

U.S. Federal Reclamation Programs
A Record of Technical Success and Social Failure

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California's Emergence as the Leading Agricultural State

California is the leading agricultural state of the United States. We now have 60% more production of agricultural commodities than does second ranked Texas (as measured by farm cash receipts - farm sales).¹ California emerged as the nation's leader about 45 years ago when, for the first time, its output of crops and livestock exceeded that of Iowa, previously the leader among the states. Since that time California has led the nation, and, of greater significance, its share of national crop production has steadily increased throughout that period.

With just 2.5% of the nation's cropland California now has 16% of all U.S. crop production (again, measured by value of farm cash receipts).² By way of contrast, Texas has 5% of U.S. crop production, but has 8% of the nation's cropland, three times more than California.³ The major elements contributing to California's leading role as a producer of crops are, of course, our unusual combination of favorable climate, high quality soils, abundant supply of agricultural labor and irrigation.

Irrigation has been a critical feature in developing California's leadership in agricultural crop production. Major irrigation projects in California have their origin in the federal projects initiated in the 1930s. Figure 1 shows the major man-made systems now in place. Figure 2 shows the long-term trend of irrigated acreage in the state. The amount of irrigated land in California has doubled over the past fifty years. While the total amount of the state's cropland has declined, the fraction of our cropland that is irrigated has increased to point where, in 1987, 91% of the state's harvested cropland is irrigated.⁴ Nearly all of the net decline in the state's cropland over the past thirty-five years has been in the category "Cropland used only for pasture or grazing." There has been no loss of harvested cropland in this period.⁵ Paradoxically, this has also been a period of rapid population increase and urbanization within the state. California's population increased from 7 million to 30 million during the same period that irrigated land area doubled. Contrary to popular wisdom, California has actually experienced some modest growth in the amount of its irrigated cropland at the same time that it has undergone remarkable urban development.

One important consequence of this increase of irrigated cropland in the state is that we have significantly increased the amount of our fruit and vegetable production. Consumer demand has favored more fresh produce in recent years and California farm producers have been able to respond to this changed demand because they have the necessary infrastructure in place to grow larger amounts of fresh produce. Figure 3 shows the 70% increase of

vegetable production our state has experienced in the past twenty years. Similarly, Figure 4 shows the 40% increase in the production of tree fruit in California in the same period while Figure 5 shows the increase in grape production. Some crops, such as broccoli and strawberries, have experienced even greater increases than these figures suggest.

Another type of crop that has become extremely important in recent years is the broad category of "Nursery and Greenhouse Crops." This type of crop now accounts for more farm sales in California than does all of our grain and cotton production combined.⁶ On a national basis, nursery and greenhouse crop production has a greater value in farm sales than does the combined wheat production in all of the fifty states.⁷

In the context of the present discussion, these production increases are all in crops that have substantial labor requirements. Prof. Juan Vicente Palerm has described this as the "re-laborization of agriculture."

California's Crop Diversity

California also has a cropping pattern that differs greatly from that of the U.S. as a whole and is related to our favorable combination of climate, irrigated land and cheap immigrant labor supply described above. Figure 6 shows the distribution of crop production by type of crop for the U.S. as a whole. About two-thirds of U.S. farm production is field crops, about one-third is vegetables, fruits and nuts, and nursery crops. Figure 7 shows that, for California, the pattern is the reverse. Just one-fifth is field crops while four-fifths is vegetables, fruits and nuts, and nursery crops.

Overall, our state now produces 39% of all U.S. vegetables and melons, 53% of all fruits, nuts and berries, and 24% of all nursery and greenhouse products.⁸ While the value farm cash receipts for grains in the U.S. dropped during the 1980s, the value of the other crops increased dramatically.

From this discussion, it should be clear that one reason why we are the nation's leading agricultural state is that we produce far more higher value crops than do other states. Our crop production value per acre of harvested cropland is about \$1,207, whereas for the U.S. as a whole it is just \$209.⁹

Federal Reclamation Programs and Irrigated Farming in California

Original Reclamation Policy

Reclamation policy has a long and interesting history. The federal Bureau of Reclamation was established in 1902 by the Reclamation Act which authorized the federal government to finance irrigation projects in the west. These projects would deliver water to arid areas where crop production was otherwise impossible. A subsidy to family farmers was explicit in the reclamation program from the very beginning. Although farmers were required to repay the costs of building reclamation projects over time (40-50 years), those payments were to be interest free. This subsidy made the issue of whether the purposes of reclamation law were being fulfilled quite important.

To open new lands for agricultural production was only part of the purpose of the Reclamation Act (and in this mandate, the Bureau has been successful). The primary purpose was to encourage the settlement of family farmers in the west and to spread the benefits of the subsidized irrigation program to the maximum number of people.

F.H. Newell, the first Commissioner of Reclamation, summarized the purpose of the Reclamation Act of 1902 in the following way,

"The object of the Reclamation Act is not so much to irrigate the land as it is to make homes...It is not to irrigate the lands which now belong to large corporations or to small ones; it is not to make these men wealthy; but it is to bring about a condition whereby that land shall be put into the hands of the smaller owner."¹⁰

To accomplish these goals, the law specified that landowners in reclamation projects could not receive irrigation water for more than 160 acres and that they must reside on or near the land. One immediate problem was that the law did not require those landowners with large holdings in reclamation project areas to sell their lands in excess of the acreage limitation. It wasn't until 1914¹¹ that Congress specified that all such landowners would have to agree to sell their excess lands. These owners were required to sign "recordable contracts" to sell their land at a price to be fixed by the Bureau which would not reflect any enhancement to the value of the land due to the construction of the irrigation projects.¹² Administrative regulations fixed the period for the sale of excess lands at not more than 10 years from the date of the contract.

In some areas, especially California, there were significant deviations from the law's original intent. The Bureau gradually came to interpret the ownership provisions as meaning 160 acres per owner, rather than per farm. As a result, tracts of land greater than 160 acres were sold to groups of relatives or business partners in 160-acre pieces, or in larger pieces with each person's share of the joint tenancy less than 160 acres. In addition, the residency requirement was not enforced.

Most of the farms whose acreage exceeded the 160-acre limit were in California. In fact, the Bureau's own research indicated that, as of 1978, 92% of the farmed acreage in the "Westside Study Area"¹³ receiving project water was in farms greater than 160 acres.¹⁴

Alleged abuses in enforcement of the provisions concerning sale of excess land were great enough that legal action was brought by the non-profit membership organization National Land for People. This action resulted in a 1976 court order finding that the Bureau was in violation of the Administrative Procedures Act and directed the Secretary of Interior to enforce the law.¹⁵ When National Land for People discovered that some of the required sales were "bogus transactions" involving the uses of strawmen, i.e., someone used to disguise another's intentions, it won a court order to stop these sales, until regulations were issued that would implement the acreage limitation provisions of the law.

At the time of the court decision many observers concluded that, finally, the 160-acre limitation would be fully enforced. Congress has repeatedly re-affirmed its commitment to this goal and its view has been upheld in the Courts.¹⁶ At the same time, the failure of Interior to publish rules and to rely instead on individual interpretations of the law by the Department's solicitors made possible a significant weakening of Congressional intent in the administration of the law. The district court ordered Interior to publish rules.

Reclamation Reform Act of 1982

In order to close these loopholes and to clarify their intent with respect to reclamation policy, Congress passed the Reclamation Reform Act in 1982 (RRA). One of the important changes introduced by RRA was that full water costs were to be charged to all farm operations on land in excess of 960 acres. The 960-acre limit was to refer to combined landholdings in all of the 17 western states that have federal irrigation projects. Old law had limited landownership to 160 acres for an individual, or 320 acres for a married couple, per water district. In states with hundreds of water districts, such as California, this was an important distinction.

The RRA limit of 960 acres was strengthened by insisting that it be applied to all holdings operated as a single farm no matter how many persons or legal entities held joint title. Prior to RRA, leasing had not been regulated.

In 1986 CIRS published a study of the size distribution of farms receiving water under the reclamation program. Table I shows the main result of this study.

TABLE I

Farm Size Distribution, Land Eligible for Project Water
Ten California Districts, 1985

<u>Size Class</u>	<u>Number</u>	<u>Irrigated Land</u>
80 acres or less	534	20,632 acres
81 - 160 acres	284	37,042
161 - 320	317	77,924
321 - 640	282	133,047
641 - 960	145	117,207
961 - 1,280	64	70,611
1,281 - 2,560	94	167,971
2,561 - 5,120	44	153,539
5,121 acres or more	27	241,900
Total	1,791	1,019,873

Source: D. Villarejo, How Much Is Enough?, California Institute for Rural Studies, Davis, CA 95616, 1986, p. 19.

Landowners were given an option. They could remain under the jurisdiction of earlier reclamation law, or they could elect to be governed by RRA. Remaining under old law would allow them to receive fully subsidized water on all of their owned land. But they would have to pay full cost on all leased land in excess of 160 acres ("hammer clause" of RRA). Many of the largest landowners elected to do this. On the other hand, if they decided to be governed by RRA, they would have to pay full cost on all water used to irrigate lands that they owned or leased exceeding 960 acres.

Congress was quite clear about its intent in making these changes:

"Both the House and Senate versions of Title II provide for an increase in the basic ownership limitation and reduce the subsidy for larger farming operations."¹⁷

In another significant departure from earlier policy, the RRA abolished the residency requirement. Under RRA, absentee landowners are able to receive low-cost irrigation water. Overall, the effect of RRA was to considerably liberalize the requirements of reclamation policy.

Bureau Rules to Implement RRA

On April 13, 1987 the U.S. Department of Interior issued final rules intended to limit the amount of Federally subsidized irrigation water that could be provided to a single farm water user in the arid regions of the western United States.¹⁸ Many observers felt that the rules represented a further weakening of reclamation administration. No restriction was placed on the number of 960-acre tracts that could be farmed together as one unit by a management company; no provision prohibited members of a farm's controlling body from acting as manager of a farm operation. Thus, a few individuals could retain control over a large farming operation simply by "restructuring" it into 960-acre pieces, and then forming a management company to farm the entire operation as one piece.

RRA and the 1987 rules were also weak in that they exempted trustees of trusts from ownership and pricing limitations. Although the rules did apply to beneficiaries of trusts (such as minor children), they allowed a farm to break up into 960-acre pieces, each one a trust for the children of the owner or operator, and each one managed by the trustee - often a parent. As a result, the number of trusts "farming" in the San Joaquin Valley is significant. The trusts are sometimes registered as water users, or alternatively, they may be partners in farming operations.¹⁹ For example, a partnership in Fresno County called Borba Brothers' Farms had 15 partners. Ten of the partners were individuals, three of the partners were corporations, and the remaining two partners were trusts. One of the trusts was called the "160 Acre Limitation Trust".²⁰

To illustrate this pattern of artificial divisions of farm businesses into separate legal entities we show in Table II the method by which Perez Ranches, Inc., split its holdings. The important point to note here is that the original business now manages all of the distinct entities. The crops, crop pattern, equipment, employees, telephone number, and mailing address are

all the same as for Perez Ranches before it was divided. the only difference is that pieces of paper now exist claiming that Perez Ranches is not the Farm operator, rather that it is merely "managing" the ten farms. We prefer to describe the "new" farms as "paper farms."

TABLE II

Perez Ranches Division into "Paper Farms"

1985	Perez Ranches, Inc.	7,528 acres
1987	FB.A	862 acres
	FB.B	923
	FB.D	940
	FB.E	898
	FB.F	656
	Daniel Perez	152
	Earl Perez	156
	Thomas Perez	157
	Perez Ranches, Inc.	530
	TC5	2,072
	Total	7,340 acres

Source: D. Villarejo and J. Redmond, Missed Opportunities...Squandered Resources, California Institute for Rural Studies, Davis, CA 95616, 1988, p. 35.

The Westlands Water District

The most significant aspect of irrigated farming, as compared with dry farming (using only natural rainfall), is that higher average yields are a certainty, especially in the long term. Quite apart from the plague of occasional severe drought that can leave dry farmers without a crop, in "normal" years yields from irrigated farms are usually very much higher than those obtained from dry farms. For example, California cotton farms produce more than 1,000 pounds per acre (lint) while Texas farms average only 322 pounds per acre. Even though California has 70% less cotton plantings than Texas, the two states have very similar total outputs.

Combining its favorable climate and abundant supplies of cheap labor with irrigated farming, California's Central Valley (considering the San Joaquin and Sacramento Valleys as a single valley) has become the world's leading agricultural region. And the Central Valley Project of the Bureau of Reclamation is the centerpiece of Federally supported irrigation systems. Of the 9.9 million acres irrigated with Federal project water in the 17 Western states, the Central Valley Project alone irrigates 2.3 million acres.²¹

The largest of the dozens of water districts served by the Central Valley Project is the Westlands Water District. Comprising a total of 603,093 acres, more than 94% of which are irrigated, or can be irrigated, the district is also the largest single recipient of Federal water.

On September 8, 1952 the WWD was organized. Since the western San Joaquin Valley, where WWD is located, receives only minor amounts of rainfall each year, farming requires irrigation.

In its early years, water users in WWD depended solely on groundwater pumping for their irrigation water. To irrigate a half million acres meant that enormous quantities of water needed to be pumped from underground aquifers. According to a contemporary account written in 1967 by Paul Taylor, Professor of Economics at the Berkeley campus of the University of California:

"For 25 years, landowners here have mined water from their underground reservoirs as miners once mined gold. So exhaustively have their pumps sucked up water that the land surface is sinking about a foot a year and the underground reservoir is badly depleted in quantity and quality."²²

Water users realized that a federal irrigation project designed to bring in surface supplies from the northern part of the state was an ideal solution to their problems. Since high rainfall in Northern California occurs in the November through March period while the growing season in the San Joaquin Valley begins in March and extends through the fall harvest, a mechanism was needed to store the heavy winter flows for later release. A large storage dam just to the north and west of WWD was feasible.

The new federal project took its name from that of the proposed reservoir: it became known as the San Luis Unit. The San Luis Unit also provides federal irrigation water to the San Luis Water District, directly north of and adjacent to WWD, and to several smaller districts. Significant surface water deliveries began in 1967 and by the mid-1970's had all but replaced pumped groundwater supplies.

Paul Taylor realized that the importation of surface water actually supplied two different sources of irrigation water. As he pointed out:

"The project is designed to bring water to the landowners by two routes: (1) by canal on the surface; (2) by raising the water level in the landowners' wells through a combination of percolation from the surface delivery, and by reduction of the overdraft. The fewer the pumpers (to explain the last point), the higher the water table for those who continue to pump water from the ground."²³

In 1985 WWD farms generated cash receipts from crop sales that amounted to \$551 million, or about \$1,000 per acre of cropped land.²⁴ The main crops produced, as ranked by aggregate value of farm cash receipts, are cotton, canning tomatoes, lettuce and cantaloupes. Records for the 1985 crop year show that WWD farms receiving federally subsidized water averaged about 1,906 irrigated acres within the district's boundaries.²⁵ In contrast, the average California irrigated farm has just 145 acres of irrigated land.²⁶ Therefore, the average WWD farm generated about \$1.85 million in farm cash receipts from their district holdings alone. Westlands farms are among the very largest in the world.

Water Costs and the Role of the Subsidy

Although WWD pays the Bureau \$9.45 per acre foot, the unsubsidized cost of delivering water to WWD is much higher. (An acre-foot is the volume of water needed to cover an acre of land to a depth of one foot). Water use in WWD averages 2.9 acre-feet per year. Based on the Bureau's figures, the annual subsidy amounts to \$99.12 per acre. For water users producing roughly \$1,000 in crop sales per acre (the WWD average), the subsidy is seen to amount to a very significant part of gross receipts. Since net farm income in California averages about 30% of gross receipts, the water subsidy amounts to 1/3 of profits.²⁷ Other careful estimates have placed the annual per acre subsidy as high as \$217 per acre.²⁸

From the above analysis, the value of the water subsidy in economic terms can be quite substantial. On a 960 acre farm in WWD the value is about \$95,000 per year. However, the relative importance of the subsidy will depend upon the crop and, hence, its value per acre. For crops with a lower value per acre, such as cotton or grain, the subsidy has a greater relative importance than it does for high value crops, such as vegetables.

Recent evidence suggests that Bureau estimates of the subsidy may be low by a substantial amount. The value of the total irrigation subsidy of all Bureau projects for the period 1902 through 1986 was placed at \$9.8 billion by Bureau officials.²⁹ According to documents obtained by Rep. Samuel Gejdenson, the Congressional representative responsible for oversight of reclamation projects, economists with Interior and the Office of Management and Budget agreed that the correct figure was in the range of \$19 billion to \$24.2 billion.³⁰ According to Gejdenson, the smallest figure was furnished in order "...to provide the Congress with the lowest possible estimate of the value of BuRec irrigation subsidies." Interior's final figure was low because it ignored the cost of constructing the dams and canals which, though supposed to be repaid by water users, has not been repaid.

Federal reclamation policy was designed to strengthen the small-holder farm system. The 1902 Reclamation Act authorized the United States government to provide irrigation water supplies to the arid regions of the Western United States. The main point was not only to support the development of irrigated farming but also to settle the region with many small-scale farmers and to create healthy rural communities.

The U.S. "farm crisis" of the 1980s had an especially severe impact on moderate-sized farms, those within the acreage limits contemplated by the Reclamation Act. It is tragic that the limits specified by this law have not been implemented even though the very future of farms in this size range is in doubt. The larger question, however, is the following: why does farm size matter?

Why is Farm Structure Important?

Farm structure refers to the role of different-sized farms in agricultural production. Farm structure is relatively concentrated if relatively few farms are responsible for the majority of output. Until

recently, U.S. agriculture has been characterized as a system in which medium- to small-scale farms dominated agricultural production. The shift to more concentrated agriculture has had a profound social, economic and environmental impact on rural California.

For much of the period subsequent to the early 1950's, the position of the small- to moderate-size farm in the U.S. has been in decline. This decline is reflected in both the number and the share of national production of such farms. By 1982 the biggest 1% of U.S. farms, ranked by annual farm sales, were responsible for 30% of all cash receipts from farm marketings and 62% of net income from farming.³¹ The largest 5% of U.S. farms produced a full 50% of farm cash receipts and earned 82% of all net income from farming.³²

Our contemporary urban-based culture has become disconnected from its agrarian roots.³³ The U.S. farm population has declined to just 2% of the total population. While debate continues over the question of whether this is "good" or "bad," a farm system has evolved, especially in California and the West, that is completely divorced from the idealistic notion of the "family farm."

The first time the Department of Interior attempted to analyze the concept of "family farm" was in its landmark 1981 Draft Environmental Impact Statement (EIS).³⁴ Their definition stated that a majority of the annual labor requirement must be furnished by the farm family (members of the immediate family). Since labor requirements vary greatly from crop to crop, it is not possible to designate a specific acreage in this definition. Interior Department officials have suggested that the upper limit on the size of an irrigated "family farm" producing a perennial crop (fruit or nuts) would range from 40 to 160 acres while the upper size limit for an irrigated "family farm" producing extensive crops (cotton or grain) would be about 960 acres.³⁵

Characteristics of California Farms and Farmers

California has a high degree of size concentration among farms as compared with other states. The biggest 3.4% of California farms, those with annual farm sales of \$1,000,000 or more, have 60% of all of the state's agricultural production.³⁶ These large farms average \$2,961,600 in cash receipts from commodity sales per farm.³⁷ Thus, the great majority of California farm production is accounted for by large-scale farm businesses.

Paradoxically, most California farms are quite small, having annual sales of less than \$50,000. 71% of California farms are in this size category.³⁸ But, taken together, they account for just 4.1% of all farm cash receipts.³⁹

California has 83,217 farms but only 41,906 of the operators of these farms report that their principal occupation is farming.⁴⁰ We shall refer to these persons as "farmers." For the other half of California farms, either a professional farm management company or a part-time farmer conducts the farming activities. We estimate that approximately 15,700 California

farms are owned by non-farmers but are managed by approximately 350 professional farm management companies which, in turn, hire employees to perform the required farm work.⁴¹ Thus, about 19% of all of the farms of the state are managed by such companies. Among fruit and tree nut farms, the share managed by professional farm managers is even higher. We estimate that 9,902 California fruit and nut farms, about 26% of the total, are run by professional managers.⁴²

The balance of 25,600 California farms are directly operated by persons whose principal occupation is something other than farming (part-time farmers). The overall economic contribution of these part-time farmers to the state's agricultural production is extremely small.

The average age of California farmers - those whose principal occupation is farming - is 55.6 years.⁴³ Fully 31% are over 65 years of age and only 9% are younger than 35.⁴⁴ Thus, California's farmer population is quite old as compared with other categories of work. About 89% are male and just 4% are persons of Spanish origin (including Portuguese).⁴⁵

We estimate that average "farmer" operator income in 1987 from all sources was \$73,017 and average "non-farmer" operator income from all sources at \$55,076.

Within California today the bulk of farm production comes not from family farms, as defined by the Department of Interior, but instead from a very different type of operation that relies on hired labor for nearly all of the farm work. To illustrate, careful examination of farming in the federally irrigated Westlands Water District (WWD) of California's San Joaquin Valley shows that the average irrigated farm size was 1,654 acres in 1978.⁴⁶ This size is well above the maximum that would be operated by a single farm family under the Interior Department's definition. In support of this conclusion, this study found that the 305 farms operating within the district had 5,305 full-time employees, an average of 17 per farm.⁴⁷ The study also found that these 305 farms employed a total of 278 full-time farm managers, 427 full-time foremen and 4,600 full-time laborers.⁴⁸ Additional thousands of seasonal hired workers were employed for the harvest season, especially for cantaloupes and vegetables. Thus, in the WWD, farming is conducted along an "industrial" model with the "farm operator" being a person, or group of persons, who owns the business and employs other people to actually perform most of the work.

The designation "industrial" or "family," according to the definition proposed in the Interior Department's EIS, is determined by the role of hired farm labor in conducting the business, and not by whether the farm business is owned by a single family. There are many farming businesses in California owned by a single family which cannot be characterized as "family farms" because of their reliance on hired labor. For example, Harris Farms, Inc., is a farm operating in WWD that is solely owned by the John C. Harris family.⁴⁹ However, this farm's 19,552 irrigated acres are worked by its 618 regular employees and large armies of seasonal workers.⁵⁰ By no stretch of the imagination could one argue, using the Department of Interior labor measure, that this is a "family farm."

Employees of California Farm Businesses

Hired farm workers now perform about 80% of all of the farm work in the state.⁵¹ During certain months of the year this share exceeds 90%. Farmers and unpaid family members perform just 20% of all farm work in California.⁵² The share of all California farm work performed by farmers and unpaid family members has been steadily declining in recent years. Forty years ago their share was about 37%.⁵³

Martin has shown that an estimated 1.2 million persons earn wages from hired farm work in California each year.⁵⁴ Total wage payments by agricultural employers suggest that the average farm laborer's annual earnings from agriculture in California are about \$3,000 per year.⁵⁵ However, many persons who work in agriculture have non-farm occupations and earn only a small income from temporary employment on farms. Thus, annual average employment (hired worker) on California farms is only about 325,000, reflecting the fact that many jobs are of short duration. This is shown in Figure 8.

About 750,000 persons earn a majority of their annual earned income from hired farm work and may be regarded as professional farm workers.⁵⁶ For each California farmer - a person whose principal occupation is farming - there are about eighteen professional farm workers.

The dominance of large-scale farm businesses in California as measured by farm production was described earlier. With respect to employment we find a similar pattern of size concentration. Of the 31,815 California employers reporting wage payments for the performance of agricultural labor, 1,031 (3.2%) account for 53% of all farm wage payments.⁵⁷ As in the case of commodity production, a relatively small number of firms account for most of the wages.

There are few studies of the employees of agricultural businesses. The most recent state-wide survey was conducted by Martin and Mines. They interviewed about 1,286 professional farm workers in a state-wide sample across crops and regions.⁵⁸ They report that more than three-quarters of interviewees were Mexican citizens or Mexican born.⁵⁹ The average age was reported to be 34 and the average educational attainment was about six years of school.⁶⁰ Further, reported annual earned income was about \$4,300 per year from farm work and \$320 per year from non-farm work.⁶¹

About 37% were migrants who followed one of two patterns: back and forth between Mexico and a definite location in the United States, or follow-the-crop migration within the U.S.⁶² However, an independent study of the Ventura County citrus harvest shows an increasing reliance on young, single male migrant workers as compared to older, married settled workers.⁶³ Little information is available to ascertain whether this increased reliance on migrant workers is more widespread or is confined to the citrus industry.

Professional farm workers are without employment an average of 27 weeks each year.⁶⁴ Those of us who live and work in the Central Valley or other parts of the state where agriculture is especially important are well aware

that unemployment cycles are closely tied to the annual cycle of farm work. In the San Joaquin Valley, the number of unemployed persons reaches its low point during the peak of agricultural labor demand in August or September of each year, and then steadily climbs to a peak in February or March, the time of lowest agricultural labor demand.⁶⁵ This is illustrated in Figure 9.

Data collected from employers by state government agencies show, as illustrated in Figure 10, that real wages earned by California farm workers, measured by average wages per full-time-equivalent (F.T.E.) farm employee, declined by 8.7% during the 1980s while non-agricultural average wages rose by 11.3%.⁶⁶ The ratio of annual average farm wages (per F.T.E. employee) to the comparable figure for non-agricultural employees began the decade of the 1980s at 55.5%. By the end of the decade this ratio had declined to 42.2%.⁶⁷

One of the most important recent developments in the pattern of agricultural employment in California has been the remarkable increase in the use of farm labor contractors in the 1980s. Labor contractors act as labor market intermediaries between the mostly non-Hispanic white farm operators or farm managers and the mostly Hispanic labor force. Aside from the very important barriers of language and culture, a labor market that is supplied by immigrant workers who migrate great distances looking for jobs becomes somewhat rationalized by the insertion of bi-lingual intermediaries who can match workers with jobs. Nearly all farm labor contractors are Hispanic.

The rise of employment by farm labor contractors is shown in Figure 11. The greater reliance on labor contractors is mirrored by a decline in the use of direct hire employees by farmers. At peak season in the San Joaquin Valley, when 217,000 hired workers are harvesting crops and performing related tasks, a majority of the work is performed by persons working for farm labor contractors.⁶⁸

Labor contractors usually do not offer employee benefits, and pay wages about 20% lower than do farm operators who directly hire employees.⁶⁹ Thus, the tendency of farmers to increasingly meet their labor needs through labor contractors is an important factor in the decline in farm employee real wages noted above.

Competition Among Farms of Differing Sizes

As farm size has tended to increase over the decades of the 20th Century, a new factor has emerged: increasing rivalry between very large "industrial" farms and smaller-scale farms. Yolo County tomato and alfalfa farmer John Bledsoe put it this way,

"...let's go and look into Yolo County (California) and see three or four farmers control most of the county. We have the Heidricks, the Wallaces, the Andco Farms. They are farming 40,000 or 50,000 acres of ground. No little guy, and I don't care what anybody says, can compete."⁷⁰

Two factors govern this rivalry: institutional biases, such as reduced interest costs or volume discounts on purchased inputs available to large

farms, and access to capital.⁷¹ Over the past decade, California has seen a series of crops affected by these intra-farm competitive factors.

The California olive industry was shaken in 1980 and 1981 by enormous production from some 5,000 acres of new plantings owned by the Prudential Insurance Company.⁷² When the crop from this planting reached the market, prices fell and smaller growers complained bitterly. According to Tehama County olive grower Les Melvill,

"In the olive industry huge acreages were planted. For example, Prudential Insurance has 5,000 acres. Well, our total acreage up here in Tehama County is - in 1979 - 4,971 acres. And that is for 400 growers. Prudential is one grower with 5,000 acres."⁷³

Ultimately, depressed prices resulted in widespread losses among smaller scale olive producers. Some even pulled their trees and left the business. But through a favorable contract with their processor, Prudential was able to weather the storm.⁷⁴

Similar experiences befell the almond, wine grape, and raisin grape industries. Large new plantings of almonds in the Southern San Joaquin Valley came in when Federal and State projects brought precious irrigation water to previously uncultivated areas.

For example, Kern County had only 190 acres of bearing almond trees in 1966 (out of a state total of 110,000 acres).⁷⁵ By 1985, Kern had established itself as the leading almond county with 77,501 harvested acres (out of a state total of 409,670 acres).⁷⁶ Table III shows the size distribution of Kern County almond farms as of 1987. As with olives, overproduction of almonds reduced the growers receipts. Almond growers in California hope to capture a large share of export markets in the future.

TABLE III
Kern County Almond Farm Size, 1987

<u>Size of almond orchard</u>	<u>Number of Farms</u>	<u>Almond acreage</u>
80 acres or less	99	4,533
81 - 160 acres	53	6,973
161 - 320	36	9,072
321 - 480	10	4,052
481 - 640	6	3,234
641 - 960	5	3,554
961 - 1,280	8	9,297
1,281 - 2,560	4	7,309
2,561 - 5,120	2	8,236
5,121 acres or more	3	23,180
Total	226	79,440

Source: Kern County Department of Agriculture, 1987 Restricted Materials Permit Applications, California Institute for Rural Studies.

In the wine grape industry, as a result of new plantings, especially very large ones in the San Joaquin Valley, bearing acreage increased from 150,000 acres in 1973 to 315,000 acres by 1977.⁷⁷ As in the case of olives and almonds, increased supplies eventually led to reduced prices. Very large vineyards, such as those owned by Getty Oil Co., protected themselves by signing long-term contracts with wineries that established price floors irrespective of market conditions.⁷⁸ Since the main grape variety planted in the San Joaquin Valley is Thompson seedless, a variety that can be crushed for wine or dried for raisins, the raisin industry was also eventually affected. In both industries, increased foreign competition also played a role. Regardless of cause, small-scale producers bore the brunt of competition from large-scale farms.

Government, primarily through water projects that led to development of new acreage for crop production, has played a pivotal role in these matters. Much of this newly irrigated land had been dryland pasture in areas of the San Joaquin Valley where annual rainfall is seven inches or less. Since pasture requires more land per farm than is required by irrigated fruit or vegetable production, most agricultural economists anticipated that development of irrigation facilities would increase the number of farms dramatically. In 1949, for example, the Bureau of Reclamation noted that there were 59,000 farms and 2,720,000 acres of irrigated land in the Central Valley as of 1939; then boldly predicted that development of the Central Valley Project would lead to 110,000 farms with an irrigated land total of 6,580,000 acres.⁷⁹ While their prediction for the number of irrigated acres was right on target, their estimate of the change in the number of farms had the wrong algebraic sign. The most recent data show that the number of farms in the Central Valley is just 40,656.⁸⁰ That is, the correctly predicted 300% increase in irrigated land triggered a 30% decline in the number of farms.

This decline precipitated by the switch from extensive to intensive farming practices which irrigation encourages, has been noted elsewhere.⁸¹ Essentially, development of irrigated cropland requires substantial investments for water distribution systems, new farming equipment, and capital reserves to finance operations for several years while the new farming system is placed in production. In the case of permanent crop plantings (fruit or nut crops), it may be five or more years before full bearing is realized.

In the specific case of the development of irrigated agriculture in western Kern County, state economists have noted:

"Lending institutions have recently shown greater caution and selectivity in loaning funds to west side agriculturalists, unless the growers possess substantial resources, according to representatives of a major bank active in the region.

"A number of smaller-scale ranchers and those with inadequate resources have already had to leave, liquidating and disposing of their properties. In the opinion of the banker, this was usually because the rancher had underestimated the capital requirements to develop land, procure necessary irrigation farming equipment, and retain adequate

reserves to finance operations for several years before sufficient income was received from sales of crops."⁸²

Thus, in the development of arid land for irrigated farming, there is a comparative advantage in having substantial capital resources. It is this pressure that contributes to forcing farm size to increase as land is developed. When combined with weak or non-existent enforcement of acreage limitation under reclamation programs, it is hardly surprising that average farm size has increased sharply as California land has been placed in irrigated production.

This same effect has been noted in the WWD. Rep. B.F. Sisk, Congressional representative from the area including WWD, nevertheless argued that construction of the San Luis Dam, designed to irrigate WWD, would sharply increase the number of farms in the district. In 1967 he stated that

"...with San Luis built, there will be 6,100 farms, nearly a sixfold increase."⁸³

The number of farms in the district actually decreased sharply, from over 1,000 to just 214.⁸⁴

In this case, however, another factor played a central role in reducing the number of farms. Lack of access to capital resources made it difficult for smaller farms to keep pace with newly identified needs. Prior to construction of the San Luis project to provide irrigation water to WWD, farmers had been pumping groundwater to grow their crops. The acreage being irrigated increased rapidly from 90,000 acres in 1939 to 500,000 acres by 1958. It was found that more water was being pumped out than was recharging the basin by natural means (groundwater overdraft). As the water table depleted, pumping depths became greater and greater. In fact, the pumping depth fell from 440 feet in 1952 to 610 feet in 1967, when federal project water was first delivered to WWD).⁸⁵ Soon only the wealthiest landholders could afford to pump. The inadequate capital resources of smaller landholders once again led to a reduction of their number.

Relation of Farm Size to Community Social Conditions

Having shown the dominance of "industrial" farms in California, we now examine their impacts on surrounding communities. In his pioneering work, As You Sow, Prof. Walter Goldschmidt illustrated the negative correlation that exists between farm size and community social conditions.⁸⁶ He found that communities near large farms tend to have poorer social conditions, as measured by such variables as median household income and proportion of the population in poverty. Comparing the San Joaquin Valley communities of Arvin and Dinuba, Goldschmidt showed that the "large farm" community of Arvin had lower family income, greater poverty, and fewer churches, small businesses and social clubs than did the "small farm" town of Dinuba. Prof. Dean MacCannell and co-authors after refining and extending this approach, established that this inverse correlation also describes individual counties in the vast "Sun Belt" farming region from California to Florida.⁸⁷ In his study, a county-averaged measure of farm size was used.

MacCannell's most significant work shows quantitative negative correlations between social conditions and increasing farm size in California's San Joaquin Valley when small geographic areas are used.⁸⁸ By examining Census Tracts, Postal Zip Code areas, and areas bounded by city limits in 42 communities in the western San Joaquin Valley, MacCannell found even stronger negative correlations. The strongest negative indicators were: median family income, adults with high school diplomas, adults with 4-year college degrees, professionals in the labor force, home ownership, households with complete plumbing, and medical services.⁸⁹ The larger farm the size in the community, the poorer were the social conditions based on these measures. Conversely, the smaller the farm size, the better the community's social conditions.

In California agriculture, where "industrial farms" are predominant, it is useful to consider broad measures of rural community conditions. One important measure used in the 1980 Census of Population stands out: the measure of poverty in U.S. metropolitan areas based on the proportion of the population supported by general assistance payments (welfare). Of the ten metropolitan areas with the highest proportion of inhabitants supported by such payments, six are in California, and all six are in California's agricultural Central Valley.⁹⁰ The six areas (and the proportion of persons supported by welfare payments) are: Visalia (15.9%), Stockton (14.4%), Yuba City (12.4%), Fresno (12.3%), Modesto (11.8%) and Redding (11.6%). The remaining four areas of the top ten are all Eastern urban centers: Jersey City, Atlantic City, Vineland (New Jersey) and New York City. Both Visalia and Stockton rank ahead of these urban centers by this measure. It is not widely recognized that poverty in the 1980's is concentrated in rural areas such as California's agricultural Central Valley as well as in major Eastern urban areas.

Perhaps the most critical factor in this high degree of poverty associated with "industrialized" farming is the strong dependence on hired farm labor which ties community conditions to farm worker income. As noted above, Mines found that the average annual earnings of a California farm worker in 1983 was just \$4,300 from farm work and another \$320 from non-farm work.⁹¹ Farmworker households with four members reported average annual earnings of \$8,750.⁹² Both figures are well below the official poverty level, based on income. California agriculture's heavy dependence on numerous low-paid laborers creates rural communities which are home to a large proportion of the state's working poor.

MacCannell directly demonstrated that, in the 42 San Joaquin Valley communities which he studied, median family income was negatively correlated with employment in farm work.⁹³ The greater the proportion of the community population in the agricultural labor force, the lower the median family income of the community and the poorer the social conditions.

We have already noted that California agriculture is heavily dependent upon hired farm workers. Surveys of farm worker family income show that average levels are very much lower than the poverty level. Thus, MacCannell's correlations generate a profile of farm worker communities.

Within California there are 61 cities or communities where at least 10% of the employed population works in agriculture.⁹⁴ For this reason they may be thought of as "agricultural communities." The largest city is Oxnard (1980 population equals 108,195) where 15% of all workers are employed in agriculture⁹⁵ Within these 61 communities the 1980 Census of Population showed that 47% of the aggregate population was Hispanic, 48% was non-Hispanic white and just over 5% of the population was Black, Asian or Native American.

For non-agricultural communities, the median distribution of population in 1980 was 9.2% Hispanic, 82.7% non-Hispanic white, 1.6% Black, 2.6% Asian and 0.8% was Native American. This sharp difference between "agricultural" and "non-agricultural" communities is closely related to the previously noted high proportion of Mexican-born persons among the hired farm work force. Most of these communities are now described as "Rural Latino Settlements" by California demographers.

California has experienced very rapid population growth during the 1980s, with much of the expansion concentrated in major urban centers. As of January 1, 1990, the fastest growing large city in California is Fresno, adding to its population at a 4.3% per year pace. Over the period 1980-1988, state population growth was 19.6%. But in the 61 agricultural communities as characterized above, the population increase amounted to 27.6%, nearly 50% higher than for the state as a whole.⁹⁶ In large measure this more rapid growth of population in agricultural communities is accounted for by differences in birth rates between Hispanic immigrants and non-Hispanic white residents. The high proportion of Hispanics in the "farmworker" communities is responsible for the higher birth rates. Thus, it is an error to assume that because the state population is highly concentrated in major urban centers, the agricultural communities are growing slowly or declining.

With respect to earned income, however, the situation is the reverse. Between 1979 and 1987, per capita income in the state grew by 59.1%.⁹⁷ But in the 61 agricultural communities, the median rate of growth of per capita income was just 28.9%, 50% lower than for the state as a whole. As a consequence, agricultural communities lost ground over this period, with the ratio of their per capita income to that of the state falling from 0.631 to 0.553.

In these communities the higher the fraction of people employed in agriculture, the larger the Hispanic population and the lower the median education level. The community with the highest share of employed persons working in agriculture is Huron (63%), where the Hispanic population accounts for 91% of the residents. In Huron the median educational level among those 25 or older is just 5.9 years. As of today, Huron has neither a high school nor a junior high school.

There are ten cities where at least 10% of the working population is employed in agriculture and in which there are at least 10,000 persons of Hispanic origin: Calexico, Chino, El Centro, Indio, Merced, Oceanside, Oxnard, Santa Maria, Santa Paula and Watsonville.⁹⁸ Eight of these cities are located within counties that rank among the top eighteen counties in the

entire U.S. in agricultural production.

There are six communities where the percent of the working population employed in agriculture exceeds 50%: Cutler, Earlimart, Huron, McFarland, Mendota and West Parlier.⁹⁹ In their study of 42 westside San Joaquin Valley communities, MacCannell and co-workers identified five places where over 50% of the households included persons self-employed on farms ("farmers"): Dos Palos, Gustine, Los Banos, Patterson and Tranquillity.¹⁰⁰ The significant observation here is that these two lists of communities do not overlap. Communities in agricultural areas of California are clearly divided into "farmworker" and "farmer" towns. While no formal study has yet been undertaken, a longitudinal determination of the tendency of communities toward these extremes would be useful.

Health Status of Farmworker Children

One of the most important indicators of social conditions in a community is the health status of its children. As a result of an unusually high incidence of cancer among the children of the community of McFarland the California Department of Health Services began a careful study of health conditions in that city. As noted above, McFarland is a town where more than 50% of employed persons are hired farmworkers: it is a "farmworker" town. Its farms are totally reliant on government provided irrigation water. The recently completed McFarland Health Screening Project has just released preliminary information concerning findings based on general health screening of all children in the town of McFarland between the ages of one and twelve.¹⁰¹ More than ninety percent of McFarland's eligible children were screened, numbering 1,717 persons in all. The screening was conducted between January and April of 1989 and included: parental interview; child interview (for children older than six years); physical examination; neurobehavioral examination; laboratory assessment of urine and blood; and the Achenbach Child Behavior Checklist. As noted previously, more than 50% of McFarland's labor force works in agriculture. It is likely that this study represents the most thorough health screening ever conducted among farm worker children in the United States.

Preliminary data show that 71% of the children were referred for medical attention. The three most common reasons for referral were vision problems (40%), dental problems (36%) and anemia (24%). Of the 1,639 children for whom a complete blood count was obtained, 22% were identified with anemia. It is unconscienable that nearly one-fourth of the children of McFarland should be suffering from malnutrition while their parents work on the richest farms of the entire world.

Data on health care access was also obtained in the interviews. It was found that 44% of McFarland families with children between one and twelve are not covered by any health insurance. Another 21% were covered by Medi-Cal, a state-funded program for the medically indigent. This means that just 29% of the families were covered by employer provided or privately purchased health insurance.

Low per capita income (\$4,305) in McFarland as compared with the state

as a whole (\$11,885), together with inadequate insurance, make the cost of health care a nearly insurmountable barrier. Access to health care is also limited owing to the lack of a sufficient supply of private physicians in the community. It was also found that many residents were unaware of the McFarland Community Health Clinic, which receives significant state and federal support to offer low-cost health care.

The health status of the children reflects these barriers to obtaining health care. A large share of children had inadequate immunization status. Over 36% of the children lacked evidence of having been seen by a dentist. Untreated tooth decay was found in children of all age levels and appeared to have a frequency inversely proportional to income.

Social Conditions in Westlands

The Westlands Water District, the largest irrigation district in the United States, is home to only two communities: Cantua Creek and Huron. Another two, Five Points and Mendota, are located at the edge of the district. And another nine communities are located within the vicinity of the district. We now consider data regarding social conditions in these communities.¹⁰²

Median family income in Cantua Creek and Huron was found to be \$14,159 and \$11,705, respectively. Both figures are far below the median for Fresno County as well as the State of California. The proportion of persons at or below the poverty level was found to be 13.5% and 33.9%, respectively. As mentioned above the average number of school years completed is just 5.9. And the city has no junior high nor high school.

For Five Points and Mendota, median family incomes were reported to be \$13,271 and \$11,912, respectively. The proportion of persons in poverty was reported to be 19.8% and 23.8%, respectively.

The proportion of Hispanics in the population of the four communities ranged from 79.2% (Five Points) to 91.4% (Huron). The largest single source of employment is farm work: these are communities based on hired farm laborers. It should be clear that the benefits of the federal irrigation project have yet to trickle down to the working poor of these communities.

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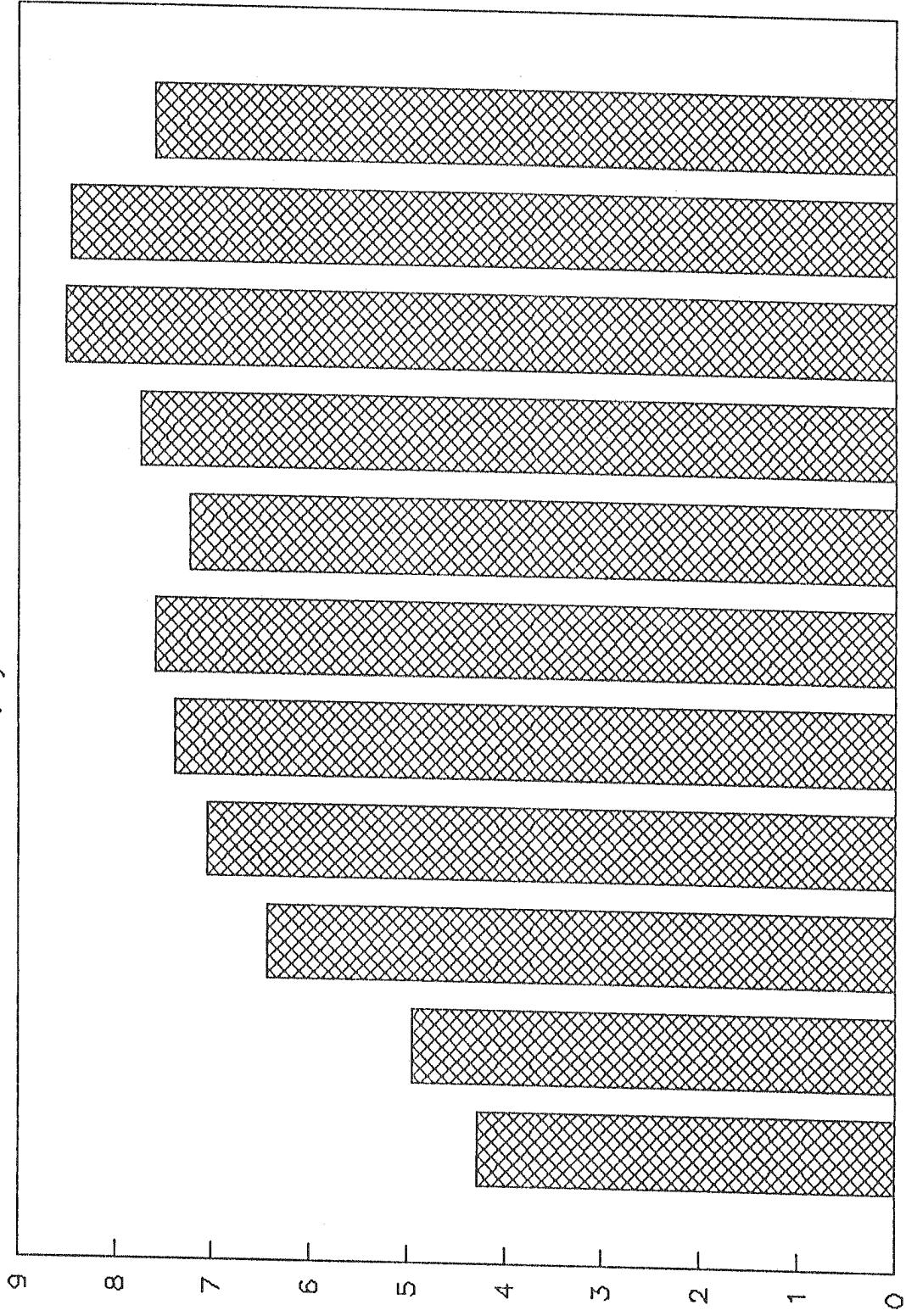
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FIGURE 1



Irrigated Land, California

Acres, by Year



Irrigated Land, Million Acres

FIGURE 2

California Vegetable Production

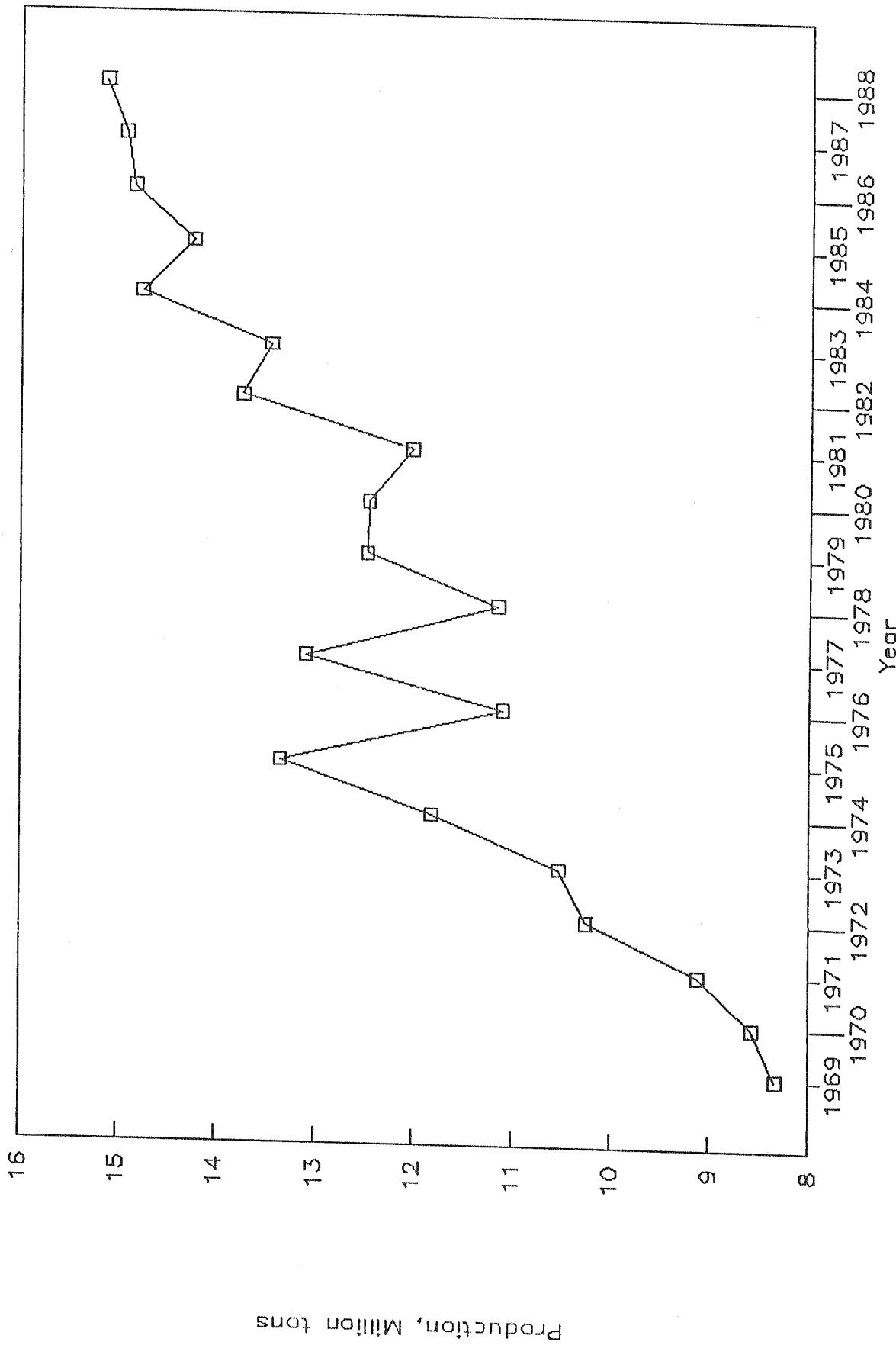


FIGURE 3

California Tree Fruit Production

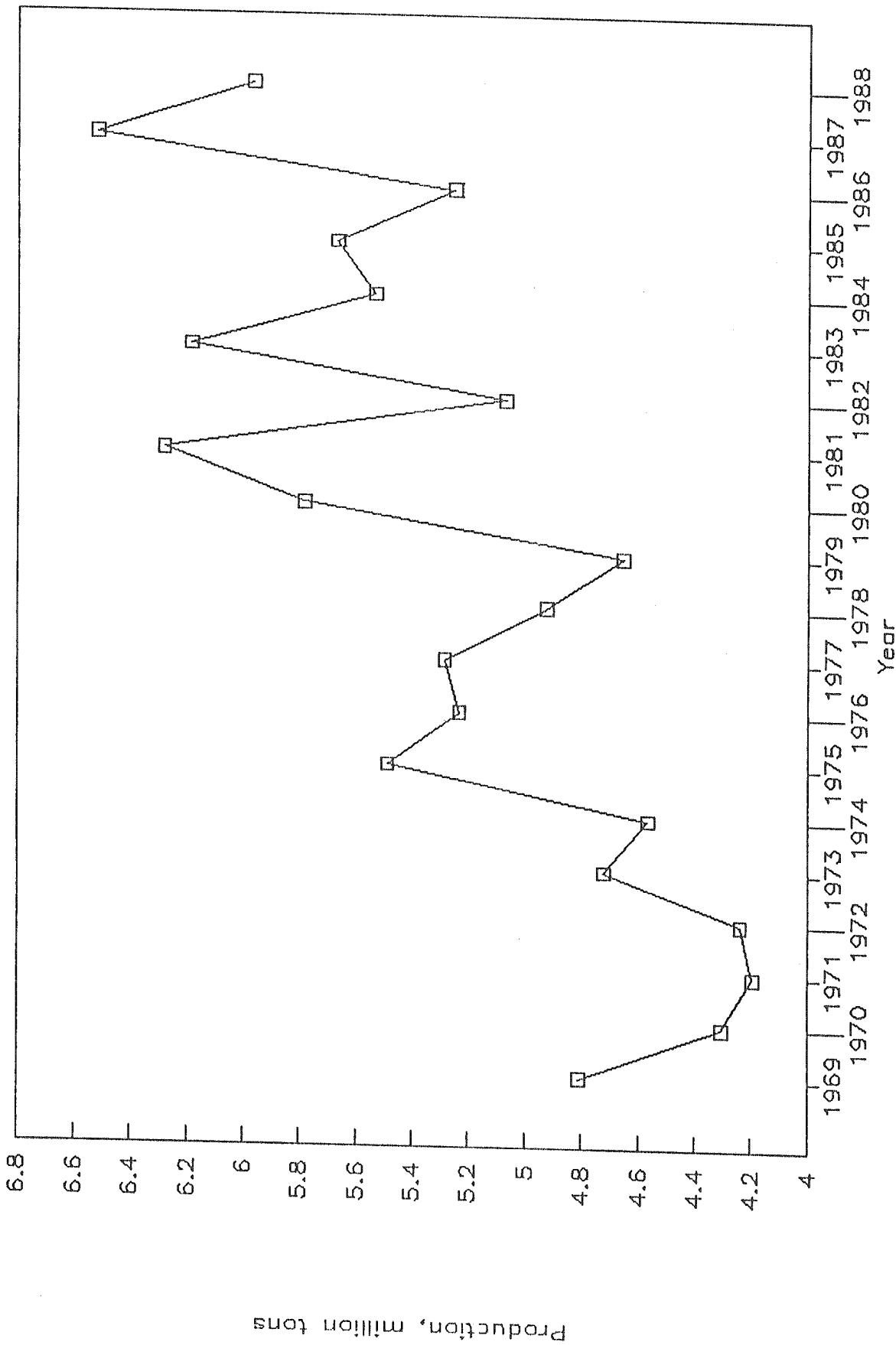


FIGURE 4

California Grape Production

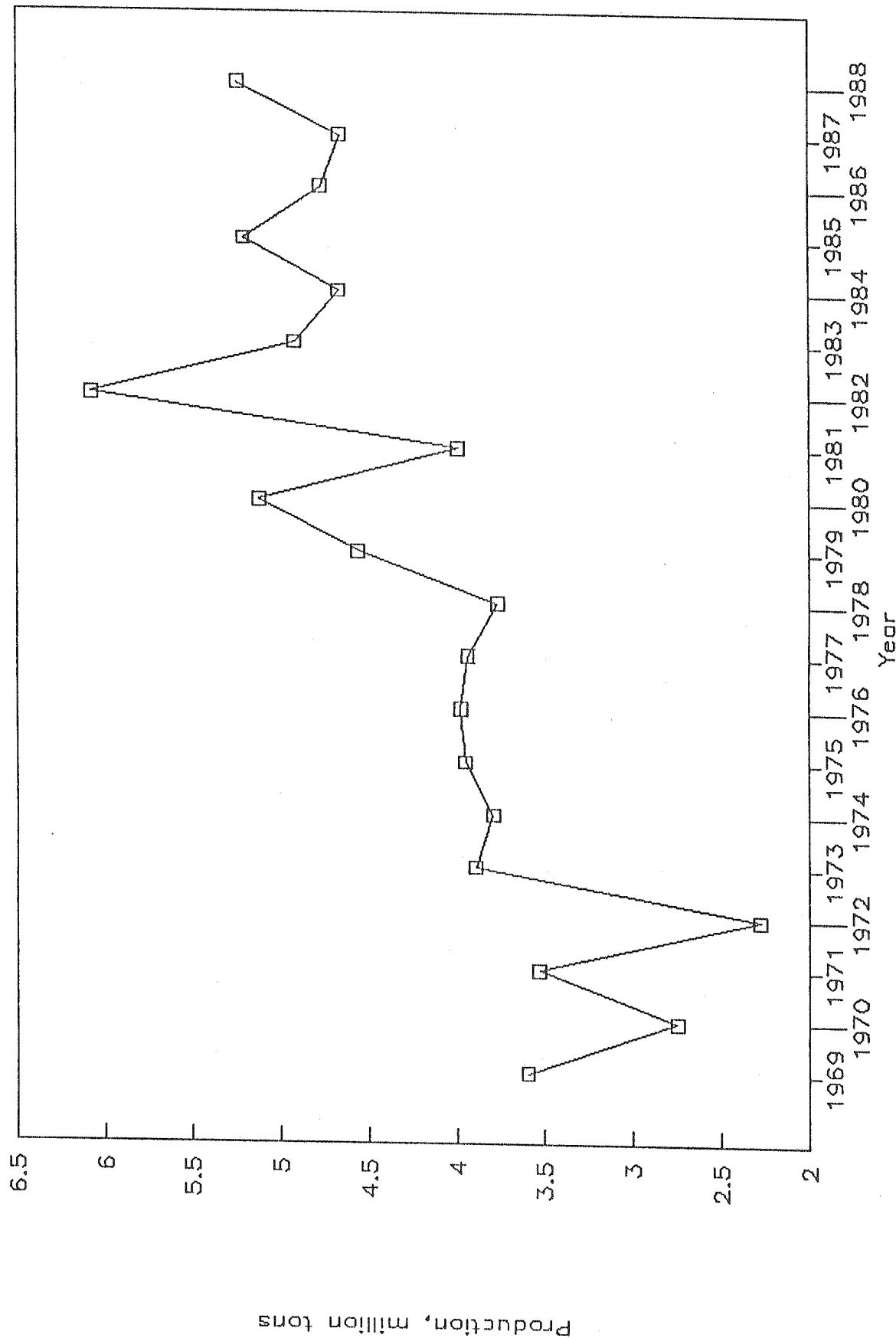


FIGURE 5

United States Crop Production, 1988

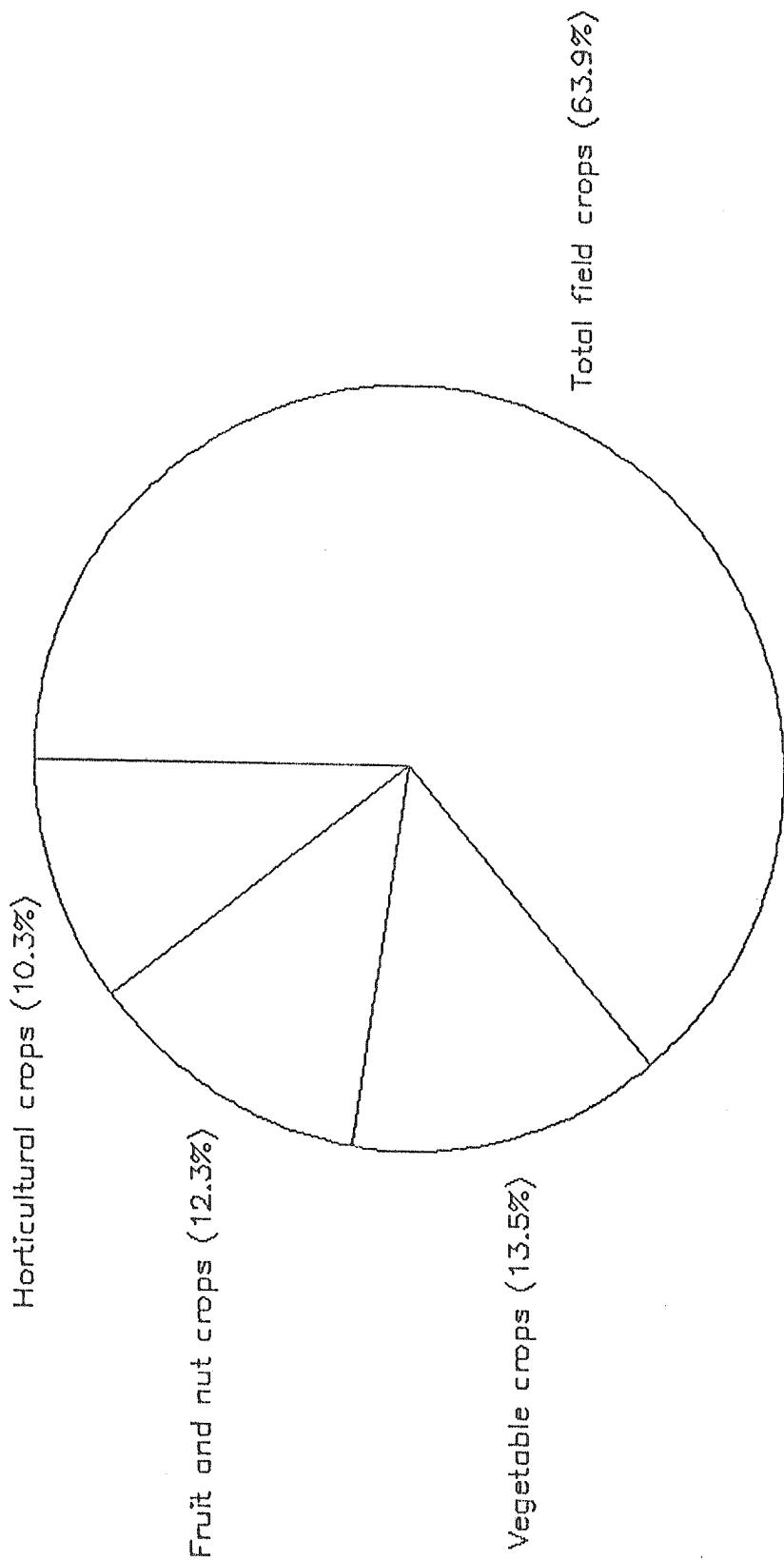


FIGURE 6

California Crop Production, 1988

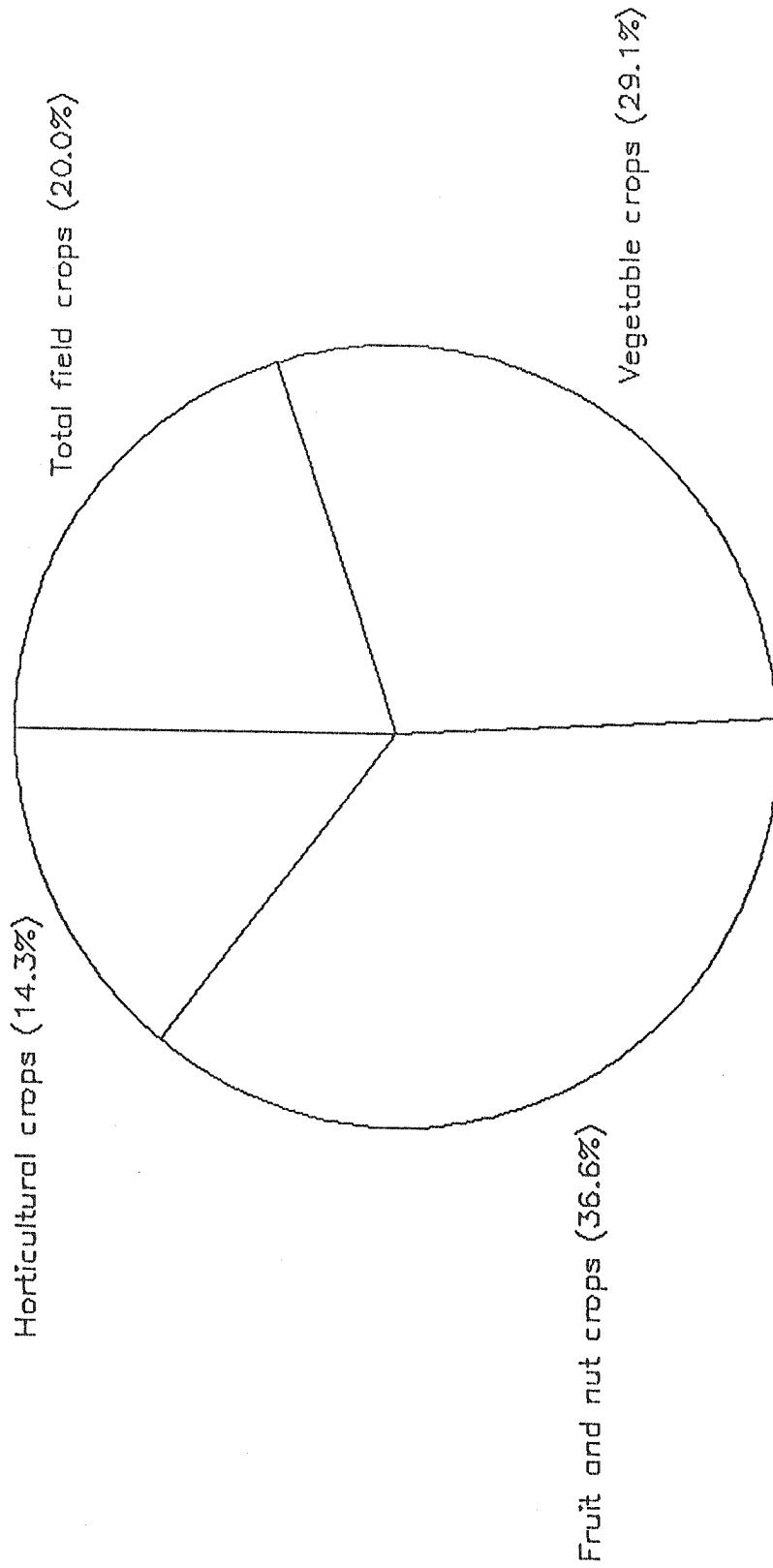
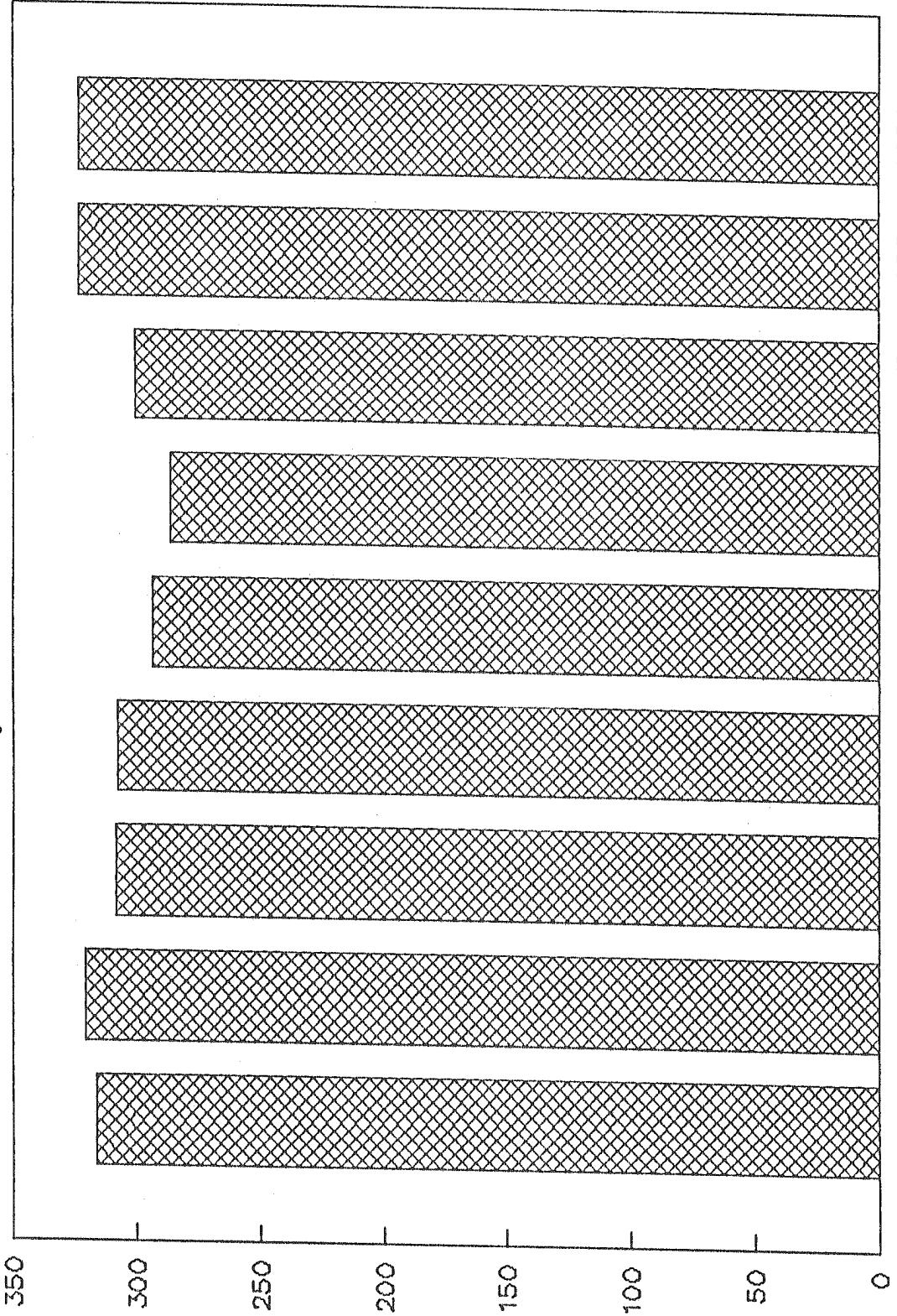


FIGURE 7

California Farm Employment, by Year

Annual Average, Direct & Contract

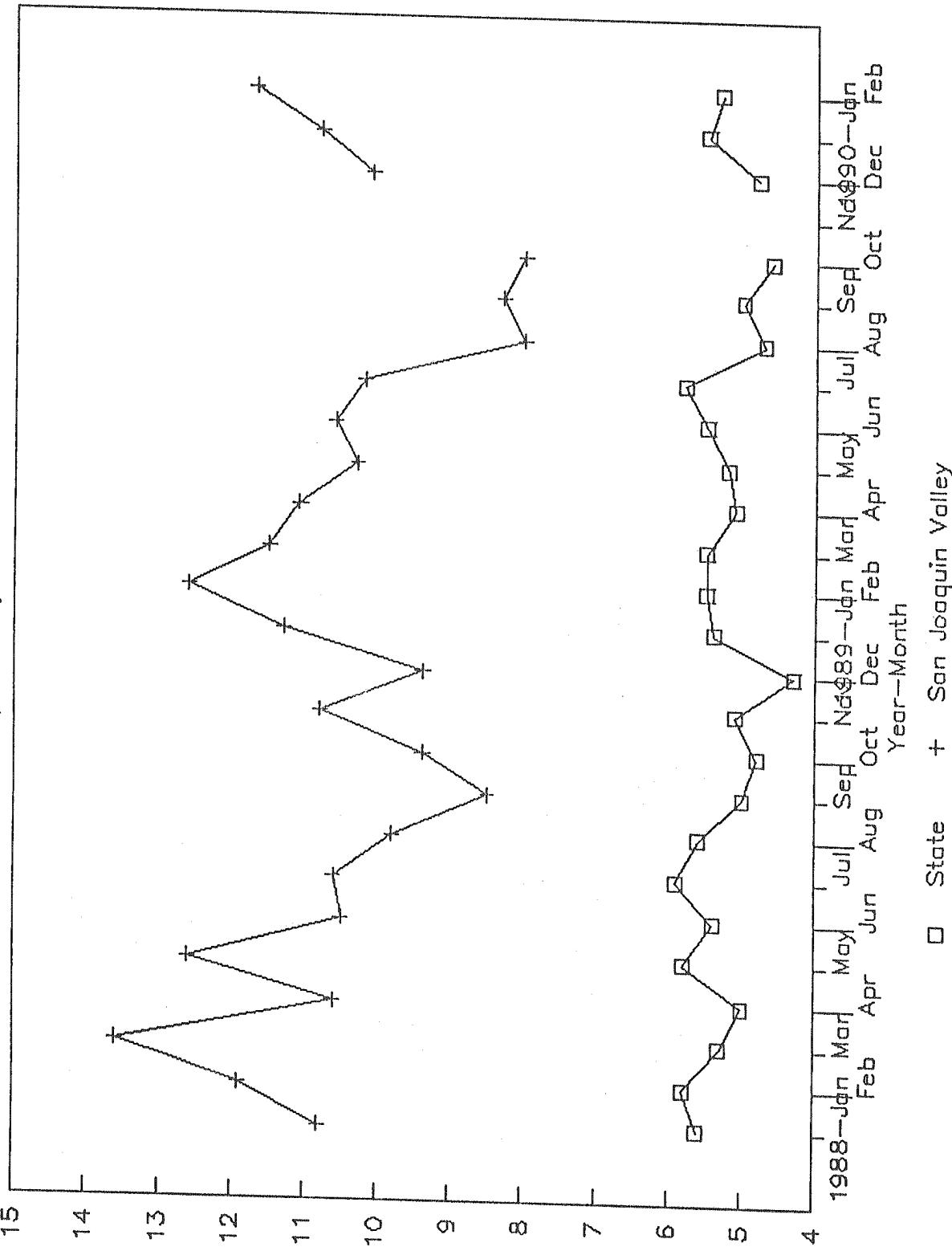


Annual Average Employment
(Thousands)

FIGURE 8

Unemployment Rate, by Year-Month

San Joaquin Valley & State



Rate of Unemployment, Per Cent

FIGURE 9

Average Wages per F.T.E.Employee
California, Constant (1989) Dollars

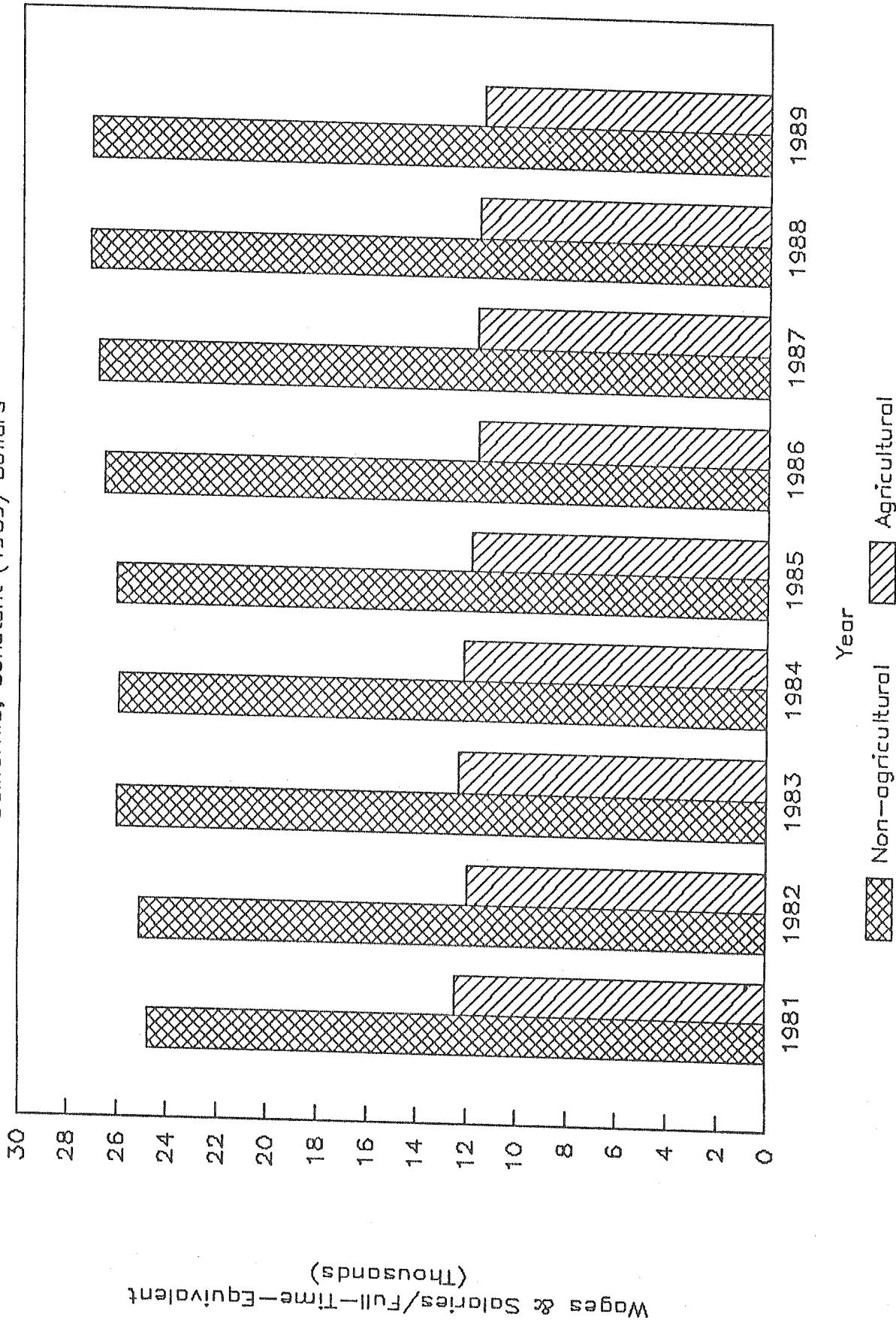


FIGURE 10

Farm Labor Contractor Employment

California, Annual Average

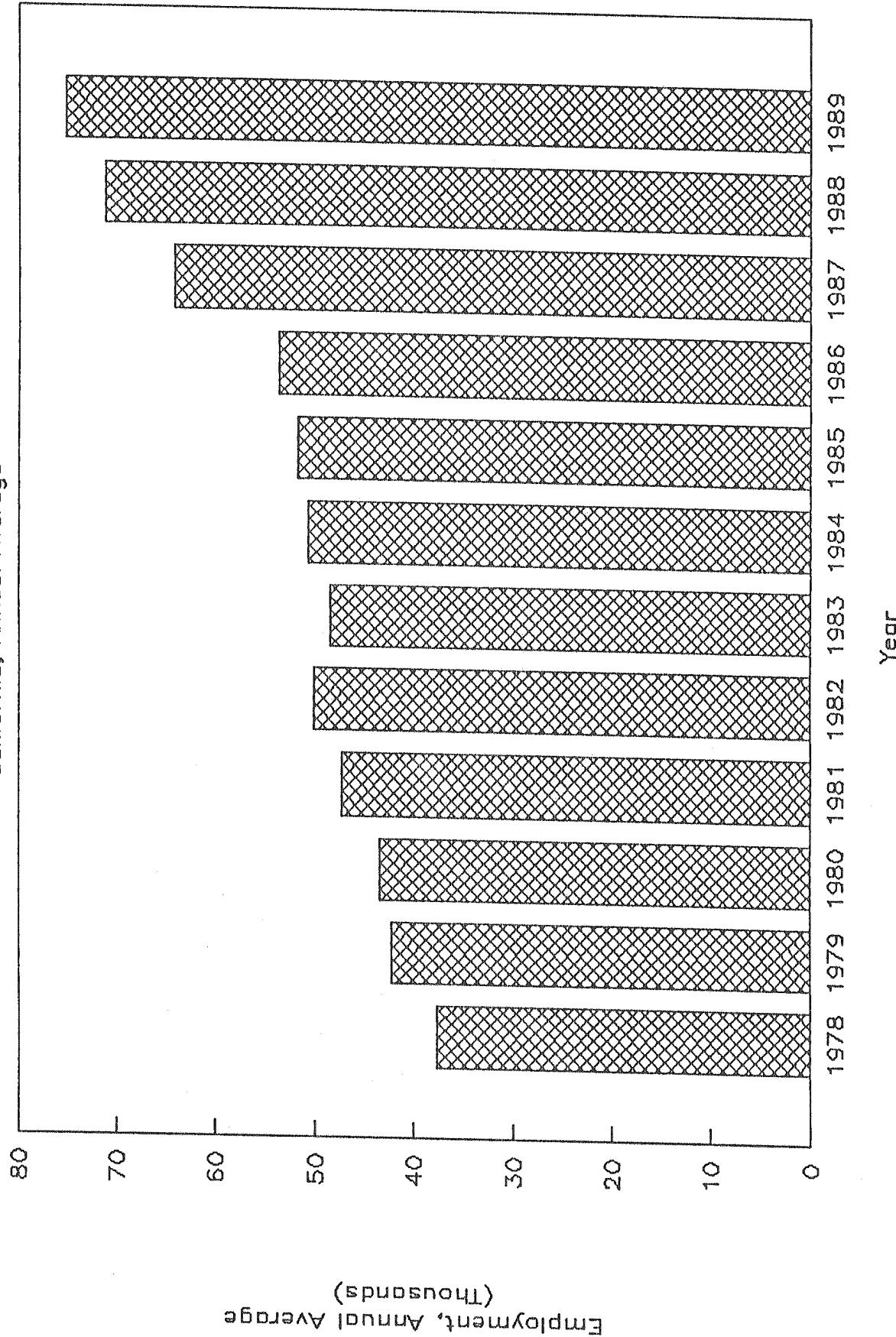


FIGURE 11