

# 7.2 Agricultural Economics

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The CALFED Bay-Delta Program may enhance or maintain agricultural revenues through increased water supply reliability, greater irrigation efficiency, and levee protection but may reduce agricultural income in local areas through farmland conversion and increased water prices.

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## 7.2 Agricultural Economics

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### 7.2.1 SUMMARY

Agriculture in the CALFED Bay-Delta Program (Program) area is an important portion of the economy. A total of 85% of the state's irrigated acres are in the Program area. The 39 counties in the Program area contribute 95% of California's agricultural production value, represent 9 of the top 10 agricultural production counties in the state, and include 7 of the top 10 agricultural production counties in the nation. Many towns, cities, counties, and special districts are supported by the revenues brought in by agriculture and its support industries, particularly in the Central Valley. Even while the state's agricultural sector is squeezed by ever-increasing population growth and water supply uncertainty, the agricultural economy has continued to grow.

**Preferred Program Alternative.** Several elements of the Preferred Program Alternative would provide protection and certainty to the agricultural economy. Increasing water supply reliability is one expected result of a successful Ecosystem Restoration Program. The Levee System Integrity Program would prevent levee breaches from flooding Delta islands, keeping lands in that region in production. The Water Use Efficiency Program can provide long-term savings and increased revenues to the agricultural economy. The Storage and Conveyance elements may provide additional water to agriculture in some areas. The magnitude and distribution of economic effects to agriculture will depend on the cost of this water. The Water Transfer Program can increase the opportunity for urban and agricultural users needing water to purchase it from willing sellers. Sellers are most likely to be existing agricultural users, resulting in water formerly used for agriculture to be exported for urban or agricultural use elsewhere.

Agricultural lands converted by Levee System Integrity and Ecosystem Restoration Program actions could result in adverse agricultural economic effects. Short-term adverse effects resulting from implementation of the Water Quality Program also could occur. The retirement of drainage-impaired lands under the Water Quality Program may cause adverse economic effects. Actions in the Storage and Conveyance elements could require the conversion of farmland, resulting in adverse effects on the agricultural economy.

Associated with any direct effects on the agricultural economy are the indirect effects, associated with the agricultural sector's purchase of goods and services in localized areas.

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The 39 counties in the Program area contribute 95% of California's agricultural production value, represent 9 of the top 10 agricultural production counties in the state, and include 7 of the top 10 agricultural production counties in the nation. Several elements of the Preferred Program Alternative will provide protection and certainty to the agricultural economy.

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**Alternatives 1, 2, and 3.** Effects under any of the three alternatives would closely resemble those of the Preferred Program Alternative. Differences in effects among the alternatives would be minimal.

## 7.2.2 AREAS OF CONTROVERSY

Under CEQA, areas of controversy involve factors that are currently unknown or reflect differing opinions among technical experts. Unknown information includes data that are not available and cannot readily be obtained. The opinions of technical experts can differ, depending on which assumptions or methodology they use. Below is a brief description of areas of controversy for agricultural economics. Given the programmatic nature of this document, many of these areas of controversy cannot be addressed; however, subsequent project-specific environmental analysis will evaluate these topics in more detail.

**Significance of Adverse Effects.** It should be noted that neither CEQA nor NEPA treats social and economic effects as environmental impacts. CEQA requires a discussion of economic and social effects only if they will lead to physical changes in the environment. NEPA requires a full discussion of social and economic effects but, as with CEQA, does not treat them as environmental impacts in and of themselves. Consequently, this programmatic document fully discusses social and economic issues as required by NEPA but, consistent with state and federal law, does not treat them as significant environmental impacts.

**Magnitude of Crop Effects.** It has been suggested that estimates of direct effects on agricultural revenues were either too low (the analysis should have used average crop value or even high-revenue crops rather than lower revenue field crops) or too high (the analysis should have accounted for yield increases that come from improved irrigation management). These suggestions were included as comments from farm groups and environmental groups in the 1998 CALFED Draft Programmatic EIS/EIR. Both possibilities have been recognized in the discussion of effects below, but quantitative estimates are presented for what are considered the most likely range of effects.

**Projected Crop Mix.** No Action Alternative assumptions regarding future agricultural crop mix and water use will remain in dispute. This analysis relies primarily on the assumptions in DWR's Bulletin 160-98.

**Significance Criteria.** Some commentators have recommended the direct use of economic or financial criteria for judging the significance of effects. This analysis uses the following approach: a direct economic or financial effect can indirectly lead to effects on, for example, land and water use, employment, public services, or other social dislocations. As discussed above, a direct economic or financial effect can be substantial but not environmentally "significant" as defined for an EIR/EIS.

**Agricultural Multipliers.** Various individuals have recommended the use of higher or different multipliers for agriculture ("multipliers" estimate how direct changes in

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No Action Alternative assumptions regarding future agricultural crop mix and water use will remain in dispute. This analysis relies primarily on the assumptions in DWR's Bulletin 160-98.

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agricultural production affect other sections of the economy, such as trucking, processing, and distribution). These recommendations were included as comments from a county agricultural commissioner and farm groups in the 1998 CALFED Draft Programmatic EIS/EIR. Given the programmatic nature of this document and the uncertainty of where Program features will be located, it is not possible to use crop-specific multipliers, some of which may be higher than those used in the analysis. This document uses IMPLAN, the most widely used economic model, for agricultural multipliers. Results are described in Section 7.10, "Regional Economics."

The Program recognizes the importance of agricultural economics to regions potentially affected by Program actions. As a multi-billion dollar industry, agriculture and related industries are the bases of livelihood for many communities throughout the Central Valley and Bay-Delta. Although different user groups may disagree about the magnitude of regional economic effects related to agricultural activities, no one disputes its importance in the California economy. Subsequent project-specific environmental analyses will evaluate these impacts in more detail.

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### 7.2.3 AFFECTED ENVIRONMENT/ EXISTING CONDITIONS

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, Delta, and San Joaquin Valley is greater than the gross value of the farm products (farm gate value) or the number of direct farm-related jobs. The agricultural industry can affect the local and regional economies in two ways. 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 effect 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. The economic multiplier depends on the commodity produced, its use of local labor and inputs, and the extent of value-added processing the commodity receives in the region. Section 7.10, "Regional Economics," presents estimates of regional effects from changes in farm production. As discussed above, these estimates are derived from IMPLAN.

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The economic value of agriculture to the communities of the Sacramento Valley, Delta, and San Joaquin Valley is greater than the gross value of the farm products or the number of direct farm-related jobs.

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**Farm Profiles.** Numbers and sizes of farms, together with ownership patterns, describe the general structure of agriculture in a region. A large number of farms can mean greater economic influences in the region in terms of employment, spending, and taxes. Ownership patterns can indicate 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 7.2-1 shows a summary of farm profiles by region.



Table 7.2-1. Number of Farms, Farm Sizes, and Farm Ownership in All Regions, 1987 and 1992

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
Other SWP and CVP Service Areas	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:  
U.S. Census 1989 and 1994.

**Cropping Patterns and Production Value.** A cropping pattern is the share of acres in 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 7.2-2 includes regional summaries of production costs and revenues for example years 1987 and 1992.

A cropping pattern is the share of acres in a region planted to individual crops or categories of crops, including fallowed land. Agricultural net returns are revenues less costs.

### 7.2.3.1 DELTA REGION

**Farm Profiles.** Between 1944 and 1964, the number of farms in the Delta 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.

The number of farms in the Delta Region decreased from 4,033 in 1987 to 3,639 in 1992, partly due to loss of farmland (62,000 acres) to industrial and urban uses, and partly due to the accumulation of farmland into fewer and larger farms. The average farm size increased from 238 to 247 acres during this period. About 70% of farms in the Delta are operated by full owners.



Table 7.2-2. Farm Income and Production Expense in All Regions, 1987 and 1992

Region	Year	TOTAL FARM INCOME (million dollars)				TOTAL PRODUCTION EXPENSES (million dollars)				NET CASH RETURN (million dollars)
		Agricultural 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
Other SWP and CVP Service Areas	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:  
U.S. Census 1989 and 1994.

**Cropping Patterns and Production Value.** Truck crops dominate Delta crop production, accounting for 30% of the region's total harvested acres. The next important group of crops in the region includes alfalfa, grains, and orchards, each accounting for 10-15% of the total crop acreage. Orchards and grapes together accounted for less than 20% of the total harvested acreage in the Delta between 1986 and 1995 but produced about 50% of the total production value, reflecting high crop values per acre. Alfalfa and field crops produced about 15% of total production value with more than 40% of the total harvested acres, indicating lower crop values per acre.

**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 7.2-2. 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.

Truck crops dominate Delta crop production, accounting for 30% of the region's total harvested acres. Farms in the Delta Region achieved \$496 million in agricultural sales in 1987 and \$590 million in 1992.



### 7.2.3.2 BAY REGION

**Farm Profiles.** Between 1944 and 1964, the number of farms in the Bay Region increased from 5,581 in 1944 to 6,146 in 1954, then declined to 4,103 in 1964. This was partly due to the accumulation of irrigated land into fewer and larger farms, and also due to urban encroachment.

The number of farms in the Bay Region decreased from 8,377 in 1987 to 7,453 in 1992, partly due to loss of farmland (54,000 acres) to industrial and urban uses, and partly due to the accumulation of farmland into fewer and larger farms. The average farm size increased from 276 acres to 303 acres during this period. About 70% of farms in the Bay Region are operated by full owners.

**Cropping Patterns and Production Value.** Grapes are the dominant crop in the Bay Region, accounting for 30% 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% of the total crop acreage. Between 1986 and 1995, grapes and orchards together accounted for less than 50% of the total harvested acreage but produced about 80% of the total production value, reflecting high crop values per acre. Alfalfa, grains, and field crops produced about 2% of total production value with more than 35% of total harvested acres, indicating lower crop values per acre.

**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 7.2-2. 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% of total expenses; and this expense has been increasing over time.

Because both agricultural acreage and production are reported on a county basis, the San Felipe Division is included under the Bay Region in this section rather than under the Other SWP and CVP Service Areas.

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Grapes are the dominant crop in the Bay Region, accounting for 30% of the region's total harvested acres. Farms in the Bay Region achieved \$845 million in agricultural sales in 1987 and \$1,065 million in 1992.

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### 7.2.3.3 SACRAMENTO RIVER REGION

**Farm Profiles.** Between 1944 and 1964, the number of farms in the Sacramento River Region increased from 9,948 in 1944 to 11,538 in 1954, then 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.

The number of farms in the Sacramento River Region decreased from 11,916 in 1987 to 11,507 in 1992, primarily due to loss of farmland (193,000 acres) to industrial and urban uses. The average farm size remained about the same during this period. About 70% of farms are operated by full owners.

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Rice is the number one crop in the Sacramento River Region, accounting for 26% of the region's total harvested acres. Farms in the Sacramento River Region achieved \$1,515 million in agricultural sales in 1987 and \$1,349 million in 1992.

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**Cropping Patterns and Production Value.** Rice is the number one crop in the Sacramento River Region, accounting for 26% of the region's total harvested acres. The next important group of crops in the region includes field crops (19%), orchards (15%), pasture (11%), and grains (10%). Between 1986 and 1995, orchards and tomatoes together accounted for less than 25% of the total harvested acreage in this region but produced about 50% of the total production value, reflecting high crop values per acre. Pasture, alfalfa, grains, and field crops produced less than 20% of total production value with more than 50% of total harvested acres, indicating lower crop values per acre.

Due to extensive re-use of water in the Sacramento Valley, substantial savings occur only 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. Instead, more lower value but drought-tolerant crops are planted.

**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 7.2-2. 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% of total expenses.

The region supports about 2,145,000 acres of irrigated agriculture. About 1,847,000 acres are irrigated on the valley floor; the surrounding mountain valleys in the region add about 298,000 irrigated acres (primarily pasture and alfalfa) to the region's total.

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Due to extensive re-use of water in the Sacramento Valley, substantial savings occur only from fallowing or through crop shifts.

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#### 7.2.3.4 SAN JOAQUIN RIVER REGION

**Farm Profiles.** Between 1944 and 1964, the number of farms in the San Joaquin River Region increased from 30,212 in 1944 to 33,832 in 1949, then 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.

The number of farms in the San Joaquin River Region decreased from 28,742 in 1987 to 26,731 in 1992, partly due to the loss of farmland (439,000 acres) to industrial and urban uses, and partly due to the accumulation of farmland into fewer and larger farms. The average farm size increased from 351 to 361 acres during this period. About 73% of farms are operated by full owners.

**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% of the region's total harvested acres. The next important crops in the region are field crops (15%), orchards (13%), grapes (10%), and alfalfa (10%). Between 1986 and 1995, grapes and orchards together accounted for less than 25% of the total harvested acreage in this region but produced about 50% of the total production value, reflecting higher crop values per acre. Pasture, alfalfa, grains,

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Cotton is the number one crop in the San Joaquin River Region, accounting for 25% of the region's total harvested acres. Farms in the San Joaquin River Region achieved \$6,565 million in agricultural sales in 1987 and \$8,089 million in 1992.

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and field crops produced less than 20% of total production value with more than 50% of total harvested acres, indicating lower crop values per acre.

**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 7.2-2. 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% of total expenses.

### 7.2.3.5 OTHER SWP AND CVP SERVICE AREAS

**Farm Profiles.** Between 1944 and 1964, the number of farms in the Other SWP and CVP Service Areas decreased from 33,715 in 1944 to 13,603 in 1964, 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.

The number of farms in the region decreased from 21,281 in 1987 to 19,899 in 1992, primarily due to the loss of farmland (791,000 acres) to industrial and urban uses. The average farm size decreased from 295 to 276 acres during this period.

**Cropping Patterns and Production Value.** In terms of harvested acres, alfalfa is the number one crop in the Other SWP and CVP Service Areas, accounting for 28% of the region's total harvested acres. The next important crops in the region are pasture (12%), subtropical orchards (11%), field crops (10%), and grains (10%). Between 1986 and 1995, truck crops and orchards together accounted for less than 30% of the total harvested acreage in the region but produced about 70% of the total production value, reflecting higher crop values per acre. Pasture, alfalfa, grains, and field crops produced less than 15% of total production value with more than 50% of the total harvested acres, indicating lower crop values per acre.

**Agricultural Production Costs and Revenues.** Farms in the Other SWP and CVP Service Areas achieved \$3,743 million in agricultural sales in 1987 and \$4,295 million in 1992, as shown in Table 7.2-2. 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% of total expenses.

Moderate levels of irrigated agriculture are located 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 service area.

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.

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Alfalfa is the number one crop in the Other SWP and CVP Service Areas, accounting for 28% of the region's total harvested acres. Farms in the Other SWP and CVP Service Areas achieved \$3,743 million in agricultural sales in 1987 and \$4,295 million in 1992.

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## 7.2.4 ASSESSMENT METHODS

Assessment variables for agricultural economic effects include irrigated acres, agricultural water and land use, water quality, costs and revenues from agricultural production, and risk and uncertainty. Potential effects are quantified based on existing estimates of land and water value, crop revenue per acre, and costs. Land and water use impacts are described in Section 7.1, "Agricultural Land and Water Use." All of the potential effects described in this section are based on review of and experience with other studies.

Water supply changes, land conversion, and costs were estimated using existing policy-level models, such as the Central Valley Production Model, and by interpolating or extrapolating estimates for other studies.

Counties in the Delta Region would bear many of the economic effects of conversion of agricultural land to other uses. These counties also would benefit from levee improvements and other construction activity. Due to the programmatic nature of this EIS/EIR, county-level detail and quantification are not possible or appropriate. Effects are summarized below in Section 7.2.7 for several regions, one of which is the Delta Region.

Table 7.2-3 shows the threshold and rate of decline due to salinity for major categories of crops grown in the Delta. For this analysis, an effective leaching fraction of 15% was used to convert between changes in applied water salinity and the resulting change in soil water salinity.

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## 7.2.5 CRITERIA FOR DETERMINING ADVERSE EFFECTS

Criteria used to evaluate the adverse effects of the Program are listed below. The following results of Program actions are considered adverse effects:

- Permanent or long-term reduction in acres of irrigated land in a region.
- A change in water quality that would reduce crop yields.
- Changes in costs or revenues that change the economics of farming to an extent that land use, water use, or employment could be affected.



Table 7.2-3. Major Crops in the Delta Region and Corresponding Threshold Salinity Level

CROP CATEGORY	IRRIGATED ACRES (1,000 acres)	THRESHOLD SALINITY LEVEL (EC <sub>e</sub> )*	PERCENT YIELD DECREASE FROM THE THRESHOLD (%)
Pasture	37	5.0	10.0
Rice	11	3.0	12.0
Truck crops	28	1.5	14.0
Tomatoes	45	2.5	9.9
Alfalfa	65	2.0	7.3
Sugar beets	15	7.0	5.9
Field crops	151	1.7	15.0
Orchards	61	1.5	12.0
Grains	60	6.0	7.1
Grapes	36	1.5	19.0

\*The salinity of the soil saturation extract is expressed as EC<sub>e</sub>, which is the electrical conductivity (in  $\mu\text{mhos/cm}$ ).

Sources:

- Irrigated acreage is from Affected Environment and Environmental Impacts: Agricultural Production and Economics, CALFED Bay-Delta Program, September 1997.
- Maas-Hoffman coefficients are described in United Nations, Food and Agriculture Organization Irrigation and Drainage Paper 29, "Water Quality For Agriculture," 1976.

## 7.2.6 NO ACTION ALTERNATIVE

The predominant issues that would affect future agricultural economic conditions under the No Action Alternative include changes in the markets for agricultural products, the supply and reliability of irrigation water, changes in water quality, development of water transfer markets, the cost of water, and conversion of farmland.

- **Changes in the agricultural market** - Demand for fruits and vegetables will increase, resulting in a shift away from field crops and grain production.
- **Irrigation water supply** - Several important changes have occurred to water supply conditions for agriculture. The CVPIA allocates up to 800 TAF of CVP water per year for environmental restoration. Likewise, the 1994 Bay-Delta Accord reduces the amount of water pumped from the Delta and delivered for agricultural and municipal uses. Estimates by Reclamation in 1997 of the average annual effect of the CVPIA on agricultural production value range from \$76 to \$151 million lost.

The predominant issues that would affect future agricultural economic conditions include changes in the markets for agricultural products, the supply and reliability of irrigation water, changes in water quality, development of water transfer markets, and the cost of water.



- *Water quality* - Reasonably foreseeable changes in water management are expected to affect water quality and thereby will affect agricultural yields. DWR has predicted retirement of up to 45,000 acres of drainage-impaired lands in the San Joaquin Valley, which would result in an adverse economic effect. However, the elimination of runoff from these acres would result in improved downstream water quality in the San Joaquin River and Delta Regions, potentially improving crop selection options and yields.
- *Water transfers* - The use of water transfers likely will increase in the future; however, water transfers have not been assessed quantitatively in this report due to the uncertainty and speculation involved. These transfers have the potential to cause adverse economic effects in agricultural areas transferring water and beneficial economic effects in agricultural areas receiving transferred water.
- *Cost of water* - Implementing cost-of-service and tiered water pricing, plus the restoration charges and surcharges imposed by the CVPIA, will increase the cost of water by up to 100% in some CVP service areas. Also, districts looking for water to transfer are almost certain to spend more for that water than they have in the past.
- *Conversion of farmland* - The continued trend of agricultural land conversion, particularly to urban purposes but also to habitat, will result in decreased agricultural production.

## 7.2.7 CONSEQUENCES: PROGRAM ELEMENTS COMMON TO ALL ALTERNATIVES

For agricultural economics, the consequences of the Ecosystem Restoration, Water Quality, Levee System Integrity, Water Use Efficiency, Water Transfer and Watershed Programs, and Storage element are similar under all Program alternatives, as described below. The consequences of the Conveyance element vary among Program alternatives, as described in Section 7.2.8.

### 7.2.7.1 DELTA REGION

#### *Ecosystem Restoration Program*

The Ecosystem Restoration Program primarily would affect agricultural economics in the Delta Region by taking agricultural land out of production. Section 4.3 in Chapter 4 contains a description of the potential acreages of agricultural lands that would be affected by the Program. The crops removed could range from a mix of field and forage crops (corn, grain, and pasture) to high-value orchards. The agricultural land would be

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purchased at a negotiated fair market value, which would reduce the economic hardship on local farmers. It is expected that gross revenue losses would range from \$500 to \$1,500 per acre on average for the region, depending on the ultimate locations of agricultural land conversions. These effects are estimated to result in a gross revenue loss of \$56-\$167 million per year. This loss would result in the subsequent loss of agriculturally related economic activity in other sectors of the economy, such as farm equipment suppliers, trucking, processing, and packing. The indirect economic losses to agricultural support sectors also could affect neighboring regions. The adverse effects could be substantial.

Possible methods to alleviate these adverse effects could include:

- Providing technical assistance to growers on ways to increase the production yielded from a unit of water (through measures such as improvement in distribution uniformity), which will tend to keep production up even as acreage goes down.
- Developing rules for restoration and land conversion that recognize and protect the agricultural productivity of surrounding lands. Issues addressed could include control of rodents and other pests, seepage and salinity control, and public access restrictions.
- Scheduling construction activities in such a manner that current crops may be harvested prior to initiating construction.
- Paying fair market value for any crops destroyed or taken out of production on private or leased lands during project construction.
- Compensating property owners for the value of their land and associated improvements.
- Supporting growers interested in implementing value-added programs on their land (for example, hunting and birdwatching).

Losses could be much greater if substantial amounts of orchard, vineyard, and vegetable land are converted. Gross revenue losses would exceed \$2,000 per acre on such lands. Some of this acreage and revenue likely would shift to other regions of the state, placing more demand on existing surface water and groundwater resources in those regions. The loss of farmland may adversely affect the financial viability of local agencies, especially water and reclamation districts.

Additional flows entering the Delta as part of the Ecosystem Restoration Program could improve the quality of water diverted for agricultural use. Benefits could include improved yields of salt-sensitive crops, reduced water application and management costs, and greater flexibility in crop selection.

The Ecosystem Restoration Program also calls for use of cooperatively managed lands in the Delta (lands that are managed to provide wildlife benefits as well as crop benefits). Examples include flooding rice fields after harvest to provide waterfowl areas or leaving

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Additional flows entering the Delta as part of the Ecosystem Restoration Program could improve the quality of water diverted for agricultural use. Benefits could include improved yields of salt-sensitive crops, reduced water application and management costs, and greater flexibility in crop selection.



a small percentage of crops unharvested to provide food and cover for wildlife. Because these programs provide compensation to landowners, often require labor needs beyond normal agricultural practices, and may increase income to landowners through hunter-related and other fees, cooperative management may result in local economic benefits.

### *Water Quality Program*

Control of upstream drain water quality and quantity from Water Quality Program actions could reduce the salinity of water diverted in the Delta for irrigation. Benefits could include reduced costs, higher yields, and more flexible crop selection. Water quality BMPs, if applied to Delta agriculture, could raise production costs.

### *Levee System Integrity Program*

The Levee System Integrity Program would benefit Delta agriculture by providing greater protection from inundation and salinity intrusion. Setback levees would require purchasing and converting up to 35,000 acres of important farmland. The value of crops taken out of production could range from \$18 to \$53 million per year. This loss may be offset somewhat by lower flood risks to remaining agricultural lands.

Possible methods to alleviate this adverse effect could include:

- Scheduling construction activities in such a manner that current crops may be harvested prior to initiating construction. Paying fair market value for any crops destroyed or taken out of production on private or leased lands during project construction.
- Compensating property owners for the value of their land and associated improvements.

Additionally, the loss of farmland may adversely affect the financial viability of local agencies, especially water and reclamation districts.

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The Levee System Integrity Program would benefit Delta agriculture by providing greater protection from inundation and salinity intrusion. However, setback levees would require purchasing and converting agricultural land.

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### *Water Use Efficiency Program*

Water Use Efficiency actions may increase farm capital, operations, or maintenance costs. Many of these practices, however, also would increase net farm income due to increased crop yield or quality, or by reducing the need for other production inputs. The Water Use Efficiency agricultural incentive program would be structured so that growers would not be required to bear the economic burden of practices that are not locally cost effective. The incentive program would provide funding for practices that provide Program benefits but are not profitable for growers. (For example, efficiency measures that may result in state-wide benefits but are locally not cost effective.) Economic benefits



could accrue from increased water use efficiency in terms of reduced water costs, increasing the economic output of some farming operations.

### *Water Transfer Program*

The Water Transfer Program may increase the opportunities for water transfers. Water transferred from Delta water users may result in adverse economic effects, such as reduction in farm production. However, the effects experienced by individual farmers would be offset by revenue generated by the sale of water. To the extent that Delta water users rely on return flow from agricultural use upstream, water transferred out of those upstream areas could adversely affect the quantity, timing, and quality of water available for Delta users.

Possible methods to alleviate these adverse effects could include:

- Developing water transfer rules that protect groundwater users, downstream diverters, and other potentially affected agricultural producers

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Water transferred from Delta water users may result in adverse economic effects, such as reduction in farm production. However, the effects experienced by individual farmers would be offset by revenue generated by the sale of water.

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### *Watershed Program*

No effects on agricultural economics in the Delta Region are anticipated from Watershed Program actions.

### *Storage*

Some Delta agricultural lands, including up to 15,000 acres of important farmland, could be converted to provide in-Delta storage. The value of crops taken out of production could range from \$8 to \$23 million per year. Some additional water supply may become available to Delta users as a result of new storage, but the amount is expected to be small. Water quality improvements made possible by releases from storage could benefit Delta agriculture.

Possible methods to alleviate this adverse effect could include:

- Scheduling construction activities in such a manner that current crops may be harvested prior to initiating construction.
- Paying fair market value for any crops destroyed or taken out of production on private or leased lands during project construction.
- Compensating property owners for the value of their land and associated improvements.

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Some Delta agricultural lands, including up to 15,000 acres of important farmland, could be converted to provide in-Delta storage.

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### 7.2.7.2 BAY REGION

#### *Ecosystem Restoration Program*

Effects from Ecosystem Restoration Program actions on agricultural economics in the Bay Region are expected to be minor.

#### *Water Quality and Water Use Efficiency Programs*

To the extent that they apply to areas nontributary to the Delta, BMPs under the Water Quality Program could substantially increase production costs. Incentives provided under the Water Use Efficiency Program could induce expenditures to improve or upgrade irrigation systems. The increased net cost to growers would be offset by cost sharing or other incentive program.

#### *Levee System Integrity and Watershed Programs*

No effects on agricultural economics are anticipated in the Bay Region from Levee System Integrity and Watershed Program actions.

#### *Water Transfer Program*

Because of the water supply deficiencies in some agricultural areas, water transfers may be an important future source of water in the Bay Region. The region is more likely to be a recipient than a source of water transfers.

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Because of the water supply deficiencies in some agricultural areas, water transfers may be an important source of water in the future in the Bay Region.

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#### *Storage*

Some additional water supply could become available in the Bay Region. Potential charges imposed on agricultural water use to recover costs of program components could lead to substantial changes in agricultural activities (such as crop selection and water use).

### 7.2.7.3 SACRAMENTO RIVER REGION

#### *Ecosystem Restoration Program*

The Ecosystem Restoration Program would convert productive farmland in the Sacramento River Region for habitat restoration. The crop revenue loss associated with removing these lands from production generally ranges from \$500 to \$1,500 per acre, resulting in a regional loss in crop revenue of between \$17 and \$51 million per year in the



Sacramento River Region. This loss would result in a substantial adverse economic effect on farm revenues, income generation, and employment levels. Loss of production also may adversely affect the financial viability of local agencies, especially water and reclamation districts. Losses per acre could exceed \$2,000 if particular orchard lands are converted for restoration purposes.

Possible methods to alleviate this adverse effect could include:

- Developing rules for restoration and land conversion that recognize and protect the agricultural productivity of surrounding lands. Issues addressed could include control of rodents and other pests, seepage and salinity control, and public access restrictions.
- Scheduling construction activities in such a manner that current crops may be harvested prior to initiating construction.
- Paying fair market value for any crops destroyed or taken out of production on private or leased lands during project construction.
- Compensating property owners for the value of their land and associated improvements.
- Supporting growers interested in implementing value-added programs on their land (for example, hunting and birdwatching).

Any changes in water supply, such as purchase of water rights for in-stream flow, could result in changes to crop patterns, potentially affecting crop value. Changes in the quantity or pattern of in-stream flow could affect downstream agricultural users and could result in adverse economic effects.

Possible methods to alleviate these adverse effects could include:

- Developing water transfer rules that protect groundwater users, downstream diverters, and other potentially affected agricultural producers.

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Any changes in water supply, such as purchase of water rights for in-stream flow, could result in changes to crop patterns, potentially affecting crop value.

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### *Water Quality Program*

BMPs for the Water Quality Program could lead to beneficial and adverse effects in land and water use patterns. Adverse effects more likely would result from costs imposed. Beneficial effects include reduced salinity of irrigation water, which could increase yields, reduce production costs, and provide more flexible crop selection.

Possible methods to alleviate these adverse effects could include:

- Providing incentives and technical expertise to landowners interested in establishing higher-value crops.



- Providing cost-sharing and other financial assistance to reduce the effects potentially resulting from the implementation of the Water Use Efficiency and Water Quality Programs.
- Providing technical assistance to growers on ways to increase the production yielded from a unit of water (through measures such as improvement in distribution uniformity), which will tend to keep production up even as acreage goes down.

### *Levee System Integrity Program*

No effects on agricultural economics are anticipated in the Sacramento River Region from the Levee System Integrity Program.

### *Water Use Efficiency Program*

Effects on agricultural economics in the Sacramento River Region from the water use efficiency program would be similar to those noted above for the Delta Region.

### *Water Transfer Program*

Water transfers would result in beneficial or adverse effects in the Sacramento River Region, depending on the timing, magnitude, and pathway of each transfer. Reduced pumping costs for areas receiving a water transfer could occur. Water transfers based on direct groundwater pumping or groundwater substitution could cause a temporary or permanent increase in groundwater pumping. Increased costs associated with groundwater overdraft include pumping from lowered groundwater levels, deepening wells, lowering pumps, and re-drilling wells. These increased operating costs could reduce irrigated acreage at nearby farms that are not transferring water. Direct groundwater and groundwater substitution transfers also could reduce surface water flows due to induced seepage; reduce crop yields due to lower water quality; reduce demand for crop storage and processing; reduce demand for farm inputs; lower ground elevations, increasing the risk of flooding in affected areas; and reduce habitat supported by surface seepage of groundwater. Adverse effects on agricultural economics can be minimized using reduction strategies. Beneficial effects from water transfers include revenues to fund irrigation equipment and technology or to offset the costs of increased groundwater pumping.

Any reductions in water supply caused by changes in the amount of water exported from the Sacramento River Region could reduce agricultural production and result in an adverse effect, depending on the magnitude of the reduction. Reductions in agricultural production also could adversely affect related agricultural industries and cause third-party effects on local rural economics. Strategies may be available to reduce the adverse economic effects.

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Surface water transfers can affect the quantity, timing, and quality of water available to downstream users.

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Surface water transfers can affect the quantity, timing, and quality of water available to downstream users. For example, irrigation water diverted from the Colusa Basin Drain in the Sacramento Valley is primarily return flow from other irrigated lands. Water transferred from the upstream lands, unless restricted to only crop consumptive use, would reduce water available for others. Strategies may be available to reduce this adverse effect.

Possible methods to alleviate these adverse effects could include:

- Developing water transfer rules that protect groundwater users, downstream diverters, and other potentially affected agricultural producers.
- Providing technical assistance to growers on ways to increase the production yielded from a unit of water (through measures such as improvement in distribution uniformity), which will tend to keep production up even as acreage goes down.

### *Watershed Program*

Implementation of upper watershed enhancements in the Sacramento River Region could result in converting upper watershed grazing lands that are adjacent to waterways to restore riparian habitat, stabilize stream channels, restore natural stream hydrology, and create a nonpoint source pollution buffer. Conversion of land could reduce agricultural revenues and employment, and could adversely affect local government revenues and services. Economic effects of the Watershed Program in the Sacramento River Region would be minor.

Possible methods to alleviate the adverse effect could include:

- Compensating property owners for the value of their land and associated improvements.

### *Storage*

Agricultural lands in the Sacramento River Region could be affected by the location of storage facilities. Potential reservoir sites are in foothill or mountain areas, where land use is largely non-irrigated grazing. Some irrigated lands may exist in the valleys potentially to be inundated, with pasture, hay, and grains the predominant crops. Effects include permanent conversion and inundation, and temporary disruption of agricultural activity during construction. Permanent conversion of farmland for facilities would be an adverse economic effect. Economic effects in the Sacramento River Region from improvements in water supply reliability would be minor.

Potential beneficiaries of additional supply in the Sacramento River Region primarily would be CVP contractors, who would use the water to replace groundwater or supply

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Implementation of upper watershed enhancements in the Sacramento River Region could result in converting upper watershed grazing lands that are adjacent to waterways to restore riparian habitat, stabilize stream channels, restore natural stream hydrology, and create a nonpoint source pollution buffer.

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lost from the CVPIA. According to an analysis completed for the CVPIA, the direct value of this water to agriculture ranges from \$30 to \$40 per acre-foot per year.

#### 7.2.7.4 SAN JOAQUIN RIVER REGION

##### *Ecosystem Restoration Program*

The Ecosystem Restoration Program would convert productive farmland in the San Joaquin River Region for habitat restoration. The crop revenue loss associated with removing these lands from production generally ranges from \$500 to \$1,500 per acre, resulting in a regional loss in crop revenue of between \$3 and \$9 million per year in the San Joaquin River Region. This loss would result in an adverse economic effect on farm revenues, income generation, and employment levels. Loss of production also may adversely affect the financial viability of local agencies, especially water and reclamation districts. Losses per acre could exceed \$2,000 if particular orchard, vineyard, or vegetable lands are converted for restoration purposes.

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Removing agricultural lands from production results in a regional loss in crop revenue of between \$3 and \$9 million per year in the San Joaquin River Region.

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Possible methods to alleviate this adverse effect could include:

- Developing rules for restoration and land conversion that recognize and protect the agricultural productivity of surrounding lands. Issues addressed could include control of rodents and other pests, seepage and salinity control, and public access restrictions.
- Scheduling construction activities in such a manner that current crops may be harvested prior to initiating construction.
- Paying fair market value for any crops destroyed or taken out of production on private or leased lands during project construction.
- Compensating property owners for the value of their land and associated improvements.
- Supporting growers interested in implementing value-added programs on their land (for example, hunting and birdwatching).

Any changes in water supply, such as purchase of water rights for in-stream flow, could result in changes to crop patterns, potentially affecting crop value. Changes in the quantity or pattern of in-stream flow could affect downstream agricultural users and could result in adverse effects.

Possible methods to alleviate these adverse effects could include:

- Developing water transfer rules that protect groundwater users, downstream diverters, and other potentially affected agricultural producers.



- Providing technical assistance to growers on ways to increase the production yielded from a unit of water (through measures such as improvement in distribution uniformity), which will tend to keep production up even as acreage goes down.

### *Water Quality Program*

BMPs for the Water Quality Program could lead to beneficial and adverse effects on land and water use patterns. Adverse effects most likely would result from costs imposed. Beneficial effects include reduced salinity of irrigation water, which could increase yields, reduce production costs, and provide more flexible crop selection. Table 7.2-3 summarizes the sensitivity of different crops to irrigation water salinity. Improvements in the salinity of water delivered to agricultural users can reduce the amount of water needed for leaching. As a result, less drain water is produced, and less salt is added to the soil and groundwater.

More carefully monitored application of water can result in increased yields and reduced chemical costs, irrespective of salinity. Lower applied water amounts could adversely affect drain water users (forcing them to search for another source of supply), raise groundwater pumping lifts, and impair groundwater storage for conjunctive use.

Possible methods to alleviate these adverse effects could include:

- Providing incentives and technical expertise to landowners interested in establishing higher-value crops.
- Providing cost-sharing and other financial assistance to reduce the effects potentially resulting from the implementation of the Water Use Efficiency and Water Quality Programs.
- Strengthening incentives for long-term agricultural zoning.

Retirement of lands with water quality problems in the San Joaquin River Region would result in adverse effects on agricultural jobs. This action could result in crop value losses of between \$18.5 and \$56 million per year in the region, using crop values of \$500-\$1,500 per acre. Economic sectors dependent on agricultural production also would be affected by losses.

Possible methods to alleviate these adverse effects could include:

- Providing technical assistance to growers on ways to increase the production yielded from a unit of water (through measures such as improvement in distribution uniformity), which will tend to keep production up even as acreage goes down.

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Retirement of lands with water quality problems in the San Joaquin River Region would result in adverse effects on agricultural jobs. This action could result in crop value losses of between \$18.5 and \$56 million per year in the San Joaquin River Region.

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- Providing assistance to reduce potential effects from implementation of the Water Use Efficiency and Water Quality Programs.
- Avoiding fallowing or shifting crops that require high input and output expenditures.

Improvements in water quality delivered to the San Joaquin Valley potentially could affect crop selection, water management, and yields and could result in beneficial effects on agricultural economics in the San Joaquin River Region.

### *Levee System Integrity Program*

Protection from salt-water contamination of delivered irrigation water supplies from implementation of the Levee System Integrity Program could benefit the San Joaquin River Region. DWR has forecast continuing Delta island levee failures unless these levees are repaired and strengthened. When levees around Delta islands fail, salt water from the Bay tends to flow toward the break and into the Delta. Since much of the irrigation water for the San Joaquin River Region is pumped from the Delta, the increased salt content due to a levee break would increase the salinity of irrigation water. The Levee System Integrity Program would strengthen and improve Delta island levees, making breaks and failures less likely.

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Protection from salt-water contamination of delivered irrigation water supplies from implementation of the Levee System Integrity Program could benefit the San Joaquin River Region.

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### *Water Use Efficiency and Watershed Programs*

Effects on agricultural economics in the San Joaquin River Region for the Water Use Efficiency and Watershed Programs would be similar to those described for the Delta Region.

### *Water Transfer Program*

The Water Transfer Program could result in beneficial effects in the San Joaquin River Region. These benefits likely would occur from the transfer of water into the region that would replace or supplement other supplies. For instance, if contractual supplies are not available due to a drought, water transfers would act as a replacement source. The cost to transfer water into the region may increase operating costs but probably would be implemented only if the transfer is cost effective for the buyer.

In some instances, the San Joaquin River Region would be a source for water transfers. These transfers most likely would be based on surface or subsurface (groundwater) storage programs but may include land fallowing, conservation, and crop modification. As a source area, effects on agricultural economics from water transfers would be similar to those described for the Sacramento River Region.



## *Storage*

Agricultural lands in the San Joaquin River Region could be affected by the location of storage facilities. Large storage facilities probably would be located in foothill or mountain areas, where land use is largely non-irrigated grazing. Some irrigated lands may exist in the valleys potentially to be inundated, with pasture, hay, and grains the predominant crops. Effects include permanent conversion and inundation, and temporary disruption of agricultural activity during construction. Permanent conversion of farmland for facilities could cause adverse economic effects.

Possible methods to alleviate these adverse effects could include:

- Paying fair market value for any crops destroyed or taken out of production on private or leased lands during project construction.
- Compensating property owners for the value of their land and associated improvements.

Much of the additional water from new storage in the San Joaquin River Region would be used to reduce groundwater overdraft, to increase in-stream flows, and to support production of lands followed by supply restrictions of the CVPIA and Bay-Delta Accord. The value of this water for agricultural production is \$60-\$100 per acre-foot. Some of this water could support acreage shifted out of the Delta Region because of land conversion.

The effects of new water supply from the Storage Program depends on the scale of the storage and conveyance facilities, the allocation of available water among users, and the cost of the water. Because quantities and impacts depend on conveyance configurations, effects are further discussed below in Section 7.2.8.

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Much of the additional water from new storage in the San Joaquin River Region would be used to reduce groundwater overdraft, to increase in-stream flows, and to support production of lands followed by supply restrictions of the CVPIA and Bay-Delta Accord.

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### 7.2.7.5 OTHER SWP AND CVP SERVICE AREAS

#### *Ecosystem Restoration Program*

Substantial conversion of agricultural land in the Delta Region could shift some production to desert areas in southern California, such as the Imperial Valley.

#### *Water Quality Program*

Potential cost effects from the Water Quality Program may occur if BMPs are applied to areas outside the Central Valley.

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Substantial conversion of agricultural land in the Delta Region could shift some production to desert areas in southern California, such as the Imperial Valley.

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### *Levee System Integrity Program*

Benefits of the Levee System Integrity Program in avoiding salinity intrusion would accrue to the Other SWP and CVP Service Areas. DWR has forecast continuing Delta island levee failures unless these levees are repaired and strengthened. When levees around Delta islands fail, salt water from the Bay tends to flow toward the break and into the Delta. Since much of the irrigation water for the Other SWP and CVP Service Areas is pumped from the Delta, the increased salt content due to a levee break would increase the salinity of irrigation water. The Levee System Integrity Program would strengthen and improve Delta island levees, making breaks and failures less likely.

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Benefits of the Levee System Integrity Program in avoiding salinity intrusion would accrue to the Other SWP and CVP Service Areas.

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### *Water Use Efficiency Program*

Economic benefits could accrue from increased water use efficiency in terms of reduced water costs, increasing the economic output of some farming operations. Efficiency improvements that result in greater water supply reliability but also higher annual costs may facilitate a shift to higher value crops that justify the increased irrigation costs.

### *Water Transfer Program*

Potential benefits from the Water Transfer Program could include increased agricultural production, income, and employment opportunities associated with any transfer that uses the water for agricultural production outside the Central Valley.

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Potential benefits from the Water Transfer Program could include increased agricultural production, income, and employment opportunities associated with any transfer that uses the water for agricultural production outside the Central Valley.

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### *Watershed Program*

No effects on agricultural economics in the Other SWP and CVP Service Areas are anticipated from Watershed Program actions.

### *Storage*

Additional water may be available to SWP contractors in the South Coast and Central Coast areas, depending on changes in storage, conveyance, and operations. It is unlikely, however, that a significant amount of this water would be delivered for irrigation use.

Relatively little SWP water pumped into southern California is used for irrigation, and a portion of the water is mixed with other local water sources. The aggregate effect on agriculture in these areas is potentially beneficial. Potential charges imposed on agricultural water use to recover costs of Storage Program components could lead to significant changes in agricultural activities (such as crop selection and water use) and could increase financial pressure to convert land to non-agricultural uses.

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Relatively little SWP water pumped into southern California is used for irrigation, and a portion of the water is mixed with other local water sources.

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## 7.2.8 CONSEQUENCES: PROGRAM ELEMENTS THAT DIFFER AMONG ALTERNATIVES

For agricultural economics, the Conveyance element results in environmental consequences that differ among the alternatives, as described below.

### 7.2.8.1 PREFERRED PROGRAM ALTERNATIVE

This section includes a description of the consequences of a pilot diversion project. If the pilot project is not built, these consequences would not be associated with the Preferred Program Alternative.

Conveyance facilities could require conversion of agricultural land that produces crop revenues of between \$5 and \$15 million per year. Setback levees would require purchasing and converting agricultural land and losing the value of crops taken out of production. To the extent that dredging reduces the amount of land that setback levees require, dredging could result in a lesser effect by causing less crop damage. Loss of this revenue is considered an adverse economic effect. In addition to conveyance facilities, the Preferred Program Alternative may include in-Delta storage. These conveyance and storage facilities would require conversion of agricultural land producing crop revenue of between \$8 and \$23 million per year. Effects on farm employment, agricultural suppliers, and other economic sectors are described in Section 7.3, "Agricultural Social Issues." Effects of water supply increases in the Delta Region would be small.

Agricultural lands in the Sacramento River and San Joaquin River Regions could be adversely affected by the location of new connector canals that would connect new storage facilities to existing conveyance facilities.

Changes in project operations are not anticipated to substantially affect agricultural land and water use in the Delta Region, Sacramento River Region, Bay Region, or Other SWP and CVP Areas. Changes in project operations may affect agricultural economics in the San Joaquin River Region. The effect could be positive or negative, depending on whether these changes would increase or reduce water diverted for agricultural use.

Potential charges imposed on agricultural water use to recover costs of Program components could lead to significant changes in agricultural activities (such as crop selection and water use).

Possible methods to alleviate these adverse effects could include:

- Strengthening tax and other incentives for long-term agricultural zoning.

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Changes in project operations may affect agricultural economics in the San Joaquin River Region. The effect could be positive or negative, depending on whether changes in operations would increase or reduce water diverted for agricultural use.

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- Scheduling construction activities in such a manner that current crops may be harvested prior to initiating construction.
- Paying fair market value for any crops destroyed or taken out of production on private or leased lands during project construction.
- Compensating property owners for the value of their land and associated improvements.

Agricultural water supply impacts would vary by alternative, based on differences in the configuration and operation of conveyance. Most additional agricultural supply would be available for irrigation in the San Joaquin River Region, with smaller amounts delivered to the Sacramento River, Bay Region, and Other SWP and CVP Service Areas.

If new supply was offered at prices comparable to existing SWP and CVP contract rates, purchase and use for irrigation would range between 0.5 and 1.5 MAF on average, and up to 2.2 MAF in a critically dry year. Under the No Action Alternative, substantial groundwater overdraft occurs, and economic analysis indicates that most of any new supply would directly or indirectly replace groundwater pumping (that is, reduce the overdraft). Some of this water also could support the shift of crops out of the Delta Region.

If the new supply was offered to users at prices substantially more than the cost of pumping groundwater or more than its value in crop production, little of the new supply is likely to be used for irrigation.

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Most additional agricultural supply would be available for irrigation in the San Joaquin River Region, with smaller amounts delivered to the Sacramento River, Bay Region, and Other SWP and CVP Service Areas.

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### 7.2.8.2 ALTERNATIVE 1

Agricultural economic effects under Alternative 1 associated with the Conveyance element would be similar to those described for the Preferred Program Alternative, without the pilot diversion facility near Hood. Consequently, the amount of agricultural land and crop value lost in the Delta Region would be less than for the Preferred Program Alternative. Nevertheless, the loss of land and crops under Alternative 1 would cause adverse economic effects similar to those described for the Preferred Program Alternative. Possible methods to alleviate the effects also would be similar.

Potential irrigation supply from new storage would range up to 760 TAF on average, and up to 1.5 MAF in a critically dry year.

### 7.2.8.3 ALTERNATIVE 2

Agricultural economic effects under Alternative 2 would be similar to those described for the Preferred Program Alternative.



Potential irrigation supply from new storage would be similar to Alternative 1.

#### 7.2.8.4 ALTERNATIVE 3

Agricultural economic effects under Alternative 3 associated with the Conveyance element would be somewhat greater than those described for the Preferred Program Alternative because more agricultural land would be required for construction of an isolated facility.

Potential irrigation supply from new storage would range up to almost 900 TAF on average, and up to 1.6 MAF in a critically dry year.

### 7.2.9 PROGRAM ALTERNATIVES COMPARED TO EXISTING CONDITIONS

#### 7.2.9.1 PREFERRED PROGRAM ALTERNATIVE

The analysis found that the beneficial and adverse economic effects from implementing any of the Program alternatives when compared to existing conditions were the same effects as those identified in Section 7.2.7 and Section 7.2.8, which compare the Program alternatives to the No Action Alternative. The comparison of Program alternatives to existing conditions did not identify any additional economic effects that were not identified in the comparison of Program alternatives to the No Action Alternative.

The analysis indicates that proposed Program actions for levee protection, storage and conveyance, and ecosystem restoration could result in additional large-scale land conversions that would affect agricultural lands, particularly in the Delta. Adverse agricultural economic effects could result from implementation of the Preferred Program Alternative combined with the expected future conversion of agricultural lands, when compared to existing conditions.

The benefits to agricultural economics are associated with water supply reliability actions from the Water Use Efficiency, Water Quality, Storage, and Conveyance elements—which could improve the availability and quality of water for agricultural purposes above the existing conditions baseline.

The following potential adverse economic effects are associated with the Preferred Program Alternative:

- Reductions in agricultural production and income
- Reduction in goods and services purchased by the agricultural sector

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Adverse agricultural economic effects could result from implementation of the Preferred Program Alternative combined with the expected future conversion of agricultural lands, when compared to existing conditions.

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### 7.2.9.2 ALTERNATIVE 1

Agricultural economic effects under Alternative 1 compared to existing conditions would be similar to those described for the Preferred Program Alternative, without the effects resulting from the conversion of agricultural lands for a pilot diversion facility near Hood.

### 7.2.9.3 ALTERNATIVE 2

Agricultural economic effects under Alternative 2 compared to existing conditions would be similar to those described for the Preferred Program Alternative.

### 7.2.9.4 ALTERNATIVE 3

Agricultural economic effects under Alternative 3 compared to existing conditions would be similar to those described for the Preferred Program Alternative but somewhat greater because construction of an isolated facility would require converting larger amounts of agricultural land. The isolated conveyance facility also would tend to increase salinity in south and central Delta areas. This decrease in water quality could negatively affect agricultural water users in these areas of the Delta, potentially reducing crop yields and crop flexibility, which would cause adverse economic effects.

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The isolated conveyance facility also would tend to increase salinity in south and central Delta areas. This decrease in water quality could negatively affect agricultural water users in these areas of the Delta, potentially reducing crop yields and crop flexibility, which would cause adverse economic effects.

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## 7.2.10 ADDITIONAL IMPACT ANALYSIS

**Cumulative Effects.** For a summary comparison of cumulative impacts for all resource categories, please refer to Chapter 3. A description of the projects and programs contributing to cumulative agricultural economic effects can be found in Attachment A.

The conversion of agricultural lands to other uses is expected to continue, and land conversion resulting from Program implementation would increase this amount. Reasons for continued conversion include:

- Pressure from population growth, especially in the Central Valley
- Reduced quantity and reliability of water supply for irrigation
- Increased cost of CVP water supply
- Drainage and salinity impacts
- Water transfers for urban use
- Water acquisition and habitat restoration under other programs such as the CVPIA

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The conversion of agricultural lands to other uses is expected to continue, and land conversion resulting from Program implementation would increase this amount.

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The cumulative effect on the agricultural economy of these trends and programs, especially when combined with Program implementation, is potentially quite large. The cumulative impacts of land conversion are described in more detail in Section 7.1, "Agricultural Land and Water Use."

**Growth-Inducing Effects.** If improvements in water supply are caused by the Program, the Preferred Program Alternative could induce growth, depending on how the additional water supply was used. If the additional water was used to expand agricultural production or urban housing development, the proposed action would foster economic and population growth. Expansion of agricultural production and population could affect agricultural economics, but the significance of the agricultural economic impact would depend on where agricultural or population growth occurred and how it was managed.

**Short- and Long-Term Relationships.** The long-term productivity of agricultural land converted for conveyance, storage, and levee improvements would be lost.

Water transfers involving groundwater or groundwater substitution can cause long-term degradation in the resource, including groundwater quality problems, subsidence, and increased pumping costs. All of these impacts can affect agricultural productivity and costs.

Levee system improvements sacrifice some agricultural land in the short term to protect remaining lands from inundation and salinity intrusion over the long term.

**Irreversible and Irretrievable Commitments.** All Program alternatives would directly and indirectly convert prime, statewide-important and unique farmland for conveyance, storage, habitat and levee improvements. These are, in most cases, irreversible and irretrievable commitments of land resources. Storage and conveyance features also could result in irretrievable commitment of resources, such as construction materials, labor, and energy resources.

## 7.2.11 ADVERSE EFFECTS

Adverse effects on agricultural economics include the loss of prime, statewide-important, and unique farmland to other uses, such as habitat or levee setbacks. Direct effects result from these losses, such as loss of farm revenue and production opportunities; indirect effects include less labor demand, reduced farm spending for goods and services, and associated regional economic and fiscal effects. These effects would be most concentrated and most substantial in the Delta Region.

Water supply changes in localized areas could result in the loss of agricultural income and jobs, which are considered adverse economic effects of the Program.

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Potentially higher costs of production resulting from implementation of water quality or water use efficiency BMPs could induce conversion of some agricultural lands to urban uses. Depending on the allocation of Program costs, higher prices for irrigation water also could induce the conversion of some agricultural land to urban uses.

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Levee system improvements sacrifice some agricultural land in the short term to protect remaining lands from inundation and salinity intrusion over the long term.

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Adverse effects on agricultural economies include the loss of prime, statewide-important, and unique farmland to other uses, such as habitat or levee setbacks; and the potential loss of agricultural income and jobs from water supply changes in localized areas.

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# 7.3 Agricultural Social Issues

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By improving water supply reliability and quality, the CALFED Bay-Delta Program would benefit the agricultural community but may result in localized adverse social effects.

7.3.1	SUMMARY .....	7.3-1
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## 7.3 Agricultural Social Issues

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### 7.3.1 SUMMARY

Farms and ranches in the CALFED Bay-Delta Program (Program) study area provide hundreds of thousands of jobs. Besides the men and women who work directly in agricultural jobs, many others work in jobs that support agriculture—moving crops to market, processing them for consumption, and providing the equipment and materials needed to support the nation's most diverse agricultural economy. In turn, the wages earned by these workers and the taxes paid on agricultural property provide revenues that support local governments throughout the Program area. When farmers and farm workers are displaced, it is these local governments that must supply an array of services to support them until other employment can be found. For many of the state's growers and farm workers, the water supply reliability provided by the Program would ensure that the lands they work can continue to be irrigated. In some areas, Program actions would displace agriculture, in turn displacing the jobs of agricultural workers.

**Preferred Program Alternative.** Increased water supply reliability would reduce the potential for future irrigation water disruptions and resulting social dislocations throughout most of the Program area, a major benefit of the Preferred Program Alternative. In some areas, agricultural employment would increase as a result of higher quality, more reliable water supplies and better irrigation efficiency, allowing the planting of higher value or more labor-intensive crops. These benefits would result from actions under the Water Quality, Storage, Water Use Efficiency, and Conveyance Elements. In the Delta Region, Levee System Integrity Program actions would protect agricultural jobs and income from catastrophic loss due to levee failure.

In some localized areas, Program elements would cause a reduction in agricultural employment and an associated increase in social issue effects. Areas that export water through the Water Transfer Program may experience increased land fallowing, with a reduction in agricultural employment and a shift of water from agricultural to urban uses. Conversion of agricultural lands to Program purposes, including actions under the Ecosystem Restoration and Levee System Integrity Programs, and the Storage element, would adversely affect agricultural employment, as would retirement of lands with drainage problems under the Water Quality Program.

Where employment is reduced, local government would be called on to provide many safety-net services while simultaneously experiencing a reduction in tax revenues. Special

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For many of the state's growers and farm workers, the water supply reliability provided by the Program would ensure that the lands they work can continue to be irrigated. In some areas, Program actions would displace agriculture, in turn displacing the jobs of agricultural workers.

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districts, such as levee or flood control districts, also could face declining revenues in some areas.

**Alternatives 1, 2, and 3.** All three Program alternatives would result in adverse social effects similar to those described for the Preferred Program Alternative. Differences in adverse social effects between the alternatives would be minimal.

## 7.3.2 AREAS OF CONTROVERSY

Areas of controversy as defined by CEQA involve differences of opinion among technical experts or information that is not available and cannot be readily obtained. According to this definition, no areas of controversy relate to agricultural social issues. While many issues associated with the Program are controversial, the effects concerning agricultural social issues are well understood and have not caused a dispute among experts. However, the following issue is best discussed under this section.

**Significance of Adverse Effects.** It should be noted that neither CEQA nor NEPA treats social and economic effects as environmental impacts. CEQA requires a discussion of economic and social effects only if they will lead to physical changes in the environment. NEPA requires a full discussion of social and economic effects but, as with CEQA, does not treat them as environmental impacts in and of themselves. Consequently, this Programmatic document fully discusses social and economic issues, as required by NEPA, but consistent with state and federal law, does not treat adverse social and economic effects as significant environmental impacts.

## 7.3.3 AFFECTED ENVIRONMENT/ EXISTING CONDITIONS

### 7.3.3.1 ALL REGIONS

Farming and farm-related industries in the Central Valley are estimated to directly and indirectly create about 3 in every 10 jobs and about 30% of personal income. Statewide, agriculture and related activities account for about 1 in every 10 jobs.

**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 in Table 7.3-1. This grouping is necessary 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

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discussed separately for organizational purposes. Additionally, community stability is described for the entire study area rather than on a regional basis.

*Table 7.3-1. Program Regions and Groupings of Counties*

PROGRAM REGIONS	COUNTIES
Delta Region	98% of Contra Costa, 45% of Sacramento, 46% of San Joaquin, 30% of Solano, and 20% of Yolo
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
Other SWP and CVP Service Areas	Imperial, Los Angeles, Plumas, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura

**Community Stability.** The affected environment for community stability includes the following:

- Social groups in the Program study area
- Economic indicators of social well being
- Employment opportunities
- Community social structure

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

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 7.3-2.

This section summarizes the regional economic indicators of social well being in the study area as they apply to all social groups and communities. The following general conclusions were derived from review of the economic data presented in Table 7.3-2:

- 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, pockets of prosperity have an “averaging effect” of raising average personal income levels and lowering average poverty and unemployment rates.

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



*Table 7.3-2. Existing Conditions: Regional Demographics and Economic Indicators of Social Well Being*

	DELTA	BAY	SAN JOAQUIN RIVER	SACRAMENTO RIVER	OTHER CVP AND SWP SERVICE AREAS
1996 Population <sup>a</sup>	2,362,614	6,498,964	3,004,222	1,666,650	19,159,450
<b>Economic Indicators</b>					
Median family income (1989) <sup>b</sup>	40,690	46,373	30,862	31,794	38,825
Per capita income <sup>c</sup> (1994)	21,991	28,079	16,475	18,313	20,358
Poverty rate	11%	9%	18%	13%	13%
1995 Unemployment rate <sup>d</sup>					
Average	7.8%	6.6%	13.3%	11.2%	10%
Range	5.8 to 12.3%	4.3 to 13.5%	8.2 to 16.9%	6.1 to 19.7%	5.1 to 28.8%

## Notes:

- <sup>a</sup> Source: California Department of Finance; county population data was aggregated into CALFED Regions according to Table 7.3-1.
- <sup>b</sup> Source: California Department of Finance; median family income for each county was averaged to show average median family income for each CALFED region.
- <sup>c</sup> Source: California Department of Finance; per-capita income for each county was averaged to show average per-capita income for each CALFED region.
- <sup>d</sup> Source: California Department of Finance; average of counties in each Program region.

Personal income is measured as family or per capita income, as shown in Table 7.3-2. Median family income is a measure of the annual income received by families living together in the same household. "Median" is a statistical term for the midpoint of a data set. The median family income in the study area covers a wide range. Per capita income in the study area ranges from \$10,000 in the Tulare Lake area in the San Joaquin River Region and Yuba County in the Sacramento River Region, to \$28,000 in Marin County in the Bay Region.

As shown in Table 7.3-2, 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.

Poverty rates also range widely in 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 California Employment Development Department (EDD) estimated the poverty rates among races in California during 1980, as summarized in Table 7.3-3. Unemployment rates in the study area are higher among minority ethnic groups. The EDD estimated state-wide unemployment rates among races in California during 1980, as summarized in Table 7.3-4.

Existing unemployment rates are lowest in the Bay and Delta Regions, where more employment opportunities are available. The highest poverty rates in the study area occur in predominantly rural areas, and poverty rates are higher among minority ethnic groups.



Table 7.3-3. Poverty Rate by Ethnicity

ETHNICITY	POVERTY RATE (Percentage)
White	6
Black	21
Hispanic	18
Asian and other	11

Source: California Employment Development Department, 1986.

Table 7.3-4. Unemployment Rate by Ethnicity

ETHNICITY	POVERTY RATE (Percentage)
White	4
Black	7
Hispanic	7
Asian and other	4

Source: California Employment Development Department, 1986.

Average annual agricultural employment was about 400,000-435,000 jobs from 1987 to 1992. Approximately 420,000 people were employed in the agriculture industry in 1992. The relationship between the agricultural sector and the larger economy of the Central Valley is important in the 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. The economy of the Central Valley has grown and diversified, and nonagricultural employment opportunities are increasing. This general trend does not hold true for many smaller communities, where agriculture remains the dominant industry and economic force.

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

For the Program study area, the largest sectors of workers who may be affected by Program actions are seasonal farm workers and agricultural workers. Seasonal unemployment among farm workers and agricultural workers usually occurs during winter months following harvest. 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.

The largest sectors of workers who may be affected by Program actions are seasonal farm workers and agricultural workers.

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 in the community.

The local community also provides an identifying factor for all residents and a sense of belonging. When economic changes occur in 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. Within the population potentially affected by the Program, this population is the most racially diverse. Table 7.3-5 indicates ethnicity by Program region, and Table 7.3-6 presents the racial distribution of farm workers by Program region.

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When economic changes occur in an area, such as the loss or gain of a major employer, or drought or flood conditions, the local community can be affected significantly.

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Table 7.3-5. Ethnicity by Program Region

PROGRAM 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
Other SWP and CVP Service Areas	52	9	9	30

Source:  
California Department of Finance 1993.

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, Native Americans, and African Americans working on farms. By 1983, an estimated 90% of the seasonal farm laborers in California were Mexicans or Chicanos, while nationwide the figure was 60%. Most migrant farm workers are either American citizens or are working in the country legally. The Department of Labor estimates that about 25% of migrant farm workers are illegal immigrants.

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Table 7.3-6. Racial Distribution of Farm Workers by Program Region

PROGRAM REGION	HISPANIC	WHITE	BLACK	AMERICAN INDIAN/ESKIMO ALEUTIAN	ASIAN/ PACIFIC ISLANDER	TOTAL NUMBER OF FARM WORKERS
Delta Region	77%	15.1%	0.8%	0.3%	6.5%	5,470
Bay Region	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
Other SWP and CVP Service Areas	86.9%	10.1%	.9%	.2%	1.7%	<u>44,960</u>
<b>Totals</b>	<b>122,490</b>	<b>19,500</b>	<b>840</b>	<b>400</b>	<b>4,860</b>	<b>148,440</b>

Source:  
Census of Population and Housing 1990.

Additionally, the Department of Labor estimates that, at any given time, 12% (or at least 190,000) domestic farm workers are out of work nationwide. 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 the rates are adjusted for inflation, real wages of farm workers have decreased 15-25% in that time.

Section 7.14, "Environmental Justice," analyzes environmental justice in greater detail.

Although wage rates for farm workers have increased over the last decade, when the rates are adjusted for inflation, real wages of farm workers have decreased 15-25% in that time.

### 7.3.3.2 DELTA REGION

Between 1944 and 1964, the number of farms in the Delta 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.

As shown in Table 7.3-2, 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), the poverty rate was 11% (1990), and the unemployment rate ranged from 5.8 to 12.3% (1995).

### 7.3.3.3 BAY REGION

Between 1944 and 1964, the number of farms in the Bay Region increased from 5,581 in 1944 to 6,146 in 1954 and then declined to 4,103 in 1964. The decrease was partly due to the accumulation of irrigated land into fewer and larger farms, and partly due to urban encroachment.



As shown in Table 7.3-2, 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), the poverty rate was 9% (1990), and the unemployment rate ranged from 4.3 to 13.5% (1995).

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The number of farms in all Program regions have been decreasing, partly due to the accumulation of irrigated land into fewer and larger farms, and partly due to urban encroachment.

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#### 7.3.3.4 SACRAMENTO RIVER REGION

Between 1944 and 1964, the number of farms in the Sacramento River Region increased from 9,948 in 1944 to 11,538 in 1954, then declined to 9,255 in 1964. The decline 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.

As shown in Table 7.3-2, 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), the poverty rate was 13%, and the unemployment rate ranged from 6.1 to 19.7% (1995).

#### 7.3.3.5 SAN JOAQUIN RIVER REGION

Between 1944 and 1964, the number of farms in the San Joaquin River Region increased from 30,212 in 1944 to 33,832 in 1949, then declined to 25,153 in 1964. The decline 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.

As shown in Table 7.3-2, the 1996 total population for the San Joaquin River Region was 3,004,222. The median family income was \$30,862 (1989), per capita income was \$16,475 (1994), the poverty rate was 18% (1990), and the unemployment rate ranged from 8.1 to 16.9% (1995).

#### 7.3.3.6 OTHER SWP AND CVP SERVICE AREAS

Between 1944 and 1964, the number of farms in the Other SWP and CVP Service Areas decreased from 33,715 in 1944 to 13,603 in 1964, 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.

As shown in Table 7.3-2, the 1996 total population for the Other CVP and SWP Service Areas was 19,159,450. The median family income was \$38,825 (1989), per capita income was \$20,358 (1994), the poverty rate was 13%, and the unemployment rate ranged from 5.1 to 28.8% (1995).



### 7.3.4 ASSESSMENT METHODS

Social well being, for purposes of this analysis, is measured in terms of community stability. Community stability is a measure of a community's ability to absorb social and economic changes that may result from a proposed action. Assessment of community stability is based on changes in economic and social indicators that may occur as a result of a Program action. These indicators include median family income, per capita income, poverty rates, and unemployment rates, as summarized by Program region in Table 7.3-2.

Predicting the human behavior that could result from Program actions is a difficult task. Past studies of impacts on community stability and social conditions related to water supply projects have focused on social, economic, and land use changes resulting from short-term drought conditions. The actual effects of implementation of long-term water supply programs cannot be predicted with complete assurance but must be projected based on assumptions of human behavior, primarily the assumed actions of farm managers and land owners implementing long-term changes to farm operations. This analysis is based on the regional economics analysis and projected changes to regional employment. These findings have been applied to the analysis for farmers, farm workers, and agribusiness.

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Past studies of impacts on community stability and social conditions related to water supply projects have focused on social, economic, and land use changes resulting from short-term drought conditions.

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### 7.3.5 CRITERIA FOR DETERMINING ADVERSE EFFECTS

For this analysis, socioeconomic effects are measured in terms of adverse changes in community stability. Community stability is measured by several economic indicators, including median and per capita income, poverty rates, and unemployment. An adverse effect on community stability would occur if a Program action resulted in a change to any of these indicators that substantially exceeded historical fluctuations.

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Socioeconomic effects are measured in terms of adverse changes in community stability.

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### 7.3.6 NO ACTION ALTERNATIVE

#### 7.3.6.1 ALL REGIONS

Future agricultural social conditions under the No Action Alternative are expected to decline somewhat compared to existing conditions.

The key factors that would affect farmers under the No Action Alternative include changes in the markets for agricultural products, the supply and reliability of irrigation water, the development of water transfer markets, and the cost of water. Increasing demand for fruits and vegetables is expected to result in a shift toward production of these

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The key factors that would affect farmers under the No Action Alternative include changes in the markets for agricultural products, the supply and reliability of irrigation water, the development of water transfer markets, and the cost of water.

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commodities and away from field crops and grains. Decreases in water availability due to the CVPIA and the Bay-Delta Accord likely would be made up with groundwater supplies. However, depending on the size of the deficit, groundwater may not be able to completely compensate. Further, pumping groundwater could increase costs and decrease profits.

The number of agricultural jobs may increase in areas due to projected changes in crop production to higher value and more labor-intensive crops. However, agricultural employment would remain seasonal. Improved mechanization for picking and sorting crops, and other improvements could eliminate tasks that currently are labor intensive. Changes in irrigation technology also may occur that could change farm labor needs. Changes to the population, crop production, and technology resulting in a decrease in employment opportunities or the duration of employment may create an increased need for social services to provide food, health care, and housing for those facing economic hardship. These needs may be seasonal or year round, depending on the extent of the change and the education, training, and technical skills of the population in the area affected.

Statewide urbanization will continue to result in conversion of large amounts of agricultural land. As the need for agricultural labor in these urbanizing areas decreases, substantial social effects will occur. Conversion of agricultural lands would be the largest cause of adverse agricultural social effects.

### 7.3.6.2 DELTA REGION

The conversion of farmlands to other uses, particularly urban uses, under the No Action Alternative would continue to reduce farm production and farm worker jobs.

Proposed and potential habitat and storage projects, including the North Delta NWR and the Delta Wetlands Project, may convert existing agricultural land to other uses under the No Action Alternative. In addition, DWR has forecast that flooding due to levee failure will negatively affect agriculture in the Delta Region. Both these impacts would adversely affect agricultural employment in the region.

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The conversion of farmlands to other uses, particularly urban uses, under the No Action Alternative will continue to reduce farm production and farm worker jobs in the Delta Region.

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### 7.3.6.3 BAY REGION, SACRAMENTO RIVER REGION, AND OTHER SWP AND CVP SERVICE AREAS

No effects related to agricultural social issues beyond those noted under "All Regions" are anticipated for these regions.



### 7.3.6.4 SAN JOAQUIN RIVER REGION

Under the No Action Alternative, DWR has forecast that up to 45,000 acres of drainage-impaired lands in the San Joaquin River Region will be retired from production by 2040. This land retirement would result in the loss of jobs associated with these lands. In other areas of the region, a change to higher value agricultural production, such as the conversion of grazing land to vineyards in Central Valley terrace areas, would tend to increase the number of agricultural jobs.

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Under the No Action Alternative, DWR has forecast that up to 45,000 acres of drainage-impaired lands in the San Joaquin River Region will be retired from production by 2040.

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### 7.3.7 CONSEQUENCES: PROGRAM ELEMENTS COMMON TO ALL ALTERNATIVES

Because of the programmatic level of the analysis and the uncertainty of where Program projects will be sited, social effects cannot be predicted for specific cities or counties. Consequently, regions, rather than specific jurisdictions, were used to describe effects. The authors acknowledge that adverse social effects likely would occur in certain jurisdictions within a region, and that reliance on regional numbers for employment and other job-related statistics does not reflect the potential adverse social effects that may be experienced by a particular city or county. While socioeconomic effects in a region may be relatively minor, these same effects concentrated in a particular jurisdiction may be substantial. Additional assessment of social effects from individual project components on specific localities will be carried out during the environmental review process for the individual projects.

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While socioeconomic effects in a region may be relatively minor, these same effects concentrated in a particular jurisdiction may be substantial.

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For agricultural social issues, the adverse effects of the Ecosystem Restoration, Water Quality, Levee System Integrity, Water Use Efficiency, Water Transfer, Watershed, and Storage elements are similar under all Program alternatives, as described below. The adverse effects of the Conveyance element vary among Program alternatives, as described in Section 7.3.8.

#### 7.3.7.1 ALL REGIONS

##### *Water Use Efficiency Program*

During the drought of the early 1990s, many communities faced reduced employment resulting from significant reduction in irrigated acreage, which left farm laborers without jobs. To the extent that efficiency improvements would help increase water supply reliability, employment opportunities would be maintained. Water supply reliability would contribute to the stability of many local agricultural communities.



Job opportunities could be created by water use efficiency improvements. As irrigation management improves, so must the knowledge of those irrigating or scheduling irrigations. This development would result in the need for more skilled labor but at higher costs. In addition, the design and installation of new or improved on-farm or district water delivery systems would create more jobs for skilled laborers. It is conceivable that efficiency improvements, especially those that involve physical construction, would add to local employment.

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Job opportunities could be created by water use efficiency improvements. Water use efficiency improvements could adversely affect farm labor but could result in improved crop yields.

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However, water use efficiency improvements could adversely affect farm labor. A benefit of improved irrigation efficiency that may be experienced by farmers is a reduced need for labor, due either to less cultivation or a change in irrigation methods. The addition of pressurized irrigation systems would result in the most substantial effect on farm labor. With pressurized irrigation, the activities of several workers could be replaced by only one worker.

Possible methods of alleviating this adverse effect could include:

- Supporting training and educational opportunities, job referral and placement services, and job retraining for unemployed individuals to reenter the workforce.

Improved water use efficiencies often translate to higher crop yields and better quality of farm products. Such advances can increase on-farm direct income, benefitting the farmer's net income and often translating to additional economic activity. Increased income can help the overall economy in total sales and purchases, and in increased tax revenues that strengthen vital functions, such as schools, roads, and social and health services.

Water use efficiency improvements also could result in improved crop yields. Improvements in the yield per acre-foot of applied water, even with possible reductions in water supply, would result in greater production of food and fiber on the same land. As populations continue to increase—in the state, the nation, and globally—highly efficient food production would be an asset.

The preceding discussion applies to all Program regions, and the Water Use Efficiency Program is not included in region-specific discussions below.

### *Watershed Program*

No adverse effects related to agricultural social issues are associated with Watershed Program actions in any Program region. The program is not included below in region-specific discussions.



### 7.3.7.2 DELTA REGION

#### *Ecosystem Restoration Program*

Implementation of the Ecosystem Restoration Program in the Delta could result in the conversion of up to 112000 acres of important farmland to restored habitat. These conversions would result in reductions in the number of jobs for farmers, farm workers, and agribusiness. Actions associated with the Ecosystem Restoration Program could result in a regional loss of agricultural revenues of up to \$167 million per year. Approximately 8,350 jobs also could be lost, which is considered an adverse social effect. The severity of the effect depends on the magnitude of the job loss, the extent of strategies employed to reduce job loss, and the actual location of the projects.

The adverse effects would be most noticeable in the loss of jobs for farm workers with limited skills. Stress may be put on existing social services, such as welfare and job training, to help provide transitions for displaced farm workers. Because the Delta Region already is experiencing high levels of unemployment and the labor force is primarily farm workers, the social and economic structure of these communities could be adversely affected. Examples may include higher demand for social services; increased crime; and loss of local small businesses, requiring customers to travel further to purchase supplies. Less technically skilled workers and those lacking basic education levels and English language skills may have more difficulty finding new employment.

Per capita income for displaced farmers and families may decline. Farm managers may be required to travel farther to their place of employment or move to other areas to gain employment. The need to move or to be away from home and family for longer periods could add additional burden to family members.

It is anticipated that displaced farm managers and technicians eventually could find work in other regions or find other jobs related to agriculture. The need for social services to provide training or economic assistance for a portion of these displaced workers may temporarily increase.

Possible methods of alleviating these adverse effects could include:

- Supporting local governments and workers faced with increased demand for social services resulting from labor displacement.
- Supporting training and educational opportunities, job referral and placement services, and job retraining for unemployed individuals to reenter the workforce. Retraining efforts could be focused on restoration practices and technology to directly reduce job losses attributable to the Ecosystem Restoration Program.
- Including clauses in restoration and construction contracts that require use of the local workforce to the extent possible.

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Actions associated with the Ecosystem Restoration Program could result in a regional loss of agricultural revenues of up to \$167 million per year. Approximately 8,350 jobs also could be lost. The most adverse effect would be the loss of jobs for farm workers with limited skills.

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The Ecosystem Restoration Program may increase the need for unskilled and skilled labor in the Delta Region. Depending on project features and location, ecosystem restoration can be labor intensive, requiring substantial amounts of semi-skilled labor. The Ecosystem Restoration Program would tend to provide greater water supply reliability to farmlands, increasing the security of some agricultural jobs. Increased numbers of recreation jobs also may reduce the level of effects to some extent.

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The Ecosystem Restoration Program may increase the need for unskilled and skilled labor in the Delta Region.

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### *Water Quality Program*

No effects related to agricultural social issues are associated with Water Quality Program actions in the Delta Region.

### *Levee System Integrity Program*

The Levee System Integrity Program would convert up to 35,000 acres of important farmland in the Delta through larger and improved levees or setback levees. Up to 2,625 jobs could be lost from conversion of these farmlands, resulting in adverse social effects. The program also would preserve existing farm worker jobs that otherwise would be lost to flooding of Delta islands.

Adverse social effects from the Levee System Integrity Program are not anticipated in any region other than the Delta, and the Levee System Integrity Program is not included in discussions below for the remaining Program regions.

### *Water Transfer Program*

The transfer of water previously used for farming from one region to another could result in adverse social effects. If fields are fallowed because water is transferred for use elsewhere, the farm workers who provided labor for the transferring farming operation could lose their jobs, depending on groundwater availability and crop flexibility. If adjacent or nearby farms are affected by groundwater overdrafts as a result of groundwater pumping increases to make up for transferred water, those farmers and their labor force also could be adversely affected. Long-term transfers that reallocate water from local agricultural uses would result in greater adverse social effects than would short-term transfers.

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The transfer of water that previously was used for farming from one region to another could result in adverse social effects.

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Possible methods of alleviating these adverse effects could include:

- Supporting limitations on the amount of acreage that can be fallowed in a given area.



## Storage

The extent of Storage element effects would vary due to the variation in water yield and the opportunity to shift agriculture to various parts of the Delta. All Program alternatives could result in adverse effects on farmers, farm workers, and agribusiness as a result of the agricultural land conversion due to in-Delta storage options. Up to 15,000 acres of important farmland could be converted for storage in the Delta. This conversion could result in a reduction of up to 1,125 jobs for farmers, farm workers, and agribusiness. The intensity of this adverse effect would depend on the location and size of storage projects.

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The extent of Storage element effects would vary due to the variation in water yield and the opportunity to shift agriculture to various parts of the Delta.

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Possible methods of alleviating this adverse effect could include:

- Supporting local governments and workers faced with increased demand for social services resulting from labor displacement.
- Supporting training and educational opportunities, job referral and placement services, and job retraining for unemployed individuals to reenter the workforce.
- Providing opportunities for alternative industries to develop, such as recreation.

### 7.3.7.3 BAY REGION

#### *Ecosystem Restoration, Water Quality and Water Transfer Programs, and Storage*

No adverse social effects are anticipated on farmers, farm workers, or agribusiness in the Bay Region from any of these Program elements.

### 7.3.7.4 SACRAMENTO RIVER REGION

#### *Ecosystem Restoration Program*

The adverse social effects of the Ecosystem Restoration Program in the Sacramento River Region would be similar to those described for the Delta Region. Ecosystem restoration could result in conversion or idling of productive agricultural land in the Sacramento River Region. Conversion or idling of agricultural lands would result in a loss of jobs for farmers, farm workers, and agribusiness. It is estimated that up to \$51 million in agricultural revenues could be lost annually as the result of this program, resulting in a loss of up to 2,550 jobs. The actual severity of the social effects would depend on the magnitude of farm worker job loss and the extent of strategies employed to reduce job loss. Additional jobs would be created through restoration activities.

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Ecosystem restoration could result in conversion or idling of productive agricultural land in the Sacramento River Region. Conversion or idling of agricultural lands would result in a loss of jobs for farmers, farm workers, and agribusiness.

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Possible methods of alleviating these adverse effect could include:

- Supporting local governments and workers faced with increased demand for social services resulting from labor displacement.
- Supporting training and educational opportunities, job referral and placement services, and job retraining for unemployed individuals to reenter the workforce. Retraining efforts could be focused on restoration practices and technology to directly reduce job losses attributable to the program.
- Including clauses in restoration and construction contracts that require use of the local workforce to the extent possible.

### *Water Quality Program*

No adverse effects in the Sacramento River Region related to agricultural social issues are anticipated from Water Quality Program actions.

### *Water Transfer Program*

The adverse social effects from the Water Transfer Program in the Sacramento River Region are the same as those described for the Delta Region.

### *Storage*

The beneficial effects of additional water supply in the Sacramento River Region could include the development of additional acreage for agriculture, increased water supply reliability resulting in greater farm investments, and shifts to higher water use and higher value crops. Other beneficial effects include development of additional acreage shifted from the Delta due to land conversion, changes to higher water use and higher value crops, and the availability of additional farm worker jobs if additional acreage is developed. The extent of this beneficial effect would vary and would depend on the ultimate cost of the water.

Development of the storage facilities could require the conversion of agricultural lands in the Sacramento River Region, resulting in a potential adverse social effect on farmers, ranchers, and farm workers. This effect could be offset by shifting crops and grazing to other parts of the Sacramento River Region. Adverse effects on farm workers would depend on new acreage or new cropping patterns developed by farmers. All alternatives, depending on storage elements implemented, could result in a minimal to substantial number of new jobs.

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The beneficial effects of additional water supply in the Sacramento River Region could include the development of additional acreage for agriculture, increased water supply reliability resulting in greater farm investments, and shifts to higher water use and higher value crops.

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### 7.3.7.5 SAN JOAQUIN RIVER REGION

The Ecosystem Restoration Program could result in conversion of agricultural land in the San Joaquin River Region. Adverse social effects of the Ecosystem Restoration Program, and strategies to alleviate those effects, would be similar to those described for the Delta Region. Agricultural revenue losses are estimated at \$9 million in the region as a result of this program.

#### *Water Quality Program*

Retirement of lands with water quality problems in the San Joaquin River Region could adversely affect agricultural jobs in the region. These lands are forecast to be retired under the No Action Alternative. It is likely however, that the lands would be retired sooner under the Program than under the No Action Alternative. The loss of these irrigated lands would lead to an adverse social effect as the jobs they support are lost

Possible methods of alleviating this adverse effect could include:

- Supporting training and educational opportunities, job referral and placement services, and job retraining for unemployed individuals to reenter the workforce.

Increased irrigation water quality in other areas could lead to better yields or selection of higher-value crops, both of which could increase farm income and farm worker jobs.

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It is likely that lands with water quality problems in the San Joaquin River Region would be retired sooner under the Program than under the No Action Alternative.

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#### *Water Transfer Program*

The adverse effects and possible alleviation related to agricultural social issues in the San Joaquin River Region from Water Transfer Program actions would be similar to those described for the Delta and Sacramento River Regions. However, this region may also be the recipient of water transfers and would experience beneficial agricultural social effects. These benefits would result from increased agricultural production, incomes, and employment opportunities.

#### *Storage*

The beneficial effects of additional water supply could include the development of additional acreage and increased water supply reliability, which may result in greater farm investments and shifts to higher water use and higher value crops. A substantial number of jobs could become available if additional acreage or higher labor demand crops were developed.

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A substantial number of jobs could become available in the San Joaquin River Region if additional acreage or higher labor demand crops were developed.

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Development of the storage facilities, depending on the location, could require the conversion of agricultural lands, resulting in adverse social effects. This negative effect could be offset by shifting development of acreage to other parts of the San Joaquin River Region. Effects on farm workers would depend on new agricultural acreage developed by farmers. Depending on the storage elements implemented, all alternatives could result in from several to a significant number of new jobs. A beneficial effect could be experienced by farm workers and associated agricultural business.

### 7.3.7.6 OTHER SWP AND CVP SERVICE AREAS

#### *Ecosystem Restoration Program*

Effects on agriculture in the Other SWP and CVP Service Areas resulting from Ecosystem Restoration Program actions are expected to be small. Substantial conversion of agricultural land in the Delta Region could shift some production to desert areas in southern California, such as the Imperial Valley.

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Substantial conversion of agricultural land in the Delta Region could shift some production to desert areas in southern California, such as the Imperial Valley.

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#### *Water Quality Program and Storage*

No effects related to agricultural social issues are anticipated in the Other SWP and CVP Service Areas as a result of the Water Quality Program or Storage element.

#### *Water Transfer Program*

Water transfers would increase agricultural production, incomes, and employment opportunities associated with any transfer that uses the water for agricultural production outside the Central Valley. The net change in jobs in the Other SWP and CVP Service Areas is expected to be minimal, with only minor effects on community stability.

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Water transfers would increase agricultural production, incomes, and employment opportunities associated with any transfer that uses the water for agricultural production outside the Central Valley.

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## 7.3.8 CONSEQUENCES: PROGRAM ELEMENTS THAT DIFFER AMONG ALTERNATIVES

For agricultural social issues, the Conveyance element results in environmental consequences that differ among the alternatives, as described below.



### 7.3.8.1 PREFERRED PROGRAM ALTERNATIVE

#### *Delta Region*

This section includes a description of the consequences of a pilot diversion project. If the pilot project is not built, these consequences would not be associated with the Preferred Program Alternative.

Channel widening under the Conveyance element likely would convert up to 4,900 acres of important farmland, depending on project location. The reduction of agricultural jobs from such conversion would result in adverse social effects.

Possible methods of alleviating these adverse effect could include:

- Supporting local governments and workers faced with increased demand for social services resulting from labor displacement.
- Supporting training and educational opportunities, job referral and placement services, and job retraining for unemployed individuals to reenter the workforce.
- Including clauses in restoration and construction contracts that require use of the local workforce to the extent possible.

Changes in project operations are not anticipated to adversely affect agricultural social issues. Water supply to individual farms is not expected to be affected in this region; therefore, agricultural social issues would not be substantially affected.

Construction of a pilot diversion facility near Hood would require converting additional agricultural lands, thereby reducing the number of agricultural jobs. However, the number of construction-related jobs would increase.

#### *Bay Region*

No effects related to agricultural social issues in the Bay Region are associated with Conveyance element actions.

#### *Sacramento River Region*

Changes in project operations are not anticipated to adversely affect agricultural social issues in the Sacramento River Region. Water supply is not expected to be affected in the region; therefore, social effects would not be substantial.

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Channel widening under the Conveyance element likely would convert up to 4,900 acres of important farmland, depending on project location. The reduction of agricultural jobs from such conversion would result in adverse social effects.

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### *San Joaquin River Region*

Changes in project operations may affect agricultural social issues in the San Joaquin River Region. Any reductions in water supply caused by changes in the amount of water exported to the region could reduce agricultural jobs and associated businesses, and result in an adverse effect, depending on the magnitude of the reduction. Possible methods of alleviating this adverse effect could include:

- Supporting local governments and workers faced with increased demand for social services resulting from labor displacement.
- Supporting training and educational opportunities, job referral and placement services, and job retraining for unemployed individuals to reenter the workforce.

Any increases in water supply caused by changes in the amount of water exported to the region could increase agricultural jobs and associated businesses, and result in a beneficial effect, depending on the magnitude of the increase.

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Any reductions in water supply caused by changes in the amount of water exported to a region could reduce agricultural jobs and associated businesses. Any increases in water supply caused by changes in the amount of water exported to a region could increase agricultural jobs and associated businesses.

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### *Other SWP and CVP Service Areas*

Changes in project operations may affect agricultural social issues in the Other SWP and CVP Service Areas, but the effect is anticipated to be small. Any reductions in water supply caused by changes in the amount of water exported to the region could reduce agricultural jobs and associated businesses, and result in an adverse effect. Any increases in water supply caused by changes in the amount and timing of water exported to this region could increase agricultural jobs and associated businesses, and result in a beneficial effect.

#### **7.3.8.2 ALTERNATIVE 1**

Because Alternative 1 does not include constructing a pilot diversion facility near Hood, somewhat fewer acres of agricultural lands in the Delta Region would be converted for conveyance, resulting in an adverse social effect on agriculture and agricultural workers of less magnitude but nevertheless substantial. Effects associated with other conveyance features and possible methods of alleviating them would be similar to those described for the Preferred Program Alternative.

#### **7.3.8.3 ALTERNATIVE 2**

Social effects under Alternative 2 would be similar to those described for the Preferred Program Alternative.



#### 7.3.8.4 ALTERNATIVE 3

Social effects under Alternative 3 and possible methods of alleviating them would be similar to those described for the Preferred Program Alternative. Adverse effects would be somewhat larger due to the potential for a greater amount of agricultural land to be converted for construction of an isolated facility.

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Adverse effects would be somewhat larger under Alternative 3 due to the potential for a greater amount of agricultural land to be converted for construction of an isolated facility.

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### 7.3.9 PROGRAM ALTERNATIVES COMPARED TO EXISTING CONDITIONS

The analysis found that the beneficial and adverse social effects from implementing any of the Program alternatives when compared to existing conditions were the same effects as those identified in Section 7.3.7 and Section 7.3.8, which compare the Program alternatives to the No Action Alternative. Additionally, the comparison of the Program alternatives to existing conditions did not identify any additional agricultural social effects that were not identified in the comparison of Program alternatives to the No Action Alternative.

The analysis indicates that the Program proposed actions for levee protection, storage and conveyance, and ecosystem restoration could result in additional large-scale land conversions that would affect agricultural lands, particularly in the Delta. Adverse agricultural social effects could result from the Preferred Program Alternative when compared to existing conditions.

#### 7.3.9.1 PREFERRED PROGRAM ALTERNATIVE

The benefits to agricultural social conditions would be associated with water supply reliability actions from the Water Use Efficiency, Water Quality, Storage, and Conveyance elements, which could improve the availability and quality of water for agricultural purposes above the existing conditions baseline. The Program is expecting an overall improvement in water supply reliability for agriculture relative to the No Action Alternative.

The following potential adverse social effects are associated with the Preferred Program Alternative:

- Farm worker and other agricultural-related job losses
- Loss of revenues to local governments and districts



### 7.3.9.2 ALTERNATIVE 1

Agricultural social effects under Alternative 1 would be similar to those described for the Preferred Program Alternative, without the effects resulting from the conversion of agricultural lands for a pilot diversion facility near Hood.

### 7.3.9.3 ALTERNATIVE 2

Agricultural social effects under Alternative 2 would be similar to those described for the Preferred Program Alternative.

### 7.3.9.4 ALTERNATIVE 3

Agricultural social effects under Alternative 3 would be similar to those described for the Preferred Program Alternative but somewhat greater because construction of an isolated facility would require converting larger amounts of agricultural land. The isolated conveyance facility also would tend to increase salinity in south and central Delta areas. This decrease in water quality could negatively affect agricultural water users in these areas of the Delta, potentially reducing crop yields and crop flexibility. Both of these adverse effects associated with Alternative 3 could result in greater adverse agricultural social effects than the other Program alternatives.

## 7.3.10 ADDITIONAL IMPACT ANALYSIS

**Cumulative Effects.** For a summary comparison of cumulative effects for all resource categories, please refer to Chapter 3. A description of the projects and programs contributing to this cumulative impact analysis can be found in Attachment A.

As discussed in Section 7.1, "Agricultural Land and Water Use," the conversion of agricultural lands for Program purposes contributes to a state-wide trend of agricultural land conversion. Between 1994 and 1996, approximately 55,000 acres of important farmlands were converted to other uses in the state (in areas for which the DOC prepares important farmland series maps). Predictions run as high as 1 million acres of agricultural land to be converted to urban uses in the Central Valley by 2040. In addition, up to 51,000 acres of agricultural lands could be converted from Delta wildlife and habitat initiatives. The production and agricultural worker job losses associated with these conversions are substantial. Adding to these losses is the increasing use of technology to replace agricultural workers. The effects of production and job losses associated with the Program's conversion of up to 243,000 acres of important farmlands, when viewed along with the other effects noted above, is substantial.

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The conversion of agricultural lands for Program purposes contributes to a state-wide trend of agricultural land conversion. The production and agricultural worker job loss associated with these conversions are substantial. Adding to these losses is the increasing use of technology to replace agricultural workers. Other potential cumulative effects include the increasing cost of food and the loss of food variety.

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**Growth-Inducing Effects.** If improvements in water supply are caused by the Preferred Program Alternative, the Preferred Program Alternative could induce growth, depending on how the additional water supply was used. If the additional water was used to expand agricultural production or urban housing development, the proposed action would foster economic and population growth. Expansion of agricultural production and population could affect agricultural social issues, but the severity of the agricultural social effect would depend on where agricultural or population growth occurred and how it was managed.

**Short- and Long-Term Relationships.** The long-term productivity of up to 243,000 acres of agricultural lands could be eliminated by the Program. Long-term productivity of an undetermined number of acres of agricultural lands would be enhanced through better quality water, additional availability of irrigation water, increased irrigation efficiency, and protection from flooding. Jobs dependent on agriculture and the social well being of some localities in the affected regions would tend to be reduced by farmland conversion and tend to be increased by the other Program features noted above.

**Irreversible and Irretrievable Commitments.** All Program alternatives would directly and indirectly convert prime, statewide-important, and unique farmland for conveyance, storage, habitat, and levee improvements. These are, in most cases, irreversible and irretrievable commitments of land resources. Storage and conveyance features also could result in irretrievable commitments of resources, such as construction materials, labor, and energy resources.

### 7.3.11 ADVERSE EFFECTS

Farm worker and other agricultural-related job losses resulting from Program actions may result in adverse agricultural social effects. In some cases, jobs may be shifted to other areas, and new recreation or restoration jobs could mitigate for some of the agricultural jobs lost; however, jobs also may be eliminated with no replacement. Job loss is considered a substantial adverse agricultural social effect of the Program. The loss of revenues and increased services burdens on some local governments and districts also could present an adverse social effect.

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The long-term productivity of up to 245,000 acres of agricultural lands could be eliminated by the Program.

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Farm worker and other agricultural-related job losses may result in significant adverse unavoidable effects. The loss of revenues and increased services burdens on some local governments and districts also could present an adverse social effect.

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