

EXPANSION IN THE CALIFORNIA AVOCADO INDUSTRY

Robert C. Rock

Economist, Cooperative Extension Service, University of California, Riverside.

The California avocado industry is now in its second expansion period in twenty years. During this period of growth the industry should be alert to the opportunities for orderly growth as well as to the dangers of excessive expansion. The following projections of acreage and production to the 1977-78 season were made in order to help guide the industry in making long-range marketing and production plans to help insure orderly growth of the industry.

Background

Improved returns in the 1940's led growers to expand total acreage by almost 50 percent during the period 1945 to 1959. The resultant larger crops during the late 1950's and early 1960's brought depressed markets and a low level of new plantings during the late 1950's and early 1960's. Because of this low level of new planting, state bearing acreage during the 10-year period of the 1960's remained level or possibly declined slightly. Annual production during this period, while varying widely from year to year, averaged close to 100 million pounds.

Since the early 1960's grower returns have improved as a result of the more favorable supply and demand relationships in the industry, improved marketing procedures and strategies by growers and handlers, and the extensive trade promotion program operating under a state marketing order. Currently the rate of new planting is increasing, and higher levels of acreage and production are projected for the remainder of the 1970's. Projections also indicate a changing pattern of seasonal supplies and a changing varietal composition in the crop for the years ahead.

Projection Method

Projections of the potential 1977-78 California avocado crop, assuming on major winter frost hazards, were developed by starting with the most recent (1973) industry acreage estimate by variety and age of tree, issued by the California Crop and Livestock Reporting Service (Table 1). These acreage estimates were then projected to 1977 using specific assumptions regarding acreage gain and loss during the period 1973 to 1977. The resulting projected acreage standing in 1977 is shown in Table 1.

Next, the 1977 projected estimates by variety and age of tree were combined with estimates of average and high yield per acre to arrive at projections of production potential for the 1977-78 crop. These production projections are shown in Table 4.

TABLE 1. California avocado acreage by variety and age of tree. Standing in 1973 and projected to be standing in 1977

Variety	Age of tree	Acreage Standing 1973 ¹	Acreage projected 1977 ²
Bacon & Zutano	9 yrs & over	1,338	2,159
	5-8 yrs	847	2,278
	4 yrs	274	1,397
	3 yrs	327	³
	2 yrs	383	—
	1 yr	406	—
	Total	3,575	5,834
Fuerte	9 yrs & over	9,450	8,612
	5-8 yrs	457	405
	4 yrs	105	366
	3 yrs	67	—
	2 yrs	71	—
	1 yr	74	—
	Total	10,224	9,383
Hass	9 yrs & over	4,919	7,091
	5-8 yrs	2,114	6,981
	4 yrs	858	3,814
	3 yrs	1,294	—
	2 yrs	968	—
	1 yr	847	—
	Total	11,000	17,886
Others	9 yrs & over	1,960	1,998
	5-8 yrs	381	438
	4 yrs	57	297
	3 yrs	65	—
	2 yrs	55	—
	1 yr	59	—
	Total	2,577	2,733
State total all ages		27,376	—
State total 4 yrs age and over		22,760	35,836

¹ Source: California Crop & Reporting Service

² Projected acreage based on assumptions indicated on pages 3 and 4.

³ Acreage of trees three years of age and younger in 1977 is not projected as these trees are assumed to be nonbearing for the 1977-78 season and do not contribute to 1977-78 production.

Assumptions

Acreage gains used in the projections were largely based on the number of avocado trees sold by California nurserymen in 1972, 1973 and planned for sale in 1974. These data were collected in a mailed survey of avocado nurserymen during January of 1974. Table 2 summarizes the number of trees by variety reported sold or planned for sale by nurserymen for years 1972 through 1974

TABLE 2. *Estimated number of avocado trees sold by California Nurserymen in 1972, 1973 and estimated for sale in 1974.*

Variety	1972	1973	1974
	<i>number of trees</i>		
Bacon & Zutano	117,906	188,522	242,053
Fuerte	18,654	30,222	48,844
Hass	304,634	416,735	574,016
Others	25,613	37,492	45,548
Total	466,807	672,971	910,461

Source: 1974 survey of avocado nurserymen.

Numbers of avocado trees sold by nurserymen were converted to potential acreage using the typical number of trees planted per acre according to variety (see Table 3). It was further assumed that for various reasons, including poor management and site selection, not all of the potential acreage so calculated would be planted and standing or producing by the 1977-78 season. To compensate for this situation a 25 percent loss in potential acreage was assumed. This resulted in an equivalent new acreage of 3,066 acres planted in 1972, 4,406 in 1973, and 5,974 acres in 1974.

TABLE 3. *Estimated number of avocado trees sold by California nurserymen 1972-1974 converted to potential acreage standing in 1977¹.*

Variety	1972	1973	1974
	<i>acres</i>		
Bacon & Zutano	680	1,088	1,397
Fuerte	140	227	366
Hass	2,077	2,842	3,914
Others	169	249	297
Total	3,066	4,406	5,974

¹ *Converted on basis of typical number of trees planted by variety and assumed loss of 25 percent of potential acreage by 1977.*

Acreage loss from urbanization, root rot, and other factors, during the four-year period 1974 to 1977 was projected at 3,600 acres or 900 acres annually. It was assumed that this loss occurred in acreage of all varieties of trees five years of age or older in 1973.

Assumed yield per acre estimates used in these projections are given in table 4. These assumed yield per acre estimates are based on total industry acreage and production experience. Yield for specific orchards could be above or below these estimates. A high yield per acre estimate was used to indicate industry production levels assuming all climatic conditions favorable and bumper crops. It should be noted that "normal" weather conditions were assumed for the average yield per acre projection and that a major winter freeze would result in yields significantly lower than the average estimates.

What is the timing of the current expansion in the California avocado industry?

A study of the expansion in acreage and production in the industry in the late 1940's and 1950's gives a clue to the timing of the current expansion. Heavy new plantings in

excess of requirements to maintain existing acreage levels started in 1945, crested in 1950, and returned to maintenance levels by 1955. A four-to-five-year lag was evident between acreage and production response. Acreage increase started in 1945, Average production in the industry turned upward by 1950, expanded rapidly through 1955, and leveled off in 1960. Throughout most of the 1960's bearing acreage has remained on a plateau, and average production has been close to the 100-million-pound level.

Using these relationships to judge the current expansion, it appears acreage increased above the maintenance level in 1969, and average industry production has turned upward with significant expansion projected by 1977. It seems reasonable that the expansion will continue after 1977, but its extent and duration will depend on future plantings. The first five years of the expansion are more certain because most of the new acreage on which the expansion is based already is in the ground.

What is the projected level of production for the 1977-78 season?

The projected acreage by age of tree in 1977-78 (Table 1) was combined with yield per acre estimates (Table 4) to project average and high production for the 1977-78 season (projections based on assumption of no major winter frost hazard). On the basis of average yield per acre estimates, the projected production in 1977-78 was 149.2 million pounds, up 40 percent from the 1973 average production level. On the basis of high yield per acre estimates, the projected production was 221.3 million pounds. While a projection was not made beyond the 1977-78 season, current and expected planting trends indicate a continued expansion beyond the 1977-78 projection date.

What is the probability that actual crop size of the 1977-78 California crop will range above and below this projection of average production?

Avocado production is characterized by wide variation in yield from year to year. A study of past production reveals a high probability of alternate size crops. In the past 43 seasons the crop has alternated in size 33 times. For example, if one had forecast each year's crop as alternating in size from the preceding crop, one would have been right 33 times out of 43 seasons, or 76 percent of the time. Of the 10 times wrong, 4 times were caused when crops increased in two consecutive years and 4 times when crops increased over a three-year period. These cases of crop increases occurred during the industry's expansion in the late 1940's and early 1950's. Two times the crop decreased in two consecutive seasons.

TABLE 4. *Projected production levels for the 1977-78 crop based on assumed average and high yield per acre.*

Variety	1977-78 Projected production ¹	
	Average yield per acre	High yield per acre
	<i>millions of pounds</i>	
Bacon & Zutano	20.4	29.2
Fuerte	40.0	62.3
Hass	76.1	111.5
Others	12.7	18.3
Total	149.2	221.3

¹ *Derived from Table 1 by multiplying projected acreage in 1977 with the following assumed yield per acre estimates:*

Variety & age of tree	Average yield	High Yield
	<i>pounds per acre</i>	
Fuerte		
9 yrs & over	4,500	7,000
5-8 yrs	2,600	4,000
4 yrs	700	1,000
Hass		
9 yrs & over	6,500	9,500
5-8 yrs	3,750	5,500
4 yrs	1,000	1,500
Bacon, Zutano & others		
9 yrs & over	5,500	8,000
5-8 yrs	3,200	4,500
4 yrs	900	1,200

In addition to alternating crop size from one year to the next, the variation in crop size has been considerable. During the past 27 seasons the crop has varied 21 times from the preceding crop size by 20 percent or more. In four seasons the variation from the preceding crop size has exceeded 100 percent. Because of this annual variation, the actual crop size during the projection season of 1977-78 could exceed 200 million pounds.

What will be the varietal composition of the 1977-78 California avocado crop?

In addition to a larger average crop, projections indicate important shifts in the varietal composition of the crop for the 1977-78 season compared with the average composition during the 1972-73 season. In terms of seasonal varieties, Fuerte production is projected to decline by 9 percent. Bacon and Zutano varieties are projected to increase by 98 percent. Hass production is projected to increase by 87 percent. As a result of projected increases in Hass, Bacon, and Zutano production a significantly larger proportion of the California crop is projected to be marketed May through December.

These shifts are indicated in the table below which compares the varietal composition of the 1972-73 crop and the 1977-78 crop based on average varietal yield per acre. The actual varietal composition of the future crop could vary from this average because of the variability of yield per acre for individual varieties, i.e., in a given year the industry could have a big Hass crop and a small Fuerte crop or vice versa.

TABLE 5. *Projected change in varietal composition of crop—1973-77*

Variety	Average composition 1972-73	Projected average composition 1977-78	Percent change
		<i>million pounds</i>	
Bacon & Zutano	10.3	20.4	+98
Fuerte	43.8	40.0	— 9
Hass	40.8	76.1	+87
Others	12.0	12.7	+ 6
Total	106.9	149.2	+40

¹ *Derived by multiplying acreage standing in 1973 (Table 1) by assumed yield per acre (Table 4).*

Conclusion

The California avocado industry is now in its second expansion period in twenty years. Net increases in state acreage began about 1969, Projections based largely on the number of avocado trees sold by California nurserymen indicate significantly higher production levels by 1977 and further increases probable during the late 1970's and early 1980's.

This projection indicates average industry production potential, assuming no major winter freeze conditions, will rise from the 100-million-pound annual level of the late 1960's to the 149-million-pound level for the 1977-78 crop.

Because of the alternate-bearing characteristics of the avocado tree, actual crop size for a given year is likely to be above or below average production levels. For this reason the actual 1977-78 crop could be above the average 149-million-pound level, reaching a high of 221 million pounds, assuming high yield per acre estimates.

Further increases in state production are expected after the 1977-78 projection year, resulting from production from trees which are expected to be planted during 1975 and later, and from heavier production from maturing young trees planted in the early 1970's.

In addition to projections of larger crops, the projections also indicate a changing pattern of seasonal supplies and a changing varietal composition of the crop for the years ahead. As a result of projected increases in Hass, Bacon and Zutano production, a significantly larger proportion of the California crop is projected to be marketed May through December.