FINAL REPORT

Cuyama Groundwater Basin Groundwater Sustainability Plan Economic Impact Analysis

Prepared for

Cuyama Basin Groundwater Sustainability Agency

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1. Executive Summary

In 2019, the Cuyama Basin Groundwater Sustainability Agency (CBGSA) commissioned an economic impact analysis of the direct economic costs to subbasin agriculture of the projects and management actions specified in the GSP. This total economic impact analysis considers the effects of the direct economic impacts attributable to GSP on linked businesses, farmworkers, disadvantaged communities, and the broader regional (four-county) economy. The results of the study are being used to support decisions on projects, management actions, and the GSP implementation timeline.

Changes in economic activity by water-dependent industries in the Cuyama Basin have ripple effects in the basin and the regional economy. For example, idling farmland means that fewer inputs are purchased, less equipment is used, and fewer workers are employed to prep, plant, irrigate, and manage fields. In turn, workers and employees of these related businesses have lower wages. Purchases of other goods and services, such as entertainment and groceries, decrease. Reduced crop production also affects related activities such as produce packing and processing. This economic impact analysis quantifies these linkages and presents the total economic impact of the GSP.

Farming in the Cuyama Basin affects businesses and individuals in the CBGSA and the broader regional economy. For example, the demand management program in the GSP would ultimately affect irrigated agricultural land values. This would cause a drop in local tax revenue, which may indirectly affect other government services. Cuyama farming operations purchase inputs from businesses located outside of the basin and create jobs for employees that live in and outside of the basin. These changes also affect local tax revenues. The economic impact analysis considers the total regional economy impact as well as impacts that would occur in the CBGSA.

Economic impacts are quantified using a custom input-output economic model of the CBGSA and four-county region (Kern, San Luis Obispo, Santa Barbara, Ventura). It is developed using the IMPLAN software and data. The study uses information from three main sources: the results of the 2019 *Direct Economic Impact Analysis of the Cuyama Groundwater Basin Groundwater Sustainability Plan Demand Management Program* prepared by ERA Economics, additional direct outreach to Cuyama Basin stakeholders, and other secondary information about the basin. Results are reported in terms of direct, indirect, and induced impacts. Direct impacts are changes (measured in dollars and jobs) in primary CBGSA industries (e.g., farming). Indirect impacts show the changes in purchases from businesses related to the CBGSA farming industries (e.g., farm labor contractors). Induced impacts show the effect of changes in purchases by employees of all directly and indirectly affected industries. The sum of these represents the total economic impact.

The results of this study illustrate the impact of the GSP at full implementation. The GSP implementation plan calls for an approximately two-thirds reduction in groundwater pumping relative to current levels. This would cause substantial economic losses in the CBGSA and in the

surrounding communities that provide labor and other inputs to farming in the region. Table 1.1 summarizes the total economic impact of GSP implementation and administration. Total annual output value losses are $207.7 million with 1,337 jobs lost.

Table 1.1 CBGSA GSP 4-County Region Economic Impact Summary ($2020)

Description	Direct	Indirect	Induced	Total
Total Output ($M)	($75.8)	($80.4)	($51.5)	($207.7)
Total Employment (FTE Jobs)	(559.7)	(437.1)	(340.2)	(1,337)

The economic impact in the CBGSA is less than the total economic impact to the regional economy because many workers and businesses are not located in the basin. The impact in the CBGSA is approximately $75.3 million in output value and 191 jobs. The jobs lost represent approximately one-third of the total jobs currently available in the CBGSA. Table 1.2 summarizes the total economic impact attributable to the CBGSA.

Table 1.2 CBGSA GSP Total Economic Impact Summary in the CBGSA ($2020)

	Direct	Indirect	Induced	Total
Output ($M)	($62.0)	($4.5)	($8.8)	($75.3)
Jobs (FTE)	(96)	(37)	(58)	(191)

The results of the analysis can be used to support GSP implementation and planning considerations. The planned demand management program in the GSP would result in economic losses for local businesses and workers. To the extent that other projects and management actions can prevent some land idling this would reduce these costs. The potential for repurposing idle lands or introducing new industries into the Cuyama Valley would offset some of these impacts. However, these alternative land uses or new industries would also require water supplies. Given the remote location of the Cuyama Valley, it is not clear if some of these alternatives would be viable. The primary industry in the CBGSA continues to be irrigated agriculture.

2. Introduction

The Cuyama Basin is designated as Critically Overdrafted by the California Department of Water Resources (DWR). The Cuyama Basin Groundwater Sustainability Agency (CBGSA) released the initial public draft of its Groundwater Sustainability Plan (GSP) for managing the basin in June 2019 and submitted its final GSP to DWR in January 2020. The GSP identifies administrative, management, and reporting requirements, in addition to a set of projects and management actions to reduce water use and increase water supply, ensuring that the basin achieves and maintains sustainable groundwater conditions by 2040.

The GSP imposes direct and indirect economic costs on the Cuyama Basin economy. Direct costs include fees and assessments to pay for GSP implementation, project costs, and lost agricultural production from idling land. Indirect costs include the drop in local land values, business activity, jobs, and income for Cuyama Valley residents and the regional economy. Economic impacts occur over time as pumping is gradually reduced or additional projects are implemented as identified in the GSP implementation plan.

This analysis establishes the direct and indirect economic impacts of implementation of the GSP in the Cuyama Basin. The direct economic impacts were evaluated in a 2019 study commissioned by the CBGSA titled "Direct Economic Impact Analysis of the Cuyama Groundwater Basin Groundwater Sustainability Plan Demand Management Program[1]." This analysis extends the direct impact analysis to evaluate the total (direct plus indirect) economic impacts of implementing the GSP in the Cuyama Basin.

The economic impacts from implementation of the GSP are primarily due to reduced groundwater supplies in the future. In addition, GSA administration costs are passed on to landowners in the Cuyama Basin in the form of fees and assessments. Reduced water supplies limit irrigated agriculture in the basin. This reduces land rents, and in turn land values in the basin. Reduced farm production results in fewer inputs purchased and reduced processing, transportation, and sale of agricultural products. This causes ripple effects in the regional economy for local businesses, jobs, and communities in the area. The costs of GSP implementation include:

- Fees and assessments to cover GSP development, annual updates, and 5-year update reports.
- Administrative fees for formation and management of the local water district and GSA.
- Landowner and stakeholder time managing and preparing for CBGSA meetings.
- Fees and assessments to implement future projects.
- Land fallowing to meet planned pumping limits in the basin.

[1] CBGSA. 2019. Direct Economic Impact Analysis of the GSP Demand Management Program. Prepared by ERA Economics.

The economy in the Cuyama Basin is heavily dependent on irrigated agriculture. There are few alternative industries in the area. The Cuyama Valley was originally settled by large oil companies who built the town to house its workers. Improvements in technology have reduced the number of jobs in the oil industry and it is currently a small employer in the area. Most jobs available for local residents and businesses directly or indirectly depend on farming activities in the area.

Changes in the cost and availability of water would cause direct changes in farming, business activity, and jobs and income for local residents in the Cuyama Basin. This study establishes the total economic impact of the GSP. The geographic scope covers the Cuyama Basin. It also includes a regional economic analysis of impacts to the broader four-county economy (San Luis Obispo, Santa Barbara, Ventura, and Kern). Many businesses that operate in the Cuyama Basin depend on workers that live outside of the basin in one of the local communities in these counties. In addition, many farming businesses have processing and distribution facilities in the neighboring communities. The economic impact analysis covers these regional impacts.

The report is structured as follows. The following section provides an overview of the economic impact analysis methodology. This is followed by an overview of socioeconomic conditions in the Basin, including jobs, income, and local businesses. The subsequent section presents the results of the economic impact analysis. A technical appendix provides additional technical details for how the economic model was developed and calibrated to local conditions in the Cuyama Basin. A second appendix displays the questions asked in the stakeholder outreach survey.

3. Quantifying Economic Impacts

This section provides an overview of the economic impact analysis methodology. The analysis methodology follows a standard economic impact approach. The first step quantifies direct economic impacts to farming businesses in the basin, primarily due to a reduction in the availability of groundwater in the future as the GSP is implemented. This analysis was described in detail in the 2019 economic impact analysis commissioned by the CBGSA[2]. Secondary economic impacts are quantified using a combination of socioeconomic data, surveys/interviews with local landowners, and a customized IMPLAN[3] economic model database for Cuyama Basin and economic activities in the region.

Direct economic impacts were quantified in a 2019 study. That analysis developed an economic model of Cuyama Basin farming and water use. It was used to establish the change in gross and net farm income, crop mix, and land idling under the proposed GSP implementation plan. The GSP implementation plan includes a demand management program that would effectively reduce

[2] CBGSA. 2019. Direct Economic Impact Analysis of the GSP Demand Management Program. Prepared by ERA Economics.
[3] Impacts for Planning and Analysis (IMPLAN), developed by MIG, Inc.

agricultural groundwater pumping by two-thirds (around 66 percent) relative to current conditions. The direct impact analysis quantified the losses in farm revenue and land idling.

Secondary economic impacts are quantified in this study. Secondary impacts result from the direct impacts. This includes changes in business activity in the Cuyama Basin and broader regional economy. For example, fallowing cropland in the Cuyama Basin would reduce the number of farm jobs for workers that live in the basin and farm labor contractors (FLC) that assemble crews that live in the region, but not in the basin. Land values in the basin would also fall because the land can no longer be irrigated (or, would be irrigated less frequently). These changes have ripple effects in the regional economy. Secondary impacts are assessed in three phases.

The first phase establishes baseline economic conditions in the Cuyama Basin and the regional economy. The regional economy is defined as the four-county area of Kern, Ventura, Santa Barbara, and San Luis Obispo Counties. The Cuyama Basin includes portions of each county, and more importantly, Cuyama Basin businesses rely on employees and businesses located outside of the Cuyama Basin. For example, carrots produced in the Cuyama Basin are harvested and hauled to the Bakersfield area where they are packed and shipped for retail. Cuyama Basin hay production is for dairy feed for a local dairy located in Santa Barbara County. Therefore, the baseline economic information is defined for the Cuyama Basin and the four-county area.

Baseline economic data was compiled from published reports and statistics. In addition, a series of stakeholder interviews were conducted with Cuyama Basin businesses, landowners, and other stakeholders. Interview questions were structured to develop a database summarizing the typical business purchases, inputs, location of employees, and seasonal employment in the Cuyama Basin and surrounding communities. Feedback from the interviews was merged with socioeconomic data to prepare baseline economic conditions for the Basin.

The second phase quantified other economic costs attributable to GSP planning and implementation. For example, the CBGSA imposed a groundwater extraction fee to cover its annual operating costs. The Cuyama Basin Water District was formed to assist in GSP development and has an acreage assessment to fund its operations. Board members and their staff are not paid for their positions on the GSA (separate from any compensation as an employee of the business), and there is a loss in productivity, or income, for their standard business practices. An estimate of these costs is presented.

The third phase developed a custom IMPLAN model for the Cuyama Basin and surrounding communities. IMPLAN is a modeling framework that can simulate the impact of changes in expenditures in one industry on all related industries, and translate those impacts into jobs, income, and tax impacts. The default IMPLAN model data includes coarse industry sectors for farming activities that are based on national average data. These do not accurately reflect local conditions with specialty crop agriculture in the Cuyama Basin. The model is customized using

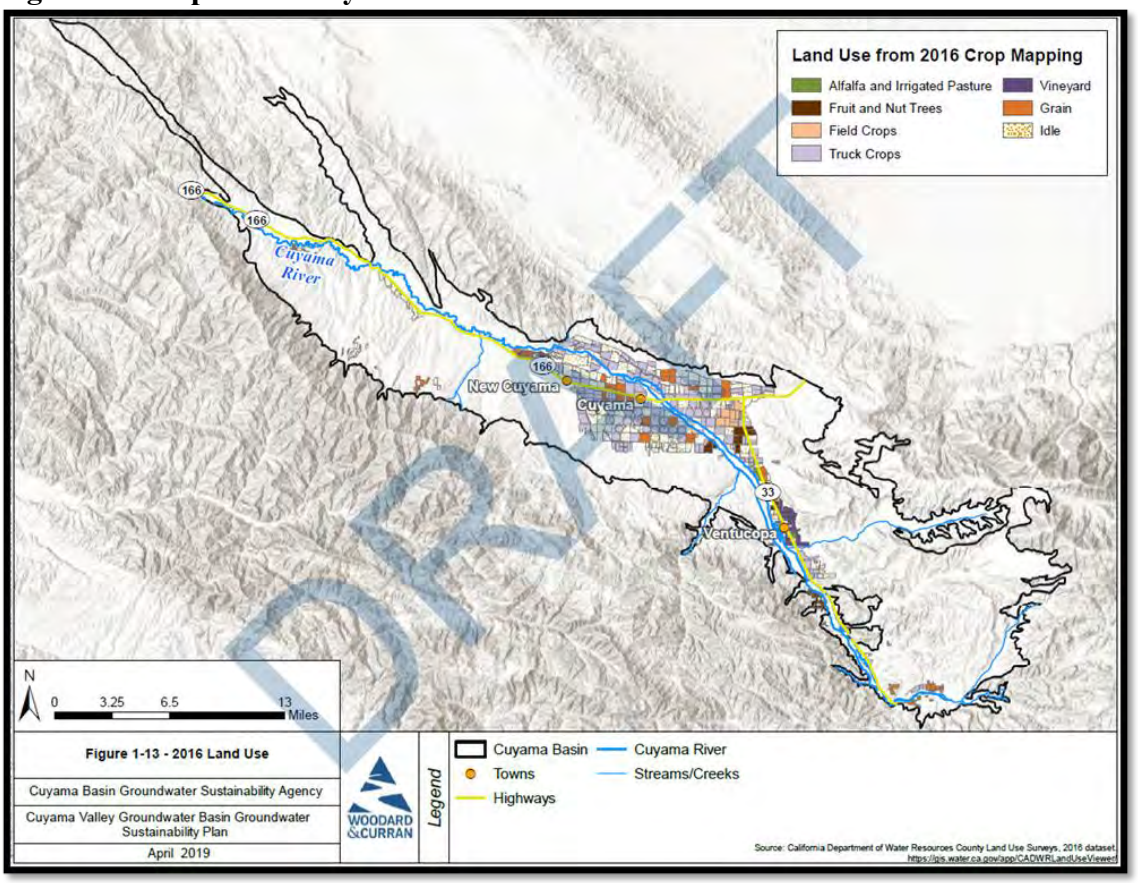
data generated for the previously conducted direct economic impact study, as well as publicly available data gathered for this analysis and private information gathered through outreach to basin stakeholders. Appendix A provides a detailed technical overview of the customized IMPLAN model applied in this study.

The custom IMPLAN model is used in this analysis to show the economic effects of GSP implementation in other industries given the changes in production estimated in the previously conducted direct economic impact analysis. These economic effects are expressed in terms of gross revenue, tax revenues, and full-time equivalent jobs. In addition, an analysis of property tax revenues impacts based on the change in land values is presented. Results are described for the Cuyama Basin and regional economy.

4. Baseline Economic Conditions

The Cuyama Basin economy is primarily dependent on agriculture, construction, and oil and gas extraction. The area experienced an oil and gas boom in the late 1940's with some production continuing today, but the primary industry in the region is irrigated agriculture. Oil and gas production is largely automated, and the industry is not a large employer in the basin. Local shops, restaurant, hotel, and other businesses also depend on irrigated agriculture since their local customers generate income from that industry. Figure 4.1 illustrates the Cuyama Basin crop acreage and geographic location.

Figure 4.1 Map of the Cuyama Basin



The Cuyama Basin is linked to the economy in the broader four-county area. Stakeholder interviews indicated that residents might complete grocery and other shopping in the Bakersfield area. The seasonal workforce for irrigated agriculture in the basin includes workers traveling from Bakersfield, Taft, Santa Maria, and other communities. Changes in economic activity in the Cuyama Basin are inextricably linked to the four-county regional economy. This section provides an overview of socioeconomic conditions in the Cuyama Basin and the regional, four-county area.

4.1 Cuyama Basin Socioeconomics

The population centers in the Cuyama Basin of New Cuyama, Cuyama, and Ventucopa are all located in the Santa Barbara County portion of the basin. The largest Census Designated Area, and only area in the basin with American Community Survey (ACS) data, is New Cuyama with a population of approximately 763 as of 2018[4]. Cuyama and Ventucopa have no published population estimates, although road signs indicate a little under 100 individuals in each community. However, a recent publication[5] by researchers at UC Santa Barbara indicates that the

[4] US Census Bureau. American Community Survey Data. 2018.
[5] Casey Walsh. Cuyama Water Census Report. UC Santa Barbara. 2020.

existing survey estimates may understate the local population in the basin, with closer to 1,200 residents in the Cuyama Valley[6]. These minor data discrepancies are addressed later in this section.

ACS data indicate roughly 80 business operations in the basin, with about 30 that appear to be primarily agricultural businesses[7]. There are roughly ten oil and petroleum companies, four churches, and three schools. Schools are in the Cuyama Joint Unified School District, including Cuyama Elementary (152 students), Cuyama Valley High School (50 students), and Sierra Madre Continuation High School (5 students). Table 4.1 provides a breakdown of businesses in the Cuyama Census Designated Area[8]. Only some of these businesses are in the region defined as the Cuyama Basin. Outreach confirmed that there are three restaurants in the basin, a grocery store, a hardware store, and three churches. Most businesses are agriculture, agricultural support industries, or local businesses that depend on purchases from employees of those businesses.

Table 4.1 Cuyama Basin Registered Businesses

Industry	Number of Businesses
Agriculture	20
Professional Services/Other	13
Government	9
Construction	8
Restaurant	7
School	5
Store	5
Oil	4
Religious	4
Logistics	3
Finance and Real Estate	2
Gas	2
Landscape	1

Source: US Census Bureau. American Community Survey Data. 2018.

Table 4.2 summarizes the breakdown of Cuyama Basin total residents and employment by industry. Approximately 32 percent of the total estimated New Cuyama population is actively employed, which is generally representative of the population in other parts of the basin. Most jobs are in agriculture and related support industries, oil and gas extraction, or community related industries such as construction, education, or hospitality. As shown in Table 4.2, total jobs are approximately 241, including 69 in agriculture, 32 in oil and gas, and 140 in other industries. These values do not align with the census data collected by the UCSB study[9] nor do they align

[6] The UCSB report defines the Cuyama Valley as the geographic area, which is slightly different coverage than the Cuyama Basin. The primary population centers are largely the same, therefore for the purposes of this analysis, the Cuyama Basin and Cuyama Valley are used interchangeably.
[7] US Census Bureau. American Community Survey Data. 2018.
[8] US Census Bureau. American Community Survey Data. 2018.
[9] Casey Walsh. Cuyama Water Census Report. UC Santa Barbara. 2020.

with the values collected by the Blue Sky Center[10]. UCSB estimates that 154 individuals, 18 percent of the total population, is employed in agriculture. This number is likely to be more accurate and would bring the total employed population of the Cuyama Valley up to 326. This would put agricultural jobs at 47 percent of the share of total, which is high compared to the two recent studies. It is likely that the share of agricultural employment is underestimated due to underreporting, and the total working age employment is higher than estimated below. Aggregation of the estimates puts total working age population around 700, and agricultural employment around 200, or 28.5 percent of the total. The remaining major employer is the school district, which employs approximately 14 teachers and 15 staff and administrators.

Table 4.2 Cuyama Basin Employment by Industry

Employed Population 16 Years and Older	Female	Male	Total	Percent of Total
Agriculture, Forestry, Fishing and Hunting	16	53	69	28.63%
Construction	12	21	33	13.69%
Mining, Quarrying, And Oil and Gas Extraction	0	32	32	13.28%
Professional, Scientific, And Technical Services	0	22	22	9.13%
Health Care and Social Assistance	0	15	15	6.22%
Information	3	11	14	5.81%
Educational Services	12	2	14	5.81%
Manufacturing	0	11	11	4.56%
Transportation and Warehousing	0	10	10	4.15%
Retail Trade	9	0	9	3.73%
Administrative and Support and Waste Management Services	6	0	6	2.49%
Utilities	0	4	4	1.66%
Arts, Entertainment, And Recreation	2	0	2	0.83%
Total	**60**	**181**	**241**	**100%**

Source: US Census Bureau. American Community Survey Data. 2018.

The median household income in the Cuyama Basin is below the State average of $71,288,[11] equal to $66,563. Approximately 15 percent of households in the basin are below the state poverty line, compared to the state average of 11.8 percent[12]. Most families that live in the basin also work in the basin. While most households own their housing units (60 percent), most major landowners are headquartered in larger municipalities in the surrounding four-county area. Table 4.3 summarizes the distribution of household income for family and non-family households.

[10] Cuyama Valley Action Plan. Blue Sky Center. 2020.
[11] US Census California Summary Statistics. California State Average. 2018 dollars.
[12] US Census California Summary Statistics. California State Average, as of 2019.

Table 4.3 Cuyama Basin Income Distribution

Households/Income	Families	Nonfamily households
Total	148	79
Less than $10,000	0%	11%
$10,000 to $14,999	0%	13%
$15,000 to $24,999	4%	15%
$25,000 to $34,999	14%	14%
$35,000 to $49,999	7%	28%
$50,000 to $74,999	27%	0%
$75,000 to $99,999	29%	0%
$100,000 to $149,999	19%	15%
$150,000 to $199,999	0%	4%
$200,000 or more	0%	0%
Median income	**$66,563**	**$29,432**
Mean income	**$71,831**	**$43,842**

Source: US Census Bureau. American Community Survey Data. 2018.

The Cuyama Basin demographic mix is similar to other rural agricultural communities in California. ACS estimates most of the population is Non-White (62 percent). This estimate is similar to those by UCSB[13] and Blue Sky[14]. Table 4.4 summarizes the race distribution in the basin. It is estimated that 60 percent of the population is Latino while only 46 percent of households are Latino.

Table 4.4 Cuyama Basin Demographic Summary

Race	Relative Share	Total
Asian	0.38%	4
Black	0.75%	9
Native American	3.01%	35
Other, Non-Latino	9.43%	108
Other, Latino	26.79%	308
White	59.62%	686

Source: Cuyama Water Census

Latino and non-Latino households in the basin vary significantly in terms of agricultural employment. According to the UCSB Water Census, 56 percent of Latino households have someone employed in agriculture compared to 14 percent of non-Latino households. Additionally, income in agricultural jobs varies significantly between ethnicities. Table 4.5 shows the income distribution between Latino and Non-Latino individuals in the basin.

[13] Casey Walsh. Cuyama Water Census Report. UC Santa Barbara. 2020.
[14] Cuyama Valley Action Plan. Blue Sky Center. 2020.

Table 4.5 Cuyama Basin Latino and Non-Latino Income Distribution

Income	Latino	Non-Latino
$0-$50k	78%	32%
$50k-$100K	21%	32%
$100k+	1%	36%

Source: Cuyama Water Census

4.2 Kern, Santa Barbara, San Luis Obispo, and Ventura Socioeconomics

The economy of the Cuyama Basin is connected to the surrounding four-county area. Farm labor contractors, farm managers, equipment, and other related businesses provide inputs to Cuyama Basin farming activities. Similarly, owners of some Cuyama Basin businesses live outside of the basin. The economy in rural areas of the four-county region is similar to the basin, relying heavily on petroleum and agriculture industries (this is not the case for communities with more service-based industries in Santa Barbara, Ventura, and San Luis Obispo counties).

Total gross output value of the four-county region economy is $230 billion per year. Agriculture, and agricultural support industries are a substantial share of the local economy, particularly in Kern County. Table 4.6 summarizes the gross output value for the top 10 industries in total, and the distribution in each of the four counties. Agricultural crops generate around $9.2 billion annually, with most ($4.7 billion) occurring in Kern County. Agricultural support industries generate around $3.7 billion. Support activities for agriculture are the 10th most valuable industry in the four-county area, compared to a statewide rank of 72nd. Agriculture ranks 6th compared to its 16th ranking statewide.

Table 4.6 Four-County Regional Economy Summary: Gross Output Value ($ Millions)

Industry	4-County	Kern	San Luis Obispo	Santa Barbara	Ventura	Statewide Rank
Petroleum refineries	$11.71	$10.35	$0.85	$0.04	$0.43	4
Oil & Gas Extraction	$11.47	$9.12	$0.10	$0.73	$1.39	46
Real estate	$10.83	$1.93	$1.44	$2.58	$4.46	1
Owner-occupied dwellings	$10.77	$3.12	$1.43	$2.06	$3.79	3
Wholesale trade	$10.28	$3.04	$0.90	$1.64	$4.29	2
Agriculture	$9.21	$4.74	$0.92	$1.64	$1.75	16
Local Gov. Education	$5.81	$2.29	$0.47	$1.23	$1.66	6
Local Gov. Non-Education	$4.33	$1.27	$0.46	$1.22	$1.26	10
Hospitals	$3.72	$1.25	$0.37	$0.91	$1.08	8
Support activities for Agriculture	$3.71	$2.40	$0.17	$0.62	$0.47	72
Total (All industries)	**$230**	**$84**	**$25**	**$43**	**$78**	

Source: IMPLAN 2014 R3 database.

Table 4.7 lists the top 10 industries by employment in the four-county area. Jobs are expressed as full time equivalents (FTE). Actual jobs, including seasonal employment which is typical in agriculture, would be higher. Oil and Gas industries (second highest in gross value) are not in the top 10 in employment. Support activities for agriculture (10th by gross output value) are the second greatest employment sector in the region. Support activities for agriculture include FLCs and other input suppliers that generate a substantial share of jobs for the region.

Table 4.7 Four-County Regional Economy Summary: Employment (FTE)

Row Labels	4-County	Kern	San Luis Obispo	Santa Barbara	Ventura	State Rank
Local Gov. Education	64,961	25,800	5,677	14,088	19,396	2
Support activities for Agriculture	64,746	45,397	2,679	9,629	7,041	22
Real estate	58,131	13,179	9,525	13,406	22,021	1
Agriculture	54,838	20,441	4,496	10,878	19,023	18
Local Gov. Non-Education	38,034	11,491	4,146	10,815	11,582	7
Full-service restaurants	37,155	7,912	6,725	9,406	13,112	5
Limited-service restaurants	37,149	12,065	4,550	7,055	13,479	6
Wholesale trade	37,098	10,725	3,854	6,022	16,497	3
Individual and family services	26,040	7,664	3,685	5,517	9,174	4
Employment services	23,187	6,070	3,854	3,856	9,408	8
Total (All Industries)	**1,287,791**	**415,280**	**163,580**	**269,245**	**439,686**	

Source: IMPLAN 2014 R3 database.

Table 4.8 lists the top 10 industries by labor income in the four-county area. Labor income is correlated with the number of jobs, but additionally reflects the average wage paid in different sectors of the economy. Agriculture and support activities for agriculture are important sources of wage income for the local population.

Table 4.8 Four-County Regional Economy Summary: Labor Income

Row Labels	4-County	Kern	San Luis Obispo	Santa Barbara	Ventura	State Rank
Local Gov. Education	$5.35	$2.11	$0.43	$1.14	$1.53	1
Agriculture	$4.68	$2.26	$0.32	$0.86	$1.14	32
Local Gov. Non-Education	$3.99	$1.17	$0.42	$1.13	$1.16	3
Wholesale trade	$3.40	$1.04	$0.24	$0.54	$1.44	2
Support activities for Agriculture	$2.29	$1.45	$0.11	$0.39	$0.31	35
Federal Gov. Non-Military	$2.18	$1.09	$0.02	$0.31	$0.69	10
Oil & Gas Extraction	$2.13	$1.53	$0.01	$0.17	$0.39	70
Hospitals	$1.98	$0.64	$0.20	$0.49	$0.58	4
Offices of physicians	$1.87	$0.51	$0.23	$0.46	$0.61	8
Real estate	$1.76	$0.33	$0.25	$0.44	$0.67	15
Total	**$29.63**	**$12.13**	**$2.23**	**$5.93**	**$9.34**	

Source: IMPLAN 2014 R3 database. All values indexed to current dollars using GDP-IPD.

The median household income varies across the four counties. Kern County median household income is equal to $61,124, below the State average of $71,288[15]. In contrast, San Luis Obispo, Ventura, and Santa Barbara counties have median household incomes well above the state average, more than $90,000 per year. Greater household income is due to the prevalence of professional services industries in those counties. Table 4.9 summarizes the distribution of household income for family (two or more people) and non-family (individual) households.

Table 4.9 Four-County Income Distribution

	Kern		San Luis Obispo	
Households	**Families**	**Nonfamily households**	**Families**	**Nonfamily households**
Total	**199,179**	**73,709**	**67,359**	**39,153**
Less than $10,000	4%	11%	3%	8%
$10,000 to $14,999	4%	14%	1%	8%
$15,000 to $24,999	10%	18%	4%	13%
$25,000 to $34,999	10%	10%	4%	14%
$35,000 to $49,999	13%	13%	11%	14%
$50,000 to $74,999	17%	15%	14%	17%
$75,000 to $99,999	12%	7%	15%	11%
$100,000 to $149,999	15%	7%	25%	10%
$150,000 to $199,999	8%	2%	12%	3%
$200,000 or more	6%	2%	12%	3%
Median income (dollars)	**$61,124**	**$30,789**	**$98,277**	**$41,847**
Mean income (dollars)	**$83,430**	**$48,783**	**$117,296**	**$62,776**

	Santa Barbara		Ventura	
Households	**Families**	**Nonfamily households**	**Families**	**Nonfamily households**
Total	**92,089**	**54,377**	**193,638**	**74,886**
Less than $10,000	2%	12%	2%	8%
$10,000 to $14,999	1%	6%	1%	6%
$15,000 to $24,999	5%	11%	4%	10%
$25,000 to $34,999	5%	7%	5%	8%
$35,000 to $49,999	11%	15%	9%	11%
$50,000 to $74,999	18%	18%	12%	16%
$75,000 to $99,999	13%	8%	15%	16%
$100,000 to $149,999	18%	12%	22%	14%
$150,000 to $199,999	10%	3%	14%	6%
$200,000 or more	16%	8%	17%	5%
Median income (dollars)	**$90,020**	**$48,596**	**$103,818**	**$60,967**
Mean income (dollars)	**$128,375**	**$78,268**	**$134,464**	**$78,521**

Source: US Census Bureau. American Community Survey Data. 2018.

[15] US Census California Summary Statistics. California State Average. 2018 dollars.

The four-county economy is more diverse than the Cuyama Basin. The basin is most similar to Kern County, in that most of the local economic activity depends directly or indirectly on irrigated agriculture. Overall though, as a share of total agricultural value, the Cuyama Basin is less than 3 percent of the total four-county gross agricultural value. Changes in Cuyama Basin farming will have ripple effects in the regional economy. The following section describes the linkages and other indirect costs associated with GSP implementation.

5. Secondary Economic Impact Analysis

Secondary economic impacts include the multiplier effects that result from direct changes in basin farming activity and from the necessary actions, fees, and assessments as a result of GSP development and implementation. This section describes current fees and assessments and estimated costs, and provides an overview of secondary economic impacts caused by changes in Cuyama Basin farming.

5.1 GSP Fees and Indirect Costs

GSP implementation costs include fees and assessments to cover GSA operating costs, administration, and annual and 5-year GSP updates. These also include direct costs incurred by local landowners to form local entities (e.g., the Cuyama Basin Water District) under the LAFCO process in order to participate in the GSA and develop the GSP.

Under SGMA, landowners and individuals do not have legal authority to form a GSA, and a special district may not exist to act as a GSA. In these areas, sometimes referred to as "white areas" of a county, the GSP management responsibilities fall to the county. To improve local stakeholder engagement in GSP development and allow for direct representation in the CBGSA Joint Powers Authority (JPA), Cuyama Basin agricultural interests formed the Cuyama Basin Water District (CBWD) in 2016. The CBWD exists to allow basin landowners covering approximately 83,000 acres to engage in the GSP development process. The annual operating budget of the CBWD is estimated at around $500,000 (from a peak of $850,000 after establishment)[16]. The per-acre assessment is approximately $16.13 per irrigated acre and $0.45 per non-irrigated acre. Total irrigated acreage is approximately 31,600 and total non-irrigated acreage is approximately 44,300.

In 2019, the CBGSA, a JPA including the CBWD and five other member agencies, adopted a groundwater extraction fee to cover its costs for GSP development, updates, and administration. The initial groundwater fee adopted in 2019 was insufficient to cover GSA administration costs. This was due to lower groundwater pumping than was previously estimated to set the fee. In 2020, the groundwater extraction fee was adjusted to its current level of $44 per acre-foot. This fee applies to all groundwater pumping in the CBGSA above the de minimis pumping level (1.5 acre-feet per acre). The fee covers an annual operating budget of the CBGSA of approximately

[16] Cuyama Basin Water District. Prop 218 Engineers Report. March 2017.

$1 million. Annual pumping was estimated at 60,000 acre-feet per year initially and is currently estimated at 47,000 acre-feet per year for the current pumping fee.

The opportunity cost of CBGSA board members' time is another indirect cost attributed to GSP development. Most board members are also employees or owners of local private businesses. Time spent reviewing board packets, meeting minutes, attending meetings, responding to consultant interview requests, and engaging in outreach and technical coordination is time that would have been spent on duties directly related to their job. Stakeholders interviewed for this study indicated that preparation time is substantial for effective engagement in the GSP process. The interviews were used to assess the amount of time spent on CBGSA activities and this was valued at the opportunity cost of board member's time.

Board meetings are held approximately monthly and typically last 2 – 3 hours per meeting. Board packets can cover several hundred pages, covering a range of technical and policy topics. Interviewees estimated spending an average of 2 – 4 hours reviewing and preparing for each board meeting, plus an additional 4 – 8 hours per week engaging in technical work to stay engaged in the process. The five CBWD board members additionally participate in the CBWD monthly board meetings. Total estimated effort is around 40 hours per month for CBGSA board members, and around 48 hours per month if a member is on both the CBGSA and CBWD boards. The total for all board members is approximately 480 hours devoted to GSP development and implementation every month. In addition, stakeholders indicated that other professional staff typically assist in monitoring the GSP development process, spending an average of 4-8 hours per week on assistance. Assuming one additional employee per board member, this is an additional 24 hours of staff time each month.

Most board members are owner-operators, officials, or other senior professionals. The opportunity cost of board member time was set equal to the average wage rate reported in Bureau of Labor Statistics Occupational Employment Statistics for executives,[17] which is $94.35. At a total of 480 hours per month, the annual opportunity cost of all board members' time is approximately $540,000. Staff time is valued at a management occupation[18] rate of $50.62 in current dollars. At a total of 24 hours per month, the annual opportunity cost of support time for board members is approximately $15,000. The total opportunity cost of board and professional support time is around $555,000 per year. This expense is treated as a true opportunity cost to the board members' businesses and therefore as a reduction in business proprietor income.

Table 5.1 summarizes the current fees and costs indirectly related to GSP development and implementation. The total cost of the GSP administrative items included in this study is estimated at $3.2 million per year. These costs do not include additional consultant time

[17] May 2019 Metropolitan Wage Estimated, OES Survey. Santa Maria-Santa Barbara Area. Classification #11-1011. 2019 annual wages were adjusted to 2020 dollars using the 1.2% annual inflation rate in 2020.
[18] May 2019 Metropolitan Wage Estimated, OES Survey. Santa Maria-Santa Barbara Area. Classification #11-1021. 2019 annual wages were adjusted to 2020 dollars using the 1.2% annual inflation rate in 2020.

(included in the CBWD and CBGSA fees) or the opportunity cost of other staff and stakeholder time.

Table 5.1 GSP Implementation and Administration Cost Summary

Item	Fee/Cost ($/unit)	Units	Total Units	Total Cost ($M)
CBGSA	$44.00	AF	47,000	$2.068
CBWD	$16.13	Irrigated AC	31,600	$0.509
CBWD	$0.45	Non-irrigated AC	44,300	$0.019
Management Opportunity Cost	$94.35	Hours	5,760	$0.54
Support Opportunity Cost	$50.62	Hours	288	$0.014
Total				**$3.155**

These costs are imposed on different businesses. Per acre and per acre-foot assessments are charged to the landowner (or irrigator) and are a reduction in proprietor income to those landowners. These assessments can be capitalized into lower CBGSA land values. The opportunity cost of board and technical support time is a loss in proprietor income for those businesses. The total cost is $3.155 million per year. To growers, this cost is effectively a reduction in proprietor income because there are no (or very limited) ways for growers to pass this on to buyers of their product. A portion of this program cost ($2.6 million) supports local GSA activities within the basin, which would provide a positive offsetting economic effect.

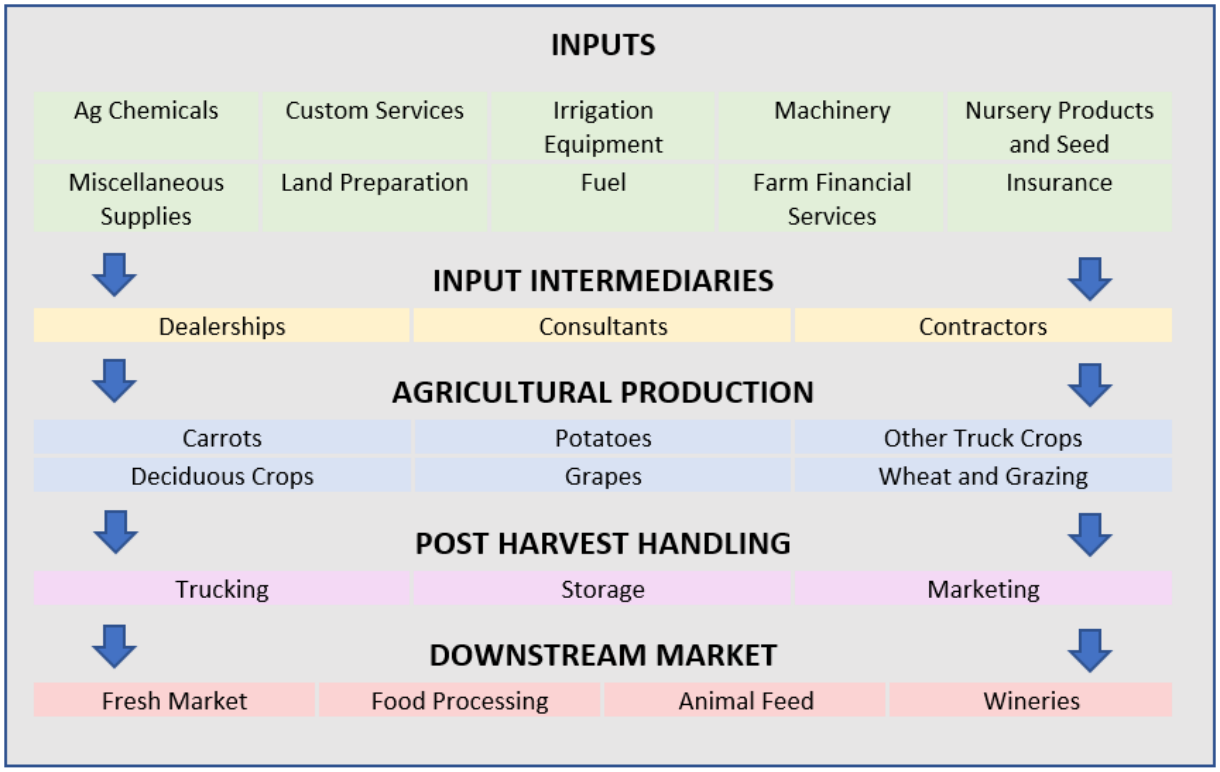
5.2 Multiplier Effects

Changes in economic activity in water-dependent industries in the Cuyama Basin have ripple effects in the basin and the regional economy. For example, idling farmland means that fewer inputs are purchased, less equipment is used, and fewer workers are employed to prep, plant, irrigate, and manage fields. In turn, workers and employees of these related businesses have lower wages and invest less in their businesses. Purchases of other goods and services, such as entertainment and groceries, also fall. Reduced crop production also affects related activities such as produce packing and processing. Land values would eventually adjust to the reduced economic activity, resulting in a drop in local tax revenue, which may indirectly affect other government services. This web of economic activity is related to changes in the primary industry (in this case, Cuyama Basin farming). These effects are referred to as secondary, multiplier, or indirect and induced economic changes.

Figure 5.1 illustrates the conceptual economic linkages of the primary Cuyama Basin industry (agricultural production) with upstream and downstream industries. The direct impacts the GSP are to farming operations in the Cuyama Basin, which are the primary water users in the basin (shown as “agricultural production” in the figure). Growers purchase inputs from suppliers, farm labor contractors, and other intermediary businesses. Post-harvest includes processing, transportation, and distribution industries. The downstream retail market includes consumers in

fresh, food processing, and various feed and specialty markets. A change in one industry affects all others. This study quantifies these economic impacts.

Figure 5.1 Water-Dependent Cuyama Basin Industries Flow Chart



Farming in the Cuyama Basin is characterized by high-value specialty crops, many of which are organically grown, produced for a wide range of domestic and export markets. The basin includes vertically integrated carrot farming operations, organic specialty apple farms, new vineyards, and a mix of other row crops, grains, and hays. These crops and the associated economic activity are summarized as follows:

Carrots, Potatoes, and Other Vegetables. Carrots make up the bulk of acreage and revenue in the basin. They are typically rotated with other vegetable crops. Overall, these three crops account for roughly 80 percent of agricultural revenues generated in the basin and 60 percent of the acreage. This includes organic carrots produced on USDA certified organic ground in the basin.

Carrots are planted between December and March and harvested from May to July. Typically, they are rotated with either potatoes or onions. In the third year the land sits idle. During idle periods the land may or may not have a cover crop on it. Cuyama Basin vegetables are produced by vertically integrated farms headquartered outside the basin, but within the four-county area. These firms perform most production activities internally, meaning their input purchases are mostly raw materials, machinery, and contracted labor.

Most input purchases are from businesses in Kern County. Most labor crews are hired through FLCs from the four-county area. Crews would typically be hired for planting, irrigation, cultivation, and harvest. Company employees manage machine operation, machinery repair, farm management, and financial services. The employees who provide support for things like machinery repair and financial services mostly live in the Bakersfield area, while the employees that handle land preparation, custom services, and farm management reside in the basin.

After harvest, vegetables are hauled by trucking companies based in Kern County to processing facilities in the Bakersfield area. Vegetables farmed in the Cuyama Basin are processed and shipped to international and domestic buyers (both food service and fresh market).

Deciduous Crops. The deciduous crop category is comprised of roughly 720 acres of Pistachios, 520 acres of Olives, and 280 acres of Apples. These crops make up roughly 6 percent of the basin's production value and 7 percent of irrigated acreage.

Organic pistachios in the basin are grown by a local company. Pistachios require pruning during the winter and hand weeding in late spring, which makes up the majority of their labor demand. After harvest, the pistachios are packed and processed within the basin.

Organic olives are also grown in the basin. Primary labor demand is for pruning in the springtime, hand weeding during the summer, and thinning in springtime after bloom. Olives are processed in the basin and sold as olive oil.

Organic apples are produced for the fresh market. Some apples go directly to market post-harvest, while others go to cold storage facilities near Bakersfield.

Grapes. The Cuyama Basin has roughly 2,000 acres of wine grapes. There is one nursery and two wine grape producers.

Chemicals and machinery are purchased from dealers in Santa Maria and Paso Robles. The operations are large enough to perform most cultivation tasks internally and partially rely on consultants and contractors for things like pest control and irrigation system maintenance.

Grape production is supported by different local trucking companies, and postharvest storage and marketing is handled internally. Management and machine operations are handled by full time employees. Contract labor demand is highest in the winter for pruning crews, with relatively smaller demand in summer for thinning and in fall for harvest.

Some of the grapes produced are used and sold at wineries within the basin, but a significant share goes to other Santa Barbara County wineries. Only a small amount leaves the four-county area, as the grapes retain a much higher value by staying within the Santa Barbara growing region.

Wheat/Grains. A mixture of feed crops is grown in the basin, with the primary market for these crops being the local dairy farm. Feed inputs are for a specialty cheese company located in Santa Barbara County.

6. Economic Impact analysis

Economic impacts are defined as direct, indirect, and induced changes. The components are defined as follows.

- **Direct.** The economic effects of changes in direct sales activity by an individual agricultural sector. For example, the farm-gate revenues from crop production.
- **Indirect.** The economic effects of changes in intermediate input purchases by the sector. For example, irrigation supply purchases for crop production.
- **Induced.** The economic effects of changes in spending by employees in all industries affected by the direct and indirect changes. For example, farm workers purchase housing and food in the four-county region.

Economic impacts in this study include direct changes and other measures of economic activity. This study includes three key measures:

- **Output value**. The gross sales value of an industry. In crop production, for example, this measure is equal to the price of the crop multiplied by the total production.
- **Value added**. The net contribution of an industry to the region's economy. It is equivalent to the commonly cited national measure of economic activity known as Gross Domestic Product (or GDP).
- **Employment**: The number of full-time equivalent jobs in a sector.

The following sections summarize economic impacts. First, direct economic impacts are reviewed and revised. Next, secondary economic impacts are presented. This includes a treatment of local land value and property tax impacts.

6.1 Direct Economic Impacts

The direct economic impacts of the GSP were analyzed in the 2019 direct economic impact analysis commissioned by the CBGSA. That study found that the agricultural industry in the basin would contract by nearly two-thirds under full GSP implementation. The average annual gross revenue losses would be $30 million. When the demand management program is fully implemented in 2040, irrigated acres would have fallen 62 percent, annual gross revenue would have fallen 63 percent, and annual water use would have fallen 67 percent. Land idling as a result of the demand management program (not including any rotational fallowing) equals approximately 12,300 acres per year by 2040.

Table 6.1 summarizes the direct economic impact results from the 2019 study in terms of gross revenue by crop type. Impacts are greatest for carrots at $55 million. Impacts to grape producers

are more modest at $13 thousand because the demand management program does not apply in some grape growing areas. The total loss at full GSP implementation is $77 million per year.

Table 6.1 Change in Gross Revenue by Crop Group, 2020-2040 (2018$)

	Carrot	Grape	Onion	Pistachio	Potato	Wheat
Revenue (millions)						
2020	$68.80	$12.54	$16.95	$7.22	$11.32	$4.49
2040	$14.02	$12.52	$9.12	$7.19	$1.04	$1.08
Change	**($54.78)**	**($0.01)**	**($7.83)**	**($0.03)**	**($10.29)**	**($3.42)**

This change represents a reduction in gross crop value. In addition to a reduction in the irrigated footprint, farming costs on remaining acres would increase due to land assessments and pumping fees to cover GSA operating costs (see Section 5.1, above) and the opportunity cost of board members' time. In summary, the total direct economic impact is $3.155 million in proprietor income loss (with a $2.639 million offset in GSA expenditures), and $77 million (indexed to $78.4 million in 2020 dollars) in reduced gross crop revenue. Proprietor income losses are evaluated as induced effects; therefore the net direct effect is $75.8 million.

6.2 Total Economic Impact

A custom IMPLAN model of the Cuyama Basin and four-county region was developed and applied to quantify secondary economic impacts. The default IMPLAN data includes coarse agricultural production sectors. All Cuyama Basin production would fall under: vegetable and melon farming, fruit farming, or tree nut farming. The coarse grouping of production sectors in the default IMPLAN data means that important differences in regional economic activity between crops cannot be accurately represented. The economic activity and expenditure patterns in the IMPLAN data are derived from national benchmark data provided by the Bureau of Economic Analysis (BEA). National averages are typically not representative of specialty crop farming in California, which has unique farming costs and markets relative to other states. Additional data was gathered using stakeholder interviews and merged to develop custom IMPLAN model sectors for Cuyama Basin farming.

Cuyama Basin stakeholder surveys elicited information on expenditures, use of inputs, employees, and sales. These data were compiled, combined with supplemental information, and aggregated so that no one farming entity can be identified. The information was then used to develop a customized version of the IMPLAN model. Appendix A provides technical details for the development of the custom model.

Direct economic impacts of SGMA implementation total $75.8 million in 2040. This is a result of reduced farming. A reduction in crop production would have impacts on downstream processing including: dairy, fresh vegetable processing, and manufactured vegetable products. The impact depends on the ability to shift production to other regions. Stakeholders were

interviewed to determine the ability to shift production to other areas for each industry. It is possible to shift production but that would increase costs. For example, hauling fresh produce greater distances and finding certified organic ground in other areas may be possible but prohibitively expensive. This analysis assumes that two-thirds of the production that would have come from Cuyama Basin shifts to other areas.

Processing markups were applied to the production value losses for vegetables and feed (dairy inputs) production shown in Table 6.1 to estimate the change in output value in downstream processing industries. Dairy industry impacts equal $7.4 million, fresh vegetable processing impacts equal $45.3 million, and manufactured vegetable products impacts equal $11.2 million. The total impact to these downstream industries equals $63.9 million per year. However, this includes input purchases from crop production and is therefore double counting some of these impacts (see technical appendix A). Netting out this double-counting, the impact to downstream dairy and vegetable processing industries is $37.4 million per year.

In summary, the custom IMPLAN model is applied to evaluate the following impacts:

- $78.4 million in crop revenue losses
- $37.4 million in downstream industry revenue losses
- $3.16 million in proprietor income loss
- $2.4 million in additional GSA expenditures in the basin

Table 6.2 summarizes the results of the impact analysis and a breakdown by primary affected industries by North American Industry Classification System (NAICS) code. The total impact equals $207.7 million. This includes direct losses of $75.8 million, indirect losses of $80.4 million, and induced losses of $51.5 million. Total FTE job losses equal 1,337. These impacts would occur within the four-county regional economy. Changes in output value and jobs by industry segment are summarized in this section. Section 6.3 summarizes the estimated impacts that would occur directly in the Cuyama Basin.

Table 6.2 Impact of Cuyama Basin GSP Implementation Summary

Annual Impact	Direct	Indirect	Induced	Total
Output ($M)	($75.8)	($80.4)	($51.5)	($207.7)
Employment (FTE)	(560)	(437)	(340)	(1,337)

Table 6.3 provides a breakdown of the direct, indirect, and induced effects by industry segment. Most direct impacts fall on farming since this industry would contract under GSP implementation. Indirect impacts include losses to downstream industries as well as losses in businesses that depend on Cuyama Basin farming activity. This includes transportation, warehousing, storage, and similar industries. Induced effects include losses due to changes in employee expenditures on things like housing and related living expenses.

Table 6.3 Impact of Cuyama Basin GSP Implementation Output Value Summary (2020$ in Millions)

NAICS Category	Description	Direct	Indirect	Induced	Total
11	Agriculture and Forestry	($78.44)	($7.09)	($0.10)	($85.64)
31-33	Manufacturing	$0.00	($36.57)	($1.03)	($37.60)
92	Public Administration	$2.60	($0.42)	($1.02)	$1.16
42	Wholesale Trade	$0.00	($12.93)	($2.26)	($15.19)
48-49	Transportation and Warehousing	$0.00	($3.84)	($1.28)	($5.12)
53	Real Estate and Rental and Leasing	$0.00	($3.12)	($11.85)	($14.97)
23	Construction	$0.00	($2.59)	($0.83)	($3.42)
56	Waste Management and Remediation	$0.00	($2.61)	($1.50)	($4.10)
54	Prof., Scientific, and Technical Services	$0.00	($2.16)	($1.91)	($4.07)
52	Finance and Insurance	$0.00	($2.16)	($5.37)	($7.52)
44-45	Retail Trade	$0.00	($1.70)	($5.14)	($6.84)
81	Other Services (except Public Admin)	$0.00	($1.71)	($2.64)	($4.35)
55	Management of Companies	$0.00	($1.45)	($0.36)	($1.81)
51	Information	$0.00	($1.04)	($2.30)	($3.34)
22	Utilities	$0.00	($0.49)	($0.38)	($0.86)
72	Accommodation and Food Services	$0.00	($0.25)	($3.38)	($3.63)
21	Mining, Quarrying, and Oil Extraction	$0.00	($0.21)	($0.32)	($0.53)
71	Arts, Entertainment, and Recreation	$0.00	($0.09)	($0.86)	($0.94)
61	Educational Services	$0.00	($0.01)	($0.69)	($0.69)
62	Health Care and Social Assistance	$0.00	($0.00)	($8.31)	($8.31)
0	**Total**	($75.84)	($80.41)	($51.52)	($207.78)

Table 6.4 summarizes indirect impacts in the top 10 affected industries. These include dairy and vegetable processing (immediate downstream sectors) as well as support activities for agriculture, transportation, and other farm inputs. Other affected industries include wholesale trade (a large sector of input suppliers), warehousing, and storage.

Table 6.4 Top 10 Industries Affected, Output Value Indirect Impacts (2020$ in Millions)

Sector	Direct	Indirect	Induced	Total
Fresh Processed Vegetables	$0.00	($24.11)	($0.00)	($24.11)
Wholesale trade	$0.00	($12.93)	($2.26)	($15.19)
Manufactured Vegetables	$0.00	($7.45)	($0.00)	($7.45)
Real estate	$0.00	($2.75)	($3.67)	($6.42)
Dairy	$0.00	($4.30)	($0.00)	($4.30)
Support activities for agriculture and forestry	$0.00	($3.90)	($0.01)	($3.91)
Vegetable and melon farming	$0.00	($2.84)	($0.03)	($2.86)
Truck transportation	$0.00	($1.50)	($0.48)	($1.99)
Construction of new commercial structures, including farm structures	$0.00	($1.95)	($0.00)	($1.95)
Warehousing and storage	$0.00	($1.46)	($0.13)	($1.59)

Table 6.5 summarizes induced effects by industry sector. Cuyama Basin agriculture is labor-intensive and this is reflected in the induced effects that show how changes in employee expenditures would affect businesses in the regional economy. The greatest impacts are in the real estate, finance and insurance, and healthcare industries. This reflects typical household expenditures on housing and living expenses.

Table 6.5 Top 10 Industries Affected, Output Value Induced Impacts (2020$ in Millions)

Sector	Direct	Indirect	Induced	Total
Owner-occupied dwellings	$0.00	$0.00	($7.88)	($7.88)
Real estate	$0.00	($2.75)	($3.67)	($6.42)
Hospitals	$0.00	$0.00	($2.64)	($2.64)
Wholesale trade	$0.00	($12.93)	($2.26)	($15.19)
Offices of physicians	$0.00	$0.00	($1.94)	($1.94)
Limited-service restaurants	$0.00	($0.13)	($1.92)	($2.05)
Monetary authorities and depository credit intermediation	$0.00	($1.13)	($1.37)	($2.50)
Insurance carriers	$0.00	($0.24)	($1.22)	($1.46)
Full-service restaurants	$0.00	($0.08)	($1.01)	($1.09)
Retail - Food and beverage stores	$0.00	($0.01)	($0.91)	($0.92)

Table 6.6 summarizes the impact on jobs in the regional economy. Values are reported in FTE and consequently show fractions of a job, corresponding to a reduction in average hours worked per year. It is important that FTE are typically less than actual number of individuals employed in agricultural industries. Considering seasonal labor patterns, one FTE can represent as many as 3 seasonal jobs.

Table 6.6 Impact of GSP Implementation, Jobs Impact Summary (Jobs in FTE)

NAICS Category	Description	Direct	Indirect	Induced	Total
11	Agriculture and Forestry	(560)	(87)	(1)	(647)
31-33	Manufacturing	0	(148)	(1)	(148)
42	Wholesale Trade	0	(48)	(8)	(56)
56	Waste Management and Remediation	0	(33)	(20)	(53)
48-49	Transportation and Warehousing	0	(26)	(9)	(35)
54	Prof., Scientific, and Technical Services	0	(18)	(15)	(33)
23	Construction	0	(15)	(4)	(20)
53	Real Estate and Rental and Leasing	0	(15)	(19)	(34)
44-45	Retail Trade	0	(14)	(55)	(69)
52	Finance and Insurance	0	(9)	(23)	(33)
0	Total (All Industries)	(560)	(437)	(340)	(1,337)

Table 6.7 summarizes the direct employment impacts by industry. The total direct FTE job loss is equal to 559.7. These losses are a result of decreased farming in the Cuyama Basin. Indirect and induced effects are also shown in the direct effects table.

Table 6.7 Direct Employment Effects

Sector	Direct	Indirect	Induced	Total
Carrot Farming	(475)	(1)	0	(476)
Potato Farming	(44)	(0)	0	(44)
Onion Farming	(37)	(0)	0	(37)
Wheat Farming	(4)	0	0	(4)

Table 6.8 summarizes the indirect job impacts by top 10 affected industry segments. This includes losses in FLC (included under support activities for agriculture) as well as job losses in related industries. Direct and induced effects are also shown in the indirect effects table.

Table 6.8 Top 10 Industries Affected, Indirect Employment

Sector	Direct	Indirect	Induced	Total
Fresh Processed Vegetables	0	(128)	0	(128)
Support activities for agriculture	0	(64)	(0)	(64)
Wholesale trade	0	(48)	(8)	(56)
Manufactured Vegetables	0	(19)	0	(19)
Real estate	0	(13)	(18)	(31)
Warehousing and storage	0	(12)	(1)	(13)
Construction of new commercial structures, including farm structures	0	(12)	0	(12)
Vegetable and melon farming	0	(12)	(0)	(12)
Retail - Gasoline stores	0	(10)	(2)	(12)
Office administrative services	0	(10)	(1)	(11)

Table 6.9 summarizes induced job impacts by top 10 affected industry sectors. Induced labor impacts are greatest in service and retail industries, reflecting in moderate job impacts from a decrease in expenditures by employees in agriculture and related industries. These impacts would likely be felt hardest in the areas where affected employees live. Additional losses in wholesale trade would occur because of reduced economic activity in other sectors. Indirect and direct effects are also shown in the induced effects table.

Table 6.9 Top 10 Industries Affected, Induced Employment

Sector	Direct	Indirect	Induced	Total
Limited-service restaurants	0	(1)	(20)	(21)
Full-service restaurants	0	(2)	(19)	(21)
Real estate	0	(13)	(18)	(31)
Hospitals	0	0	(13)	(13)
Offices of physicians	0	0	(13)	(13)
Individual and family services	0	0	(12)	(12)
Retail - Food and beverage stores	0	(0)	(11)	(11)
Retail - General merchandise stores	0	(0)	(10)	(10)
All other food and drinking places	0	(0)	(10)	(10)
Wholesale trade	0	(48)	(8)	(56)

6.3 Economic Impacts in the Cuyama Basin

The Cuyama Basin is a small portion of the four-county economy. Some of the total economic impact of the GSP will fall on communities out of the basin. This section summarizes an analysis developed to evaluate the impact of the GSP proportionally occurring within the Cuyama Basin.

. The main driver for the direct economic impacts analysis within the Cuyama Basin is GSP implementation limits placed on the water supply available for farming, resulting in idle cropland in the basin. This would also cause changes in cropland values with corresponding tax impacts. Indirect impacts depend on where agricultural inputs are purchased. Based on stakeholder surveys, input purchases are primarily from businesses located outside of the basin (e.g., wholesale traders and support industries in Santa Maria and Bakersfield areas). Similarly, most induced effects occur from reduced employee expenditures outside of the basin. However, the basin does include local hardware store, convenience stores, and food service/hospitality that would be affected by GSP implementation.

Estimation of the regional incidence of indirect effects is based on the share of inputs supplied from businesses within the basis and the demand within the basin for agricultural products. The share of indirect effects within the basin related to input purchases is small, roughly 2% of the $4.45 million estimate. Most indirect effects expected to occur in the basin are related to changes in local dairy output.

Estimation of induced effects within the basin are based on IMPLAN's estimates of employment changes and the prevalence of those jobs in the basin. For example, IMPLAN estimates employment reductions in hospitals and clinics. With no hospitals in the basin the effects would be zero, however with one clinic in the basin we are able to make reasonable calculations of employment changes in this sector based on the total employment change estimated by IMPLAN, the total employment in the basin, and the proportion of job loss related to direct

effects within the basin. Estimates of employment changes in each industry sector are then used to estimate a relative in-basin induced output change, based on the share of total induced employment change occurring within the basin.

Table 6.10 summarizes the economic impacts occurring within the Cuyama Basin. Of the total impact of $207.7 million, around $75.3 million occurs directly within the basin. Similarly, out of the 1,337 FTE jobs lost, approximately 191 are estimated to occur within the basin. This represents approximately one-third of the current workforce in the basin.

Table 6.10 Summary of Economic Effects Within the Cuyama Basin

	Direct	Indirect	Induced	Total
Output ($M)	($62.0)	($4.5)	($8.8)	($75.3)
Jobs (FTE)	(96)	(37)	(58)	(191)

6.3.1 Land Value and Tax Impacts in the Cuyama Basin

The value of agricultural land in the Cuyama Basin is tied to the economic output and net revenue of crops grown on that land. As the productive capacity of the basin falls due to water supply constraints, so would the value of land. To quantify this cost, the expected future crop net revenue loss is capitalized into a reduced value of basin agricultural land.

Table 6.11 summarizes the results of an example analysis to illustrate the impact on land values in the basin. The 2019 direct economic impact analysis estimates annual loss in crop net revenue at $19 million at full implementation. This value is divided across irrigable land in the basin to get a cost of $1,040 per acre. Finally, this annual cost is used to generate a capitalized cost per irrigated acre. In addition to the net revenue loss from demand management, landowners also pay an annual assessment fee that affects land value. The same estimation approach is used to estimate a capitalized cost per irrigated acre in Table 6.11.

Table 6.11 GSP Implementation Capitalized Cost

	Annual Cost	Annual cost per irrigated acre	Capitalized cost per irrigated acre
GSP Demand Management Program	$19 M	$1,040	$8,000 - $11,000
GSP Assessments	$2.6 M	$140	$1,200 - $1,600

A decrease in agricultural land value would reduce local property taxes and put pressure on local community services. Assessor's data were used to estimate current tax revenue and how those revenues would change under GSP implementation. This analysis does not take into account that the market value is typically less than the assessed value due to Proposition 13 limits and/or Williamson Act enrollment. As such, a range of impacts are presented so the reader has a sense for the potential magnitude of changes.

The tax base for the Cuyama Basin is defined here as the area that pays the 2016 Joint Cuyama School District Bond. Property in Kern County is excluded from the analysis because no ag land would be idled in the Kern portion of the basin. Table 6.12 summarizes property tax rates by county. Tax Rate Areas for each county are as follows: Santa Barbara 063001 to 063011, San Luis Obispo 070-000 to 070-002, and Ventura 51001 to 51007.

Table 6.12 Property Tax Rate Summary

	Santa Barbara	San Luis Obispo	Ventura
Prop 13	1%	1%	1%
Cuyama Unified Bond	0.03591%	0.03591%	0.03591%
Community Colleges	0.02188%	0.02188%	0.02188%
State Water Project		0.004%	
Total	**1.05779%**	**1.06179%**	**1.05779%**

County Assessor data were compiled from county websites[19], and cross-referenced with a GIS overlay of APNs in the basin to establish estimated property tax revenues. Table 6.13 summarizes estimated tax revenue by county. These are approximate values based on the reported land values in the county data and do not adjust for enrollment in Williamson Act or other tax adjustments, which would negate some of the property tax loss in this analysis. The analysis is developed for illustrative purposes.

Table 6.13 Property Tax Summary, Basin Wide

	Parcels	Estimated Property Tax Revenue ($ millions)	Estimated Taxable Value ($ million)	Total Acres
San Luis Obispo	243	0.59	55.80	71,000
Santa Barbara	1,316	2.10	102.61	212,000
Ventura	612	0.31	31.70	218,000
Total	**2,171**	**3.01**	**190.11**	**501,000**

The value of irrigated agricultural land changes in response to GSP implementation. The value of agricultural land without access to irrigation water depends on potential alternative uses for that land. A method was developed to evaluate a range of potential impacts. First, all APN units are filtered to include only parcels actively producing crops that would be idled, using a GIS overlay of crops. The value of agricultural land is then reduced in proportion to the reduction in available water supply. The value of unirrigated land was evaluated under several alternatives. The 2020

[19] https://opendata.slocounty.ca.gov/datasets/planning-land-use-by-parcel
https://www.countyofsb.org/pwd/appdisclaimer.sbc
https://maps.ventura.org/countyview/

Trends publication by the American Society of Farm Managers and Rural Appraisers (ASFMRA) reports land values for central coast inland rangeland between $300 and $7,000. Higher value rangeland is typically driven by smaller parcels with residential or recreational uses mixed in. A more accurate range for strictly agricultural inland rangeland would be between $300 and $1,500. These values are used to develop a ranging analysis.

A simulation with different land value changes was developed. In each iteration, the order of land to be idled gets shuffled, then parcels are idled until enough land comes out of production. Property tax outcomes are recorded for each iteration, and the mean property tax impact is what get used to represent the property tax impact. Results are listed below in table 6.14 for a range of potential idle land values. Current property tax values for this subset of APNs equals $1,114,000.

Table 6.14 Property Tax Impact Ranging Analysis Summary

		Value of Idle Land				
	Current	**$300**	**$600**	**$900**	**$1,200**	**$1,500**
Santa Barbara	$564,500	$167,500	$220,500	$259,500	$290,000	$324,000
San Luis Obispo	$489,000	$126,500	$160,000	$194,000	$224,500	$255,500
Ventura	$86,500	$73,000	$86,000	$86,500	$86,500	$86,500
Total Tax Revenue	**$1,114,000**	**$367,000**	**$466,000**	**$540,000**	**$600,500**	**$666,500**

Implementation of the GSP would create a property tax decrease ranging from $750,000 to $450,000 depending on the productivity and alternate uses of idled land.

7. Summary

The analysis quantified the total economic impact of the GSP on the Cuyama Basin economy. A custom IMPLAN model was developed and used to simulate impacts, using inputs from the 2019 direct impact analysis. A series of supplemental analyses were developed to quantify changes in property tax and other indirect expenditures related to the GSP.

In summary, the direct impact of $75.8 million at the primary production level has secondary effects that total $207.7 million. This implies that primary production has a multiplier effect of 2.74 in the region. Primary production makes up 36 percent of the total impact with direct downstream effects contributing 17 percent, indirect effects contributing 22 percent, and induced effects contributing 25 percent.

The results show that the GSP would cause significant economic damage in the area. The basin is heavily dependent on irrigated agriculture for local economic activity.

Alternative land uses were suggested in several stakeholder interviews. This would include new development efforts to bring new industries into the basin. At this time, any investment by new industries is speculative. And any new industries would also require water and would be affected by GSP implementation.

Two of these potential alternatives include expansion of cannabis production in the basin and a shift towards a more local food system. Each of these ideas are agricultural activities and fall within the framework of this analysis. An analysis of these industries would need to assess these activities with the constraints specific to the basin in mind. Two major constraints include offsetting water use and labor supply. As stated previously, farming related activities will increase demand for water which would compete against existing crops for the limited groundwater supply. While allocations are not yet defined, it may be difficult to find a parcel of land with the appropriate amount of water or a seller within the basin. Outreach identified labor supply and labor cost as a major concern in addition to water availability.

This analysis can be used it to support decisions on GSP development and planning. The economic impacts show the cost of demand management and can be compared to the costs of potential projects to evaluate those potential investments. It is clear from this analysis that changes in irrigated agriculture have important multiplier effects in the regional economy. The regional economy is also affected by groundwater management in other basins of the region. For example, groundwater basins in Kern County are also implementing demand reduction measures in their GSPs, which would add to the economic impacts of the region.

8. Appendix A: Data and IMPLAN Model Calibration

This appendix provides a technical overview of the data and methods applied to develop a custom, calibrated IMPLAN input-output model representing Cuyama Basin water-dependent industries (primarily, agriculture). The default industry data was modified based on interviews conducted with landowners, growers, residents, and businesses owners in the Cuyama Valley area. This primary data is supplemented with secondary data collected from a variety of sources. The methods and data are documented in this technical appendix.

This study utilizes the IMPLAN Version 3.1 software package, in conjunction with the 2014 IMPLAN economic data file for Santa Barbara, San Luis Obispo, Kern, and Ventura Counties in California. The IMPLAN (Impacts for Planning and Analysis) model is developed by MIG, Inc.

IMPLAN is an input-output economic model. It estimates the effects of exogenously estimated changes in final demand within a defined geographic region. The model leverages a database of national and regional economic accounts that summarize purchasing relationships between industries. The IMPLAN model calibrates to this data, allowing for the evaluation of changes in purchasing relationships through multiple iterations, or rounds of spending. The model also incorporates data used to estimate institutional demand and inter-institutional transfers, which reflect purchases made by households and government agencies.

The model requires as input an exogenous change in final demand (or other measures of economic impact). This is commonly referred to as a direct economic impact, meaning that a direct economic impact analysis is necessary to establish the inputs to the IMPLAN model. The 2019 direct economic impact analysis study commissioned by the CBGSA was used to develop this required input data.

IMPLAN output values include the direct, indirect, and induced economic impacts. These can be expressed in terms of output, employment, labor income, or one of the four components of value added (employee compensation, proprietor income, other property type income, or tax on production and imports). Direct impacts are associated with the initial dollars spent within the study area. Amounts paid to entities located outside of the study area are excluded from the analysis because these dollars do not circulate within the local economy. The indirect impacts are estimated as industries that were the recipients of direct purchasing of the materials and services necessary for production. Induced impacts result from household consumption made possible by wages paid to workers and income generated to proprietors and institutions. The total economic impact includes all of these related rounds of expenditures in the local economy.

For the purposes of this analysis, the exogenous change in final demand includes land fallowing and GSP costs (i.e., fees and assessments) paid by agricultural producers in the basin. This was estimated in the 2019 economic impact analysis commissioned by the CBGSA. A custom IMPLAN model was developed to evaluate impacts in this analysis.

The default IMPLAN model includes four (4) primary specialty crop sectors. These coarse sectors are not sufficiently representative of specialty crop agriculture in the Cuyama Basin. This is because default IMPLAN data is based on national benchmark data provided by the Bureau of Economic Analysis (BEA). The breakdown of value-added components is similarly derived. Proprietor income is reported only at the farm level, with no detail provided that would help to distinguish between commodities. Other model parameters are similarly derived from national average data. While the model reflects the best information that is available on a national basis, it is possible to leverage local data to improve the accuracy of the resulting multipliers. This involves developing custom industry data and modifying the IMPLAN model to better reflect the characteristics of Cuyama Basin area producers and related industries.

8.1 IMPLAN Model Calibration Overview

An IMPLAN model with custom industry profiles representative of Cuyama Basin agriculture was developed. Technical work included defining output, value-added, intermediate expenditures, and industry production coefficients for twelve (12) newly defined agricultural producer, processor, and government industry sectors.

8.1.1 The Structure of the IMPLAN Model

The default IMPLAN model contains industry account data for 536 aggregate industries, as well as households and assorted institutions. Data for each industry are grouped into three main categories that were customized for this analysis. These include:

- **Study Area Data:** Data for each industry include total industry output, total employment and the ratio of output per employee, and value added, which includes employee compensation, proprietor income, other property type income, and taxes on production and imports.
- **Industry Production:** The production function for each industry identifies the list of commodities that are purchased as intermediate inputs. The coefficients represent the proportion of total output that gets allocated to purchases of each commodity and were tailored to purchases in the Cuyama Basin.
- **Commodity Production:** The commodity production function identifies the commodities produced by each industry, including the primary product and any associated byproducts.
    - **Trade Flows:** The trade flow data are broken down into two interrelated components. The local use ratio defines the proportion of local production of a given commodity that is utilized by other domestic industries. The remainder is assumed to be leakage resulting from foreign and domestic commodity exports. Second, the regional purchase coefficient defines the proportion of gross demand for a given commodity that is supplied from local sources, with the remainder being imported from outside the analysis region.

These technical coefficients were estimated based on a combination of local data, stakeholder interviews, aggregate (e.g., census) data, and crop production budgets. A series of custom sectors were developed for the model.

8.1.2 Creating a Custom Industry Profile

Custom industry profiles for specialty crop agriculture in the four-county region were developed using the following approach. The aggregated model combined the profiles using a weighted average method to ensure consistency with the default IMPLAN sectoring scheme and the National Trade Flows Model in IMPLAN.

The first step identifies each IMPLAN sector that corresponds to the Cuyama Basin industry. For farming sectors this is straightforward. Other sectors are cross-referenced to the appropriate IMPLAN sector using Cuyama Basin business NAICS codes.

The default industry balance sheet for each industry was exported. This was aggregated into a database with all default industry parameters, including output, employment, value-added, regional purchase coefficients, and production coefficients. IMPLAN industry accounts were modified using two approaches. For existing accounts, such as wholesale trade (which includes a mix of agricultural industries), the default industry data was modified to reflect local Cuyama Basin conditions. Second, a series of new industry accounts were created for custom farming sectors in the model for local Cuyama Basin crops. New sectors were developed by using a sector that is not populated in the default data (e.g., tobacco farming), importing the default commodity production profile for the original sector, and then recalibrating it to the local Cuyama Basin data for the new sector.

Trade flow components of RSC and RPC were also modified to reflect local purchases. These coefficients define leakage parameters – how much of a commodity is produced/sold out of the region. This is an important parameter for estimating total economic impacts. Extensive stakeholder outreach and data gathering were conducted to determine the location of primary input businesses (e.g., location of FLC and employees) in and out of the basin.

8.1.3 Downstream Effects

When calculating the indirect effects of an output change, IMPLAN does not estimate the effects of reduced supply of given commodities - for example, the effect of reduced carrot production on carrot processing and shipping. Instead, IMPLAN assumes that these inputs can be imported from elsewhere at an equal cost. Based on stakeholder feedback, this may be possible for some commodities, but the extent of substitution is limited, and production costs would increase. The IMPLAN accounts for downstream industries were modified to accurately reflect these changes.

The analysis allows the downstream firm to substitute purchases (e.g., grow more vegetables in a different location), but incur a higher cost to source the commodity that is no longer being produced and pass this cost along to the consumer. The other option for the downstream firm is

to reduce output because it is unable to operate at this higher cost, or not enough of the commodity is available. This analysis allows a portion of production (two-thirds) to shift to other areas with no effect on downstream industries.

8.1.4 Custom Industry Profiles

The following custom industry sectors were created:

- Carrots
- Onions
- Potatoes
- Pistachios
- Grapes
- Wheat
- Cuyama Dairy
- Cuyama Manufactured Vegetables
- Cuyama Fresh Processed Vegetables
- Cuyama Wineries
- Cuyama Nuts
- GSA Board

The following industry sectors were modified:

- Grains
- Vegetable and melon farming
- Fruit farming
- Tree nut farming
- Dairy Cattle and Milk Production
- Frozen fruits, juices and vegetables manufacturing
- Roasted nuts and peanut butter manufacturing
- All other food manufacturing
- Wineries

The following sections summarize the data and modifications.

8.2 Economic Data Sources

This study leverages multiple secondary data sources. This section references the data sources.

8.2.1 Stakeholder Outreach Interviews

A series of stakeholder meetings were conducted over virtual videoconferencing platforms during the late summer and early fall of 2020. The general purpose of the interviews was to solicit feedback on the study and gather supplemental data. Most of the interview questions

focused on the location, timing, and magnitude of input purchases. For example, the number of workers in irrigation labor crews, when those crews were typically in the field, and where the workers resided (e.g., local residents or workers from out of the basin). The general interview questionnaire is included as Appendix B; however, it is important to note that the questionnaire was used as a guide for meeting discussion topics rather than a strict survey tool.

Stakeholder data were critical for calibrating the IMPLAN model and tailoring the data described below. In addition to industry data, stakeholders were able to offer input into local production practices and conditions. Where possible, this feedback was integrated into the analysis. For example, some stakeholders expressed concerns about alternative economic activities in the basin that may offset some of the economic impacts shown in this study. It is not clear at this time which industries could be successful in the Cuyama Basin. The area is rural and far from large cities or other professional business centers. Therefore, resource-based industries, such as agriculture and oil and gas extraction, are the most likely. Any future industries that come into the basin would still be subject to GSP requirements.

8.2.2 University of California Cost and Return Studies

UC Cooperative Extension Cost and Return Studies[20] provide the basis for modeling crop production in this study. These were adjusted with stakeholder data/feedback. The UC studies were used to develop the production functions in the IMPLAN model. Six UC budgets were referenced in this report, one for each of the six major crop groups. These crop reports reference production practices in the San Joaquin Valley, the Imperial Valley, other coastal regions, and the Klamath Basin. These studies were selected because they were most like the growing conditions in the Cuyama Basin, or they were the closest alternative. Additional support information on production costs for Carrots is derived from a Washington State cost study. The reports, along with links are reported in Table 8.1 below and referenced in the document.

Table 8.1 Baseline Cost Study References Table

Study Title	Region
Costs and Returns to Pistachios	San Joaquin Valley - South 2015
Costs and Returns to Produce Carrots	Southeast Interior - 2004
Costs and Returns to Produce Carrots (Fresh)	Southeast Interior - 2004
Costs and Returns to Wine Grapes	North Coast Mendocino County 2016
Costs and Returns to Onions	San Joaquin Valley - South 2006
Costs and Returns to Potatoes	Intermountain - Klamath Basin 2015
Costs and Returns to Wheat	San Joaquin Valley - South 2013
Carrot Enterprise Budgets	Columbia Basin – 2004; Imperial 2004

[20] University of California Cooperative Extension (UCCE). Various years. Cost of Production Studies.

8.2.3 USDA Price and Yield Data

In addition to the prices and yields included in cost studies, this report relies on information from the United States Department of Agriculture (USDA). Prices and yields by county are used to interpret trends and understand local conditions. The data used to support this study was downloaded from the USDA[21] for Kern, Ventura, Santa Barbara, and San Luis Obispo Counties.

8.2.4 Land IQ Acreage Data

Information on the amount and distribution of irrigated acreage in the Cuyama Basin is estimated using data provided by Land IQ, which is publicly available through the California Department of Water Resources. This was refined using the GSP data developed by the CBGSA and its contractor Woodard & Curran.

8.2.5 Other Data Sources

Socioeconomic data for used in the study comes from three sources: US Census Bureau American Community Survey[22], UCSB Cuyama Water Census[23], and Blue Sky Center Community Valley Action Plan[24]. These sources all report similar information, however collection methods, area definitions, and categorical definitions vary between studies.

8.3 Cuyama Basin Custom IMPLAN Model

The 2019 direct economic impact analysis established the range of potential direct economic costs for each major industry. Additional analysis conducted for this study identified additional indirect costs. These preliminary analyses were used to identify sectors of the economy that would be affected by GSP implementation. These sectors were then developed (customized) in the IMPLAN model. This section describes the development of the IMPLAN model.

GSP implementation would result in a reduction in basin production of carrots, onions, miscellaneous truck, and grains. These crops fall into two default IMPLAN model farming sectors: grain farming (sector 2) and vegetable and melon farming (sector 3). A total of six (6) custom farming sectors were developed. As described earlier, custom IMPLAN model development was from data developed through stakeholder surveys and basin economic data. Data include production practices, prices, yields, costs, inputs, and labor. Appendix A summarizes the data sources. Unused sectors were used to develop the new custom sectors. Table 8.2 below summarizes the values for each of these inputs for each of the six new custom sectors.

[21] United States Department of Agriculture National Agricultural Statistics Service (NASS). Various Years.
[22] US Census. American Community Survey Data.
[23] Casey Walsh University of California, Santa Barbara. 2020. “Cuyama Water Census: Final Report.”
[24] Blue Sky Center. 2020. “Cuyama Valley Community Action Plan Appendix B – Cuyama Valley Community Survey Results.”

Table 8.2 Custom Production Sector Study Area Data ($ Millions)

	Wheat	Misc. Truck	Onions	Carrots	Deciduous	Grapes
Output	$5.16	$16.87	$12.34	$93.80	$11.99	$17.65
Value Added Categories						
Employee Compensation	$0.15	$1.96	$2.88	$46.38	$1.25	$4.25
Proprietor Income	$0.33	$0.59	$0.82	$32.94	$2.63	$0.83
Other Property Type Income	$-	$0.32	$0.04	$4.96	$1.15	$2.18
Tax on Prod. and Imports	$0.11	$0.07	$0.02	$1.44	$0.34	$1.11
Total Value Added	$0.60	$2.96	$3.76	$85.73	$5.37	$8.38
Intermediate Expenditures	$4.57	$13.92	$8.58	$8.07	$6.63	$9.28
Employment (Full Time Equivalent)	7	51	83	622	21	73

The sectors these new custom sectors were developed to replace existing sectors as follows:

- 07 Tobacco Farming → 07 Carrot Farming
- 09 Sugarcane and sugar beet farming → 09 Potato Farming
- 22 Copper, nickel, lead, and zinc mining → 22 Grape Farming
- 23 Iron ore mining → 23 Onion Farming
- 25 Silver Ore mining → 25 Pistachio Farming
- 26 Uranium-radium-vanadium ore mining → 26 Wheat Farming.

The new industries were entered into the study area data and the output values in the original sectors (2 and 3) were adjusted. In particular, the output value for Misc. Truck, Onions, and Carrots are all subtracted from 03 Vegetable and melon farming, output for Deciduous is subtracted from 05 Tree nut farming, output for grapes is subtracted from 04 Fruit farming, and output for wheat is subtracted from 02 Grain farming. This ensures the overall output value of the aggregate industry (now defined across eight (8) model segments) is unchanged.

Custom sectors for five downstream industries linked to primary crop production were created. These industries represent the processors that use inputs coming out of the Cuyama Basin. Total output of these industries is estimated using default markup values from IMPLAN[25]. The division of value added and employment in these industries is estimated based on the broader sector each of these new custom sectors originally falls into. Table 8.3 summarizes the aggregated input data used to calibrate the new sectors in the model.

[25] Default data was used because the Cuyama Basin agricultural industry is small. Including a specific markup from stakeholder interviews would effectively reveal sensitive business trade secrets.

Table 8.3 Custom Processing Sector Study Area Data ($ Millions)

	Dairy	Juice	Winery	Vegetable Processing	Nuts
Output	$24.11	$55.99	$108.50	$222.70	$45.75
Value Added Categories					
Employee Compensation	$1.38	$6.10	$17.22	$30.06	$4.26
Proprietor Income	$4.40	$0.52	$6.46	$1.03	$0.01
Other Property Type Income	$6.93	$2.07	$2.91	$0.54	$7.64
Tax on Production and Imports	$0.17	$0.85	$6.48	$2.24	$0.36
Total Value Added	$12.88	$9.54	$33.06	$33.87	$12.26
Intermediate Expenditures	$11.23	$46.45	$75.44	$188.83	$33.48
Employment (Full Time Equivalent)	43	128	386	722	74

The sectors these new custom sectors replace are as follows:

- 28 Stone mining and quarrying → 28 Cuyama related dairy
- 34 Other nonmetallic minerals → 34 Cuyama Juice
- 35 Drilling oil and gas wells → 35 Cuyama Wineries
- 46 Electric power generation – All other → 46 Cuyama vegetables
- 68 Wet corn milling → 68 Cuyama Nuts.

After the new industries are entered into the study area data, the sectors these crops were originally included in are adjusted. In particular, output for 28 Cuyama related dairy is subtracted from 12 Dairy cattle and milk production, output for 34 Cuyama juice is subtracted from 79 Frozen fruits, juices and vegetables manufacturing, 35 Cuyama wineries is subtracted from 109 Wineries, 46 Cuyama vegetables is subtracted from 105 All other food manufacturing, and 68 Cuyama Nuts is subtracted from 99 Roasted nuts and peanut butter manufacturing.

Finally, one additional custom sector is created for the model, the GSA itself. Since the model is comparing the GSA at full implementation compared to current conditions, only a placeholder value of $10 is entered as output and value-added categories are divided to match the information in the GSA budget.

Custom industry production coefficients were developed for each of the custom sectors. The production functions for each of the six crop groups are based on the data gathered and described earlier. The production functions for the five downstream sectors are based on existing IMPLAN industries in IMPLAN with minor modifications. For example, 34 Cuyama Juice is based on 79 Frozen fruits, juices and vegetables manufacturing. The production function of this industry was exported from 79 to 34 and the categories for agricultural inputs were zeroed out and the sum of their coefficients was used as the coefficient for Commodity Code 3003 Vegetables and melons. Finally, the production function for 68 GSA Board was developed based on the GSA fiscal report.

Commodity production coefficients for custom industries were also updated. These values are generally more straightforward for the industries included in this study. For example, 07 Carrot production produces one commodity, 3003 Vegetables and melons.

Finally, industry RPCs were updated. The regional purchase coefficients for the six custom crop industries have been calculated based on information gathered during project outreach. The RPC coefficients for each commodity purchased by each custom industry was updated manually. The regional purchase coefficients for the four commodities produced by the custom sectors must be zeroed out in relation to the custom downstream sectors in the model. For example, the RPC for 3002 Grains in relation to 28 Cuyama Related Dairy was set to zero. This allows output changes in the downstream industry to be included in the same model run without double counting the direct effects at the farm level.

8.3.1 Impact Analysis Events

The final step in the analysis was developing the economic impact analysis using the direct economic impact inputs. These were defined from the analysis described in the 2019 economic impact analysis report and the main text of this study. Table 8.4 summarizes the event type, summary of the change, and the affected custom IMPLAN sectors.

Table 8.4 Impact Event Specification – GSP Implementation

Activity Type	Activity Name	Activity Level[1]	IMPLAN Sector	Industry Sales (Output Change $M)[2]
Industry Change	Decrease in Carrot Output	1	7 Carrot Farming	($46.9)
Industry Change	Decrease in Onion Output	1	23 Onion Farming	($5.99)
Industry Change	Decrease in Grain Output	1	26 Wheat Farming	($4.13)
Industry Change	Decrease in Misc. Truck	1	9 Potato Farming	($8.59)
Industry Change	Decrease in Vegetable Processing	1	46 Cuyama Vegetables	($37.11)
Industry Change	Decrease in Specialized Vegetable Processing	1	34 Cuyama Juice	($9.33)
Industry Change	Decrease in Dairy Production	1	28 Cuyama Related Dairy	($6.4)
Industry Change	Increase in GSA Board Output	1	68 GSA Board	$2.59
Income Change	Decrease in Proprietor Income	1	6001 Proprietor Income	($0.558)

The scenario shown in Table 8.4 was run in the custom IMPLAN model and used to define economic impact values presented in this report.

9. Appendix B: Stakeholder Outreach Interview

This document provides a summary of the project and a list of the general types of questions that would be asked of meeting participants. It is important to note that this is not intended to be a formal interview or survey. The questions listed in this document are for internal use and are not planned to be shared with a meeting participant in advance of a meeting.

9.1 Study Overview

In support of the Groundwater Sustainability Plan (GSP), the CBGSA commissioned an economic impact analysis of the direct economic costs to Cuyama Basin agriculture of the projects and management actions specified in the GSP. In response to feedback from stakeholders, and to better understand the economic consequences of the implementation plan specified in the GSP, the CBGSA is currently developing a regional economic impact analysis that considers the effects of the GSP on linked businesses, farmworkers, disadvantaged communities, and the broader regional (four-county) economy. This indirect and induced ("regional" or "multiplier") economic impact analysis quantifies the impact on jobs, employee wages, business sales, taxes, and land values in the Basin and surrounding (4-county) communities. Results of this analysis will be used to support GSP implementation through more effective policy planning, and potential mitigation programs, in the Basin.

9.2 Outreach

A concurrent data analysis/inventory has identified underlying industry statistics required to support this analysis from public sources. The purpose of this outreach is to validate data and fill key data gaps in business purchases and economic activity for Basin agricultural industries. This includes, for example, information about the location of input purchases, employees, local labor force, local businesses, and post-harvest handling/shipping/processing.

All of the information collected through this outreach will be confidential and all data will be aggregated in a way such that no individual business is identifiable. The following pages summarize the general types of questions that will be asked of meeting participants. Specific questions will vary depending on the industry and any study data gaps.

9.2.1 Overview – General Information

Within 4-county region: This study focuses on the economic cluster of crop production, processing, and distribution in the 4-county Cuyama Basin area, which is limited to the following counties: San Luis Obispo, Santa Barbra, Ventura, and Kern. Transactions with entities physically located in these counties (though they may be headquartered elsewhere) fall into this category.

Outside 4-county region: Transactions with entities that are not physically located in San Luis Obispo, Santa Barbra, Ventura, and Kern counties fall into this category. Examples include foodservice companies in the Bay Area, farmers' markets in Los Angeles, grocery stores in other states, or export markets.

1. What is the primary agricultural product produced on your operation?
   _____

2. What other crops or ag products are produced?
   _____

3. Which, if any, of the crops produced are certified organic?
   _____

4. Approximately how many acres do you currently own and operate? _____

5. What type of ownership structure does your operation fall under?
   ☐ Sole Proprietor ☐ Partnership ☐ LLC
   ☐ Corporation ☐ Cooperative
   ☐ Other_____

6. Approximately what share (%) of your business is in the Basin?
   ☐ 0%-20% ☐ 20%-40% ☐ 40%-60%
   ☐ 60%-80% ☐ 80%-100%

7. Approximately what share (%) of your business is in the 4-county area?
   ☐ 0%-20% ☐ 20%-40% ☐ 40%-60%
   ☐ 60%-80% ☐ 80%-100%

9.2.2 Inputs

Crop production budgets and supporting data have been developed for the region using public sources. However, to assess the secondary impacts of changes in business purchases the study requires information on the approximate locations (and share) of primary input categories. We do not need specific cost numbers, but we need a sense for the magnitude and relative share of input purchases by coarse categories.

Input	Primary Provider Location	Approximate share (%) within Basin
Pesticides, fertilizers, or other ag chemicals	Basin 4-County Other	
Support activities for agriculture and forestry (custom services)	Basin 4-County Other	
Irrigation equipment and repair	Basin 4-County Other	
Machinery and machinery repair	Basin 4-County Other	
Nursery stock or seed	Basin 4-County Other	
Miscellaneous equipment and tools	Basin 4-County Other	
Land preparation & building construction	Basin 4-County Other	
Farm financial services	Basin 4-County Other	
Insurance	Basin 4-County Other	
Harvest	Basin 4-County Other	
Other:	Basin 4-County Other	

9.2.3 Labor

Labor inputs vary by crop, operation, and practices. The following questions will fill data gaps in the quantity and location of the primary workforce for each operation.

1. Approximate share of FLC vs hired labor? _____
    a. Notes:_____
2. Use table below to identify employee mix by operation:
    a. Planting
    b. Cultivation
    c. Harvest
    d. Off-season
    e. Other misc/year-round activities
    f. Other for vertically integrated operations

Employee Type	Approximate number of full or part time employees	Primary location and share (%)
Farm managers Notes:	_____	Basin 4-County Other
Machine operations Notes:	_____	Basin 4-County Other
General labor Notes:	_____	Basin 4-County Other
Other (e.g., processing) Notes:	_____	Basin 4-County Other
Other (e.g., pack/ship, etc.) Notes:	_____	Basin 4-County Other

9.2.4 Post-Harvest Value Added

The primary data gap for forward linked industries is identifying the location of businesses that provide these services, and primary destination output markets. For vertically integrated grower-shipper operations this would include similar information at other points in the supply chain potentially affected by changes in Cuyama Basin agriculture.

1. Approximate share of domestic retail vs export? _____
    a. Notes:_____
2. Approximate share of sales within 4-county area (if known)? _____
    a. Notes:_____

Post-Harvest Activities	Service provider location (Basin, 4-County, Other)	Approximate Share (%) within Basin and 4-County area	Notes
Transportation	Basin 4-County Other		
(specifics if available)			
Storage	Basin 4-County Other		
(specifics if available)			
Processing	Basin 4-County Other		
(specifics if available)			
Direct to Consumer Sales or Retail	Basin 4-County Other		

Post-Harvest Activities	Service provider location (Basin, 4-County, Other)	Approximate Share (%) within Basin and 4-County area	Notes
(list by output market)			

Other General Discussion Topics and Questions for Non-Agricultural Industries

Stakeholders from other local Basin businesses may be contacted. Some of the questions listed above will apply to these businesses. Additional data gaps include:

1. What would your operation do if it had to reduce production in the Cuyama Basin? Would some production shift to other areas, if so, how much?
    a. Would this result in additional costs?
    b. What other logistical constraints?
2. To what extent does business revenues (sales) depend on Basin residents? Residents in the greater 4-county area? Discuss.
3. To what extent does business revenues (sales) depend on Basin agriculture? Discuss
4. To what extend does primary business labor come from the Basin?
5. What approximate share of the labor force is also employed in local agricultural industry jobs (if any), and if so, what approximate share is within the Basin?
6. Other factors that we missed?
7. Other factors that you feel are important for assessing the effect of potential changes in Basin agriculture?
8. Other considerations and concerns?