

CALFED

**TECHNICAL REPORT
AFFECTED ENVIRONMENT**

AGRICULTURAL RESOURCES
Including Agricultural Economics, Agricultural Land
Use, and Social Well Being Related to Agriculture

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LIST OF ACRONYMS

BCDC	San Francisco Bay Conservation and Development Commission
CAC	County Agricultural Commissioner
CALFED	CALFED Bay-Delta Program
Census	U.S. Department of Commerce Census of Agriculture
CES	University of California Cooperative Extension Service
Commission	Delta Protection Commission
Corps	U.S. Army Corps of Engineers
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
EDD	California Employment Development Department
FLC	Farm Labor Contract
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service (formerly Soil Conservation Service)
Reclamation	U. S. Bureau of Reclamation
RWQCB	Central Valley Regional Water Quality Control Board
SB	Senate Bill
SFD	San Felipe Division
SJVDP	San Joaquin Valley Drainage Program
SRCD	Suisun Resource Conservation District
SWP	State Water Project
SWRCB	State Water Resources Control Board

AGRICULTURAL RESOURCES

INTRODUCTION

This technical report addresses the following topics:

- Agricultural economics,
- Agricultural land use, and
- Social well being related to agriculture.

Agricultural Economics

Potential CALFED actions may affect agricultural production both within and outside the Delta. Concerns include water supply within and exported from the Delta, quality of water diverted within and exported from the Delta, water transfers, land purchases for levee protection and for habitat, and water costs. This section focuses on agricultural economics and land uses, and provides information on some key agricultural indicators used to assess potential CALFED actions, particularly on:

- Irrigated and harvested acres,
- Value of agricultural production,
- Cost of production and net income,
- Agricultural water use and water pricing, and
- Farm structure and characteristics.

AGRICULTURAL WATER USE AND PRICING

Many water districts recover part or all of their costs from per-acre assessments in addition to, or instead of, per acre-foot water charges. These assessments are not included in the prices

summarized here. In addition, under section 3407(d) of the CVPIA of 1992, CVP service contracts water is charged \$6 per acre-foot for the restoration fund, with an additional \$7 per acre-foot charged for CVP Friant-Kern water deliveries. Contractors can be excused from part or all of restoration charges based on ability to pay. These costs and adjustments are not included in the prices discussed in this report.

CROPPING PATTERNS AND PRODUCTION VALUE

A cropping pattern is the share of acres within a region planted to individual crops or categories of crops, including fallowed land. Agricultural land use can be partially described by its cropping pattern, and cropping patterns are important to agricultural and regional economics. If CALFED actions reduce the amount of irrigation water available, farmers can change their cropping patterns by fallowing a portion of the lands that receive Delta export water, by planting crops that require less irrigation water, or by adopting water conservation measures.

All three options would affect farm profits. The extent of the impact would depend on the change in the amount of water used, the cost of producing the new crops, the prices received for the new crops, and the costs of implementing water conservation measures, such as more efficient irrigation systems.

FARM PROFILES

Numbers and sizes of farms, together with ownership patterns, describe the general structure of agriculture within a region. A large number of farms can mean larger economic influences within the region in terms of employment, spending, and taxes. Ownership

patterns can give an indication of the numbers of farm owners and managers who live within a region. Labor expenses are important to workers and the communities in which they live.

AGRICULTURAL PRODUCTION COSTS AND REVENUES

Agricultural net returns are revenues less costs. Higher costs reduce farm profits, but some part of costs also represent farm expenditures in the regional economy. Revenues are unit price multiplied by the level of production.

Agricultural Land Use

Agricultural land use comprises those land uses designated for farming. Crop types include: fruit, nut, and vine crops; grain and hay; vegetables; field crops; pasture land; fallow land; and other undefined agricultural uses. The Natural Resources Conservation Service (NRCS, formerly Soil Conservation Service) distinguishes among four basic designations of farmland: Prime Farmland, Additional Farmland of Statewide Importance, Unique Farmland, and Additional Farmland of Local Importance. Prime and Additional Farmland of Statewide Importance may currently be used as cropland, pastureland, rangeland, forest land, or other land but not urban built-up land or water.

Prime Farmland is land best suited for producing food, feed, forage, fiber, and oilseed crops, and also is available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land but not urban built-up land or water). Prime Farmland has the soil quality, growing season, and moisture supply needed to produce sustained high yields or crops economically when treated and managed (including water management) according to modern farming methods.

Additional Farmland of Statewide Importance is land other than Prime Farmland with a good combination of physical and chemical

characteristics for producing food, feed, forage, fiber, and oilseed crops, and also is available for other uses (e.g., cropland, pastureland, rangeland, and forest land) but not for urban use or water.

Unique Farmland is land other than Prime and Additional Farmland of Statewide Importance that currently is used for the production of specific high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high-quality and/or high yields of a specific crop when treated and managed according to modern farming methods. Examples of such crops are citrus, olives, avocados, fruit, and vegetables.

Additional Farmland of Local Importance is land used for the production of food, feed, forage, fiber, and oilseed crops, even though these lands are not identified as having national or statewide importance. These lands are identified by a local committee made up of concerned agencies and called together by the NRCS District Conservationist designated as county representative. The local committee reviews the lands under this category on at least a 5-year basis.

For purposes of this technical report, no distinction is made among these four designations of agricultural uses when describing the affected environment and potential land use impacts of the project alternatives.

The Delta study area contains primarily farmlands with the appropriate soil physical and chemical characteristics, growing season, and moisture supply necessary to qualify as prime farmlands. This includes 80 to 90 percent of the area of organic and highly organic mineral soils, Sacramento River and San Joaquin River deltaic soils, and basin and basin rim soils. Most of the remaining soils of the Delta study area primarily support farmlands that have values of high statewide significance for the production of agricultural products. The major exceptions are in Suisun Marsh and the Yolo Bypass, where flooding is frequent, and in developed areas. There are minor exceptions in other smaller

areas affected by frequent flooding, inadequate drainage, or high soil salinity.

Social Well Being Related to Agriculture

The evaluation of social well being for the CALFED project is primarily concerned with two issues: community stability and environmental justice.

Community stability refers to the ability of people and communities to cope with changes in economic and demographic changes that may occur as a result of a CALFED action. The affected environment for the community stability analysis includes current social conditions in terms of various economic indicators, employment opportunities, educational opportunities, and the social structure of a community.

Environmental justice is evaluated based on whether one racial or economic group is disproportionately impacted by an environmental or health hazard resulting from a CALFED action. The affected environment for the environmental justice analysis includes the racial demographics within the areas affected by CALFED actions. Because farm workers are the most racially diverse and have the lowest income of all agricultural workers, this discussion focuses on that population.

SOURCES OF INFORMATION

Agricultural Economics

Agricultural economics and land use data from 1920 to 1995 were collected to develop a historical perspective and to describe recent trends and conditions in agricultural production and land use in the CALFED study area. The primary data sources are identified in the following paragraphs.

County Agricultural Commissioner (CAC) Reports. These reports are published annually and are available from the 1930s to the present for some counties. They provide detailed data on harvested acreage, yield, and value of production for the principal crops produced in each county.

California Department of Water Resources (DWR) Bulletin 160 Reports. These reports are published periodically to update California's water plan. Data on irrigated acres by planning subarea were collected from the 1966, 1974, 1983, and 1993 reports.

U.S. Department of Commerce Census of Agriculture (Census). These agricultural census reports provide information by county. The data include the number and size of farms, extent of farmlands, cropland acreage, irrigated acreage, types of farm ownership, market value of production, production expenses, and acreage of principal crops. The data were collected in 1964, 1969, 1978, 1987, and 1992.

University of California Cooperative Extension Service (CES) Crop Budgets. The CES has developed budgets for representative crops in many California counties and regions to be used by farmers as guides for making production decisions and determining potential returns. The budgets are based on typical production practices for the area.

Data for more than 200 crops are collected, but they are grouped into 12 crop categories for presentation. Table 1 shows the 12 crop categories and the main crops that are included in each crop category.

Crop Category	Main Crops Included
Pasture	Irrigated pasture
Alfalfa hay	Alfalfa hay
Sugar beets	Sugar beets
Other field crops	Field corn, dry beans, lima beans, safflower, sunflower, alfalfa seed, wild rice, miscellaneous seed, miscellaneous field crops
Rice	Rice
Truck crops	Cantaloupe, honeydew, watermelon, dry and fresh onions, garlic, white potatoes, peppers, carrots, cauliflower, lettuce, peas, spinach, broccoli, asparagus, sweet potatoes, other truck vegetables.
Tomatoes	Fresh tomatoes, processing tomatoes
Deciduous orchard	Almonds, pistachios, English walnuts, prunes, plums and apricots, peaches, nectarines, pears, cherries, apples, miscellaneous deciduous fruit
Grains	Wheat, barley, oats, sorghum, grain hay, other silage
Grapes	Raisins, table grapes, wine grapes
Cotton	Upland cotton, pima cotton
Subtropical orchard	Oranges, lemons, grapefruit, olives, figs, kiwis, avocados, pomegranates, miscellaneous

Table 1. Crop Categories and Main Crops

Agricultural Land Use

Information for this report was compiled from a variety of sources, including the California Farmland Mapping Program (California Department of Conservation 1994), DWR's California Water Plan Update (1994); County General Plans; and personal communication with offices of the state, regional Councils of Government, and counties. A list of written materials used in preparing this report is provided in the References section.

Social Well Being Related to Agriculture

Data from 1992 and 1990 (State of California Controller's Office 1990 - 1992) were used as the basis for the social analysis. Data from the 1980s were used for social groups, institutions, and communities. Historical data about social perceptions for the study area are not consistent among most regions and are not available for some regions. Information presented in this technical report for changes in agricultural communities is based on reports of recent drought conditions in the Central Valley and the 1990 San Joaquin Valley Drainage Program (SJVDP).

Recent and historical demographic and economic indicator data were collected at the regional county level and aggregated into the CALFED regions. The major information sources for the demographic and economic indicator data are U.S. census data from the U.S. Department of Commerce, and other data from the California Department of Finance and the California Employment Development Department (EDD).

Additional demographic and economic data were collected by reviewing past sociological studies for the study area. This information is summarized in the social well being sections of this chapter as it pertains to specific social groups, communities, and institutions.

ENVIRONMENTAL SETTING

Regulatory Context

AGRICULTURAL ECONOMICS

Laws and regulations affecting California agricultural resources fall into several main categories: water rights permitting, water quality regulation, endangered species and other fish and wildlife protections, and levee maintenance and repair programs. Numerous other regulatory agents influence agriculture (including labor law, and air quality regulations), but this brief description highlights those closely related to potential CALFED actions.

Water diversions in the study area are a mixture of riparian, pre-1914 appropriative, and post-1914 appropriative rights. All of these rights are subject to conditions of reasonable and beneficial use, and the post-1914 rights are subject to State Water Resources Control Board (SWRCB) permits. Particular laws and regulations that have affected agricultural water use in recent years include: SWRCB's Decision 1485 (D-1485); the December 1994 Bay-Delta Accord; biological opinions for winter run salmon and Delta smelt; Vernalis water quality standards; and the Central Valley Project Improvement Act (CVPIA) of 1992. The Coordinated Operations Agreement between the State and the U. S. Bureau of Reclamation (Reclamation) currently governs how the State Water Project (SWP) and Central Valley Project (CVP) interact in their management and use of Delta water.

Government agencies with responsibility for, or influence on, water use by agriculture include the SWRCB and Central Valley Regional Water Quality Control Board (RWQCB), state and federal water projects that both deliver water within and divert water from the Delta, local irrigation and reclamation districts, state and federal agencies that protect water quality and environmental resources, and the U.S. Army

Corps of Engineers (Corps) and local agencies responsible for flood protection and levee maintenance.

AGRICULTURAL LAND USE

Both the State and local planning jurisdictions govern land in the study area. The California State Legislature passed laws resulting in state policy that guides land uses in the study area, and local jurisdictions govern land use through general plans and the development review process. Several state and federal agencies also have jurisdiction for certain resources, such as water quality and biological resources.

The California State Legislature passed the Delta Protection Act of 1992, which created the Delta Protection Commission (Commission) to provide regional coordination of the Delta. The Commission developed a long-term Land Use and Resource Management Plan for the 487,265-acre Primary Zone of the Delta (71 percent of the legal Delta) (Delta Protection Commission 1995).

The California State Legislature enacted the Suisun Marsh Preservation Act in 1974 required a protection plan to be developed for the Marsh. The Act directed the San Francisco Bay Conservation and Development Commission (BCDC) and the California Department of Fish and Game (DFG) to prepare the Suisun Marsh Protection Plan (Protection Plan) "to preserve the integrity and assure continued wildlife use" of the Suisun Marsh.

In 1978, the SWRCB issued D-1485, which set water salinity standards for Suisun Marsh from October through May to preserve the area as a brackish water tidal marsh and to provide optimum conditions for plant production as food for waterfowl. Decision 1485 also placed operational conditions on the water rights permits of the CVP and SWP. Order 7 of the decision required the permittees to develop and fully implement a plan, in cooperation with other agencies, to ensure that the channel salinity standards are met (DWR 1994).

The Suisun Resource Conservation District (SRCD) and DFG sponsored Senate Bill (SB) 1981, which required a long-range protection plan for the Suisun Marsh. The bill was enacted and gave BCDC responsibility for implementation of the Protection Plan and SRCD local responsibility over habitat management practices in the Suisun Marsh.

The five primary counties of the Delta Region (Contra Costa, Sacramento, San Joaquin, Solano, and Yolo) organized the Delta Advisory Planning Council, which in 1976 produced the Delta Action Plan and Watercourse Use Program, a preliminary comprehensive resource plan and program for the Sacramento and San Joaquin Delta. The Delta Action Plan identifies a number of areas of significant recreational and scenic value.

SOCIAL WELL BEING RELATED TO AGRICULTURE

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," (issued in 1994) is designed to focus the attention of federal agencies on the human health and environmental conditions in minority communities and low-income communities. It requires federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations. In an accompanying Presidential memorandum, the President emphasizes that existing laws, including the National Environmental Policy Act (NEPA), provide opportunities for federal agencies to address environmental hazards in minority communities and low-income communities.

Executive Order 12898 and its accompanying memorandum have the primary purpose of ensuring that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority

populations and low-income populations ...". The Executive Order also explicitly calls for the application of equal consideration for Native American programs.

All Regions

HISTORICAL PERSPECTIVE

This section provides a discussion of those aspects of historical perspective that are common to all five CALFED regions. Additional region-specific information follows this section.

Region-specific discussions of historical perspective include:

- Number of farms and irrigated acres,
- Agricultural cropping patterns, and
- Agricultural land use.

Recorded agriculture in California began with Spanish settlers in the late 1700s. These settlers produced mostly dryland crops adequate for their own needs. Irrigation consisted of a few crude canals to transport water from nearby rivers and streams to the farms. Acreage irrigated at the Spanish missions was small, yet it provided an important object lesson for American and European settlers who began arriving in California in the 1830s and 1840s.

Table 3 includes the number of farms and irrigated acres for all CALFED regions from 1944 to 1964. Table 3 lists the average irrigated acres by crops for all CALFED regions from 1946 to 1950. These tables are referred to in region-specific discussions that follow.

Table 2 shows a chronology of the development of irrigated acreage in the study area by decade. About one million acres were irrigated in all of California before 1900. When gold was discovered in the Sierra foothills of northern California in 1848, the mining boom created a new market for agricultural products, and more sophisticated water transportation systems

(e.g., reservoirs, ditches, and flumes) were built to mine the gold. These water works were used to supply water for Sacramento Valley irrigation as gold mining activity decreased. Irrigated agriculture began to increase significantly after the mid-1800s, and total irrigated land reached 4.2 million acres by 1920. After the 1920s, large reservoirs were built to capture runoff and growing seasons. As a result, total irrigated acres in California increased to 4.3 million acres by 1940 and 6.8 millions acres by 1950. The main factors that affected initial irrigated land development in California are discussed below.

Although there is virtually no rain during the summer growing season, many rivers, streams, and groundwater aquifers are found in California. Most of the water falls in the northern part of the state. Less than adequate annual precipitation for agriculture, along with frequent droughts and floods, created the need for water development and flood protection.

Passage of the Federal Swamp Act of 1849 allowed landowners to purchase swamp and overflow lands at a reduced cost and encouraged reclamation of the land for agriculture. Seasonal and periodic flooding was an important incentive for reclamation. In 1880, the State Engineer classified 1.1 million acres in the Sacramento Valley as swamp and overflow lands, with an additional 600,000 acres in the San Joaquin Valley and the Delta.

The construction of railroads within the state and the completion of the transcontinental railway allowed California produce to be transported within California and to markets as far away as the eastern United States.

The mining boom in the mid-1800s increased the non-farm population, providing the first big market for agricultural products. The non-farm population continued to increase as more industries and settlers moved into California.

Year	Irrigated Acreage (million acres)
1880	0.4
1890	1.0
1900	1.4
1902	1.8
1910	3.2
1920	4.2
1930	3.5
1940	4.3
1950	6.8

NOTE:
The numbers before 1900 are for all California, and the numbers after 1900 are the sum of the five CALFED regions.

SOURCE:
California Department of Water Resources(DWR) 1955.

Table 2. Development of Irrigated Acreage in the Study Area, 1880 to 1950

Enactment of the Desert Land Act of 1877 encouraged the development of irrigated agriculture in Kern County. Land within designated areas was purchased, and with proof that irrigation of the land was necessary, water rights were also acquired.

Hydropower generation from local water storage projects provided cheap energy for pumping water supplies to irrigation facilities and fields.

CURRENT RESOURCE CONDITIONS

This section provides information on those aspects of current resource conditions that are common to all five CALFED regions. Additional region-specific information follows this section.

	1944	1949	1954	1959	1964
Delta					
Number of farms	3,457	4,502	4,331	4,117	3,374
Irrigated acres (1,000 acres)	203	334	373	436	445
Bay Region					
Number of farms	5,581	5,713	6,146	5,347	4,103
Irrigated acres (1,000 acres)	169	200	223	236	210
Sacramento River Region					
Number of farms	9,948	11,068	11,538	10,899	
Irrigated acres (1,000 acres)	640	866	1,100	1,155	
San Joaquin River Region					
Number of farms	30,212	33,832	32,037	29,327	25,153
Irrigated acres (1,000 acres)	2,367	3,208	3,526	3,744	3,893
SWP and CVP Service Areas Outside the Central Valley					
Number of farms	33,715	30,780	25,548	19,554	13,603
Irrigated acres (1,000 acres)	1,026	1,268	1,234	1,193	1,124

SOURCES:
Census 1946, 1951, 1956, 1961, and 1966.

Table 3. Number of Farms and Irrigated Acres in All Regions, 1944 to 1964

Crop Category	Irrigated Acres (1,000 acres)				
	Delta Region	Bay Region	Sacramento River Region	San Joaquin River Region	SWP and CVP Service Areas Outside the Central Valley
Pasture	62	17	179	443	59
Alfalfa	52	9	86	439	325
Sugar beets	0	17	0	0	34
Field crops	52	21	127	130	152
Rice	15	0	258	23	0
Truck crops	88	61	49	210	253
Orchards	42	115	161	181	79
Grains	62	2	35	662	126
Grapes	31	6	8	410	10
Cotton	0	0	0	723	34
Subtropical orchards	1	0	2	42	294
Total	402	247	904	3,262	1,366

SOURCE:
DWR 1955.

Table 4. Average Irrigated Acres by Crops in All Regions, 1946 to 1950

Discussions of region-specific current resource conditions for each region include:

1. Agricultural Economics
 - Agricultural water use and pricing,
 - Cropping patterns and production value,
 - Farm profiles, and
 - Agricultural production costs and revenues.
2. Agricultural Land Use
3. Social well being related to agriculture.

AGRICULTURAL ECONOMICS

Overview

The CALFED study area represents an important agricultural region for both California and the United States. California is the most diversified agricultural economy in the world, producing more than 250 crop and livestock commodities. The study area encompasses 85 percent of the total California irrigated land, covering 39 of the 58 counties in California. In 1995, the 39 counties together contributed about 95 percent of California's agricultural production value and represented nine of the top 10 agricultural counties in California and seven of the top 10 counties in the nation.

California agriculture produces an abundance of products including over 50% of the U.S. production of fruits, nuts, and vegetables on 3% of the nation's farmland. The economic value of agriculture to the communities of the Sacramento Valley, the Delta, and the San Joaquin Valley is greater than the gross value of the farm products (farm gate value) or the number of direct farm-related jobs. There are two ways in which the agricultural industry impacts local and regional economies. First, to produce and harvest a crop requires a variety of inputs such as seed, fertilizer and chemicals, water, equipment and fuel, and labor. Then, after harvest, farm produce is transported,

stored, processed, packaged, and marketed. These tasks result in direct economic activity. The second way is the distribution of the income resulting from the initial direct economic activity. This income supports local and regional economies as this farm and farm-related income is spent for food, housing, and other consumer items. Depending on the farm commodity produced, and the extent of value-added processing it receives, the economic multiplier effect can range from 1.8 to 4, with a general average of 2.7 often cited. According to California agricultural statistics for 1995, farm income totaled \$22.1 billion and generated over \$70 billion in related economic activity, resulting in an overall economic multiplier of 3.2.

The importance of agriculture to the economy of the Central Valley is even greater. Farming and farm-related industries in the Central Valley are estimated to directly and indirectly create about three out of ten jobs and about 30% of personal income. Statewide agriculture and related activities account for about one in every ten jobs.

Table 5 provides agricultural water use and water pricing in all CALFED regions from 1985 to 1990. Table 6 shows irrigated acres and production value in all CALFED regions from 1986 to 1995. Table 7 includes the number of farms, farm sizes, and farm ownership in all CALFED regions for 1987 and 1992. Table 8 contains farm income and production expense in all CALFED regions for 1987 and 1992.

Agricultural Water Use

Agriculture in the five CALFED study regions receives irrigation water from the CVP, the SWP, local water rights and water projects, and groundwater. Most of this water is delivered to farmers through irrigation districts and other water agencies. The availability and reliability of supply of high quality water limits the productivity of important farmlands. Table 5 provides agricultural water use and water pricing from 1985 to 1990.

Irrigation Applied Water Use by Region (1,000 acre-feet)					
Water Source	Delta	Bay	Sacramento River	San Joaquin River	SWP and CVP Service Areas Outside the Central Valley
Local water	1,100	123	1,801	4,854	107
CVP water	85	54	1,467	4,268	0
SWP water	0	13	1	1,168	232
Groundwater	110	544	1,448	1,803	229
Weighted Average Price (\$/af)					
Surface water	0-15	15-45	0-15	20-85	15-255
Groundwater	20-35	60-130	30-60	30-80	80-120
SOURCE: DWR 1994.					

Table 5. Agricultural Water Use and Water Pricing in All Regions, 1985 to 1990

Central Valley Project: The CVP supplies about 30 percent of total agricultural water use in the study area (DWR 1994). Most of CVP water is delivered to the Central Valley counties in the Sacramento River Region and the San Joaquin River Region. CVP water is delivered to approximately 250 water districts, individuals, and companies through water service contracts, Sacramento River water rights, and San Joaquin River exchange contracts. The terms “water service contract” and “project water” refer here to water developed by the project and delivered pursuant to repayment and water service contracts. CVP exchange contracts and Sacramento River water rights represent water rights that predate the CVP.

State Water Project: The SWP supplies about 10 percent of total agricultural water use in the CALFED study area. Through contracts with 29 water agencies, the SWP provides water within the Central Valley to Butte, Solano, Kings, and Kern counties; outside the Central Valley to several Southern California counties; to Alameda and Santa Clara counties in the South Bay Area; and to Napa and Solano counties in the North Bay Area. In addition, the SWP provides water rights deliveries to water

rights holders along the Feather River (Butte and Plumas counties).

Local Surface Water: Local surface water supplies (those not delivered by either project) provide about 40 percent of all agricultural water supplies in the study area. More local surface water supplies are available on the east side of the valley because of the larger amount of precipitation in the Sierra Nevada. Locally owned water projects are especially important on the Yuba, Stanislaus, Tuolumne, Kings, and Merced rivers; but local sources on the west side like the federal Solano Project also are important.

Crop Category	Delta Region		Bay Region		Sacramento River Region		San Joaquin River Region		SWP and CVP Service Areas Outside the Central Valley	
	Irrigated Acres (1,000 acres)	Production Value (million dollars)	Irrigated Acres (1,000 acres)	Production Value (million dollars)	Irrigated Acres (1,000 acres)	Production Value (million dollars)	Irrigated Acres (1,000 acres)	Production Value (million dollars)	Irrigated Acres (1,000 acres)	Production Value (million dollars)
Pasture	37	4	15	2	189	19	290	34	185	15
Rice	11	9	50	9	161	68	527	374	420	258
Truck crops	28	77	0	0	28	25	51	54	32	40
Tomatoes	45	91	16	10	335	176	786	532	154	67
Alfalfa	65	37	0	0	469	394	18	12	0	0
Sugar beets	15	13	47	280	16	31	301	982	289	1,514
Field crops	151	76	4	10	135	234	180	433	8	47
Orchards	61	177	26	148	265	578	668	2,074	22	343
Grains	60	16	14	3	175	43	344	103	146	47
Grapes	36	127	70	316	10	42	507	1,681	37	215
Cotton	0	0	0	0	4	2	1,269	1,153	20	19
Subtropical orchards	0	0	0	0	15	30	221	973	167	842
Total	509	628	244	779	1,803	1,642	5,162	8,403	1,481	3,408

SOURCES:
CAC various years.

Table 6. Irrigated Acres and Production Value in All Regions, 1986 to 1995

Region	Year	Number and Size			Ownership Status		
		Number of Farms	Land in Farms (1,000 acres)	Average Farm Size (acres)	Full Owners	Part Owners	Tenants
Delta	1987	4,033	962	238	2,817	691	529
	1992	3,639	900	247	2,525	628	487
Bay	1987	8,377	2,315	276	5,950	1,194	1,233
	1992	7,453	2,261	303	5,306	1,035	1,112
Sacramento River	1987	11,916	4,527	380	8,183	2,160	1,568
	1992	11,507	4,334	377	7,786	2,093	1,629
San Joaquin River	1987	28,742	10,095	351	20,942	4,610	3,730
	1992	26,731	9,656	361	9,144	4,420	3,168
SWP and CVP Service Areas Outside the Central Valley	1987	21,281	6,279	295	16,744	1,837	2,700
	1992	19,899	5,488	276	16,063	1,639	2,197

SOURCES:
Census 1989 and 1994.

Table 7. Number of Farms, Farm Sizes, and Farm Ownership in All Regions, 1987 and 1992

Region	Year	Total Farm Income (million dollars)				Total Production Expenses (million dollars)				Net Cash Return (million dollars)
		Agric. Product Value	Other Revenue	Total	Livestock Related	Fertilizers and Chemicals	Hired and Contract Labor	Other	Total	
Delta	1987	496	12	508	81	38	97	169	385	123
	1992	590	10	600	89	48	128	209	474	126
Bay	1987	845	2	847	102	36	255	281	674	173
	1992	1,065	6	1,071	105	53	338	335	831	240
Sacramento River	1987	1,515	145	1,660	126	140	252	525	1,043	617
	1992	1,394	183	1,577	147	180	316	630	1,273	304
San Joaquin River	1987	6,565	222	6,787	1,276	531	1,337	2,197	5,341	1,446
	1992	8,089	308	8,397	1,780	670	1,691	2,736	6,877	1,520
SWP and CVP Service Areas Outside the Central Valley	1987	3,743	30	3,773	872	185	842	1,044	2,943	830
	1992	4,295	29	4,324	904	222	1,072	1,312	3,510	814

SOURCES:
Census 1989 and 1994.

Table 8. Farm Income and Production Expense in All Regions, 1987 and 1992

Groundwater: Groundwater provides a significant supply of water for agriculture in normal years, and it is often used to reduce or eliminate shortages of surface water supplies during drought. On average, groundwater provides about 20 percent of total agricultural water use in the study area.

Declining groundwater tables, subsidence, and loss of aquifer storage continue to be costly problems, particularly in the western and southern parts of the San Joaquin River Region and the Bay Region, where less surface water is available. Declining groundwater tables increase pumping costs. The costs of subsidence include damage to structures, failure of well casings, and frequent surveying. Water from the CVP and SWP had replaced some of the groundwater pumping, and withdrawals

were about equal to estimated recharge (Bertoldi et al. 1991). However, the recent drought and supply restrictions imposed by the CVPIA of 1992, the Bay-Delta Accord, and Biological Opinions have reduced surface water supplies and renewed the past trend of groundwater depletion throughout the valley.

Farm Profiles

Numbers and sizes of farms, together with ownership patterns, describe the general structure of agriculture within a region. A large number of farms can mean larger economic influences within the region in terms of employment, spending, and taxes. Ownership patterns can give an indication of the numbers of farm owners and managers who live within a region. Labor expenses are important to workers

and the communities in which they live. Table 7 shows a summary of farm profiles by region.

Cropping Patterns and Production Value

A cropping pattern is the share of acres within a region planted to individual crops or categories of crops, including fallowed land. Agricultural land use can be partially described by its cropping pattern, and cropping patterns are important to agricultural and regional economics.

Agricultural Production Costs and Revenues

Agricultural net returns are revenues less costs. Higher costs reduce farm profits, but some part of costs also represent farm expenditures in the regional economy. Revenues are unit price multiplied by the level of production. Table 8 includes regional summaries of production costs and revenues for example years 1987 and 1992.

AGRICULTURAL LAND USE

The Natural Resources Conservation Service (NRCS) distinguishes among four basic designations of farmland: Prime Farmland, Additional Farmland of Statewide Importance, Unique Farmland, and Additional Farmland of Local Importance. Prime and Additional Farmland of Statewide Importance may currently be used as cropland, pastureland, rangeland, forest land, or other land but not as urban land or water.

Prime Farmland is land best suited for producing food, feed, forage, fiber, and oilseed crops, and also is available for these uses. Prime Farmland has the soil quality, growing season, and moisture supply needed to produce sustained high yields or crops economically when treated and managed (including water management) according to modern farming methods.

Additional Farmland of Statewide Importance is land other than Prime Farmland with a good combination of physical and chemical

characteristics for producing food, feed, forage, fiber, and oilseed crops, and also is available for these uses.

Unique Farmland is land other than Prime and Additional Farmland that currently is used for the production of specific high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality and/or high yields of a specific crop when treated and managed according to modern farming methods. Examples of such crops are citrus, olives, avocados, fruit, and vegetables.

Additional Farmland of Local Importance is land used for the production of food, feed, forage, fiber, and oilseed crops, even though these lands are not identified as having national or statewide importance. These lands are identified by a local committee made up of concerned agencies that review the lands under this category on at least a 5-year basis.

Table 9 shows estimated totals of 1994 important farmland acreage based on information from the California Department of Conservation (DOC), Farmland Mapping and Monitoring Program for counties within the Central Valley. The numbers are estimates of important farmland acreage (including prime and unique farmland and farmland of local and statewide importance) in the Delta, Sacramento River, and San Joaquin River regions, the regions where important farmland is most likely to be affected. (It is important to note that several of the counties in the study area have not been completely surveyed by the California DOC for important farmland and that these summaries have been approximated. For a detailed discussion of the Farmland Mapping and Monitoring Program and acreages by county, visit the California DOC's internet website at <http://www.consrv.ca.gov/olc/farmland.html>.)

Region	Acres
Delta	520,000
San Joaquin	4,750,000
Sacramento	2,160,000

Table 9. Important Farmland in the Central Valley

Table 6 identifies approximate acres in irrigated agriculture for each of the five CALFED regions.

Agricultural Habitats

Croplands, orchards, and vineyards have been developed on some of the state's most fertile soils. Soils supported a much greater diversity of native species and productive natural habitats historically than they do today. Many wildlife species have adapted to areas now converted to cropland. Wintering waterfowl and shorebirds consume waste grains left in fields after harvest, and use fields flooded for weed control, leaching, and creation of seasonal wetlands.

Additional information on agricultural habitats can be found in the Vegetation and Wildlife Technical Report.

SOCIAL WELL BEING RELATED TO AGRICULTURE

To describe the affected environment for social well being, this document relies on the grouping of counties for each region shown as follows in Table 10. This grouping is necessary in order to aggregate racial, income and population data from the U. S. Census.

The affected environment for social well being involves both community stability issues and environmental justice issues. Although community stability and environmental justice issues overlap in many respects (for example, income and poverty levels) they are discussed separately for organizational purposes. Additionally, community stability is described

for the entire study area rather than on a regional basis.

CALFED Regions	Counties
Delta Region	98 % of Contra Costa, 45% of Sacramento, 46% of San Joaquin, 30% of Solano, and 20% of Yolo counties.
Bay Region	Alameda, 2% of Contra Costa, Marin, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz and Sonoma.
Sacramento River Region	Butte, Colusa, Glenn, Placer, 55% of Sacramento, Shasta, 70% of Solano, Sutter, Tehama, 80% of Yolo, and Yuba.
San Joaquin River Region	Fresno, Kern, King, Madera, Merced, 54% of San Joaquin, Stanislaus, and Tulare.
SWP and CVP Service Area Outside Central Valley	Imperial, Los Angeles, Plumas, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura.

Table 10. CALFED Regions and Groupings of Counties

Community Stability

The affected environment for community stability includes the following:

- Social groups in the CALFED study area,
- Economic indicators of social well being,
- Employment opportunities, and
- Community social structure.

Social Groups in the CALFED Study Area

Several important social groups are related to agriculture in the study area: farmers, farm workers, and agribusiness workers.

Farmers: Farmers are those individuals who own land and/or manage farm operations for lands within the five CALFED regions, including those receiving CVP or SWP water supplies. These individuals could be affected by changes in agricultural water supply quantities or reliability. They must determine the crops to plant and related farm production expenditures. They rely on long-term and firm water supplies to manage farm production. About half of all farm operators list their principal occupations as farming. Others are employed in additional jobs to supplement their income.

Farmers who own and operate family-owned corporations or farms are important and differ from corporate farm owners. Owners of corporate farms frequently reside outside the valley and hire professional managers to run the farms. The farm manager is an employee, not an owner, with allegiances to the corporate owners that may exceed those to the community.

Farm Workers and Agribusiness Workers: Farm workers are those persons employed to work on farms, excluding farm managers. Farm workers are irrigation technicians, machine operators, and seasonal workers. California agriculture is highly dependent on seasonal and skilled farm workers to assist with crops. "Seasonal workers" are employed by several farmers within the same county. "Migrant workers" move from county to county to find work. Crop production in the San Joaquin River Region is the most labor-intensive within the study area. Crops grown within the region that require intensive labor are orchard, vineyard, and vegetable crops. Cotton, alfalfa, grain, sugar beet, and pasture crops are the least labor-intensive and do not require seasonal labor for planting, thinning, pruning, harvesting, sorting, or packing as do labor-intensive crops.

The average hourly wages paid to farm laborers range between \$4 and \$10, depending upon the type of work performed. The studies also found that there is a surplus of available workers in the San Joaquin Valley according to the EDD and La Cooperative (1990-1991 publication *Voice of the Fields*). This surplus has led to conditions where workers lived in open fields or in cars,

increased use of Farm Labor Contract (FLC) services, and shorter periods of employment. In addition, it was reported that FLCs pay lower wages and piece contracts, and that workers would prefer to work directly with the grower. Farm workers, although skilled in the services that they provide, may not have the language skills or educational training to allow them to enter other areas of employment.

Agribusiness workers are those individuals who are indirectly involved in farm production and are employed in agricultural or service industries. These workers include providers of seed, fertilizer, and pesticides; equipment and irrigation technology sales; and farm processors (e.g., cotton gins, packing and shipping companies, olive processors, and tomato processors). Agricultural workers may have the language, education, and business skills to allow them to enter other areas of employment; however, studies are not available to indicate the potential for this to occur.

Economic Indicators of Social Well Being

Social well being is a measure of community standards and attitudes or contentment. High levels of employment, income, and opportunities for satisfaction, like cultural or recreation opportunities, generally contribute to high levels of social well being. In contrast, high levels of unemployment and poverty, and few opportunities for satisfaction can contribute to lower feelings of contentment and social well being. These attitudes may be reflected in the community by higher crime rates, increased alcoholism or other dependencies, and other adverse social conditions. Social groups can assist community members in dealing with adverse economic conditions by providing financial support, counseling, and family services.

Economic indicators of social well being include population demographics, median family income, per capita income, poverty rates, and unemployment rates. These indicators are summarized by region in Table 11.

This section summarizes regional economic indicators of social well being in the study area as they apply to all social groups and communities. Some general conclusions derived from review of the economic data presented in Table 11 are as follows:

- In the study area, people living in predominantly rural areas have lower incomes, higher poverty rates, and higher unemployment rates than those living in the urban regions. However, San Francisco and Los Angeles counties experience high income levels and some of the highest poverty rates in the state.
- In all regions (except the Sacramento River Region) pockets of prosperity have an “averaging effect” of raising average personal income levels and lowering average poverty and unemployment rates, as shown in Table 11.

Personal Income

Personal income is measured as family and/or per capita income, as shown in Table 11. Median family income is a measure of the annual income received by families living together in the same household. The median is a statistical term for the midpoint of a data set. There is a wide range of median family income in the study area. Per capita income in the study area ranges from \$10,000 in the Tulare Lake area and Yuba County (Sacramento River Region) to \$28,000 in Marin County in the Bay Region.

Poverty Rates

There is a wide range of poverty rates within the study area. The highest poverty rates in the study area occur in predominantly rural areas, and poverty rates are higher among minority ethnic groups. A 1986 study by the EDD (Ong et al. 1986) estimated the poverty rates among races in California during 1980, as summarized in Table 12.

	Delta Region	Bay Region	Sacramento River Region	San Joaquin River Region	CVP and SWP Service Areas Outside the Central Valley
Population (1996)	2,362, 514	5,498,964	1,666,650	3,004,222	19,159,450
Economic Indicators					
Median family income (1989)	40,690	46,373	31,794	30,862	38,825
Per capita income (1994)	21,991	28,079	18,313	16,475	20,358
Poverty rate	11%	9%	13%	18%	13%
Unemployment rate (1995)					
Average	7.8%	6.6%	11.2%	13.3%	10%
Range	5.8 to 12.3%	4.3 to 13.5%	6.1 to 19.7%	8.2 to 16.9%	5.1 to 28.8%
NOTE: Aggregated into CALFED regions as shown in Table 10.					
SOURCE: California Department of Finance 1993.					

Table 11. Regional Demographics and Economic Indicators of Social Well Being for All Regions

Ethnicity	Poverty Rate
	(Percentage)
White	6
Black	21
Hispanic	18
Asian and other	11
SOURCE: Ong, et al. 1986	

Table 12. Poverty Rate by Ethnicity

Unemployment Rates

As shown in Table 11, existing unemployment rates are lowest in the Bay and Delta regions where more employment opportunities are available. Unemployment rates are presented as a range in areas with diverse economies such as the urban and agricultural areas in the Sacramento Valley and San Joaquin Valley.

Unemployment rates in the study area are higher among minority ethnic groups. The EDD (Ong et al. 1986) estimated statewide unemployment rates among races in California during 1980, as summarized in Table 13.

Ethnicity	Unemployment Rate
	(percentage)
White	4
Black	7
Hispanic	7
Asian and other	4
SOURCE: Ong, et al. 1986	

Table 13. Unemployment Rate by Ethnicity

Employment Opportunities

Employment opportunities vary within the study area regions. Urban centers offer the greatest employment opportunities for all skill levels. Employment opportunities exist in a greater number of industrial sectors than those found in

the rural portions of the study area, thus providing a better employment base. Employment opportunities in rural areas involve predominant industries, such as agriculture, logging, and fishing. When economic downturns or other influencing factors occur that affect these predominant industries, workers have limited opportunities for finding new work. Changes in employment opportunities are important economic indicators of social well being. Employment opportunities generally increase as worker education and technical skill levels increase. However, agricultural employment has been available for less technically skilled workers. Agricultural production for many crops requires trained workers for pruning, thinning, sorting, and harvesting.

Average annual agricultural employment was about 400,000 to 435,000 jobs from 1987 to 1992. Approximately 420,000 people were employed in the agriculture industry in 1992 (EDD 1993). The relationship between the agricultural sector and the larger economy of the Central Valley is important in assessment of social factors. Agricultural employment is becoming a less significant factor in measuring the viability of the local economy in all areas of the Central Valley than it once was historically. The economy of the Central Valley has grown and diversified, and non-agricultural employment opportunities are increasing. This general trend does not hold true for some communities. Agriculture remains the dominant industry and economic force in many smaller communities.

Factors affecting social well being include not only employment opportunities but also job guarantees. Job guarantees are affected by seasonal employment trends and economic trends and, in some cases, natural occurrences. Seasonal employment affects agricultural workers. Economic trends also may affect agriculture. Natural occurrences such as weather conditions can shorten or lengthen seasonal employment opportunities. For example, water shortages can reduce the number of acres farmed. Natural occurrences such as drought and flood conditions and economic conditions are not under the control of CALFED

and, although they are not addressed further in this chapter, are important to consider in the assessment of existing conditions.

For the CALFED study area, the largest sectors of workers who may be affected are seasonal farm workers and agricultural workers. Seasonal unemployment among farm workers and agricultural workers usually occurs during winter months following harvest and summer vacation periods. Changes in seasonal employment can affect the demand for social services. The demand for social services increases during periods of unemployment, such as requests for unemployment payments, health services, and other family support programs. The need to utilize family, health, and income support services can decrease social well being among persons who are employed during much of the year but are seasonally unemployed.

Community Social Structure

Regional social programs are administered by county and city governments. Funding for these programs may be available from the federal government, state government, or local agencies or interest groups.

Counties provide support through a variety of services. Services administered through county offices include worker education and training programs, job placement services, aid for families and children, and welfare programs.

Cities provide public protection services and health services to residents. Employment and job training programs are not administered by cities, except under special circumstances in which a city may promote economic development and employment opportunities, or provide funding to other local agencies for worker placement.

School districts can sponsor worker education programs such as English as a second language or basic technical skills. School districts generally are considered to provide education for grades one through 12. However, local community colleges also assist workers by improving education and labor skills. The local Private Industry Councils and Employment

Opportunities Commissions can work with schools to provide worker training.

Schools also can provide after-school child care and subsidized meals to assist working families and disadvantaged children. In areas with low family income, these programs can be valuable.

Local communities provide a social base for people to access assistance and support during times of need. The social structure of a community may provide job training, educational opportunities, family support services, religious and cultural outlets for support and counseling, recreational opportunities, and monetary assistance. These services may be available through community or county agencies or from cultural and religious institutions within the community. The local community also provides an identifying factor for all residents and a sense of belonging. When economic changes occur within an area, such as the loss or gain of a major employer or drought or flood conditions, the local community can be affected significantly.

This is especially true if the local economy is centered around one industry type, such as agriculture. The community is a crucial level of social organization. It is at this level that most social services are delivered, social networks formed, and values and beliefs confirmed.

Environmental Justice

The analysis of potential environmental justice issues focuses on the farm worker population. Table 14 indicates ethnicity by region, and Table 15 presents the racial distribution of farm workers by region.

The vast majority of U.S. farm workers have been Mexican immigrants and their children since the Bracero Program, which operated from 1942 to 1964, brought in more than 4 million laborers from Mexico. Earlier decades saw substantial numbers of Chinese, Japanese, Filipinos, and Native and African Americans. By 1983, an estimated 90 percent of the seasonal farm laborers in California were Mexicans or Chicanos, while nationwide the

Region	Ethnicity (percentage)			
	White	Black	Asian	Hispanic
Delta Region	68	8	9	14
Bay Region	61	8	15	16
Sacramento River Region	82	4	5	10
San Joaquin River Region	62	4	6	30
SWP and CVP Service Areas Outside the Central Valley	52	9	9	30

SOURCE:
California Department of Finance 1993

Table 14. Ethnicity by Region

Region	Hispanic	White	Black	American Indian/Eskimo Aleutian	Asian Pacific/ Islander	Total Number of Farm Workers
Delta	77%	15.1%	0.8%	0.3%	6.5%	5,470
Bay	82.2%	14.4%	1%	0%	2.2%	12,230
Sacramento River	58.9%	30.9%	0.4%	1%	8.2%	11,560
San Joaquin River	84%	11.9%	0.3%	0.2%	3.4%	74,220
SWP and CVP Service Areas Outside the Central Valley	86.9%	10.1%	.9%	.2%	1.7%	<u>44,960</u>
Totals	122,490	19,500	840	400	4,860	148,440

SOURCE:
Census 1990

Table 15. Racial Distribution of Farm Workers by Region

figure was 60 percent. Most migrant farm workers are either American citizens or are working in the country legally. The Department of Labor estimates that about 25 percent of migrant farm workers are illegal immigrants.

Additionally, the Department of Labor estimates that at any given time, 12 percent (or at least 190,000) domestic farm workers are out of work nation-wide. The majority of farm workers earn annual wages of less than \$7,500. Although wage rates for farm workers have increased over the last decade, when they are adjusted for inflation, farm workers' real wages have decreased 15 to 25 percent in that time. (USDA 1991.)

Delta Region

HISTORICAL PERSPECTIVE

Until the 1850s, the Delta region was mostly a tidal marsh, part of an interconnected estuary system that included the Suisun Marsh and San Francisco Bay. During the flood season, the Delta became a great inland lake; and when the floodwaters receded, the network of sloughs and channels reappeared throughout the marsh. Land surveys were the first step in developing the Delta. The Delta channels were surveyed in 1841 and again in 1849 by the U.S. Navy. These surveys facilitated transportation and helped open the Delta and upstream communities to increased trade with the San Francisco Bay Area. Already experiencing a population boom because of the Gold Rush, Delta and northern California communities expanded even more as travel to the area became easier and less expensive (DWR 1994b).

Historical records indicate agriculture and irrigation development in the study area began in the mid-1800s. Prior to the extensive levee system and water development facilities in the Delta, agriculture in the region consisted primarily of dryland farming or irrigated agriculture from artesian wells, groundwater pumping, and some creek canals. Reports

indicate that the number of irrigated acres in the Sacramento Valley and San Joaquin River Basin regions were gradually increasing from the 1880s through the 1920s.

Development of the Delta began in late 1850, when the Federal Swamp Land Act conveyed ownership of all swamp and overflow land, including Delta marshes, from the federal government to the State of California. Proceeds from the State's sale of swampland were to go toward reclaiming them, primarily for conversion to agricultural land. In 1861, the State legislature created the Board of Swamp and Overflowed Commissioners to manage reclamation projects. In 1866, the Board's authority was transferred to county boards of supervisors. The first reclamation projects began in 1869, when developers constructed 4-foot-high by 12-foot-wide levees on Sherman and Twitchell islands using the peat soils of the Delta. Since then, levee construction has improved and expanded to 1,100 miles throughout the Delta to protect agricultural and urban lands against flooding (DWR 1993a, 1994).

Shortly after the completion of the levees in 1913, the construction of a complicated series of human-made waterways and water development facilities began in the Delta. Purposes of constructed waterways included providing navigation, improving water circulation, and obtaining material for levee construction. Water development facilities were constructed to ship water from the Delta to other parts of the state for agricultural, urban, and other uses (DWR 1993a).

Reclamation of Suisun Marsh lands began in 1850 with construction of levees to reclaim land for agricultural use. By 1930, 44,600 acres had been developed. During this period, the generally good quality of the water available in the marsh made growing beans, tomatoes, asparagus, corn, and wheat both practical and profitable. By the early 1930s, most commercial agriculture in the marsh ceased because upstream water intrusion and development had reduced freshwater overflows from the Delta, resulting in greater tidal intrusion of highly saline water from San

Francisco Bay. This, in turn, produced salt levels in the soils that exceeded the tolerance of commercial crops (Suisun Resource Conservation District 1980).

In the study area, the extensive levee system, constructed waterways (for example, Contra Costa Canal and Stockton Deep Water Channel), water development facilities, groundwater development, and railroads enabled irrigated agriculture to extend deeper into the Delta. Between 1920 and 1950, irrigated agriculture development increased rapidly from 2.7 million acres to over 4.7 million acres for the entire Central Valley.

Table 3 shows average irrigated acres by 12-crop categories in the Delta Region between 1946 and 1950. The types of crops grown in the Delta region have changed over time. Early crops were grains, fruits, and vegetables that were marketed to nearby cities. Specialty crops such as wheat, barley, beans, and potatoes, were also grown in the Delta region. A greater variety of crops were planted in the Delta as they grew in popularity, such as asparagus, sugar beets, tomatoes, and celery (Delta Protection Commission 1995).

Truck crops were the dominant crop in the Delta Region, accounting for 22 percent of the total irrigated acres. Pasture, alfalfa, field crops, and grains each used about the same amount of irrigated acres, accounting for between 10 and 15 percent of the total irrigated acres. Other major crops grown in the region included grapes and orchards.

The expansion of irrigated agriculture has continued since 1950. Increased water development projects, such as CVP and SWP, in addition to local water projects, secured more dependable water supplies for the Central Valley and Southern California regions. However, more recently, urban development has surpassed agricultural development, encroaching on agricultural land and reducing the total amount of agricultural land in the Delta (DWR 1993b, CDC 1994).

Table 2 shows the number of farms and irrigated acres between 1944 and 1964 in the Delta

Region. The number of farms in the region increased from 3,457 in 1944 to 4,502 in 1949 and then declined to 3,374 in 1964. The decline was due mainly to the accumulation of irrigated land into fewer and larger farms. As a result, the average farm size in the Delta Region increased from 58 acres in 1944 to 132 acres in 1964

Between 1976 and 1993, the total amount of agricultural land in the legal Delta was reduced by about 14,500 acres, almost all of which occurred in the Delta Secondary Zone. The areas where large acreages of agricultural land were reclassified to urban lands were the Brentwood and Oakley areas in Contra Costa County, the Pocket area in Sacramento County adjacent to the Sacramento River, the West Sacramento area in Yolo County, and the Stockton and Tracy areas in San Joaquin County.

Table 16 summarizes the land use acreage changes in the Delta between 1976 and 1993. Although current agricultural practices include some cattle grazing and limited dry farming of grain crops where suitable soils exist, most of the reclaimed marshland has been converted to private duck clubs and State wildlife areas, both of which use the levee systems developed for agriculture as a management tool to provide habitat for wildlife (Suisun Resource Conservation District 1980).

Land Use	1976	1993	Net Change
Agriculture	541,820	527,309	-14,511
Urban	44,474	67,219	+22,745
Open Space	95,021	82,846	-12,175
Water Surface	57,178	61,119	+3,941

SOURCE:
DWR 1993b.

Table 16. Land Use Acreage Changes Between 1976 and 1993 in the Legal Delta

CURRENT RESOURCE CONDITIONS

AGRICULTURAL ECONOMICS

Agricultural Water Use and Pricing

Most agricultural water users in the Delta are private water right holders. Local water rights water accounts for over 85 percent of the total irrigation water use. Other irrigation water sources in the Delta Region are CVP water and groundwater, each accounting for about five to 10 percent of the total agricultural water uses. Compared with other parts of California, the cost of water is much cheaper in the Delta Region because of large amounts of local riparian and pre-1914 appropriate water rights. Table 5 shows average agricultural applied water use and water prices between 1985 and 1990 in the Delta Region.

Cropping Patterns and Production Value

Truck crops dominate Delta crop production, accounting for 30 percent of the region's total harvested acres. The next important group of crops in the region include alfalfa, grains, and orchards, each accounting for 10 to 15 percent of the total crop acreage. Other main crops grown in the region include tomatoes, irrigated pasture, and grapes. Table 6 presents irrigated acres and gross production value by 12 crop categories in the Delta Region for 1986 to 1995.

Orchards and grapes together accounted for less than 20 percent of the total harvest acreage in the Delta between 1986 and 1995 but produced about 50 percent of the total production value, reflecting high crop values per acre. Alfalfa and field crops produced about 15 percent of total production value, with more than 40 percent of total harvested acres, indicating lower crop values per acre.

Farm Profiles

The number of farms decreased from 4,033 in 1987 to 3,639 in 1992 in the Delta Region. The decline was partly due to loss of farm land (62,000 acres) to industrial and urban uses, and partly to the accumulation of farm land into fewer and larger farms. The average farm size increased from 238 acres to 247 acres during this period.

About 70 percent of farms in the Delta are operated by full owners, 17 percent by part owners, and 13 percent by tenants. Little change occurs in these numbers between 1987 and 1992. Table 7 shows farm numbers, farm size, and farm ownership in the Delta Region for 1987 and 1992.

Agricultural Production Costs and Revenues

Agricultural net returns are revenues less costs. Higher costs reduce farm profits, but some part of costs also represent farm expenditures in the regional economy. Revenues are unit price multiplied by the level of production.

Farms in the Delta Region achieved \$496 million in agricultural sales in 1987 and \$590 million in 1992, as shown in Table 8.1.2-2. Production expenses were about \$474 million in 1992, leaving a net cash return of \$126 million. Hired and contract labor was the largest expense reported, accounting for 25% of total expenses.

AGRICULTURAL LAND USE

Today, of the nearly 750,000 acres in the legal Delta, about 500,000 acres are rich farmland (DWR 1994b). Most of this area is classified as prime farmland, unique farmland, and locally important farmland, or as having high statewide significance for agricultural production. The study area's rich peat and mineral soil supports several types of agriculture (DWR 1993b).

One of the unique problems with organic/peat soil is that, when exposed to aerobic conditions by farm cultivation, it oxidizes and erodes away. This has led to a drop in land surface elevations

several feet below sea level throughout much of the Delta from historical levels at or above sea level.

Currently, the Delta Region raises over 70 different types of grains, fruits, nuts, and vegetables (DWR 1993b). Table 17 summarizes the types of agriculture in the study area.

Crop Type	Approximate Acres in Study Area (% of Region)
Fruit/nut/vine crops—apples, cherries, walnuts, almonds, table grapes, wine grapes	32,407 (4%)
Grain and hay crops—rice, barley, wheat, oats	97,440 (11%)
Vegetable crops—artichokes, asparagus, tomatoes, melons	82,940 (10%)
Field crops—flax, sunflowers, corn, hops	181,500 (21%)
Pasture land—alfalfa, clover, mixed and native pasture	110,510 (13%)
Idle land	33,600 (4%)
Other agriculture (undefined agriculture use)	7,800 (less than 1%)

SOURCES:
CDC 1991, 1994.

Table 17. Agriculture in the Delta Region

SOCIAL WELL BEING RELATED TO AGRICULTURE

As shown in Table 11, the 1996 total population for the Delta Region was 2,362,514. The median family income was \$40,690 (1989), per capita income was \$21,991 (1994), poverty rate

was 11 percent (1990), and the unemployment rate ranged from 5.8 to 12.3 percent (1995).

Because the farm worker population tends to migrate seasonally and live in temporary housing, reliable numbers of farm workers are difficult to obtain. Based on the 1990 Census of Population and Housing, the farm worker population in the Delta Region included approximately 5,480 farm workers. It is likely, however, that actual numbers are much larger than this census figure. Of those counted in the census, 77 percent were Hispanic, 15 percent were White, less than one percent were Black, seven percent were Asian/Pacific Islander, and less than one percent were American Indian/Eskimo Aleutian. Table 15 shows the racial breakdown in percentages for all farm workers in the 1990 Census of Population and Housing.

Bay Region

HISTORICAL PERSPECTIVE

As is characteristic of all the CALFED study regions, agriculture in the Bay Region expanded greatly during the Gold Rush of 1849. As more people arrived in California and urban development flourished along the Bay and upon lower watershed areas, more land in the upper watersheds was brought into production.

The number of farms increased from 5,581 in 1944 to 6,146 in 1954 in the Bay Region. Then, it declined to 4,103 in 1964. This was partly due to the accumulation of irrigated land into fewer and larger farms. As a result, the average farm size in the region increased from 30 acres in 1944 to 51 acres in 1964. Another reason of fewer farms was caused by the loss of farm land to urban encroachment (DWR 1955). Between 1959 and 1964, 27,000 acres of irrigated crop land were lost to non-agricultural land use, mostly to industrial and urban uses. Table 2 shows the number of farms and irrigated acres between 1944 and 1964 in the Bay Region. Table 3 shows average irrigated acres by 12-

crop categories in the Bay Region between 1946 and 1950.

Orchards were by far the most important crop in the Bay Region, accounting for 47 percent of the total irrigated acres. The next important crop in the region was truck crops, accounting for 25 percent of the total irrigated acres. Other crops grown in the region included pasture, alfalfa, sugar beets, and field crops.

Prior to the 1940s, land uses in the Bay Region were principally urban in the city of San Francisco and rural in other portions of the region. Over the last 50 years, however, land uses throughout the region have become progressively more urbanized.

CURRENT RESOURCE CONDITIONS

AGRICULTURAL ECONOMICS

Agricultural Water Use and Pricing

Over 75 percent of irrigation water sources in the Bay Region are from groundwater pumping. Local water and project water make up the other 25 percent. Groundwater extractions commonly exceed groundwater replenishment, therefore many of the region's aquifers are experiencing overdraft conditions (DWR 1994).

Between 1985 and 1990, the average cost of surface water in this region is estimated at \$15 to \$45 per acre-foot, which is about the average in California. The cost of groundwater in the Bay Region is much higher (\$60 to \$130 per acre-foot) compared with the Delta and Sacramento River regions. Table 5 shows average agricultural applied water use and water prices between 1985 and 1990 in the Bay Region.

Cropping Patterns and Production Value

Grapes are the dominant crop in the Bay Region, accounting for 30 percent of the

region's total harvested acres. The next important group of crops in the region is sugar beets and truck crops, each accounting for about 20 percent of the total crop acreage. Other main crops grown in the region include orchards, irrigated pasture, and field crops. Table 6 presents average harvested acres and gross production value by 12 crop categories in the Bay Region for 1986 to 1995.

Between 1986 and 1995, grapes and orchards together accounted for less than 50 percent of the total harvest acreage in the Bay Region but produced about 80 percent of the total production value, reflecting high crop values per acre. Alfalfa, grains, and field crops produced about two percent of total production value, with more than 35 percent of total harvested acres, indicating lower crop values per acre.

Farm Profiles

The number of farms decreased from 8,377 in 1987 to 7,453 in 1992 in the Bay Region. The decline was partly due to loss of farm land (54,000 acres) to industrial and urban uses, and partly to the accumulation of farm land into fewer and larger farms. The average farm size increased from 276 acres to 303 acres during this period. Table 7 shows farm numbers, farm size, and farm ownership in the Bay Region for 1987 and 1992.

About 70 percent of farms in the Bay Region are operated by full owners, 17 percent by part owners, and 13 percent by tenants. Little change occurs in these numbers between 1987 and 1992.

Agricultural Production Costs and Revenues

Farms in the Bay Region achieved \$845 million in agricultural sales in 1987 and \$1,065 million in 1992, as shown in Table 8. About two-thirds of these sales were receipts for crops. The remainder of the sales were mostly livestock products. Farmers received an additional \$6 million in government payments and direct sales, custom work, and other farm services in 1992.

Production expenses were about \$831 million in 1992, leaving a net cash return of \$240 million. Hired and contract labor was the largest expense reported, accounting for about 40 percent of total expenses, and it has been increasing over time. Other large categories (other than livestock-related expenses) were fertilizers and chemicals, petroleum products and electricity, and interest paid.

AGRICULTURAL LAND USE

Approximately 240,000 acres of irrigated agricultural land remain in production, most of which are in Contra Costa, Solano, and Sonoma counties.

SOCIAL WELL BEING RELATED TO AGRICULTURE

As shown in Table 11, the 1996 total population for the Bay Region was 5,498,964. The median family income was \$46,373 (1989), per capita income was \$28,079 (1994), poverty rate was 9 percent (1990), and the unemployment rate ranged from 4.3 to 13.5 percent (1995).

Based on the 1990 Census of Population and Housing, the farm worker population in the Bay Region included approximately 12,230 farm workers. This number is likely significantly smaller than actual numbers. Of those counted in the census, 82 percent were Hispanic, 14 percent were White, less than one percent were Black, two percent were Asian/Pacific Islander, and less than one percent were American Indian/ Eskimo Aleutian. Table 15 shows the racial breakdown in percentages for all farm workers in the 1990 Census of Population and Housing.

Sacramento River Region

HISTORICAL PERSPECTIVE

Between 1944 and 1954, the number of farms increased from 9,948 in 1944 to 11,538 in 1954 in the Sacramento River Region. Then, it declined to 9,255 in 1964. This was mainly due

to the accumulation of irrigated land into fewer and larger farms. As a result, the average farm size in the region increased from 64 acres in 1944 to 138 acres in 1964. Table 2 shows the number of farms and irrigated acres between 1944 and 1964 in the Sacramento River Region.

Rice was the most important crop in the Sacramento River Region, accounting for 30 percent of the total irrigated acres. Almost 90 percent of California rice crops were grown in this region during the 1946 to 1950 period. The next important crops in the Sacramento River Region were irrigated pasture and orchards, each accounting for 20 percent of the total irrigated acres. Other crops grown in the region included alfalfa, field crops, grains, and truck crops. Table 3 shows average irrigated acres by 12 crop categories in the Sacramento River Region between 1946 and 1950.

CURRENT RESOURCE CONDITIONS

AGRICULTURAL ECONOMICS

Agricultural Water Use and Pricing

About 40 percent of irrigation water sources in the Sacramento River Region are from local water rights or local water projects. CVP project water and groundwater each makes up the rest of the total agricultural water uses. The 30 percent of the region's lands that are irrigated with groundwater generally have a very reliable supply (DWR 1994).

The majority of diverters along the Sacramento and Feather rivers existed before major CVP and SWP reservoirs were built. Between 1985 and 1990, the average cost of surface water in this region is estimated at \$0 to \$15 per acre-foot, among the lowest in California. The cost of groundwater is estimated at \$30-60 per acre-foot, also among the lowest in the state. Table 5 shows average agricultural applied water use and water prices between 1985 and 1990 in the Sacramento River Region.

Cropping Patterns and Production Value

Rice is the number one crop in the Sacramento River Region, accounting for 26 percent of the region's total harvested acres. The next important group of crops in the region includes field crops (19 percent), orchards (15 percent), pasture (11 percent), and grains (10 percent). Other main crops grown in the region include alfalfa, tomatoes, and sugar beets. Table 6 presents average harvested acres and gross production value by 12 crop categories in the Sacramento River Region for 1986 to 1995.

Orchards and tomatoes together accounted for less than 25 percent of the total harvest acreage in this region but produced about 50 percent of the total production value, reflecting high crop values per acre. Pasture, alfalfa, grains, and field crops produced less than 20 percent of total production value, with more than 50 percent of total harvested acres, indicating lower crop values per acre.

Due to extensive re-use of water in the Central Valley, significant savings only occur from fallowing or through crop shifts. Decreased reliability constrains the conversion to high-value crops because of increased risk, particularly when groundwater is unavailable or of low quality. More lower-value but drought tolerant crops are planted instead.

Farm Profiles

Between 1987 and 1992, the number of farms decreased from 11,916 in 1987 to 11,507 in 1992 in the Sacramento River Region. The decline was primarily due to loss of farm land (193,000 acres) to industrial and urban uses. The average farm size remained about the same during this period. Table 7 shows farm numbers, farm size, and farm ownership in the Sacramento River Region for 1987 and 1992.

About 70 percent of farms in the Sacramento River Region are operated by full owners, 18 percent by part owners, and 12 percent by tenants. Little change occurs in these numbers between 1987 and 1992.

Agricultural Production Costs and Revenues

Farms in the Sacramento River Region achieved \$1,515 million in agricultural sales in 1987 and \$1,349 million in 1992, as shown in Table 8. About two-thirds of these sales were receipts for crops. The remainder of the sales were mostly livestock products. Farmers received an additional \$183 million in government payments and direct sales, custom work, and other farm services in 1992.

Production expenses were about \$630 million in 1992, leaving a net cash return of \$304 million. Hired and contract labor was the largest expense reported, accounting for about 25 percent of total expenses, and it has been increasing over time. Other large categories (other than livestock-related expenses) were fertilizers and chemicals, petroleum products and electricity, and interest paid.

AGRICULTURAL LAND USE

Land uses in the Sacramento River Region are principally agricultural and open space, with urban development focused in the City of Sacramento. More than half the region's population lives in the greater metropolitan Sacramento area. Other fast-growing communities include Vacaville, Dixon, Redding, Chico, and various Sierra Nevada foothill towns. Urban development has occurred along major highway corridors in Placer, El Dorado, Yolo, Solano, and Sutter counties, and has taken some irrigated agricultural land out of production. Suburban ranchette homes on relatively large parcels surround many of the urban areas, and often include irrigated pastures or small orchards.

Excluding the legal Delta portion of the Sacramento River region, in 1994 there were approximately 2.2 million acres of important farmland mapped in the Sacramento River Region. About 1,847,000 acres are irrigated on the valley floor. The surrounding mountain valleys within the region add about 298,000 irrigated acres (primarily pasture and alfalfa) to the region's total. The region produces a

significant amount of the overall agricultural tonnage in California, especially rice, grain, tomatoes, field crops, fruit, and nuts.

SOCIAL WELL BEING RELATED TO AGRICULTURE

As shown in Table 11, the 1996 total population for the Sacramento River Region was 1,666,650. The median family income was \$31,794 (1989), per capita income was \$18,313 (1994), poverty rate was 13 percent, and the unemployment rate ranged from 6.1 to 19.7 percent (1995).

Based on the 1990 Census of Population and Housing, the farm worker population in the Sacramento River Region included approximately 11,560 farm workers. It is likely that actual numbers are much larger than this census figure. Of those counted in the census, 59 percent were Hispanic, 31 percent were White, less than one percent were Black, eight percent were Asian/Pacific Islander, and less than one percent were American Indian/Eskimo Aleutian. Table 15 shows the racial breakdown in percentages for all farm workers in the 1990 Census of Population and Housing.

San Joaquin River Region

HISTORICAL PERSPECTIVE

Between 1944 and 1964, the number of farms increased from 30,212 in 1944 to 33,832 in 1949 in the San Joaquin River Region. Then, it declined to 25,153 in 1964. This was mainly due to the accumulation of irrigated land into fewer and larger farms. As a result, the average farm size in the region increased from 78 acres in 1944 to 155 acres in 1964. Table 2 shows the number of farms and irrigated acres between 1944 and 1964 in the San Joaquin River Region.

In terms of irrigated acres, cotton and grains were the most important crops in the San Joaquin River Region between 1946 and 1950, accounting for 22 percent and 20 percent of the

total irrigated acres, respectively. The next important crops in the San Joaquin River Region were irrigated pasture, alfalfa and grapes, each accounting for about 15 percent of the total irrigated acres. Other crops grown in the region included orchards, field crops, and truck crops. Almost 100 percent of California cotton and 90 percent of California grapes were grown in this region during the 1964 to 1950 period. Table 3 shows average irrigated acres by 12 crop categories in the San Joaquin River Region between 1946 and 1950.

Prior to the 1960s, land uses in the San Joaquin River Region were principally agriculture and open space, with urban uses limited to small farm communities. Although agriculture and food processing are still the region's major industries, expansion from the San Francisco Bay Area and Sacramento over the past 30 years have resulted in the creation of major urban centers throughout the region.

CURRENT RESOURCE CONDITIONS

AGRICULTURAL ECONOMICS

Agricultural Water Use and Pricing

About 40 percent of irrigation water sources in the San Joaquin River Region are from local water rights or local water projects. CVP project water provides 35 percent of total irrigation water uses, mostly to the Westlands Water District. The rest of water in the region is from SWP and groundwater pumping.

Between 1985 and 1990, the average cost of surface water in this region is estimated at \$20-85 per acre-foot, among the high end in California. The cost of groundwater is estimated at \$30-80 per acre-foot, also among the high end in the state. Table 5 shows average agricultural applied water use and water prices between 1985 and 1990 in the San Joaquin River Region.

Cropping Patterns and Production Value

In terms of harvested acres, cotton is the number one crop in the San Joaquin River Region, accounting for 25 percent of the region's total harvested acres. The next important crops in the region are field crops (15 percent), orchards (13 percent), grapes (10 percent), and alfalfa (10 percent). Other main crops grown in the region include pasture, truck crops, tomatoes, and grains. Table 6 presents average harvested acres and gross production value by 12 crop categories in the San Joaquin River Region for 1986 to 1995.

Grapes and orchards together accounted for less than 25 percent of the total harvest acreage in this region but produced about 50 percent of the total production value, reflecting high crop values per acre. On the contrary, pasture, alfalfa, grains, and field crops produced less than 20 percent of total production value with more than 50 percent of total harvested acres, indicating lower crop values per acre.

Farm Profiles

The number of farms decreased from 28,742 in 1987 to 26,731 in 1992 in the San Joaquin River Region. The decline was partly due to loss of farm land (439,000 acres) to industrial and urban uses, and partly due to the accumulation of farm land into fewer and larger farms. The average farm size increased from 351 acres to 361 acres during this period.

About 73 percent of farms in the San Joaquin River Region are operated by full owners, 17 percent by part owners, and 10 percent by tenants. Little change occurs in these numbers between 1987 and 1992. Table 7 shows farm numbers, farm size, and farm ownership in the San Joaquin River Region for 1987 and 1992.

Agricultural Production Costs and Revenues

Farms in the San Joaquin River Region achieved \$6,565 million in agricultural sales in 1987 and \$8,089 million in 1992, as shown in

Table 8. About two-thirds of these sales were receipts for crops. The remainder of the sales were mostly livestock products. Farmers received an additional \$308 million in government payments and direct sales, custom work, and other farm services in 1992.

Production expenses were about \$2,736 million in 1992, leaving a net cash return of \$1,520 million. Hired and contract labor was the largest expense reported, accounting for about 25 percent of total expenses, and it has been increasing over time. Other large categories (other than livestock-related expenses) were fertilizers and chemicals, petroleum products and electricity, and interest paid.

AGRICULTURAL LAND USE

Land uses in the San Joaquin River Region are predominantly open space in the mountain and foothill areas, and agricultural in the San Joaquin Valley area. Urban land usage in 1990 totaled 295,300 acres. Urban areas include the cities of Stockton, Modesto, Merced, and Tracy, as well as smaller communities such as Lodi, Galt, Madera, and Manteca. The western side of the region, south of Tracy, is sparsely populated. Small farming communities provide services for farms and ranches in the area, all relatively close to Interstate 5.

In 1994, excluding the legal Delta portion of San Joaquin County, about 4,750,000 acres of important farmland were mapped in the San Joaquin River Region.

SOCIAL WELL BEING RELATED TO AGRICULTURE

As shown in Table 11, the 1996 total population for the San Joaquin Region was 3,004,222. The median family income was \$30,862 (1989), per capita income was \$16,475 (1994), poverty rate was 18 percent (1990), and the unemployment rate ranged from 8.2 to 16.9 percent (1995).

Based on the 1990 Census of Population and Housing, the farm worker population in the San Joaquin River Region included approximately 74,220 farm workers. It is likely that actual

numbers are much larger than this census figure. Of those counted in the census, 84 percent were Hispanic, 12 percent were White, less than one percent were Black, four percent were Asian/Pacific Islander, and less than one percent were American Indian/Eskimo Aleutian. Table 15 shows the racial breakdown in percentages for all farm workers in the 1990 Census of Population and Housing.

SWP and CVP Service Areas Outside the Central Valley

HISTORICAL PERSPECTIVE

Between 1994 and 1964, the number of farms decreased from 33,715 in 1944 to 13,603 in 1964 in the SWP and CVP Service Areas Outside the Central Valley. This was mainly due to the accumulation of irrigated land into fewer and larger farms. As a result, the average farm size in the region increased from 30 acres in 1944 to 82 acres in 1964. Table 2 shows the number of farms and irrigated acres between 1944 and 1964 in the SWP and CVP Service Areas Outside the Central Valley.

In terms of irrigated acres, alfalfa and subtropical orchards were the most important crops in the SWP and CVP Service Areas Outside the Central Valley between 1956 and 1950, accounting for 24 percent and 22 percent of the total irrigated acres, respectively. The next important crops in the SWP and CVP Service Areas Outside the Central Valley were truck crops, field crops, and grains, each accounting for about 15 to 20 percent of the total irrigated acres. Other crops grown in the region included pasture and orchards. Over 90 percent of California subtropical orchards were grown in this region during the 1964 to 1950 period. Table 3 shows average irrigated acres by 12 crop categories in the SWP and CVP Service Areas Outside the Central Valley between 1946 and 1950.

CURRENT RESOURCE CONDITIONS

AGRICULTURAL ECONOMICS

Agricultural Water Use and Pricing

Outside the Central Valley, SWP water and groundwater each provide 40 percent of total irrigation water in the region. Local water provides the rest of total irrigation water uses.

Between 1985 and 1990, the average cost of surface water in this region is estimated at \$15 to \$255 per acre-foot, among the highest in California. The cost of groundwater is estimated at \$80 to \$120 per acre-foot, also among the highest in the state. Table 5 shows average agricultural applied water use and water prices between 1985 and 1990 in the SWP and CVP Service Areas.

Cropping Patterns and Production Value

In terms of harvested acres, alfalfa is the number one crop in the SWP and CVP Service Areas Outside the Central Valley, accounting for 28 percent of the region's total harvested acres. The next important crops in the region are pasture (12 percent), subtropical orchards (11 percent), field crops (10 percent), and grains (10 percent). Other main crops grown in the region include sugar beets and grapes. Table 6 presents average harvested acres and gross production value by 12 crop categories in the SWP and CVP Service Areas Outside the Central Valley for 1986 to 1995.

Between 1986 and 1995, truck crops and orchards together accounted for less than 30 percent of the total harvest acreage in this region but produced about 70 percent of the total production value, reflecting high crop values per acre. Pasture, alfalfa, grains, and field crops produced less than 15 percent of total production value with more than 50 percent of total harvested acres, indicating lower crop values per acre.

Farm Profiles

Between 1987 and 1993, the number of farms decreased from 21,281 to 19,899, respectively, in the SWP and CVP Service Areas Outside the Central Valley (Table 7). The decline was primarily due to loss of farm land (791,000 acres) to industrial and urban uses. The average farm size decreased from 295 acres to 276 acres during this period.

About 80 percent of farms in the SWP and CVP Service Areas Outside the Central Valley are operated by full owners, eight percent by part owners, and 12 percent by tenants. Little change occurs in these numbers between 1987 and 1992.

Agricultural Production Costs and Revenues

Farms in the SWP and CVP Service Areas Outside the Central Valley achieved \$3,743 million in agricultural sales in 1987 and \$4,295 million in 1992, as shown in Table 8. About two-thirds of these sales were receipts for crops. The remainder of the sales were mostly livestock products. Farmers received an additional \$29 million in government payments and direct sales, custom work, and other farm services in 1992.

Production expenses were about \$3,510 million in 1992, leaving a net cash return of \$814 million. Hired and contract labor was the largest expense reported, accounting for about 30 percent of total expenses, and it has been increasing over time. Other large categories (other than livestock-related expenses) were fertilizers and chemicals, petroleum products and electricity, and interest paid.

AGRICULTURAL LAND USE

About 15 percent (377,500 acres) of the region's land is estimated to comprise agricultural land uses. Intensive agriculture exists in the Santa Maria and lower Santa Ynez valleys; moderate levels of agricultural activity also occur near the South Coast area. Agricultural crops include grapes, vegetables, and truck crops, as well as a

thriving flower seed industry. Total irrigated land in the area was about 145,000 acres in 1990.

The South Coast is the most urbanized region in all of California. Irrigated cropland accounts for about 288,000 acres of the region. The largest amount of irrigated agriculture is in Ventura County, where about 116,600 acres of cropland are cultivated, including vegetables, strawberries, citrus, and avocados.

Moderate levels of irrigated agriculture subsist in the Mojave River, Antelope, and Indian Wells valleys. Most of the acreage produces alfalfa, pasture, or deciduous fruit. About one-half (30,000 acres) of the entire region's irrigated crop land is estimated to lie in the SWP and CVP Service Areas Outside the Central Valley.

Prominent agricultural crops in the southern portion of San Bernardino County, the middle portion of Riverside County, and the Salton Sea in Imperial County include alfalfa, winter vegetables, melons, grapes, dates, and wheat, located primarily in the Coachella Valley area. About 15 percent (377,500 acres) of the land in the SWP and CVP Service Areas Outside the Central Valley is estimated to comprise agricultural land uses.

SOCIAL WELL BEING RELATED TO AGRICULTURE

As shown in Table 11, the 1996 total population for the CVP and SWP Service Areas was 19,159,450. The median family income was \$38,825 (1989), per capita income was \$20,358 (1994), poverty rate was 13 percent, and the unemployment rate ranged from 5.1 to 28.8 percent (1995).

Based on the 1990 Census of Population and Housing, the farm worker population within the San Joaquin River Region included approximately 44,960 farm workers. It is likely that actual numbers are much larger than this figure. Of those counted in the census, 87 percent were Hispanic, 10 percent were White, less than one percent were Black, two

percent were Asian/Pacific Islander, and less than one percent were American Indian/Eskimo Aleutian. Table 15 shows the racial breakdown in percentages for all farm workers in the 1990 Census of Population and Housing.

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