

# CLIMATE THREATS, ABUNDANT SOLUTIONS:

## Climate Change and Agriculture Recommendations to the New California Governor

September 2018



**CalCAN**  
CALIFORNIA CLIMATE &  
AGRICULTURE NETWORK

# CLIMATE THREATS, ABUNDANT SOLUTIONS:

## Climate Change and Agriculture Recommendations to the New California Governor

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The California Climate and Agriculture Network (CalCAN) is a statewide coalition that advances policy reforms to realize the powerful climate solutions offered by sustainable and organic agriculture. Since 2009, we have cultivated farmer leadership to face the challenges of climate change and to serve as the sustainable agriculture voice on climate change policy in California.

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# GLOSSARY

<b>AB 32</b>	Assembly Bill 32, Global Warming Solutions Act of 2006
<b>AHSC</b>	Affordable Housing and Sustainable Communities
<b>AMMP</b>	Alternative Manure Management Program
<b>ARB</b>	Air Resources Board
<b>CalCAN</b>	California Climate and Agriculture Network
<b>CARCD</b>	California Association of Resource Conservation Districts
<b>CDFA</b>	California Department of Food and Agriculture
<b>CEC</b>	California Energy Commission
<b>CPUC</b>	California Public Utility Commission
<b>DAC</b>	Disadvantaged community
<b>DDRP</b>	Dairy Digester Research and Development Program
<b>DOC</b>	Department of Conservation
<b>DWR</b>	Department of Water Resources
<b>EPIC</b>	Electric Program Investment Charge
<b>FREP</b>	Fertilizer Research and Education Program
<b>GGRF</b>	Greenhouse Gas Reduction Fund
<b>GHG</b>	Greenhouse gas
<b>GSA</b>	Groundwater sustainability agency
<b>GSP</b>	Groundwater sustainability plan
<b>ILRP</b>	Irrigated Lands Regulatory Program
<b>LAFCO</b>	Local Agency Formation Commission
<b>NEMA</b>	Net Energy Metering Aggregation
<b>NRCS</b>	Natural Resources Conservation Service
<b>OPR</b>	Office of Planning and Research
<b>PIER</b>	Public Interest Energy Research
<b>RCD</b>	Resource Conservation District
<b>SALCP</b>	Sustainable Agricultural Lands Conservation Program
<b>SAREP</b>	UC Sustainable Agriculture Research and Education Program
<b>SGC</b>	Strategic Growth Council
<b>SGMA</b>	Sustainable Groundwater Management Act
<b>SWEEP</b>	State Water Efficiency and Enhancement Program
<b>UCANR</b>	University of California Agriculture and Natural Resources
<b>UCCE</b>	University of California Cooperative Extension
<b>USDA</b>	United States Department of Agriculture
<b>WCB</b>	Wildlife Conservation Board



# EXECUTIVE SUMMARY

**In January 2019, the new Governor of California will enter office at a pivotal time for the state’s efforts to transform to a clean energy economy. While the federal government denies and obscures fundamental threats of a changing climate, California continues to embrace its efforts to avoid the worst impacts of climate change and transition to a cleaner, more resilient economy. Those efforts are paying off. This year, the state reported achieving its goal to reduce annual greenhouse gas (GHG) emissions to 1990 levels four years ahead of schedule, a milestone in the efforts begun with the passage of the Global Warming Solutions Act (AB 32) in 2006.**

The new Governor will have important choices to make in how the state deepens and expands upon this transformational climate change work. Agriculture will necessarily have to be central to this effort. Our food security and the vitality of our rural and urban communities depend upon it.

The California Climate and Agriculture Network (CalCAN) formed as a coalition of sustainable and organic agriculture organizations in 2009 to forward agricultural solutions to climate change. Climate science tells us that agriculture is among the most vulnerable industries to greater weather extremes and rising temperatures. We also know that biologically-based, ecologically diverse agriculture that reduces synthetic inputs and conserves natural resources has much to offer when it comes to storing carbon in our soils, reducing potent GHG emissions, improving air and water quality and enhancing resiliency to a changing climate.

In our report, *Climate Threats, Abundant Solutions: Climate Change and Agriculture Recommendations to the New California Governor*, we review the important progress made under Governor Jerry Brown to advance agricultural solutions to climate change. We also put forward a comprehensive set of recommendations to the new Governor of California to advance this work. To be successful we must scale up, integrate, streamline and level the playing field.

The recommendations in the report were informed by some of the state’s leading scientists, farmers and advocates who are experts on climate change and agriculture issues (see list of reviewers).

California agriculture must lead the way in developing innovative responses to climate change. Our farms and ranches must become net carbon sinks, producers of renewable energy and home to diversified operations that can adapt to increasingly variable and unpredictable weather patterns.



Under Governor Brown's leadership, California has launched a suite of Climate Smart Agriculture programs that have the potential to transform the way we do the business of agriculture. To date, more than \$400 million has been invested in programs to save water and energy on farms, protect agricultural lands at risk of development, increase carbon sinks in our agricultural soils and reduce potent methane emissions from dairies and livestock operations.

While these early investments are an important start, the next Governor of California must deepen these efforts to succeed in transforming agriculture. Our long-term food security and environmental health depend on California prioritizing sustainable agricultural solutions to climate change.

In the last two years of the Brown administration this focus on multi-benefit sustainable agricultural solutions to climate change has been challenged. Budgets of two Climate Smart Agriculture programs, the Healthy Soils Program and the State Water Efficiency and Enhancement Program (SWEEP), were zeroed out in fiscal year (FY) 2017-18 and greatly reduced in FY 2018-19. But in those same years, \$600 million was allocated to priorities of conventional agriculture trade associations to fund air quality and cap-and-trade compliance, including farm equipment upgrades, dairy digesters and food processor energy efficiency programs. Such a shift away from multi-benefit Climate Smart Agriculture puts at risk agriculture's ability to be ready for a changing climate.

As we look to the next four years, we recommend the following principles to the new Governor to inform the efforts to achieve sustainable food and farming systems in California for decades to come.

### **SCALE UP:**

The next Governor must scale up our investments in Climate Smart Agriculture if we are to reach a critical mass of the state's large and diverse farming community. Moreover, the new Governor should increase our targets for GHG emissions reductions from agriculture and natural and working lands.

### **INTEGRATE:**

The next administration can speed up adoption of Climate Smart Agriculture by better integrating these efforts across programs, moving away from siloed programs that can miss synergistic benefits.

### **STREAMLINE:**

Regulatory streamlining can achieve important impacts without increasing the cost of compliance or forgoing intended environmental health benefits. Farmers often face competing and complex regulatory schemes that can constrain our ability to achieve transformative farming systems.

### **LEVEL THE PLAYING FIELD:**

Small and mid-scale farmers and socially disadvantaged farmers are also among the least resourced and least prepared to address a changing climate, but their contribution to our food security and rural communities makes them essential partners in climate solutions. As the state deepens and expands its efforts to build a more resilient food and farming system, the new Governor should emphasize the need for resources for those farmers, farmworkers and rural communities most at risk.

What follows is a set of recommendations to the new Governor of California on policies and programs needed to accelerate and scale up agriculture's powerful and unique climate solutions.



# FARMLAND CONSERVATION RECOMMENDATIONS

## Administrative Action:

- Develop a regional “hotspot” approach to a portion of the Sustainable Agricultural Lands Conservation Program (SALCP) and Affordable Housing and Sustainable Communities (AHSC) funds. Develop criteria for combined SALCP and AHSC investments in regions that would benefit from coordination of both an in-fill/transit-friendly development approach and improved farmland conservation efforts.
- Develop a consistent mitigation standard of three acres of farmland preserved for every one acre converted to non-agricultural uses for state-funded public works projects.
- Develop a Governor’s taskforce of stakeholders to advance farmland conservation reforms, including Williamson Act, farmland mitigation, Local Agency Formation Commission (LAFCO) and other reforms, with the goal of taking a comprehensive approach to the farmland loss issue.

## Legislative Action:

- Require several key LAFCO reforms to better support in-fill development and protection of farmland, including:
  - Require LAFCOs to establish baseline requirements for annexation and spheres of influence for local governments.
  - Require that LAFCOs’ Municipal Service review updates include an inventory of agricultural and open space lands and potential development patterns to make informed decisions on annexation and sphere of influence amendment proposals, and to define the location of prime agricultural lands within their jurisdictions.
  - Require all LAFCOs to assess the feasibility of adjusting sphere of influence boundaries to remove prime agricultural lands from those boundaries and reduce the size of spheres of influence around each city.
  - Require that local jurisdictions have reasonable urban growth boundaries and farmland mitigation policies before annexation of additional territory is allowed. The law should be amended to allow cities to annex land for the purpose of permanently protecting it as farmland, thereby allowing cities to effectively create buffers between urbanized areas.

## Budget Action:

- Maintain consistent and reliable funding for the SALCP by supporting its ongoing continuous appropriation of 10 percent of the Greenhouse Gas Reduction Fund (GGRF) allocation to the Strategic Growth Council (SGC).
- Fund city and county government planning and policy development efforts, as specified in SB 732 (Stern, 2017) to improve farmland conservation, including the development of mitigation policies, urban growth boundaries and transfer of development rights programs.



- Restore subvention payments to counties for a reformed Williamson Act. Such reforms should include landowner requirements to improve soil and water conservation efforts on their agricultural lands, including developing and implementing a conservation plan. Other reforms that should be considered include higher subvention payments for longer contracts (30- and 40-year rolling contracts, compared to current 10- or 20-year rolling contracts) and improved local government farmland mapping and conservation policy development.

## HEALTHY SOILS RECOMMENDATIONS

### Administrative Action:

- Through the state’s Climate Change Research Plan and the Air Resources Board’s (ARB) Annual Research Plan, fund long-term working lands research projects to more accurately quantify the economic return of healthy soils practices for producers, improve understanding of the stacking of farm practices to increase carbon storage and inform our understanding of healthy soils contributions to ecological services, such as improved drought resiliency, flood protections and groundwater recharge.
- Improve the California Department of Food and Agriculture’s (CDFA) implementation of the Healthy Soils Program through development of a simplified application, increased farmer access to technical assistance and clarification in the program guidelines that demonstration projects are for farmer-to-farmer demonstration projects focused on expanding adoption of such practices, not research (as described in FAC, Div. 1, Part 1, Ch. 3, Sec. 569).
- Direct the Department of Water Resources (DWR) to include in their agricultural water conservation and flood risk mitigation programs support for on-farm practices that improve soil water infiltration, groundwater recharge and soil water retention capacity.
- CalRecycle, working with CDFA, should conduct an analysis of the regulatory and financial barriers to compost production as well as regional and crop-specific market demand for compost in agriculture.
- Improve implementation of AB 2174 (Alejo, 2012) that directs CDFA Fertilizer Research and Education Program (FREP) funds to improve technical assistance, research and education on improved nutrient management that results in minimizing impacts of nitrogen fertilizers to the environment, including nitrates in groundwater and GHG emissions. A greater portion of FREP funds should be used for this purpose.
- As proposed by the Department of Conservation (DOC), implement the “third phase” of SALCP by incentivizing conservation easement holders to improve soils management to increase carbon sequestration and reduce related GHG emissions.



## Legislative Action:

- Diversify the membership of the CDFA FREP advisory board and technical advisory subcommittee to include more soil health and climate change experts with expertise in soils management, compost production and related GHG mitigation in agriculture.

## Budget Action:

- Increase funding for the Healthy Soils Program to drive innovation and support transformative agricultural practices.
- Increase funding for organic waste diversion and composting through CalRecycle's GGRF funds.
- Provide seed funding for the California Farm Demonstration Network coordinated by the California Association of Resource Conservation Districts (CARCD) with the University of California's Agriculture and Natural Resources (UCANR), CDFA and other partners.

# WATER STEWARDSHIP RECOMMENDATIONS

## Administrative Action:

- Update the SWEEP guidelines to allow incentives for more efficient flood irrigation systems for those still relying on surface irrigation. Also include incentives for soil management practices (e.g., compost, mulch and cover crops) that improve water infiltration and storage capacity in the soil, groundwater recharge and reduce GHGs.
- To improve Sustainable Groundwater Management Act (SGMA) implementation, support research on groundwater recharge best management practices in agriculture, including flooding of orchard and vineyard crops. Additionally, simplify permitting for on-farm groundwater recharge and pond building that demonstrably produce environmental benefits.
- Require more detail in the reporting by irrigation districts of their water conservation and drought preparedness measures in their Agricultural Water Management Plans to DWR.
- Direct the appropriate agencies to create a digital hub for information regarding groundwater recharge incentives, permits, regulations and research.
- Develop Irrigated Lands Regulatory Program (ILRP) best management practices that are relevant to organic producers and others using non-synthetic fertilizer nutrient management such as compost, mulch and cover crops. Provide regulatory relief for use of such practices that rely on biological soils management which are known to reduce pollution risk.

- Direct the State Water Resources Control Board to allow for the creation of an organic agriculture coalition to aggregate and coordinate organic farmer participation in ILRP.
- Direct the State Water Resources Control Board, with input from partner agencies like CDFA, to conduct an analysis of ILRP to better understand the program’s impact on nitrate leaching and farmer participation, particularly for organic and sustainable agriculture producers, and to develop recommendations to improve program impact.

### **Budget Action:**

- Provide continuous, robust funding for SWEEP in order to prepare farmers and the state for the more frequent and severe droughts we can expect in California.
- Support research associate positions at the UCANR to support ILRP compliance.

## **DAIRY/LIVESTOCK RECOMMENDATIONS**

### **Administrative Action:**

- Maintain and expand upon ARB-funded research on alternative manure management strategies to reduce methane emissions, with a focus on practices that also improve air and water quality and are relevant to the greatest number of dairy and livestock producers in the state.
- Host a biennial dairy and livestock methane research conference to review the status of alternative manure management research and education.
- Streamline and improve the Alternative Manure Management Program (AMMP) application process and guidelines to enhance the program’s reach and impact. Partner with California Natural Resources Conservation Service (NRCS), UC Cooperative Extension (UCCE) and the Resource Conservation Districts (RCDs) to improve program outreach and education.
- Expand technical assistance for AMMP projects, including project development, application assistance and project implementation.
- Expand AMMP to include strategies to reduce enteric fermentation from dairy and livestock operations, including practices that are relevant to pasture-based dairies.
- Conduct an environmental and cost/benefit analysis of dairy digester investments in the state, including all public investments made (e.g., grants, all credits—offsets, Low Carbon Fuel credits, renewable energy credits, etc.).

### **Budget Action:**

- Provide a specific funding allocation to AMMP.

# ON-FARM RENEWABLE ENERGY RECOMMENDATIONS

## Legislative Action:

- Require the California Public Utility Commission (CPUC) to reconsider the contiguous rule in order to increase the number of farms making use of Net Energy Metering Aggregation (NEMA) without unfairly burdening the utility or other customers. For example, the CPUC could determine that parcels within a certain radius of the generating meter qualify under the statute and should be allowed within a customer’s aggregation arrangement.
- Pursue a suite of CPUC and/or California Energy Commission (CEC) reforms to improve NEMA implementation and related on-farm renewable energy projects, including:
  - Work with the utilities and partners in the solar industry to develop farm-focused educational materials and outreach events for NEMA.
  - Develop easily-accessible mapping tools that show the available capacity on existing grid infrastructure near their customers.
  - Develop policies to more fairly distribute ad hoc local grid upgrade costs among the customers, utilities and state (e.g., on-bill financing, cost-sharing and/or loan-ownership programs).
  - Provide a directory of recommended independent solar consultants/advisors based on certain standards—just as municipalities provide pre-vetted lists of solid waste haulers or e-waste drop-offs.
  - Establish a fund at the CPUC or CEC through which farmers may apply to receive free or discounted technical assistance from qualified consultants and advisors who can help them navigate the complexities of evaluating options for on-farm solar.

# CLIMATE RESILIENT AGRICULTURE RECOMMENDATIONS

## Administrative Action:

- Incorporate outreach, education and farm-level planning about climate risks and resiliency strategies into existing Climate Smart Agriculture programs and networks, including the new Climate Smart Agriculture Team with UCANR and CDFA and the Farm Demonstration Network. Develop a network of growers modeling innovation in on-farm climate resilience that serve as demonstration sites.

- Place more emphasis on reaching a broad spectrum of producers, developing commodity-specific adaptation strategies and addressing regional climate change risks, so that the state’s research and education funds are targeting the most at-risk situations.
- Support local governments in planning for agricultural adaptation and resilience, including economic impacts of climate risks to the agricultural economy. This can be done through the SB 732 planning grants with DOC and the SALCP strategy and outcome grants to local government.

### **Budget Action:**

- Establish a climate resiliency agricultural research focus as part of the Office of Planning and Research (OPR) Climate Research Program. Invest in public, traditional crop breeding research and integrated, diverse cropping and livestock systems to develop climate resilient agricultural systems.

## **CLIMATE EQUITY RECOMMENDATIONS**

### **Administrative Action:**

- Support ongoing efforts through the Low-Income Home Weatherization Program, administered by the Department of Community Services Development, to improve energy efficiency and renewable energy use, including improved HVAC systems, for farmworker and rural housing in the state. Expand the program to include migrant housing centers and worker dormitories.
- Continue support for farmworker housing and improved rural housing projects that are connected to schools, medical services, transit and other community services through the AHSC Program. Develop criteria specific to farmworker housing.
- Work with the Rural Smart Growth Task Force to address the lack of high quality rural housing, including farmworker housing, and the need for improved regional transit options, including improved bus service, agricultural worker vanpools and more.
- Establish a Rural Communities Ombudsman at OPR to coordinate rural community/climate change initiatives that are forwarded by the task force, described above.
- Fully implement the Farmer Equity Act of 2017, including tracking and reporting on socially disadvantaged farmer participation in the development and implementation of CDFA programs and related outreach efforts by CDFA. Such efforts should include making Climate Smart Agriculture program materials available in Spanish and other languages. Conduct targeted outreach workshops with translation services available for multiple languages.



- Better integrate efforts to provide safe drinking water in rural areas and reduce nitrate contamination by improving the implementation of ILRP (see Water Stewardship section) and expanding the reach of the Healthy Soils Program (see Healthy Soils section). Culturally competent outreach and technical assistance are essential to improving the implementation and reach of both programs.

### **Legislative Action:**

- Support the establishment of the Safe and Affordable Drinking Water Fund as described in SB 623 (Monning, 2017).

### **Budget Action:**

- Fully fund the Low-Income Home Weatherization and the Agricultural Workers Vanpools programs as part of the GGRF expenditure plan.
- Improve access and increase funding to disaster services for farmworker families during times of crop failures, drought and other extreme events.



## **TECHNICAL ASSISTANCE, PLANNING AND RESEARCH RECOMMENDATIONS**

### **Administrative Action:**

- Integrate technical assistance as part of program delivery for all of the Climate Smart Agriculture programs. A percent of program funds should be directed to a Technical Assistance Fund where technical assistance providers with demonstrated expertise in the project types and farmer outreach may be eligible to apply to CDFA or DOC (in the case of SALCP) to support program outreach, education, project development, application assistance and project implementation.
- Strengthen collaboration among existing networks of technical assistance providers to identify high-impact Climate Smart Agriculture demonstration projects and program improvements, targeting diverse projects across the state.
- Support innovative collaborations and trainings across technical assistance providers—including UCCE, California NRCS, RCDs and non-profit organizations—to improve their technical assistance capacity, especially for implementation of the Climate Smart Agriculture programs and outreach and assistance to socially disadvantaged farmers.
- Work with CEC and CPUC to expand the Electric Program Investment Charge (EPIC) research program to include climate change research similar to the former Public Interest Energy Research (PIER) program, including research relevant to the agricultural sector.

## Budget Action:

- Fund the newly created CDFA-UCANR Climate Smart Agriculture Team. These efforts should aim to restore funding for UCCE back to 1990 levels, while directing more support to climate specialists and technical assistance for socially disadvantaged farmers, particularly through the Small Farm Program.
- Provide funding and staff support for the implementation of the Farmer Demonstration Network.
- Restore base funding for RCDs that operate throughout the state, bringing technical expertise to farmers and ranchers on a host of natural resource conservation management issues, including climate change mitigation and adaptation.
- Reinstate state funding for the statewide UC Sustainable Agriculture Research and Education Program (SAREP), the only program of its kind at UCANR that focuses on outreach, education and research for farmers interested in sustainable and organic farming methods.
- Fund the SGC Climate Change Research Program, including the land-based research funding priority, and add a new climate change and agriculture resiliency focus.



Credit: USDA NRCS

# INTRODUCTION

**California is home to the largest and most diverse agricultural industry in the country. On over 76,000 farms and ranches, California agriculture is the leading producer of the country’s vegetables, fruits, nuts and dairy products.<sup>1</sup> But that is not all the state’s agriculture is producing. California farmers and ranchers are also the leading producers of on-farm renewable energy, producing more solar energy on their farms than farmers in any other state.<sup>2</sup> And they are among the first in the country to embrace Climate Smart Agriculture.**

Many California farmers and ranchers have recognized their role in shifting towards agricultural production that produces the food that we depend on in ways that reduce GHG emissions, increase our carbon sinks and improve our air and water quality overall—all while keeping farmers viable and on the land.

Climate science tells us California cannot achieve its 2030 climate change targets without transformative, sustainable agricultural solutions to GHG mitigation.<sup>3</sup>

Furthermore, agriculture has much to lose if the state does not avoid the worst impacts of a changing climate. A recent University of California assessment found that by the end of the century rising temperatures and related reduced winter chill hours will impact key crops. By 2050, yields are projected to decline by 40 percent for avocados and 20 percent for almonds, table grapes, oranges and walnuts. Central Valley land acreage suitable for walnut, apricot, peach and nectarine will be cut by half, while acreage suitable for pecan, quince and chestnut will be cut by 22 percent.<sup>4</sup> In the coming years, the increase

in variable precipitation—from drought to floods—puts our agricultural industry at great risk.

Paving over some of the world’s most productive farmland also threatens the long-term viability of our agricultural sector. California loses an average of nearly 50,000 acres of agricultural land every year, most of that to urban conversion that brings with it significant and permanent increases in GHG emissions<sup>5</sup>. From 1984 to 2010, California lost one million acres of agricultural land.<sup>6</sup> We are on track to lose another one million acres by 2030. This has significant implications not only for food production, but also for the state’s GHG emissions profile.

Under Governor Brown’s leadership, California has launched a suite of Climate Smart Agriculture programs that have the potential to transform the way we do the business of agriculture. To date, more than \$400 million<sup>7</sup> has been invested in programs to save water and energy on farms, protect agricultural lands at risk of development, increase carbon sinks in our agricultural soils and reduce potent methane emissions from dairies and livestock operations.

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<sup>1</sup> For current statistics on California agriculture, see: [www.cdfa.ca.gov/statistics](http://www.cdfa.ca.gov/statistics)

<sup>2</sup> See the USDA On-Farm Energy Production Survey: [https://www.agcensus.usda.gov/Publications/Energy\\_Production\\_Survey/](https://www.agcensus.usda.gov/Publications/Energy_Production_Survey/)

<sup>3</sup> For more of a discussion of these issues see California’s 2017 Climate Change Scoping Plan: [www.arb.ca.gov/cc/scopingplan/scoping\\_plan\\_2017.pdf](http://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf)

<sup>4</sup> T. Pathak, M. Maskey, J. Dahlberg, F. Kearns, K. Bali & D. Zaccaria. 2018. Climate Change Trends and Impacts on California Agriculture: A Detailed Review. *Agronomy*. 8, 25; doi:10.3390/agronomy8030025. [www.mdpi.com/journal/agronomy](http://www.mdpi.com/journal/agronomy)

<sup>5</sup> Since its establishment in 1982, the Farmland Mapping and Monitoring Program of the Department of Conservation has tracked agricultural land use changes in California. See: [www.conservation.ca.gov/dlrp/fmmp/Pages/trends/FastFacts.aspx](http://www.conservation.ca.gov/dlrp/fmmp/Pages/trends/FastFacts.aspx)

<sup>6</sup> See the Department of Conservation’s Farmland Mapping and Monitoring Program: [www.conservation.ca.gov/dlrp/fmmp/Pages/trends/FastFacts.aspx](http://www.conservation.ca.gov/dlrp/fmmp/Pages/trends/FastFacts.aspx)

<sup>7</sup> This includes funding for Healthy Soils, State Water Efficiency and Enhancement Program, the Sustainable Agricultural Lands Conservation Program and the Dairy Methane programs from 2014-2019. At the time of this writing we do not have the final funding amounts for SALCP for FY 2017-18 and FY 2018-19, which will likely bump up this number above \$500 million.



While these early investments are an important start, the next Governor of California must deepen these efforts in order to succeed in transforming agriculture. Our long-term food security and environmental health depend on California prioritizing sustainable agricultural solutions to climate change.

In the last two years of the Brown administration this focus on multi-benefit sustainable agricultural solutions to climate change has been challenged. Budgets of two Climate Smart Agriculture programs, Healthy Soils and SWEEP, were zeroed out in fiscal year (FY) 2017-18 and greatly reduced in FY 2018-19. But in those same years, \$600 million was allocated to priorities of conventional agriculture trade associations to fund air quality and cap-and-trade compliance, including farm equipment upgrades, dairy digesters and food processor energy efficiency programs. Such a shift away from multi-benefit Climate Smart Agriculture puts at risk agriculture's ability to be ready for a changing climate.

As we look to the next four years, we recommend the following principles to the new Governor to inform the efforts to achieve sustainable food and farming systems in California for decades to come:

**SCALE UP:**

The next Governor must scale up our investments in Climate Smart Agriculture if we are to reach a critical mass of the state's large and diverse farming community. Moreover, the new Governor should increase our targets for GHG emissions reductions from agriculture and natural and working lands. Scaling up also implies targeted approaches to deal with specific situations, commodities and communities. The Brown administration has begun these conversations with the California Climate Change Natural and Working Lands Implementation Plan, which is still in draft form at the time of this writing. The next administration should consider ways to build upon these efforts and go beyond them.

**INTEGRATE:**

The next administration can speed up adoption of Climate Smart Agriculture by better integrating these efforts across programs, moving away from siloed programs that can miss the synergistic benefits. For example, the state can better integrate its work on the Healthy Soils and Alternative Manure Management programs by fostering compost provision to crop producers, while reducing potent methane emissions, improving soil health and increasing carbon sinks. Furthermore, many of the climate change mitigation opportunities in agriculture can also improve agriculture's resiliency to increased weather extremes. Among the strategies is promoting healthy soils to improve drought and flood tolerance. We should emphasize these kinds of synergies throughout our state's agricultural programs, along with prompt sustainable agricultural solutions that improve and integrate programmatic implementation to provide multiple benefits. An effort that has greatly improved interagency coordination on land use/in-fill development and climate change issues is the Strategic Growth Council (SGC). We recommend maintaining SGC in the new administration.

**STREAMLINE:**

Regulatory streamlining can achieve important impacts without increasing the cost of compliance or forgoing intended environmental health benefits. Farmers often face competing and complex regulatory schemes that can constrain our ability to achieve transformative farming systems. For example, the Irrigated Lands Regulatory Program (ILRP) is intended to prevent the leaching of nitrates from synthetic agricultural fertilizers into surface and groundwater, but for many farmers the program is complex, time-consuming and has little impact. ILRP is especially difficult for organic producers whose nutrient management practices do not include synthetic fertilizers but instead rely upon biological alternatives that reduce nitrate leaching, build healthy soils and improve carbon sinks. The new Governor can look to programs like ILRP as opportunities to reward the best practices by reducing regulatory requirements and connecting those efforts with incentives like the Healthy Soils Program to help shift more producers to these practices.





### LEVEL THE PLAYING FIELD:

Small and mid-scale farms make up the vast majority of California farms.<sup>8</sup> Socially disadvantaged farmers, defined as farmers of color, make up nearly a quarter of California farmers. Farms operated by Latino and Asian American farmers are among the fastest growing segment of California's agricultural industry. Small and mid-scale farmers and socially disadvantaged farmers are also among the least resourced and least prepared to address a changing climate, but their contribution to our food

security and rural communities makes them essential partners in climate solutions. As the state deepens and expands its efforts to build a more resilient food and farming system, the new Governor should emphasize the need for resources for those farmers, farmworkers and rural communities most at risk.

What follows is a set of recommendations to the new Governor of California on policies and programs needed to accelerate and scale up agriculture's powerful and unique climate solutions.



<sup>8</sup> USDA 2012 Agricultural Census. [www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_1\\_State\\_Level/California/st06\\_1\\_001\\_001.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_State_Level/California/st06_1_001_001.pdf)

# FARMLAND CONSERVATION

**California is the first state in the country to embrace conservation of agricultural lands as a necessary strategy to reduce GHG emissions associated with land use changes. Efforts to increase farmland conservation in the state are part of a larger urban in-fill development and affordable housing strategy of the Brown administration to limit sprawl development, address the housing crisis, keep our agricultural lands intact and reduce vehicle miles traveled.**

This comes at an important time for the state as farmland loss continues at an alarming rate of an average of 50,000 acres annually.<sup>9</sup> The majority of that agricultural land loss is to urban conversion, which not only permanently increases GHG emissions, but also limits the state's land for food production and constrains the state's ability to recharge groundwater,<sup>10</sup> improve flood control<sup>11</sup> and provide wildlife habitat.<sup>12</sup>

The state's efforts to improve farmland conservation as part of meeting AB 32 targets were informed, in part, by a groundbreaking UC Davis study in 2012 that found that an acre of urban land emits 70 times more GHG emissions than an acre of irrigated cropland.<sup>13</sup> Following the study's findings, CalCAN and our partners advocated for the inclusion of farmland conservation in the administration's first GGRF expenditure plan.

In 2014, the Sustainable Agricultural Lands Conservation Program (SALCP) was created at the SGC as part of the Council's efforts to reduce GHG emissions associated with vehicle miles traveled. The program is administered by DOC and funds both conservation easements on agricultural lands at risk of urban sprawl or rural ranchette development and local government farmland conservation planning and policy development.

Since the program's creation in 2015, California has permanently protected nearly 80,000 acres of agricultural land. Compared to the 58,000<sup>14</sup>

acres protected in the past 22 years under the California Farmland Conservancy Program, SALCP has significantly expanded investments in farmland conservation in California in a short period of time.

Despite the successes of SALCP, farmland conservation remains a challenge in California. California has converted 1.4 million acres of agricultural land to non-agricultural uses from 1984 to 2010 with urbanization accounting for the vast majority of this farmland loss at nearly 1.1 million acres.<sup>15</sup> Rising farmland costs, land speculation and growing city spheres of influence threaten to make it harder to fund conservation easements in regions most in need of curbing sprawl conversion of agricultural land. Beginning, veteran and socially disadvantaged farmers and ranchers find it difficult to purchase agricultural land to enter or continue farming in California.

The state should play a proactive role in encouraging local governments to improve their efforts to develop farmland conservation policy and planning. Many regions of the state still lack mitigation programs for agricultural land conversions. Additionally, many LAFCOs are still approving proposals that allow cities to create large spheres of influence that encourage sprawl development and increase speculative buying of agricultural land. Rural counties continue to struggle to support Williamson Act contracts since the defunding of county subvention payments in 2009.

<sup>9</sup> Farmland Mapping and Monitoring Program. Department of Conservation. See: [www.conservation.ca.gov/dlrp/SALCP](http://www.conservation.ca.gov/dlrp/SALCP)

<sup>10</sup> See: [www.caes.ucdavis.edu/news/articles/2015/10/map-identifies-farmland-with-potential-for-groundwater-recharge](http://www.caes.ucdavis.edu/news/articles/2015/10/map-identifies-farmland-with-potential-for-groundwater-recharge)

<sup>11</sup> See: [www.americanrivers.org/2017/03/natural-infrastructure-key-resilient-flood-management-system/](http://www.americanrivers.org/2017/03/natural-infrastructure-key-resilient-flood-management-system/)

<sup>12</sup> See: [www.wildfarmalliance.org/showcasing\\_wild\\_farms](http://www.wildfarmalliance.org/showcasing_wild_farms)

<sup>13</sup> Jackson, Louise, Van R. Haden, Allan D. Hollander, Hyunok Lee, Mark Lubell, Vishal K. Mehta, Toby O'Geen, Meredith Niles, Josh Perlman, David Purkey, William Salas, Dan Sumner, Mihaela Tomuta, Michael Dempsey, and Stephen M. Wheeler. 2012. Adaptation Strategies for Agricultural Sustainability in Yolo County, California. California Energy Commission. Publication number: CEC-500-2012-032.

<sup>14</sup> See: [www.conservation.ca.gov/dlrp/Pages/Index.aspx](http://www.conservation.ca.gov/dlrp/Pages/Index.aspx)

<sup>15</sup> Farmland Mapping and Monitoring Program. Department of Conservation.



# RECOMMENDATIONS

## Administrative Action

- Develop a regional “hotspot” approach to a portion of the SALCP and Affordable Housing and Sustainable Communities (AHSC) funds. Develop criteria for combined SALCP and AHSC investments in regions that would benefit from coordination of both an in-fill/transit-friendly development approach and improved farmland conservation efforts.
- Develop a consistent mitigation standard of three acres of farmland preserved for every one acre converted to non-agricultural uses for state-funded public works projects.
- Develop a Governor’s taskforce of stakeholders to advance farmland conservation reforms, including Williamson Act, farmland mitigation, LAFCO and other reforms, with the goal of taking a comprehensive approach to the farmland loss issue.

## Legislative Action

- Require several key LAFCO reforms to better support in-fill development and protection of farmland, including:
  - Require LAFCOs to establish baseline requirements for annexation and spheres of influence for local governments.
  - Require that LAFCOs’ Municipal Service review updates include an inventory of agricultural and open space lands and potential development patterns to make informed decisions on annexation and sphere of influence amendment proposals, and to define the location of prime agricultural lands within their jurisdictions.
  - Require all LAFCOs to assess the feasibility of adjusting sphere of influence boundaries to remove prime agricultural lands from those boundaries and reduce the size of spheres of influence around each city.
  - Require that local jurisdictions have reasonable urban growth boundaries and farmland mitigation policies before annexation of additional territory is allowed. The law should be amended to allow cities to annex land for the purpose of permanently protecting it as farmland, thereby allowing cities to effectively create buffers between urbanized areas.



## Budget Action

- Maintain consistent and reliable funding for the SALCP by supporting its ongoing continuous appropriation of 10 percent of the GGRF allocation to the SGC.
- Fund city and county government planning and policy development efforts, as specified in SB 732 (Stern, 2017) to improve farmland conservation, including the development of mitigation policies, urban growth boundaries and transfer of development rights programs.
- Restore subvention payments to counties for a reformed Williamson Act. Such reforms should include landowner requirements to improve soil and water conservation efforts on their agricultural lands, including developing and implementing a conservation plan. Other reforms that should be considered include higher subvention payments for longer contracts (30- and 40-year rolling contracts, compared to current 10- or 20-year rolling contracts) and improved local government farmland mapping and conservation policy development.



The Ag Land Trust in Monterey County was established in 1984. Since then, it has established 85 agricultural easements on some of California's most productive irrigated cropland that produces strawberries, lettuce, broccoli, and more. The Trust has been able to significantly increase the number of its projects in recent years with funding from SALCP, receiving an impressive 10 SALCP grants to protect 2,034 acres of farmland. The properties are all located adjacent or within a few miles of the city limits of Salinas, Gonzales, Soledad and other cities, in an effort to limit urban sprawl development and protect farmland. Many farmers in the area have been there for several generations and want to see the land stay in agriculture.

*"The community values the open space and clean air in our region, and don't want the area to turn into another Silicon Valley. Once farmland is paved over, it's gone forever."*

*- Sherwood Darington,  
Managing Director, Ag Land Trust*





# HEALTHY SOILS

Credit: Deborah Paggiaccia

**Soil is the foundation of agricultural productivity and sustainability, global food security and our rural economies. The health of our soils is improved through farm management that increases soil organic matter and reduces reliance on synthetic inputs. Healthy soils benefit not only the state's efforts to reduce GHG emissions, but also improve crop yields, drought and flood tolerance and air and water quality.**

Recognizing the multiple benefits of well-managed soils, the Brown administration launched the Healthy Soils Initiative in 2015. The Initiative is a collaboration of state agencies and departments, led by CDFA, to promote the stewardship of healthy soils.

In 2016, that interagency group released a Healthy Soils Action Plan,<sup>16</sup> which advanced recommendations for the state to provide healthy soils research, education, technical support and financing. While a number of key actions in the plan have been implemented (see California Farm Demonstration Network and Healthy Soils Program below), some other important actions remain unfulfilled, particularly in terms of research, technical support and interagency collaboration. For example, the state still needs to invest in long-term research on healthy soils practices to better understand a number of issues, including the stacking of farm practices to improve carbon storage and healthy soils' contribution to ecological services like improved drought tolerance. Research is needed to tailor such farm practices to different soil types and growing regions in the state.

The hallmark achievement of the administration's Healthy Soils Initiative has been the launch of the Healthy Soils Program. The legislature allocated \$7.5 million from the GGRF for the Healthy Soils Program in 2016. The Healthy Soils Program incentivizes farmers and ranchers to adopt soil-building practices that increase on-farm carbon sequestration, reduce on-farm GHG emissions and provide a litany of agronomic and environmental co-benefits.

The Healthy Soils Program received an additional \$9 million from Proposition 68 and \$5 million in GGRF for FY 2018-19, but the program will need

significantly more funding to reach a critical mass of the state's farmers and ranchers.

There are also opportunities to improve Healthy Soils Program delivery. Farmer demand for the program has also been stifled by a lack of technical assistance and unnecessarily complicated applications and guidelines. For example, in the first round of funding, fewer than one in four farmers who attended Healthy Soils workshops ended up successfully submitting applications, in large part due to the complexity of the application and the lack of one-on-one technical assistance.

In 2018, the Brown administration moved towards improving technical assistance for a number of the climate change investment programs, including Healthy Soils. Significantly, the SGC advanced a proposal by CDFA and UCANR to develop a Climate Smart Agriculture Team, made up of Cooperative Extension specialists and farm advisors in 12 regions of the state. The specialists will be tasked with outreach, education and application assistance to develop on-farm Climate Smart Agriculture projects. This is a significant improvement on the short-term and poorly funded technical assistance currently available for program applicants, but for the proposal to be successful it will need ongoing funding under the new administration.

An important related issue for healthy soils is the production and use of compost in agriculture. Compost application was by far the most popular practice in the first round of the Healthy Soils program, reflecting high farmer and rancher interest in using compost to improve their soils. Compost offers a triple climate benefit, including 1) reduced potent methane emissions by diverting organic

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<sup>16</sup> Available at: [www.cdfa.ca.gov/oeffi/healthysouils/docs/CA-HealthySoilsActionPlan.pdf](http://www.cdfa.ca.gov/oeffi/healthysouils/docs/CA-HealthySoilsActionPlan.pdf)

wastes from going to landfills; 2) increased soil carbon sequestration; and, 3) increased water infiltration and retention in the soil,<sup>17</sup> thereby reducing irrigation needs and increasing groundwater recharge.

Recent legislative efforts have attempted to accelerate organic waste recycling and increase compost production. AB 1826 (Chesbro, 2014) requires commercial waste generators to recycle organic waste through compost production or anaerobic digestion. AB 1045 (Irwin, 2015) requires CalEPA, ARB, CalRecycle, the State Water Board, and CDFA to coordinate their regulations and efforts to divert organic waste from landfills and promote the use of compost. SB 1383 (Lara, 2016) committed the state to diverting 50 percent of the state’s organic waste from landfills by 2020 and 75 percent by 2025.

By all accounts, the state is not on track to meet those organic waste diversion goals. Consequently, the next administration will need to expand efforts to develop the state’s composting infrastructure as well as reinvigorate the AB 1045 working group to identify short-term actions to reduce regulatory barriers for both commercial composting facilities and on-farm composting operations.

Through its Fertilizer Research and Education Program (FREP), CDFA could also do more to promote compost application and other organic and biologically-oriented soil health and nutrient management strategies. The next administration will have an opportunity to reorient the program towards more public-interest-driven and multi-beneficial research and education outcomes by fully implementing AB 2174 (Alejo, 2012) and increasing the diversity of expertise of members on its committees.

Lastly, the new administration will have the opportunity to build on interagency and stakeholder efforts to expand healthy soils adoption. In 2017, the California Farm Demonstration Network was launched by CDFA, UCANR, CARCD, California NRCS and the California Farm Bureau. The network aims to showcase the implementation of conservation agriculture by “early adopters” and provide practical learning opportunities for producers. Put simply, the network has a promising collaborative and demonstration-oriented approach but needs seed funding to give it momentum.

<sup>17</sup> Hudson, B. Soil organic matter and available water capacity. Journal of Soil and Water Conservation March/April 1994 vol. 49 no. 2 189-194  
United States Department of Agriculture Natural Resources Conservation Service. 2008. Soil Quality Indicators – Available Water Capacity.  
[www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_053288.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053288.pdf)

**José Robles lives next to the almond orchards he has farmed near Modesto since 2005. Degraded soil led to a decline in almond yields and José lost a section of trees to soil-borne pests called nematodes. José was thrilled to discover that applying mulch and compost eliminated the nematodes and the need to fumigate with pesticides. He noticed that healthier soils work like a sponge, holding more water and supporting more productive trees. With technical assistance from the National Center for Appropriate Technology, José received a Healthy Soils Program grant to apply compost, plant cover crops and install a hedgerow to attract insects and improve orchard pollination.**

***“The most immediate benefit we get is to our health. Now, we can pick nuts right from the trees without worrying about getting sick from pesticides.”***

**- José Robles,  
Robles Farm**



# RECOMMENDATIONS

## Administrative Action:

- Through the state’s Climate Change Research Plan and ARB’s Annual Research Plan, fund long-term working lands research projects to more accurately quantify the economic return of healthy soils practices for producers, improve understanding of the stacking of farm practices to increase carbon storage and inform our understanding of healthy soils contributions to ecological services such as improved drought resiliency, flood protections and groundwater recharge.
- Improve CDFA implementation of the Healthy Soils Program through development of a simplified application, increased farmer access to technical assistance and clarification in the program guidelines that demonstration projects are for farmer-to-farmer demonstration projects focused on expanding adoption of such practices, not research (as described in FAC, Div. 1, Part 1, Ch. 3, Sec. 569).
- Direct DWR to include in their agricultural water conservation and flood risk mitigation programs support for on-farm practices that improve soil water infiltration, groundwater recharge and soil water retention capacity.
- CalRecycle, working with CDFA, should conduct an analysis of the regulatory and financial barriers to compost production as well as regional and crop-specific market demand for compost in agriculture.
- Improve implementation of AB 2174 (Alejo, 2012) that directs CDFA FREP funds to improve technical assistance, research and education on improved nutrient management that results in minimizing impacts of nitrogen fertilizers to the environment, including nitrates in groundwater and GHG emissions. A greater portion of FREP funds should be used for this purpose.
- As proposed by the Department of Conservation, implement the “third phase” of the SALCP by incentivizing conservation easement holders to improve soils management to increase carbon sequestration and reduce related GHG emissions.

## Legislative Action:

- Diversify the membership of the CDFA FREP advisory board and technical advisory subcommittee to include more soil health and climate change experts with expertise in soils management, compost production and related GHG mitigation in agriculture.

## Budget Action:

- Increase funding for the Healthy Soils Program to drive innovation and support transformative agricultural practices.
- Increase funding for organic waste diversion and composting through CalRecycle’s GGRF funds.
- Provide seed funding for the California Farm Demonstration Network coordinated by CARCD with UCANR, CDFA and other partners.



# WATER STEWARDSHIP

Credit: USDA NRCS

**The worst drought in a millennium. The wettest winter on record. Oroville dam. California’s vulnerability to extreme droughts and floods has been laid bare over the past eight years. The “precipitation whiplash” the state has been experiencing is a phenomenon that climate scientists predict will increase in frequency and severity in the decades to come.<sup>18</sup> One recent academic literature review by six UC researchers found that by the end of the century, California can expect a 50 percent increase in the number of severe droughts, a 50 percent increase in the number of severe flooding events and a potential 65 percent loss in snowpack.<sup>19</sup>**

New policies passed in the past eight years have laid the groundwork for long-overdue groundwater management, nitrate pollution reduction and investments in on-farm water use efficiency. The task of the next administration must be to ensure the successful implementation of policies to accelerate the adoption of on-farm management practices that enhance flood control, groundwater recharge, irrigation efficiency, drought-preparedness and water pollution reduction.

In 2014, the legislature and the Governor passed the Sustainable Groundwater Management Act (SGMA), a sensible package of bills requiring local governments to monitor and regulate groundwater usage. At the time of this publication, 143 local groundwater sustainability agencies (GSAs) have formed and are now in the process of developing groundwater sustainability plans (GSPs). One important task of the next administration will be to support these newly formed agencies with technical assistance to draft fair and effective GSPs. Another will be to explore ways to incentivize and streamline permits for on-farm groundwater recharge, which will be an increasingly important tool to achieve groundwater sustainability.

At the same time, the state continues to implement new groundwater regulations that were added to the ILRP in 2012. The program aims to prevent further contamination of surface and groundwater through grower education, required nutrient man-

agement planning and reporting. The state must ensure that nutrient management reporting requirements are feasible and appropriate technical assistance is available for diversified, small-scale, organic and socially disadvantaged farmers. There must also be monitoring to ensure that surface and groundwater quality is improving as a result of the program’s efforts.

Voters recently approved two natural resources-related bonds, Proposition 1 in 2014 and Proposition 68 in 2018. Both measures included critical funding for agricultural water use efficiency projects, including through the State Water Efficiency and Enhancement Program (SWEEP), which was created through emergency drought legislation (SB 103) in 2014.

Coordinated by CDFA, SWEEP funded over 600 water and energy efficiency projects in 33 counties between 2014-2017. SWEEP provides cost-share grants to growers to install more efficient irrigation systems including subsurface drip irrigation, solar-powered water pumps and remote soil moisture monitoring equipment. SWEEP’s initial projects are expected to conserve nearly 86,000 acre-feet of water annually and reduce GHG emissions by over 300,000 metric tons CO<sub>2</sub>e over 10 years.<sup>20</sup> Not surprisingly, the program has been very popular with farmers and consistently oversubscribed, often with two to three times more applications than awards.

<sup>18</sup> Swain et al. (2018). Increasing precipitation volatility in twenty-first-century California. *Nature Climate Change*. Volume 8, pages 427-433. doi:10.1038/s41558-018-0140-y

<sup>19</sup> Pathak et al. (2018). Climate Change Trends and Impacts on California Agriculture: A Detailed Review. *Agronomy* 2018, 8(3), 25. doi:10.3390/agronomy8030025

<sup>20</sup> Calculated with program data from CDFA.





To meet the interwoven goals of groundwater sustainability, water conservation, energy efficiency and clean drinking water, the next administration should explore synergies between existing policies and programs. For example, SWEEP funding would likely have an even higher impact if it were coordinated with irrigation districts' water and energy

conservation initiatives. Similarly, SWEEP guidelines may need to be updated to allow incentives for more efficient flood irrigation—which has the benefit of recharging groundwater—rather than solely incentivizing more efficient pressurized irrigation systems.

## RECOMMENDATIONS

### Administrative Action:

- Update the SWEEP guidelines to allow incentives for more efficient flood irrigation systems for those still relying on surface irrigation. Also include incentives for soil management practices (e.g., compost, mulch and cover crops) that improve water infiltration and storage capacity in the soil, groundwater recharge and reduce GHGs.
- To improve SGMA implementation, support research on groundwater recharge best management practices in agriculture, including flooding of orchard and vineyard crops. Additionally, simplify permitting for on-farm groundwater recharge and pond building that demonstrably produce environmental benefits.
- Require more detail in the reporting by irrigation districts of their water conservation and drought preparedness measures in their Agricultural Water Management Plans to DWR.
- Direct the appropriate agencies to create a digital hub for farmer to access information regarding groundwater recharge incentives, permits, regulations and research.
- Develop ILRP best management practices that are relevant to organic producers and others using non-synthetic fertilizer nutrient management such as compost, mulch and cover crops. Provide regulatory relief for use of such practices that rely on biological soils management which are known to reduce pollution risk.

- Direct the State Water Resources Control Board to allow for the creation of an organic agriculture coalition to aggregate and coordinate organic farmer participation in ILRP.
- Direct the State Water Resources Control Board with input from partner agencies like CDFA, to conduct an analysis of ILRP to better understand the program’s impact on nitrate leaching and farmer participation, particularly for organic and sustainable agriculture producers, and to develop recommendations to improve program impact.

## Budget Action:

- Provide continuous, robust funding for SWEEP in order to prepare farmers and the state for the more frequent and severe droughts we can expect in California.
- Support research associate positions at the UCANR to support ILRP compliance.

Pao Yang started farming in 2013 on 40 acres of family land recently transitioned from almonds and grapes to diversified Asian vegetables and herbs. Pao is one of 19 farmers assisted by the University of California Cooperative Extension (UCCE) in Fresno and Tulare counties in applying for and implementing SWEEP grants. Because English is not his first language, technical assistance was critical to Pao’s successful application. Pao estimates that he has cut his energy bills almost in half after repairs to his pump and installation of a drip irrigation system, funded by his SWEEP award. Now that Pao delivers water more precisely to his crops, he sees less weed pressure. The result is reduced labor cost and water savings, and bolstered economic viability of his operation.



*“SWEEP helps producers repair outdated and inefficient equipment, enabling critical water and energy savings that help keep small farms in business.”*

*- Ruth Dahlquist-Willard,  
UCCE Fresno & Tulare counties*



# DAIRY/LIVESTOCK METHANE

Credit: USDA NRCS

**Two thirds of California agriculture’s GHG emissions come from the dairy and livestock industry. Manure management accounts for a third of agricultural emissions and enteric fermentation (the belches of livestock) accounts for another third.<sup>21</sup>**

In 2016, California adopted the country’s most ambitious law, SB 1383 (Lara), to regulate methane emissions from dairy and other livestock operations in addition to addressing short-lived climate pollutants from other sectors. SB 1383 requires that the dairy and livestock industries reduce methane emissions by 40 percent by 2030. All efforts before 2024 are voluntary, with considerable public investment in methane reduction strategies for the industry. If certain threshold requirements are not met by 2024 toward making progress to the 2030 goal, ARB is authorized to impose regulations on the dairy industry.<sup>22</sup>

SB 1383 expanded the methane reduction strategies of the state from its initial focus solely on anaerobic digesters to embrace alternative manure management practices. Subsequently in 2017, CDFA developed the Alternative Manure Management Program (AMMP), which funds projects on confinement and pasture-based dairies and livestock operations.

The eligible projects include a transition away from wet manure handling, which creates the anaerobic conditions that lead to methane production, to dry manure handling (e.g., composting, dry scrape, advanced solids separation, etc.) or pasture-based projects (e.g., conversion to or expansion of pasture-based systems). Projects must also demonstrate other air and water quality benefits. An effort to solicit projects from across the state in diverse production regions will contribute to more widespread adoption. Funding for technical assistance is needed to support producers’ transition to alternative manure management, particularly in the North Coast dairy region where there are fewer available industry resources such as design engineers.

Dairy and livestock producer demand for AMMP-funded projects was surprising given the newness of the effort and the short timeline to apply. In the first round of AMMP funding, CDFA received nearly \$30 million in project requests and funded 17 projects with an investment of \$9.6 million. CDFA is responsible for determining the funding split between AMMP and the Dairy Digester Research and Development Program (DDRP). No clear criteria to determine that split in funding has been provided.

With over \$46 million invested in dairy digesters since 2015 when the DDRP was established at CDFA, digesters remain a central focus for the state’s efforts to meet the SB 1383 targets, but more analysis is needed to understand the impact of those investments.

For the majority of dairies, anaerobic digesters remain out of reach and are not compatible with their operations because of scale and economics. Digesters are expensive, costing between \$2 million to \$9 million to install. Most small- and mid-scale operations do not produce enough manure to warrant the costs of installing a digester as they cannot maintain a digester full time and are unlikely to have the capital for such an investment.

Many of California’s initial digesters, funded by state or federal subsidies prior to the establishment of the DDRP, are no longer operating. Proponents of digesters argue that the current technology has greatly improved, but a recent analysis by the Assembly Budget Subcommittee<sup>23</sup> raises significant concerns about the long-term economic viability and environmental benefit of digester projects. Moreover, statewide environmental justice groups raise significant concerns about the air and water quality impacts of digesters, particularly in the Central Valley.

<sup>21</sup> ARB GHG Emissions Inventory, 2017. [www.arb.ca.gov/cc/inventory/data/tables/ghg\\_inventory\\_sector\\_sum\\_2000-15.pdf](http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_sector_sum_2000-15.pdf)

<sup>22</sup> For more on SB 1383 implementation for the dairy and livestock industries, see: [www.arb.ca.gov/cc/dairy/dairy.htm](http://www.arb.ca.gov/cc/dairy/dairy.htm)

<sup>23</sup> For the digester analysis conducted by Assembly Budget Subcommittee on Resources and Transportation (2017), see the April 2017 hearing of the Budget Sub Committee 3. <https://abgt.assembly.ca.gov/sub3hearingagendas>

# RECOMMENDATIONS

## Administrative Action:

- Maintain and expand upon ARB-funded research on alternative manure management strategies to reduce methane emissions, with a focus on practices that also improve air and water quality and are relevant to the greatest number of dairy and livestock producers in the state.
- Host a biennial dairy and livestock methane research conference to review the status of alternative manure management research and education.
- Streamline and improve the AMMP application process and program guidelines to enhance the program's reach and impact. Partner with California NRCS, UCCE and the RCDs to improve program outreach and education.
- Expand technical assistance for AMMP projects, including project development, application assistance and project implementation.
- Expand AMMP to include strategies to reduce enteric fermentation from dairy and livestock operations, including practices that are relevant to pasture-based dairies.
- Conduct an environmental and cost/benefit analysis of dairy digester investments in the state, including all public investments made (e.g., grants, all credits—offsets, Low Carbon Fuel credits, renewable energy credits, etc.).

## Budget Action:

- Provide a specific funding allocation to AMMP.

Scott Magnuson's family has been farming east of Turlock since the 1890s. Scott received one of the first AMMP grants in 2018 to improve his manure management system and reduce methane emissions. With the grant funding, he installed a mechanical screen that separates water from the manure solids, allowing him to recycle the water and compost the manure. He spreads the compost on pastures to increase fertility and forage quantity, which in turn allows him to increase pasture time for the cattle and avoid manure accumulation in the barns. In the new heifer barn he will produce compost by mixing manure with large volumes of bedding right underneath the animals, turning the bedding frequently for aeration.



*"What I like about this program is that there are all kinds of innovative new ways for managing dairy emissions that help our business and the land. Hopefully our project will make our dairy more sustainable for decades to come."*

*- Scott Magnuson,  
Magneson Dairy, Merced County*



# ON-FARM RENEWABLE ENERGY

**California farmers and ranchers produce more renewable energy than their counterparts in any other state in the country. However, there is still enormous untapped potential for agricultural operations to offset their energy needs, save money and contribute to the state's energy and climate change goals.**

In 2009, just over 1,900 farms in California produced solar energy, according to the U.S. Department of Agriculture's (USDA) first survey of on-farm energy production.<sup>24</sup> In 2012, the survey was repeated as part of the Census of Agriculture and found that this number had almost tripled to nearly 5,500 farms.<sup>25</sup>

Between steeply declining costs of renewable energy technologies and a number of policies passed and implemented in the past eight years, we expect the number of farms producing renewable energy will have significantly increased (new data will soon be available through the 2018 Census of Agriculture).

In 2011, Governor Brown signed into law SB 489 (Wolk), which expanded the state's Net Energy Metering program to include all available types of renewable energy generation, including bioenergy.

In 2012, SB 594 (Wolk) was signed into law, which allows the aggregation of multiple energy meters under one Net Energy Metering agreement, known as Net Energy Metering Aggregation (NEMA). The California Public Utilities Commission (CPUC) finalized NEMA rules in 2014, allowing for

agricultural operations (and other large energy customers with multiple meters) to distribute credits from excess energy produced on one meter to offset usage on other meters located on contiguous properties (e.g., for an irrigation pump, equipment shop and/or packing shed). Prior to SB 594, farmers who wanted solar to offset most or all of their energy consumption had to connect a separate solar array to each meter. This costly and impractical requirement often made significant investments in on-farm renewable energy highly inefficient and cost prohibitive for many growers.

In late 2016, CalCAN published a NEMA Progress Report.<sup>26</sup> The report summarized findings and recommendations from interviews with growers who have installed solar and solar industry representatives involved with agricultural projects. The report found that many growers still lack access to reliable information on NEMA. Unpredictable grid upgrade and interconnection costs were also reported to cause delays and prevent projects. Furthermore, the CPUC's strict requirement that meters must run on contiguous land to be aggregated was found to be contrary to NEMA's intent and ignores the reality that farms often operate on unconnected but nearby lands.

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<sup>24</sup> See the USDA On-Farm Energy Production Survey: [www.agcensus.usda.gov/Publications/Energy\\_Production\\_Survey/](http://www.agcensus.usda.gov/Publications/Energy_Production_Survey/)

<sup>25</sup> Ibid.

<sup>26</sup> Available at: [www.calclimateag.org/nema-progress-report](http://www.calclimateag.org/nema-progress-report)

# RECOMMENDATIONS

## Legislative Action:

- Require the CPUC to reconsider the contiguous rule in order to increase the number of farms making use of NEMA without unfairly burdening the utility or other customers. For example, the CPUC could determine that parcels within a certain radius of the generating meter qualify under the statute and should be allowed within a customer’s aggregation arrangement.
- Pursue a suite of CPUC and/or CEC reforms to improve NEMA implementation and related on-farm renewable energy projects, including:
  - Work with the utilities and partners in the solar industry to develop farm-focused educational materials and outreach events for NEMA.
  - Develop easily-accessible mapping tools that show the available capacity on existing grid infrastructure near their customers.
  - Develop policies to more fairly distribute ad hoc local grid upgrade costs among the customers, utilities and state (e.g., on-bill financing, cost-sharing and/or loan-ownership programs).
  - Provide a directory of recommended independent solar consultants/advisors based on certain standards—just as municipalities provide pre-vetted lists of solid waste haulers or e-waste drop-offs.
  - Establish a fund at the CPUC or CEC through which farmers may apply to receive free or discounted technical assistance from qualified consultants/advisors, who can help them navigate the complexities of evaluating options for on-farm solar.

**John Teixeira of Teixeira & Sons LLC in Los Banos, in the heart of the Central Valley, grows tomatoes, melons, almonds, cotton, wheat and corn. In 2015, he invested in a 1.2 megawatt solar array to save energy costs and to ensure the long-term sustainability of his business. He installed about three acres of solar panels at a cost of \$1 million, and estimates that it will be paid back in about five years because he is saving an average of \$1,000 each day on his utilities bill. The investment penciled out because of a combination of tax credits and the fact that he could aggregate multiple meters through California’s NEMA program.**



*“Energy is not going to get cheaper, so we are making long-term investments to get us through hard economic times.”*

*- John Teixeira,  
Teixeira & Sons LLC, Merced County*

# CLIMATE RESILIENT AGRICULTURE

**As an industry dependent on the weather and water availability, California agriculture is on the front lines of climate change. Farmers and ranchers see it in their daily lives and a growing body of research points to significantly tougher challenges ahead. But farmers and ranchers are adaptive and resilient people. Given the appropriate information, tools and technical and financial support, they will find ways to keep California's agricultural industry and rural economies prosperous.**

California has catalyzed considerable climate adaptation research, planning and information-sharing at the statewide level. Adaptation planning and study have improved our collective understanding of regional and sector-wide impacts of climate change. The third California Climate Change Assessment included two studies on agricultural climate risks and strategies, including one which created an agricultural vulnerability index for the state.<sup>27</sup> A steady stream of research on climate impacts on agriculture has been published since then, including most recently a detailed review of climate change trends and impacts on California agriculture<sup>28</sup> published by six UC researchers in early 2018. Three additional studies on climate risks, mitigation and adaptation are currently underway as part of the fourth Climate Change Assessment.

In 2013, CDFA published its most comprehensive planning document for agricultural resilience: "Climate Change Consortium for Specialty Crops: Impacts and Strategies for Resilience."<sup>29</sup> The report—the product of a year-long convening of agricultural and climate change experts—identifies climate change impacts on agriculture and detailed recommendations.

The Consortium's report informed the Brown administration's 2014 update of the Safeguarding California Plan,<sup>30</sup> which was first published in 2009. The 2014 update offers detailed and substantive summaries of climate impacts in agriculture and

recommended adaptation strategies. In stark contrast, the 2018 Safeguarding update<sup>31</sup> mostly just summarizes ongoing actions at CDFA, falling far short of what is needed to make agriculture resilient in the state. The next administration would do well to build on the 2009 and 2014 Safeguarding plans.

The Brown administration launched two clearing-houses for climate adaptation and resiliency research and information. The administration first launched Cal-Adapt.org in 2011, which continues to be a useful source of localized projections of climate impacts, including changes in average maximum temperature and average precipitation. The administration's Office of Planning and Research (OPR) launched a beta version of the second ResilientCA.org in 2018, which serves as a centralized database of information and resources to assist decision makers at the state, tribal, regional and local levels when planning for and implementing climate adaptation efforts.

In 2017, all that research, planning and information-sharing finally led to funding for agricultural adaptation implementation. The cap-and-trade extension bill, AB 398 (E. Garcia), included climate adaptation and resiliency as one of seven eligible funding areas for the GGRF expenditure plan. Following the bill's passage, the legislature allocated \$26 million in the FY 2017-18 budget for a new Climate Adaptation and Resiliency

<sup>27</sup> Available at: [www.energy.ca.gov/2012publications/CEC-500-2012-031/CEC-500-2012-031.pdf](http://www.energy.ca.gov/2012publications/CEC-500-2012-031/CEC-500-2012-031.pdf)

<sup>28</sup> Pathak et al. (2018). Climate Change Trends and Impacts on California Agriculture: A Detailed Review. *Agronomy* 2018, 8(3), 25. doi:10.3390/agronomy8030025

<sup>29</sup> Available at: [www.cdca.ca.gov/oeft/climate/docs/CCC\\_Report.pdf](http://www.cdca.ca.gov/oeft/climate/docs/CCC_Report.pdf)

<sup>30</sup> Available at: [www.resources.ca.gov/docs/climate/Final\\_Safeguarding\\_CA\\_Plan\\_July\\_31\\_2014.pdf](http://www.resources.ca.gov/docs/climate/Final_Safeguarding_CA_Plan_July_31_2014.pdf)

<sup>31</sup> Available at: [www.resources.ca.gov/climate/safeguarding](http://www.resources.ca.gov/climate/safeguarding)



Program housed at the Wildlife Conservation Board (WCB) and the State Coastal Conservancy's Climate Ready program.<sup>32</sup> That work will continue with a combination of Prop. 68 and GGRF funds in FY 2018-19.

Proposition 68, passed by voters in June, will provide an additional \$443 million for a broad array of climate adaptation work through the Natural Resources Agency, including agricultural resiliency.

The task before the next administration is to channel the climate adaptation work and momentum to date into more regional- and crop-specific planning and on-the-ground implementation. Now is the time for action on climate change adaptation. Among those actions is to expand the focus of the Climate Smart Agriculture programs to include improving agriculture's resiliency to a changing climate that threatens our food security.

## RECOMMENDATIONS

### Administrative Action:

- Incorporate outreach, education and farm-level planning about climate risks and resiliency strategies into existing Climate Smart Agriculture programs and networks, including the new Climate Smart Agriculture Team with UCANR and CDFA and the Farm Demonstration Network. Develop a network of growers modeling innovation in on-farm climate resilience that serve as demonstration sites.
- Place more emphasis on reaching a broad spectrum of producers, developing commodity-specific adaptation strategies and addressing regional climate change risks, so that the state's research and education funds are targeting the most at-risk situations.
- Support local governments in planning for agricultural adaptation and resilience, including economic impacts of climate risks to the agricultural economy. This can be done through the SB 732 planning grants with DOC and the SALCP strategy and outcome grants to local government.

### Budget Action:

- Establish a climate resiliency agricultural research focus as part of OPR's Climate Research Program. Invest in public, traditional crop breeding research and integrated, diverse cropping and livestock systems to develop climate resilient agricultural systems.

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<sup>32</sup> More info on WCB's new program available at: [www.wcb.ca.gov/Programs/Climate-Adaptation](http://www.wcb.ca.gov/Programs/Climate-Adaptation)





Ed and Shay Seaman came to own Santa Barbara Blueberries near Gaviota after working in every aspect of the operation, starting in the roadside stand. The region's persistent drought and the devastating wildfires and mudslides in 2017 underscored their commitment to build on-farm resilience and rehydrate the landscape as a response to the climate-related challenges they face. With their Healthy Soils grant, Ed and Shay will plant native shrubs and trees on the slope above their well to reduce soil erosion, stabilize the hillside and encourage water penetration for aquifer recharge. They will spread compost over grazed lands to increase soil moisture, organic matter and carbon. Mulching the blueberry fields will cut irrigation demand by holding water in the soil.

*"We need more small farmers and ranchers managing land for agricultural resilience to the benefit of our ecosystems and communities."*

*- Ed Seaman,  
Santa Barbara Blueberries,  
Santa Barbara County*



A photograph showing several farmworkers in a field, some wearing protective gear like gloves and masks, working near a large piece of agricultural machinery. The scene is outdoors with green plants in the foreground.

# CLIMATE EQUITY

**While all Californians are impacted by climate change, climate change does not affect all people and communities in the same way. Climate equity (or justice) requires California leaders to ensure that the people and communities who are least culpable in the warming of the planet and most vulnerable to the impacts of climate change do not suffer disproportionately as a result of historical injustice and disinvestment.<sup>33</sup> Farmworkers, underserved farmers of color, women farmers and disadvantaged rural communities are among those who require proactive and targeted policies and investments.**

Farmworkers are the heart of California's agricultural communities. California has led efforts nationally to improve the quality of life for farmworkers over the past eight years. For example, AB 60 (Alejo, 2013) and AB 353 (Cedillo, 2011) allow undocumented immigrants to obtain driver's licenses and stopped the practice of impounding cars of drivers without a valid driver's license—critical changes for the approximately 50 to 70 percent of California's farmworkers who are undocumented and often live great distances from their work. Moreover, as temperatures rise in California, efforts to reduce heat stress for farmworkers have advanced. For example, SB 1360 (Padilla, 2014) clarifies required heat recovery periods for workers.

New programs are aimed at improving farmworker housing, including improved energy efficiency and use of renewable energy.<sup>34</sup> An Agricultural Workers Vanpool pilot program was launched in early 2018 and current legislation (AB 2006, Eggman) would establish the program in statute. Together these efforts improve quality of housing and farmworker transportation, but a rapidly changing climate and prevailing injustices require us to do more.

Farmers of color, who manage one in four farms in California, and women farmers, who manage one in five farms, are also disproportionately vulnerable

to climate change impacts. Farmers of color and women farmers tend to operate on significantly smaller acreages, earn significantly less revenue from the products they sell, and receive significantly less in government funding compared to white farmers and men<sup>35</sup>—all of which makes them less economically resilient, particularly in the face of unpredictable and extreme changes to the climate.

At the same time, farmers of color are important partners in climate solutions. Latinos—who make up the majority population in Fresno, Kings, Madera, Merced and Tulare counties<sup>36</sup>—are found to be more concerned than non-Latino Americans about climate change,<sup>37</sup> making Latino communities valuable allies in climate change efforts.

The state made important progress in addressing inequities in agriculture when it passed AB 1348 (Aguiar-Curry, 2017) also known as the Farmer Equity Act. The Act codified the definition of “socially disadvantaged farmers” and requires CDFA to ensure “the inclusion of socially disadvantaged farmers and ranchers in the development, adoption, implementation, and enforcement of food and agriculture laws, regulations, and policies and programs.”<sup>38</sup> The bill's definition and requirements directly respond to racial and gender inequities throughout the history of California agriculture that continue to shape current disparities in access

<sup>33</sup> This is the definition of climate justice used by the Climate Justice Working Group in their 2017 document: “Advancing Climate Justice in California: Guiding Principles and Recommendations for Policy and Funding Decisions.” Available here: [www.healthyworldforall.org/en/express-img/17081516-3570-img1.pdf](http://www.healthyworldforall.org/en/express-img/17081516-3570-img1.pdf)

<sup>34</sup> See: [www.csd.ca.gov/LinkClick.aspx?fileticket=IAdlvG39ENC%3d&portalid=0](http://www.csd.ca.gov/LinkClick.aspx?fileticket=IAdlvG39ENC%3d&portalid=0)

<sup>35</sup> USDA Census of Agriculture Race, Ethnicity, and Gender Profile - Statewide Summary for California (2012). Retrieved from: [www.agcensus.usda.gov/Publications/2012/Online\\_Resources/Race\\_Ethnicity\\_and\\_Gender\\_Profiles/California](http://www.agcensus.usda.gov/Publications/2012/Online_Resources/Race_Ethnicity_and_Gender_Profiles/California)

<sup>36</sup> U.S. Census Bureau Vintage 2017 Population Estimates Program. Retrieved from: [www.census.gov/quickfacts](http://www.census.gov/quickfacts)

<sup>37</sup> Leiserowitz, A., Culter, M., Rosenthal, S. Sept. 27, 2017 Climate Change on the Latino Mind. Yale Program on Climate Change Communications. [www.climatecommunication.yale.edu/publications/climate-change-latino-mind-may-2017](http://www.climatecommunication.yale.edu/publications/climate-change-latino-mind-may-2017)

<sup>38</sup> FAC, Part 1, Div.1, Ch. 3, Sec. 513(a)



to land and resources, including government programs. At the time of this writing, CDFA is in the final stages of hiring an executive level staff position to support the implementation of the Act.

The state is also taking a regional approach to address inequality through climate change investments. Disadvantaged communities (DACs) are those which most suffer from a combination of economic, health, and environmental burdens. DACs in agricultural regions already disproportionately bear the negative environmental burdens of our current agricultural system, especially in terms of air and drinking water pollution,<sup>39</sup> and climate change is likely to intensify those burdens.

The state has taken important steps to recognize, redress and engage DACs. In 2012, SB 535 (De León) required CalEPA to identify DACs and mandated 25 percent of all GGRF investments provide benefits to DACs. This led to the creation of CalEnviroScreen and numerous GGRF programs prioritizing investments in DACs. For example, the Low-Income Home Weatherization Program was created in 2014 and has since invested \$192 million in energy efficiency upgrades for nearly 9,000 single-family homes, solar installations for nearly 3,000 single-family households, and solar installations and/or energy efficiency upgrades for 4,500 multi-family housing units—all in DACs.



## RECOMMENDATIONS

### Administrative Action:

- Support ongoing efforts through the Low-Income Home Weatherization Program, administered by the Department of Community Services Development, to improve energy efficiency and renewable energy use, including improved HVAC systems, for farmworker and rural housing in the state. Expand the program to include migrant housing centers and worker dormitories.
- Continue support for farmworker housing and improved rural housing projects that are connected to schools, medical services, transit and other community services through the Affordable Housing and Sustainable Communities Program. Develop criteria specific to farmworker housing.
- Work with the Rural Smart Growth Task Force to address the lack of high quality rural housing, including farmworker housing, and the need for improved regional transit options, including improved bus service, agricultural worker vanpools and more.
- Establish a Rural Communities Ombudsman at OPR to coordinate rural community/climate change initiatives that are forwarded by the task force, described above.

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<sup>39</sup> See CalEnviroScreen 3.0 Maps for Pollution Burden. Available here: [www.oehha.ca.gov/calenviroscreen/maps-data](http://www.oehha.ca.gov/calenviroscreen/maps-data)

- Fully implement the Farmer Equity Act of 2017, including tracking and reporting on socially disadvantaged farmer participation in the development and implementation of CDFA programs and related outreach efforts by CDFA. Such efforts should include making Climate Smart Agriculture program materials available in Spanish and other languages. Conduct targeted outreach workshops with translation services available for multiple languages.
- Better integrate efforts to provide safe drinking water in rural areas and reduce nitrate contamination by improving the implementation of the ILRP (see Water Stewardship section) and expanding the reach of the Healthy Soils Program (see Healthy Soils section). Culturally competent outreach and technical assistance are essential to improving the implementation and reach of both programs.

## Legislative Action:

- Support the establishment of the Safe and Affordable Drinking Water Fund as described in SB 623 (Monning, 2017).

## Budget Action:

- Fully fund the Low-Income Home Weatherization and the Agricultural Workers Vanpools programs as part of the GGRF expenditure plan.
- Improve access and increase funding to disaster services for farmworker families during times of crop failures, drought and other extreme events.

Early in 2015, the first residents moved into a unique housing development in Woodland. Mutual Housing at Spring Lake is a zero net energy affordable housing project with 62 apartments and townhomes available exclusively to farmworkers earning no more than 60 percent of the area median income. This is the country's first certified zero net energy rental housing and it is Yolo County's only permanent affordable housing for farmworkers with the added benefit of very low energy bills. Tenants are educated on technologies such as electric heat pumps, a photovoltaic system, LED lighting, energy usage monitors, low-flow toilets and showers and drought tolerant landscaping. There is a community building, a garden and children's play area, as well as a resident council. An additional 39 units are under construction and will be occupied early in 2019.



Credit:  
Mutual Housing  
at Spring Lake

*“Our home is more than just an affordable place to live. I learned about recycling and how to save energy. I feel transformed by this community.”*

*- Guadalupe Jimenez, resident*



# TECHNICAL ASSISTANCE, PLANNING AND RESEARCH

**More progress is needed to improve technical assistance and planning resources for farmers and ranchers seeking to reduce their climate change impacts and improve their own resiliency to greater weather extremes.**

The Climate Smart Agriculture programs offer only limited grant application workshops and some one-on-one assistance, but have not supported project development or implementation. This severely limits the effectiveness and reach of these programs. Other states and the federal government, which offer support for farmers to improve land management to address natural resources concerns, including climate change impacts, routinely combine financial incentives with technical assistance and conservation planning. Such an approach is needed in California.

The recently announced CDFA-UCANR Climate Smart Agriculture Team along with legislation currently before the legislature, AB 2377 (Irwin, 2018), would significantly improve the technical assistance access for farmers if successful.

Meanwhile, many of the publicly funded agricultural technical service providers' budgets are at their lowest point in decades. UCCE has not recovered from the budget cuts of the 1990s and 2000s that left the number of county-based farm advisors at its lowest level since the 1960s. Similarly, the RCDs have not restored their funding since the budget cuts of the 2000s. The 98 RCDs in the state were formed in response to the Dust Bowl of the 1930s to work with landowners to improve soil health and natural resource conservation on working lands.

Together, UCCE and the RCDs provide important technical assistance and conservation planning support for farmers and ranchers in the state. Their rich knowledge of potential adaptation

strategies needs to be compiled, applauded and made available to broader audiences. Their expertise should be supported and expanded to provide outreach, application assistance and project implementation to California growers who are on the forefront of climate change mitigation and adaptation. Bilingual and culturally competent assistance should be provided to farmers of color.

In 2003, the focus of the Public Interest Energy Research (PIER) Program was expanded to include climate change research,<sup>40</sup> and it became an important funding source for agriculture and climate change research. The program funded key research topics ranging from climate change impacts on the agricultural sector to adaptation and mitigation strategies for California agriculture. Much of that research was the bedrock for the development of the current Climate Smart Agriculture programs.

However, the PIER program ended following the end of the public goods charge in 2010 (some projects continued past 2010 as their funding was awarded prior to 2010). It was replaced with EPIC, which did not continue PIER's climate change research agenda. With the loss of PIER and likely loss of federal USDA funding for climate change and agriculture research, research funding on California agriculture and climate change issues is greatly constrained.<sup>41</sup> But the need remains for research on important topics that will inform climate change mitigation and adaptation issues for agriculture.

<sup>40</sup> In 1996, in response to the deregulation of the energy sector, PIER was created in statute with funding from a public goods charge on electric utility bills. Coordinated by the California Energy Commission, PIER funded research on the environmental impacts of the energy sector. By 2003, the PIER program began funding climate change research in addition to other energy sector/environmental concerns.

<sup>41</sup> The Fourth Climate Change Assessment funded several climate change and agriculture research projects.  
See: [www.resources.ca.gov/climate/safeguarding/research](http://www.resources.ca.gov/climate/safeguarding/research)

On their reservation north of San Diego, the Pauma Band of Luiseño Indians grows 160 acres of avocados, citrus and vegetables. With technical assistance from their local RCD, the tribe secured a Healthy Soils grant to convert their 40-acre vegetable operation to a no-till olive orchard with an emphasis on improving the soil as they make the transition. They will plant cover crops for three years to outcompete weeds and build soil organic matter. They will eliminate tillage to minimize soil disturbance and the release of carbon, and save on fuel by cutting tractor use. Working with the RCD, they will offer tours to share their experiences with climate smart farm practices.

*“With valuable help from our technical advisors, we are building healthier soils to grow healthier food for our communities to eat.”*

*- Miguel Hernandez,  
Pauma Band Water Master  
and Agricultural Manager*



## RECOMMENDATIONS

### Administrative Action:

- Integrate technical assistance as part of program delivery for all of the Climate Smart Agriculture programs. A percent of program funds should be directed to a Technical Assistance Fund where technical assistance providers with demonstrated expertise in the project types and farmer outreach may be eligible to apply to CDFA or DOC (in the case of SALCP) to support program outreach, education, project development, application assistance and project implementation.
- Strengthen collaboration among existing networks of technical assistance providers to identify high-impact Climate Smart Agriculture demonstration projects and program improvements, targeting diverse projects across the state.
- Support innovative collaborations and trainings across technical assistance providers—including UCCE, California NRCS, RCDs and non-profit organizations—to improve their technical assistance capacity, especially for implementation of the Climate Smart Agriculture programs and outreach and assistance to socially disadvantaged farmers.
- Work with CEC and CPUC to expand the EPIC research program to include climate change research similar to the former PIER program, including research relevant to the agricultural sector.

## Budget Action:

- Fund the newly created CDFA-UCANR Climate Smart Agriculture Team. These efforts should aim to restore funding for UCCE back to 1990 levels, while directing more support to climate specialists and technical assistance for socially disadvantaged farmers, particularly through the Small Farm Program.
- Provide funding and staff support for the implementation of the Farmer Demonstration Network.
- Restore base funding for RCDs that operate throughout the state, bringing technical expertise to farmers and ranchers on a host of natural resource conservation management issues, including climate change mitigation and adaptation.
- Reinstate state funding for the statewide SAREP, the only program of its kind at UCANR that focuses on outreach, education and research resources for farmers interested in sustainable and organic farming methods.
- Fund the SGC Climate Change Research Program, including the land-based research funding priority, and add a new climate change and agriculture resiliency focus, as described in the Climate Resiliency section of this report.

Led by Dr. Amélie Gaudin at UC Davis, a team of researchers is investigating best management practices that maximize the benefits of using cover crops in almond orchards, a strategy for improving soil health currently used by few producers. On three commercial orchards from south of Orland to Bakersfield, the researchers are comparing two cover crop mixes to both bare ground and native vegetation. They are monitoring an impressive set of metrics including soil changes in organic matter, carbon, compaction and nitrogen levels as well as water use efficiency, pollinator populations and weed pressure. Funding comes from the Almond Board of California and a Healthy Soils Program demonstration project grant.

*“While there are some obvious ecological and agronomic benefits to using cover crops, there are also operational constraints and trade-offs. The findings from this research will help almond growers make informed management decisions.”*

*- Amélie Gaudin, UC Davis*







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