Farm Bureau Monterey

Keeping Farmers Growing Since 1917

August 4, 2025

Mr. James Bishop
Senior Engineering Geologist (Specialist),
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401-7906

VIA: E-mail to AWS-Program@waterboards.ca.gov

RE: Alternative Water Supply Program

Dear Mr. Bishop:

Monterey County Farm Bureau represents family farmers and ranchers in the interest of protecting and promoting agriculture throughout our County. Since 1917, Farm Bureau strives to improve the ability of those engaged in production agriculture to provide a reliable supply of food and fiber through responsible stewardship of our local resources.

Our organization has participated in the development and implementation of multiple iterations of the Irrigated Lands Program, including the adoption of Ag Order 4.0, as part of the Ag Partners[1] group. We appreciate the continued engagement on the development of the Alternative Water Supply Program (AWS) after nearly two years of meetings, proposals, and conversations. Our interest is in finding a solution to the drinking water problem when wells are influenced by nitrogen use from prior (legacy) agricultural practices.

First and foremost, any AWS must be administered by an entity that the agricultural producers trust and respect. As this will become a financial commitment to all participating agricultural producers in the region, the initialization, implementation, and continual operation of the program needs to have support from those who are funding the AWS. Without this trust factor, the AWS will find it difficult to fully engage the agricultural producers on a broad basis to make the entire program cost effective.

We also support a phased approach to implementation of the AWS throughout the region, as demonstrated by the prior supplemental water program in the Salinas Valley region (managed and operated by the former Salinas Valley Stewardship Group). By phasing the program, there is opportunity

[1] Ag Partners are: Grower-Shipper Association of Central California, Grower-Shipper Association of Santa Barbara and San Luis Obispo Counties, Monterey County Farm Bureau, Western Growers Association, Western Plant Health Association, and California Farm Bureau.

to learn from the prior program and implement more concisely immediate services, and avoid a regionwide initialization that will be difficult to coordinate and manage. This will allow for right-sizing the services provided and determine the extent of the need of those willing to accept intermediate term services of supplemental drinking water. As has been discussed in numerous meetings with staff, there are examples of programs that have achieved success in the immediate term and there is no need to re-imagine a new program that will ultimately be more costly to implement and deploy (thus using a lessons-learned approach). The effort should be to get a first-phase intermediate term program in place that shows true value and reliability for those receiving water but also those who will be investing in the program, providing strong fiscal balance and operational trust.

The cost structure will be critical in acquiring and maintaining AWS participation. The agricultural sector economy has not been financially healthy these past two years, with impacts from market pricing declines, disaster recovery, labor shortages, and input cost increases pressuring the bottom line for many farming operations, particularly small to medium sized farms. Multiple crops grown on the Central Coast are experiencing drastic marketing pressures, most notably wine grapes (where production was depressed over 20% in Monterey County[2] in 2024).

Our organization commissioned a study from Cal Poly San Luis Obispo on the costs of regulatory compliance.[3] Since 2017, California regulatory compliance costs for agricultural producers have increased 64% and are now fully 12.6% of the costs of production of a crop (in the study's case, for lettuce). This includes costs for water quality compliance (the irrigated lands program) and costs associated with the Sustainable Groundwater Management Act (SGMA), now in full implementation regionwide.

As a reference, fees that landowners and agricultural producers are now paying in the Salinas Valley for SGMA *administration* on a per acre basis are set to $13.83 for the fiscal 2025/2026 year. These fees are solely for the management functions of the Salinas Valley Basin Groundwater Sustainability Agency.

All growers in the Central Coast region will also be facing substantial costs for the *implementation* of sustainable groundwater management, either through changing of farm practices and cropping patterns (i.e. demand management) or proposed water resource projects, all in an effort to balance the groundwater basins by 2040. This is a hard deadline set by the State Water Resources Control Board who continues to monitor progress by the various groundwater sustainability agencies throughout the region. These costs have yet to be determined on a per acre basis.

Here in Monterey County (specifically the Salinas Valley region), proposed water resource projects are undergoing feasibility studies to determine where the "best bang for the buck" will produce the desired results. As seawater intrusion is the most challenging of the SGMA undesirable results, all projects under consideration are extremely expensive and the majority of the costs will fall to the landowners and agricultural producers of the overlying groundwater basin. Early estimates indicate the costs of these proposed projects could reach as high as $1.5 *Billion* (including necessary repairs to two dams and reservoirs required by CA Division of Dam Safety). The agricultural community will be very hard-pressed to meet this type of expenditure level while sustaining financial viability of farming operations. SGMA has the potential to alter the farming dynamic beyond the breaking point of financial stability.

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[2] Monterey County Crop Report 2024, Monterey County Agricultural Commissioner, issued July 1, 2025.

[3] "Two Decades of Change: Evolving Costs of Regulatory Compliance in the Produce Industry" – Lynn Hamilton & Michael McCullogh, California Polytechnic University, January 2025 (study attached as appendix to this comment letter).

Additional regulatory costs for agricultural producers include California air quality mandates, workplace safety and training rules, increased labor expenses (minimum wage and overtime rule changes), food safety measures and audits, and greenhouse gas mitigations for the climate action plans. All these add up to a substantial portion of the cost of growing a crop; sadly, these cost increases are not readily reflected in the price at the wholesale level, increasing pressure to the bottom line of agricultural producers.

In terms of all regulatory costs that the agricultural sector must consider in the next decade, finding balance in the costs for the AWS will be critical in ensuring support from the agricultural operations that will be funding this program. An excessively costly program will not gain support in the context of all other regulatory and production costs that farming operations must bear to remain sustainable in their farming operations.

We request that the Regional Water Board staff continue to work collaboratively with the agricultural stakeholders to develop an AWS that is reasonable, cost-effective, and managed by a trusted resource, and can be mutually agreed upon and supported by the regulated community.

Without consideration of the management scope and costs of the AWS program, there will be little that the Ag Partners can do to gain support for a regionwide implementation using a phased approach.

Economics of the agricultural sector must be considered and included in the development of the Alternative Water Supply Program.

Thanks for your consideration and we look forward to further engagement on the AWS development.

Sincerely,

Norman C. Groot
Executive Director

APPENDIX A

Cal Poly San Luis Obispo Study

Regulatory Compliance in the Produce Industry

Two Decades of Change: Evolving Costs of Regulatory Compliance in the Produce Industry

Lynn Hamilton[1]
and
Michael McCullough[2]
Cal Poly, San Luis Obispo

January 2025

CAL POLY

[1] Lynn Hamilton, Ph.D., is a Professor of Agribusiness at Cal Poly, San Luis Obispo
[2] Michael McCullough, Ph.D., is a Professor of Agribusiness at Cal Poly, San Luis Obispo

Acknowledgements

We appreciate the initiative and support for this project from the Monterey County Farm Bureau and its members, as well as the cooperating ranch owners and staff who have volunteered their time and shared information over the years to make possible this unique, long-term view of regulatory change in California.

EXECUTIVE SUMMARY:

Rising costs of regulation are an increasing concern for California growers. An initial study of regulatory costs in California agriculture was conducted in 2006, as means to compare California's regulatory environment to other competing states. Industry groups in the Salinas Valley contacted Cal Poly to update the original study in 2018 as new state and federal laws imposed significantly higher regulatory burdens on growers, specifically with respect to food safety, water quality, labor wages, air quality and worker health and safety. We used 2017 data as it was the most recently completed full production year.

As the 2020s progressed, additional regulations, including the Sustainable Groundwater Management Act, the Irrigated Lands Program, equipment emissions regulations and minimum wage and overtime laws for farmworkers were being phased in. Industry groups once again requested an updated study to quantify the evolving regulatory landscape for farms and ranches. This report updates the 2017 case study that documented the regulatory costs on a commercial-scale head lettuce grower in the Salinas Valley. The same grower that we interviewed for the previous two projects was willing to cooperate on the 2024 study, providing a snapshot across three different decades on one large Salinas Valley lettuce operation.

In the 2006 study, the cooperating lettuce grower reported regulatory costs totaling $109.15 per acre or 1.26% of total production costs. Lettuce production costs were $8,793 per acre. Workers' compensation comprised over half of regulatory costs in the initial report; other compliance areas included water quality, food safety, worker education and training.

However, by 2017, the regulatory landscape had drastically changed, precipitated by a 2006 E. coli outbreak in spinach in the Salinas Valley (that occurred after the 2006 data was collected) that altered the landscape for food safety compliance. New environmental and worker wage and safety laws were also imposed in the ensuing years. The 2017 data showed that regulatory costs were $977.30 per acre, or 8.90% of total production costs. The grower's total production costs were $10,977 per acre in 2017.

The results of the first comparison case study showed that production costs increased by 24.8% from 2006 to 2017, but the costs of regulatory compliance rose by 795%.

Increased compliance requirements in 2024 bring the grower's total costs of regulation to $1,600.12 per acre, which is a 63.7% increase from 2017 and a 1366% increase since 2006. Total costs for lettuce production increased to $12,702.47 in 2024. Over the entire period, this is a 44.4% increase in production costs. Regulatory costs comprised just 1.24% of production costs in 2006, then rose to 8.9% of production costs in 2017, and are now calculated at 12.6% of production costs. These cost increases have occurred while farm-gate prices have remained relatively stable. From 2007 to 2017 the average farmgate value per acre of head lettuce increased from $8,637 to $12,415 or 43.7%, which primarily covered increased production costs. However, the most recent estimates of farmgate value for 2023 are $12,461 marking only a 0.37% increase. The following pages summarize the regional, state and federal laws that lead to these costs.

Summary of Major Regulatory Changes Affecting California Agriculture, 2006-2024

Food Safety

- 2007: The Leafy Greens Marketing Agreement: passed by California leafy greens grower and handlers; requires growers to create and follow a food safety plan and trace-back program, environmental assessments for food safety risks, extensive water and soil amendment testing and certification, and field audits to verify compliance with worker practices and field sanitation.

- 2011: Food Safety Modernization Act: incorporated Hazard Analysis and Critical Control to the food system, increased inspections and food safety practices on the farm and in the handling/processing sectors. Adopts many of the same practices in the fresh produce sector (known as the Produce Safety Rule) as the LGMA; the LGMA updated its metrics in 2018 to align with FSMA.

- 2019, 2020 and 2021: Updates to the 2007 Leafy Greens Marketing Agreement. The LGMA was aligned with the most recent Federal food safety ruling, the Food Safety Modernization Act (FSMA), and had updated its standards in 2018 to be fully aligned with the Produce Rule, after two E. Coli outbreaks in 2018 and 2019 in Central Coast Romaine lettuce were traced to contaminated water. In response, the LGMA adopted more robust monitoring standards for agricultural water quality in 2019 and refined its standards for harvest equipment sanitation and water quality assessment in 2020. In 2021, the LGMA added new requirements, including increased risk assessment from adjacent farmland, revised soil amendment and crop input requirements, and added root cause analysis to the already extensive list of food safety obligations for leafy greens production.

Air Quality:

- 2006: AB 32, California Global Warming Solutions Act. Instituted a cap-and-trade system for greenhouse gas emission reductions with the goal of reducing California's GHG emissions to 1990 levels by 2020.

- 2020: SB 1. Truck and Bus Regulation. This rule requires all heavy-duty diesel vehicles that operate in California to reduce toxic exhaust emissions. By January 2023, nearly all diesel trucks and buses operating in the state are required to have 2010 or newer model year engines to reduce particulate matter (PM) and nitrogen oxides (NOx) emissions. Starting in 2020, only compliant vehicles could be registered with the California Department of Motor Vehicles.

- Revised 2020: Ag Engine Registration Permits & Fees. The Monterey Bay Air Resources Board Rule 220 requires, since 2007, any stationary diesel agricultural engine of 50 horsepower (hp) or greater to be permitted and registered annually. As established by Rule 310, the current fees (as of July 1, 2024) are $243 for the first engine and $173 for each additional engine.

Water Quality:

- 2012 and 2017: Updates to the Region 3 (Central Coast) Irrigated Lands Regulatory Program. Groundwater well monitoring was added in 2012, and as of 2017, all Tier 2 and Tier 3 (medium and large) farms must report total nitrogen applied to their crops.

- 2014: Sustainable Groundwater Management Act: requires critical and high-priority groundwater basins to develop a local Groundwater Sustainability Agency by January 2018, which are then tasked with developing Groundwater Sustainability Plans to prevent further groundwater overdraft and pollution.

- 2020: Sustainable Groundwater Management Act of 2014: Critical and high-priority groundwater basins were required create a local Groundwater Sustainability Agencies by January 2018 and then develop and implement a Groundwater Sustainability Plan (GSP) by 2020 to prevent further groundwater overdraft and pollution. The GSPs can impose fees, restrict groundwater use and require monitoring, among other regulatory actions. Basins that do not meet their sustainability goals can fall under control of the State Water Board. The governing body in the Salinas area is the Salinas Valley Basin Groundwater Sustainability Agency.

- 2021: Agricultural Order 4.0: Starting in 2022, the Central Coast Region 3 Irrigated Lands program added significant monitoring and reporting requirements for groundwater as well as regulating nitrogen application via targets or limits and mandated growers to submit on-farm nitrogen management plans. Farms are phased in based on location and size and farm. Ag Order 4.0 also includes surface water protection but will not be phased in until 2032.

Labor Health and Safety

- 2010: Affordable Care Act: Requires employers with at least 50 employees to provide health insurance.

- 2014: AB 1522, Healthy Workplace, Healthy Family Act: As of July 1, 2015, employers must provide paid sick leave to any full or part-time worker; employees earn at least one hour of paid leave for every 30 hours worked.

- 2015: Cal OSHA updated its Heat Stress Prevention regulations, requiring shade and water provision to outdoor employees when the temperature reaches 80° F, as well as supervisor and employee training about heat stress prevention.

- 2019: SB 78, Health, Chapter 38. California created an individual health care mandate enforceable with penalties starting in 2020. While there is no state-required mandate for employers to provide insurance, the federal Affordable Care Act of 2010 requires employers with at least 50 employees to provide health insurance. California's law requires employers to file reports on behalf of self-insured, full-time and part-time

employees, along with covered dependents, as well as distribute proof-of-coverage forms to California resident employees. Each unreported employee can result in a $50 fine.

- 2018 & 2019: SB 1343 and S778, employers with five or more employees must have all staff complete at least one hour of Sexual Harassment Prevention Training and Education by January 1, 2021. All employees with supervisory roles are required to complete at least two hours of training. These trainings must be renewed every two years. Prior to this legislation, employers of 50 or more employees to provide training only for supervisors and management staff.

- 2024: AB 1522, Healthy Workplace, Healthy Family Act: As of January 1, 2024, employers must provide 40 hours (five days) of paid sick leave (PSL) to full-time workers annually; this is an increase from the 2015 law that required employers to provide 24 hours (three days) of paid sick leave per employee. California's Division of Labor Standards Enforcement clarified that part-time employees earn at least one hour of paid leave for every 30 hours worked, the same as the original law. All employees who work at least 30 days for the same employer, within a year in California are covered by this law.

- 2024: SB 553 As of July 1, 2024, employers must develop and implement a workplace violence prevention plan in accordance with new Labor Code section 6401.9, as well as conduct trainings for employees about workplace violence prevention with training material that is appropriate to the employees' educational level and language.

Labor Wages

- 2016: AB 1513, Piece Rate Compensation: As of July 1, 2016, companies that employ piece-rate workers are required to compensate unproductive time (i.e. rest breaks) at either the legal minimum wage or the workers' average wage, whichever is higher, and employees must receive documentation of the non-productive time on their pay stubs.

- 2016: SB 3, Minimum Wage Phase-In Requirement: California employers with 26 or more employees must scale up minimum wage, starting at $10.50/hr in 2017 to $15/hr by 2022. Employers with 25 or fewer employees had an additional year to phase in the increases, but by 2023, all employers had to meet the current minimum wage requirement. The minimum wage for 2024 for non-fast-food workers was $16.00/hr.

- 2016: AB 1066 created a timetable for agricultural workers to receive overtime pay so that they gradually received overtime pay on the same basis as workers in most other industries. Starting in 2019, agricultural businesses with 26 or more employees had to phase in overtime pay, starting at 9.5 hours per day or 55 hours per week. The hours scaled down until the law was fully implemented on January 1, 2022, with overtime starting at 8 hours per day or 40 hours per week. Businesses with 25 or fewer employees had until January 1, 2025, to fully phase in overtime at this rate. Wages are calculated at 1.5x once the daily or weekly time limit is surpassed.

Introduction

The regulatory environment in California is constantly evolving in response to new laws, policies, and legislative mandates, and has scaled up considerably in recent years. Regulations can provide benefits to the agricultural industry and society at large by increasing food safety, improving air and water quality, and improving conditions for farm workers. However, regulations also impose compliance costs on agricultural businesses. Regulatory costs can be classified as either direct, involving a cash outlay in response to the regulation, or indirect, involving an opportunity cost to the business or industry as a result of the regulation. Both direct and indirect costs of regulations to agricultural producers in California have been increasing in recent years and have been documented in two previous studies in the Salinas Valley in 2006 and 2017 as well as the San Joaquin Valley in 2012 and 2018.

This paper presents the second update to the original 2006 study of regulatory costs for a large Salinas Valley lettuce grower; the first update was in 2018 (Hamilton 2006; Hamilton & McCullough 2018). The 2006 study found that regulatory compliance costs totaled $109.15 per acre, or 4.25% of cultural costs and 1.24% of total production costs (Hamilton 2006). However, by 2017, the regulatory landscape had significantly changed, precipitated by a 2006 E. coli outbreak in spinach in the Salinas Valley (that occurred after the 2006 data was collected) that altered the landscape for food safety compliance. New environmental and worker wage and safety laws were also imposed in the ensuing years. The 2017 study found that regulatory costs had escalated to $977.30 per acre, or 8.90% of total production costs. Total production costs in 2017 were $10,977 per acre for this grower. Workers' compensation was again the highest cost of regulatory compliance and had risen to $336 per acre. Labor wage regulations comprised another $189 per acre, and food safety compliance followed closely behind at $181 per acre. Affordable Care Act requirements added $141 per acre, while pesticide regulatory compliance totaled over $35 per acre. Other regulatory compliance costs totaled between $5.50 and $28 per acre. The results of the updated case study show that, for this lettuce grower, production costs increased 24.8% from 2006 to 2017, but the costs of regulatory compliance rose by 795% (Hamilton & McCullough, 2018).

Lettuce continues to be an important crop in California, consistently ranked in the top five commodities in California. The most recent California agricultural statistics for lettuce in the 2023 crop year reported a value of $3.93 billion in farmgate sales for all lettuce and 264,600

harvested acres. California grows 76% of all lettuce in the U.S. Monterey County, where the data for this study was collected, produces 60% of California's lettuce (CDFA, 2023).

Very few studies exist that examine the costs of regulation at the producer level. A study of regulatory costs accruing to agriculture in 2012 in the San Joaquin Valley found regulatory compliance for labor and environmental laws was between .98% and 5.6% of cash operating costs. This study investigated 22 growers across the eight most important crops in the San Joaquin Valley (McCullough et al., 2018). However, a follow-up study of the same growers found that by 2018, regulatory costs had outstripped costs of production increases by a wide margin. Compliance costs per acre had increased 265% over the six-year period, while production cost across all crops in the study had risen by only 25% (McCullough et al., 2020). Specialty crops, such as table grapes, citrus and stone fruit, had relatively higher compliance costs, and a larger proportion of regulatory costs had shifted to large farms because small farms were exempt from the Affordable Care Act and many provisions of the Food Safety Modernization Act.

Problem Statement: This study will update the 2006 and 2017 case studies of a Salinas Valley commercial lettuce grower to examine the increasing array of regulatory costs faced by California farms in 2024. California producers sold over $59 billion of farm-gate products in 2023, the most recent year reported (CDFA). However, many countries and some states produce similar agricultural products, and California producers could be at a competitive disadvantage if their costs of regulation continue to escalate.

Objectives: To conduct a case study analysis of 2024 regulatory costs in lettuce production and compare them to the regulatory costs documented in 2006 and 2017 with the same grower in the Salinas Valley. We also review the changes in regulations for California agriculture since 2017, primarily with respect to water quality, groundwater legislation, and labor regulations including minimum wage, overtime and worker health and safety protocols. The findings of this study will provide the agricultural industry and policy makers with more complete information when making policy decisions regarding regulatory issues for California farmers.

Methodology

Western Growers' Association identified a cooperating grower for the study in 2006, and the same grower was contacted in 2017 and 2024 to participate in the follow-up studies. The grower was contacted in August 2024 and the in-person interview with the owner and several managers took place in October 2024, with follow-up emails for additional information; confirmation for all data was provided in mid-January 2025. The cooperating producer was assured anonymity as proprietary production cost data would be the centerpiece of the study.

Regulatory changes since 2017 were reviewed and are included in the regulatory cost narrative. All known regional, state and federal laws that were in effect in any capacity in 2024 were documented. Some laws are still being phased in, such as the surface water provisions of Irrigated Lands Program, while others, like the Sustainable Groundwater Management Act, have been fully implemented.

The cooperating grower was provided a spreadsheet that outlined the regulatory cost areas that were expected to impact the operations. They were asked to estimate the annual amount of time maintaining compliance in each regulatory area; the value of that time; whether it was their time or an employee's or contractor's time; and to provide the fees they were assessed for any permits, licenses, training sessions or exams. Fines for non-compliance were also reported when applicable. In some cases, the regulatory costs in question accrued to the entire farm operation, while some regulatory costs were specific to head lettuce. In the cases where the regulatory costs accrued to the entire farm, the costs were apportioned to the head lettuce acreage. This information was collected during an in-person interview with the owner(s) and relevant staff members. The owners were also asked to provide the annual production budget for their head lettuce operation, to compare the impact of regulatory expenses on their growing costs. The 2023 University of California Cooperative Extension cost of production budget for head lettuce in the Salinas Valley (Tourte, et al. 2023) was used as a baseline from which to compare the grower's production costs.

A total cost of regulation was summarized for the grower, and the regulatory cost per acre was calculated and compared to the 2006 and 2017 findings. We do not report the total farm acreage or proportion devoted to lettuce to maintain confidentiality. However, the lettuce grower fits into the "large" grower category (greater than 1,000) acres as defined by the U.S. Census of

Agriculture. The terms "farm" and "ranch" are used interchangeably throughout this study in reference to agricultural operations.

Results

The discussion and regulatory cost areas are divided into the following categories:

- Education and Training for Regulatory Compliance
- Air Quality Requirements
- Water Quality/Quantity Requirements
- Department of Pesticide Regulation
- Food Safety
- Workers Compensation
- Affordable Care Act
- Labor Health & Safety Requirements
- Assessments

Education and Training for Regulatory Compliance

This category summarized all education and training efforts on the part of the grower to maintain compliance with Cal OSHA as well as pesticide and food safety requirements. In 2006 the costs of this category were due to the grower's time spent in staying current with worker safety laws and environmental issues and amounted to $1.27 per acre. By 2017, the education and training component of regulatory compliance had exploded, and the operation spent $26.31 per acre on education and training. The largest component of this segment in 2017 was that one of the owners estimated that they spent about 1/3 of their time on keeping up with new food safety and other regulatory requirements. The value of their time comprised about 25% of this compliance category.

In 2024, the farm had eliminated the lettuce bin program and only harvested lettuce by the carton. Meanwhile, they had to consider the impact of new agricultural overtime regulations. The 2017 study included three harvest crews, all directly employed by the ranch, which at that time were able to work 60 hours per week before overtime accrual. In 2024, the ranch employed an additional lettuce harvest crew (25-30 workers), contracted with an outside provider, and each crew worked 40 hours per week. The human resources director manages on-boarding training with all employees with respect to onboarding, health/safety compliance required by Cal OSHA and the Department of Pesticide Regulation as well as food safety, which takes half of their total

time. In addition, the HR manager must attend an annual "train the trainer" session; the training fees, travel and hotel stay cost $1250.

All workers must go through the Worker Protection Standard training for 30 minutes annually. The grower has 120 workers for the lettuce operation and another 50 for the overall farm. In addition, these employees must take part in food safety/pesticide safety training every two weeks for 30 minutes. Four supervisors and three foremen are also involved, and the farm's HR director runs these meetings. In addition, new laws require that all employers provide a Workplace Violence Prevention program and training for all employees annually, and all employees participate in at least one hour of sexual harassment prevention training every two years. Anyone in a supervisory role must take part in at least two hours of sexual harassment prevention training every two years. Food safety compliance staff, of which the farm has three, must each attend at least four hours of trainings every year to maintain state and federal approved certifications.

Overall, the sum of the education and training efforts for regulatory compliance is $25.61 per acre, a -3% decrease from 2017. Besides assessments, this the only regulatory category to decrease from 2017, which may seem unlikely as the regulatory requirements have only expanded in this area. However, in 2017, because of the significant and ongoing changes in food safety requirements as the Produce Rule was coming into full effect, one of the owners of the ranch was investing significant time in maintaining currency as the rules evolved, which added over $7 per acre to the cost of education and training compliance. By 2024, the Leafy Greens Marketing Agreement was fully aligned with the federal Produce Rule, two additional food safety staff were on the ranch's payroll, and the owner's time was more focused on the evolving regulations with water quality/quantity under the Irrigated Lands Regulatory Program and SGMA. The owner's opportunity costs of time shifted to other compliance areas.

Air Quality Requirements

The Federal Clean Air Act requires the Environmental Protection Agency to authorize state implementation of air quality plans. The main component of the Clean Air Act that concerns agriculture is compliance with National Ambient Air Quality Standards, which sets limits on six pollutants known to cause health hazards, environmental damage, and/or contribute to the formation of smog: ozone, particulate matter, sulfur dioxide, carbon monoxide, nitrogen

dioxide and lead. Each state is required to submit a State Implementation Plan to reduce or maintain pollutant levels below national standards set by the EPA. The regulatory burden in each region is based primarily on whether the air quality meets or exceeds the pollutant levels set by the EPA under Title V, which requires the monitoring of and meeting standards for major source pollutants. This approach establishes different regulatory requirements from one air region to the next (U.S. EPA).

California is comprised of 35 air districts. Requirements for air quality compliance vary greatly, depending on the pollution levels inherent in a particular region. The lettuce grower in Salinas falls under the jurisdiction of the Monterey Bay Air Resources Board (MBARD), which considers agricultural operations for growing crops or livestock as generally exempt from air quality permits and regulations. Monterey County, on the Central Coast of California, has no non-attainment areas for air quality, and thus does not fall under EPA's Title V regulations for pollution reduction.

The original study in 2006 reported no costs for air quality regulation. By 2017, state laws required more extensive reporting under the AB 32, Global Warming Solutions Act, even for "clear air" areas such as Monterey County. As of May 2007, all agricultural diesel engine equipment, both stationary and mobile, must be registered with the MBARD, and equipment emissions must be monitored (California Air Resources Board). In 2017, the grower reported spending $5.31 per acre on air quality compliance, the lowest of any category; most of the costs were in staff time to report equipment and emissions information as well as upgrading equipment filters.

In 2020, a new California Air Resources Board rule known as the Truck and Bus Regulation requires all heavy-duty diesel vehicles that operate in California to reduce toxic exhaust emissions. By January 2023, nearly all heavy-duty diesel trucks and buses operating in the state are required to have 2010 or newer model year engines to reduce particulate matter (PM) and nitrogen oxides (NOx) emissions. The ranch's trucks were found to be non-compliant with the rule in 2024, and the ranch was fined $1,900. They were required to replace three trucks, which cost $60,000 each, and are expected to be in service for 10 years. Existing haul trucks had emissions filters upgraded at $25,000 each; the expected life span is six years. The lettuce grower has two staff members who each spend 40 hours annually reporting equipment and emissions information to the MBARD. The ranch's irrigation pumps fall under the

Agricultural Diesel Engine Registration, Rule 310, of the MBARD; which requires most stationary diesel-powered engines on agricultural operations to have a permit. The annual fees are $243 for the first engine and $173 for each additional engine. The total air quality compliance costs per acre in 2024 was $8.29, the lowest of all regulatory categories, but an increase of 56% over 2017 costs.

Water Quality/Quantity

The United States Clean Water Act is the primary federal statute that mandates states to control water quality. The EPA provides funding for states to administer the required planning and regulatory programs, but states must submit plans to control water pollution that meet the criteria established by federal law. The most difficult type of pollution to control is non-point source pollution, or NPS. According the U.S. EPA, nonpoint source pollution is the largest source of water quality problems in the U.S.

Two California agencies are responsible for developing and carrying out the NPS pollution control policies; the State Water Resources Board (SWRB) and the nine Regional Water Quality Control Boards (RWQCB). The Porter-Cologne Act, initially adopted in 1969, is the state law that provides the authority to the SWRB and the RWQCB to control NPS pollution (Gerstein, et al. 2005). Each regional board develops "basin plans" for their hydrologic areas, governs requirements and issues waste discharge permits, takes enforcement action against violators, and monitors water quality. The California Water Code gives RWQCBs the authority to regulate discharges of waste that could impact the waters of the state of California, through permits called "Waste Discharge Requirements." A discharge is any release of waste, such as fertilizer, pesticide or sediment, to a water of the state. Waters of the state include rivers, streams, lakes, bays and estuaries, and groundwater.

The lettuce producer's operation is in Region 3 which is comprised of Santa Cruz, San Benito, Monterey, San Luis Obispo, and Santa Barbara counties as well as the southern parts of Santa Clara and San Mateo counties, the northern portion of Ventura County, and small portions of Kern County. Since the original study, the Central Coast Regional Water Quality Control Board adopted much more stringent rules for water quality on irrigated lands; a revised Agricultural Order was introduced in 2012, updated in 2017 and further restrictions were set forth in 2021, now known Agricultural Order 4.0. Approximately 500,000 irrigated acres spread

across 3,000 farms are under the jurisdiction of Ag Order 4.0 (CCRWQCB). Rather than structuring compliance in a tiered system based on farm size per Ag Order 3.0, agricultural operations are now classified in groundwater and surface water priority areas, referred to as GW Phase 1, 2 and 3 and SW Phase 1, 2 and 3 based on geographic location over the groundwater basin and subbasins. Surface water restrictions were not yet implemented in 2024, they will be phased in by 2032.

The lettuce grower falls into GW Phase 2, which includes all farms/ranches in the Corralitos – Pajaro Valley Subbasin and two Salines Valley subbasins – the 180/400 Foot Aquifer and the East Side Aquifer subbasins. By 2024, the following water quality compliance activities are required of all Region 3 GW Phase 2 operations (California Water Boards – Central Coast R3):

- Submit or update an electronic Notice of Intent (enrollment with the Region 3 Water Board)
- Collect and submit information for Total Nitrogen Application (TNA) report
- Conduct monitoring of on-farm domestic wells for nitrate & 1,2,3-TCP annually and report results; drinking water notifications are also required
- Primary irrigation well monitoring and reporting with annual sampling for nitrate and TDS
- Develop a groundwater trend monitoring workplan
- Well sampling & reporting either semi-annually or via an approved workplan
- Compile a trend evaluation report
- Meet either targets or limits for pollutants, depending on whether farm is enrolled whether the farm is participating with an approved third-party compliance service
- Ranch-level groundwater discharge monitoring may be required if targets or limits are exceeded. This is not required of farms enrolled in Third Party ACP

In 2006, the lettuce grower estimated a water quality compliance of $4.30 per acre. The farm's primary cost in 2006 was for water monitoring systems; flow meters were installed to report water use. Irrigation water quality testing was done for food safety compliance, not to protect water quality.

By 2017, the grower reported that costs had risen to $18.57 per acre, a 331% increase over the 2006 costs. Most of these costs involved increased monitoring and reporting of both groundwater as well as fertilizer applications to the land. Contracts with third-party testing services and a reporting system, as well as staff time comprised the largest components of compliance costs. The Sustainable Groundwater Management Act had not been fully

implemented, but the grower was investing significant time in education and planning for its implementation in the Salinas Valley. The compliance costs in 2017 also included the Salinas Valley Water Sustainability fee that ranchers paid into; for this grower it was $21,000 to help provide clean drinking water to area residents.

In 2024, most of the ongoing compliance activities are handled by an approved, third-party provider, Central Coast Water Quality Preservation, Inc., to which the ranch pays $43,000 annually. A manager who works mainly in compliance spends about 30 hours annually to prepare and submit the required electronic notice of intent to the water board. The owner and another family member spend several days working with the third-party provider to evaluate the ranch for reporting and monitoring purposes. A $15,000 annual add-on to the Famous software system tracks and reports nitrogen application by farm block. Reporting nitrogen applications to meet annual targets set by Ag 4.0 requires an estimated 86 hours of staff time annually. The ranch also spends $9,000 to replace flow meters per year. Overall, the ranch spent $10.45 per acre on water quality compliance fees and activities in 2024. The remaining costs are associated with groundwater allocation and sustainability.

As of 2020, the Sustainable Groundwater Management Act was implemented in all overdrafted groundwater basins in the state. The law, passed in 2014, required local water basins to develop a Groundwater Sustainability Agency (GSA) by 2018, which was tasked with developing an approved Groundwater Sustainability Plan (GSP) by 2020. Each overdrafted basin must meet their groundwater sustainability goals by 2040 (California Department of Water Resources). For the region pertaining to this study, the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) was formed in 2017, and in 2020, the GSP went into effect. The SVBGSA is comprised of six subbasins, and the fees associated with the GSA are determined by which subbasin(s) a ranch overlays. The cooperating grower's ranch falls within the 180/400 Foot and the Eastside subbasins. Each subbasin has required Tier 1 and Tier 2 fees calculated on a per-connection and per-irrigated acre basis. In 2024, the 180/400 Foot subbasin fees were $12.76 per acre and $5.22 per connection, and the Eastside subbasin fees were $11.24 and $4.54, respectively. Two of the other subbasins have fees as high as $21 and $43 per irrigated acre. Fees are set annually by the SVBGSA and are used to fund the agency and any regulatory activities, such as requirements to register wells and report groundwater use through the basins' Groundwater Monitoring Program. There are currently no demand management

requirements, but the SVBGSA held a variety of workshops to collect feedback from Salinas Valley landowners and residents during 2024 regarding future demand management strategies in the region. The cooperating ranch owners are very involved in SVBGSA and reported spending several hours per month on SGMA-related meetings and activities. The ranch is also a member of the Salinas Valley Basin Water Alliance, which was developed in late 2020 "in an effort for growers to track and engage with public water policy regarding groundwater supply" (SVBWA). The ranch pays $45,000 annually for membership.

The overall cost of education and compliance for SGMA and related activities in 2024 was $19.28 per acre, which did not exist as a separate category in 2017 as SGMA was not yet implemented. Water regulations overall accounted for $29.72 per acre, a 60% increase from 2017.

Pesticide Use Regulations

The U.S. Environmental Protection Agency regulates pesticides under the auspices provided by two major acts of Congress; the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and the Federal Food, Drug and Cosmetic Act (FFDCA). These were strengthened by the Food Quality Protection Act (FQPA), which became law in 1996. States are authorized to regulate pesticides under FIFRA and under state pesticide laws. States may place more restrictive requirements on pesticides than EPA. Both the EPA and the state must register a pesticide before distribution. California pesticides must undergo a more rigorous review than all other states. The Department of Pesticide Regulation, under Cal EPA, administers the certification and licensing process. Owners of private firms who plan to use restricted-use pesticides (as classified by the U.S. EPA) on their own property (defined as property owned/leased or rented by him/her or his/her employer) can apply for a Private Applicator Certificate, which requires the passage of an exam that is administered through the County Agriculture Commissioner's office. To renew the Private Applicator Certificate, six hours of continuing education over the three years of the valid certification is required.

An Agricultural Pest Control Advisor's (PCA) license is required of anyone who advises the use of restricted materials, and a Qualified Applicator's license is required of anyone planning to apply restricted materials for hire. The requirements for a PCA include 42 semester units of core courses, over and above a B.S. degree or equivalent. The applicant must pass a

Laws and Regulations exam, and must acquire 40 hours of DPR-approved continuing education every two years to maintain the license.

Both private applicators and PCAs are required to provide a Notice of Intent to the County Agricultural Commissioner at least 24 hours before the application of restricted materials. Since 1990, when the DPR began its "full-use reporting" program, private applicators and PCAs must report their applications monthly to the County Agricultural Commissioner, who then reports the data to the Department of Pesticide Regulation. The reports must include the data and location where the application was made, the type of crop, as well as the type and amount of pesticides used. The DPR keeps a comprehensive database of pesticide use in California (California Department of Pesticide Regulation).

The lettuce grower contracts out their crop protection services to third party providers and estimate that the embedded cost of pesticide regulation is around 5% of their costs, or $47.53 per acre. These regulatory costs would include posting signs, filing notices of intent, filing pesticide application reports, and is included in the price of the chemicals. One of the owners spends three hours annually renewing their pesticide certification, which added another $.06 per acre. In 2024, the total pesticide regulatory costs were reported as $47.59 per acre, a 34% increase over 2017 and a 107% increase since 2006. However, we note that these costs are likely underreported, as it is difficult without a comparison state (as in the 2006 study) to study the cost differences in pesticides due to increased registration costs in California and requirements to use a PCA. If a crop protection service includes their PCA and other regulatory services within the price of the chemicals, it is also difficult to ferret out the regulatory component. Some of the increased regulatory costs of pesticide use are also captured in other areas of this study, such as Education & Training for Regulatory Compliance as well as the Worker Protection Standard that accounts for the costs of safety gear for workers.

Food Safety

When the 2006 study was conducted, it preceded the E. coli outbreak in spinach that occurred later that year, and regulatory food safety oversight was minimal, mostly paying for a third-party food safety audit. In 2006, this grower spent $.64 per acre on food safety.

By 2017, food safety regulations were the grower's third highest compliance cost behind workers' compensation and other labor wage regulatory costs. Most of these compliance costs

were components of the Leafy Greens Marketing Agreement (LGMA) of 2007, an industry-developed set of food safety practices for California leafy greens producers and handlers. These were updated to correspond with the federal Food Safety Modernization Act of 2011, which included the Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption, which went into effect in 2016, commonly known as the Produce Safety Rule. The rule established, for the first time, scientific minimum standards for food safety throughout the entire food supply chain, from production and harvest to packaging, handling and transporting (U.S Food and Drug Administration).

The LGMA has five basic provisions at the farm level, covering the following areas: 1) Environment, 2) Water, 3) Soil Amendments, 4) Worker Practices and 5) Field Operations.

While the LGMA was fully enforced in 2017, food safety outbreaks still occurred. In 2018 and 2019, two E. coli outbreaks in Central Coast Romaine lettuce were traced to contaminated water. In response, the LGMA adopted more robust monitoring standards for agricultural water quality in 2019 and in 2020, refined its standards for harvest equipment sanitation and water quality assessment. In 2021, the LGMA added new requirements, including increased risk assessment from adjacent farmland, revised soil amendment and crop input requirements, and added root cause analysis to the already extensive list of food safety obligations for leafy greens production.

The original requirements for the LGMA are that a farm must have a written food safety plan that describes their management practices toward food safety. Growers must maintain buffer zones between fields and any areas used for livestock, compost or septic leach fields. Fields must be inspected prior to harvest for animal intrusion, either wild or domestic, and staff must document the incident and all or part of the crop might be destroyed.

With respect to worker practices, growers must provide toilet facilities and hand washing stations that are regularly cleaned and stocked with supplies. The facilities must be accessible from the workers' locations, and workers must participate in on-going training sessions and have signage posted regarding employer rules regarding hand washing and other sanitation issues such as eating and drinking near adjacent fields. Field operations with

respect to cross-contamination between other leafy greens fields is another component of the LGMA; growers must have in place a process to clean equipment between fields and identify any sources of contamination. Each production block must have a food safety harvest assessment, documenting cleaning and sanitation procedures, any evidence of animal intrusion, and equipment storage procedures. Farms are subject to both scheduled and unscheduled audits of their food safety practices (LGMA).

By 2024, the ranch has expanded its food safety staff to include two employees whose primary responsibilities are regulatory compliance. Their director of food safety spends half of their time in record keeping and documentation of food safety activities. Additional costs attributed to the food safety team are three pickup trucks that are used daily in compliance activities, driving to various ranch blocks to document food safety requirements. Harvest machinery sanitation requires one full-time worker for each of the four crews during the 32 weeks of the growing season, which costs nearly $100,000 annually. The foreman of each crew must test all of the workers' equipment and making sure the crew is following sanitation practices, as well as conduct the preharvest inspection and paperwork. This time totals over $62,000 during the season. Toilet facilities and handwashing facilities are provided for each crew and are cleaned every day during the season; the rental, maintenance and cleaning expenses are more than $25,000 for the season. Costs for the overall farm's toilet facilities, cleaning and maintenance are partially apportioned to the lettuce program. Third-party food safety audits for the lettuce portion of the farm cost $14,000 annually. The combined costs of food safety compliance in 2024 was $244.15 per acre – a 35% increase from 2017, and thousands of percent higher than the 2006 food safety cost of $.64 per acre.

Workers' Compensation

As with many regulatory costs, workers' compensation is a cost of doing business in California. All employers, even those with only one employee, are required to carry workers' compensation in the state. In California, the Division of Workers Compensation monitors and administers workers' compensation claims. California employers generally have three options to fund their workers' compensation benefits: (1) self-insurance, (2) private insurance, or (3) state insurance.

- Self-Insurance - This option is available for employers with at least $5 million in net worth, net income of $500,000 per year and be certified from the Department of Industrial Relations. Private employers must post security as a condition of receiving a certificate of consent to self-insure.
- Private Insurance - Employers may purchase insurance from any of the approximately 300 private insurance companies which are licensed by the Department of Insurance to provide workers' compensation insurance in California. Insurance companies are free to price this insurance at a level they deem appropriate for the insurance and services provided.
- State Insurance - Employers may also purchase insurance from the State Compensation Insurance Fund, a state-operated entity that exists solely to provide workers' compensation insurance on a non-profit basis (California Department of Industrial Relations).

Prior to the 2006 study, the state had undergone workers compensation reform in 2003 and 2004, a result of which reduced premiums for employers. The grower reported costs for workers' compensation as $58.94 per acre in 2006, 95% of which came from the 10% insurance premium on worker pay. The additional five percent came from clerical staff filing paperwork with the State of California. In 2006, workers' compensation comprised 54% of this grower's total regulatory costs.

California passed additional workers' compensation reforms in 2012; the primary changes were increased benefits to injured workers and new processes for independent bill review, a new fee schedule and changes in the calculations of permanent disability benefits, among others. Despite these reforms, workers compensation costs increased dramatically for the grower by 2017, mostly driven by wage increases. Because workers compensation is paid as a percentage of their pay rate, any increase in wages will result in an increase in workers' compensation costs, even when the premium level is constant.

By 2024, the same phenomenon occurred. The grower reported that the workers' compensation premium for field workers, supervisors and foremen is 15% of their wages, the same as in 2017. The grower noted that the harvest crews are paid on piece rate and typically earn $19 to $21 per hour. Workers' compensation is calculated based on actual earnings, so the grower's total cost of workers compensation premiums was $320 per acre. Workers' compensation for other employees, including the foremen, supervisors and overall farm employees (apportioned to the lettuce operation) added over $100 more per acre. Overall, the

grower's reported costs of workers' compensation in 2024 was $428.40 per acre, a 27% increase from 2017, and a 627% increase from 2006. It is possible that the 2006 study underestimated the workers' compensation costs to some degree – we did not consider the impact of piece rate wages, and thus used the minimum wage at the time, which was $6.75 per hour.

Affordable Care Act Requirements

The Affordable Care Act (ACA) of 2010 went into effect in 2014 and requires all employers with 50 or more full time or full-time-equivalent employees to provide health care coverage for their workforce, and file an annual information return to the IRS reporting whether and what type of health insurance is provided to employees. The same information must be provided to the employees annually to provide the IRS on their tax returns. While the federal individual mandate for health care coverage was eliminated from the ACA, California created an individual health care mandate enforceable with penalties starting in 2020. California's law requires employers to file reports on behalf of self-insured, full-time and part-time employees, along with covered dependents, as well as distribute proof-of-coverage forms to California resident employees.

The federal provision for employee-sponsored health care coverage and state-mandated reporting resulted in payments of $500 per worker per month for the harvest crew, and an apportioned cost of $80 per month to the lettuce operation for all-farm employees. Reporting requirements comprise 200 hours annually of the controller's time. Overall, ACA coverage and documentation cost $334.47 in 2024, an increase of 137% over 2017. The high cost of health care premiums is the primary cause; in 2017 the grower reported paying $250 per harvest worker per month, which doubled in the ensuing years.

Labor Health and Safety Requirements

The original study in 2006 did not include a category for this area of regulatory compliance. Heat stress and illness prevention measures were adopted by Cal OSHA in 2006 for those in outdoor occupations, defined as agriculture, construction, oil and gas extraction, landscaping, and the transportation or delivery of agriculture, construction or heavy materials. This was the first law of its kind in the nation, but there was little training or enforcement during this initial period. In the ensuing years, training became mandatory for both supervisors and

employees and additional worker protection standards have been developed. In 2015, Cal OSHA approved changes to its Heat Illness Standard, effective May 1, 2015. Employers must provide shade structures that are sufficient to cover all employees taking breaks at one time when the temperature is above 80°F. Clean, cool drinking water must be provided free of charge to employees, and both the shade structure and water must be nearby the workers' location. Many growers use portable shade wagons or trailers. Pre-shift heat stress trainings are required to remind workers about drinking sufficient water, taking breaks and the signs of heat stress. During extreme heat conditions, defined as 95°F or above, workers must take a 10-minute rest break to cool down every two hours in an eight-hour shift. Workers must also be able to take at least a five-minute break upon request, even if temperatures are below those thresholds. Farming operations are subject to unannounced inspections by Cal OSHA to check for compliance. Fines are assessed for any violations (California DIR, Heat).

With respect to pesticide safety, the training costs for the 2017 Worker Protection Standard were covered in the Education/Training for Regulatory Compliance category. However, it is the grower's responsibility to provide safety gear to the workers, such as gloves and protective eyewear. Some of these provisions are part of the LGMA food safety protocols as well. The lettuce grower estimates that the costs for the worker supplies comes to about $.05 cents per carton, or $42.50 per acre. Shade trailers for the lettuce operation cost about $1,200 per crew; after depreciating the cost of the trailers over six years this comes to $.21 per acre. Providing sufficient clean, cool drinking water to the crews during the season costs about $5 per crew per day. Overall, the cost of labor health and safety provisions cost $43.71 acre in 2024, a 52% increase from 2017.

Labor Wage Requirements

This category was part of the original study, but again, costs increased in conjunction with regulatory expansion through 2024. In 2006, the grower's labor wage requirements were reported as the time spent in filing employee paperwork and taxes primarily with respect to the workforce and was calculated as $1.36 per acre. As in many other categories, new regulations greatly expanded this cost by 2017 and furthermore in 2024. In 2016, AB 1513 went into effect for employers of piece rate workers. The California Labor Code was amended to establish separate wage calculations to compensation for rest or other non-productive time so as not to

penalize workers for taking rest breaks. Most of this grower's workforce is paid on piece rate, so the foremen must document and payroll staff must calculate the non-productive time. This time is paid at an average hourly rate based on their piece work rate. The grower estimated this regulation cost $.35 per carton for additional documentation time required of staff and higher wage rates for rest breaks. Additionally, SB 3, the Healthy Workplace Healthy Families Act of 2014, requires employers to provide paid sick leave for any employee who works 30 or more days within a year, including part-time and temporary workers. Employees earn at least one hour of paid sick leave for every 30 hours worked (California DIR). Beginning in January 2024, the mandated number of paid sick days increased from 24 hours (three days) to 40 hours (five days). The grower estimates that the expanded paid sick leave costs $.15 per carton. The total combined cost to the grower for nonproductive time wage increases and sick leave, are calculated at $425 per acre, a 125% increase over 2017, and is the second highest regulatory cost category.

Assessments

The California Leafy Greens Research Board began in 2008, after a referendum by the leafy greens growers and approval by the California Department of Food and Agriculture. The 2024 assessment on growers was $.004 per carton. This organization is separate from the Leafy Greens Marketing Agreement, which required growers to pay .012 per carton in 2024. The total cost per acre for these assessments was $13.18 per acre in 2018. As in the previous study, this is the rare regulatory category that decreased over the study period; in 2017 the assessment rates were higher and the cost per acre was $14.88, so the 2024 cost decreased by -11%. In 2006, under an industry marketing board assessment that preceded the LGMA, the cost was $19.66 per acre.

Summary and Conclusion

In the decades since the initial case study, the regulatory costs of production have skyrocketed in California. The first update to the 2006 study showed a 795% increase in regulatory costs, from $109.16 per acre in 2006 to $977.30 per acre in 2017. Increased compliance requirements in 2024 bring the grower's total costs of regulation to $1,600.12 per acre, which is a 63.7% increase from 2017 and a 1,366% increase since 2006. Total costs for lettuce production increased by 24.8% from 2006, from $8,793 per acre in 2006 to $10,977 in

2017. In 2024, the grower reported production costs of $12,702.47 per acre, a 15.7% increase from 2017 and a 44.4% increase since 2006.

As the fresh produce industry has adapted to the food safety requirements of the LGMA and Produce Rule in the ensuing years, the most notable increases in regulatory costs in this update are those associated with labor. The Affordable Care Act and reporting requirements, the additional labor wage requirements for provision of sick leave and the higher average wages for piece rate workers all contribute to this growth. While workers' compensation premiums have stabilized, higher average wage rates due to both regulatory requirements and the general agricultural labor market shortage drive up workers' compensation costs.

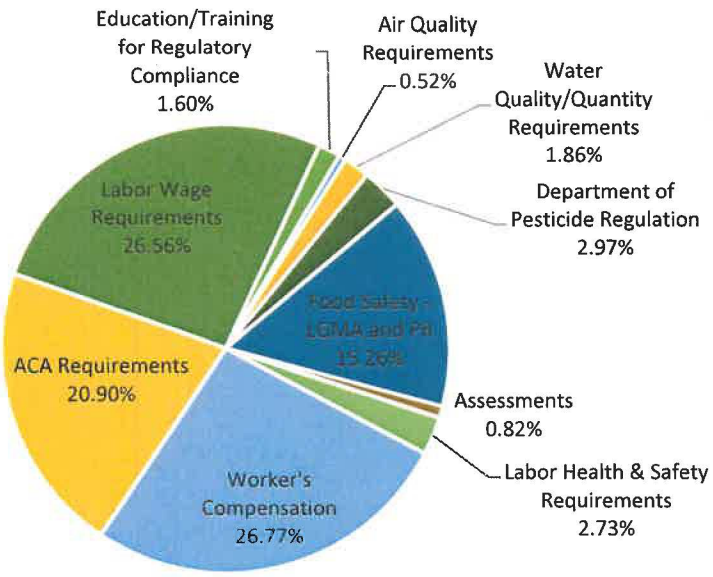
The two most significant environmental regulations involve water, and the implementation of SGMA and Ag Order 4.0 resulted in a 60% increase in regulatory costs compared to 2017. Even though the Salinas Valley is in a relatively clean air region, increased stipulations for agricultural equipment emissions and equipment replacement under the Truck and Bus Rule increased cost of compliance by 56%. Table 1 summarizes the changes in the regulatory costs from 2006 to 2017 to 2024.

Table 1. Regulatory Cost Changes for Salinas Valley Lettuce Grower, 2006, 2017 & 2024

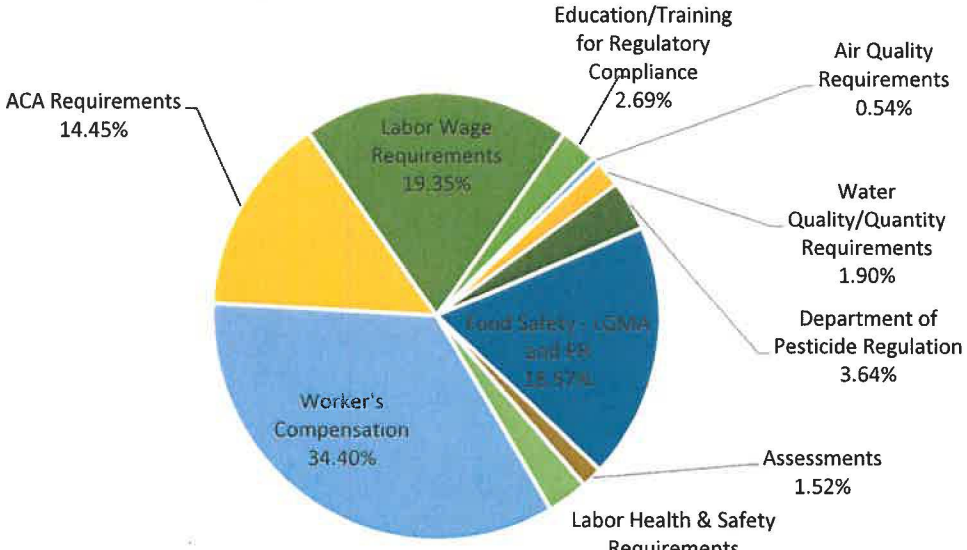
Regulatory Category	2006	2017	2024
	Cost per acre		
Education/Training for Regulatory Compliance	$1.27	$26.31	$25.60
Air Quality Requirements	$0.00	$5.31	$8.29
Water Quality/Quantity Requirements	$4.30	$18.57	$29.72
Department of Pesticide Regulation	$22.98	$35.55	$47.59
Food Safety - LGMA and PR	$0.64	$181.48	$244.15
Assessments	$19.66	$14.88	$13.18
Labor Health & Safety Requirements	$0.00	$28.72	$43.71
Worker's Compensation	$58.94	$336.23	$428.40
ACA Requirements	$0.00	$141.19	$334.47
Labor Wage Requirements	$1.36	$189.10	$425.00
Totals (per acre)	**$109.16**	**$977.34**	**$1,600.12**

Figure 1 on the following page depicts the percentage breakdown for each regulatory category by year. Though workers' compensation remains the most expensive regulatory category in 2024 and has dramatically increased since 2006, its relative cost has diminished as other regulatory costs, notably labor wage requirements, food safety, and health insurance, have increased.

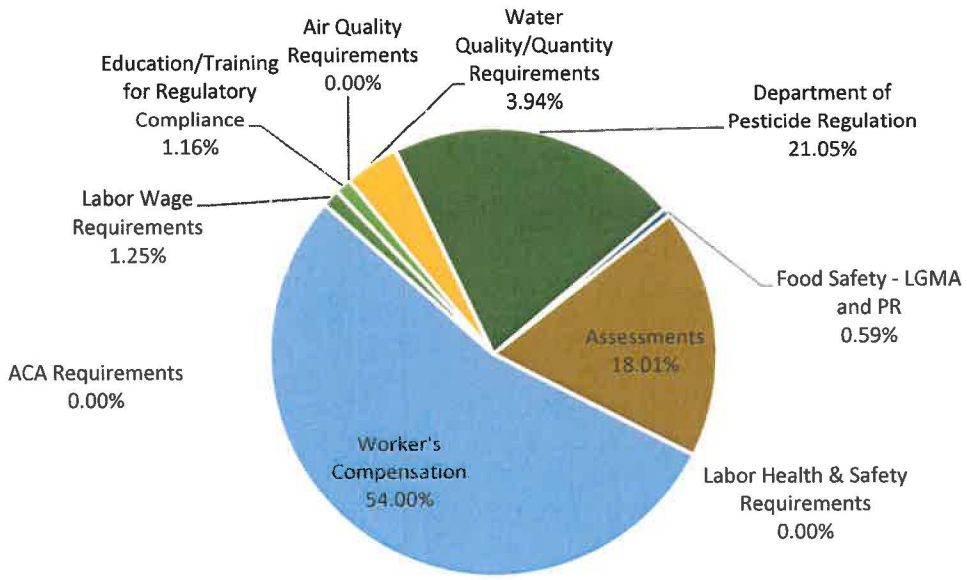
Figure 1. Regulatory Category Comparisons 2024, 2017, & 2006



2024 Regulatory Costs - $1600.12/acre



2017 Regulatory Costs - $977.34/acre



2006 Regulatory Costs - $109.16/acre

The impact of California's minimum wage laws and agricultural overtime rules were not directly included as a regulatory cost in this study, though the impacts are embedded. California's minimum wage was $6.75 per hour in 2006, increased to $10.50 in 2017 and was $16.00 per hour in 2024. However, the fresh produce industry increasingly relies on the federal H2A program for workers to shore up a domestic agricultural labor shortage. California's 2024 H2A adverse effective wage rate was $19.75, thus becoming the effective minimum wage for industries reliant upon this program (U.S. Department of Labor). Additionally, the harvest workers are paid piece rate wages (with a guarantee of at least minimum wage), and the grower reported that the lettuce workforce earned between $19 - $21 per hour in 2024. Thus, the effect of higher California minimum wage laws is not directly factored into this case study, though we recognize its indirect impact.

The agricultural overtime law passed in 2016 and was phased in starting in 2019 with final implementation in 2022. While we did not expressly calculate the impact on the grower, we do note a change in harvest crews – the grower added a lettuce harvest crew via a labor contractor, and the crews worked 40 hours per week. The previous two studies reported harvest crews working the then-standard 60 hours per week. Though the overhead costs for hiring additional labor is expensive (and is captured in the regulatory costs represented in this study), it

is less costly than paying workers overtime. The growers noted the change in crew numbers was a cost-reduction decision.

As was the case in the previous two studies, some laws are in the process of full implementation. Ag Order 4.0 includes a plan for much more restrictive surface water management, requiring all surface water run-off to be captured and/or eliminated. Phase-in begins based on surface water priority regions, and initial work plans have been submitted in those areas. This study did not include those requirements, as the ranch location was not in a current compliance zone. The growers noted they will have to build grass waterways, retention ponds, and likely will have to remove acreage from production to meet the regulatory requirements for surface water discharge. The timeline stretches into 2032, but implementation will require significant adjustments all over Salinas Valley.

Policy Implications

The purpose of the initial case study conducted in 2006 was to compare regulatory costs between California, Arizona and Texas and to quantify, at the grower level, the cumulative effect of regulation. We know of no prior studies that document the total effect of environmental and employee regulations at the farm level, though subsequent work has been conducted by the authors as well as other researchers. Though there are certainly limitations to the case-study method that make it difficult to extrapolate these results industry-wide, this study provides a snapshot of the regulatory burden faced by a large grower of one of California's top agricultural commodities over a time span characterized by a wave of new regulations. Policies are fragmented among a broad swath of government agencies, at regional, state and federal levels, and it is rare that a government agency understands the total regulatory burden growers face, or the impacts of increasing regulations. No one (except the growers) seems to understand that rising regulatory costs erodes profits and limits their long-term ability to keep farming and growing food. Farms are price takers and have little ability to pass along the increased cost of production, from regulatory or other input cost increases.

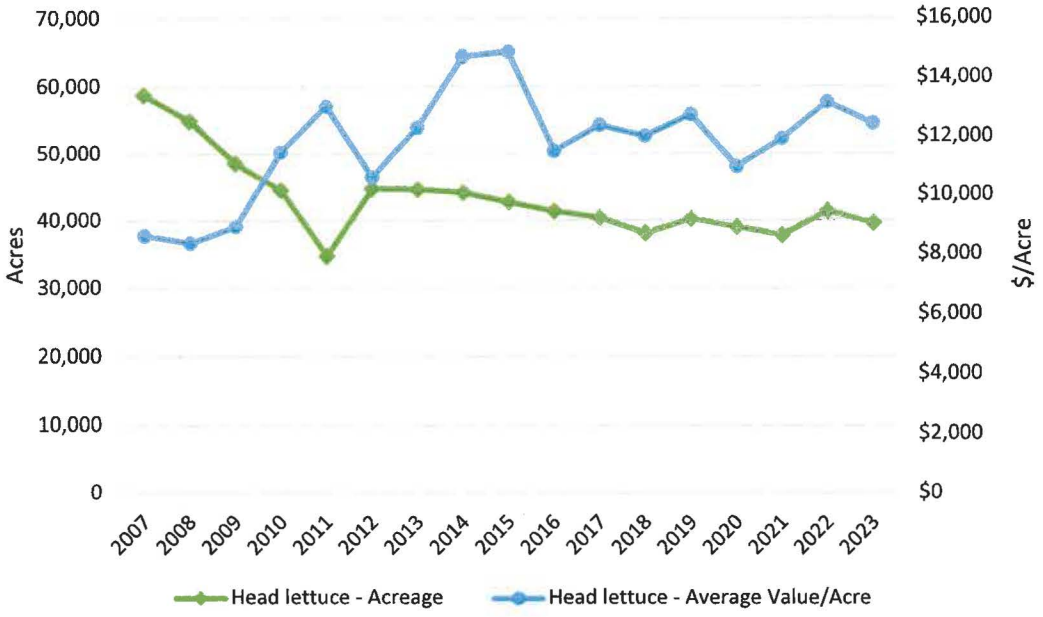
The work presented here depicts the dramatic rise over time in the regulatory burden in agriculture. Notably, most of the additional regulations since 2006 (the largest exception being the Affordable Care Act) were enacted at the state level. Amid the backdrop of existing environmental and economic stresses caused by recurring drought, climate change, labor

shortages, and uncertainty in trade and immigration policy, California's future as the U.S.'s number one agriculture state seems imperiled. Anecdotal evidence from growers as well as recent research indicate that other states are not necessarily California's biggest competition, but other countries. A recent report by the University of Illinois highlights the exponential growth of Peru's blueberry industry in the last decade (Pazos and Janzen, 2025), and production is on track to overtake the U.S. The study notes country's ability to compete in grapes and avocados, and the Peruvian government is making large investments in irrigation to bring more land into production. Large specialty crop producers such as Driscoll's, Sun Pacific and Mission Avocado have expanded their operations into Central and South America where land, labor, water and regulatory costs are a fraction of that in the U.S. Such a trend could permanently change California's dominant position in U.S. agriculture.

Since the 2017 study was published, automation and AI has started to infiltrate specialty crop agriculture, and further, well-directed adaptation could hold promise in helping to maintain competitiveness. A recent case study published by Western Growers showed significant labor cost savings by adopting laser weeder technology in specialty crops. While these innovations are still in the early adopter stage, the future could provide regulatory relief in finding alternatives to an increasingly expensive labor force, not only in indirect regulatory costs, but in rising direct wages. Technology also has the potential to reduce reliance on chemical herbicides and more efficiently use scarce water supplies.

Finally, it is important to note the relative impact of increased regulatory costs on growers' ability to generate profit. If farmgate values of head lettuce were keeping up with increases in production and regulatory costs, growers would be able to absorb increased costs. This, however, is not the case. Figure 2 illustrates the relative flat trend in acreage and the average value of head lettuce per acre. Since the previous case study, the average farm-gate value per acre for head lettuce has been $12,256. Grower margins over cash production costs have become thinner over time and with additional regulatory costs growers are likely to experience more unprofitable seasons.

Figure 2. Head Lettuce Acreage and Average Value per Acre for Monterey County



Source: Monterey County Crop Reports, 2007 - 2023.

This case study once again indicates that California agricultural producers face increasingly intensifying regulatory pressure. While California agriculture has thus far shown resilience as regulations have escalated, the results of this study provide evidence that the regulatory burden has far surpassed production cost increases. Whether California agriculture continues to be a dominant force in the U.S. food system may at least in part depend on growers' abilities to withstand the increasingly expensive regulatory environment in the Golden State.

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