Appendix A: Data Inputs for the Pacific Institute Agricultural Water-Use Efficiency Scenarios

Baseline Scenario

Table 1. Irrigated Area by Crop for the Baseline Scenario (1,000 acres)

	Sacramento River	San Joaquin River	Tulare Lake	Total
Grain	150.5	185.5	358.9	694.9
Rice	567.2	19.1	0.0	586.3
Cotton	16.9	144.5	725.3	886.7
Sugar Beet	8.9	18.5	28.2	55.6
Corn	116.0	256.7	231.9	604.6
Dry Bean	35.8	46.8	32.8	115.4
Safflower	71.3	12.7	16.5	100.5
Other Field Crops	38.6	32.0	38.7	109.3
Alfalfa	130.9	232.8	369.7	733.4
Pasture	306.6	173.1	31.5	511.2
Processing Tomatoes	101.8	88.7	107.9	298.4
Fresh Tomatoes	3.4	27.1	9.9	40.4
Cucurbits	25.0	38.3	29.9	93.2
Onions and Garlic	2.4	5.6	41.2	49.2
Potato	0.6	3.4	20.7	24.7
Other Truck Crops	13.9	69.2	96.2	179.3
Almond and Pistachio	131.8	292.5	256.9	681.2
Other Deciduous Trees	247.7	159.1	205.1	611.9
Subtropical Trees	31.2	7.6	209.4	248.2
Vineyards	37.4	237.2	408.3	682.9
Total	2,037.9	2,050.4	3,219.0	7,307.3

Source: DWR 2008b

Table 2. Gross Production Value for Each Crop Type in the Baseline Scenario

	Irrigated Crop Area (1,000 acres)	Production Value (2005$/acre)	Total Production Value (2005$ billion)
Field Crops	4,397.9	$524	$2.3
Vegetables	685.2	$5,171	$3.5
Fruit and Nuts	2,224.2	$3,134	$7.0
Total	**7,307.3**	--	**$12.8**

Note: All dollar values in year 2005 dollars. Production value per acre ($/acre) based on gross production by crop type for 2000-2003 (USDA 2007a) divided by irrigated crop acreage during the same period (DWR 2008b). Total production value is equal to the production value by acre multiplied by the irrigated crop area.

Table 3. Irrigation Method for Each Crop Type in the Baseline Scenario (in percentage of irrigated acres)

	Flood	Sprinkler	Micro/Drip
Field Crops	83.6%	12.3%	4.1%
Vegetables	42.9%	36.0%	21.1%
Orchards	20.3%	16.2%	63.5%
Vineyards	20.8%	8.7%	70.5%
All Crops	60.6%	15.0%	24.4%

Source: Orang et al. 2001

Smart Irrigation Scheduling Scenario

Table 4. Irrigated Area by Crop for the Smart Irrigation Scheduling Scenario (1,000 acres)

	Sacramento River	San Joaquin River	Tulare Lake	Total
Grain	150.5	185.5	358.9	694.9
Rice	567.2	19.1	0.0	586.3
Cotton	16.9	144.5	725.3	886.7
Sugar Beet	8.9	18.5	28.2	55.6
Corn	116.0	256.7	231.9	604.6
Dry Bean	35.8	46.8	32.8	115.4
Safflower	71.3	12.7	16.5	100.5
Other Field Crops	38.6	32.0	38.7	109.3
Alfalfa	130.9	232.8	369.7	733.4
Pasture	306.6	173.1	31.5	511.2
Processing Tomatoes	101.8	88.7	107.9	298.4
Fresh Tomatoes	3.4	27.1	9.9	40.4
Cucurbits	25.0	38.3	29.9	93.2
Onions and Garlic	2.4	5.6	41.2	49.2
Potato	0.6	3.4	20.7	24.7
Other Truck Crops	13.9	69.2	96.2	179.3
Almond and Pistachio	131.8	292.5	256.9	681.2
Other Deciduous Trees	247.7	159.1	205.1	611.9
Subtropical Trees	31.2	7.6	209.4	248.2
Vineyards	37.4	237.2	408.3	682.9
Total	2,037.9	2,050.4	3,219.0	7,307.3

Source: DWR 2008b

Table 5. Gross Production Value for Each Crop Type in the Smart Irrigation Scheduling Scenario

	Irrigated Crop Area (1,000 acres)	Production Value (2005$/acre)	Total Production Value (2005$ billion)
Field Crops	4,397.9	$524	$2.3
Vegetables	685.2	$5,171	$3.5
Fruit and Nuts	2,224.2	$3,134	$7.0
Total	**7,307.3**	--	**$12.8**

Note: All dollar values in year 2005 dollars. Production value per acre ($/acre) based on gross production by crop type for 2000-2003 (USDA 2007a) divided by irrigated crop acreage during the same period (DWR 2008b). Total production value is equal to the production value by acre multiplied by the irrigated crop area.

Table 6. Irrigation Method for Each Crop Type in the Smart Irrigation Scheduling Scenario (in percentage of irrigated acres)

	Flood	Sprinkler	Micro/Drip
Field Crops	83.6%	12.3%	4.1%
Vegetables	42.9%	36.0%	21.1%
Orchards	20.3%	16.2%	63.5%
Vineyards	20.8%	8.7%	70.5%
All Crops	60.6%	15.0%	24.4%

Source: Orang et al. 2001

Advanced Irrigation Management Scenario

Table 7. Irrigated Area by Crop for the Advanced Irrigation Management Scenario (1,000 acres)

	Sacramento River	San Joaquin River	Tulare Lake	Total
Grain	150.5	185.5	358.9	694.9
Rice	567.2	19.1	0.0	586.3
Cotton	16.9	144.5	725.3	886.7
Sugar Beet	8.9	18.5	28.2	55.6
Corn	116.0	256.7	231.9	604.6
Dry Bean	35.8	46.8	32.8	115.4
Safflower	71.3	12.7	16.5	100.5
Other Field Crops	38.6	32.0	38.7	109.3
Alfalfa	130.9	232.8	369.7	733.4
Pasture	306.6	173.1	31.5	511.2
Processing Tomatoes	101.8	88.7	107.9	298.4
Fresh Tomatoes	3.4	27.1	9.9	40.4
Cucurbits	25.0	38.3	29.9	93.2
Onions and Garlic	2.4	5.6	41.2	49.2
Potato	0.6	3.4	20.7	24.7
Other Truck Crops	13.9	69.2	96.2	179.3
Almond and Pistachio	131.8	292.5	256.9	681.2
Other Deciduous Trees	247.7	159.1	205.1	611.9
Subtropical Trees	31.2	7.6	209.4	248.2
Vineyards	37.4	237.2	408.3	682.9
Total	2,037.9	2,050.4	3,219.0	7,307.3

Source: DWR 2008b

Table 8. Gross Production Value for Each Crop Type in the Advanced Irrigation Management Scenario

	Irrigated Crop Area (1,000 acres)	Production Value (2005$/acre)	Total Production Value (2005$ billion)
Field Crops	4,397.9	$524	$2.3
Vegetables	685.2	$5,171	$3.5
Fruit and Nuts	2,224.2	$3,134	$7.0
Total	**7,307.3**	--	**$12.8**

Note: All dollar values in year 2005 dollars. Production value per acre ($/acre) based on gross production by crop type for 2000-2003 (USDA 2007a) divided by irrigated crop acreage during the same period (DWR 2008b). Total production value is equal to the production value by acre multiplied by the irrigated crop area.

Table 9. Irrigation Method for Each Crop Type in the Advanced Irrigation Scheduling Scenario (in percentage of irrigated acres)

	Flood	Sprinkler	Micro/Drip
Field Crops	83.6%	12.3%	4.1%
Vegetables	42.9%	36.0%	21.1%
Orchards	20.3%	16.2%	63.5%
Vineyards	20.8%	8.7%	70.5%
All Crops	60.6%	15.0%	24.4%

Source: Orang et al. 2001

Modest Crop Shifting Scenario

Table 10. Irrigated Area by Crop for the Modest Crop Shifting Scenario (1,000 acres)

	Sacramento River	San Joaquin River	Tulare Lake	Total
Grain	112.9	139.1	269.2	521.2
Rice	425.4	14.3	0	439.7
Cotton	12.7	108.4	544	665.1
Sugar Beet	6.7	13.9	21.2	41.8
Corn	87	192.5	173.9	453.4
Dry Bean	26.9	35.1	24.6	86.6
Safflower	53.5	9.5	12.4	75.4
Other Field Crops	29	24	29	82
Alfalfa	98.2	174.6	277.3	550.1
Pasture	230	129.8	23.6	383.4
Processing Tomatoes	351.2	195.8	269.6	816.6
Fresh Tomatoes	11.7	59.8	24.7	96.2
Cucurbits	86.3	84.5	74.7	245.5
Onions and Garlic	8.3	12.4	102.9	123.6
Potato	2.1	7.5	51.7	61.3
Other Truck Crops	48	152.8	240.4	441.2
Almond and Pistachio	131.8	292.5	256.9	681.2
Other Deciduous Trees	247.7	159.1	205.1	611.9
Subtropical Trees	31.2	7.6	209.4	248.2
Vineyards	37.4	237.2	408.3	682.9
Total	2038	2050.4	3218.9	7307.3

Table 11. Gross Production Value for Each Crop Type in the Modest Crop Shifting Scenario

	Irrigated Crop Area (1,000 acres)	Production Value (2005$/acre)	Total Production Value (2005$ billion)
Field Crops	3,298.7	$524	$1.7
Vegetables	1784.4	$5,171	$9.2
Fruit and Nuts	2,224.2	$3,134	$7.0
Total	7,307.3	--	$17.9

Note: All dollar values in year 2005 dollars. Production value per acre ($/acre) based on gross production by crop type for 2000-2003 (USDA 2007a) divided by irrigated crop acreage during the same period (DWR 2008b). Total production value is equal to the production value by acre multiplied by the irrigated crop area.

Table 12. Irrigation Method for Each Crop Type in the Modest Crop Shifting Scenario (in percentage of irrigated acres)

	Flood	Sprinkler	Micro/Drip
Field Crops	83.6%	12.3%	4.1%
Vegetables	42.9%	36.0%	21.1%
Orchards	20.3%	16.2%	63.5%
Vineyards	20.8%	8.7%	70.5%
All Crops	60.6%	15.0%	24.4%

Source: Orang et al. 2001

Efficient Irrigation Technology

Table 13. Irrigated Area by Crop for the Efficient Irrigation Technology Scenario (1,000 acres)

	Sacramento River	San Joaquin River	Tulare Lake	Total
Grain	150.5	185.5	358.9	694.9
Rice	567.2	19.1	0.0	586.3
Cotton	16.9	144.5	725.3	886.7
Sugar Beet	8.9	18.5	28.2	55.6
Corn	116.0	256.7	231.9	604.6
Dry Bean	35.8	46.8	32.8	115.4
Safflower	71.3	12.7	16.5	100.5
Other Field Crops	38.6	32.0	38.7	109.3
Alfalfa	130.9	232.8	369.7	733.4
Pasture	306.6	173.1	31.5	511.2
Processing Tomatoes	101.8	88.7	107.9	298.4
Fresh Tomatoes	3.4	27.1	9.9	40.4
Cucurbits	25.0	38.3	29.9	93.2
Onions and Garlic	2.4	5.6	41.2	49.2
Potato	0.6	3.4	20.7	24.7
Other Truck Crops	13.9	69.2	96.2	179.3
Almond and Pistachio	131.8	292.5	256.9	681.2
Other Deciduous Trees	247.7	159.1	205.1	611.9
Subtropical Trees	31.2	7.6	209.4	248.2
Vineyards	37.4	237.2	408.3	682.9
Total	2,037.9	2,050.4	3,219.0	7,307.3

Table 14. Gross Production Value for Each Crop Type in the Efficient Irrigation Technology Scenario

	Irrigated Crop Area (1,000 acres)	Production Value (2005$/acre)	Total Production Value (2005$ billion)
Field Crops	4,397.9	$524	$2.3
Vegetables	685.2	$5,171	$3.5
Fruit and Nuts	2,224.2	$3,134	$7.0
Total	7,307.3	--	$12.8

Note: All dollar values in year 2005 dollars. Production value per acre ($/acre) based on gross production by crop type for 2000-2003 (USDA 2007a) divided by irrigated crop acreage during the same period (DWR 2008b). Total production value is equal to the production value by acre multiplied by the irrigated crop area.

Table 15. Irrigation Method for Each Crop Type in the Efficient Irrigation Technology Scenario (in percentage of irrigated acres)

	Flood	Sprinkler	Micro/Drip
Field Crops	35.9%	60%	4.1%
Vegetables	15%	35%	50%
Orchards	10%	20%	70%
Vineyards	10%	10%	80%
All Crops	26%	45%	29%

Fallowing

Table 16. Irrigated Area by Crop for Fallowing (1,000 acres)

	Sacramento River	San Joaquin River	Tulare Lake	Total
Grain	135.5	167.0	323.0	625.4
Rice	510.5	17.2	0.0	527.7
Cotton	15.2	130.1	652.8	798.0
Sugar Beet	8.0	16.7	25.4	50.0
Corn	104.4	231.0	208.7	544.1
Dry Bean	32.2	42.1	29.5	103.9
Safflower	64.2	11.4	14.9	90.5
Other Field Crops	34.7	28.8	34.8	98.4
Alfalfa	117.8	209.5	332.7	660.1
Pasture	275.9	155.8	28.4	460.1
Processing Tomatoes	101.8	88.7	107.9	298.4
Fresh Tomatoes	3.4	27.1	9.9	40.4
Cucurbits	25.0	38.3	29.9	93.2
Onions and Garlic	2.4	5.6	41.2	49.2
Potato	0.6	3.4	20.7	24.7
Other Truck Crops	13.9	69.2	96.2	179.3
Almond and Pistachio	131.8	292.5	256.9	681.2
Other Deciduous Trees	247.7	159.1	205.1	611.9
Subtropical Trees	31.2	7.6	209.4	248.2
Vineyards	37.4	237.2	408.3	682.9
Total	1,893.6	1,938.2	3,035.7	6,867.5

Source: DWR 2008b

Table 17. Gross Production Value for Each Crop Type fro Fallowing

	Irrigated Crop Area (1,000 acres)	Production Value (2005$/acre)	Total Production Value (2005$ billion)
Field Crops	3958.1	$524	$2.1
Vegetables	685.2	$5,171	$3.5
Fruit and Nuts	2,224.2	$3,134	$7.0
Total	**6,867.5**	**--**	**$12.6**

Note: All dollar values in year 2005 dollars. Production value per acre ($/acre) based on gross production by crop type for 2000-2003 (USDA 2007a) divided by irrigated crop acreage during the same period (DWR 2008b). Total production value is equal to the production value by acre multiplied by the irrigated crop area.

Table 18. Irrigation Method for Each Crop Type for Fallowing (in percentage of irrigated acres)

	Flood	Sprinkler	Micro/Drip
Field Crops	83.6%	12.3%	4.1%
Vegetables	42.9%	36.0%	21.1%
Orchards	20.3%	16.2%	63.5%
Vineyards	20.8%	8.7%	70.5%
All Crops	60.6%	15.0%	24.4%

Source: Orang et al. 2001