

Conflicts in California's Food Safety and Sustainable Agricultural Practices

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On-farm food safety practices focus on mitigating sources of foodborne pathogens, such as *Escherichia coli* (*E. coli*) and *Salmonella enterica*, and managing potential routes of exposure through water, soil, and animal movement. However, many practices conflict with practices designed to enhance sustainability or environmental quality. Consequently, California growers must balance policy and program requirements for food safety and environmental protection to produce a safe, healthy, and sustainable food supply.



Sustainable farming practices like on-farm ponds may attract wildlife that will lead to lost points on food safety audits.

Photo Credit: Ginger Jordan on Unspalsh.

Foodborne illness outbreaks have serious consequences for agriculture by disrupting supply chains, shaking consumer confidence, and causing economic losses, and potentially resulting in illnesses and deaths. Recent outbreaks and liability concerns have increased pressure on growers to address food safety risks. In 2019,

the U.S. Food and Drug Administration (FDA) initiated the “new era of smarter food safety,” and industry groups are strengthening their food-safety practice standards, including water treatment, animal exclusion, and no-harvest buffer zones.

Meanwhile, California has invested significantly in encouraging the adoption of sustainable, climate-smart agricultural practices through governmental policies and programs. State-wide initiatives include efforts to promote water quality and use-efficiency, soil health, wildlife conservation, and pest management with lower chemical inputs. Among these system-wide efforts to promote sustainability are practices that conflict with on-farm government- or industry-set requirements for food safety.

In this regulatory context, growers may be constrained by competing pressures in their attempt to balance and promote both objectives. For example, sustainable practices that support wildlife or integrate livestock on-farm are counterbalanced by costs such as lost production from no-harvest buffer zones. The challenge of balancing the two can limit the adoption of alternative, sustainable practices and the success of policies and programs that support them.

Key On-Farm Food Safety Requirements

Requirements vary in form, governance, and prescriptiveness. Under the federal Food Safety Modernization Act (FSMA), the FDA sets risk-based, prevention-oriented safety standards. FSMA's Produce Safety Rule (PSR) outlines guidelines for managing major sources of potential contamination. The California Department of

Food and Agriculture's (CDFA) Produce Safety Program is the designated authority for inspection and enforcement of the PSR.

Voluntary commodity-specific programs, such as those under the California Leafy Greens Marketing Agreement (LGMA) and the California Cantaloupe Advisory Board, set food safety guidelines that are typically more rigorous than FSMA. Audits by USDA-certified government inspectors ensure compliance and are conducted separately from FSMA inspections.

Large processors, retailers, and buyers may impose additional, more-stringent requirements. These requirements are often proprietary information, making it difficult to assess their incremental impact on either food safety or grower returns. Inspections to meet buyer standards are separate from FSMA compliance inspections.

Key Sustainable Agriculture Initiatives for California Growers

Within CDFA, the Environmental Farming Incentive Program funds soil health, water efficiency, and nutrient management practices on agricultural lands, including the Healthy Soils (HSP) and State Water Efficiency and Enhancement (SWEEP) Programs. These programs, along with the federal Environmental Quality Incentives (EQIP) and Conservation Stewardship (CSP) Programs, promote practices such as cover crops, hedgerows, compost, buffer strips, grassed waterways, and constructed wetlands. These programs are voluntary. However, environmental regulations can require growers to implement sustainable practices, such as establishing vegetated setbacks as part of riparian area management.

Conflicts: Water

Maintaining water quality is important to human and environmental health. Vegetative buffers, grassed waterways, and constructed wetlands act as natural filters for microbes, nitrogen and other fertilizers, and pesticides. In order to manage nitrogen runoff, Regional Water Quality Control Boards (RWQCB) are starting to require growers to monitor and report, as well as limit, the amount of nitrogen that is applied and removed from fields. Water conservation and efficiency practices, such as groundwater recharge, are increasingly prevalent amid frequent drought conditions statewide. Starting in 2020, the Sustainable Groundwater Management Act (SGMA) began requiring local agencies to form groundwater sustainability agencies tasked with developing and implementing groundwater sustainability plans.

Food safety requirements regarding water focus on minimizing the risk of contact with pathogen-contaminated water. The PSR sets agricultural water quality standards. Antimicrobial and chlorine treatments may be required to meet these water quality standards. Buyer food-safety requirements can mandate specific no-harvest buffers between harvestable crops and pooled water, as well as require specific practices when using exposed water sources such as irrigation ditches and ponds.

Such food safety requirements may restrict or eliminate the use of on-farm practices that protect water quality and quantity. Chemically treated exposed water may expose wildlife to toxins, and in turn, wildlife may contaminate the water and irrigated crops with pathogens. Growers can lose points on compliance audits if they irrigate with surface water rather than groundwater, despite depleted groundwater reservoirs in some regions. The PSR requires measures to

reduce potential “hazards as a result of contact of covered produce with pooled water.” Industry standards are stricter: the LGMA requires a no-harvest buffer of at least 30 feet from flood water, while buyers and shippers may require 30–50 feet from irrigation reservoirs, ponds, and catch basins. These requirements may conflict with groundwater recharge and flood-management efforts.

Growers have adjusted their production practices in response. Growers have reported creating no-harvest buffers and even disking under entire fields of crops when a perceived risk (e.g., animal feces) is present. However, disking leaves excess nitrogen in the field, which conflicts with enforceable water quality regulations that require applied and removed nitrogen reporting. One almond grower reported that the guidance provided to them by food safety auditors would have resulted in a violation of the Clean Water Act.

Reusing water, saving water, or using water for habitat improvements can conflict with food safety. Pooled and flood water, waterbodies (ponds, reservoirs, wetlands), and irrigation reuse systems (tailwater recovery ponds), may attract animals and can lead to lost points on food safety audits. Biological material from utilizing dairy effluent for irrigation presents a food-safety concern for crops harvested from the ground. Land fallowed under SGMA and other water-use restrictions may be managed with non-crop vegetation to support groundwater recharge. Yet, non-crop vegetation is one of the most-cited food safety concerns due to the increased risk of contamination.

Conflicts: Soil

The government heavily incentivizes practices that support soil health financially; from 2016 to 2023, the CDEFA allocated \$105 million in state

funding to the HSP and funded 1,500 projects. Programs such as HSP, EQIP, CSP, and many others promote practices including composting, crop rotation, and cover crops, which can enhance soil microbial abundance, activity, and diversity.

Food-safety requirements raise concern over the use of soil amendments containing animal materials that may introduce *E. Coli* or other pathogens. Non-crop vegetation, including cover crops, can create issues for food safety when they attract wildlife that may harbor pathogens. While the PSR sets application and microbial treatment standards for the use of biological soil amendments of animal origin, they tend to be broadly described, which can leave growers subject to varying interpretations for enforcement.

Commodity-specific and buyer requirements may also apply. The LGMA does not allow soil amendments that contain raw manure, untreated animal products, or un-composted green waste; if they have been applied, there is a required one-year waiting period prior to producing leafy greens. The National Organic Program also requires a waiting period. Buyers may require longer waiting periods. As a result of food safety requirements, growers in orchard systems are moving toward composted manure; however, current requirements can make on-farm composting difficult. For example, shelling factories would not accept one grower’s almonds if compost had been applied to the ground.

Conflicts: Domestic and Wild Animals

Diversified, mixed crop-livestock farming systems are often considered a sustainable practice; grazing can enhance soil fertility. Many programs promote on-farm wildlife habitat through practices that support non-crop vegetation, such as hedgerows.

Hedgerows provide habitat for pest's natural enemies, pollinators, and other wildlife.

The presence of animal activity, wild or domestic, can cause food-safety concerns. Cats, which support natural rodent control, introduce the possibility of carrying toxoplasmosis into packing houses. Furthermore, growers will use animals to graze cover crops prior to harvest, but droppings can create food-safety issues. Livestock are known to harbor pathogens in feces; thus, the integration of livestock into farm operations is sometimes prohibited due to the risk of contamination. Small and medium farms have shown increased interest in diversifying operations by integrating livestock, such as poultry, sheep, and pigs, that can help support soil health but are sometimes discouraged by food-safety inspectors.

While the science regarding the role of wildlife is not as well-established, there are concerns within the agri-food industry about the risks. Wildlife such as deer are sometimes attracted to cover crops in ground-harvested nut orchards, which conflicts with some buyer food-safety requirements to restrict wildlife. While FSMA does not require farms "to exclude animals...destroy animal habitat...or otherwise clear farm borders," growers may employ these practices, especially under pressure from stricter requirements. The PSR does require growers to check for potential contamination from animals and "take all measures reasonably necessary" to determine whether the crop can be harvested.

Hedgerows, a highly incentivized field structure, can result in lost points on food-safety audits. Buyers' no-harvest buffer requirements can range from five feet to an entire field. To minimize the risk of animal intrusion, growers report discouraging, and even directly eliminating, wildlife and habitat. A farm that manages on-farm habitat and is adjacent to wildlife refuges

reported that wildlife observed by auditors at harvest resulted in crop destruction.

Policy Implications

The difficulties growers face undertaking sustainable agricultural practices while meeting food-safety requirements may inhibit the success of governmental policies meant to support those practices. Consequently, growers may have trouble achieving regulatory compliance in the face of policies with competing objectives.

Food safety conflicts can be costly for growers. No-harvest buffers can reduce revenues by reducing productive land. Growers forced to alter practices may experience yield loss or increased production costs. These conflicts can also prevent information sharing between growers—a key strategy for sustainable practice adoption. In the face of regulatory uncertainty with regard to competing objectives and conflicting practice requirements, growers may be hesitant to discuss their farm management practices for fear of regulatory enforcement; this hesitancy prevents the spread of best practices through farmer-to-farmer knowledge networks.

Given these challenges, policymakers can evaluate interactions among policies and programs to help growers balance food safety and sustainability. This may include considering the following actions: evaluating the practices eligible for incentive funding; developing metrics for policy/program and practice adoption success; funding additional research about how to achieve food-safety objectives while also using sustainable practices; and endeavoring to ensure that mandatory environmental regulations do not compromise food safety.

The conflicts growers face in on-farm management practices reflect competing priorities of industry stakeholders and government agencies. These

parties should engage directly; growers alone cannot be responsible for determining what constitutes safe and sustainable food for society.

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This research was conducted while Zakowski was employed at the CDEA.

For additional information, the authors recommend:

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