

SOME FACTORS INFLUENCING FUTURE AGRICULTURAL  
WATER DEMAND IN CALIFORNIA'S CENTRAL VALLEY

by

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## ABSTRACT

Agricultural water demand in California's Central Valley is directly correlated with irrigated cropland acreage. The remarkable expansion of irrigated cropland in the state in the period from 1949 to 1982 resulted in a net addition of more than 2 million acres of land under irrigation, a 31% increase. Of this amount +1.4 million acres were in the San Joaquin Valley and another +0.5 million were in the Sacramento Valley.

The largest factor influencing near term irrigated cropland acreage in the Central Valley is the world wide glut of most agricultural commodities. The resulting low commodity prices and poor near term outlook will encourage growers of cotton and rice to participate in USDA commodity programs in record numbers. Crop set-asides in these two commodities amount to 25% and 35% of established base acreages, respectively. In terms of acreage this will amount to a reduction in plantings of 300,000 acres for cotton and 180,000 acres for rice. Growers will seek to plant other crops on set-aside land, including alfalfa, wheat, wild rice and feed grains.

Demand for alfalfa hay will be reduced in 1986 as a result of dairy herd reductions under the USDA dairy herd termination program. Slightly expanded alfalfa acreage and reduced demand suggests that about 10% of the current crop will be surplus tending to push hay prices downward. This weakening of price will discourage further plantings of alfalfa on lands idled in USDA set-aside programs.

Fruit and nut acreage will not change appreciably in the Central Valley in the near future. Modest increases in citrus and some fresh market tree fruit acreage will be offset by probable reductions in grape acreage, particularly Thompson grapes. Net changes are likely to amount to less than 50,000 acres for the foreseeable future.

Vegetable acreage will show a tendency to increase in the San Joaquin Valley and to decrease slightly in the Sacramento Valley. Factors responsible for these changes include continued expansion of demand for fresh market vegetables and intra-state transfer of processing tomato acreage. Overall changes in vegetable acreage will amount to less than 50,000 acres.

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## EXPANSION OF CALIFORNIA AGRICULTURE

Thirty-five years ago California's agricultural production passed that of Iowa and, for the first time, the Golden State became the nation's farm leader. Since that time California's share of national crop and livestock production has steadily increased. Today California's annual commodity receipts lead second-ranked Texas by more than 40%. (1)

Examination of this unprecedented record of agricultural growth shows that no factor was more important than California's development of irrigated agriculture. From 1949 to 1982 the state's irrigated land expanded from 6,438,328 acres to a total of 8,460,508 acres, a 31% increase. (2) When one realizes that during this same period more than 250,000 acres of irrigated land was converted to urban use in Southern California it is clear that the actual additions of new lands to irrigated production were greater than the above figures suggest.

San Joaquin Valley agriculture was the center of this great expansion of irrigated cropland. As shown in Table 1, no less 1,393,724 net irrigated acres were added to the Valley's total in this period. This represents some 68.9% of the net additions statewide. Moreover, Fresno, Tulare and Kern Counties alone account for a net addition of 891,358 irrigated acres. It is not a coincidence that these three counties are, at present, the top three counties in the entire United States in terms of annual cash receipts from crop and livestock marketings.

The period from 1949 through 1982 may also be characterized as the time when water supply agencies saw their mission defined primarily in terms of construction of new facilities.

The State Water Project and the Central Valley Project added more new water supply capacity to the state's resources than were added at any other time in the state's history. Since the total of irrigable land in the state has been determined to be about 19,000,000 acres, the roughly 9,000,000 acres irrigated at present represents only one-half of the state's land that may be suitable for irrigated farming. (3)

Table 1

Expansion of Irrigated Agriculture, 1949-1982

County	Irrigated land, Acres		
	1949	1982	Net change
Fresno	836,335	1,184,637	+348,302
Kern	478,571	864,465	+385,894
Kings	348,937	554,114	+205,177
Madera	187,851	262,035	+74,184
Merced	348,738	449,897	+101,159
San Joaquin	388,326	483,618	+95,292
Stanislaus	317,064	343,628	+26,564
Tulare	481,503	638,665	+157,162
8 County Total	3,387,325	4,781,059	+1,393,734
California	6,438,328	8,640,508	+2,022,180

Source: U.S. Department of Commerce, Bureau of the Cenus, Census of Agriculture. State and County Data., 1949 and 1982.

Just as striking as the data on irrigated land are the data pertaining to land use changes within agriculture during this same period. These are shown in Table 2.

The total amount of cropland (dryland plus irrigated) in the state decreased significantly from 13.8 to 11.3 million acres in the period from 1949 to 1982. However, as can be seen in the data of Table 2, some 2.2 million acres of the 2.5 million acre decrease resulted from reductions of cropland used for pasture. While some of this loss of pastureland occurred as the result of

the conversion of agricultural land to urban uses, as in the San Francisco Bay area, significant amounts of west side pasture of the Central Valley have been converted to irrigated agriculture. This "upgrading" of agricultural use has also occurred where dryland cropping has been replaced by irrigated farming.

Overall, the effect has been a reduction of cropland used for dry farming and for pasture (whether dry or irrigated). At the same time the amount of California irrigated farmland has been increasing sharply resulting in a substantial rise in the fraction of cropland that is irrigated. The share of the state cropland that is irrigated has increased from 46.8% in 1949 to 75.2% in 1982.

Table 2  
Agricultural Land Use, California

Type of Land Use	1949	1954	1982	Total Amount of Land, Acres Change
Cropland	13,765,110	13,229,708	11,257,374	-2,507,736
Pasture	3,530,589	3,018,010	1,344,619	-2,185,970
Irrigated land	6,438,328	7,048,049	8,460,508	+2,022,180
Harvested acres				
Fruits & nuts	n.a.	1,353,476	2,153,205	+799,729
Vegetables	n.a.	494,338	1,077,875	+583,537

Source: U.S. Department of Commerce, Bureau of the Census, Census of Agriculture, California, State and County Data, 1949, 1954 and 1982

Nowhere is the data more clear about this process of "upgrading" than in the figures for harvested acreage of fruit, nut and vegetable crops. From 1954 to 1982 the total amount of harvested acreage of fruit and nuts increased by roughly 800,000 acres (+59%) and harvested vegetable acreage expanded by 583,537 acres (+118%). Virtually all of this cropland is irrigated.

## SAN JOAQUIN VALLEY

The San Joaquin Valley has been the leading beneficiary of shifts in agricultural land use. In 1954 the Valley had some 3,601,701 acres of harvested cropland of the statewide total of 8,326,331 acres. This represented 43% of the state total. (4) By 1982 the Valley had 4,760,708 acres of harvested cropland equivalent to 54% of the state total of 8,764,808 acres. (5) The Valley's share of fruit and nut acreage is 65% (1,398,904 orchard acres of a state total of 2,158,404 acres) and its share of harvested vegetable acreage is 32% (289,080 acres out of a total of 894,573 acres statewide). (6)

### Cattle and calves

Traditionally California agriculture's leading commodity, the beef industry has been faced with a number of difficulties in recent years. Per capita meat consumption in the U.S. declined from 162.4 lb/year in the period 1970-73 to 154.3 lb/year in the period 1980-83. (7) This 5% decline is widely regarded as the leading cause of herd size reduction in the U.S. from 132 million animals in 1975 to 110 million at the end of 1984. (8) In the same period producer prices have also declined.

However, San Joaquin Valley (SJV) livestock producers have not reduced their herds. From 1978 to 1982 total herd size in the eight county area remained steady at 2.2 million animals. State totals actually increased slightly in the same period, from 4.4 to 4.6 million head. (9) Above normal rainfalls for the past several years have kept range conditions at the excellant level. Low and declining feed prices have also contributed to keeping costs of feeder stock at moderate levels.

Long term concerns of cattle producers center on keeping both transportation and interest costs low and the failure of packing firms to raise prices paid for slaughter cows despite high beef prices. Because prices paid to livestock producers have actually been falling only packers and retailers profit. Over the past seven years the national price spread on beef has increased from 70.8 cents per pound to \$1.064 per pound. (10) This means that rising prices paid by consumers are not leading to better prices for ranchers.

The USDA dairy herd termination program and accompanying increase of slaughter cows will adversely affect livestock prices in the short term but is not expected to keep prices depressed. The number of slaughter cows in California is about 1.8 million per year. Since the number of California dairy animals to be slaughtered in the dairy herd termination program is about 114,000 this effect amounts to about a 6% increase. (11)

The long-term outlook for the cattle industry remains "more of the same." This means that the San Joaquin Valley, with its substantial feed lot operations and extensive foothill and high land pasture will continue to be a major livestock producer.

#### Milk and cream

The dairy industry in California, and in the San Joaquin Valley, has been one of the state's strongest areas of agricultural growth. A generation ago California ranked fourth among all states in dairy output. Today, it ranks second to Wisconsin having surpassed both Pennsylvania and New York. Spurred by strong increases in demand from a rapidly expanding population the California dairy industry has led the way in developing

large scale milking parlors and other economies of scale. A herd of 3,000 milk cows is no longer extraordinary in California. Average herd size in the state reached 204 milk cows in 1982, up from 134 milk cows in 1974. (12)

The San Joaquin Valley dairy industry has experienced an even more rapid growth than that of the state as a whole. Table 3 summarizes the increase of milk cow herd totals in the most recent years.

Table 3

San Joaquin Valley Dairies, Number of milk cows

<u>County</u>	1974	1982	Change
Fresno	47,457	49,938	+2,481
Kern	20,913	15,694	-5,219
Kings	43,426	56,761	+13,335
Madera	13,496	17,246	+3,750
Merced	65,249	91,306	+26,057
San Joaquin	49,807	65,445	+15,638
Stanislaus	79,669	99,407	+19,738
Tulare	82,657	126,552	+43,895
8 County Total	402,674	522,349	+119,675
California	768,848	946,201	+177,353

Source: U.S. Department of Commerce, Bureau of the Census,  
Census of Agriculture, California. State and  
County Data.., 1974 and 1982.

As can be inferred from the data in Table 3, some two-thirds of the growth in dairy herds in California are accounted for by SJV dairies. This has increased the SJV's share of dairy herd cows to 55% of the state total. Equally important, average herd size in the SJV is somewhat larger than the statewide average: 273 versus 204 milk cows, respectively. Thus, there is more of a tendency in the SJV for dairies to be able to take greater advantage of economies of scale.

The 1986 USDA whole herd buyout program has induced about 325 dairies in California to shut down affecting about 114,000 dairy cows representing 10% of dairy output. (13)

San Joaquin Valley dairies chose to participate in the 1986 buyout program at about the same rate as did dairies in all other parts of California. (14) However, average herd size of participating dairies was somewhat smaller than for all SJV dairies. Therfore, average herd size for those dairies that remain in production will show an increase. Similarly, average production per cow in the SJV was about 184.40 cwt per year whereas for those SJV dairies choosing to close average cow production was only 151.52 cwt per year. Thus, SJV dairies with a higher productivity tended to remain in the business. We expect dairy productivity in the SJV to show an increase in the next year even though total production will decline. (15)

The long term outlook for the San Joaquin Valley dairy industry is quite positive. There will continue to be a shift of dairy production away from Southern California (especially Riverside and San Bernardino Counties) and into the SJV. (16) Both dairy herd size and production per milk cow in the SJV are are expected to increase as well. The continuing state boom in population and the expanded California cheese industry will pace demand to higher levels. Production costs are expected to be stable and feed costs may actually drop.

#### Cotton

Cotton has been the state's leading crop with the San Joaquin Valley accounting for nearly all production. However, the price outlook for cotton is quite poor and is likely to deteriorate

even further in the short term. (17) A huge worldwide crop is the main source of the problem with such traditional cotton importing nations as China becoming major exporters. (18) According to cotton marketing experts, U.S. cotton exports could fall to the range of 2.5 to 3.5 million bales in 1986, very sharp decrease from the 6.5 million bales exported in 1985. (19)

California growers are expected to fare better than growers in other parts of the nation. This is because California cotton quality and yields are excellent as compared to those in other states. For this reason the state's cotton industry has been quite competitive even in a declining market.

California cotton plantings will be substantially decreased in the period of the next few years. The new Federal farm programs under the 1985 Farm Bill contemplate very significant acreage set-asides and contain provisions that will induce a high degree of farmer participation.

While the program details are somewhat involved it is important to clearly understand them to see what impact there will likely be on both production and acreage planted. Briefly, the Congress sets a Target Price (currently \$0.81/lb for cotton) in enacting the Farm Bill. This price is supposed to reflect what the "average" farmer would need to receive in order to cover production costs and earn what an average urban wage earner receives in wages. When the world market price falls below this target the Secretary of Agriculture may authorize "deficiency" payments based on the difference. The Secretary may also require that producers "set-aside" a portion of their normal crop acreage of that crop and not produce on that acreage. In such a case the

deficiency payment applies to the farmer's actual production on the remaining (planted) acreage. Finally, the Secretary also sets a loan rate (currently \$0.55/lb) that is the basis for a Commodity Credit Corporation (CCC) loan on which the farmer's crop serves as collateral. (20) After one year the farmer may repay the loan and sell the cotton or may forfeit the cotton by not repaying the loan. This decision is based on the world price as compared to the loan rate. Clearly, if the world price is below the loan rate the farmer will choose to forfeit whereas the farmer will choose to sell the cotton and repay the loan if the world price exceeds the loan rate.

The system of CCC loans acts as a supply control mechanism by keeping cotton off the market (in CCC stocks) when prices are below the loan rate while the commodity becomes available when the world price exceeds the loan rate. A critical element is that farmers must comply with all program requirements including set-asides to establish eligibility for the program.

California cotton farmers tended not to participate in recent USDA programs for a very important reason. A payment limit of \$50,000 per producer was set by the Congress in the early 1970's in response to public outcry concerning very large cash payments to Western cotton producers. A majority of cotton acreage in California is in farms that have an established cotton base in excess of 1,000 acres so a major effect of the \$50,000 limitation has been exclusion of the larger producers. (21) That is, at then existing market prices, a farmer with 1,000 acres of cotton would lose more money by setting aside (and not planting) the 300 acres required by the 1984 program than would

be gained by the \$50,000 deficiency payment that year. In fact, in 1984 only 34% of the state's cotton base acreage enrolled in the program so that reductions in state plantings were far below the 30% reduction required by that year's set-aside. (22)

The 1986 cotton program has several novel features including certificates for cotton in CCC stocks as partial payment for price "deficiencies" as well as supplemental cash payments when world cotton prices fall below the loan rate by a certain value. Neither of these forms of payment are subject to the \$50,000 limit. As world prices fall to \$0.35/lb (May 1986) it is almost imperative for cotton producers to enroll in the cotton program.

The 1986 cotton program reports more than 85% of state base acreage enrolled. This implies a reduction in plantings of at least 21% as compared to 1985. Roughly 1,100,000 acres will be planted, a reduction of 300,000 acres from 1985. Nearly all of this acreage reduction will be in the San Joaquin Valley. Since the cotton outlook remains poor as far as anyone can see into the future decreased production and low prices can be expected for some time to come. Cotton growers will look to other commodities to substitute on set-aside land. For 1986 these may include feed grains, alfalfa and wheat.

#### Grapes

##### --Wine Grapes

The California wine grape industry is essentially a two-tier structure. The premium varietal segment, concentrated primarily in the Central Coastal districts, comprises about 10% to 12% of production. The bulk wine segment, located mostly in the SJV, has more than 80% of total production (by volume). (23)

In the decade of the 1970's there was a very rapid expansion of new plantings, resulting in a burst of new production once the non-bearing acreage matured. Figure 1 shows the rather dramatic rise in annual production that followed this boom in plantings. It is worth noting that the 1973 non-bearing acreage of nearly 150,000 acres equalled the total of that year's bearing acreage.

Total grape production for all purposes was over 4 million tons in 1978, climbed to more than 5 million tons in 1980, and reached nearly 6 million tons in 1982. While the premium wine market remains strong, with over 30% of annual sales (by dollars) the bulk wine market has softened considerably.

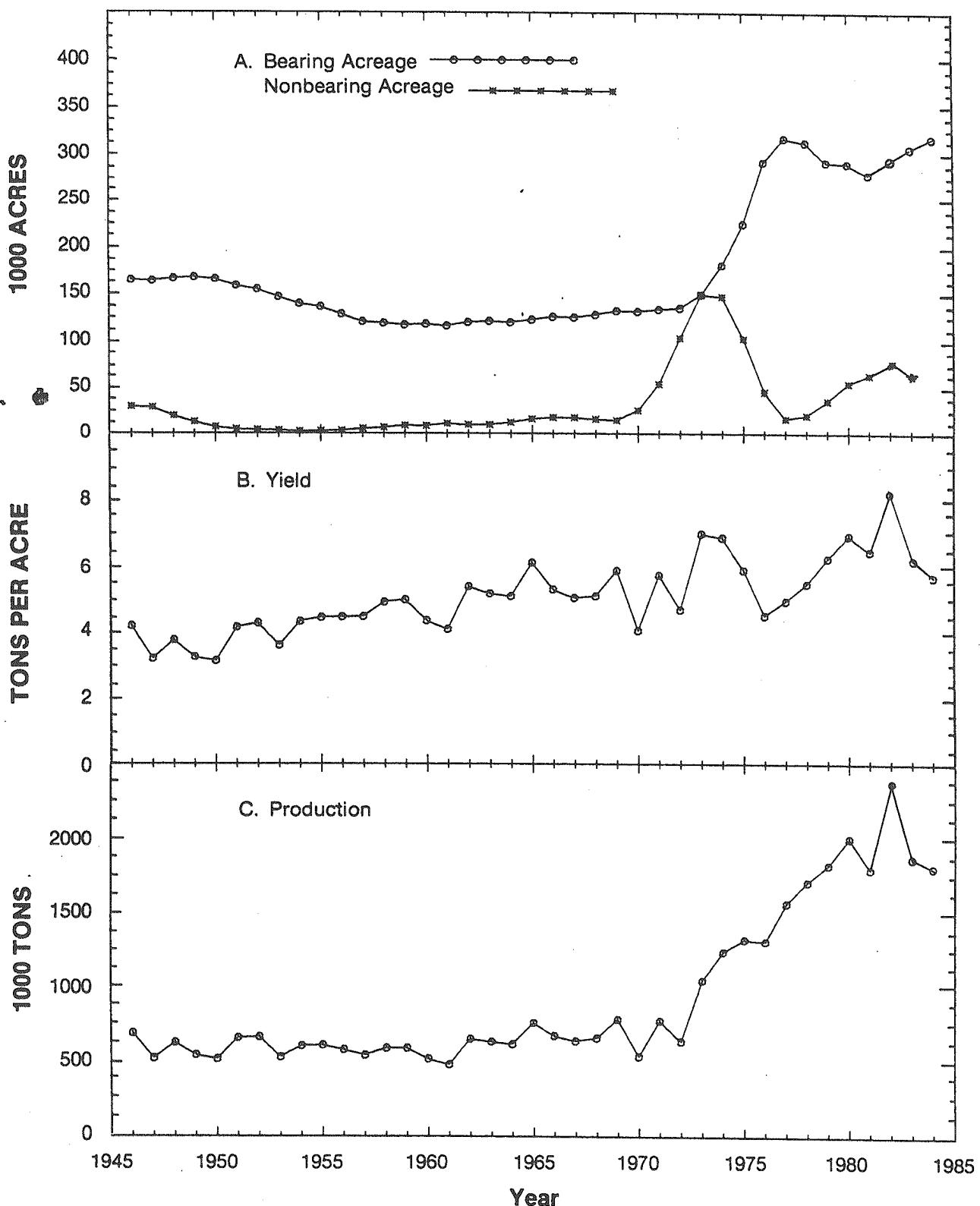
It is generally agreed that the spectacular 300% growth in annual sales of California wines of the past 15 years will not be repeated. Per capita wine consumption has not significantly changed in the past few years. The most promising segment for growth is the relatively new "wine cooler." However, the much smaller usage of wine grapes as a proportion of product volume for wine coolers as compared to bottled wines translates into a considerably slower growth of grape usage than product sales alone would indicate.

For wine grape producers these trends in production have meant a substantial weakening of wine grape prices. Table 4 provides a summary of the recent experience of wine grape prices.

The short term prospects for improvements in prices for bulk wine grapes are not good. The outlook is for "...continued surplus grape production and low grower prices...acreage of pro-

Figure 1

Wine Grapes: Acreage, Yield per Acre, and Total Production, California, 1946-1984.



Source: Giannini Foundation of Agricultural Economics, University of California, California Tree Fruits, Grapes and Nuts: Acreage and Trends in Acreage, Yields, and Production, 1946-1983, Giannini Foundation Information Series No. 85-1, May 1985, p.63.

Table 4  
Wine Grape Production and Prices

Year	Production	Prices (dollars/ton)
1980	2,896,000 tons	188
1981	2,416,000	248
1982	3,123,000	191
1983	2,310,000	188
1984	2,557,000	155
1985	2,624,000	111

Sources: California Department of Food and Agriculture, 1985 Grape Crush Report; Wines and Vines, July 1985, p. 38

ducing vineyards is expected to increase during the next two years because of vines planted in the 1980's coming into production." (24) The Security Pacific Bank research department offers the comment that "Wineries will attempt to become more competitive by emphasizing quality rather than tonnage, but under present conditions many growers will not survive." (25)

There are at least two other factors that contribute to the present imbalance of supply and demand. First, imports of foreign wines have grown from 10% of total sales in 1970 to about 25% of annual U.S. wine sales. This is perceived by some producers as the major cause of the wine industry's current problems. Second, the state's largest winery began to phase out purchase of Thompson grapes during the 1970's and eliminated them from their annual crush in 1982. (26)

Though foreign competition remains a major challenge to many U.S. industries, the International Trade Commission found that the domestic wine industry has no basis for claiming that major European wine producing countries are unfairly subsidizing table wines in the U. S. market. (27) In dismissing a complaint

brought by a group of San Joaquin Valley producers, the ITC held that the major U.S. wineries, who chose to remain out of the dispute, are actually under-pricing European imports. It is difficult to argue that the foreign competition is "unfair" when the major domestic wineries offer their product at considerably lower prices. Moulton has reported new evidence to show that European producers are plagued by many of the same problems as domestic producers and concluded that European growers "... do not have an economic comparative advantage over California growers in the production of grapes, if all costs are considered." (28)

A significant and difficult to quantify displacement of wine grapes has occurred as a result of the decision by the state's leading winery to phase out Thompson grapes from their crush. According to a winery spokesperson this move was intended to up-grade wine quality. There are two significant aspects to this development: the reduction in access to wine markets for Thompson grapes (a raisin variety) forcing a switch back to raisins, and the entry of some very large businesses into the business of growing the favored varieties. Federal tax incentives have been widely regarded as a strong encouragement for non-farm businesses to plant new vineyards. Shown in Figure 2 is a portion of a long-term contract between one such grower and a major winery concerning the planting of a large block of a favored variety. The contract is long-term and one key section provides that the grower shall receive the higher of \$175 per ton or the prevailing price for that region and variety. This in effect establishes a floor on the price for grapes that

Figure 2

MADERA COUNTY

11721

RECORDING REQUESTED BY E. & J. GALLO WINERY MODESTO, CALIF. 95353	RECORDED IN OFFICIAL RECORDS OF MADERA COUNTY, CALIFORNIA
AND WHEN RECORDED MAIL TO  PHILIP L. BAVA E. & J. GALLO WINERY P.O. BOX 1130 MODESTO, CA 95353	JUN - 3 '80 TIME - 11:30 AM FEE \$10.00 EVELYN C. BRANSTETTER COUNTY RECORDER
SPACE ABOVE THIS LINE FOR RECORDER'S USE	
<b>E. &amp; J. GALLO WINERY LONG-TERM GRAPE CONTRACT</b>	
<p>This contract is between <u>Getty Oil Company</u> of  <u>Bakersfield</u>, California ("Grower"), and E. &amp; J. GALLO WINERY of Modesto, California  ("Winery"). Grower has presently growing, or agrees to plant in 19<sup>81</sup> approximately <u>822</u> acres to <u>FRENCH</u>  <u>COLOMBARD</u> on a ranch located at <u>2½ miles South of Road 16 &amp; Ave. 6, Madera,</u>  with legal description as follows: <u>See Supplement #1</u> California</p>	
<p>which Grower has determined to be suitable for this variety of grapes, and Winery is relying on Grower's judgement that Grower can produce high quality grapes thereon. Grower agrees to harvest and deliver each year all grapes of the above variety grown on said acreage to a winery designated by Winery, beginning with 19<sup>81</sup>, (or the first crop picked, if later) and continuing until cancelled by either party. Either party may cancel this contract, effective at any time after <u>15</u> years from the date hereof, upon giving written notice to the other party at least <u>5</u> years prior to the effective date of such termination. Winery agrees to buy all such grapes delivered, subject to all the terms and conditions stated herein and on the back hereof.</p>	
<p><b>QUALITY:</b>  Winery is entering into this contract in order to receive high quality grapes for its Primary Program. In order to qualify for Winery's Primary Program, Grower's grapes must meet all the Quality Standards set forth on the back hereof.</p>	
<p><b>DELIVERY:</b>  In order to produce wines of the desired quality for the Primary Program, the time of crushing each variety is extremely important, both as to quality and the proper utilization of Winery's crushing facilities. Winery will schedule a reasonable period of time for delivery of each particular variety in each year, and Grower agrees to deliver at Grower's expense in accordance with such delivery schedule. Winery's representative will give Grower written authorization, in duplicate, to deliver within such delivery period. One copy of such authorization must be presented with the first load of such variety Grower delivers. If Winery designates a point of delivery other than its winery at <u>Fresno, Calif.</u> Winery shall pay Grower any reasonable additional hauling cost incurred by Grower in delivering to such other point, provided the grapes are delivered within Winery's delivery schedule, and qualify for Primary Program.</p>	
<p><b>PRICES FOR PRIMARY PROGRAM:</b>  Grapes covered by this contract meeting the Primary Program standards set forth herein and testing not less than <u>20</u>° Balling will be paid for at the highest cash price generally paid by Winery for such crop year in the area where grown for the same variety of the same Balling, or a guaranteed minimum of \$1.75--00 per ton, whichever is higher. This purchase price will be reduced at the rate of 10% for each degree or fraction thereof less than <u>20</u>° Balling that said grapes test, down to <u>18</u>°. Balling Grapes testing less than <u>18</u>° Balling do not meet the standards of the Primary Program.</p>	
<p><b>PRICES FOR GRAPES NOT MEETING PRIMARY PROGRAM:</b>  Any load of grapes that does not meet Winery's Primary Program because of failure to meet the delivery schedule, or sugar standards, or tolerances for defects measured by the State Inspector, will be crushed into a lesser program and paid for at the price Winery is paying for other grapes being crushed into the same program at the same date and location and Grower will be notified of such program or price.</p>	
<p>Any load of grapes which does not meet Winery's Primary Program because of any defect not measured by the State Inspector will not be crushed by Winery until Grower or Grower's agent is notified of the program into which Winery will accept the grapes and Winery's price for same. Grower shall have the option to have Winery crush the load into such program or Grower may dispose of the load elsewhere.</p>	
<p><b>ENCUMBRANCES:</b>  Grower warrants the ranch above, and all grapes to be grown thereon, are Grower's sole property and at this date same are free from any encumbrances except <u>None</u> and agrees to notify Winery promptly of any future encumbrances. Grower has read this contract, including the back, and agrees to all its provisions, including those in Schedule A attached hereto.</p>	
<p>Signed this <u>27</u> day of <u>April</u>, 19<sup>80</sup> <u>X-17-44</u> <u>Julio R. Gallo</u></p>	
Accepted: <u>E. &amp; J. GALLO WINERY</u> <u>Dennis N. Torigian</u> <u>Agribusiness Manager</u>	
By: <u>Julio R. Gallo</u> Recommended by _____ ( <u>This contract is not binding on Winery unless signed by Julio R. Gallo</u> ) Winery Grower Relations Department	
GR 101 400 Grower Copy - Colored Winery Copies - White, Yellow, Pink	

presumably justifies the substantial investment by the grower in planting such a large block of grapes for new production.

European wine producing countries faced with an similar, though much larger scale, problem of overproduction are offering incentives to growers who pull out some of their standing acreage. European wine grape acreage is 5.8 million acres and the amount of surplus that should be pulled amounts to 500,000 acres, an amount far greater than the total California acreage planted to wine grapes, some 325,000 acres. (29)

We anticipate a sharp reduction of new plantings of wine grapes and some reductions of standing vines. It does not appear likely, however, that reductions of producing vineyards will be sufficient to more than offset the amount of new production from already established non-bearing vineyards that will come into production in the next two years. Hence, bearing acreage will continue to increase.

#### --Raisin grapes

Like the wine grape industry the raisin grape industry is plagued by low prices. Recent trends in production and prices are shown in Table 5. The leading factors are overproduction, displacement of some Thompson grapes from wineries, increased foreign competition and weakness in the export market.

In response, the raisin industry diversion program seeks to keep supply as low as possible in an effort to stabilize the price paid to growers. Industry promotion campaigns and low prices for consumers may brake any further declines in prices received by growers.

Some industry observers suggest that the most intelligent

approach to the common problems faced by the wine and raisin grape producers would be to pull out some 50,000 acres of Thompson grapes from the San Joaquin Valley. (30) This amounts to only 17% of producing vineyards of that variety and could help to restore a balance of supply and demand in both industries.

Table 5

Raisin Production and Grower Returns, California

Year	Production (tons)	Grower Returns (per ton)
1980	1,620,000	\$230
1981	1,032,000	329
1982	1,547,000	220
1983	1,785,000	132
1984	1,390,000	91

Source: Wines and Vines, July 1985, p. 38

--Table grapes

This segment of the grape industry is much stronger than the raisin and wine grape segments. Bearing table grape acreage in the state is fairly stable at about 75,000 acres, a much smaller amount than is planted to other types of grapes. Though shipments have increased by more than 25% in the past decade the prices growers receive have remained reasonably steady. (31)

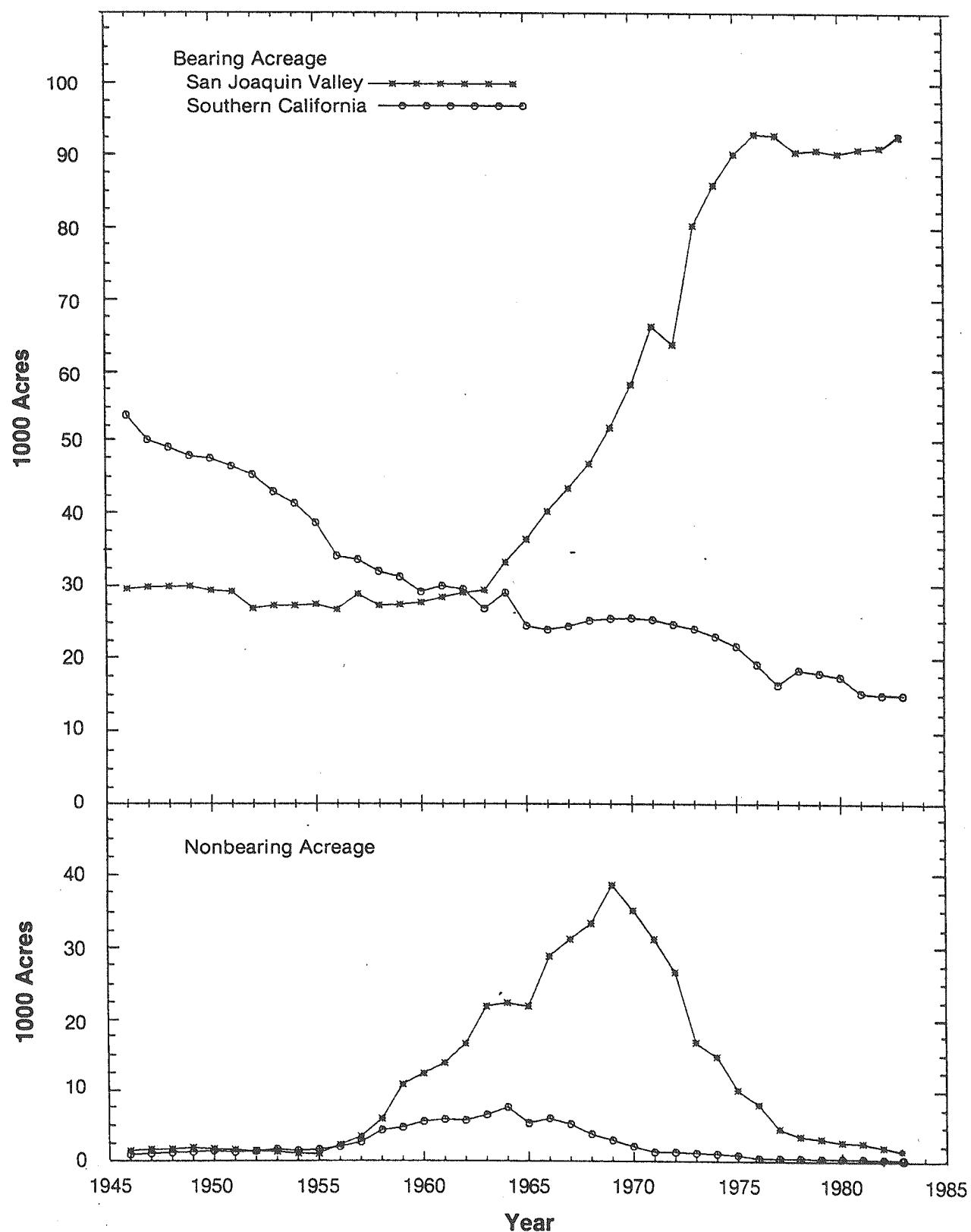
--Citrus

Citrus production has been shifting away from the Southern California district and moving into the San Joaquin Valley for more than a generation. This is shown in Figures 3 and 4 for the two varieties of oranges produced in California and in Figure 5 for lemons.

Demand for citrus is steady and grower returns have been excellent. The outbreak of citrus canker disease in Florida groves has benefitted California growers only to a limited extent

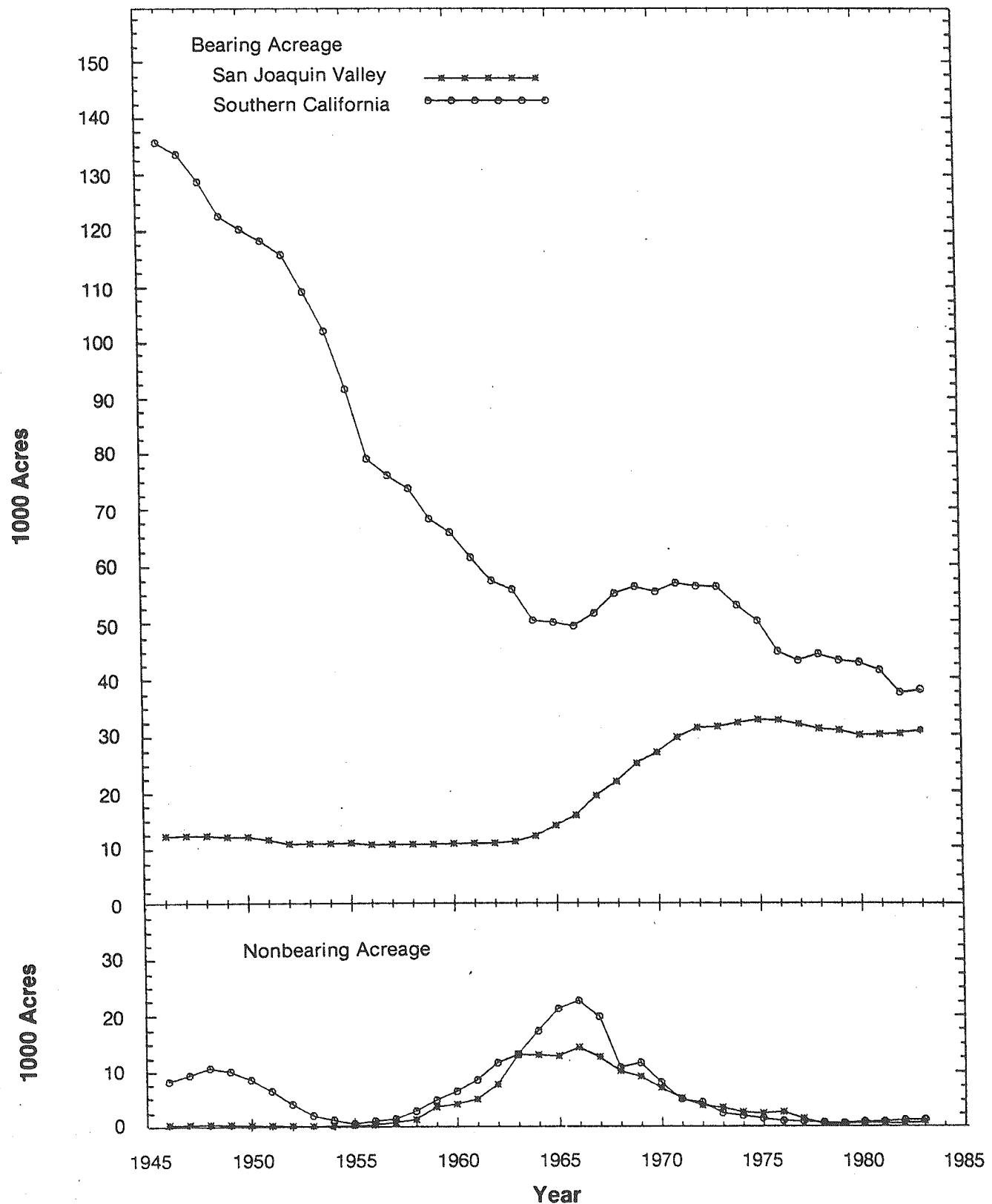
Figure 3

Navel Oranges: Acreage by Major California Production Areas, 1946-1983.



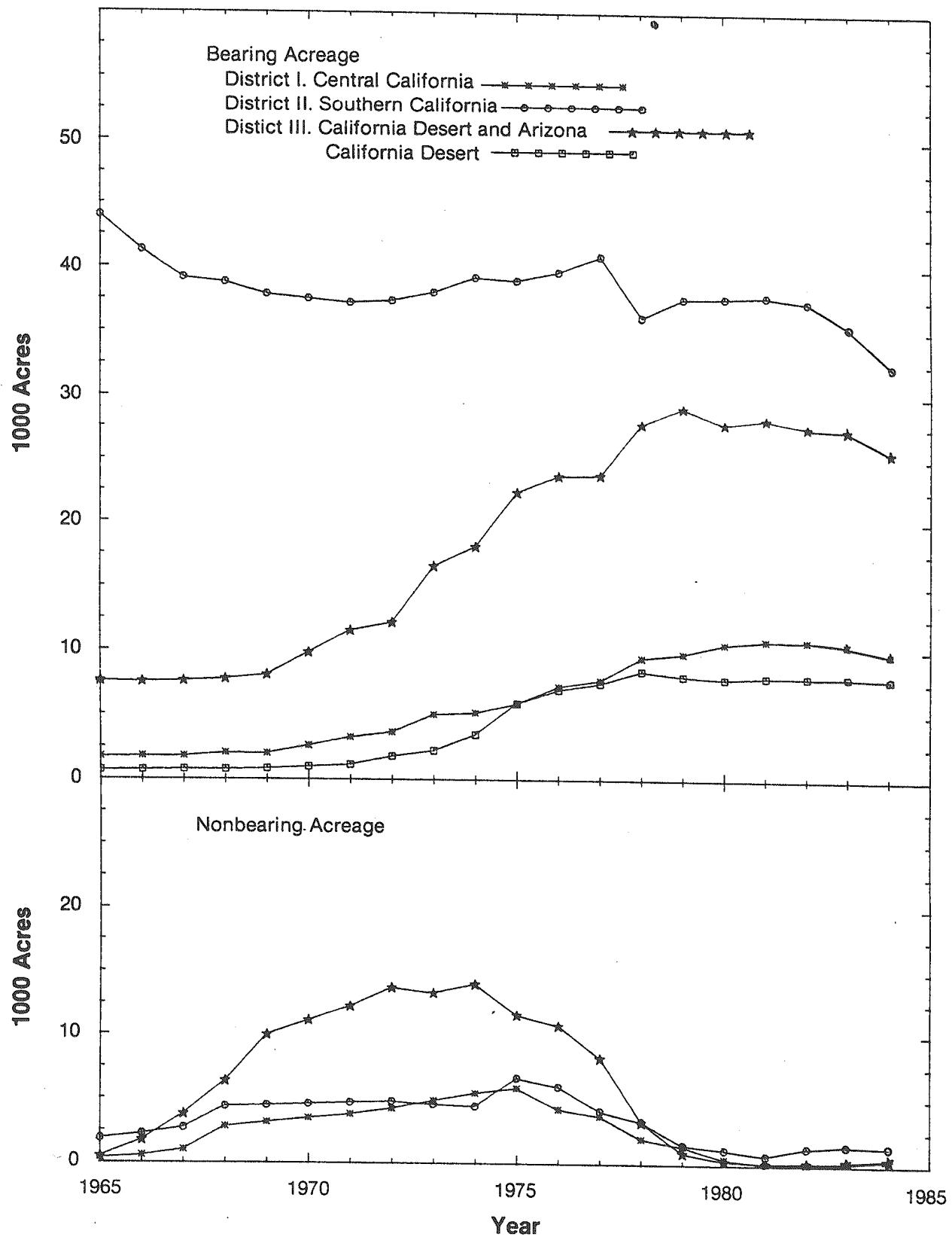
Source: Giannini Foundation ..., p.16

Figure 4  
Valencia Oranges: Acreage by Major California Production Areas, 1946-1983.



Source: Giannini Foundation ..., p.18.

Figure 5  
Lemons: Acreage by Major Production Areas, 1965-1984.



Source: Giannini Foundation ..., p.10.

because Florida oranges are crushed for juice while California's crop is primarily for the fresh market. However, about 25% of the state's Navel orange crop is used in juice or by-products.

Growers reported record high profits in the SJV counties where citrus is grown. Since only a relatively minor amount of citrus plantings remain in Southern California areas and demand is steady there will be only a small expansion of new plantings in the SJV.

--Alfalfa

Alfalfa production occupies the second largest crop acreage in the San Joaquin Valley. Dairy industry demand is the main factor driving the alfalfa hay industry. As a result of the new USDA dairy herd termination program there is an unexpected decrease in demand in the near term. 1986 alfalfa plantings were somewhat larger than those of 1985 as some growers shifted away from field crops with sharply declining prices. As a result of increased alfalfa acreage and reduced demand from the dairy industry there is likely to be a 10% production surplus in 1986.(32)

In the long term it is expected that the California dairy industry will continue to expand, particularly in the San Joaquin Valley. Therefore, after a year or two of adjustment, alfalfa prices may recover and acreage will remain substantial.

--Fresh market vegetables

Per capita consumption of fresh vegetables has substantially increased in recent years. Rising from an average of 129 lb per year in 1970-74 to an average of 148 lb per year in the past five years, per capita consumption is still increasing. (33) Recent additions of "salad bars" to the rapidly expanding fast food

outlets will continue to stimulate demand.

California has been the principal supplier of the nation's fresh market vegetables for several generations. San Joaquin Valley production is expanding. Acreage of the major crops grown for the fresh market in the San Joaquin Valley increased by about 25% between 1980 and 1984. (34) This expansion occurred primarily in the high value segment, especially lettuce, garlic, broccoli and carrots.

As land rental and water costs continue to soar in the Salinas and San Diego Coastal districts there will likely be further shifts in production. Much of the shift has been to areas of Mexico, most recently Baja California. However, some long-time Salinas Valley growers have significantly expanded their SJV acreage, particularly in broccoli, cauliflower and lettuce plantings.

One difficulty facing SJV vegetable growers is guessing how much of the crop to plant. The 1985 potato crop glut in the Kern district has encouraged growers there to cut back on plantings for 1986 to avoid the very low prices received for the 1985 crop. Similar experiences with broccoli in the Salinas district in 1985 led growers there to cut back on 1986 plantings. These experiences will tend to make growers plan to brake new plantings somewhat. Increases of fresh market vegetable acreage in the SJV will likely fluctuate about a steady, but slowly, increasing trend line.

#### --Almonds

California almond plantings have experienced a remarkably rapid increase over the past 15 years. This is shown in Figure

6. As shown in Figure 7, the major share of the expansion of almond acreage has been in the San Joaquin Valley. Kern County had only a few hundred acres of almond groves in 1965 but today has 84,000 acres, of which 13,000 acres are non-bearing.

New plantings have somewhat higher tree densities so that overall yields have been increasing as well. The combined effect has been a mammoth crop, subject to very large fluctuations due to adverse weather conditions during the pollination period in 1984 and 1986. Nevertheless, as Figure 6 clearly shows, the long-term production trend is sharply higher.

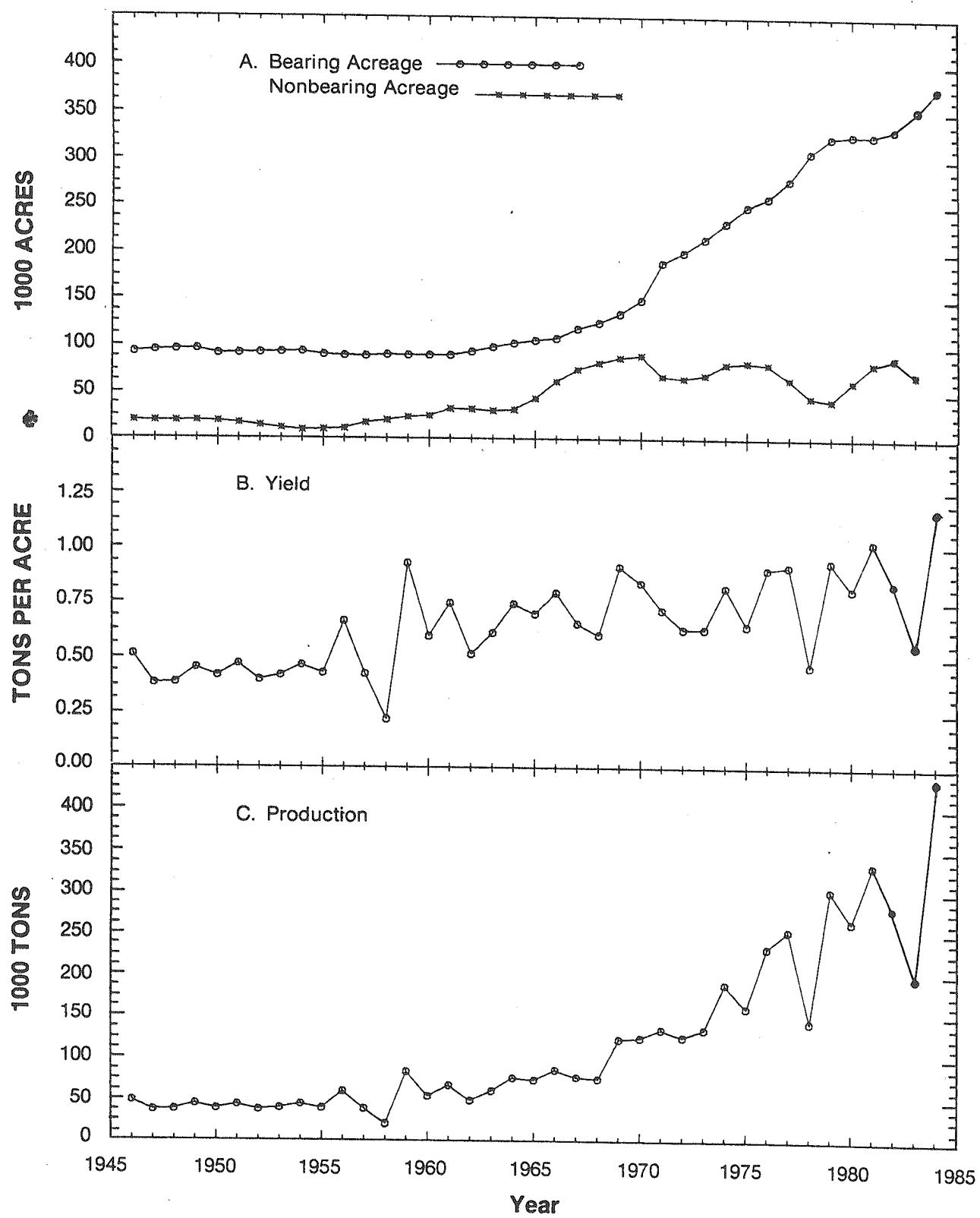
As in the case of other commodities with an increased base of plantings, the long term price trend has been unfavorable to growers. Though prices will be higher in 1986 as a result of a much reduced crop the return to some growers may still be poor because of the much smaller yield.

The California Almond Growers Exchange markets a majority of the crop and has been vigorously pursuing overseas markets. Spain and Italy are major competitors and are likely to be very hard to displace from the European sector of the market. It is likely that newly developed markets, such as Japan, hold the greatest long-term potential for increasing almond exports.

The problem of low prices in abundant crop years and low total returns in years of light crops has forced a number of growers to leave the business. A continuing shake-out will characterize the near-term with few new plantings along with some reductions in standing trees. However, there are still some 54,600 acres of non-bearing trees that will come into production in the years ahead as compared to 380,000 acres of

Figure 6

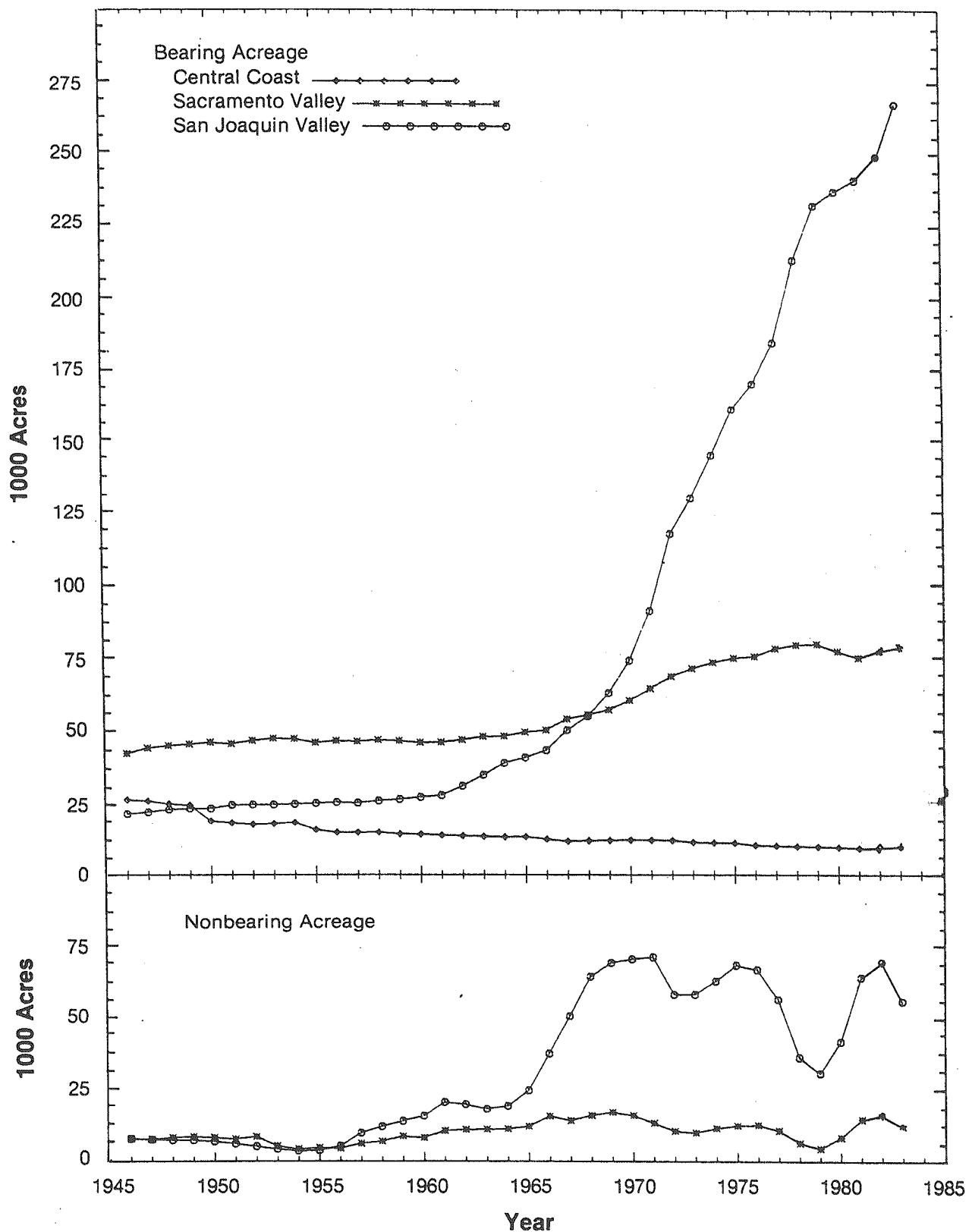
Almonds: Acreage, Yield per Acre, and Total Production, California, 1946-1984.



Source: Giannini Foundation ..., p.71.

Figure 7

Almonds: Acreage by Major California Production Areas, 1946-1983.



Source: Giannini Foundation ..., p.72.

bearing trees. (35) Therefore, production will continue to show an increase, on the average, for several more years. There is little likelihood of a new wave of almond plantings, such as occurred in the 1960's and 1970's.

--Peaches

Consumer demand for fresh fruit has increased even faster than demand for fresh vegetables. Per capita consumption of fresh fruit was an average of 76.26 lb per year in the period 1970-74. For the period 1980-83 this figure had risen to 86.7 lb per year, roughly a 14% increase. (36)

Freestone peaches have been one of the crops benefitting from this shift in consumer preference. Competition from the southeastern states is a significant factor as are weather conditions during the critical pollination period. Bearing acreage will remain stable for the foreseeable future.

Cling peaches are grown for the canning and processing industries. Once highly dependent on export markets, the major canneries have been shutting down local operations in recent years. Multinational firms, such as Del Monte Corp., have chosen to relocate their packing operations to European Community (EC) nations and thereby avoid import tariffs. (37) At one time Del Monte was California's leading canning firm. Today, it has but one plant remaining in the state. Its canneries that serve the EC market are located in Italy and South Africa.

Faced with declining cannery purchases local growers have implemented a pullout program that has reduced cling peach acreage from some 41,000 acres in 1980 to 27,500 acres in 1984. Sharply rising imports of canned peaches now pose a major threat

to the state's growers. It appears likely that further declines in California cling peach acreage will occur even though consumer demand remains relatively stable because domestic packs will be faced with competitively priced imports.

--Processing Tomatoes

Production of processing tomatoes was centered in the Lower Sacramento Valley until the mid-1970's. Today, Fresno County's Westside production far exceeds that of Yolo County, once the state's leading county in processing tomato production. As recently as 1977 the San Joaquin Valley share of the state's total acreage of this crop was 36%. By 1984 this had risen to 46%. (38)

Fresno County production and yields continue to outpace those of other counties. In 1978 that county's acreage was 36,650 acres and by 1984 had reached 65,800 acres. (39) The much lower rainfall and early spring conditions favor a long season in the Westside areas of the SJV. Canneries are able to spread their incoming flow of the harvested crop in a highly reliable manner. Canneries seek to maintain a high level of efficiency during the packing season with crop flow near peak.

California's total acreage of processing tomatoes has been stable for more than a decade. In part, this reflects the fact that some 85% or more of national production is now located in California and further additions at the expense of other states will, of course, be quite small. Foreign competition has also become a factor.

Acreage and price will remain stable for the foreseeable future with additional intra-state shifts in producing areas

a strong possibility. The SJV will be the main beneficiary of these shifts for the reasons indicated above.

--Walnuts

Acreage of producing trees has been stable for a number of years in California. About one-third of the total California crop is exported and competes with a roughly equal amount that is produced in other countries. Grower returns have declined in recent years reflecting ample supplies and tough competition in world marketings.

The San Joaquin Valley is the site of about half of the state's bearing acreage. Over the past thirty-five years state production has been relatively constant. There have been major intra-state shifts in production. These are illustrated in Figure 8. Southern California and Central Coast production areas have declined in importance and the SJV has become the leading district. Further shifts in production centers are unlikely in the foreseeable future.

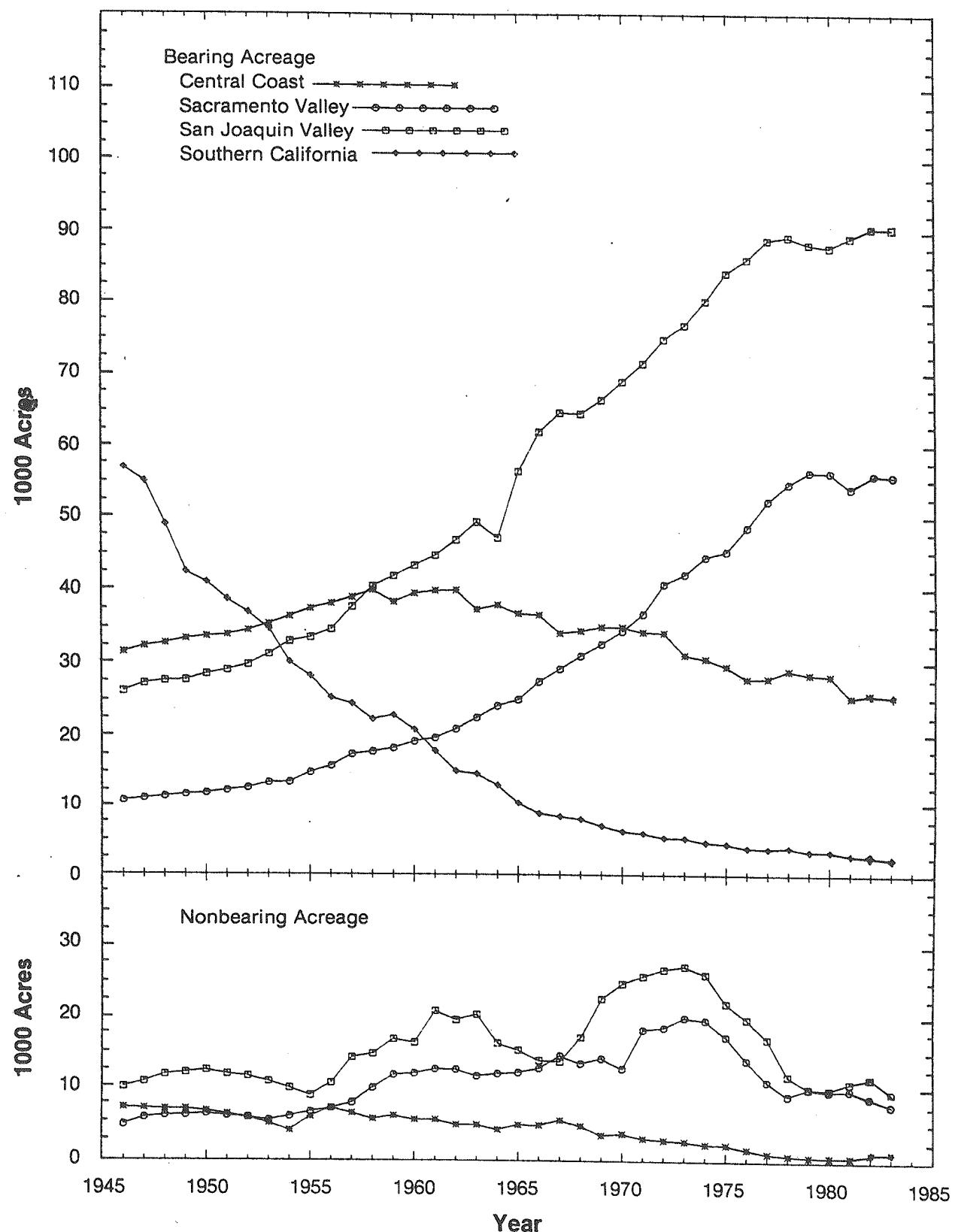
--Chickens and Turkeys

Poultry consumption has increased sharply in the U.S. in recent years. Per capita consumption rose from an average of 49.6 lb per year in 1970-74 to 63.4 lb per year in 1980-83. (40) The SJV is the state's center of poultry production with some 90% of the annual number of slaughter fowl. (41)

Producers prices remain strong and the outlook for the industry is quite favorable. Should red-meat supplies increase the poultry industry will experience increased competition for the consumer's meat purchases. This will tend to soften prices somewhat.

Figure 8

**Walnuts: Acreage by Major California Production Areas, 1946-1983.**



Source: Giannini Foundation ..., p.81.

## SACRAMENTO VALLEY

As shown in Table 6, the Sacramento Valley is the state's fourth ranking region of agricultural production.

Table 6

### California Agricultural Production, 1984

District	Production Value	Share of State
San Joaquin Valley	\$7.567 billion	47%
Southern California	4.242	26
Central Coast	2.284	14
Sacramento Valley	1.421	9
Other districts	0.588	6

Source: California Crop and Livestock Reporting Service,  
Summary of County Agricultural Commissioners' Reports, August 1985.

Per centage shares of state total do not add to 100% because of rounding.

Though the Sacramento Valley (SV) share of state production has declined in recent years it has benefitted from expanded acreage of irrigated land. This is shown in Table 7.

Table 7

### Expansion of Irrigated Agriculture, 1949-1982

<u>County</u>	Irrigated land, acres		
	1949	1982	Net change
Butte	125,209	215,908	+90,699
Colusa	97,347	236,752	+139,405
Glenn	102,557	193,336	+90,779
Sacramento	127,514	146,857	+19,343
Solano	105,790	116,704	+10,914
Sutter	201,138	233,746	+32,608
Tehama	72,138	99,437	+27,299
Yolo	139,483	253,532	+114,049
Yuba	67,259	82,638	+15,379
Total	1,038,435	1,578,910	+540,475

Source: U.S. Department of Commerce, Bureau of the Census, Census of Agriculture, California, State and County Data, 1949 and 1982.

Much of the addition of irrigated acreage summarized in

Table 7 represents a shift in cropping from one type of field crop to another. For example, expanded rice production has displaced dryland grain production. In contrast with the San Joaquin Valley there is a very small production of fresh market vegetables and an even smaller production of grapes in the SV.

About 40% of SV farm marketings are field crops as compared to a 26% share for the SJV. For this reason, SV farmers are more subject to fluctuations in the world grain trade. Record grain harvests on a world-wide basis have made current prospects less attractive for SV farmers.

A total of 513,696 acres of SV irrigated land was planted to rice in 1982.(42) This represents one-third of the Valley's land under irrigation. Bountiful supplies of rice in Asian exporting nations make the export competition severe. Only 30% of U.S. rice production is consumed by the domestic market. As in the case of the world cotton market, decisions of foreign producers can have a devastating impact on California growers.

The 1986 USDA rice program includes a 35% set-aside. Like the cotton program, participation by California farmers is high. As a result planted rice acreage in the SV will be approximately 335,000 acres, a reduction of 180,000 acres. (43)

Sacramento Valley fruit and nut crops account for 25% of gross crop receipts in the district. Cling peach and pear acreage is declining as a result of cannery phaseouts. Other tree fruit and nut acreage remain stable though prices for some crops, such as almonds, have been low.

About 12% of SV farm production comprise vegetables, mostly processing tomatoes. Though historically the main production

district, the SV has been replaced by the SJV district as the state's leader. This has occurred entirely as a result of a shift of production from SV to SJV. That is, state production has remained constant. It is likely that this intra-state shift will continue because of the higher yields reported by SJV growers and the more favorable growing season.

## ISSUES - CURRENT AND FUTURE

Quite apart from factors influencing production of particular commodities Central Valley agriculture is facing some vexing problems. These are water costs, the continuing cost-price squeeze and problems associated with export markets.

### --Water Pricing

As emphasized in the discussion of SJV and SV crop prospects presented above, the single largest factor in the recent spurt of growth of Central Valley agriculture has been the development of additional water supplies to irrigate more land. Controversy concerning the failure of the U.S. Department of Interior to carry out the will of Congressional intentions as expressed in the provisions of the 1902 Reclamation Act pertaining to acreage limitation and residency led to an upsurge of litigation in the 1970's. As a result of Federal Court decisions upholding the intent of Congress regarding these matters the Department began, in the years of the Carter Administration, to develop regulations to implement the law. The ensuing storm of controversy led to the passage of the Reclamation Reform Act of 1982 (RRA).

The new law is in the process of implementation with the most controversial feature, known as the "hammer clause," due to become effective no later than April 1987. Sec 203 (b) of the RRA provides that landholders with irrigable acreage in excess of 960 acres must pay full costs on Federal water supplies used to irrigate the excess acreage. Substantial water price increases would result. (44)

There are several difficult questions concerning the proper implementation of the RRA. First, how much acreage will be

affected and in which districts is that land located? Second, can the intent of Congress in requiring Districts to amend long-term water contracts with the Department, under certain well-defined conditions, be carried out? Third, if carried out, will RRA-forced water price increases lead to changes in the pattern of cropping?

The intent of Congress in limiting water subsidies to small scale family farmers in the 1902 Reclamation Law has never been seriously questioned. The 1982 amendments reflected an effort to reach a compromise that, on the one hand, changed the law to conform with practices that were patently in violation of the 160 acre limitation and, on the other, set into motion a process of forcing water users to begin to pay full water costs on excess acreage.

It has been well-established that more than 90% of the land affected by full cost pricing is located within California. (45) Recent evidence suggests that an actual majority of land in the state's six districts receiving the largest CVP water deliveries is in farms which exceed 960 acres. (46) It is also known that of the 415 farms in the 17 Western states affected by RRA some 399 are in California. In addition, of the estimated westwide total of 685,000 acres expected to be required to pay full cost, if current farm size patterns persist, about 663,000 acres are in the mid-Pacific region (California). (47)

Major districts in California affected by full-cost pricing include Westlands Water District and Glenn-Colusa Irrigation District, the largest districts in the SJV and SV, respectively. The latter district has already initiated litigation that seeks

to block implementation of the intent of Congress as expressed in the RRA.

Draft regulations have been circulated by Department officials among water user groups although the public, including interested members of Congress, was not given access to these materials at that time. (48) Assuming that Department officials intend to carry out the will of Congress, regulations will be promulgated in the latter half of 1986 and will go into effect in early 1987.

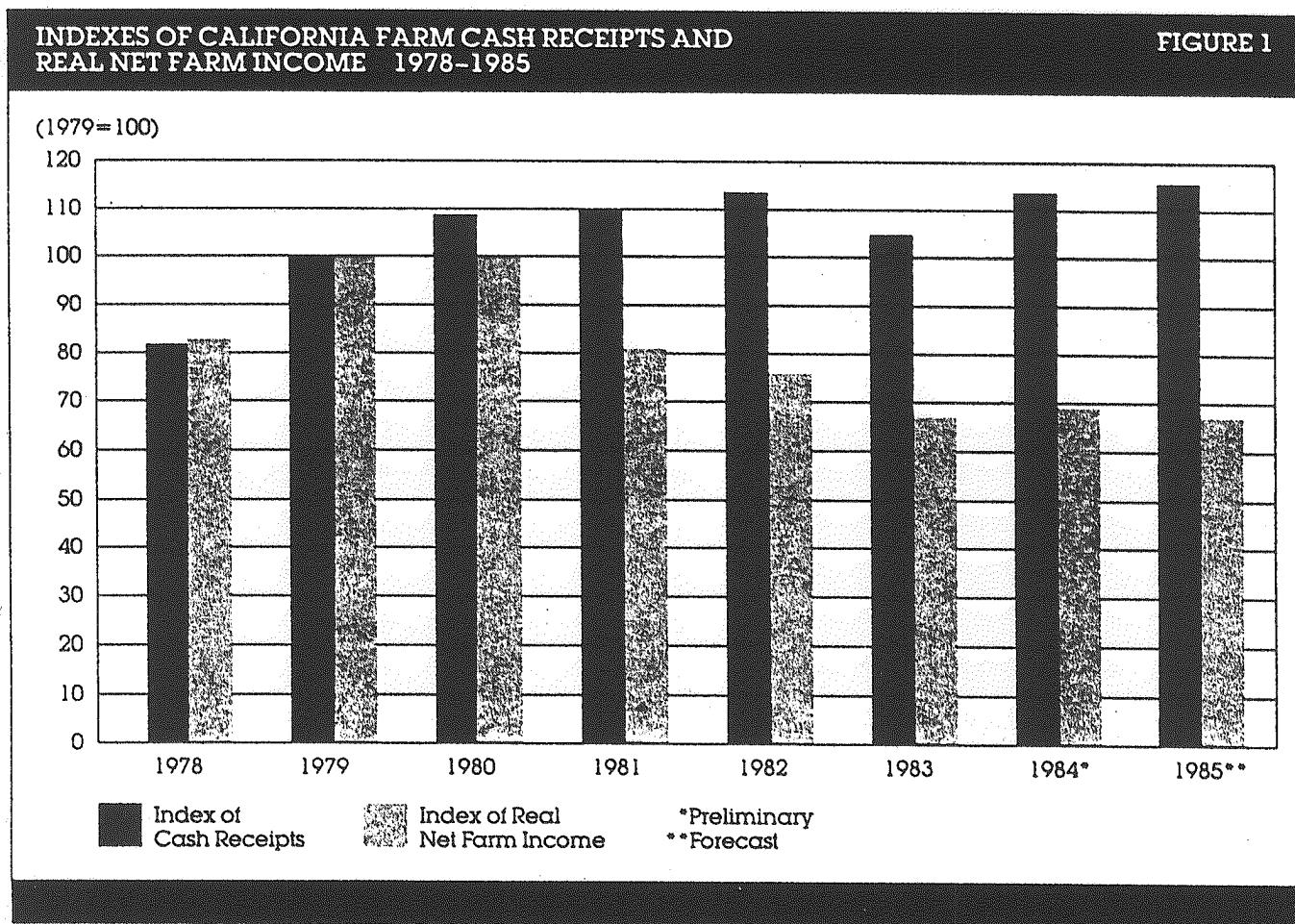
It is difficult to imagine that an Administration and Congress committed to reducing Federal deficits and trimming budgets will seriously entertain further legislation to weaken the RRA, especially if only a small number of very large farm businesses are the beneficiaries. Therefore, the most likely outcome of the 85 year controversy over acreage limitation will be promulgation of regulations to implement the RRA and a series of legal actions by water user groups to block the law.

As has been pointed out elsewhere the main consequence of implementation of the RRA will be to encourage affected producers to shift cropping patterns in a manner designed to generate some additional revenue to cover the increased water costs. (49) Some farm businesses may choose to retire a significant portion of their land pending favorable commodity market developments.

#### --The Cost-Price Squeeze

For more than thirty years agriculture has been faced with rising production costs and, with some notable exceptions, crop returns that have not kept up with overall inflation. As shown in Figure 9 real net farm income in California has fallen

Figure 9



Source: Bank of America, California Agriculture Outlook-1985, June 1985, p.1

33% in five years. While this decline has put a severe strain on those farm businesses with a high load of debt service, there is another effect as well. Individual farm businesses will seek to maintain income by cutting unit costs - and this is most effectively accomplished by increasing production volume.

As described earlier for the case of SJV dairies, there will be a significant increase in average herd size and in production per milk cow as a direct result of the USDA dairy herd termination program. In effect, government policy is directly assisting the dairy industry reduce industry-wide unit costs by helping to eliminate the smaller and less productive dairies.

Individual farm businesses can achieve the same results, in general, only by expanding their productive acreage. As land prices fall and as debt-strapped farmers seek to avoid loss of both home and livelihood a climate is created in which those with capital will increasingly see opportunities. Medium size units, under conditions such as prevail at present, will give way to the larger units. Evidence that this process has been underway in California agriculture for some time is presented in Table 8. We show here the distribution of state farm commodity receipts by size of farm (measured by amount of annual commodity receipts).

Table 8

Distribution of Farm Sales by Size of Farm, California

Farm size - Annual sales	1974	1982
Less than \$100,000	13%	8%
\$100,000 - \$499,999	26	19
\$500,000 or more	61	73

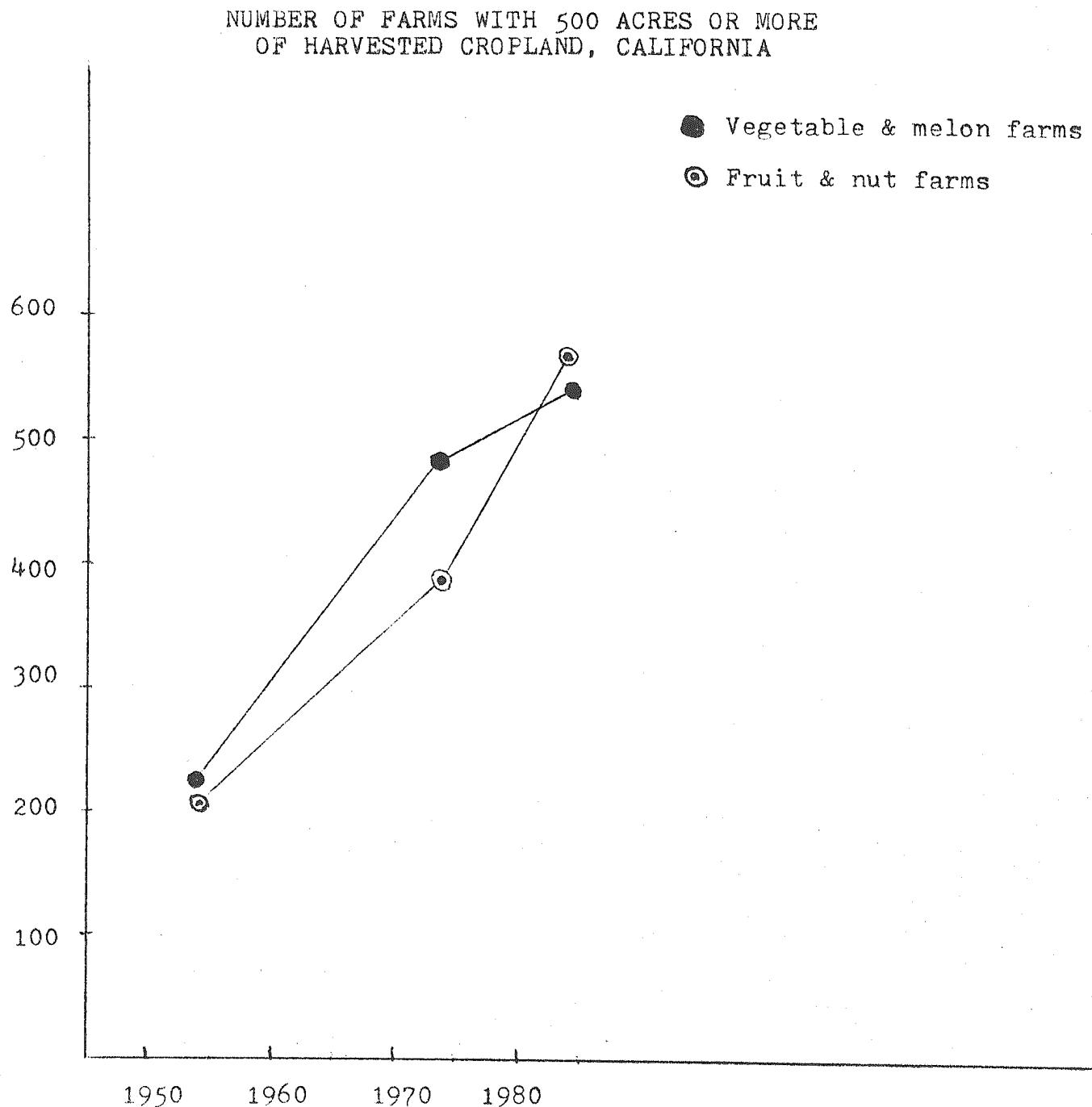
Source: U.S. Department of Commerce, Bureau of the Census,  
Census of Agriculture. California. State and County Data, 1974 and 1982

The most striking features of these changes in shares of state farm receipts is that very large farms (annual sales of \$550,000+) have increased their share by 20% in just 8 years. And medium to large farms (annual sales between \$100,000 and \$499,999) have seen their share of state agricultural output fall by 27% in the same short time. Small to medium farms (annual sales less than \$100,000) have seen their share of state farm output fall by a whopping 38%.

The current shake-out in agriculture will not only force a number of producers out of business it will also re-shape the structure of the state's farm sector. Lenders have already made clear that they intend to provide support only to those producers with a demonstrable ability to show a positive cash flow. In a time of low commodity prices this means that those able to generate the highest rate of return on invested capital will have a competitive relative advantage. It has been shown that the very largest California farm businesses have an average rate of return on invested capital comparable to that of the industrial sector leaders. (50)

There are other possible measures of this important trend in California farm structure. Figure 10 shows the recent trend in the actual numbers of fruit and nut and, separately, vegetable and melon farms with harvested cropland in excess of 500 acres. Fruit and nut farms in this size range increased from 203 in the state in 1954 to 389 in 1974, an increase of 186 (+9.3 per year). By 1982 the number of such farms had grown to 570, a net increase of 181 (+22.6 per year). Similar figures describe the changes in the number of vegetable and melon farms with more than

Figure 10



Source: U.S. Department of Commerce, Bureau of the Census, Census of Agriculture, California, State and County Data, 1954, 1974, 1982.

500 acres of harvested cropland.

What is remarkable about these figures is that the rate of increase of the number of such "large" farms is actually itself accelerating. Both types of farms have been traditionally the stronghold of small scale family operators. This evidence suggests that their dominance may well be ending.

--Dependence of Agriculture on Export Markets

U.S. agriculture enjoyed a boom in exports in the years that followed the Russian grain purchase. By the early 1980's total agricultural commodity exports had reached a value of \$45 billion per year. California shared in this boom with 1981 exports of \$4.2 billion, more than one-third of the value of that year's total production. (51)

In the past five years U.S. farm exports have decreased quite sharply to an estimated value of just \$29 billion in 1985. It is expected that the world wide grain glut and excess production of such important commodities as cotton and grapes will make a further decrease likely in 1986. California's exports have fallen as well, and at a rate not significantly different from the nation's.

What is of great concern is that the world wide crop glut is not likely to be quickly reversed. That is, each nation will act to benefit its own national interest as opposed to agreeing to production controls on a multi-national basis. In such a climate there will be increased competition and possible trade retaliation that could adversely affect crops of particular importance to California producers.

Already, significant amounts of vegetable production has

developed in Mexico. The latest areas to develop irrigated production capacity are located in Baja California. There is a strong possibility that most of the national fresh tomato demand will be satisfied from Mexican sources in the future.

A significant increase in agricultural imports to the U.S. has been occurring in recent years. It is presently at a level of about \$21 billion per year. Should U.S. agricultural exports continue to decline it is entirely conceivable that we shall become a net food importer by the end of the decade.

The lesson for California agriculture is that the export market has vagaries that are beyond the direct control of the state's farmers. Even foreign policy decisions, whether trade embargoes or commitments not to harm a particular nations main export crop sales, can have an abrupt and undesirable impact on California agriculture's own plans. One can only say that the ups and downs of this kind of dependence on foreign markets will create substantial and unpredictable swings that will have major impacts on domestic producers.

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