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EXPANSION IN THE CALIFORNIA AVOCADO INDUSTRY

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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 1976-77 season were made in order to help guide the industry in making long-range marketing and production plans and 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 1969. 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, the extensive trade promotion program operating under a state marketing order, and improved marketing procedures and strategies by growers and handlers. 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

Using the 1971-72 season as the base year, bearing acreage and production potential projections for the four varietal groups were made for the 1976-77 season. The projections were based on specific assumptions regarding new acreage planted, acreage losses, and estimates of yield per acre during the next five years. While these assumptions were developed after an evaluation of all available relevant information, it should be noted that projections become realities only if the assumptions are valid. For example, an acceleration in acreage loss due to the ravages of root rot or higher than anticipated new plantings could modify these projections in either direction.

New Plantings

Information on the number of avocado trees grown for sale in California prior to 1965 was reported by the Bureau of Nursery Service, California Department of Agriculture, Sacramento. Information on the number of trees currently being grown for sale by commercial nurserymen was collected for this study by two mailed surveys: one in March of 1971 and the other during April of 1972.

The 1972 survey was mailed to a list of 16 California nurserymen who grow avocado trees for commercial planting. Information was received from 12 nurserymen representing 90 percent or more of the total production of avocado trees. In the 1972 questionnaire, nurserymen reported on the number and variety of avocado trees they had available for sale for commercial plantings in 1972 and the number they planned to sell in 1973 and 1974.

The surveys indicated 355,602 trees available for sale in 1971; 435,781 trees in 1972; 456,442 in 1973; and 388,111 in 1974. A comparison of the number of nursery trees currently grown for sale to the number of trees grown for sale since 1940 is shown below:

NUMBER OF AVOCADO TREES GROWN FOR SALE IN CALIFORNIA – 1940-41 TO DATE

Season	*No. trees (thousands)*	*Season*	*No. trees (thousands)*
1940-41	11	1957-58	n.a.
1941-42	75	1958-59	n.a.
1942-43	78	1959-60	147
1943-44	122	1960-61	147
1944-45	125	1961-62	73
1945-46	176	1962-63	62
1946-47	285	1963-64	77
1947-48	193	1964-65	80
1948-49	236	1965-66	n.a.
1949-50	292	1966-67	n.a.
1950-51	226	1967-68	n.a.
1951-52	256	1968-69	n.a.
1952-53	214	1969-70	n.a.
1953-54	156	1970-71	n.a.
1954-55	n.a.	1971-72	356
1955-56	n.a.	1972-73	436
1956-57	n.a.	1973-74	456
		1974-75	388

Source: 1940-41 to 1964-65 season – Bureau of Nursery Service, California Department of Agriculture, Sacramento. 1970-71 to 1974-75 season – Agricultural Extension, University of California, Riverside, Survey of Nurserymen.

The varietal composition of nursery trees available for sale in 1972 is shown below:

VARIETAL COMPOSITION OF NURSERY TREES FOR SALE IN CALIFORNIA IN 1972

Fuerte	6.1%
Other Fall & Winter*	26.2
Hass	66.2
Other Spring & Summer	1.5
	100.0%

* *Mainly Bacon and Zutano variety.*

In order to obtain an indication of the geographical distribution of new acreage planted, nurserymen were asked to estimate where trees they had available for sale in 1972 would be planted. This information is summarized below:

NURSERYMEN'S ESTIMATE OF THE GEOGRAPHICAL DISTRIBUTION OF NURSERY TREES AVAILABLE FOR SALE IN 1972

San Diego County	46.9%
Mid-counties*	4.9
Ventura, Santa Barbara, San Luis Obispo Counties	41.9
San Joaquin Valley	4.8
Other northern counties	1.5
	100.0%

* *Includes Riverside, San Bernardino, Orange and Los Angeles Counties.*

Acreage Gain and Loss

Using 1971-72 season as a base year, acreage was projected to the 1976-77 season under the following assumptions: 1) Nursery trees available for sale were converted to planted acreage based on typical planting distances and a 20 percent loss of trees at planting time and during the five-year projection period. This resulted in an estimate of 3,106 acres planted in 1972 and standing in 1976; 3,251 acres planted in 1973 and standing in 1976; and 2,782 acres planted in 1974 and standing in 1976. 2) A loss of 400 acres annually from acreage planted in 1972 and earlier was assumed (a total loss of 2,000 acres during the five-year period 1971 to 1976).

An estimate of acreage by age of tree in 1971-72 and a projection of acreage for the 1976-77 season based on these assumptions are shown below:

COMPARISON OF 1971 AND 1976 ACREAGE BY AGE OF TREE

Age of tree	*1971-72* — *acres* —	*1976-77*
Over 10 years	16,104	17,677
6 to 10 years	3,073	4,447
5	978	3,106
4	1,053	3,251*
3	617	2,782
2	955	2,000
1	1,344	1,000
Total	24,124	34,263
5 yrs. and over (bearing)	20,155	25,230
Less than 5 years (nonbearing)	4,947	9,033

* *Acreage planted in 1973 and standing in 1976-77.*
Source: 1971 acreage — Calif. Crop & Livestock Reporting Service.

Bearing acreage or acreage five years of age or older for the 1976-77 season is projected at 25,230 acres, 25 percent above the 1971 level. Non-bearing acreage or acreage less than rive years of age in 1976-77 is projected at 9,033 acres, making a total state acreage of 34,263 acres. It should be noted that the nonbearing acreage estimate in 1976-77 is largely based on acreage yet to be planted while the bearing acreage estimate is based on acreage in the ground. Considering present planting activity, however, it seems probable that new plantings will continue and bearing acreage will increase beyond the 1976-77 projection date.

Yield Per Acre

Estimating yield per acre for avocados in future years is made difficult by the great variability in yields experienced in commercial production. Variability in yield per acre is related to the age of tree, the variety grown, as well as the specific geographic location and other characteristics of the orchard. In addition, yield per acre varies from year to year due to the alternate bearing habits of the avocado tree. Sample data of yield per

acre for high-yielding individual commercial orchards as well as average yields in the industry are given in Tables 1 and 2. It should be noted that the average yield per acre over several years in all cases is considerably below peak year yields. These data served as a basis for developing the assumed yield estimate used in this projection.

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 five-year lag is evident between acreage and production response. Acreage increase started in 1945. Average production in the industry turned upward in 1950, expanded rapidly through 1955, and leveled off in 1960. Throughout most of the 1960's, bearing acreage 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 is projected to turn upward in 1973 and expand significantly by 1978. It seems reasonable that the expansion will continue after 1978, 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 1976-77 season?

The projected acreage by age of tree in 1976-77 was combined with yield per acre estimates developed from Tables 2 and 3 to project average production for the 1976-77 season. On the basis of average yield per acre estimates, the projected production in 1976-77 was 140.5 million pounds, up 32 percent from the 1971-72 production level. While a projection was not made beyond the 1976-77 season, current and expected planting trends indicate a continued expansion beyond the 1976-77 projection date.

What is the probability that actual crop size of the 1976-77 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, four times were caused when crops increased in two consecutive years and four 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.

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 1976-77 could range between 200 and 100 million pounds.

What will be the varietal composition of the 1976-77 California avocado crop?

In addition to a larger average crop, projections indicate important shifts in the varietal composition of the crop for the 1976-77 season compared with the average composition during the 1971-72 season. In terms of seasonal varieties, Fuerte production is projected to drop by 21 percent. Other fall and winter varieties (mainly Bacon and Zutano varieties) are projected to increase by 91 percent. Hass production is projected to increase by 93 percent. A modest decline is projected for other spring and summer varieties. 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 June through December.

These shifts are indicated in the table below which compares the varietal composition of the 1971-72 crop and the 1976-77 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.

CHANGE IN VARIETAL COMPOSITION OF CROP — 1971 TO 1976

Variety	Average composition 1971-72 — million pounds —		1976-77		% change %
Fuerte	48.9		38.8		- 21
Other Fall and Winter*	12.5		23.9		+ 91
Fuerte + F & W	61.4	(58%)	62.7	(45%)	+ 2
Hass	36.3		69.9		+ 93
Other Spring and Summer	9.0		7.9		- 12
Hass + S & S	45.3	(42%)	77.8	(55%)	+ 72
Total	106.7	(100%)	140.5	(100%)	+ 32

* *Mainly Bacon and Zutano varieties.*

TABLE 1. SAMPLE YIELD PER ACRE FROM SELECTED MATURE HIGH-YIELDING COMMERCIAL AVOCADO ORCHARDS IN CALIFORNIA [1]

Variety & orchard no.	No. acres[2]	1965-66	1966-67	1967-68	1968-69	1969-70	5-year[3] average	High	Low
					— pounds per acre —				
Fuerte									
1	10	8,103	11,292	4,778	10,358	9,750	8,856	11,292	4,778
2	8	3,121	11,232	1,938	8,212	9,035	6,708	11,232	1,938
3	10	8,075	5,738	6,805	2,526	1,542	4,937	8,075	1,542
4	18	7,562	4,026	6,159	5,111	4,579	5,487	7,562	4,026
5	45	7,364	7,373	5,363	6,414	5,992	6,048 (12yr)	8,892	1,736
6	58	3,245	8,055	2,390	7,734	2,638	5,243 (6yr)	8,055	2,390
7	9	4,389	13,178	4,411	13,733	5,922	8,508 (6yr)	13,733	4,389
Hass									
8	4	14,000	11,325	7,925	15,800	7,750	11,667 (6yr)	15,800	7,750
9	5	27,800	480	8,840	22,520	6,520	13,368 (10yr)	27,800	480
10	10	14,600	6,520	12,200	15,000	10,520	10,280 (6yr)	15,000	2,840
11	10	20,960	9,400	14,440	13,480	5,640	12,320 (6yr)	20,000	5,640
12	20	18,209	7,444	8,408	10,063	6,423	10,109	18,209	6,424
13	10	20,995	4,057	14,260	1,813	2,635	8,752	20,995	1,813
14	16	12,667	5,850	6,060	6,717	8,696	7,998	12,667	5,850
15	46	17,143	6,218	9,020	7,135	6,484	7,898 (11yr)	17,143	3,748

[1] *Sample orchards located in San Diego, Riverside, Orange and Ventura Counties.*

[2] *Number of acres in sample orchard.*

[3] *Except as noted.*

Source: Grower records.

TABLE 2. CALIFORNIA AVOCADO INDUSTRY AVERAGE YIELD PER BEARING ACRE BY VARIETIES — 1965-66 TO 1972-73 [1]

Variety	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
			— pounds per bearing acre —			
Fuerte	4,552	8,446	2,209	6,065	2,158	5,532
Hass	9,995	6,959	8,496	6,212	6,380	8,659
Other varieties	6,191	7,688	3,894	6,813	4,145	7,294
All varieties	5,951	7,972	3,961	6,245	3,637	6,739

	1971-72	1972-73 [2]	8-year average	High	Low
Fuerte	1,124	5,691	4,472	8,446	1,124
Hass	4,419	10,467	7,698	10,467	4,419
Other varieties	4,042	6,314	5,798	7,688	3,894
All varieties	2,652	7,264	5,553	7,972	2,652

[1] *High and low yields underlined.*

[2] *Preliminary.*

Source: Yield per bearing acre derived from bearing acre data published by the California Crop and Livestock Reporting Service, Sacramento, and industry shipping data published by the Federal-State Market News Service, Los Angeles.