this original set of primary data, Helen Thaler conducted field interviews with strawberry growers in Marion, Washington, and Columbia counties during the June 1983 harvest season. The purpose of the interviews was to update the 1981 information, especially concerning labor conditions, labor sys-

tems used, and ethnic and age composition of the labor force. Information also was gathered on acreage and yield trends since 1981, on the prices received, and general grower attitudes concerning strawberry production.

Thaler interviewed 17 persons representing 10 farms, 8 of which were in the 1981 sample. Nine of the 10 farms had strawberries being harvested in 1983. In addition to growers, information was collected from three platoon leaders, one labor contractor, and five supervising pickers.

Some of the important indications of the interviews: five of the nine growers harvesting in 1983 were using platoons as their major picking method. Two were using a combination of platoons and drive-outs, and two were using a combination of drive-outs and labor contractors.



There was a sufficient supply of workers at the prevailing piece rates which began at \$1.50 and increased to \$2 per crate by the end of the season. Because of excessive rain, the length of the harvest season and the desire of persons less dependent on strawberry harvest earnings to work were diminished, making this rate increase necessary. The pickers observed on the nine farms were made up of Anglos, Hispanics, and Vietnamese in about equal percentages. An increase in the number of Vietnamese workers since 1981 was noted.

Children (11 years and under) were very much in evidence where drive-outs were used—the responsibility of their presence being that of the adults in the drive-out crews. Platoons, which were preferred, did not permit 11-year-olds; in fact, they did not generally use pickers much younger than 13.

In addition to obtaining additional primary data from Oregon strawberry growers and workers regarding the 1983 harvest, we researched the California strawberry industry through both secondary (published) and primary data. We obtained our primary data in interviews conducted by Alan Haight, a student researcher under the general supervision of William H. Friedland, professor of sociology at the University of California at Santa Cruz. Duration of the research was from July 1 to August 31, 1983. Haight's general objective was to gather field data regarding labor practices of California strawberry growers.

The framework for the research was the issue of equity in the distribution of the burdens of labor regulations as they affect Oregon producers in comparison to California and U.S.—Mexican producers. An important hypothetical factor in the inter-regional and international competition for commodity markets is the ability to create technologies which capture the benefit or diminish the disbenefit of public policy. For instance, in the case of California and U.S.-Mexican strawberries, corporate and absentee land owners have been able to take advantage of tenure systems which enable them to use children. On the other hand, Oregon strawberry producers, who are predominately (93 percent) family, medium-sized enterprise farmers in terms of the classic public policy definition, are effectively prohibited from using children.

The operational hypothesis was that this was increasing the comparative advantage of U.S.-Mexican and California producers in the intense competition for the U.S. processed strawberry market.

Haight's specific objectives were to interview knowledgeable experts in California regarding labor practices of California berry growers with particular attention to sharecroppers, who, by virtue of being deemed "owners," are not effectively bound by child and other labor standards.

Knowledgeable experts included state employment office field representatives, agricultural extension agents, county commissioners, and berry growers in Santa Cruz, Monterey, Santa Barbara and San Luis Obispo counties,

home of approximately half the large 60- to 1,000-acre strawberry ranches.

During the two months he worked on this project, Haight researched 10 to 15 articles dealing with California strawberry technology and labor, and monitored the *California Packer* and other trade periodicals. In addition, he interviewed in depth, six farm advisors and county extension agents, three state employment representatives, eight grower/operators, and eight sharecroppers. Haight also obtained numerous public statistics bearing on California strawberry production, marketing, processing, and pricing from both the California Strawberry Advisory Board and the Processing Strawberry Advisory Board of California.

The information generated by Haight's research can be separated into two categories. One category consists of his assessment of prevailing labor practices in general and the pervasiveness of sharecropping in particular. The second category of information consists of secondary data which he provided as requested and which we analyzed.

## Sharecropping—Pervasiveness in California

Strawberry sharecropping is confined exclusively to the two central coast districts of California (Salinas/Watsonville and Santa Maria) and is absent from southern production districts (Ventura, L.A.-Orange, San Diego). Since approximately 1974, growers have generally cut back on sharecropped acreage. Sharecroppers, in turn, are being replaced with what are commonly referred to as "commercial" or "hired" crews recruited from the family and social groups of pickers and company employees, and from the open labor market.

Although accounts vary somewhat as to the pervasiveness of sharecropping in the two central coast districts, it is generally agreed that in Santa Maria sharecropping constitutes 50 percent of the total acreage; in the Salinas/Watsonville district it appears to be approximately 30 percent.

Calculating the acreage sharecropped for the two central coast districts (Salinas/Watsonville—1,173; Santa Maria—530) and comparing this with the total acreage in strawberries for the entire 5 districts (11,200) indicates that, at the lower extreme, sharecropped acreage probably constitutes no more than 1,703 acres or 15 percent of the state total.

Therefore, sharecropping cannot be considered as being a significant advantage to California growers in competition with Oregon growers.

In perspective, it should be noted that even an increase in both districts of as much as 20 percent in the extent of sharecropping would result in an increase of only 3 percent for a total of just 18 percent of the state's total acreage. Thus, there is considerable room for error in the calculation for the two districts without remedying the more basic problem of the limited geographical extent of strawberry sharecropping.

A less compelling though perhaps equally significant measure is the extent to which the sharecropped districts contribute to the processed market. Production figures from each of the districts for 1982 reveal that, in combination, Salinas/Watsonville and Santa Maria contributed an average of just 22 percent of their output to California's processed product; the southern, non-sharecropped districts contributed 43 percent of their output. Thus, not only is the extent of sharecropped acreage limited geographically to the northern districts, but its probable contribution to the processed market is further constricted by the lower ratio of processed to fresh product of these districts in comparison to the southern districts.

## California Strawberry Labor in General

The question remains as to the utility of the sharecropping system to California growers in the context of inter-regional competition with Oregon growers. Persistence of strawberry sharecropping in California is owed not to its characterization as a means of violating labor standards but rather as a means of solving the problematics of labor supply and labor management attendant to any seasonal commodity. Despite the potential range of labor standard violations which can and doubtless do occur within the sharecropping system, and while it is clear that by virtue of the sharecropping contract growers have successfully avoided the direct threat of union organization, it is the demand of growers for a particular quality of labor to work the same fields throughout the course of the season which has led growers to offer significant incentives to their employees. One incentive is the perceived opportunity of the sharecropping contract. Incentives also take the form of wages which are competitive with those of other commodities (such as unionized lettuce), medical insurance, paid holidays, and other benefits, and a relatively stable work schedule during the season from year to year.

Regarding wages paid to strawberry pickers, growers use a piece rate adjusted seasonally with an hourly rate to maintain a predetermined hourly minimum wage between \$7 and \$8. Crews are generally paid \$1.30 per crate on a piece rate basis. During the June and July peak, pickers average six crates per hour.

The growers use their base rate as the "adjustment factor" over the course of the season to keep wages competitive. There are considerable variations in the way growers pay—base rate plus bonus, straight piece rate, or straight hourly wage—but most are a combination of two or more systems. Haight corroborated the earnings, both in terms of how much was picked and what the rate of pay was, using interviews with pickers, growers, and field observations.

Using these same methods, Haight also confirmed the stability of the labor market in the central coast strawberry district. Growers reported that some pickers had been working for them every season for as long as the last 12 years, and the majority of pickers were described as local residents. This type of regularity and decasualization was corroborated by individuals at every level of the industry, as well as in conversations with strawberry sharecroppers and hired pickers.

In addition to achieving a stable labor supply by incentives that enable strawberry growers to compete against unionized lettuce farms for stable, productive "returnees," there are other factors which Haight cites as giving California a continuous competitive advantage in inter-regional competition with Oregon and the Northwest. These are plant research, length of the growing season, and the established industrial produce environment in California which continues to reproduce an agricultural labor force and to develop new fresh fruit and vegetable commodities.

Apropos of Haight's general conclusions, Miriam Wells is acknowledged as doing the pioneer work in this area and her 1981 study of the social history and political economic dynamics of California sharecropping is cited specifically as the basic reference for Haight's work on our behalf.